

**LOCF**

**Learning Outcomes  
Based Curricular  
Framework**

**POs, PSO and COs**

## **UNDERGRADUATE PROGRAMMES**

### **LANGUAGES**

#### **PROGRAM OUTCOMES**

- Students undergoing the program will improve their basic English language skills like reading, listening, comprehending, speaking, debating and writing
- Learners will gain confidence to use an international language and become competent global citizens in an age of globalization
- Teaching language for first generation learners
- Multicultural and multi lingual approach.

#### **PROGRAM SPECIFIC OUTCOMES**

- Students will improve their reading and interpreting skills by introducing them to texts on specific social, economic, cultural, political issues. Such texts through their contemporaneity will contextualize language and help students to think critically and articulate their thoughts in classroom discussions.
- They will learn to communicate with teachers, their peers and other with speakers in public domain using English language. They will be able to read and comprehend reference materials related to core subjects of their discipline. They should be able to read English language newspapers and also understand English language content available on television and also social media platforms
- Students should also be able to distinguish between formal, colloquial, journalistic, poetic, scientific forms and registers of language.

**Course Outcomes:**

- reading competence through engagement with challenging texts of selected prose, poetry and short stories
- logical thinking, analytical skills and critical thinking abilities through such engagement
- Conversation skills through Dialogue Writing
- Analytical skills through interpreting Graphs and Charts
- Logical thinking through completing a story by following guiding hints
- Metaphorical use of language through Idioms and Phrases
- Using appropriate Articles and Prepositions
- How to use Question Tags?
- Vocabulary building / semantics / etymology
- Skills of paraphrasing by practice of Precis Writing
- Appropriate use of collocations, Phrasal verbs and Tense forms
- Report Writing – Business Report, Writing Minutes of meetings
- Framing ‘Wh’ Questions, Use of Active and Passive voice, Direct and Indirect speech
- Critical thinking through analyzing a Cartoon
- Grammatically correct use of Sub- Verb agreement

## **COMMUNICATIVE ENGLISH**

### **PROGRAM OUTCOMES**

- It is basically aimed at developing core competence in various aspects of communication most essential in occupational functions in the field of Journalism, Business and entrepreneurship.
- It is also intended to help students understand the difference between formal and informal use of language
- The focus is largely on Speaking, Writing and listening skills

### **PROGRAM SPECIFIC OUTCOMES**

- Introducing students to the sounds of English language by teaching them the basics of phonetics
- Give students a better understanding of grammar, usage and vocabulary of English language
- Introduce students to writing strategies and train them in soft skills
- Introduce students to the specific language skills required to write for the media
- Develop skills of persuasion by training students in the use of rhetoric and logic in speech and writing
- Technical writing skills: Business English Communication
- Social skills through conversational language, inter-personal communication and Event Management

### **Course Outcomes (CO 3)**

- Introducing Students to Sounds of English.
- Introducing the concept of morphology and morpho- phonemics.
- Enhancing LSRW skills in the students through advanced phonetics.
- Introducing concepts of Word Stress, Sentence Stress and Intonation.
- Develop the skills of Grammar and Vocabulary.
- prepare students for various competitive exams.
- language proficiency, effective presentation and skills of Interaction.
- understanding language skills required for broadcast media.
- understanding of terms such as, fact, truth, subjectivity, objectivity and bias
- understanding various genres of Media Writing, techniques of reporting, reviewing, interviewing and commentary.
- rhetorical devices in writing and speech. skills of Technical Writing
- Language use in blogging and its nuances, editing and indexing skills

## ENGLISH MAJOR

### **PROGRAM OUTCOMES**

- Students are introduced to various literatures from across the world alongside a survey of canonical British writers
- They are introduced to concepts of colonialism, post colonialism, nativism, culturalism and identity
- They are introduced to various critical and theoretical approaches to help them develop their critical thinking abilities

### **PROGRAM SPECIFIC OUTCOMES**

- Knowledge of British social and cultural history through introduction to canonical texts of British literature
- Understanding of diverse cultural contexts of different nations, geographies and people through selected texts of renowned authors
- Understanding of Modernism through introduction to relevant texts of prose, poetry, drama and fiction of the 20<sup>th</sup> century
- Knowledge of concepts such as nation, nationalities, race and civilization through introduction to selected texts from the period of Indian nationalist struggle
- Knowledge of concepts like colony, colonization and Postcolonialism through historical understanding of relevant texts
- Understanding the concept of literary criticism and literary theory. Knowledge of various theories necessary for interpretation of texts
- Introduction to concepts and theories of culture, ideologies of culture and critical analysis of cultural aspects represented in literature
- Understanding concepts of gender, sexuality, hetero-normativity, patriarchy, sexism, gender relations and embodiment.

### **Course Outcomes (CO 3)**

- To introduce students to the major works of English literature.
- To understand different periods in the history of English literature.
- To understand works in different genres of literature.
- To introduce students to Literature from various regions of the world.
- To give an understanding of social and cultural contexts across the world.
- To bring a global perspective on literature
- To understand the beginnings of Modernism.

- To explore the realms of Literary Modernism in English literature.
- To understand the different movements and literary styles associated with modernism.
- To understand concepts of colonialism, postcolonialism, neo-imperialism
- To analyze the social, political and historical impact of colonization and native responses to it
- To study structures of power underlying colonialism, nativism
- To understand the impact of colonization on language
- To examine literary works, theatre and films from a postcolonial perspective
- To trace the changing approaches to literary studies
- To give an understanding of the philosophical background of ancient western classical criticism
- To chart the transition from literary criticism to theory
- To give an overview of modern critical practices
- To explore concepts of Nationalism/Nation, Colonization, Gender, Caste
- To understand the socio-historical background of anti-colonial nationalism
- To locate current discourse of cultural nationalism in late Nineteenth century Social Reform Movement
- To study autobiographical, literary works, plays, fiction written in response to nationalism, partition and post-colonial nation-state
- To understand the historical evolution of the meanings of culture
- To understand the distinction between symbolic culture and culture as lived practice
- To explore cultural identities of race, class, gender and nation in literary texts
- To examine cultural signifiers in visual and literary texts
- To understand the concept of gender as a social construct
- To examine the ideological underpinnings of masculinity, femininity
- To analyse the alternate nature of sexuality
- To examine the ways in which gender intersects with different categories such as class, race, nation

## ಕನ್ನಡ ಐಚ್ಛಿಕ ಪತ್ರಿಕೆ

ಕನ್ನಡ ಐಚ್ಛಿಕ ಪತ್ರಿಕೆ ಕಾರ್ಯಕ್ರಮದ ಫಲಿತಾಂಶ (P0 2 )

### ಪ್ರಸ್ತಾವನೆ

ಕನ್ನಡ ಭಾಷೆ ಹಾಗೂ ಸಾಹಿತ್ಯಕ್ಕೆ ಪ್ರಾಚೀನವಾದ ಇತಿಹಾಸವಿದೆ. ಭಾರತದ ಪ್ರಾಚೀನ ಸಾಹಿತ್ಯ ಹಾಗೂ ಸಾಹಿತ್ಯ ಸಂಪನ್ನ ಭಾಷೆಗಳಲ್ಲಿ ಕನ್ನಡವೂ ಒಂದು. ಈ ಭಾಷೆಯ ಪ್ರಾಚೀನತೆ ಹಾಗೂ ಅದರಲ್ಲಿನ ಸಾಹಿತ್ಯ ಸಂಪನ್ನತೆ, ಸಾಂಸ್ಕೃತಿಕ ಮೌಲ್ಯಗಳನ್ನು ಗಮನಿಸಿ ಕೇಂದ್ರ ಸರ್ಕಾರವು ಕನ್ನಡಕ್ಕೆ ಶಾಸ್ತ್ರೀಯ ಭಾಷೆಯ ಸ್ಥಾನ-ಮಾನವನ್ನು ನೀಡಿ ಗೌರವಿಸಿದೆ. ಪ್ರಾಚೀನ ಕನ್ನಡ ಸಾಹಿತ್ಯದಲ್ಲಿ ಚಂಪೂ, ವಚನ, ರಗಳೆ, ಷಟ್ಪದಿ, ಸಾಂಗತ್ಯ, ಕೀರ್ತನೆ, ತ್ರಿಪದಿ ತತ್ವಪದ ಮೊದಲಾದ ವೈವಿಧ್ಯಮವಾದ ಸಾಹಿತ್ಯ ಪ್ರಕಾರಗಳು ಸೃಷ್ಟಿಯಾಗಿವೆ. ಹೊಸಗನ್ನಡ ಕಾಲಘಟ್ಟದಲ್ಲಿ ನವೋದಯ, ಪ್ರಗತಿಶೀಲ, ನಮ್ಮ ಬಂಡಾಯ, ದಲಿತ ಸಾಹಿತ್ಯ ಚಿಂತನೆಗಳು ಹುಲುಸಾಗಿ ಬೆಳೆದಿವೆ. ಇವು ನಾಡಿನ ಸಾಂಸ್ಕೃತಿಕ ಚರಿತ್ರೆಯನ್ನು ಕಟ್ಟಿಕೊಡುತ್ತವೆ. ಮುಂದಿನ ಜನಾಂಗ ಕನ್ನಡ ನಾಡು-ನುಡಿಯ, ಸಂಸ್ಕೃತಿಯ ಚಿಂತನೆಯೊಂದಿಗೆ ಸಂವೇದನಾಶೀಲವಾದ ವ್ಯಕ್ತಿತ್ವವನ್ನು ರೂಪಿಸಿಕೊಳ್ಳಲು ಕನ್ನಡ ಸಾಹಿತ್ಯ ಅಧ್ಯಯನದ ಅಗತ್ಯವಿದೆ.

### ಕಾರ್ಯಕ್ರಮದ ನಿರ್ದಿಷ್ಟ ಫಲಿತಾಂಶಗಳು : (PS0 2)

- ಕನ್ನಡ ಸಾಹಿತ್ಯದ ವಿವಿಧ ಕಾಲಘಟ್ಟಗಳ ಸಾಹಿತ್ಯ ಪ್ರಕಾರಗಳ ಸಮಗ್ರವಾದ ಜ್ಞಾನವನ್ನು ಹೊಂದಿರುವುದು
- ನಾಡು-ನುಡಿಯ ಕುರಿತಾದ ಐತಿಹಾಸಿಕ ಪ್ರಜ್ಞೆ, ತಿಳಿವಳಿಕೆಯ ಮೂಲಕ ಸಮಕಾಲೀನ ಸಮಸ್ಯೆಗಳನ್ನು ಅರ್ಥೈಸಬಲ್ಲ ಜಾಣ್ಮೆಯನ್ನು ಬೆಳೆಸಿಕೊಂಡಿರುವುದು
- ಸಾಹಿತ್ಯ ಚರಿತ್ರೆ, ಛಂದಸ್ಸು, ವ್ಯಾಕರಣ, ಭಾಷಾವಿಜ್ಞಾನ, ಕಾವ್ಯಮೀಮಾಂಸೆಗಳ ಜ್ಞಾನಗಳನ್ನು ಸ್ಪರ್ಧಾತ್ಮಕ ಪರೀಕ್ಷೆಗಳಿಗೆ ಅನ್ವಯಿಸಿಕೊಳ್ಳುವ ಕೌಶಲ ಬೆಳೆಸಿಕೊಂಡಿರುವುದು
- ಸಾಹಿತ್ಯದ ಓದಿನ ಮೂಲಕ ಸಂವೇದನೆಗಳನ್ನು ಸೂಕ್ಷ್ಮಗೊಳಿಸಿಕೊಳ್ಳುವ ಹಾಗೂ ಚಿಂತನೆಗಳನ್ನು ಹರಿತಗೊಳಿಸಿಕೊಳ್ಳುವ ಸಾಮರ್ಥ್ಯವನ್ನು ಕರಗತ ಮಾಡಿಕೊಂಡಿರುವುದು
- ಕಾವ್ಯ, ಕಥೆ, ವಿಮರ್ಶೆ, ಹರಟೆ, ಚುಟುಕು, ಹಾಸ್ಯ ಬರಹಗಳು, ನುಡಿಚಿತ್ರ ಮೊದಲಾದವುಗಳನ್ನು ರಚಿಸಬಲ್ಲ ಸೃಜನಶೀಲತೆಯನ್ನು ಬೆಳೆಸಿಕೊಂಡಿರುವುದು I
- ಸ್ಪರ್ಧಾತ್ಮಕ ಪರೀಕ್ಷೆಗಳಿಗೆ ಬೇಕಾದ ಜ್ಞಾನ ಕೌಶಲಗಳನ್ನು ಬೆಳೆಸಿಕೊಂಡಿರುವುದು

## ಪದವಿಯ ಫಲಿತಾಂಶಗಳು (COs)

- ಹೊಸಗನ್ನಡ ಸಾಹಿತ್ಯ ಚರಿತ್ರೆಯ ಸ್ವ ರೂಪ, ಲಕ್ಷಣ, ವ್ಯಾಪ್ತಿಮೊದಲಾದ ಅರಿವನ್ನು ಬೆಳೆಸಿ ಹೊಸಗನ್ನಡಕಾವ್ಯ, ನಾಟಕಗಳನ್ನು ಓದುವ, ವಿಶ್ಲೇಷಿಸುವ, ವಿಮರ್ಶಿಸುವ ಜ್ಞಾನಗಳಿಸಿಕೊಂಡಿರುವುದು
- ನಡುಗನ್ನಡ ಸಾಹಿತ್ಯ ಚರಿತ್ರೆಯ ಸ್ವರೂಪ, ಲಕ್ಷಣ, ವ್ಯಾಪ್ತಿ ಮೊದಲಾದ ಅರಿವನ್ನು ಬೆಳೆಸಿಕೊಂಡಿರುವುದು
- ನಡುಗನ್ನಡ ಕಾವ್ಯ ಪ್ರಕಾರಗಳ ಸ್ವರೂಪ, ಲಕ್ಷಣಗಳನ್ನು, ವಸ್ತು ವೈವಿಧ್ಯವನ್ನು ಪರಿಚಯ ಮಾಡಿಕೊಂಡಿರುವುದು
- ಕರ್ನಾಟಕ ಸಂಸ್ಕೃತಿಯ ಸ್ವರೂಪ, ಲಕ್ಷಣಗಳ ಜ್ಞಾನವನ್ನು ಪಡೆದುಕೊಂಡಿರುವುದು
- ಕನ್ನಡ ಛಂದಸ್ಸಿನ ಚರಿತ್ರೆ ಹಾಗೂ ವಿವಿಧ ಪ್ರಕಾರಗಳು, ಅವುಗಳ ಲಕ್ಷಣಗಳ ಅರಿವು ಮೂಡಿಸಿಕೊಂಡಿರುವುದು
- ನಡುಗನ್ನಡ ಹಾಗೂ ಹಳಗನ್ನಡ ಪದ್ಯಗಳಿಗೆ ಪ್ರಸ್ತಾರ ಹಾಕುವ, ಛಂದಸ್ಸನ್ನು ಕಂಡುಕೊಳ್ಳುವ ಕೌಶಲವನ್ನು ಬೆಳೆಸಿಕೊಂಡಿರುವುದು
- ಜನಪದ ಸಾಹಿತ್ಯದ ಸ್ವ ರೂಪ, ಲಕ್ಷಣಗಳ ಅರಿವು, ಜನಪದ ಸಾಹಿತ್ಯ ಪ್ರಕಾರಗಳು, ವಿವಿಧ ಜನಪದ ಕಲಾ ಪ್ರಕಾರಗಳು, ಜನಪದ ರಂಗಭೂಮಿ, ಜನಪದ ದೈವಗಳು, ಜನಪದ ಕ್ರೀಡೆಗಳು ಮೊದಲಾದ ವಿಚಾರಗಳ ಕುರಿತು ಸ್ಪಷ್ಟವಾದ ಅರಿವು ಹೊಂದಿರುವುದು
- ಪ್ರಾಚೀನ ಕನ್ನಡ ಸಾಹಿತ್ಯ ಚರಿತ್ರೆಯ ಅರಿವನ್ನು ಹೊಂದಿರುವುದು
- ಶಾಸನ ಸಾಹಿತ್ಯ ಅವುಗಳ ಸ್ವ ರೂಪ, ಲಕ್ಷಣಗಳು ಹಾಗೂ ಅವುಗಳ ಐತಿಹಾಸಿಕತೆ ಇವುಗಳ ಅರಿವು ಮೂಡಿಸಿಕೊಂಡಿರುವುದು
- ಹಳಗನ್ನಡ ಚಂಪೂ ಕಾವ್ಯದ ಓದು, ವ್ಯಾಖ್ಯಾನಗಳ ಅರಿವು ಮೂಡಿಸಿಕೊಂಡಿರುವುದು
- ಕನ್ನಡ ವ್ಯಾಕರಣ ಪರಿಚಯ ಮಾಡಿಕೊಂಡಿರುವುದು ಹಾಗೂ ಅದನ್ನು ಇಂದಿನ ಸಂವಹನದಲ್ಲಿ ಅಳವಡಿಸಿಕೊಳ್ಳಬಲ್ಲ ಕೌಶಲ ಪಡೆದುಕೊಂಡಿರುವುದು
- ಕನ್ನಡ ಸಂಶೋಧನೆಯ ಇತಿಹಾಸ, ಸ್ವರೂಪ, ಪ್ರಕಾರಗಳು, ವಿವಿಧ ಹಂತಗಳು ಹಾಗೂ ಸಂಶೋಧನೆ ಬರಹಗಳ ಸ್ಪಷ್ಟವಾದ ಅರಿವನ್ನು ಹೊಂದಿರುವುದು
- ವಿವಿಧ ಸಾಹಿತ್ಯ ಜ್ಞಾನದೊಂದಿಗೆ ಕನ್ನಡದಲ್ಲಿ ಸ್ಪರ್ಧಾತ್ಮಕ ಪರೀಕ್ಷೆಗಳನ್ನು ಎದುರಿಸಬಲ್ಲ ಶಿಸ್ತನ್ನು ಮೈಗೂಡಿಸಿಕೊಂಡಿರುವುದು

## ECONOMICS

### PROGRAMME OUTCOMES

PO 1:	Facilitate the understanding of basic economic theories.
PO 2:	A comprehensive understanding of the various courses in the discipline.
PO 3:	Enable to apply quantitative techniques suitable for the discipline.
Po 4:	Analyse the policies of the government in solving economic problems.
PO 5:	Develop skills required to blend the subject learned and the real life situations.
PO 6:	Able to evaluate the working of the economy, its interconnection with the social, political, cultural, environmental, ethical issues in a comprehensive manner.

### PROGRAMME SPECIFIC OUTCOMES

PSO 1:	Enable the students with the knowledge of Economics both theoretical and applied.
PSO 2:	Develop a comprehensive understanding of the various aspects of the branches of Economics related to micro and macro aspects.
PSO 3:	Understand the working of the domestic and foreign economy.
PSO 4:	Enable the students to apply the theoretical knowledge of Economics in applying to the real life situations.
PSO 5:	Analyse the issues related to various problems like unemployment, balance of payments, poverty, inequality, inflation facing the economy.
PSO 6:	Develop skills to integrate and organise the inter linkages between and among the varied divisions of the economy.
PSO 7:	Have a critical assessment of the working of the economy, the interconnections between the various sectors and the policies linked to the development.

### COURSE OUTCOMES:

#### MICRO ECONOMIC THEORY : G102.1

CO 1:	Acquire knowledge of some of the basic concepts, principles and theories of Micro Economics.
CO 2:	Be informative about the foundation for the study of other branches of Economics.
CO 3:	Have studied analytical, reasoning and graphical presentation of skills.
CO 4:	Able to appreciate the utility of economics in day – today life.

CO 5:	Aware and understand different types of market structures and their working.
CO 6:	Be familiar with the concept of distribution.
CO 7:	Able to understand the consumer behaviour and able to apply the knowledge acquired in his / her day to day life in matters related to buying, selling, maximization of satisfaction, etc.
<b>HUMAN RESOURCE ECONOMICS G 102. 1E:</b>	
CO 1:	Develop the understanding of the concept of human resource and to understand its relevance in organizations.
CO 2:	Helps to understand basic concepts of Human Resource Management.
CO 3:	Analyse the strategic issues and strategies required to select and develop manpower resources.
CO 4:	Know the basic concepts of Human Resource Development.
CO 5:	Know the development, implementation, and evaluation of employee recruitment and selection.
CO 6:	Have a basic knowledge on organizational development.
<b>MACRO-ECONOMIC THEORY: G102.2</b>	
CO 1:	Understand the working of an economy.
CO 2:	Able to know the origin, scope and branches of macro economics.
CO 3:	Be informative about tools of macro economics.
CO 4:	Know the circulation of income and wealth in different sectors of the economy.
CO 5:	A thorough understanding of the various theories behind pricing of products and factors in different market environment;
CO 6:	Ability to identify and evaluate the main models of market structures and to appreciate the theories behind policy prescriptions.
CO 7:	This course in Macroeconomics is expected to develop skill in economic reasoning. By the time, students complete this course, they would know the relevance of government decisions like Wage policy, monetary policy, the RBI policy, etc. in the day to day life.
<b>HEALTH ECONOMICS : G 102.2E</b>	
CO 1:	Get a working knowledge of economics of health.
CO 2:	Understand the present health condition of India and the world.
CO 3:	Be informative and able to understand the different health indicators.

CO 4:	Describe key behaviours that affect a consumer's health status and the cost of health care overall.
CO 5:	Be able to identify the concepts of healthcare financing and payment for healthcare.
CO 6:	Be able to provide an overview of how health insurance works and to compare and contrast different types of health insurance.
<b>MONETARY ECONOMICS G102.3</b>	
CO 1:	Understand origin and development of money.
CO 2:	Obtain the knowledge and understanding of the theoretical basis for money circulation, monetary policy, mechanisms of money creation.
CO 3:	Be informative about different theories of value of money.
CO 4:	Understand the concept of value of money and its determination, working of monetary economy, banking system, money and capital markets, international financial institutions and their relationship with India.
CO 5:	Informative about currencies and exchange values of different countries currencies.
CO 6:	Understand the role of central bank of the country and its functioning.
<b>INDIAN ECONOMY : G102.3E</b>	
CO 1:	Understand the nature of Indian Economy, GDP, demographic profile, natural resources.
CO 2:	Informative about all the three sectors and sectoral reforms, economic planning and steps taken for development of Indian Economy.
CO 3:	Students will be knowledgeable about fundamental problems of Indian economy.
CO 4:	Be informative about various initiatives of the Government of India to irradiate poverty and provide employment.
CO 5:	Be aware about reforms of different sectors of Indian economy.
CO 6:	Able to understand the importance of different institutions like NITI Aayog, Panchayat Raj in India.
<b>INTERNATIONAL TRADE AND PUBLIC ECONOMICS G102</b>	
CO 1:	The student will be acquainted with economic concepts and models of international trade

CO 2:	Explain the different concepts of terms of trade, the structure of BOP, disequilibrium in BOP, causes of disequilibrium, describe the foreign exchange rate and determine its equilibrium exchange rate and explain the objectives of IMF and IBRD.
CO 3:	Understand the meaning of public finance or government finance; its nature, subject matter, explain the differences between public finance and private finance and differentiate between the public and private goods
CO 4:	Classify the public revenue and its various sources; revenue receipts and non-revenue receipts, understand the tax and no-tax revenues, the causes of increasing public expenditure in the modern economies
CO 5:	Explain the varying effects of public expenditure on the economy and role of public expenditure in a developing economy
CO 6:	Understand the various sources of government borrowing and the reasons behind the growing public debt, describe how the debt is repaid, the role of public debt in developing countries, explain the concept of debt trap.
<b>QUANTITATIVE ECONOMICS : G102.4E</b>	
CO 1:	Helps to understand the basic concepts of economics.
CO 2:	Train the students to use linear functions and its applications in economic analysis.
CO 3:	Equip the students to use non-linear functions in economic problems.
CO 4:	Helps to have basic knowledge on production and market equilibrium.
CO 5:	To be able to understand revenue and cost analysis.
CO 6:	Helps to understand various types of market structures using differential and integral calculus.
<b>ECONOMIC THOUGHT : G102.5</b>	
CO 1:	Students will be informative about the contribution of eminent economists to the subject.
CO 2:	Be able to understand the background of their writings and theories which help them to know the significance of economics at present times.
CO 3:	Understand the relevance of economic thought at present.
CO 4:	Will be able to know the difference between different schools of Economic thought.

CO 5:	To be informative about Indian Economists and their contributions to economics.
CO 6:	To be knowledgeable about different Nobel prize winners in Economics and their contributions.
<b>ECONOMIC STATISTICS:G102.5A</b>	
CO 1:	Describe and discuss the key terminology, concepts tools and techniques used in economic statistical analysis
CO 2:	Discuss critically the uses and limitations of statistical analysis
CO 3:	Solve a range of problems using the techniques covered
CO 4:	Conduct basic statistical analysis of data.
CO 5:	Understand statistical methodology and interpret statistical evidence.
CO 6:	Use the basic concepts of probability
<b>DEVELOPMENT ECONOMICS :G102.5B</b>	
CO 1:	A comprehensive understanding of economic progress and welfare. Students will be equip to calculate various indices like HDI, GDI, GII & MPI.
CO 2:	A detail analysis on various country profiles and understanding the development models adopted by those countries.
CO 3:	Capital budgeting tools equip the students to make a best decision in selecting the projects.
CO 4:	An attempt is made to critically evaluate population as growth promoting factor or retarding factor.
CO 5:	Helps to understand the interlinkages between agriculture and industry, there by economic development
CO 6:	Helps to select appropriate type of economic planning for the economic development and growth of the countries.
<b>HEALTH ECONOMICS :G 102.5c</b>	
CO 1:	Get a working knowledge of economics of health.
CO 2:	Understand the present health condition of India and the world.
CO 3:	To be informative and able to understand the different health indicators.
CO 4:	Describe key behaviours that affect a consumer's health status and the cost of health care overall.
CO 5:	Be able to identify the concepts of healthcare financing and payment for

	healthcare.
CO 6:	Be able to provide an overview of how health insurance works and to compare and contrast different types of health insurance.
<b>INDIAN ECONOMICS G102.6</b>	
CO 1:	Understand the nature of Indian Economy, GDP, demographic profile, natural resources.
CO 2:	Informative about all the three sectors and sectoral reforms, economic planning and steps taken for development of Indian Economy.
CO 3:	Students will be knowledgeable about fundamental problems of Indian economy.
CO 4:	Be informative about various initiatives of the Government of India to irradiate poverty and provide employment.
CO 5:	Be aware about reforms of different sectors of Indian economy.
CO 6:	Students will understand the importance of different institution like NITI Aayog and Panchayath Raj in India.
<b>MATHEMATICAL ECONOMICS G.102.6A</b>	
CO 1:	Demonstrate a knowledge and understanding of the mathematical concepts and methods used in economics
CO 2:	Demonstrate the facility to express economic ideas in the language of mathematics.
CO 3:	Analyze and evaluate economic models by using formal mathematical methods.
CO 4:	Demonstrate an understanding of the rules of differentiation as they apply to multivariable functions
CO 5:	Find solutions to unconstrained optimization problems by identifying relative and global maximums and minimums of single and multivariable functions
CO 6:	Use integration and matrix algebra techniques in economic analysis
<b>MANAGERIAL ECONOMICS :G102.6B</b>	
CO 1:	To enable the students to gain knowledge about the various tools, techniques and concepts of economic environment.
CO 2:	Helps to understand the process of decision making, behavior & preferences of the consumers.

CO 3:	To train the students to use capital budgeting and demand forecasting techniques in business.
CO 4:	Helps to know pricing policies adopted in various business models.
CO 5:	Understanding the profit planning with the help of break even analysis
CO 6:	Helps to know importance of entrepreneurship in economic development.
<b>ENVIRONMENTAL ECONOMICS: G102.6C</b>	
CO 1:	To understand the relationship between environment and economic growth; how economic growth affects environment; how environment development programmes affect economic growth; the tradeoff.
CO 2:	To create basic ideas of the cost of environmental growth and sustainable policy approach to prevent environmental degradation, green accounting, methods of environmental valuation, Environmental concerns, environmental education, environmental awareness, environmental laws, environmental hazards and economics of recycling.
CO 3:	To enable the student to focus on economic effects of environmental policies around the world. It is a science emphasis on natural resources and its efficient allocation, management with alternatives, and environmental indemnities like air, water soil pollution, solid waste management, and global warming etc.
CO 4:	Explain how something can be both “environmentally destructive” and “economically optimal”; and how something can be environmentally beneficial and economically suboptimal.
CO 5:	Helps to examine the relationship between the economy and the environment in the context many activities started by environmental economists, activists and nature lovers.
CO 6:	Identify factors to find solutions to environment problems that are relevant to protect the welfare of the people.

## **HISTORY**

### **PROGRAMME OUTCOMES**

The subject History is taught along with Political Science, Economics and English Major under the three major combination.

The student who studies in the department of History would imbibe considerable knowledge of the other subjects which are taught along, with ease. Studying history is complementary to other subjects and vice versa. The economic life/conditions, political life/conditions and social life/conditions are taught in all the programmes which are offered in the department. History itself is also essential to understand the other subjects taught. Studying history along with these subjects would enable a student to understand the past and present society holistically. This would make a student of history competent and knowledgeable, an ingredient to be a successful person in one's life goal.

### **PROGRAMME SPECIFIC OUTCOMES**

History as a subject is considered to be the memory of mankind. In the Department of History, papers such as Indian History, History of Modern Europe, History of Modern Asia and History of Karnataka are taught.

It is a well-balanced curriculum in the under graduate level especially in this part of the country keeping with the emphasis of world, regional, national and local histories.

Students by studying these papers will acquire a fair knowledge of these subjects. This knowledge is essential for getting into any service/employment be it government or private. Especially eligibility tests to enter such service requires the student to know these subjects. Apart from that, a student who as an individual and a responsible citizen has a fair amount of knowledge of History of different spheres national, regional and so on. The department prepares such knowledgeable citizens and offers them to the nation who would be an asset to any country.

### **COURSE OUTCOMES:**

#### **I Semester**

#### **G101.1. India in the Early Historical Period (to A.D. 300)**

By studying this course students will be able to understand the geography of India and how it shaped its history. Students would also know the evidence on which Indian History is built and understood. They would grasp the early human settlements in

Indian subcontinent and later on, the civilizations which flourished in India and how they shaped the later history of India.

**Elective Course-I**  
**CONTEMPORARY INDIA**

By studying this course students will be able to understand the contemporary History of India and how Modern India has been shaped. Studying the latest history of the country would enable them to know the day to day events and developments. These would be easily intelligible to them. This study is a necessity to every citizen of the country. Moreover, the students are taught History of India till 1964 in the regular course.

**II B A: II SEMESTER**  
**G101.2 - India in the Ancient Period (A.D. 300 - 1300)**

By studying this course students will be able to understand the ancient history of the country especially great empires such as the Mauryan and Gupta Empire. They were very important phases of ancient Indian History and especially these eras witnessed the development of great Indian culture and heritage. Rise of Buddhism during Mauryan rule and the revival of Brahminical Hinduism during Gupta period will be learnt by the students. Gradually how Buddhism came into the Hindu fold will also be learnt by the students.

**Elective Course-II**  
**CREATION OF MODERN STATE OF ISRAEL AND THE PALESTINIAN PROBLEM**

In this course students can learn one of the major developments in Modern World History - the formation of the State of Israel and a new crisis called the Palestinian Problem. The world leaders are engaged for quite some time in the Palestinian Problem. There are various groups engaged in either supporting or opposing the issues involved herein. This course is a part of international relations

**II B A: III SEMESTER**  
**G101.3. Medieval India (A.D. 1200 - 1707)**

By studying this course students will be able to understand the early part of Medieval Indian History when Turkish and Mongol invaders established their rule in India and gradually become Indians and contribute to Indian culture and art and architecture. Islamic society and its contributions and their ethos will be understood by the students. How Indian society responded to the influence of Islam, will be understood by the students.

<p><b>Elective Course-III</b></p> <p><b>ENVIRONMENTAL HISTORY OF INDIA</b></p>
<p>By studying this course students will be able to understand the History of India along with environmental issues it developed time to time. For instance, the early settlements of people in Indian subcontinent, how they used environment for their survival and so on. Evidence like how they learnt to store water for drinking purpose and for irrigation purpose and so on. Students will also learn the latest environmental concerns due to large scale industrialization, the life of forest dwelling tribes, the government legislations on environmental concerns and so on.</p>
<p><b>II B A: IV SEMESTER</b></p> <p><b>G101.4- Colonial India (A.D. 1707 - 1885)</b></p>
<p>By studying this course students will be able to understand the advent of the Europeans towards the end of the fifteenth and towards the beginning of sixteenth century. How Europeans established their colonies and exploited India in all fields is learnt. How the English were able to rule the entire subcontinent, how they introduced education, united the subcontinent politically, how various Governor Generals followed various policies to control India so on are learnt. The Indians also resisted their imperialism leading to rebellions like the Santhal rebellion and the Great Revolt of 1857 are learnt.</p>
<p><b>Elective Course-IV</b></p> <p><b>HISTORY AND TOURISM IN INDIA</b></p>
<p>By studying this course students will be able to understand the importance of tourism today and also the tourism Industry in India. History and Historical sites which are of tourist importance is taught. Along with it the Indian culture and its significance and its heritage will be understood by the students.</p>
<p><b>III B A: V SEMESTER</b></p> <p><b>G101.5 -Freedom Movement in India and its Legacy (A.D. 1885 - 1964)</b></p>
<p>By studying this course students will be able to understand the domination of the colonial government and its reaction by the Indians. How Indians organized themselves to fight the long colonial domination will be understood by the students. Secondly, in the history of the world how non-violent movement of Mahatma Gandhi triumphed is also taught. How by the mid twentieth century, India became independent and emerged as a prominent democratic country of the world is also taught.</p>

**III B A: V SEMESTER**

**G101.5a- Medieval Karnataka (A.D. 1336 - 1750)**

By studying this course students will be able to understand the History of Karnataka State especially Karnataka in medieval period. In the medieval period great empires such as Vijayanagar and Bahmani flourished and contributed immensely to the History and culture of South India and Deccan. Vijayanagar was praised by the travelers as abode of wealth and prosperity, contributing immensely to the culture and heritage of the people of this region.

**III B A: V SEMESTER**

**Optional paper**

**G101.5c - History of the Far East and South East Asia (Since 1900)**

By studying this course students will be able to understand the History of Asia with special reference to China and Japan and also Vietnam and Indonesia. All these modern countries were abode of ancient civilizations and how in modern times came under imperialistic domination. How they fought imperialism just like Indians is taught. Presently, China has grown to become a super power and Japan too had reached its economic climax. China is a communist country as well as an economic giant. How these countries are faring in modern times is taught.

**III B A: VI SEMESTER**

**G101.6 History of Europe (A.D 1845-1945)**

By studying this course students will be able to understand the History of Europe from the rise of Nationalism in Western Europe towards the later part of nineteenth century till the Second World War and formation of United Nations. This paper also teaches the problems of decaying of Ottoman empire and related history as well as the conquest of Africa and rise of Nazism and Fascism. How the two world wars devastated the economy and society and its impact is also taught to the students.

**III B A: VI SEMESTER**

**Optional paper**

**G101.6a -History of Modern Karnataka (A.D. 1750 - 1956)**

By studying this course students will be able to understand the History of Modern Karnataka especially after the decline of Vijayanagara. How various palegars became independent rulers and how Mysore emerged as one of the strong states under Hyderali

and his son Tippu Sultan. How they continued their fight against the imperialistic British who were following various tactics to put down the Indian rulers. This paper also teaches various movements like the backward class movement, independence movement as well as unification movement along with the progress the state of Karnataka made in modern times in spheres such as literature, education, art and so on.

**III B A: VI SEMESTER**

**Optional paper**

**G101.6b History of the West and Central Asia (since 1900)**

By studying this course students will be able to understand the History of Modern West and Central Asia including countries such as Turkey, Iran, Iraq, Arab World along with modern State of Israel and Palestinian Problem. West Asia also was colonized by the European powers and how they were continuously made to fight the British and other imperialistic hegemonies, is taught. Leaders such as Mustafa Kemal Pasha, Reza Shah Pahlavi, Dr Mosaddeq, Amanullah Khan and others are taught who were some of the rare leaders of the region. Paper also teaches contemporary history of the region with topics such as the rise of Taliban in Afghanistan.

## JOURNALISM

### Program Outcome and Program Specific Outcome

PO 1:	Develop Graduates with basic understanding on various media and communication practices and its importance in contemporary society
PO 2:	Enhancement of skills in various Media production techniques and to be industry ready
PO 3:	Develop and apply scientific approach to meet the needs of the society and to produce responsible and creative media professionals

### **PROGRAMME SPECIFIC OUTCOMES**

PSO 1:	Gain knowledge on various communication patterns
PSO 2:	Acquire skills of journalistic practices
PSO 3:	Recognizing Media as a important information and education tool
PSO 4:	Equipped with various media technologies
PSO 5:	Creation of innovative media content
PSO 6:	Ability to enquire and respond to various social issues and concerns through media practices
PSO 7:	Develop skills to analyze media content with a critical bent of mind
PSO 8:	Get hands on experience in media field through internships and media campaigns
PSO 9:	Create socially responsible media practitioners

### **COURSE OUTCOMES:**

CO 1:	Understand basic concepts of communication and journalism, and their role in society
CO 2:	Familiarize students with various processes and models of communication
CO 3:	Acquire knowledge on different types of reporting, their importance and evaluate media content
CO 4:	Develop skills on sourcing, reporting and writing for media.

### **PAPER G105.1E DIGITAL LITERACY (OPEN ELECTIVE)**

CO 1:	Accessing Internet and finding information of interest
CO 2:	Understanding cyber security and financial literacy and discuss related case studies

CO 3:	Acquire digital literacy to understand the concept of online banking and critically evaluate it
CO 4:	Get familiar with e governance services, e-commerce and mobile apps
<b>SEMESTER II</b>	
<b>PAPER 105.2 PRINT AND ONLINE JOURNALISM</b>	
CO 1:	Understand the different types and techniques of print and online journalism
CO 2:	Explore the development of print media in India
CO 3:	Develop skills for journalistic writing
CO 4:	Critically look at social media as a platform for citizen journalism and create digital content
<b>PAPER 105.2E</b>	
<b>BLOGGING AS MEDIA PRACTICE (OPEN ELECTIVE)</b>	
CO 1:	Identify basics and techniques of blogging practice and evaluate them
CO 2:	Understand scope of blogging and importance of search engine optimization
CO 3:	Develop skills on creating blog post and marketing.
<b>SEMESTER III</b>	
<b>PAPER 105.3 Broadcast Journalism</b>	
CO 1:	Gain basic understanding about broadcast media
CO 2:	Explore the history and development of broadcast media in India
CO 3:	Obtain efficiency in writing for broadcast media
CO 4:	Acquire skills in production and analyzing audio- visual content for radio and television
<b>PAPER 105.3 E FOLK MEDIA COMMUNICATION (OPEN ELECTIVE)</b>	
CO 1:	Understand variety of folk media in India
CO 2:	Obtain theoretical knowledge of folk media as important medium of communication
CO 3:	Analyze and evaluate the role of folk media in community development
<b>SEMESTER IV</b>	
<b>PAPER 105.4 EDITING PRACTICE</b>	
CO 1:	Study the structure and functions of editorial department
CO 2:	Acquire skills on editing techniques
CO 3:	Analyze the content patterns of print media

CO 4:	Develop skills in using software for designing newspaper and photo editing
<b>PAPER 105.4E</b>	
<b>MEDIA AND GENDER ISSUES (OPEN ELECTIVE)</b>	
CO 1:	Explore basic concepts of gender studies and media
CO 2:	Sensitize the students on gender stereotyping in media and developing critical thinking
CO 3:	Critically evaluate gender representation in media
<b>SEMESTER V</b>	
<b>PAPER G 105.5(a) FILM STUDIES</b>	
CO 1:	Understand the film language and acquire ability to appreciate films.
CO 2:	Obtain knowledge about major film movements and genres.
CO 3:	Acquire basic skills in production and analysis of films
CO 4:	Recognize the role and contemporary status of cinema in society.
<b>PAPER G 105.5(b)</b>	
<b>PAPER VI- ADVERTISING AND PUBLIC RELATIONS</b>	
CO 1:	Understand basic laws related to media
CO 2:	Acquire an understanding of the nature of ethics in journalism
CO 3:	Analyze the recent amendments in media law with case studies
CO 4:	Form students as responsible media persons
<b>PAPER G 105.6(b)</b>	
<b>Paper VIII Media Management</b>	
CO 1:	Comprehension of the basics of managerial practices in an organization.
CO 2:	Ability to evaluate various types, aspects of media business, issues and challenges in global media
CO 3:	Identify different communication policies and recommendations of major media committees
CO 4:	Explore organizational patterns of Indian media and entertainment industry and understand their future scope.

## POLITICAL SCIENCE

### Program Outcome and Program Specific Outcome

PO 1:	Demonstrate competency with the basic tools underlying the subject of Political Science (as a discipline of study and research);
PO 2:	Discern key concepts in politics, sharpen the understanding of political discourses and augment the ability to conduct scientific enquiry on political questions;
PO 3:	Promote a healthy civic society, contribute to the society as responsible civic conscious members of the society and to be gender sensitive;
PO4:	Analyse political and policy issues and build capacities to articulate policy options;
PO5:	Demonstrate critical thinking, including the ability to form an argument about key concerns of political theory and issues of public policy and politics.
PO6 :	Understand the relations between nations of the world.
PO7 :	Promote participation in the global world for better living.
PO8:	Demonstrate the need for global leadership.
<b>PROGRAMME SPECIFIC OUTCOMES</b>	
PSO 1:	Discuss the major theories and concepts of political science and its subfields
PSO 2:	Distinguish systematic normative inquiry from Behavioural kinds of inquiry within the discipline of political science.
PSO 3:	Demonstrate the ability to apply abstract theory to concrete problems by using the ideas of political theorists to address contemporary political issues
PSO 4:	Assess the origin and evolution of conceptual framework of political theory and Political Institutions.
PSO 5:	Demonstrate the inter-connection between Liberty, Equality, Justice and Democratic ethos.
PSO 6:	Discuss the major theories and concepts of political science and its subfields
PSO 7:	Distinguish systematic normative inquiry from Behavioural kinds of inquiry within the discipline of political science.
PSO 8:	Demonstrate the ability to apply abstract theory to concrete problems by using the ideas of political theorists to address contemporary political issues

<b>COURSE OUTCOMES:</b>	
<b>I SEMESTER</b>	
<b>G 103.1 UNDERSTANDING POLITICAL THEORY</b>	
CO 1:	Recognise the centrality of state in the discourses of politics.
CO 2:	Describe and appraise the distinct theories on the origin of state, theories of rights and democracy.
CO 3:	State the contemporary debates on the key concepts -equality, freedom, democracy, citizenship, and justice and recognise the expanding horizons of these discourses.
CO 4:	State the contemporary debates on the nature of security of state.
CO5 :	Indicate how Liberal and Marxist traditions consider and understand politics.
CO6 :	Discuss the origin, evolution and key issues which are at the core of the feminist movement, multiculturalism and postcolonialism.
<b>Elective Course</b>	
<b>G103.1E LEGAL LITERACY IN INDIA</b>	
CO 1:	Recall the structure, components and functioning of the various institutions of the Indian legal system, and develop an understanding on the role of law in their day to day life
CO 2:	Demonstrate the knowledge on criminal justice system, civil procedure code, various family laws, laws relating to contract and property in India
CO 3:	Analyse various mechanisms in India relating to access to legal aid and justice, RTI, PIL and about the formal and alternate dispute redressal (ADR) mechanisms
<b>II SEMESTER G 103.2 MAJOR POLITICAL THINKERS</b>	
CO 1:	State the key ideas of all the political philosophers given in the course.
CO 2:	Describe the concept of ideal state.
CO 3:	Illustrate how and why Machiavelli gave an overriding priority to pragmatism above ethics and values in the operation of statecraft.
CO 4:	Recall the medieval political history especially the church- state controversy.
CO 5:	Discuss the significance of State according to modern Western and Indian political thinkers.
CO 6:	Indicate the role of Women political thinkers towards promoting political participation.

<b>G103.2E PUBLIC POLICY AND GOVERNANCE</b>	
CO 1:	Define and Describe the concept, nature, scope, significance and types of Public Policy
CO 2:	Indicate and appraise the public policy and governance in India
CO 3:	Discuss the public problems and develop public policy responses
<b>III Semester</b>	
<b>G 103.3 IDEOLOGY AND POLITICS IN INDIA</b>	
CO 1:	Recall the constitutional articles related to fundamental rights, directive principles and federal structure of the Indian state.
CO 2:	Distinguish between constitutional philosophy and party ideologies in realising the constitutional goals.
CO 3:	Compare and contrast the Indian political system with that of other countries.
CO 4:	Apply India's constitutional principles and philosophy to the working of the government through electoral and political processes
CO 5:	Appraise and develop solutions to the challenges to the constitution's foundational principles.
CO 6:	Analyse the merits and demerits of security and other recent acts within the context of India's constitution.
<b>G103.3E CONFLICT, PEACE AND RECONCILIATION</b>	
CO 1:	Identify and interpret the relationship between social conditions and conflicts
CO 2:	Evaluate the roots of conflict and apply strategies of reconciliation
CO 3:	Design strategies for developing the social, political, economic, and ecological conditions for peace building.
<b>IV Semester</b>	
<b>G 103.4 POLITICAL INSTITUTIONS AND PROCESSES IN COMPARATIVE PERSPECTIVE</b>	
CO 1:	Compare and contrast major democratic political systems
CO 2:	Discuss and apply various approaches to the study of political systems
CO 3:	Examine the foundational principles enshrined in the constitution
CO 4:	Identify types of political parties and analyze their ideologies
CO 5:	Analyze the role of pressure groups in major democracies in order to assess

	the working of democratic system in the context of promotion of rights
CO 6:	Review major formal political institutions as well as some informal institutions
<b>G103.4E ECOLOGY SUSTAINABILITY AND DEVELOPMENT</b>	
CO 1:	CO1 Describe and draw the meaning and significance of ecological sustainability and the interrelationship between resource use, politics and environment
CO 2:	Explain the way development impacts the people – women, tribal Population and analyze and develop strategies to address ecological and environmental issues and promote awareness on the shrinking diversity in India and motivate to protect diversity
CO 3:	Develop skills to assess Environmental Impact, Environment friendly technologies and education in sustainability and Promote to think Globally and Act Locally
<b>V Semester I Paper (Core)</b>	
<b>103.5a INTERNATIONAL RELATIONS</b>	
CO 1:	Indicate the extent and importance of the study of International Relations
CO 2:	Apply mathematical models to the study of International Relations
CO 3:	Discuss the limitations of national power
CO 4:	Locate and explain the realm of diplomacy
CO 5:	Discuss the dynamics of Cold War politics and promote the understanding on the need for disarmament
CO 6 :	Assess the Emerging Centres of power in the World today
<b>V Semester -II Paper (Core)</b>	
<b>G 103.5b PUBLIC ADMINISTRATION</b>	
CO 1:	Indicate the extent and importance of the study of International Relations
CO 2:	Apply mathematical models to the study of International Relations
CO 3:	Discuss the limitations of national power
CO 4:	Locate and explain the realm of diplomacy
CO 5:	Discuss the dynamics of Cold War politics and promote the understanding on the need for disarmament
CO 6:	Assess the Emerging Centres of power in the World today
<b>V Semester paper III (Optional)</b>	
<b>G 103.5c POLITICAL SOCIOLOGY</b>	
CO 1:	Explain and draw the emerging perspectives on Political Sociology and Political Socialization

CO 2:	Describe Political Participation, Political Culture, and Political Apathy
CO 3:	Organise the trends in Modernity & Post Modernity
CO 4:	Describe the trends in Nationalism, Secularism, Communalism, Regionalism and Women Movements
CO 5 :	Discuss and arrange the components of Civil Society Organization and indicate the need for Right to information
<b>VI Semester Paper-I (Core)</b>	
<b>G 103.6a INTERNATIONAL POLITICS</b>	
CO 1:	Describe the recent developments in the International Bodies.
CO 2:	Identify the activities of the International Bodies
CO 3:	Identify the complexities of changing International Politics
CO 4:	Describe the need for reform of the Security Council
CO 5:	Demonstrate the conceptions of Soft Power and India's Foreign Policy
CO 6:	Indicate the contours Foreign Policy of the US and to review the policy of Convergence in South Asia
<b>VI Semester II Paper (Core)</b>	
<b>103.6b FUNDAMENTALS OF MANAGEMENT</b>	
CO 1:	Discuss and draw the functions and principles of management
CO 2:	Demonstrate the skills of Developing Excellent Managers
CO 3:	Corelate the various schools of Management Thought
CO 4:	Review the limitations of Planning and Techniques of Control
CO 5:	Develop leadership skills and to assess employee motivation and comprehend corporate strategy
CO 6:	Describe the need for valuing diversity, its dimensions and attitudes
<b>VI Semester -Paper III (Optional)</b>	
<b>G 103.6 LEADERSHIP</b>	
CO 1:	Describe the need for Traditional, Legal-rational, Charismatic, Authoritarian and Democratic Leadership
CO 2:	Define and explain Political, Civic, literary, and Cultural Leadership
CO 3:	Explain the importance of spiritual leadership
CO 4:	Describe different mores of leadership
CO 5:	Define and describe corporate leadership and labour leadership

## PSYCHOLOGY

### **PROGRAM OUTCOME**

PO 1:	Demonstrate the ability to think critically and scientifically about human behaviour in different areas of study.
PO 2:	Competence in understanding and developing scientific interventions enhance human experience in various settings such as schools, industry, hospitals, governance, and community.
PO 3:	Design and conduct research in different areas of study.
PO 4 :	Examine, explain, relate, recognize, accept and respect socio cultural diversity
PO 5:	Transfer classroom learning to real world problems for a sustainable future.
PO 6 :	Communicate thoughts and ideas clearly and in an articulate manner both verbally and in writing.
PO 7 :	Engage actively in service-learning activities to promote health, harmony, Human welfare and Well- being.
PO 8:	Adopt and Display values of hope, empathy, compassion, integrity and trust required to, accept diversity, Build community, establish and maintain a sense of well-being.

### **PROGRAMME SPECIFIC OUTCOMES**

PSO 1:	Apply the basic concepts and theories of psychology to understand oneself and others.
PSO 2:	Demonstrate the ability to think critically, analytically and to reason logically about the issues in child development
PSO 3:	Reflect experience and use skills to bring about personal and social change.
PSO 4:	Understand the various manifestations of psychopathology and therapeutic techniques Apply the basic principles of psychology to enhance human behavior at the workplace.
PSO 5:	Develop an understanding and application of the complex interplay of Bio psycho social factors impacting Health.
PSO 6:	Competence in administering, scoring, reporting and analysis of psychometric tests.
PSO 7:	Apply the basic concepts and theories of psychology to understand oneself and others.
PSO 8:	Demonstrate the ability to think critically, analytically and to reason logically about the issues in child development

<b>COURSE OUTCOMES:</b>	
<b>I SEMESTER</b>	
<b>G 106.1 Foundations of Behaviour I</b>	
CO 1:	Understand the roots, history, its evolution and the goals governing the scientific study of human behaviour
CO 2:	Think critically and scientifically about behaviour and mental processes.
CO 3:	Compare and contrast major perspectives in psychology.
CO 4:	Describe and Evaluate basic research methods in psychological science.
CO5 :	Explain the biological/neurobiological underpinnings of behaviour
CO6 :	Demonstrate conceptual clarity and application of psychological concepts such as consciousness, sensation, perception, to everyday life.
CO7 :	Exercise ethical principles and guidelines in psychological research.
CO8 :	Competence in administering, scoring, reporting and analysis of psychometric tests.
<b>Elective Course</b>	
<b><u>G 106.1 E THE SCIENCE OF PERSONALITY: PERSONAL LEARNING AND GROWTH</u></b>	
CO 1:	Understand how personality develops through the lens of theories such as Freud, Victor Frankl, Eric Fromm,
CO 2:	Explain the impact of one's experiences on the way one thinks and behaves
CO 3:	Describe personality disorders
CO 4:	Apply the theories to assess one's own personality. Insight into one's own personality through self-assessments leading to personal growth.
<b>II SEMESTER</b>	
<b>G106.2 <u>Foundations of Behaviour II</u></b>	
CO 1:	Understand the goals governing the scientific study of human behaviour
CO 2:	Think critically and scientifically about behaviour and mental processes.
CO 3:	Compare and contrast the theories of Learning, human motivation, emotion, Intelligence and personality.
CO 4:	Describe and apply the basic cognitive process of information processing to learn and remember.
CO 5:	Assess the contributions of two psychological constructs personality and intelligence in understanding individual differences.
CO 6:	Demonstrate conceptual clarity and application of psychological concepts such

	as learning, memory, motivation, emotion, personality and intelligence to everyday life.
CO7 :	Differentiate between and explain the need for testing and assessment.
CO8 :	Competence in administering, scoring, reporting and analysis of psychometric tests.
<b>G106.2E <u>PSYCHOLOGY OF POSITIVE HUMAN FUNCTIONING</u></b>	
CO 1:	Understand the need to focus on flourishing and wellbeing by experiencing positive emotions.
CO 2:	Focus and use human strengths to meet challenges and adversities.
CO 3:	Use techniques to enhance psychological and social well being
CO 4:	Develop meaning and purpose through meaning and value exercises
CO 5:	Practice mindfulness and life enhancement strategies.
<b>Semester III G106.3 Child development I</b>	
CO 1:	Demonstrate the ability to think critically, analytically and to reason logically about contemporary issues in Child Development.
CO 2:	Examine and discuss, the major theories of child development such as those of Piaget, Sigmund Freud, Vygotsky, Bowlby and Bronfenbrenner
CO 3:	Describe and use various research designs and methods to study Children.
CO 4:	Understand and analyze complex Biological, Social and Cultural factors which impact the major developmental milestones from Conception through adolescence
CO 5:	Knowledge of advancement in medical science regarding various Prenatal diagnostic techniques, reproductive techniques and interventions during prenatal and post-natal life.
CO 6:	Knowledge of post birth challenges, assessments and application of theories to Infants physical, cognitive and socio emotional development.
CO 7:	Competence in administering, scoring, reporting and analysis of psychometric tests related to children and adolescents.
<b><u>CHOICE BASED COURSE (Elective)</u> <u>BEHAVIOR IN THE SOCIAL CONTEXT</u></b>	
CO 1:	Identify the situations that demand conformity and also factors that lead to

	violation of norms in the society
CO 2:	Connect the impact of obedience, compliance to major historical events.
CO 3:	Engage more in prosocial behaviour for the benefit of one's psychological wellbeing and the society
CO 4:	Understand the process of attitude formation and apply the methods to change attitude
CO 5:	Challenge stereotypes, prejudice and discrimination to reduce social conflicts
CO 6:	Use the knowledge of self and others perception to develop healthy relationship and enhance the quality of relationships in personal and professional life.
<b>IV Semester</b> <b><u>G 106.4 Child development II</u></b>	
CO 1:	Demonstrate the ability to think critically, analytically and to reason logically about development from early childhood to adolescence.
CO 2:	Examine, discuss and apply the theories of Piaget, Sigmund Freud, Bowlby Kohlberg, Erickson, Vygotsky, and Bronfenbrenner to cognitive, socioemotional Development from early childhood to adolescence.
CO 3:	Evaluate the impact of development in the social context like parenting, family, gender, school, play, technology, friendships during early and middle childhood period.
CO 4:	Understand and analyze complex Biological, Social and Cultural factors which impacts choices, Identity formation and sexual orientation during adolescence
CO 5:	Describe and identify problems and Neuro developmental disorders in children and Adolescents.
CO 6:	Competence in administering, scoring, reporting and analysis of psychometric tests related to children and adolescents.
<b><u>CHOICE BASED COURSE (Elective)</u></b> <b><u>PSYCHOSOCIAL COMPETENCIES FOR BETTER LIVING</u></b>	
CO 1:	Understand the need for psychosocial competencies for better living.
CO 2:	Evaluate one's level of competency in different contexts
CO 3:	Use techniques to overcome fear, anger, communication barriers.
CO 4:	Equipped with Skills to solve problems, make decisions and form teams
CO 5:	Cope effectively with the demands and challenges of everyday life

<b>Semester V</b> <b>G106.5a Social Psychology</b>	
CO 1:	Understand Human behaviour in the social Context using various theories.
CO 2:	Explore prosocial behaviour and its outcome on the society
CO 3:	Discuss the factors that lead to attitude formation and its impact on society
CO 4:	Differentiate between prejudice, discrimination and stereotypes and discuss techniques to reduce it.
CO 5:	Analyse the power of social influence, both the influence of individual on groups and vice versa
CO 6:	Apply the Principles of social Psychology to enhance Human experience
<b><u>G106.5b Abnormal Psychology</u></b>	
CO 1:	Distinguish between normal and abnormal behaviour.
CO 2:	Describe the changes in the understanding of psychopathology over time.
CO 3:	Conceptualize abnormal <u>behaviour</u> from multiple paradigms.
CO 4:	Assess the strengths, limitations and process of diagnosis.
CO 5 :	Describe, identify, analyze and explain Anxiety, Obsessive- compulsive, Dissociative, Symptom, Psychotic, Depressive, Personality and Neurocognitiv disorders.
CO 6 :	Understand and apply evidence based therapeutic techniques to treat abnormal behaviour.
CO 7 :	Competent to administer, score, report and analyze psychometric tests related to Mental health
<b>Semester VI</b> <b><u>G106.6a Industrial &amp; Organisational psychology</u></b>	
CO 1:	Describe the scope of I/O psychology
CO 2:	Explain the principles of human resource development
CO 3:	Describe the process of recruitment, need for training and various performance appraisal techniques
CO 4:	Apply the theories of motivation to analyse workplace productivity
CO 5:	Compare the different leadership styles and its outcome on the organisation
CO 6:	Recognise the role of psychologists in product branding by understanding consumer behaviour
CO 7:	Apply the Principles of General Psychology and social Psychology to enhance Human experience in industry

**VI Semester**  
**G106.6b Health Psychology**

CO 1:	Describe the history and emergence of the field of health psychology
CO 2:	Understand and apply the biopsychosocial model of health to descrhealth and disease
CO 3:	Examine the role of biological and psycho social factors in the genesis of health and chronic illnesses such as diabetes, cardiovascular diseases, ; Cancer, HIV AIDs, illnesses of childhood, adolescents and old age.
CO 4:	Understand the role of personality, gender, interpersonal relations, socio cultural influences and their linkage to risk, prevention, illness and wellness
CO 5:	Apply the practical information gained to make lifestyle choices and changes.
CO 6:	Describe and explain the risk factors of leading cause of death, stress, pain and Coping.
CO 7:	Demonstrate the ability to use stress and pain management techniques, and strategies to prevent intentional and unintentional injuries.
CO 8:	Competence in administering, scoring, reporting and analysis of psychometric tests related to health.

## SOCIOLOGY

### **PROGRAM OUTCOME**

PO 1:	The students acquire knowledge in the field of social sciences, literature and humanities which make them sensitive and sensible.
PO 2:	The B.A. graduates will be acquainted with the global social, economical, historical, geographical, political, ideological and philosophical tradition and thinking.
PO 3:	The programme empowers and thoroughly prepares the graduates to appear for various competitive examinations or choose the post graduate programmes of their choice.
PO4:	The programme enables the students to acquire knowledge with human values framing the base to deal with various problems in life with courage and humanity.
PO5:	The students will be ignited enough to critically think and act over for solution to various issues prevailing in human life to make this world a better place.
PO6 :	The programme provides a holistic base for every student to become a responsible citizen.

### **PROGRAMME SPECIFIC OUTCOMES**

PSO 1:	Demonstrate knowledge of fundamental theoretical approaches and core disciplinary concepts.
PSO 2:	Understand sociological phenomena, social structures, social institutions, cultural practices, and multiple axes of difference and/or inequality.
PSO 3:	Understand the Indian society, both the rural and urban communities, and the institutions therein with their complex functioning.
PSO 4:	Possess knowledge of the history and evolution of the industrial society and its functioning in current times.
PSO 5:	Develop an ability to use social scientific research methods to address sociological questions and exhibit critical thinking skills in evaluating sociological research, including the background assumptions, appropriateness of methods used and the strength of explanatory evidence.
PSO 6:	Possess knowledge and analyse various social problems engulfing India and suggest remedies for the same.

PSO 7:	Demonstrate the ability to use several of the major classical or contemporary perspectives in social theory and apply the same in contemporary society.
PSO 8:	Understand the current social welfare programmes in India and their importance for the growth and progress of India keeping the vulnerable groups in mind.
<b>COURSE OUTCOMES:</b>	
<b>I SEMESTER</b>	
<b><u>Principles of Sociology</u></b>	
CO 1:	Understand the discipline of Sociology
CO 2:	Trace the origin of Sociology
CO 3:	Analyse the relevance of Sociology in contemporary times
CO 4:	Describe the fundamental theoretical approaches
CO 5 :	Apply the theories to conceptualize a sociological problem
CO 6 :	Understand the specialized branches of Sociology and various career opportunities
CO 7 :	Analyse the importance of the specialized branches of Sociology in the global context
CO 8 :	Explain the basic concepts of Sociology
CO 9 :	Understand the concept of culture
<b>I Semester - Elective Course</b>	
<b><u>Sociology of Sanitation</u></b>	
CO 1:	Understand the discipline of Sociology
CO 2:	Trace the origin of Sociology
CO 3:	Analyse the relevance of Sociology in contemporary times
CO 4:	Describe the fundamental theoretical approaches
CO 5 :	Apply the theories to conceptualize a sociological problem
CO 6 :	Understand the specialized branches of Sociology and various career opportunities
CO 7 :	Analyse the importance of the specialized branches of Sociology in the global context
CO 8 :	Explain the basic concepts of Sociology
CO 9 :	Understand the concept of culture

CO 10 :	Explain the process of socialization
CO 11 :	Apply socialization in the daily social lives
<b>II SEMESTER</b>	
<b><u>Social Institutions and Social Change</u></b>	
CO 1:	Understand the social institutions of family and kinship
CO 2:	Analyse the recent trends affecting the institutions of family and kinship
CO 3:	Describe the institution of marriage in India
CO 4:	Identify marriage among the major religious communities in India
CO 5:	Understand the institution of religion and its origin
CO 6:	Identify the functions and dysfunctions of religion
CO 7 :	Distinguish between religion and morality
CO 8 :	Explain the relationship between religion and science
CO 9 :	Understand the education system
CO 10 :	Identify the functions of education
CO 11 :	Analyse the relationship between education and inequality and education and mobility
CO 12 :	Explain the Right to Education Act
CO 13 :	Identify the concept and characteristics of social change
CO 14 :	Differentiate between the social processes of change, development and progress
CO 15 :	Critically examine the various factors of social change
CO 16 :	Explain the contemporary processes of social change
<b>II Semester - Elective Course</b>	
<b><u>Sociology of Disaster and Social Crisis</u></b>	
CO 1:	Understand disaster and social crisis
CO 2:	Explain the study of Disaster Management and Social Crisis
CO 3:	Describe disaster victims and their vulnerability
CO 4:	Understand the disaster relief system
CO 5:	Describe the types, causes and effects of disasters
CO 6:	Analyse various forms of social crisis during a disaster
CO 7 :	Critically examine the role of government and NGOs in crisis management
<b>III Semester</b>	

<b><u>Indian Society: Rural and Urban</u></b>	
CO 1:	Understand the Indian village system
CO 2:	Identify the features of an Indian village
CO 3:	Classify the Indian villages
CO 4:	Analyse the problems of Indian villages
CO 5:	Explain the Panchayati Raj system
CO 6:	Understand the joint family system and identify its characteristics
CO 7:	Classify the joint family
CO 8:	Understand the caste system
CO 9:	Critically examine mobility in caste system
CO 10:	Critically analyse the relevance and the recent changes in the institutions of joint family and caste system
CO 11:	Understand the tribal community
CO 12:	Explain the distribution of tribals across India
CO 13:	Examine the problems faced by the tribal community in India
CO 14:	Understand the urban community
CO 15:	Differentiate between the concepts of urbanism and urbanization
CO 16:	Explain the urban administration system
CO 17:	Identify the urban infrastructure and its problems
CO 18:	Critically examine the urban problems and its causes
CO 19:	Propose solutions to the urban problems
<b>III Semester - Elective Course</b>	
<b><u>Indian Society</u></b>	
CO 1:	Understand the Indian Society and its composition
CO 2:	Critically examine India as a pluralistic society
CO 3:	Describe the social institution of marriage among Hindus, Muslims and Christians in India
CO 4:	Understand kinship
CO 5:	Describe the institution of family and its functions in India
CO 6:	Analyse the recent changes in the institution of family
CO 7:	Critically examine the changes in Indian society
CO 8:	Analyse casteism, regionalism and secularism in modern India

<b>IV Semester</b> <b><u>Industrial Sociology</u></b>	
CO 1:	Understand a specialized area of Sociology – Industrial Sociology
CO 2:	Explain the evolution of industry
CO 3:	Identify the various types of productive system
CO 4:	Explain the actors of industrial relations
CO 5:	Analyse collective bargaining
CO 6:	Describe participative management
CO 7:	Analyse corporate social responsibility
CO 8:	Understand industrial disputes
CO 9:	Identify the types of industrial disputes
CO 10:	Explain the Industrial Disputes Act 1947
CO 11:	Examine various processes of settling disputes
CO 12:	Analyse the labour welfare measures
CO 13:	Explain the trade union movement and its origin and development
CO 14:	Identify the objectives and functions of trade unions
CO 15:	Describe the types of trade unions
CO 16:	Critically examine the weakness of trade union
CO 17:	Analyse and suggest remedies to the problems of trade unions
<b>IV Semester - Elective Course</b> <b><u>Sociology of Health</u></b>	
CO 1:	Understand the origin and development of Sociology of health.
CO 2:	Examine the major dimensions of health
CO 3:	Describe the social components of health
CO 4:	Analyse the theoretical approaches in health
CO 5:	Critically examine the attitudes, values and beliefs associated with disease
CO 6:	Analyse changing doctor-patient relationship
CO 7:	Critically analyse inequalities in health with reference to gender and class
CO 8:	Understand functioning of hospitals
CO 9:	Describe the health systems in India
CO 10:	Analyse the programmes, policies and social legislations for health care in India

<b>V Semester</b>	
<b><u>Social Problems in India</u></b>	
CO 1:	Understand the concept of social problems
CO 2:	Examine the causes of social problems
CO 3:	Apply theoretical approaches to understand social problems
CO 4:	Explain family disorganization
CO 5:	Analyse the causes and effects of family disorganization
CO 6 :	Propose solutions to family disorganization
CO 7:	Understand crime and juvenile delinquency and their causes
CO 8:	Explain the various theories of punishment
CO 9:	Examine the preventive, reformatory and rehabilitation measures
CO 10:	Explain alcoholism and drug addiction
CO 11:	Describe the causes and effects of alcoholism and drug addiction
CO 12:	Explain the remedial measures for alcoholism and drug addiction
CO 13:	Understand communalism and communal violence
CO 14:	Analyse communalism in the Indian context
CO 15:	Describe the National Integration Movement
CO 16:	Examine the various theories of communalism
CO 17:	Critically analyse the role of government and media in communalism
CO 18 :	Describe the problems of the aged
CO 19:	Critically examine the changing role of the aged in the family
CO 20:	Analyse the care and welfare of the aged
<b>V Semester</b>	
<b><u>Research Methodology</u></b>	
CO 1:	Understand social research
CO 2:	Examine the problems in social research
CO 3:	Describe the steps in social research
CO 4:	Apply research designs
CO 5:	Differentiate between types of sources of data
CO 6:	Describe sampling
CO 7:	Apply various techniques of sampling

CO 8:	Describe observation as a method of data collection
CO 9:	Describe questionnaire as a method of data collection
CO 10:	Create a questionnaire
CO 11:	Describe interview as a method of data collection
CO 12:	Analyse the process of interview
CO 13:	Create an interview schedule
CO 14:	Describe the planning and organization of a report
CO 15:	Create a complete primary research report
<b>Sixth Semester</b>	
<b><u>Sociological Thought and Modern Theories</u></b>	
CO 1:	Understand Sociological thought
CO 2:	Differentiate between social thought and sociological thought
CO 3:	Analyse the transition from Social philosophy to Sociology
CO 4:	Describe the contributions of early sociological thinkers like Comte, Spencer, Durkheim, Weber and Marx.
CO 5 :	Critically examine theories of the early Sociological thinkers
CO 6:	Apply the early theories in the present times
CO 7:	Explain the growth of modern sociological theories
CO 8 :	Analyse the theories of modern thinkers like Parsons, Merton, Coser, Mead and Blumer
CO 9:	Critically examine the modern theories in Sociology and analyse their significance and interdisciplinary application
<b>Sixth Semester</b>	
<b><u>Social Policy and Welfare in India</u></b>	
CO 1:	Understand the concept of social policy and social welfare
CO 2:	Examine the agencies of social welfare, both government and non-government agencies
CO 3:	Describe civil society
CO 4:	Describe the National Policy for Children
CO 5:	Examine the various programmes for welfare of children

CO 6:	Understand children in conflict with law
CO 7:	Analyse child labour and the problem of the girl child
CO 8:	Describe the National Youth Policy
CO 9:	Describe youth programmes
CO 10:	Analyse the importance of youth and sports
CO 11:	Understand the problems of women
CO 12:	Examine the various government policies and programmes for women
CO 13:	Analyse violence against women
CO 14:	Describe the Domestic Violence Act 2005
CO 15:	Describe the National Health Policy
CO 16:	Understand health education
CO 17:	Describe the special nutrition programme and the Population Policy
CO 18 :	Explain the family welfare programme
CO 19:	Critically examine the role of media in family welfare
CO 20:	Understand the marginalized groups
CO 21 :	Explain the backward classes
CO 22:	Examine the welfare of SCs, STs and OBCs
CO 23 :	Critically analyse the reservation policy

## Social work

### **PROGRAM OUTCOME**

PO 1:	Empowerment of graduates with professional attitude and behaviour
PO 2:	Apply scientific knowledge and acquire effective communication skills in professional commitment
PO 3:	Develop and engage scientific approach to meet human needs and identify them as social change maker towards transformation.

### **PROGRAMME SPECIFIC OUTCOMES**

PSO 1:	Able to uphold values and ethics of Social Work
PSO 2:	Able to perform diverse roles in various social work settings
PSO 3:	Able to work effectively in team environment.
PSO 4:	Skilled to communicate effectively working with individuals
PSO 5:	Skilled to communicate effectively working with Groups
PSO 6:	Skilled to communicate effectively working with Communities
PSO 7:	Demonstrate the spirit of volunteerism to reach out disadvantaged sections of the society.
PSO 8:	Able to assess and intervene with the individuals, families, groups, organizations and communities
PSO 9:	Develop zeal and enthusiasm to work within the framework of existing structure (Governmental and Nongovernmental)

### **COURSE OUTCOMES:**

#### **I SEMESTER**

#### **G111.1: INTRODUCTION TO SOCIAL WORK**

CO 1:	Students acquire knowledge on fundamental concepts of Social Work
CO 2:	Develop an understanding about the context of emergence of social work as a profession and its practice in various settings
CO 3:	Analyze the importance values and ethics of professional Social work practice with a critical perspective

#### **I Semester - Elective Course**

#### **LIFE SKILLS**

CO 1:	Learn new ways of thinking and problem solving
CO 2:	Build confidence in spoken skills, group collaboration and cooperation
CO 3:	Recognize the impact of their actions and learn to take responsibility
CO 4:	Develop a greater sense of the self by acquiring analytical skills to make right decisions in life.

<b>SECOND SEMESTER</b> <b><u>G111.2: SOCIAL CASE WORK AND SOCIAL GROUP WORK</u></b>	
CO 1:	Acquire knowledge on the fundamental concepts of Social Case Work and Social Group Work
CO 2:	Understand Social Case Work and Social Group Work as methods of Social Work and apply it as an intervention method.
CO 3:	Develop skills and techniques to work with different stages and record the process
<b>SECOND SEMESTER</b> <b>CHILD WELFARE (OPEN ELECTIVE)</b>	
CO 1:	Students develop Comprehensive Understanding of the Concept of Child Vulnerability
CO 2:	Acquire knowledge on the Child Rights and its violation through case studies
CO 3:	Develop Capacity to draw up Right Based Approach for Child Welfare
<b>THIRD SEMESTER</b> <b><u>G111.3: COMMUNITY ORGANIZATION AND SOCIAL ACTION</u></b>	
CO 1:	Understand the community organization and Social Action as methods of Social work.
CO 2:	Acquire conceptual understanding about different approaches in Community organization and Social action
CO 3:	Understand the role of community organizer in different community settings and develop an attitude and skills for the participatory process.
CO 4:	Acquire skills in need assessment, program planning, and implementation and evaluation framework through field practicum.
<b>THIRD SEMESTER</b> <b><u>SOCIAL DEVELOPMENT &amp; SUSTAINABLE DEVELOPMENT (OPEN ELECTIVE)</u></b>	
CO 1:	Get acquainted with fundamental concepts of development, social development and Sustainable development.
CO 2:	Learn to integrate social development and sustainable development to address the serious challenges of the globe.
CO 3:	Develop the abilities to involve oneself actively in the process of sustainable development
<b>FOURTH SEMESTER</b> <b><u>G111.4: HEALTH CARE AND EDUCATION</u></b>	
CO 1:	Develop an understanding of holistic concept of Health and different Health

	Care systems in India
CO 2:	Analyze the impact of different Diseases and develop strategies in its Control and Prevention
CO 3:	Identify the relationship between Food, Health and Diseases and to assess the significance of Nutrients to maintain health
CO 4:	Acquire skills in need assessment, program planning, implementation and evaluation framework through field practicum
<b>FOURTH SEMESTER</b> <b><u>DISASTER MANAGEMENT: PREPAREDNESS AND RESPONSE (OPEN ELECTIVE)</u></b>	
CO 1:	Increase knowledge and understanding of disaster phenomenon and its impact on society.
CO 2:	Acquire skills to address potential effects of disasters and to respond to avert these effects.
CO 3:	Develop capacity to respond, manage and mitigate disasters
<b>FIFTH SEMESTER</b> <b><u>G111.5a: SOCIAL WORK WITH FAMILIES</u></b>	
CO 1:	Develop proficiency in practice of Social work with families
CO 2:	Develop competency in family intervention and family therapy
CO 3:	Demonstrate the ability to identify issues in the family and ability to develop intervention strategies
<b>V Semester</b> <b><u>Research Methodology</u></b>	
CO 1:	Acquire competent skills and learn techniques to deal with individuals groups and communities.
CO 2:	Demonstrate professional rapport building skills with the target group.
CO 3:	Demonstrate skills in social analysis, need assessment, program planning and implementation and evaluation framework skills in various settings.
CO 4:	Display oral, written and presentation skills of communication in social work settings
<b>FIFTH SEMESTER</b> <b><u>SOCIAL WORK FIELD PRACTICUM (60 hours of work)</u></b>	
CO 1:	Draw up conceptual clarity on the basics tenets and theories related to social exclusion from a social work perspective.
CO 2:	Develop ability to examine gender as a major organizing principle of

	contemporary social life
CO 3:	Explore the ways that gender intersects with other important lines of social differentiation, such as caste, ethnicity, social class, sexuality, and nationality.
CO 4:	Understand the tribal way of life and problems in India and develop zeal to work for their welfare.
<b>SIXTH SEMESTER SUBALTERN STUDIES</b>	
CO 1:	Draw up conceptual clarity on the basic tenets and theories related to social exclusion from a social work perspective.
CO 2:	Develop ability to examine gender as a major organizing principle of contemporary social life
CO 3:	Explore the ways that gender intersects with other important lines of social differentiation, such as caste, ethnicity, social class, sexuality, and nationality.
CO 4:	Understand the tribal way of life and problems in India and develop zeal to work for their welfare.
<b>SIXTH SEMESTER <u>G111.6b: CRIMINAL JUSTICE SYSTEM AND CORRECTIONAL SOCIAL WORK</u></b>	
CO 1:	Obtain deeper knowledge about criminal justice system in India
CO 2:	Acquiring deeper understanding on the hard realities of prison life by exploring their attitude towards offenders
CO 3:	Students will be able to analyse critically social legislation for prevention of crime
CO 4:	Demonstrate competency to rehabilitate offenders through the application of social case work and social group work methods
<b>SIXTH SEMESTER SOCIAL WORK FIELD PRACTICUM (48 hours of work)</b>	
CO 1:	Understand the functioning of structured setting/agency-Primary or Secondary
CO 2:	Understand in depth the application of social work methods in dealing with individuals and groups.
CO 3:	Develop the ability to do interventions ensuring client's participation.
CO 4:	Develop skills in recording, writing academic articles based on practical experience.

## BBA

### PROGRAMME OUTCOMES

PO1	Acquaint with fundamentals of management education coupled with business correspondence, management aptitude, managerial skills and soft skills.
PO 2	Apply conceptual constructs to solve practical decision making problems by using case analysis, projects and assignments.
PO 3	Facilitate various analytical, technical, creative and integrative abilities in students to build management practices.
PO 4	To document their participation and contribution towards student activities, internship opportunities or other sanctioned initiatives.
PO 5	Identify the opportunities for social entrepreneurship, designing business solutions and demonstrate ethics in organizational decision making.
PO 6	Enhance social interaction blending with eco-sensitivity to make students think and act ethically from campus to corporate world.
PO 7	Edifice leadership and communication skill.

### Programme Specific Outcomes

PSO 1	To assimilate domain knowledge which essentiate the ability to solve business problems thereby abiding ethical procedure.
PSO 2	Fostering hands on experience through industry - institution interaction by enhancing participation through industry visit, internship programmes, workshop and seminars/webinars.
PSO 3	Strengthen academic pursuits by imparting theoretical underpinnings in the field of finance, marketing and human resource aspects, which are in fact, the core functions of the corporate set up.
PSO 4	To facilitate the students to take up emerging challenges and implement viable, ethically upright and socially acceptable solution.
PSO 5	Provide an opportunity to specialize in management areas such as Marketing, Finance, Human Resource Management,
PSO 6	Instilling professionalism, management aptitude, presentation skills, soft skills and written executive communication skills.
PSO 7	Facilitate entrepreneurial skills in students by providing handful of opportunities through incubation centre and promotion of innovation in ideas

	and proposals.
PSO 8	Engage the students in active social interaction and creating awareness on eco-sensitive activities.
<b>SEMESTER - I</b>	
<b>G 401.1 Financial Accounting-I</b>	
CO 1	Apply Generally Accepted Accounting Principles for preparation of the financial statements.
CO 2	Apply the principles of double - entry book keeping and classify the transactions into the subsidiary books of a firm
CO 3	Rectify accounting errors in the books of accounts of a firm.
CO 4	Summarize transactions for finalizing the final accounts of business
<b>G 402.1 Principles of Economics</b>	
CO 1	Know the origin of economics
CO 2	Understand the consumer behaviour in different market situations
CO 3	Understand demand forecasting
CO 4	Examine production process.
<b>G 403.1 Business Statistics and Mathematics- I</b>	
CO 1	Develop statistical thinking and enable students to use techniques of organizing data in tabular and graphical form in order to enhance data analysis and interpretation.
CO 2	Understand the role of measures of central tendency and dispersion in summarization, description and interpretation of data and also to understand the basic concepts of probability.
CO 3	Calculate derivative of a function and to determine the rate of change of quantities, to find largest and smallest values of a function.
CO 4	Distinguish the concepts of simple interest, compound interest and their basic applications.
<b>G 404.1 Managerial Development and Communication</b>	
CO 1	Understand the evolution of management thought and the functional areas of management in an organization.
CO 2	Integrate the planning and organizing function to build an effective organization.

CO 3	Relate the function of directing with staffing and to identify control techniques available in management.
CO 4	Contribute to the organization by learning the art of communicating using business reports, minutes etc.
<b>G 405.1 Marketing Management</b>	
CO 1	Understand the core concepts of marketing such as demand, product utility, marketing mix, market segmentation, targeting and market positioning.
CO 2	Develop an ideal product mix and marketing strategy based on the life cycle of the product.
CO 3	Analyse consumer behaviour to devise marketing strategies that can influence buyer decision process.
CO 4	Illustrate the emerging trends in marketing.
<b><u>Group 2 Elective</u></b> <b>G 406.1E Insurance Management.</b>	
CO 1	Understand the principles and concepts of insurance.
CO 2	Classify and examine products and provisions of life insurance contract.
CO 3	Assessing the various General Insurance products and get insight of provincial control.
<b>G 407.1E Computer Application in Business</b>	
CO 1	Understand the basics of e- commerce and various e- commerce models.
CO 2	Explore how Microsoft Excel can be used to support existing businesses and strategies.
CO 3	Gain familiarity with the concepts and terminology used in Information System Security and cybercrimes.
CO 4	Achieve hands-on experience in developing database using Microsoft Access.
<b>G 408.1E Right to Information Act</b>	
CO 1	Understand the importance of information under the Right to Information Act.
CO 2	Familiarize the powers and duties of informational commissioner.
CO 3	Explore the working of a public authority.
<b>G 409.1E Personality Development</b>	
CO 1	Understand the conceptual aspects of personality.
CO 2	Examine yourself and to develop positive attitude.
CO 3	Identify stress factors that cause anger and methods to manage stress and anger.

<b>SEMESTER - II</b>	
<b>Group-1 G 401.2 Financial Accounting</b>	
CO 1	Analyse final accounts of non- trading concern and distinguish between the expenses and income along with its nature as to capital or revenue.
CO 2	Understand consignment transactions and its accounting treatment in the books of consignor and consignee.
CO 3	Illustrate the methods for maintaining branch accounts and its respective accounting treatment, ascertain profit/loss made by Branch and take corrective measures against unprofitable branches.
CO 4	Prepare joint venture accounts under different methods.
<b>G 402.2 Managerial Economics</b>	
CO 1	Understand the managerial concept of business.
CO 2	Analyse cost and revenue concepts.
CO 3	Know about competition in market conditions.
CO 4	Learn about imperfect competition.
<b>G 403.2 Business Statistics and Mathematics –II</b>	
CO 1	Determine the relationship between the two variables by using correlation and to estimate the relationship between the two variables using regression analysis.
CO 2	Apply the concept of index numbers to understand market situation.
CO 3	Develop a fundamental understanding of linear programming problem and to solve it using graphical and simplex method.
CO 4	Understand the concept of True discount, Banker's discount, Annuities and their basic applications.
<b>G 404.2 Services Marketing</b>	
CO 1	Understand the significance of service marketing in an economy with special reference to Indian economy.
CO 2	Understanding the importance of technology in services industry.
CO 3	Understand the different approaches towards quality service and dimensions of quality.
CO 4	Know the customer expectation and perception through GAP model.
CO 5	Form an idea about consumer expectations from services.
CO 6	Analyse the concept of consumer complaints and know the different areas of service scape.
CO 7	Know the importance of physical environment on services.

<b>G 405.2 Human Resources Management</b>	
CO 1	Describe the concept of HRM, its history and the present day relevance in organizations.
CO 2	Explain the meaning and necessity of human resource planning and analyse the methods adopted for recruitment in organizations.
CO 3	Evaluate the role of selection, placement and training in realizing the objectives of HRM.
CO 4	Understand the importance of job evaluation and the compensation structure in organizations.
<b>Group-2 Elective G 406.2E Event Management</b>	
CO 1	Explain the concept of organizing events.
CO 2	Analyse the legalities required to organize events.
CO 3	Describe how to plan and schedule events.
<b>G 407.2E Retail Management</b>	
CO 1	Describe the complex nature and environment of retail management together with the various segments and key drivers of retailing in India.
CO 2	Understand the different types of retail formats & career opportunities in retailing.
CO 3	Comprehend the decisions retailers make to satisfy customer needs in a rapidly changing and competitive environment.
<b>G 408.2E Bank Management</b>	
CO 1	Understand the operations of modern banking.
CO 2	Analyse the types of relationship between the bank and its customer.
CO 3	Assess the various procedures of lending and to understand the regulations relating to the functioning of a paying banker.
<b>G 409.2E Forex Management</b>	
CO 1	Know the concepts of foreign exchange market.
CO 2	Understand the organization and functions of foreign exchange department of a bank and different types of accounts.
CO 3	Know the concepts of ready exchange rates for trading and non -trading transactions.

**III SEMESTER- 2019 BATCH ONWARDS**

<b>GROUP-1</b>	
<b>G 401.3 Corporate Accounting-I</b>	
CO 1	To outline the accounting for issue, forfeiture and reissue of forfeited shares under varying situations and the book building process.
CO 2	To describe how companies, redeem its preference shares; prepare account for the scheme of redemption by utilizing the capital redemption reserve account and to understand the various ways of issue of debentures and redemption of debentures.
CO 3	To understand the nature and appreciate the need for valuing goodwill under various methods and also to familiarise with the need for valuation of shares under the various methods.
CO 4	To identify the new format of balance sheet as per revised Schedule VI and to know the various provisions of revised Schedule VI.
<b>G 402.3 Public Finance</b>	
CO 1	To understand the various theories governing public finance and shall gain a thorough understanding about government policies on taxation, debt and expenditure.
CO 2	To understand the economic challenge of allocating limited resources among competing uses in a global economy and across different market structures under conditions of limited information.
CO 3	To understand the role of government in the economy in the context of business activity, income distribution, economic growth, globalisation and market failure.
CO 4	It helps students gaining theoretical and practical knowledge about the fiscal policy instruments and its relevance in the economic stabilisation.
<b>G 403.3 Direct Taxes – Paper I</b>	
CO 1	To explain the significance of residential status in relation to determining total income taxable in India of a person.
CO 2	Learn to compute taxable and exempted tax-free incomes
CO 3	To understand the various taxable and tax-free allowances and perquisites which are available to individual assesses
CO 4	To learn to compute taxable salary of an individual.

<b>G 404.3 Commercial Law</b>	
CO 1	Analyse and evaluate the nature, significance, types and essential elements of a valid contract.
CO 2	Conceptual clarity on consideration and capacity to contract.
CO 3	Conceptual clarity on free consent, legality of object and modes of performance, discharge and breach of contract.
CO 4	Ability to understand the legal rules in a Contract of Indemnity and Contract of Guarantee.
<b>G 405.3 Financial Management</b>	
CO 1	To understand the concept of financial management, time value of money and finance functions.
CO 2	To acquaint with the knowledge of cost of debt, cost of equity, cost of preference share capital, retained earnings, WACC.
CO 3	To assess profitable projects and investments using evaluation tools.
CO 4	To analyse the leverages of companies to measure their financial performance and a firm's capitalization.
CO 5	To understand the relation between shareholders wealth and the earnings of the company.
<b>Group-2 Elective</b>	
<b>G 406.3E Business Etiquettes</b>	
CO 1	To understand the concept of Business Etiquette.
CO 2	To understand various kinds of etiquettes.
CO 3	To understand the importance of Body Language.
<b>G 407.3E Training the trainer</b>	
CO 1	To understand the significance of oratory skills in our personality.
CO 2	To Excel in presentation skills and inculcate negotiation skills.
CO 3	To get acquainted with the concept of resourceful sessions and establishing connection with audience.
<b>G 408.3E Personal Selling</b>	
CO 1	Study the types of personal selling and the importance of trust and ethics.
CO 2	Learn the skills required to understand the market, the buying process, and the communication skills needed to build customer relationships.
CO 3	Study the sales dialogues, sales presentations, and demonstration methods.

<b>G 409.3E Corporate Social Responsibility</b>	
CO 1	To know the most common theoretical perspectives for understanding Corporate Social Responsibility (CSR) and the role of business in sustainable development.
CO 2	It examines the development of the idea of corporate social responsibility, and helps the student in understanding the role of public sector towards the contribution in CSR.
CO 3	Provides insights on the challenges faced and various CSR initiatives required for development of any business.
<b><u>IV SEMESTER- 2019 BATCH ONWARDS</u> Group-1</b>	
<b>G 401.4 Corporate Accounting-II</b>	
CO 1	To understand the types of amalgamation and the methods of accounting as per Accounting Standard 14 and to understand the concept of absorption
CO 2	To understand the concept of external and internal reconstruction and the difference between amalgamation, absorption and external reconstruction and to understand the concept of alteration of share capital, internal reconstruction or capital reduction and the procedure for reducing share capital.
CO 3	To understand the modes of liquidation, its consequences and the order of payment.
CO 4	To understand the format of final accounts adopted by banking companies as per the recent amendments
<b>G 402.4 Indian Economy</b>	
CO 1	To understand the features and structural changes of Indian economy and compare with the growth pattern and challenges of other economies.
CO 2	It enables the students to apply the theoretical knowledge in the actual working of Indian economy.
CO 3	To make the students understand the role of various economic policies in promoting the development of Indian economy.
CO 4	It enables the students to learn critically, discuss and debate current economic issues on the basis of latest policy documents and trends.
<b>G 403.4 Direct Taxes- Paper II</b>	
CO 1	To learn to compute taxable income from house property.

CO 2	To learn to compute business and professional incomes.
CO 3	To understand the computation of long term and short-term capital gains.
CO 4	To find out taxable income from other sources.
<b>G 404.4 Corporate Law</b>	
CO 1	Understand the concept of Joint Stock Company and suggest the suitability of Joint Stock Company as a form of Business organization.
CO 2	Understand the use of the memorandum of association and article of association in a company.
CO 3	Understand the relationship between company and the shareholders and the various documents required to raise the capital.
CO 4	Apply the concepts learned for winding up and the procedure to be followed in winding up of the company.
<b>G 405.4 Research Methodology</b>	
CO 1	To understand the fundamentals of a research and the various process used in executing a research.
CO 2	It helps the students to identify the different research problems and formulate the research design accordingly.
CO 3	It helps the students in selecting various samples and also helps in the measurement and scaling of the research.
CO 4	To understand the methods to collect data, analysing the data and based on the analysis executing a research report.
<b>Group-2 Elective G 405.4E Personal Investment and Tax Planning</b>	
CO 1	Learn the importance, and have a basic understanding of personal tax planning techniques and risk management process.
CO 2	Develop and identify analytical skills to facilitate effective financial decision-making, including informed decisions regarding investment, insurance, retirement, and estate planning.
CO 3	To provide working knowledge of personal tax planning for making appropriate financial decisions, both personal and business.
CO 4	To have an understanding of income tax laws in India and be able to do tax planning and also state the use of deductions of expenses to reduce the taxable income.

<b>G 406.4E Fundamentals of Accounting</b>	
CO 1	To explain the accounting concepts and conventions used in the business.
CO 2	To Classify the transactions into the books of a firm.
CO 3	To prepare Profit and Loss Accounts and balance sheet of a company.
<b>G 407.4E Travel and Tourism Management</b>	
CO 1	To learn about demand for tourism industry and to understand the basic concepts of tourism.
CO 2	To learn how to prepare the itinerary.
CO 3	To learn how to design the tour packages.
<b>G 408.4E New Venture Creation and Entrepreneurship</b>	
CO 1	To understand the basics of entrepreneurship, types of entrepreneurs and to understand the outcomes of social, rural and women entrepreneurs.
CO 2	To prepare a budget for start-ups and know the proper sources of funding to the enterprises.
CO 3	To learn to write a business plan and draft a business idea to brain storm business ideas.
<b>V SEMESTER (2019 BATCH ONWARDS)</b>	
<b>G 401.5 Cost Accounting</b>	
CO 1	To understand and explain basic conceptual framework of cost, cost accounting, costing methods, techniques and the relevance of different types of cost in decision making process.
CO 2	To understand and explain concepts of material cost, material cost control and issue of materials and calculate pricing of material purchase, inventory control techniques and prepare stores ledger under different methods of pricing of material purchases.
CO 3	To understand and explain conceptual framework of labour and labour cost, calculate labour cost, gross wage and net wage, different systems of wage payment
CO 4	To understand and explain concepts of labour and labour cost, prepare primary and secondary distribution summary of overheads, absorption of factory overheads and calculate overhead absorption rates
CO 5	To understand and explain the concepts of cost audit, scope of cost audit, audit report and duties of cost auditor

<b>G402.5 Operations Management</b>	
CO 1	Understanding the basics of operations management and applicability of operations management in different disciplines.
CO 2	Examining CPM and PERT in business projects. Understanding cost –time trade off by applying Crashing techniques
CO 3	Application of various transportation models in operational areas to find out the initial and optimal solution.
CO 4	Understanding on how to apply assignment models based on man to machine to arrive at optimal solution.
CO 5	Assessing various work assessment concepts and understanding modern day tools of Operations management in business
<b>G403.5 Advance Taxation – Paper I</b>	
CO 1	Understanding the procedure of set-off and carry forward of losses while arriving at Gross Total Income of an Assessee.
CO 2	Assessing basic deductions under Section 80 with practical learning applicable while filing the return by an Assessee.
CO 3	Understanding assessment procedure of Individual and firm by determining tax liability of firm.
CO 4	Assessing the company tax procedure and computation of tax liability of the company.
CO 5	Examining the tax laws applicable to co-operative societies with practical learning and assessing the tax liability of cooperative societies.
<b>G404.5 Auditing</b>	
CO 1	To understand the basics of auditing in today's organizations.
CO 2	To examine the internal control and vouching procedures
CO 3	To assess the procedures which have to be adopted by the auditors in regard to verification and valuation of assets and liabilities
CO 4	To explain appointment, rights, duties, liabilities and professional ethics of a company Auditor.
CO 5	To analyse various auditing issues with the help of case laws and to examine various computerised auditing techniques
<b>G404.5 Project/ Internship</b>	
Project	Students will get hands on experience by undertaking live project in different streams such as Finance, Human resource management and marketing management
Internship	Students will get hands on experience by undertaking live internship in

	corporate sector/ business units on different streams such as Finance, Human resource management and marketing management.
<b>G405.5 Organizational Behaviour</b>	
CO 1	To understand the origins of organizational behaviour and influences on personality.
CO 2	To examine those elements of the cognitive process that contributes to employee behaviour.
CO 3	To analyse styles of leadership and its effects on the psychology of the organization.
CO 4	To understand the effects of employees working together under a formal structure, its benefits, problems and motivation.
CO 5	To explain the how organizational culture could result in Conflicts, acquisition of power and positive or negative politics
<b>G406.5 Working Capital Management (Finance Specialisation)</b>	
CO 1	Examining various working capital components and various sources of financing on current assets by applying practical concepts.
CO 2	Understanding the cash management principles and planning of cash budget in business with practical problems.
CO 3	Evaluating various receivable norms and collection policies with optimum credit policy with practical learning.
CO 4	Examining various techniques of inventory management and its applicability in Production sector with practical assessment.
CO 5	Understanding various forms of lease agreements with practical learning and gaining the knowledge of various forms of hybrid financing to business.
<b>G407.5 Strategic Human Resource (HR Specialisation)</b>	
CO 1	To familiarize the students with the methods of performance appraisal and importance of succession planning in an organisation.
CO 2	To get the knowledge about changing horizons in HRM which can change the working structure of the organization.
CO 3	To familiarise students with the process of HRD adopted by the organisation and also importance of executive development in the growth of organization.
CO 4	To study the importance of collective bargaining and the techniques obtained

	by organisations to make workers participate in the various levels of management.
CO 5	To study the importance of discipline in any working environment need of grievance procedure in an organization.
<b>G408.5 Rural Marketing (Marketing Specialisation)</b>	
CO 1	This chapter highlights the profile of rural market existing in India.
CO 2	To understand the strategies adopted in rural marketing.
CO 3	To apply the marketing of services and consumer durables and addressing the issues of the artisans.
CO 4	To address the issues related to rural marketing.
CO 5	To learn the details of the institutions supporting rural marketing.
<b>2019 BATCH ONWARDS VI SEMESTER</b>	
<b>G401.6 Cost and Management Accounting</b>	
CO 1	To understand job, batch, unit costing and contract costing methods: calculation of cost and its application in managerial decision making.
CO 2	To understand and explain concepts of process costing, types of losses with treatment of loss; Calculate cost using process costing and preparing process account.
CO 3	To understand and explain concepts of operating costing, calculate cost using operating costing and prepare operating cost statement of Transport Company.
CO 4	To understand and explain conceptual framework of cost and management accounting, calculate and interpret the break-even point after describing its underlying assumptions.
CO 5	To understand and explain concepts of budget and budgetary control, prepare and interpret production budgets; To understand and explain concepts of standard costing and variance analysis as an important tool for business management
<b>G402.6 Investment Management</b>	
CO 1	To understand the conceptual framework of investment and identify the risk associated with different avenues of investment.
CO 2	To analyse the financial markets available and the trading mechanism adopted in the Indian securities market.
CO 3	To comprehend the operations and regulations adopted in Indian securities

	market.
CO 4	To gauge the significance of analysis of economic, industry and company parameters while studying the investment climate.
CO 5	To understand the concept of mutual fund while building the portfolio and to study the facilitating services of banking operations. To analyse the modalities incorporated in estate-planning and to study the laws governing estate-planning in India.
<b>G403.6 Advance Taxation – Paper II</b>	
CO 1	Understand the basic concepts of Goods and Services tax and assess the applicability of GST in India.
CO 2	Assessing the practical learning of GST by understanding the fundamental principles and various rates involved in GST.
CO 3	Understanding GST registration procedure by practical learning.
CO 4	Examining on procedure of settlement of input tax credit against out tax with reference to SGST, CGST and IGST.
CO 5	Understanding the various types of customs duties and practical application of custom duties on Import of goods and services with practical assessment.
<b>G404.6 Logistics and Supply Chain Management</b>	
CO 1	To understand the concept of supply chain management and appraise the importance of the design and redesign of a supply chain as key components of an organization's strategic plan.
CO 2	To learn the notion of logistics and major logistics functions and activities.
CO 3	To understand the modes of transportation, warehouse processes, systems, and performance measures.
CO 4	To analyse the material handling process and packaging operations of a firm.
CO 5	To understand the components of logistics network design and logistics infrastructure
<b>G405.6 Entrepreneurship Development</b>	
CO 1	To understand the basics and factors affecting entrepreneurs and to know about different types of entrepreneurs.
CO 2	To understand various types of entrepreneurship and EDP programmes and to understand the outcomes of social, rural and women entrepreneurs.
CO 3	To learn about legal procedures about enterprise and to learn to get licence and other rights in order to expand the business.

CO 4	To prepare a budget for a venture and know the proper sources of funding to the enterprises.
CO 5	To learn to write a business plan and draft a business idea and to brain storm business ideas
<b>G406.6 Financial Statement Analysis (Finance Specialisation)</b>	
CO 1	Examining various concepts of financial statement analysis applicable in business.
CO 2	Analysing various techniques of financial statement analysis incorporated by the corporate entity assessing the same with practical knowledge.
CO 3	Understanding various liquidity ratios and capital structure ratios involved in determining the financial position of the business with practical learning.
CO 4	Understanding various activity ratios and profitability ratios involved in determining the financial position of the business with practical learning.
CO 5	Analysing cash flow statement with practical learning and determining the cash position of business with the knowledge of various components involved in preparing cash flow statement.
<b>G407.6 Industrial Relations and Labour Welfare (HR Specialisation)/</b>	
CO 1	To study the importance of employee, employer and government in framing healthy relationship within the industry.
CO 2	To study the causes for disputes and the settlement measures adopted to by the industry.
CO 3	To study the facilities provided for the betterment of the workers and the schemes provided by the government for the welfare of the employees.
CO 4	To study the security measures provided for special categories of labourers.
CO 5	To study the importance of safety in the working atmosphere and facilities provided to maintain the health of the workers.
<b>G408.6 Advertising Management (Marketing Specialisation)</b>	
CO 1	To understand the fundamentals of advertising.
CO 2	To examine factors such as consumer behaviour, perception, communication in relation to advertising.
CO 3	To analyse the practical aspects of advertising that is relevant to working in an advertising agency.
CO 4	To understand the essential details that are necessary for any agency/firm to look into before releasing the advertisement.
CO 5	To explain those essential aspects of marketing that forms a part of advertising in India.

<b>B.Com</b>	
<b>Programme Outcomes</b>	
PO 1:	Develop a thorough understanding of various fundamental concepts of commerce, finance and economics and apply them in real life situations.
PO 2:	Apply knowledge, understanding and skill to identify the unsolved problems in rapidly changing business environment and analyse and assess these problems using appropriate methodology.
PO 3:	Develop a good value system leading to high ethical and moral conduct, to meet the expectations of established legal practices in the field of Commerce.
PO 4:	Stand with the requirement of business sector seeking youth fit for employment in the world of work, with the acquired competencies and attitudes.
PO 5:	Build a strong footing for advanced studies in Commerce and its allied areas on multiple disciplines concerned with commerce.
PO 6:	Engage in the process of reflective, independent and pragmatic thinking by understanding the concepts in every area of commerce and business.
PO 7:	Acquire various soft skills like communication, analytical and computer literacy required to manage complete business situation as well as life situations.
PO 8	: Apply their knowledge necessary to address complex environmental, gender related and legal issues at local, regional and global scale.
PO 9:	Write analytically in a variety of formats, including essays, research papers, reflective writing and critical reviews of secondary sources using language skills.
<b>Programme Specific Outcomes:</b>	
PSO-1:	Understand various concepts and theories providing strong academic foundation in the field of economics and business.
PSO-2:	Acquaint and demonstrate practical skills in areas of Marketing, Banking, Business Management, Taxation and Human Resource Management.
PSO-3	Acquire practical skills to work as tax consultant, audit consultant, investment consultant and other financial supporting services.
PSO-4:	Apply the practical skills in Accounting and Costing and able to handle independently accounts and costing functions in the business.
PSO-5:	Exhibit gender sensitivity with the knowledge gained from the aspects related

	to gender equity.
PSO-6:	Apply various technical ICT tools to explore, analyse and use the information for business purposes.
PSO-7:	Emphasize cultivating the ideology which promotes sustainable environmental system and eco-friendly fair business practices.
PSO-8:	Achieve proficiency with the ability to crack competitive exams like CA, CS, ICWA and other courses.
PSO-9:	Apply mathematical and statistical tools in academics, business and research.
PSO-10:	Clarify the problems related to employer, employee and Consumers through the exposure to labour laws and consumers acts.
PSO-11:	Equip with analytical skills in linguistics, communications and literary criticism.
<b>Course outcomes of B.Com (Regular)</b>	
<b>Semester I Financial Accounting-I</b>	
CO-1:	Develop an understanding of fundamental accounting concepts and conventions.
CO-2:	Outline the concept of IFRS and apply the accounting standards.
CO-3:	Examine the reasons for the errors in the accounts and rectify the errors.
CO-4:	Identify the reasons for the difference in the cash book and pass book and reconcile the same
CO-5:	Develop final accounts of trading and non-trading concerns
<b>Business Economics</b>	
CO-1:	Understand the basic concepts of Business Economics.
CO-2:	Describe the consumer behaviour in different market situations.
CO-3:	Explain market structure and recent changes.
CO-4:	Analyse concepts of production, cost and revenue
CO-5:	Outline the relevance of demand forecasting and functions of demand
<b>Principles of Management</b>	
CO-1:	Acquire a clear understanding of the basic concepts of Management
CO-2:	Acquaint with the knowledge of application of Principles of Management under different organisation structures
CO-3:	Develop the skills for practical execution of the functions of Management
CO-4:	Apply the knowledge on systematic planning and its execution

CO-5:	Recognize the concepts, principles and execution of functions under International Management.
<b>Business Statistics</b>	
CO-1:	Identify a statistical method for solving practical problems.
CO-2:	Discuss critically the uses and limitation of statistical techniques.
CO-3:	Describe and discuss the key terminology, concepts, tools and techniques used in business statistical analysis.
CO-4:	Evaluate critically the underlying assumptions of analysis tools
<b>Elective 1 Human Resource Management</b>	
CO-1:	Describe the basic concept of Human Resource Management.
CO-2:	Outline the process involved in the selection and training of human resource.
CO-3:	Evaluate the various techniques of job analysis, job design and job description.
<b>Elective 2 Tourism Management</b>	
CO-1:	Outline the basic concepts of travel and tourism and discuss the terminology used.
CO-2:	Identify various areas related to tourism and how it affects the destination.
CO-3:	Outline the selected issues that currently influence the tourism industry both locally and globally.
CO-4:	List various organizations involved in the development of tourism.
CO-5:	List the Tourism Policy of India which governs and regulate the development of Tourism in India
<b>Elective 3 Shipping and Port Management-I</b>	
CO-1:	Identify business opportunities in shipping industry.
CO-2:	: Analyse the role of ship management company and shipping intermediaries.
CO-3:	Evaluate different types of containerisation and understand the challenges faced by depots
<b>Elective 4 Insurance-I</b>	
CO-1:	Understand the importance of life and general insurance
CO-2:	Explain the features of various insurance products

CO-3:	Outline the procedures involved in making claims.
<b>Elective 5</b>	
<b>Logistics And Supply Chain Management</b>	
CO-1:	Understand the importance of logistics to business organizations.
CO-2:	Provide a brief overview of the set of activities that make up the logistics process
CO-3:	Describe the process of Supply Chain Management
CO-4:	Understand the relationship between Supply chain Management and Integrated Logistics
CO-5:	Analyse the components of customer service in logistics.
<b>Semester II</b>	
<b>Financial Accounting-II</b>	
CO-1:	Understand the need of accounting standard and comparison of Indian accounting standards with international financial reporting standard
CO-2:	Apply different methods of depreciation accounting.
CO-3:	Develop an understanding of preparation of Consignment accounts and Joint Venture accounts.
CO-4:	Apply the knowledge of preparation of departmental accounts.
CO-5:	Execute the valuation of investments.
<b>2. Business Environment</b>	
CO-1:	Analyse environmental issues relating to the business.
CO-2:	Explain the concept of public finance
CO-3:	Distinguish between the monetary and fiscal policy issues in India
CO-4:	Analyse critically various economic reform measures in India.
CO-5:	Develop entrepreneurial skills required in the modern business.
<b>Banking Theory and Practice</b>	
CO-1:	Outline the concept of bank and banking.
CO-2:	Describe evolution and development of banking system in India.
CO-3:	Discuss important provisions of banking regulation act of 1949, objectives and problems of credit management
CO-4:	Explain negotiable instruments and holder and holder in due course, endorsement of negotiable instruments
CO-5:	Investigate recent trends in banking sector.

CO-6:	Apply accounting knowledge while drafting final accounts of banking companies
<b>Business Mathematics</b>	
CO-1:	Apply equations, formulae, and mathematical expressions and relationships in a variety of contexts.
CO-2:	Explain business mathematics concepts that are encountered in the real world.
CO-3:	Understand and be able to communicate the underlying business concepts and mathematics involved to help another person gain insight into the situation.
CO-4:	Apply the knowledge in mathematic in solving business problems
CO-5:	Develop mathematical skills required in mathematically intensive areas in Economics and Business.
<b>Elective 1 Human Resource Management-II</b>	
CO-1:	Understand the emerging issues and challenges of Human Resource Management
CO-2:	Emphasis the importance of Work Life Balance
CO-3:	Develop the ethics in Human Resource Management
CO-4:	Acquire the knowledge of International Human Resource Management
<b>Elective 2 Tourism Operations</b>	
CO-1:	Identify the nature of different tourism products and provide insights into the process of developing and managing various tourism products.
CO-2:	Outline the market segmentation and learn about target markets.
CO-3:	Explain the important natural tourism products of India.
CO-4:	Describe the various aspects in tourism entrepreneurship
CO-5:	Examine the role of entrepreneur in tourism sector.
CO-6:	Describe the innovations which can be brought in tourism
<b>Elective 3 Shipping and Port Management -II</b>	
CO-1:	Understand the basics of shipping and shipping industry
CO-2:	Analyse the regulatory framework governing Port development in India
CO-3:	Describe the port operations and term operations

<b>Elective 4 Insurance- II</b>	
CO-1:	Understand the regulation of Insurance business
CO-2:	Examine the application of life insurance
CO-3:	Describe the legal aspects of life insurance
<b>Elective 5 Logistics and Supply Chain Management-II</b>	
CO-1:	Understand the tools and techniques in inventory management.
CO-2:	Explain the concepts of warehouse, management systems
CO-3:	Describe the fundamental roles of Logistics with regards to transportation and Warehousing.
<b>Semester III Financial Accounting-III</b>	
CO-1:	Understand the overall overview of Indian Accounting Standards and International Financial Reporting Standards and applicability of AS 14 to AS 19.
CO-2:	Explain the salient features, application and accounting for hire purchase and Installment system.
CO-3:	Acquaint with the practical knowledge of Royalty accounting
CO-4:	Apply the knowledge in the preparation of Branch accounts
<b>Cost Accounting-I</b>	
CO-1:	Apply the knowledge of basic concepts of cost accounting.
CO-2:	Execute the preparation of cost sheet.
CO-3:	Understand the concept of material control
CO-4:	Analyse overhead cost classification and methods of absorption of overheads
CO-5:	Identify the causes of disagreements in profits and reconcile the same.
<b>Income Tax-I</b>	
CO-1:	Acquaint themselves with the knowledge of basic concepts and definitions of Income Tax Act 1961.
CO-2:	Assess the residential status of an assessee and to compute the taxable income of assessee with different residential status
CO-3:	Identify the incomes exempted from tax.
CO-4:	Determine income from salary and income from house property of an assessee

<b>Principles of Marketing</b>	
CO-1:	Understand the basic concepts and functions of marketing.
CO-2:	Explain the importance and strategies of market segmentation.
CO-3:	Acquire the knowledge of development of a product.
CO-4:	Develop the pricing and branding strategies of an organisation
CO-5:	Describe the Global marketing environment..
<b>Elective 1 Entrepreneurship</b>	
CO-1:	Understand the parameters to assess opportunities and constraints for new business ideas
CO-2:	List various challenges faced by entrepreneurs.
CO-3:	Outline strategies for successful implementation of ideas.
CO-4:	Design a business plan and perform a project appraisal
CO-5:	Identify various institutional supports available for entrepreneurs
<b>Elective 2 Soft skills training and development</b>	
CO-1:	Understand the concept and importance of soft skills
CO-2:	Acquaint with the relevance of time management and team building
CO-3:	Exhibit corporate etiquettes required in the corporate world
<b>Elective 3 Stock Market Operations</b>	
CO-1:	Develop a good understanding of the primary and secondary market
CO-2:	Acquire the practical knowledge relating to trading in stock market.
CO-3:	Describe the legal procedures involved in the functioning of stock market
<b>Elective 4 Consumer Protection</b>	
CO-1:	Understand the concept of consumer movement
CO-2:	Outline the consumer rights and need for consumer protection
CO-3:	Acquaint the knowledge of redressal mechanism of consumers complaints.
CO-4:	Identify the types of quality assurance standards.
<b>Elective 5 Advertising</b>	
CO-1:	Understand the concept and objectives of setting the advertising budget
CO-2:	Evaluate the advertising effectiveness
CO-3:	Examine the different types of marketing

CO-4:	Identify the significance of online marketing
CO-5:	Explain the ethical issues in advertising
<b>Elective 6</b>	
<b>Retail Management</b>	
CO-1:	Describe retailing, the entities involved, and the impact of decisions on a retail business
CO-2:	Explain the consumer decision-making process
CO-3:	Analyse the factors influencing retail operations
<b>Elective 7 Investment Management</b>	
CO-1:	Understand the basic concept of investment
CO- 2:	Acquire knowledge about the avenues of investment.
CO- 3:	Understand the importance of financial plan and plan for investment
CO- 4:	Acquire knowledge of building funds like emergency fund, retirement fund etc
<b>Semester I</b>	
<b>Financial Accounting-IV</b>	
CO-1:	Understand the concepts and prepare partnership account from admission of a partner to dissolution of firm
CO-2:	Acquire knowledge of accounting standards and IFRS
CO-3:	Identify the reasons for the amalgamation of firms
CO-4:	Develop accounting aspects relating to amalgamation of partnership firms and limited liability partnership
<b>E-Commerce and Accounting</b>	
CO-1:	Analyze the impact of E-commerce on business models and strategy.
CO-2:	Understand the features and practical uses of MS Excel.
CO-3:	Apply the application of MS-Excel
CO-4:	Acquaint the practical knowledge of Tally and its application.
CO-5:	Use the Tally ERP 9 software
CO-6:	Understand generating the basic reports in Tally
<b>Cost of Accounting-II</b>	
CO-1:	Understand the concept of Job, Batch and Contract costing.
CO-2:	Apply the knowledge gained in the preparation of a budget and use budgets for performance evaluation after flexing the budget.

CO-3:	Interpret variable cost variances and fixed cost variances.
CO-4:	Explain the concept of cost audit and cost accounting records.
<b>4. Income Tax-II</b>	
CO-1:	Apply the income tax rules governing computation of income from business or profession, capital gains and income from other sources
CO-2:	Interpret aggregation of income and deduction u/s 80 C to 80 U
CO-3:	Apply the knowledge in the computation of the total income of individuals and total tax liability of an individual assessee.
<b>Elective 1 Tourism Management</b>	
CO-1:	Understand the fundamentals of tourism from the management, marketing and financial perspectives.
CO-2:	Develop the conceptual knowledge of tourism planning and tourism development.
CO-3:	Explain functions of Indian and International tourism organisations
<b>Elective 2 Event Management</b>	
CO-1:	Understand the role of a event manager
CO-2:	Acquaint with the knowledge of procedural requirements involved in event management
CO-3:	Execute the conduct of an event
<b>Elective 3 Personal Tax Planning</b>	
CO-1:	Acquire practical knowledge of assessment of income of an individuals
CO-2:	Apply the knowledge of computation of tax liability of individuals and make proper tax planning.
CO-3:	Execute filing of IT returns
<b>Elective 4 Stock Market operations</b>	
CO-1:	Develop a good understanding of the primary and secondary market
CO-2:	Acquire the practical knowledge relating to trading in stock market
CO-3:	Describe the legal procedures involved in the functioning of stock market.
<b>Semester V Corporate Accounting-I</b>	
CO-1:	Explain meaning, features and types of companies, issue, reissue and forfeiture of shares

CO-2:	Outline SEBI guidelines on underwriting of shares, types of underwriting
CO-3:	Discuss the meaning and features of goodwill
CO-4:	Lists out various methods of valuation of goodwill and valuation of shares
CO-5:	Prepare the final accounts of companies
CO-6:	Explains meaning, features and types of debentures and illustrates methods of redemption of debentures
CO-7:	Investigate recent issues in financial accounting
<b>International Business</b>	
CO-1:	Acquaint the knowledge related to international trade.
CO-2:	Outline the balance of payment of nation and analyse the economic condition.
CO-3:	Examine the working condition of various international institutions.
CO-4:	Describe the trade policies and trade barriers involved in international business
CO-5:	Analyse the reforms related to foreign capital in India
CO-6:	Explain different forms of economic integration
<b>Principles and Practice of Auditing</b>	
CO-1:	Develop the knowledge of fundamental audit concepts.
CO-2:	Explain different types of audit report, written representations and the final review and report.
CO-3:	Determine the appropriate company audit report for a given audit situation
CO-4:	Perform verification of vouchers
CO-5:	Understand the procedures of company audit and auditors report
<b>Business Law</b>	
CO-1:	Understand the concept of law through various acts.
CO-2:	Describe the essentials of offer and acceptance
CO-3:	Assess the legality of agreement
CO-4:	Examine the effects of consent and misrepresentation
CO-5:	Develop an understanding of discharge of contract
CO-6:	Outline the legal aspects of right to information and cyber law
<b>Financial Management</b>	
CO-1:	Understand the role and purpose of the financial management function
CO-2:	Acquire the knowledge of patterns of capital structure and capital structure

	planning
CO-3:	Clear understanding of Theories of Capital Structure
CO-4:	Understand Dividend Policies and Theories on Dividend Policies.
CO-5:	Get practical knowledge in Capital Budgeting and techniques of Capital Budgeting
CO-6:	Understand the working of lease financing
<b>Business Taxation</b>	
CO-1:	Apply the knowledge of assessment of HUF
CO-2:	Describe the meaning of firms and AOP/BOI and assessment of its total income and tax liability
CO-3:	Develop an understanding of different forms of companies and computation of tax liability of companies
CO-4:	Explain the assessment procedures of different assessees
CO-5:	Understand the benefits of tax planning
<b>Semester VI</b>	
<b>Corporate Accounting-II</b>	
CO-1:	Understand the concept of merger, absorption and external reconstruction.
CO-2:	Execute the accounting treatment for amalgamation and external reconstruction.
CO-3:	Analyse the accounting process of internal reconstruction and liquidation of companies.
CO-4:	Apply the accounting knowledge of holding companies accounts.
CO-5:	Explain the concept and application of value added
CO-6:	Examine the recent issues in Financial Accounting
<b>2. Foreign Exchange Management</b>	
CO-1:	Understand the evolution of foreign exchange market
CO-2:	Describe the various players in the foreign exchange management
CO-3:	Develop an understanding of arithmetic and interbank deals
CO-4:	Explain the regulations of foreign exchange market
CO-5:	Outline the different dimensions of foreign exchange in Indian context
<b>3. GST and Customs Law</b>	
CO – 1:	Understand the basic concepts of GST

CO – 2:	Explain the concept of supply under GST
CO – 3:	Describe the procedures involved in the registration of a taxable person under GST
CO – 4:	Acquire the knowledge of computation of value of taxable supply under GST and customs duty
CO - 5:	Determine the amount of GST liability and customs duty.
<b>Corporate Law and Governance</b>	
CO-1:	Understand the procedural requirements for the formation of a company
CO-2:	Identify and modes of acquiring membership of accompany
CO-3:	Outline the requisites of a valid meeting
CO-4:	Describe the procedures involved in winding up of companies
CO-5:	Assess the mechanisms available to improve corporate governance
CO-6:	Evaluate the corporate social responsibility projects of business organisations
<b>Management Accounting</b>	
CO-1:	Understand management accounting and its objectives in facilitating decision making.
CO-2:	Apply accounting ratios and make a financial analysis and prepare reports.
CO-3:	Acquaint with the knowledge of preparing Cash Flow and Funds Flow statements
CO-4:	Analyze cost-volume-profit techniques to determine optimal managerial decisions.
CO-5:	Perform cost variance analysis and demonstrate the use of standard costs in flexible budgeting.
CO-6:	Understand the aspects, importance and applicability of Responsibility Accounting, Management Audit
CO-7:	Apply the techniques of financial forecasting
<b>6. Security Analysis and Portfolio Management</b>	
CO-1:	Acquire theoretical and practical background in the field of investments.
CO-2:	Develop an insight into the relationship of the risk and return.
CO-3:	Understand theories of Portfolio management and also the tools and techniques for efficient portfolio management.
CO-4:	Apply the concept of portfolio management for the better investment.
CO-5:	Analyse different types of fundamental and technical analysis

CO-6:	Explain the asset pricing theories and concept of derivatives
<b>B.COM (BPS)</b>	
<b>Programme Outcomes</b>	
PO 1:	Students will be able to critically analyze the business environments while making a decision to get associated with the corporate organisations.
PO 2:	Students will be able to effectively communicate within and outside the organisations by drafting essential letters, reading out official announcements in meetings, listening and interpreting matters concerned to the organisation precisely, in languages that are used in common.
PO 3:	Students will be able to interact freely with members of bodies with which the college has MOU with Tata Consultancy Services and take their guidance in their careers like business or employment.
PO 4:	Students will demonstrate empathetic concerns towards the marginal society and contribute towards the development of the nation, by being well informed regarding Corporate Social Responsibility issues and active participation in public service through corporate organisations.
PO 5:	Students will be able to deal with ethical dilemmas and value systems existing in the corporate organisations and accept responsibilities.
PO 6:	Learning environmental issues, students will show sensitivity towards sustainability and ecology in corporate organisations.
PO 7:	Students will have the ability to keep learning through-out their careers and thereby contributing towards social and technological changes.
<b>Programme Specific Outcomes:</b>	
PSO-1:	Understand the nature and basic Industry based concepts like banking for business processes, Insurance for business processes, Retail Marketing and Capital Investment in businesses.
PSO-2:	Analyze Accounting procedures involved in payments and receipts from customers, banking institutions etc., which required in maintaining the books of accounts for various business processes.
PSO-3	Determine the outcomes of the retail marketing research projects and learn the ways to implement business projects effectively and efficiently.
PSO-4:	Understand the nature of Corporate world and learn the required corporate

	behaviours in order to blend with the culture of the corporates.
<b>B.COM (ACCA)</b>	
<b>Programme Outcomes</b>	
PO 1:	Students will be able to critically analyze the Global Accounting standards and Reporting while making a decision as finance and administrative Executives in the capacity of an ACA Affiliate.
PO 2:	Students will be able to effectively communicate within and outside the multi-cultural organisations at a global level by frequent interactions leading to effective listening and interpreting matters concerned thus develop negotiating skills.
PO 3:	Students will be able to interact freely with members of global body like ISDC, with which the college has MOU and take their guidance to enrich their global careers.
PO 4:	Students will demonstrate empathetic concerns towards global citizens and contribute towards the development of the various nations, by being well informed regarding Corporate Social Responsibility issues and actively participating in resolving international crisis affecting the corporate world.
PO 5:	Students will be able to deal with ethical dilemmas and value systems existing in the global corporate organisations and accept responsibilities by enforcing ethical code of conducts.
PO 6:	By learning global environmental issues, students will show sensitivity towards sustainability and ecology in corporate organisations at an international level.
PO 7:	Students will develop the ability to learn constantly through-out their global careers and thereby contribute significantly towards social and technological changes
<b>Programme Specific Outcomes:</b>	
PSO-1:	Understand internationally accepted financial accounting and reporting practices throughout the program.
PSO-2:	Analyze and apply various fundamental knowledge of accounting, Taxation laws, Financial reporting techniques in corporates and other institutions.
PSO-3	In depth knowledge of business concepts like Risk Management, Corporate Governance, Business Ethics which is required to manage the organisations effectively.
PSO-4:	Understand the applications of Management accounting, Auditing techniques,

	Cost Accounting techniques and Finance in business organisations.
<b>B.COM (CA)</b>	
PO 1:	Students will be able to critically analyze the Indian Accounting standards and unbiased reporting to concerned authorities in the capacity of a Chartered Accountant.
PO 2:	Students will be able to effectively communicate within and outside the business organisations by developing effective listening, speaking or expressing fluently in different languages through electronic media and thereby connecting people and the business.
PO 3:	Students will be able to interact freely with members of national body like ICAI, in parallel collaboration with KVC Academy and take their guidance to further their careers as Chartered Accountants.
PO 4:	Students will demonstrate empathetic concerns towards marginalized societies and contribute towards responsible auditing leading to businesses which enhance economic development of the nation.
PO 5:	Students will be able to deal with ethical issues while reporting and inculcate high value system by avoiding misuse of public funds, frauds and scams. They will accept responsibility by being truthful and honest in their careers as Chartered Accountants, by upholding International Accounting Standards.
PO 6:	By learning national and international environmental issues, students will show sensitivity towards sustainability and maintain ecological balance in large and small business organisations by effectively auditing CSR activities.
PO 7:	Students will develop the ability to learn constantly through-out their careers as Chartered Accountants and thereby contribute significantly towards changes that take place in economic and business world.
<b>Programme Specific Outcomes:</b>	
PSO-1:	Understand and analyze the Indian Accounting standards and fundamental accounting concepts and conventions along with preparation of annual accounts of proprietary and professional concerns.
PSO-2:	Develop abilities and applications of specific accounting standards and legislations to various business transactions.
PSO-3:	Understand environmental issues, Laws of Partnership, National Income and its measurements and thereby develop entrepreneurship qualities.
PSO-4:	Analyze the provisions of company law and acquire the abilities to address its application in auditing the company's books of accounts.
PSO-5:	Understand basic concepts of Cost and Management Accounting and learning to prepare Cost Sheets by integrating accounting systems.
PSO-6:	Understanding the provisions of income-tax laws and acquire the ability to apply such knowledge to make computations and address application-oriented issues.

<b>Bachelor of Computer Applications (BCA)</b>	
<b>Program Outcome(PO)</b>	
<b>PO1:</b>	Understand, Analyze and Develop computer programs in the areas related to Object-oriented concepts, Web designing and Algorithms.
<b>PO2:</b>	Develops the necessary skills to make a career in the field of computers.
<b>PO3:</b>	Inculcate various software development practices.
<b>PO4:</b>	Develops the ability to select modern computing tools, skills and technique necessary for innovative software solutions.
<b>PO5:</b>	Developing ability to identify, analyze the complex computing problem using fundamentals of computer science and application domain.
<b>PO6:</b>	Building ability to work as a member or leader of a team in multidisciplinary environment.
<b>Program Specific Outcome(PSO)</b>	
<b>PSO1:</b>	Producing knowledgeable and skilled human resources to be employable in IT Industry.
<b>PSO2:</b>	Exploring the skills of students to become entrepreneurs who can develop customized solutions for small and medium enterprises.
<b>PSO3:</b>	Giving skills and information not only about computer and information technology but also about organization and management.
<b>Course Outcomes</b>	
<b>Semester I</b>	
<b>G 601.1: PROBLEM SOLVING THROUGH C</b>	
<b>CO1:</b>	Course is designed to provide complete knowledge of structured and procedural programming understanding
<b>CO2:</b>	To apply programming knowledge to create solutions to challenging problems, including specifying, designing, implementing and validating solutions for new problems
<b>G 602.1: COMPUTER FUNDAMENTALS AND OFFICE AUTOMATION</b>	
<b>CO1:</b>	Able to identify various devices and their working principles.
<b>CO2:</b>	The main objective of this syllabus is to introduce 'computer' to the students.
<b>G 603.1: DISCRETE MATHEMATICS</b>	
<b>CO1:</b>	This course covers the basic concepts of discrete mathematics used in computer.

<b>CO2:</b>	Students will be able to Understand the basic principles of sets and operations in sets, functions and graph theory.
<b>G604.1E CBCS: Paper1</b>	
<b>COMPUTER NETWORKS</b>	
<b>CO1:</b>	At the end of the course the students will be able to understand the architectural principles of computer networking and compare different approaches to organizing networks.
<b>CO2:</b>	Identify core networking and infrastructure components and the roles they serve.
<b>G604.1E CBCS: Paper 2</b>	
<b>CYBER SECURITY</b>	
<b>CO1:</b>	Students will get the technical knowledge and skills needed to protect and defend computer systems and networks.
<b>CO2:</b>	Respond to cyber threats, reduce vulnerabilities and minimize damage from cyber incidents through a combination of institutional structures.
<b>Semester II</b>	
<b>G 601.2: MICROPROCESSOR</b>	
<b>CO1:</b>	At the end of the course, a student will be able to: Assess and solve basic binary math operations using the microprocessor
<b>CO2:</b>	Students will be able to explain the microprocessor's and Microcontroller's Internal architecture.
<b>G602.2:RELATIONAL DATABASE MANAGEMENT SYSTEM</b>	
<b>CO1:</b>	The student will be able to understand the features of database management systems and Relational database.
<b>CO2:</b>	Demonstrate an understanding of the relational data model and use SQL.
<b>G 603.2: COMPUTER ORIENTED NUMERICAL ANALYSIS</b>	
<b>CO1:</b>	At the end of the course students will be able to solve an algebraic or transcendental equation using an appropriate numerical method.
<b>CO2:</b>	Solve a differential equation using an appropriate numerical method and Apply Numerical Concepts in Coding.
<b>G604.2E CBCS: Elective Paper</b>	
<b>INTRODUCTION TO DATA SCIENCE</b>	
<b>CO1:</b>	Students will develop the ability to build and assess data-based models.
<b>CO2:</b>	Students will execute statistical analyses with professional statistical software.

<b>G604.2E CBCS: Elective Paper 2 FUNDAMENTALS OF E-COMMERCE</b>	
<b>CO1:</b>	Analyze the impact of E-commerce on business models and strategy.
<b>CO2:</b>	Identify the security threats in the field of E-commerce.
<b>Semester III</b>	
<b>G 601.3: JAVA PROGRAMMING</b>	
<b>CO1:</b>	Know the structure and model of the Java programming language
<b>CO2:</b>	Develop software using the Java programming language and Choose an engineering approach to solving problems, starting from the acquired knowledge of programming and knowledge of operating systems.
<b>G 602.3: WEB DESIGNING</b>	
<b>CO1:</b>	Understand features of Internet and email and Develop Simple web pages using HTML & Style Sheets
<b>CO2:</b>	Develop interactive web page using scripting language.
<b>G 603.3: OPERATING SYSTEMS</b>	
<b>CO1:</b>	At the end of the course students will able to Analyze the structure of OS and basic architectural components involved in design Analyze the various resource management techniques conceptualize the components involved in designing a contemporary OS.
<b>CO2:</b>	Learn Windows Operating system basics
<b>G604.3E Elective Paper 1 GRAPHIC DESIGN</b>	
<b>CO1:</b>	Students are able to draw primitive graphical shapes and perform transformation techniques.
<b>CO2:</b>	They are also learning about various new technologies developed and their applications.
<b>G604.3E Elective -II: INTERNET OF THINGS</b>	
<b>CO1:</b>	Students will be fully aware of Technology behind IoT.
<b>CO2:</b>	Design Principles for Connected devices, IoT communication protocols and internet based communication.
<b>Semester IV</b>	
<b>G 601.4: DATA STRUCTURES USING C</b>	
<b>CO1:</b>	To describe the usage of various data structures To choose the appropriate data structure to solve a programming problem.

<b>CO2:</b>	To demonstrate various methods of organizing large amounts of data.
<b>G 602.4: WEB PROGRAMMING USING PHP</b>	
<b>CO1:</b>	Be able to setup and configure MySQL, PHP, Apache web server development environment.
<b>CO2:</b>	Understand Object oriented programming paradigm in PHP. And build a simple, functional web application using PHP/MySQL.
<b>G 603.4: DATA MINING</b>	
<b>CO1:</b>	Students will be able to categorize and carefully differentiate between situations for applying different data-mining techniques: frequent pattern mining, association, correlation, classification.
<b>CO2:</b>	Design and implement systems for data mining.
<b>G 604.4E Elective -I: HARDWARE AND PC MAINTENANCE</b>	
<b>CO1:</b>	<b>CO1:</b> Assembling Computer Systems Installing Various Operating Systems.
<b>CO2:</b>	<b>CO2:</b> Learn software Troubleshooting Computer Systems
<b>G604.4E Elective -II: Fundamentals of ICT</b>	
<b>CO1:</b>	<b>CO1:</b> Be able to apply knowledge of computing analyze a problem, and identify and define the computing requirements appropriate to its solution.
<b>CO2:</b>	<b>CO2:</b> Be able to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
<b>Semester V</b>	
<b>G 601.5: JAVA 2 ENTERPRISE EDITION</b>	
<b>CO1:</b>	<b>CO1:</b> At the end of the course students will be able to Design/Develop Program.
<b>CO2:</b>	<b>CO2:</b> Develop appropriate data model and database scheme ,Create and test prototypes.
<b>G 602 .5: COMPUTER GRAPHICS AND MULTIMEDIA</b>	
<b>CO1:</b>	<b>CO1:</b> Students will able to: To list the basic concepts used in computer graphics.
<b>CO2:</b>	<b>CO2:</b> To implement various algorithms to scan, convert the basic geometrical primitives, transformations, Area filling, clipping.
<b>G 603.5: OBJECT ORIENTED ANALYSIS &amp; DESIGN</b>	
<b>CO1:</b>	Analyze Objects and Classes of the software system.

	Construct object model using object types, attributes, structures and associations.
<b>C02:</b>	<b>C02:</b> Analyze Functional and Dynamic Modeling
<b>G 604 .5: SOFTWARE ENGINEERING</b>	
<b>C01:</b>	<b>C01:</b> Be successful professionals in the field with fundamental knowledge of software engineering.
<b>C02:</b>	<b>C02:</b> Analyze and resolve information technology problems through the application of systematic approaches and diagnostic tools.
<b>G 605 .5: PYTHON PROGRAMMING</b>	
<b>C01:</b>	Be skilled at creating, debugging and testing a software application using the Python programming language.
<b>G 606.5:ESIGN AND ANALYSIS OF ALGORITHMS</b>	
<b>C01:</b>	<b>C01:</b> Ability to analyze the performance of algorithms.
<b>C02:</b>	<b>C02:</b> Ability to choose appropriate algorithm design techniques for solving problems.
<b>Semester VI</b>	
<b>G 601.6 LINUX AND SHELL PROGRAMMING</b>	
<b>C01:</b>	<b>C01:</b> Identify and use UNIX/Linux utilities to create and manage simple file processing operations, organize directory structures with appropriate security.
<b>C02:</b>	<b>C02:</b> Develop shell scripts to perform more complex tasks.
<b>G 602. 6: MOBILE COMMUNICATION</b>	
<b>C01:</b>	<b>C01:</b> To make students familiar with various generations of mobile communications
<b>C02:</b>	<b>C01:</b> To understand the concept of cellular communication and To understand the basics of wireless communication Knowledge of GSM mobile communication standard, its architecture, logical channels, advantages and limitations
<b>G 605 .5: CLOUD COMPUTING</b>	
<b>C01:</b>	<b>C01:</b> Understand the concepts, characteristics, delivery models and benefits of cloud computing
<b>C02:</b>	<b>C02:</b> Understand the key security and compliance challenges of cloud computing

<b>DEPARTMENT OF COMPUTER SCIENCE</b>	
<b>PROGRAMME OUTCOMES</b>	
<b>PO-1:</b>	Program develops professionals as a resource to IT Field and equipped students to start their own business as software developers, programmers, database administrators, and system analysts.
<b>PO-2:</b>	Graduates are empowered to learn new ideas and technology as the field evolves.
<b>PROGRAMME SPECIFIC OUTCOMES</b>	
<b>PSO-1:</b>	The ability to understand the principles and working of the hardware and software aspects of computer systems.
<b>PSO-2:</b>	Ability to design, develop, implement computer programs and use knowledge in various fields and hence to provide solution to new ideas and innovations.
<b>COURSE OUTCOMES</b>	
<b>I Semester- Paper 1</b>	
<b>G 505.1 – Problem solving using C</b>	
CO-1.	Interpret the basic principles of C Programming.
CO-2.	Acquire decision making and looping concepts.
CO-3.	Design and develop modular programming
CO-4.	Explore usage of Arrays, strings, structures and files.
CO-5.	Effective utilization of pointers and preprocessor directives.
CO-6.	Illustrate the concepts of various data structures.
<b>Semester-I</b>	
<b>G505.1P - C Programming LAB</b>	
CO-1.	Demonstrate an understanding of computer programming language concepts.
CO-2.	Student able to develop C programs on Linux platform.
CO-3.	Ability to design and develop Computer programs, analyzes, and interprets the concept of pointers, declarations, initialization, operations on pointers and their usage.

CO-4.	Able to define data types and use them in simple data processing applications also he/she must be able to use the concept of array of structures
CO-5	Student must be able to define union and enumeration user defined data types.
<b>I SEMESTER:</b>	
<b>G505.1E-CBCS: Elective Paper 1</b>	
CO-1.	Recognize different types of number systems as they relate to computers. Add and subtract in binary, octal, and hexadecimal number. Convert values from decimal, binary, octal, hexadecimal, and binary-coded decimal number systems to each other and back to the other systems
CO-2.	Learning simplification in logic gates by referring K-map and Designing and demonstrating various types of sequential circuits using flip flops.
CO-3.	Students acquire the knowledge of basics of computers, hardware and software's and operating systems. Explore different ways of communicating with I/O devices and interfaces
<b>II Semester- Paper 2</b>	
<b>G505.2 – DATA STRUCTURE USING C</b>	
CO-1.	Demonstrate and classify various data structures and their Primitive operations.
CO-2.	Apply the concepts of arrays and strings in sorting and pattern Matching applications.
CO-3.	Learning the operations of linear data structures like stacks, Queues and linked lists.
CO-4.	Demonstrate primitive operations on different types of trees and Their applications.
CO-5.	Summarize the concepts of graphs, traversal techniques, hashing and file handling.
CO-6.	Design and develop solutions to solve various computing Problems by choosing appropriate data structures.

<b>II Semester</b>	
<b>G505.2 P- DATA STRUCTURE USING C lab</b>	
CO-1.	Solve computational problems using basic C language Constructs. Design and implement operations on both single and Multidimensional arrays.
CO-2.	Develop menu driven programs to demonstrate primitive Operations on stacks & queues.
CO-3.	Assess the operations on different types of Trees.
CO-4.	Demonstrate traversal techniques on graphs.
CO-5.	Apply appropriate data structures to solve computing problems.
<b>II Semester OPEN ELCTIVE</b>	
<b>G. 505.2E CYBER SECURITY</b>	
CO-1.	Students will be familiar with cyber security landscapes and able to Analyze and evaluate the cyber security needs of an organization.
CO-2.	Determine and analyze software vulnerabilities and security solutions to reduce the risk of exploitation.
CO-3.	Measure the performance and troubleshoot cyber security systems.
CO-4.	Implement cyber security solutions and use of cyber security, information assurance, and cyber/computer forensics software/tools.
CO-5.	Comprehend and execute risk management processes, risk treatment methods, and key risk and performance indicators.
<b>III Semester- Paper 3</b>	
<b>G505.3- JAVA PROGRAMMING</b>	
CO-1.	Identify classes, objects, members of a class and relationships among them needed for a specific problem...
CO-2.	Write Java application programs using OOP principles and proper program structuring.
CO-3.	Demonstrate the concepts of polymorphism and inheritance
CO-4.	Write Java programs to implement error handling techniques using exception handling
<b>III Semester- Paper 3</b>	
<b>G505.3P : JAVA PROGRAMMING LAB ( Linux Based)</b>	
CO-1.	Students learn to defining Classes and Objects, Identify classes, objects,

	members of a class and relationships among them needed for a specific problem.
CO-2.	Write JAVA programs to demonstrate method overloading.
CO-3.	Demonstrate the concepts of polymorphism , inheritance and method overriding V/s method overloading.
CO-4.	Explain the benefits of JAVA's Exceptional handling mechanism compared to other Programming Language.
CO-5.	Write Java programs to implement error handling techniques using exception handling.
<b>III Semester</b>	
<b>Skill Based Electives – Computer Hardware and Maintenance.</b>	
CO-1.	Students will learn about Design of basic computer.
CO-2.	Students will learn on different types of servers and functioning of these servers.
CO-3.	Students will learn about the architecture of common bus system.
CO-4.	Students will learn about the different micro-operations used.
CO-5.	Students will learn about internet and intranet services.
<b>IV Semester- Paper 4</b>	
<b>G505.4- Relational Data Base Management System using MySQL</b>	
CO-1.	Describe the fundamental elements of relational database management systems.
CO-2.	Explain the basic concepts of relational data model, entity-relationship model, relational database design, relational algebra and SQL.
CO-3.	Design ER-models to represent simple database application scenarios
CO-4.	Convert the ER-model to relational tables, populate relational database and formulate SQL queries on data.
CO-5.	Improve the database design by normalization.
<b>Semester-IV</b>	
<b>G 505.4P: RDBMS LAB (Windows based)</b>	
CO-1.	Students get practical knowledge on designing and creating relational database systems.
CO-2.	Understand various advanced queries execution such as relational constraints, joins, set operations, aggregate functions, trigger views and embedded SQL.

CO-3.	Use of various software to design and build ER Diagrams, UML, Flow chart for related database systems.
CO-4.	Students will be able to design and implement database applications
CO-5.	Students get practical knowledge on designing and creating relational database systems.
<b>IV Semester (OPEN ELECTIVE)</b> <b>Interdisciplinary Elective</b> <b>G 505.4E Office Automation</b>	
CO-1.	After completion of the course, students would be able to documents, spreadsheets, make small presentations and would be acquainted with internet.
<b>V Semester- Paper 5(elective)</b> <b>G 505.5A1 - OPERATING SYSTEM AND LINUX</b>	
CO-1.	Identify the functionalities of OS and their categories.
CO-2.	Evaluate multithread techniques and process scheduling algorithms.
CO-3.	Demonstrate suitable techniques for resource management
CO-4.	Evaluate file system allocation and memory management Techniques.
CO-5.	Review the protection mechanisms in processing environment.
CO-6.	Explore the case studies of Operating Systems in Linux platform.
<b>V Semester- Paper 5(elective)</b> <b>G 505.5A2 – Principles of TCP/IP</b>	
CO-1.	Identifies protocols and standards in the Internet.
CO-2.	Describe the TCP/IP protocol suite.
CO-3.	Defining subnetting and supernetting.
CO-4.	Explain error reporting and query mechanism in the Internet.
CO-5.	Describe process-to-process communication (UDP, TCP, and SCTP).
<b>V Semester- Paper 5B1(elective)</b> <b>G505.5B1 - PYTHON PROGRAMMING</b>	
CO-1.	Examine python syntax & semantics and be fluent in using flow Control functions.
CO-2.	Demonstrate proficiency in handling strings and file systems in Python.
CO-3.	Create & run python programs using core data structures like Lists, dictionaries, tuples, and sets and use of REs.
CO-4.	Interpret and apply the concepts of OOP.

CO-5.	Programming and web services.
CO-6.	Implement exemplary applications related to network
CO-7.	Implement database applications in python.
<b>Semester-V</b>	
<b>G 505.5BP: PYTHON PROGRAMMING LAB</b>	
CO-1.	Define and demonstrate the use of built-in data structures “lists” and “dictionary”.
CO-2.	Design and implement a program to solve a real world problem.
CO-3.	Design and implement GUI application and how to handle exceptions and files.
CO-4.	Make database connectivity in python programming language
CO-5.	Define and demonstrate the use of built-in data structures “lists” and “dictionary”.
<b>V Semester- Paper 5b2-ELECTIVE PAPER)</b>	
<b>G505.5B2 - JAVA 2 ENTERPRISE EDITION</b>	
CO-1.	After the completion of this course, the students will be able to develop a small project independently
<b>V Semester- Paper 5b2-ELECTIVE PAPER)</b>	
<b>G505.5BP - JAVA 2 ENTERPRISE EDITION</b>	
CO-1.	Practical knowledge of working with programming language by using j2EE concepts.
CO-2.	Ability to work with dynamic databases.
CO-3.	Create web application using java servlets and manage web session using servlets and jsp.
<b>(VI Semester- Paper 7)</b>	
<b>G505.6A1 - DATA ANALYTICS</b>	
CO-1.	Ability to identify the characteristics of datasets and compare the trivial data and big data for various applications.
CO-2.	Ability to select and implement machine learning techniques and computing environment that are suitable for the applications under consideration.
CO-3.	Ability to solve problems associated with batch learning and online

	learning, and the big data characteristics such as high dimensionality, dynamically growing data and in particular scalability issues.
CO-4.	Ability to understand and apply scaling up machine learning techniques and associated computing techniques and technologies.
CO-5.	Ability to visualize data through various forms.
<b>(VI Semester- Paper 7(elective))</b>	
<b>G505.6A2 - software engineering and testing</b>	
CO-1.	Assess professional and ethical responsibility, software engineering principles and activities involved in building large software programs.
CO-2.	Demonstrate process of requirements gathering, classification, Specification & validation.
CO-3.	Design models for software system, component and process Within realistic constraints.
CO-4.	Apply cost estimation and time scheduling for quality project Activities.
CO-5.	Apply, design, implement, verify, validate and maintain software Systems with metrics.
<b>VI Semester- Paper 8</b>	
<b>G505.6B1 – Web Programming Using PHP</b>	
CO-1.	Describe fundamentals of web
CO-2.	Introduce the creation of static webpage using HTML
CO-3.	Describe the importance of CSS in web development
CO-4.	Describe the function of JavaScript as a dynamic webpage creating tool
CO-5.	Distinguish PHP as a server side programming language
<b>VI Semester- Paper 7- ELECTIVE PAPER</b>	
<b>G505.6 B2 - COMPUTER NETWORKS</b>	
CO-1.	Demonstrate the principles of application layer protocols.
CO-2.	Distinguish transport layer services and protocols.
CO-3.	Classify IP and Routing Algorithms in network layer.
CO-4.	Demonstrate streaming and working of communication networks.
CO-5.	Knowledge on different transmission modes,switching and multiplexing concepts.

<b>505.6AP: DATA ANAYTICS LAB</b>	
CO-1.	Understand the key issues in big data management and its associated applications in intelligent business and scientific computing.
CO-2.	Acquire fundamental enabling techniques and scalable algorithms
CO-3.	Interpret business models and scientific computing paradigms, and apply software tools for big data analytics.
CO-4.	Achieve adequate perspectives of big data analytics in various applications like recommender systems, social media applications etc.
<b>505.6AP: SOFTWARE ENGINEERING LAB</b>	
CO-1.	Explain needs for software specifications also they can classify different types of software requirements and their gathering techniques.
CO-2.	Convert the requirements model into the design model and demonstrate use of software and user interface design principles
CO-3.	Justify role of SDLC in Software Project Development and they can evaluate importance of Software Engineering.
<b>505.6BP: PHP LAB</b>	
CO-1.	Write PHP scripts to handle HTML forms.
CO-2.	Write regular expressions including modifiers, operators, and meta characters.
CO-3.	Analyze and solve various database tasks Using PHP language.
CO-4.	Analyze and solve common Web application tasks by Writing PHP programs.
<b>505.6BP: COMPUTER NETWORKS LAB</b>	
CO-1.	Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies.
CO-2.	Have a basic knowledge of the use of cryptography and network security.
CO-3.	Specify and identify deficiencies in existing protocols, and then go onto formulate newand better protocols.
CO-4.	Analyze, specify and design the topological and routing strategies for an IP based networking infrastructure
CO-5.	Have a working knowledge of datagram and internet socket programming

<b>DEPARTMENT OF COMPUTER ANIMATION</b>	
<b>PROGRAMME OUTCOMES</b>	
PO-1.	Obtain knowledge on fundamental and advanced aspects of Computer Animation, Graphic Design & Visual Effects.
PO-2.	To innovate best practices for elements of design, Web Technology and Gaming.
PO-3.	To explore the theories of Multimedia and animation to design and develop 2D/3D animations, film-making, visual effects for the Interactive media
PO-4.	Apply in depth knowledge of animation and the knowledge of Principles of Animation in every software
PO-5.	Able to work with professional skill in Animation studios and production houses.
<b>PROGRAMME SPECIFIC OUTCOMES</b>	
PSO 1:	Design, create and animate characters and objects using fundamental principles of animation
PSO 2:	Understand the techniques of 2D and 3D software.
PSO 3:	Understanding stop motion and basic traditional animation
PSO 4:	Understand the concept of linear and nonlinear editing, Video Capture and VFX techniques
<b>COURSE OUTCOMES</b>	
<b>Semester-I</b>	
<b>G 512.1: Introduction to Computer Animation and Animation Graphics</b>	
CO-1.	Understand different tools and features.
CO-2.	Understand the techniques of applications.
CO-3.	To able to create different kinds of designs like Logo, Brochures, certificates, greetings cards, pamphlets, business cards etc.
CO-4.	Creating GIF Animation files
<b>Semester-I</b>	
<b>G 512.1P: Graphics Designing Lab Using Adobe Photoshop</b>	
CO-1.	Create Different types of Vector Art, Background design, Logos, Greeting Card etc
CO-2.	Creating GIF animation clips for the websites
<b>G 512.1E (Open Elective): Traditional Animation</b>	
CO-1	Learn history of animation and animation fundamentals.
CO-2	Understand how traditional animation works.
CO-3	Understand about using animation principles.

CO-4	Identify and execute the proper steps in cartoon production
CO-5	Summarize design principles, concepts, styles and terminologies
CO-6	Apply skills learned including stop motion and basic traditional animation.
<b>Semester-II</b>	
<b>G 512.2: Introduction to the 2D Animation and Macromedia Flash</b>	
CO-1	Describe past history of origin of animation.
CO-2	Understanding the rise of computer animation.
CO- 3	Create animated sequences from the development of the original concept through design to final film or video production.
CO-4	Integrate the concepts, principles and theories involved in the physics of animation in all aspects of drawing.
<b>G 512.2P : 2D Animation Lab Using Macromedia Flash</b>	
CO- 1	Work on timeline and understand tools and features of software.
CO- 2	Work systematically on layers and masking.
CO- 3	Develop 2d characters and animation of different style
CO- 4	Render in different file formats.
<b>G 512.2E (Open Elective): 2D Character &amp; Environment Sketching</b>	
CO- 1	Understand Western art in detail.
CO- 2	Understand different pictorial drawings and dimensions.
CO- 3	Draw and understand geometrical structures.
CO- 4	Draw shading, coloring and gesture drawings.
<b>Semester-III</b>	
<b>G 512.3: Multimedia Techniques</b>	
CO- 1	Use filmmaking terminology to communicate effectively throughout all stages of production.
CO- 2	Demonstrate skills required to create quality media productions including skills in story development, producing, cinematography, editing, and audio production/post production.
CO- 3	Learn how to combine basic design principles in video editing.
CO- 4	Edit and compress video for use in various delivery modes of digital media using standard digital video editing software.
CO- 5	Identify hardware and software protocols specific to the field of visual effects.
CO- 6	Create photo-real images to match live action footage by the application of advanced rendering techniques.
CO- 7	Integrate 2D and/or 3D computer generated imagery and live action elements using compositing techniques.

<b>G 512.3P:: Practical-III Multimedia Editing Lab</b>	
CO- 1	Understand the concept of editing.
CO- 2	Understand different transitions, wipes and effects required for editing.
CO- 3	Understand how to develop and trim the story.
CO- 4	Understand how to organize clips, Create short films, documentaries with proper sync between video & audio.
<b>G 512.3E (Open Elective): Graphic Design</b>	
CO- 1	Understand different tools and features.
CO- 2	Understand the techniques of applications.
CO- 3	To able to create different kinds of designs like Logo, Brochures, certificates, greetings cards, pamphlets, business cards etc.
CO- 4	Creating GIF Animation files
<b>Semester-IV G 512.4: 3D Modeling</b>	
CO- 1	Creating different types of polygon models
CO- 2	Understand the usage of tools and parameters.
CO- 3	Create different 3D environments, models, structures, architectures.
CO- 4	Understanding how mesh works in 3D modelling.
<b>G 512.4P: Practical-IV -3D Modeling</b>	
CO- 1	Understand the different types of 3D modeling & Creating interior & exterior models
CO- 2	Acquire the working knowledge 3 Dimension space
<b>G512.4E (Open Elective): Video editing</b>	
CO- 1	Identify and describe key terms, concepts, major trends and periods related to various modes of production.
CO- 2	Learn how to combine basic design principles in video editing.
CO- 3	Demonstrate skills required to create quality media productions
CO- 4	Apply methodological design process for construction of a television program.
CO- 5	Create an audio visual television program
<b>Semester-V G 512.5a: 3D Texturing, Camera &amp; Lighting (Paper 5)</b>	
CO- 1	Give detailed texturing and colouring to 3D characters or objects.
CO- 2	Understand how shaders are applied.
CO- 3	Understand different mapping done to enhance the details of the object.

CO- 4	Understand the concept of hair dynamics and different presets.
CO- 5	Creating camera animations.
CO- 6	Creating a desired lighting required for the 3D scene e.g. interiors, exteriors.
<b>G 512.5b: : Web Technology (Paper 6)</b>	
CO- 1	Understand the principles of creating an effective web page, including an in-depth consideration of information architecture.
CO- 2	Become familiar with graphic design principles that relate to web design and learn how to implement theories into practice.
CO- 3	Learn the language of the web: HTML and CSS.
CO- 4	Be able to embed social media content into web pages.
CO- 5	To create web elements and UI designs.
<b>G 512.5P: Practical - 3D Texturing, Camera &amp; Lighting Lab - Paper 5</b>	
CO- 1	Creating Textures for Interior & Exterior objects
CO- 2	To create the Lights inside & outside the house
CO- 3	To move the Camera in the 4D space
<b>G 512.5P: Practical - Web Technology Lab – Paper 6</b>	
CO- 1	Create the static web pages
CO- 2	Create CSS code required for the web pages.
CO- 3	Domain name registration and hosting fundamentals.
<b>Semester-VI</b>	
<b>G 512.6a:: 3D Rigging &amp; Animation – (Paper 7)</b>	
CO- 1	Understand and create Object and character animation.
CO- 2	Understand different controllers, wraps and modifiers.
CO- 3	Work with poses and postures.
CO- 4	Work with bone parameters and IK Solvers.
CO- 5	Do skinning process with much ease.
<b>G 512.6P:: Practical -: 3D Rigging &amp; Animation Lab – (Paper 7)</b>	
CO- 1	Moving the skelton & Bones of 3D objects.
CO- 2	Understand and create Object and character animation.
CO- 3	Attaching skin to the bones
<b>G 512.6b: Media &amp; Interactive animation - (Paper 8)</b>	
CO-1.	Utilize several Flash tools and tactics learned throughout the course to

	produce an interactive flash based website.
CO-2.	Demonstrate the ability to effectively utilize the timeline and motion tween affects to produce animation.
CO-3.	Demonstrate critical thinking in problem solving.
CO-4.	Designing industry standard e learning animations.
CO-5.	Applying interactivity to the animations with the help of Action script.
CO-6.	Develop and demonstrate troubleshooting skill.
<b>G 512.6P: Practical - Interactive animation Lab (Paper 8)</b>	
CO-1.	Understand the Action script fundamentals.
CO-2.	Design and develop animations using Action script for web and internet applications.
CO-3.	Publishing the animations on different devices and applications.

## **BIOLOGICAL SCIENCES**

<b>BIOCHEMISTRY</b>	
<b>PROGRAMME OUTCOMES (PO)</b>	
PO.1.	It will help students to inculcate the basic concepts of biochemistry including an understanding of the fundamental biochemical principles and their applications in a systematic, scientific, evidence-based process. The programme will also provide a general understanding of the inter disciplines with a holistic approach in biological sciences.
PO.2.	Students will gain experience in basic laboratory methods, techniques and be able to apply the scientific method to the experimental processes, hypothesis testing, data interpretation and logical conclusions.
PO.3.	Develop problem solving and analytical skills through case studies, research papers and hands-on-experience
PO.4.	Provide requisite knowledge of laboratory safety, data replication and quality control, record keeping and other aspects of “responsible conduct of research”.
PO.5.	Ability to employ modern library search tools to locate and retrieve primary literature on a topic and critically evaluate the literature.
PO.6.	Students will be able to apply and effectively communicate scientific reasoning and data analysis in both written and oral forms. They will be able to communicate effectively with well-designed posters and slides in talks aimed at scientific audiences as well as the general public.
PO.7.	Students will learn to work collaboratively in a team.
PO.8.	Students will gain knowledge of ethical and good laboratory practices, health and biohazard regulations, plagiarism and intellectual property rights related issues practiced in modern era of scientific investigation.
PO.9.	Graduates will be able to apply the major theories and research procedures to contemporary social problems.
PO.10.	The programme will prepare students to plunge into various fields of higher education or related profession in various disciplines, armed with plethora of knowledge, hands-on-experience and scientific attitude, at national and global levels.

<b>PROGRAMME SPECIFIC OUTCOMES (PSO)</b>	
PSO.1.	Describe the chemical structures, properties, and biological functions of the molecules which make up living matter: water, amino acids and proteins, nucleic acids, carbohydrates, and lipids.
PSO.2.	Describe methods to study the structures of these molecules and to synthesize them.
PSO.3.	Describe the mechanisms by which the structures of proteins determine their functions and by which their functions are regulated.
PSO.4.	Explain how enzymes function in terms of thermodynamics, transition states, and kinetics. Perform calculations involving various kinetic parameters, including $K_M$ and $V_{max}$ .
PSO.5.	Contrast the effects of different types of inhibitors on enzymes and on their kinetic parameters.
PSO.6.	Describe the mechanisms of action of selected enzymes and the experimental evidence for these mechanisms.
PSO.7.	Explain how enzyme activity is regulated by various means.
PSO.8.	Define thermodynamic parameters, including free energy, entropy and reduction potentials. Perform calculations involving them.
PSO.9.	Discuss the role of ATP in the thermodynamics of metabolism.
PSO.10	Describe the metabolic roles of NADH, NADPH, FADH <sub>2</sub> , coenzyme A, water & fat soluble vitamins and ribonucleotides.
PSO.11	Name and describe the molecules which participate in selected metabolic pathways, such as glycolysis, citric acid cycle, and gluconeogenesis. Discuss the enzymes and cofactors catalyzing each transformation in these metabolic pathways and the controls on the pathways studied.
PSO.12	Summarize the pathways providing monosaccharides for glycolysis, emphasizing the interacting controls of these processes.
PSO.13	Explain DNA replication, transcription, translation, DNA recombination and DNA damages
PSO.14	Summarizes DNA mutation and cancer, radiotherapy.
PSO.15.	Describe basics in microbiology and immunology
PSO.16.	Demonstrate techniques in microbiology, immunology and cell biology.

<b>COURSE OUTCOMES (CO)</b>	
<b>FIRST SEMESTER</b>	
<b>BIOOLECULES G 510.1</b>	
CO.1	Appreciate the role of biomolecules as building blocks of biological system.
CO.2	Thorough with chemical and molecular foundations of life.
CO.3	Able to write the structure, function and properties of amino acids.
CO.4	Introduced to the structure, properties and roles of carbohydrates, lipids and nucleic acids.
CO.5	Aware of the biological importance of nucleic acid as genetic material.
CO.6	In the laboratory, able to independently apply various biochemical techniques to identify and quantify major biomolecules.
<b>CBCS -ELECTIVE PAPER</b>	
<b>PROTEIN BIOCHEMISTRY G 510.1E</b>	
CO.1	Students will acquire knowledge about the protein structure
CO.2	They will learn about principles and applications of chromatography techniques used in a biochemistry lab.
CO.3	Students will learn about the principle and application of electrophoresis, centrifugation techniques and advanced spectroscopic techniques.
<b>SECOND SEMESTER</b>	
<b>HUMAN PHYSIOLOGY &amp; NUTRITION G 510.2</b>	
CO.1	Understand the basic organization and functions of various organ systems and the functioning of the whole body.
CO.2	Comprehend and appreciate the importance of the fluid components of the body in regulating and connecting the various organ systems; particularly the heart and vascular system, CSF, lymph.
CO.3	Appreciate and understand the biochemical, molecular and cellular events that orchestrate the functioning of neurons.
CO.4	Get a holistic understanding of understanding of the characteristics, function, distribution and deficiency of macro and micronutrients in the human body.
CO.5	Develop in students an inquisitive learning approach to understand vitamin and associated disorder, the mechanism digestion and food adulterants at its basic level.

<b>CBCS -ELECTIVE PAPER BIOCHEMISTRY OF HORMONES G510.2E</b>	
CO.1	Understand and appreciate the different modes of communication between cells in a multi-cellular organism
CO.2	Understand the role of endocrine system in maintaining homeostasis
CO.3	Should be able to describe molecular, biochemical and physiological effects of all hormones and factors on cells and tissues.
CO.4	Understand the disease and disorders associated with endocrine imbalance.
<b>THIRD SEMESTER ENZYMOLOGY G 510.3</b>	
CO.1	Learn the types, nature and biological importance of enzymes in living systems
CO.2	Gain insight into the classification, theories of enzyme specificity
CO.3	Learn about the enzyme isolation, activity, units and catalysis
CO.4	It will throw lights on mechanisms of enzyme action, kinetics of enzyme catalyzed reactions and importance of enzyme inhibitors
CO.5	Learn to appreciate how enzymes are regulated and the physiological importance of enzyme regulation in the cell
CO.6	The course will introduce students to the applications of enzymes in research, medicine and industry.
<b>CBCS -ELECTIVE PAPER STEM CELLS G 510.3E</b>	
CO.1	Students will acquire basic information about the stem cells and its types
CO.2	Gain knowledge of ethical concerns in stem cell research
CO.3	Comprehend the applications of stem cell in regenerative medicine
<b>FOURTH SEMESTER METABOLISM G 510.4</b>	
CO.1	Understand the concepts of general metabolism, characteristics of each metabolic pathways and methods used to study these pathways.
CO.2	Gain holistic knowledge of various catabolic and anabolic pathways in the body
CO.3	Understand mechanism of the regulation of various pathways
CO.4	Able to obtain knowledge about the diseases caused by defects in metabolism.

CO.5	Understand different assays in the laboratory to obtain compressive knowledge on the metabolic pathways.	
<b>CBCS -ELECTIVE PAPER MOLECULES OF LIFE G 510.4E</b>		
CO.1	Able to understand the structure and importance of biomolecules. .	
CO.2	Aware of the significance individual biomolecules.	
CO.3	Able to independently identify various biomolecules based on structures and associated disorders.	
<b>FIFTH SEMESTER PAPER-5 MOLECULAR BIOLOGY G 510.5a</b>		
CO.1	Students will acquire basic information about the structure of DNA and various forms of DNA, about organization of genome in various life forms, supercoiling of DNA and its significance	
CO.2	Students will learn about the molecular basis of processes like DNA replication, recombination and transposition and understand the significance of these processes	
CO.3	Acquire basic knowledge about the processes of transcription and translation in prokaryotes and eukaryotes	
CO.4	Learn about the features of the genetic code and various experimental approaches used to crack the code	
CO.5	Develop understanding of the molecular basis of RNA processing and RNA splicing	
CO.6	Learn about the various ways in which these biological processes are regulated and the significance of regulation in maintaining life forms	
CO.7	Students will learn about the various ways in which the DNA can be damaged leading to mutations and lesions and different ways to repair DNA damage, DNA recombination.	
<b>PAPER-6</b>	<b>GENETIC ENGINEERING AND BIOTECHNOLOGY</b>	<b>G510.5b</b>
CO.1	The process for isolation and engineering of DNA using restriction and modification enzymes.	
CO.2	Use of cloning and expression vectors.	
CO.3	The methods for creation of genomic and cDNA libraries, their applications and use.	
CO.4	Understand IPR and ethical issues in Biotechnology	
CO.5	Gain knowledge on tissue culture media and techniques	
CO.6	Understanding the methods for antibiotic alcoholic and non alcoholic production at industry	
<b>SIXTH SEMESTER</b>		
<b>PAPER-7 MICROBIOLOGY AND IMMUNOLOGY G 510.6a</b>		
CO.1	Trace the history and developments in microbiology.	

CO.2	Have an overview of the culture and staining techniques for bacteria, viruses and microbial nutrition	
CO.3	Understand the immune system including cells, organs and types of immunity.	
CO.4	Describe the basic mechanism, differences and functional interplay of innate and adaptive immunity	
CO.5	Understand Antigens & its Recognition, antigen processing and presentation	
CO.6	Understand the structure & functions of different classes of Immunoglobulins, and techniques like ELISA, RIA and immunodiffusion	
CO.7	Define the cellular and molecular pathways of humoral and cell-mediated immune responses	
CO.8	Describe the mechanisms involved in different types of hypersensitivity	
CO.9	Explain the autoimmunity and grafting	
CO.10	Understand complement pathways in detail	
<b>PAPER-8</b>	<b>CLINICAL &amp; MEMBRANE BIOCHEMISTRY</b>	<b>G510.6b</b>
CO.1	Learn about urine, blood and related disorder in detail.	
CO.2	They will understand the cell membrane structure, functions, ionophores and active transport mechanism	
CO.3	Introduced to basic concepts radioactivity, its measurements	
CO.4	Gain knowledge about the radiation hazards and safety	
CO.5	Get knowledge about the carcinogens, cancer and its types	
CO.6	Acquire insight into cancer diagnosis and treatment	

## BIOTECHNOLOGY

### PROGRAMME OUTCOMES (PO)

PO 1:	Students will be able to acquire, articulate, retain knowledge relevant to biotechnology.
PO 2:	Ability to integrate technologies through an inter-disciplinary learning habit.
PO 3:	Students will be able to apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional practice
PO 4:	Students will be able to understand the impact of societal activities on environmental contexts, and demonstrate the knowledge of, and need for sustainable development
PO 5:	Ability to design and conduct experiments, as well as to analyze and interpret scientific data
PO 6 :	Students will be able to communicate effectively and write effective reports and design documentation, make effective presentations and give and receive clear instructions related to biotechnological research and development.
PO 7:	Ability to inculcate an attitude of enquiry towards developing innovative ability and enhancing entrepreneurship skills.

### PROGRAMME SPECIFIC OUTCOMES (PSO)

PSO.1	Graduates in biotechnology will be eligible for pursuing higher education, M.Sc. programmes in the different field of life science.
PSO.2	Graduates will exhibit contemporary knowledge in Biotechnology and students will be eligible for doing jobs in pharmaceutical and biotechnological Industry.
PSO.3	Graduates will be able to understand the potentials, and impact of biotechnological innovations on environment and their implementation for finding sustainable solution to issues pertaining to environment, health sector, agriculture, etc.
PSO.4	Graduates will be able to design, conduct experiments, analyze and interpret data for investigating problems in Biotechnology and allied fields.
PSO.5	· Graduates will be able to work individually as well as in team to survive in multidisciplinary environment.
PSO.6	Students are able to learn the modern molecular biological techniques viz,

	chromatography, SDS-PAGE, Agarose Gel Electrophoresis, fermentation, downstream processing and PCR which are very much required for the large-scale production of biotechnology derived products.
<b>COURSE OUTCOMES (CO)</b>	
<b>FIRST SEMESTER</b>	
<b>BIOPHYSICS AND BIOSTATISTICS G 511.1</b>	
CO.1.	Understand the principle, working, maintain and calibrations of bio analytical tools and techniques for industrial and research purpose.
CO.2.	This course covers both fundamental and applications of the instruments that are routinely used for the characterization of biomolecules
CO.3.	Biophysical techniques for the Isolation, Identification and Quantification of Biomolecules.
CO.4.	Able to learn underlying principle of techniques such as electrophoresis, microscopy, spectroscopy, centrifugation and chromatography.
CO5.	Enrich the students how to utilize various tools of biostatics in interpretation of biological data.
CO.6.	Students will be able to characterize data and understand different sampling methods.
CO.7.	The course covers other core areas of biostatistics including Standard Deviation, probability and correlation
CO.8.	By the end of the course, the students are able to appreciate the importance of statistics in research and prepares them for a career in research
<b>CBCS -ELECTIVE PAPER</b>	
<b>FOOD PROCESSING TECHNOLOGY G511.1E</b>	
CO.1.	Describe the source and variability of raw food material and their impact on food processing operations.
CO.2.	Explain the spoilage and deterioration mechanisms in foods and methods to control deterioration and spoilage
CO.3.	Explain the methods of food processing and packaging
<b>SECOND SEMESTER</b>	
<b>BIOCHEMISTRY G511.2</b>	
CO.1.	Comprehend the structure and function of different biomolecules including of

	proteins, lipids, nucleic acids, and carbohydrates.
CO.2.	Upon successful completion of this course, the student will learn, the major classes of enzyme and their functions in the cell
CO.3.	Basic concepts of enzymes their mechanism of action
CO.4.	The course also provides information pertaining to role of co-enzyme cofactor in enzyme catalyzed reaction, properties of enzymes and regulation of biochemical pathways.
CO.5.	Students are able to understand enzyme kinetics, thermodynamics and other related areas
CO.6.	Acquire knowledge base of metabolic pathways such as Glycolysis, Krebs's Cycle, ETC etc. occurring inside living cells.
<b>CBCS -ELECTIVE PAPER</b>	
<b>Biotechnology &amp; Its Applications G511.2E</b>	
CO.1.	Explain various methods of gene transfer in plants and animals
CO.2.	Application of biotechnology in agriculture, production of transgenic animals, biofertilizers, biopesticides etc
CO.3.	To describe DNA fingerprinting technology, PCR techniques
<b>THIRD SEMESTER</b>	
<b>MICROBIOLOGY AND IMMUNOLOGY G511.3</b>	
CO.1.	To Classify and explain the structure and general characteristics of Microorganisms.
CO.2.	To prepare various Bacteriological, Algal, and Fungal Media.
CO.3.	To get insight in Primary and Secondary organs of Immune system.
CO.4.	To describe Antigen-antibody interactions as well as techniques like ELISA, RIA, Immunofluorescence
CO.5.	To explain cell mediated immunity, Monoclonal antibody production and Hypersensitivity.
CO.6.	The course will provide sound knowledge of how immune system deals with various pathogens, different processes and cell types involved in prevention of disease along with the concept and significance of vaccines
<b>CBCS -ELECTIVE PAPER</b>	
<b>PLANT TISSUE CULTURE &amp; MUSHROOM CULTURE TECHNIQUES G511.3E</b>	

CO.1.	Understand the concepts of plant tissue culture, preparation of media
CO.2.	It will explain the production of haploid plants, Hybrids, Virus free plants
CO.3.	Explain the methods of germplasm conservation
CO.4.	Mushroom culture and its nutritional values
<b>FOURTH SEMESTER</b>	
<b>Molecular Biology and Recombinant DNA Technology G511.4</b>	
CO.1.	To describe Fine structure of prokaryotic and eukaryotic genes
CO.2.	To understand the mechanism of replication, transcription, translation in prokaryotes and eukaryotes.
CO.3.	This course provides technical know-how on versatile techniques in recombinant DNA technology.
CO.4.	To isolate the DNA from bacteria, plant and animal cells
CO.5.	To explain the construction of DNA & c DNA library and their applications.
CO.6.	To explain the application of gene cloning in agriculture and medicine
CO.7.	The course will provide techniques involved in production of transgenic plants and animals and their pros and cons.
CO.8.	Approaches in handling the perceived risks of GMOs released into the environment possible adverse impacts of GMO's on biodiversity.
CO.9.	Intellectual Property Rights.
<b>CBCS -ELECTIVE PAPER</b>	
<b>IMMUNE SYSTEM AND DISEASE MANAGEMENT G511.4E</b>	
CO.1.	Understand the principles governing vaccination and the mechanisms of protection against disease
CO.2.	Understand how immuno deficiencies related to disease
CO.3.	Understand and explain the basis of allergy and allergic diseases.
<b>FIFTH SEMESTER</b>	
<b>PAPER-5 Plant Biotechnology G511.5a</b>	
CO.1.	This course will provide the students knowledge about different techniques of plant biotechnology utilized for conservation and mass propagation of rare and endangered plant species.
CO.2.	The course will enlighten student about principles of plant tissue culture including in vitro culture of different plant parts.
CO.3.	The course will provide detail pertaining to tools and processes involved in generation of transgenic plants.
CO.4.	It will explain the production of haploid plants, Hybrids, Virus free plants and

	selection of variants
CO.5.	It will teach Germplasm conservation and various methods involved
<b>PAPER-6 Animal Biotechnology G511.5b</b>	
CO.1.	To understand principles of animal culture, media preparation
CO.2.	To explain Invitro fertilization and embryo transfer technology.
CO.3.	The course will describe as to how animal cell culture is carried out for research and diagnostic purposes.
CO.4.	The techniques involved in cloning
CO.5.	The course will describe gene therapy and its applications
CO.5.	How transgenic animals are generated, what are the pros and cons along with ethical issues associated with transgenesis.
<b>SIXTH SEMESTER</b>	
<b>PAPER-7 ENVIRONMENTAL BIOTECHNOLOGY G511.6a</b>	
CO.1.	Learning outcome of Environment Biotechnology is to describe existing and emerging technologies that are important in the area of environment and the principles and techniques which underline the application of biosciences, address environmental issues including pollution, Environment Protection laws, biogeochemical cycle, mineral resource, renewable energy and water recycling.
CO.2.	Course will have a specific focus on bioremediation and treatment of polluted effluent.
CO.3.	The course will also provide conceptual knowledge on water analysis, solid and liquid waste management
CO.4.	To explain the microbial degradation of pesticides, Bioremediation & Biofertilizers.
CO.5.	Course will have a specific focus on biofuels and energy gardens.
<b>PAPER-8 Bioprocess Technology G511.6b</b>	
CO.1.	The role of a bioprocess engineer in chemical, pharmaceutical and distillation industry.
CO.2.	The integrated bioprocess, design reactors, maintain contamination free environment in bioprocesses.
CO.3.	To develop concepts to scale-up bioprocesses for industry as well as research organizations.
CO.4.	Develop skills associated with screening of Industrially Important Strains.
CO.5.	Understand principles underlying design of Fermentor and Fermentation Process

<b>BOTANY</b>	
<b>PROGRAMME OUTCOMES (PO)</b>	
PO1.	Get an opportunity in further studies, research and employment in various areas of life sciences
PO2.	Enhance their knowledge in the field of life sciences and are able to handle laboratory equipments and experimentation for higher education leading to research
PO3.	Enhance the scope of employability by obtaining all-round knowledge in the allied subjects along with Botany.
PO4.	Develop an awareness towards the environment, biodiversity, conservation and their significance.
PO5.	Equip themselves for competitive examinations
PO6.	Inculcate an interest for nature and the need to preserve the nature by maintaining green house, herbal gardens in the campus and environs
<b>PROGRAMME SPECIFIC OUTCOMES (PSO)</b>	
PSO1.	Understand the basic concepts of plant taxonomy, pathology, anatomy, embryology, evolution, physiology, genetics , molecular biology, , plant biotechnology, phytochemistry, pharmacognosy, ecology & sustainable development
PSO2.	Acquire practical skills in the field of basic and applied plant sciences
PSO3.	Understand the applications of basic and applied plant sciences , and to promote and popularize the study of Botany for its importance and its social relevance
PSO4.	Equip themselves for competitive examinations
<b>COURSE OUTCOMES (CO)</b>	
<b>FIRST SEMESTER</b>	
<b>VIRUS, BACTERIA &amp; ALGAE</b>	
C01.	Acquire the basic knowledge of classification in lower groups of organisms
C02.	Understand the structure (thallus, reproductive structures), composition (cell wall and spores) of lower groups of organisms
C03.	Classify algae up to the level of a family
C04.	Identify cyanobacteria and algae at the level of orders
C05.	To understand the applications in the fields of virology, bacteriology and phycology
<b>CBCS -ELECTIVE PAPER</b>	

<b>ORGANIC FARMING</b>	
C01.	Understand the concept and importance of organic farming
C02.	Maintain and improve soil health condition
C03.	Understand sustainable management of natural resources
<b>SECOND SEMESTER FUNGI, PLANT PATHOLOGY, BRYOPHYTES AND PLANT ANATOMY</b>	
C01.	Understand the structure, reproduction and economic importance of fungi and bryophytes
C02.	Compare and contrast the groups algae, fungi and bryophytes
C03.	Evaluate the interaction between different groups of organisms like plant-microbes that occurs in nature.
C04.	Get knowledge on symptoms and control measures of plant diseases caused by fungi, algae, and nematodes
C05.	Understand the anatomical features of higher plants
<b>CBCS -ELECTIVE PAPER PLANT NUTRACEUTICALS</b>	
C01.	Understand the benefits of food and nutraceuticals
C02.	Understand the effects on human health and potential applications in risk reduction of diseases
<b>THIRD SEMESTER PTERIDOPHYTES, GYMNOSPERMS, MORPHOLOGY AND EMBRYOLOGY OF ANGIOSPERMS</b>	
C01.	Understand the diversity and classification of Pteridophytes and Gymnosperms
C02.	Gain knowledge on the reproductive structures and life cycle of Pteridophytes and Gymnosperms
C03.	Know the morphology of plant fossils and process of fossilization
C04.	Understand the process of pollination and its applications in plant breeding
C05.	Acquire the basic concepts of plant embryology
<b>CBCS - ELECTIVE PAPER MEDICINAL BOTANY</b>	
C01.	Understand the concept of plant based medicine
C02.	Know the Medico-ethnobotanical sources
C03.	Identify local wild edible and medicinal plants

<b>FOURTH SEMESTER</b>	
<b>PLANT TAXONOMY, ETHNOBOTANY AND ECONOMIC BOTANY</b>	
C01.	Understand the concept of plant systematics and classification
C02.	Describe the principles and rules involved in plant systematics and classification
C03.	Identify the plants upto the level of a family
C04.	Understand the application of this field in floriculture, agriculture and medicine
C05.	Practice sustainable use of plant resources
<b>CBCS - ELECTIVE PAPER</b>	
<b>NURSERY MANAGEMENT AND GARDENING</b>	
C01.	Understand the concept and importance of gardening
C02.	Maintain a nursery
C03.	Commercialize the knowledge
<b>FIFTH SEMESTER</b>	
<b>PAPER V</b>	
<b>PLANT ECOLOGY &amp; SUSTAINABLE DEVELOPMENT</b>	
C01.	Learn various types of ecosystems and its significance in biodiversity conservation
C02.	Understand ecological concepts like succession and plant adaptations
C03.	Learn the practical application of research methodologies in ecology with reference to community studies
C04.	Understand the concept of sustainability
C05.	Understand the limitations of available natural resources and the need to sustain them
C06.	Evaluate sustainable management related to local and global issues
C07.	Get knowledge on the recent issues associated with environment.
<b>PAPER VI</b>	
<b>CYTO GENETICS AND MOLECULAR BIOLOGY</b>	
C01.	Understand the concept of chromosomal organization, biomolecules (protein and nucleic acid)
C02.	Acquire knowledge of the genes inhabiting the cellular world of life that are engaged in metabolic processes.
C03.	Understand the concepts of cell division and cell cycles .

C04.	Gain knowledge on principles of genetics
C05.	To understand the natural genetic variation in plants and to know how diverse factors contribute to the expression of genotypic and phenotypic variation.
C06.	Understand the effect of different types of mutation on genotypic and phenotypic expression • understand the concept of plant sex determination and gene mutation
C07.	To widen the knowledge on the role of polyploidy in plant breeding which could be employed in diverse fields of basic and applied research.
<b>SIXTH SEMESTER</b>	
<b>PAPER VII</b>	
<b>PLANT PHYSIOLOGY</b>	
C01.	Learn the underlying principles of various physiological processes like Ascent of sap, transpiration, photosynthesis, translocation and respiration in plants
C02.	Understand the mechanism involved in these physiological processes
C03.	Know the various plant growth substances and their physiological effects
C04.	Understand the role of mineral nutrients in plants
C05.	Understand the concepts like vernalization and photoperiodism, and their practical applications in agriculture
C06.	Acquire the information on plant signalling and communication in plants
<b>PAPER VIII</b>	
<b>PLANT BIOTECHNOLOGY, PHYTOCHEMISTRY AND PHARMACOGNOSY</b>	
C01.	Learn the concepts and fundamental aspects pertaining to plant biotechnology, phytochemistry, pharmacognosy
C02.	Understand the concept of genetically modified plants and their relevance to economy
C03.	Know the principle involved in cultivation of medicinal plants by organic farming, plant tissue culture and to realize the eco friendly potential application of biotechnological processes in pharmaceuticals ,food industry, agriculture and its role in bioremediation
C04.	Enhance their analytical skills in research and know the lab safety measures.
C05	. Acquire knowledge with regard to commercializing the primary and secondary metabolites as natural medicinal drugs

## MICROBIOLOGY

### PROGRAMME OUTCOMES (PO)

<b>PO.1</b>	It will help students to inculcate the basic concepts of biochemistry including an understanding of the fundamental biochemical principles and their applications in a systematic, scientific, evidence-based process. The programme will also provide a general understanding of the inter disciplines with a holistic approach in biological sciences.
<b>PO.2</b>	Students will gain experience in basic laboratory methods, techniques and be able to apply the scientific method to the experimental processes, hypothesis testing, data interpretation and logical conclusions.
<b>PO.3</b>	Develop problem solving and analytical skills through case studies, research papers and hands-on-experience, especially integrated into skill enhancement courses.
<b>PO.4</b>	Provide requisite knowledge of laboratory safety, data replication and quality control, record keeping and other aspects of “responsible conduct of research”.
<b>PO.5</b>	Ability to employ modern library search tools to locate and retrieve primary literature on a topic and critically evaluate the literature.
<b>PO.6.</b>	Students will be able to apply and effectively communicate scientific reasoning and data analysis in both written and oral forms. They will be able to communicate effectively with well-designed posters and slides in talks aimed at scientific audiences as well as the general public.
<b>PO.7</b>	Students will learn to work collaboratively in a team
<b>PO.8</b>	Students will gain knowledge of ethical and good laboratory practices, health and biohazard regulations, plagiarism and intellectual property rights related issues practiced in modern era of scientific investigation.
<b>PO.9</b>	Graduates will be able to apply the major theories and research procedures to contemporary social problems.
<b>PO.10</b>	The programme will prepare students to plunge into various fields of higher education or related profession in various disciplines, armed with plethora of knowledge, hands-on-experience and scientific attitude, at national and global levels.

<b>PROGRAMME SPECIFIC OUTCOMES (PSO)</b>	
<b>PSO.1.</b>	Acquired knowledge and understanding of the microbiology concepts as applicable to diverse areas such as medical, industrial, environment, genetics, agriculture, food and others.
<b>PSO.2.</b>	Demonstrate key practical skills/competencies in working with microbes for study and use in the laboratory as well as outside, including the use of good microbiological practices.
<b>PSO.3.</b>	Competent enough to use microbiology knowledge and skills to analyze problems involving microbes, articulate these with peers/ team members/ other stake holders, and undertake remedial measures/studies etc.
<b>PSO.4.</b>	Developed a broader perspective of the discipline of Microbiology to enable him to identify challenging societal problems and plan his professional career to develop innovative solutions for such problems.
<b>COURSE OUTCOMES (CO)</b>	
<b>FIRST SEMESTER</b>	
<b>Fundamentals of Microbiology G 509.1</b>	
<b>CO.1.</b>	Have developed a good knowledge of the development of the discipline of Microbiology and the contributions made by prominent scientists in this field.
<b>CO.2.</b>	Have developed a very good understanding of the characteristics of different types of microorganisms, methods to organize/classify these into and basic tools to study these in the laboratory.
<b>CO.3.</b>	Describe the nutritional requirements of bacteria for growth; developed knowledge and understanding that besides common bacteria there are several other microbes which grow under extreme environments.
<b>CO.4.</b>	Perform basic laboratory experiments to study microorganisms; methods to preserve bacteria in the laboratory; calculate generation time of growing bacteria.
<b>CO.5</b>	.Are able to perform basic experiments to grow and study microorganisms in the laboratory.
<b>CBCS -ELECTIVE PAPER</b>	
<b>Techniques in Microbiology G509.1E</b>	
<b>CO.1.</b>	Principles and applications of a number advanced types of microscopes and of analytical instruments.

<b>CO.2.</b>	Acquire the knowledge of several separation techniques using chromatography.
<b>CO.3.</b>	Acquire the knowledge of Spectrophotometry Principle and its application in biological research.
<b>SECOND SEMESTER</b>	
<b>Basic Microbiology G509.2</b>	
<b>CO.1.</b>	Describe characteristics of bacterial cells, cell organelles, cell wall composition and various appendages like capsules, flagella or pili.
<b>CO.2.</b>	Differentiate a large number of common bacteria and cyanobacteria by their salient characteristics; classify bacteria into groups.
<b>CO.3.</b>	Are able to explain the useful and harmful activities of the microorganisms.
<b>CO.4.</b>	Identify common fungi by their salient characteristics; classify fungi into groups.
<b>CO.5.</b>	Differentiate viruses by their salient characteristics; classify viruses into groups.
<b>CBCS -ELECTIVE PAPER</b>	
<b>Common Fungal and Viral Diseases in Human G509.2E</b>	
<b>CO.1.</b>	Understand the various fungal and viral infections and organs affected.
<b>CO.2.</b>	Have developed a very good understanding of preventive measures for human infections by fungi and prevention and control of mycoses.
<b>CO.3.</b>	Gained knowledge of a variety of human viruses. Understanding about the transmission and prevention of viral diseases.
<b>THIRD SEMESTER</b>	
<b>Microbial Physiology and Metabolism G 509.3</b>	
<b>CO.1.</b>	Understand the basics of bioenergetics and the role of ATP in Metabolism. Other Energy rich molecules structure and significance.
<b>CO.2.</b>	Describing the growth characteristics of the microorganisms capable of growing under unusual environmental condition of temperature, oxygen, and solute and water activity.
<b>CO3.</b>	Describing the growth characteristics of the microorganisms which require different nutrient for growth and the associated mechanisms of energy generation for their survival like autotrophs, heterotrophs, chemolithoautotrophs etc.
<b>CO 4.</b>	Differentiating concepts of aerobic and anaerobic respiration and how these are manifested in the form of different metabolic pathways in microorganisms.
<b>CO.5.</b>	Describe the biogeochemical cycles and mineral transformation by microbes.
<b>CBCS -ELECTIVE PAPER</b>	
<b>Basic Concepts of Food Safety. G509.3E</b>	
<b>CO.1.</b>	Understand the concepts of food safety and the significance of food safety.
<b>CO.2.</b>	Have developed a very good understanding of sanitation and hygiene in food sector.
<b>CO.3.</b>	Gained knowledge of a variety of methods of pest control to ensure food safety.

<b>FOURTH SEMESTER</b>	
<b>Microbial Ecology and Environmental Microbiology. G509.4</b>	
<b>CO.1.</b>	Have developed a fairly good knowledge and understanding of different types of environments and habitats where microorganisms grow including the microbiomes of the human gut and animal gut.
<b>CO.2.</b>	Are able to identify the important role microorganisms play in maintaining healthy environment by degradation of solid/liquid wastes; how these activities of microorganisms are used in sewage treatment plants, production of activated sludge and functioning of septic tanks
<b>CO. 3.</b>	Have understood the significance of microbes in air and air sanitation.
<b>CO.4.</b>	Have developed the practical skills for conducting experiments.
<b>CO-5</b>	<b>5.</b> Are able to understand the methods of examination of soil microbes.
<b>CBCS -ELECTIVE PAPER</b>	
<b>Solid Waste Management G 509.4E</b>	
<b>CO.1.</b>	Understand the concepts categories of solid waste
<b>CO.2.</b>	Have developed a very good understanding of types of e-waste.
<b>CO.3.</b>	Gained knowledge of a variety of methods of safe disposal of solid and e-waste.
<b>FIFTH SEMESTER</b>	
<b>PAPER-5 Medical Microbiology and Immunology G509.5a</b>	
<b>CO.1</b>	Understand the basic concepts of immunology and types of immune system.
<b>CO.2.</b>	Understood the basic and general concepts of causation of disease by the pathogenic microorganisms and the various parameters of assessment of their severity including the broad categorization of the methods of diagnosis.
<b>CO. 3.</b>	Developed a thorough understanding of common bacterial, viral, fungal, parasitic diseases of human being including some very important diseases of the animals also.
<b>CO.4.</b>	Conceptualized the protective role of the immune system of the host and

	developed an understanding of the basic components as well as the mechanisms underlying the immune system and its response to pathogenic microorganisms.
<b>CO.5</b>	Are able to conduct experiments for growing common bacteria in different microbiological media, antibiotic sensitivity determination and antigen antibody reaction (precipitation test in the agarose)
<b>PAPER-6 Plant Microbiology and Bioremediation G509.5b</b>	
<b>CO.1.</b>	Developed a clear understanding of the multifarious roles of microorganisms in soil, in association with plants.
<b>CO.2.</b>	Are able to describe the role of microorganisms in the production of plant diseases and biological control.
<b>CO3.</b>	Are able to identify the role of microorganisms in the causation of the diseases in plants.
<b>CO 4.</b>	Understand the role of microorganisms in biodegradation of organic pollutants and natural compounds.
<b>CO.5.</b>	Develop a clear understanding of composting the organic waste and role of microbes in composting.
<b>SIXTH SEMESTER</b>	
<b>PAPER-7 Principles of Bacterial Genetics, Genetic Engineering and Bioinformatics G509.6a</b>	
<b>CO.1.</b>	.Has acquired knowledge of gene, their expression and regulation of expression. Has acquired a fairly good understanding mechanisms of genetic exchange, mutations and their implications.
<b>CO.2.</b>	Has developed practical skill for isolation of bacteria/plasmid DNA
<b>CO3.</b>	Has acquired a fairly good knowledge of the tools and the methods for genetic engineering.
<b>CO 4.</b>	Developed skills to use computers for analysis of biological data.
<b>CO.5.</b>	Skill to use important biological databases, use tools to retrieve data, and compare the data of the biological macromolecules. Developed basic skills for data retrieval, representation, analysis and interpretation.
<b>PAPER-8 Applied Microbiology G509.6b</b>	
<b>CO.1.</b>	.Has acquired a fairly good knowledge of microbes in food and their role in food spoilage.
<b>CO.2.</b>	Has acquired knowledge of various methods of food preservation.
<b>CO3.</b>	Has acquired knowledge of spoilage of selective foods and their preservation
<b>CO 4.</b>	Has acquired knowledge of fermentation types and production of organic acids, alcohols, enzymes, antibiotics and various foods in the industry.
<b>CO.5.</b>	Has acquired knowledge of how microbes are involved in milk spoilage and milk preservation.

## ZOOLOGY

### PROGRAMME OUTCOMES (PO)

PO.1.	Create awareness of various branches in zoology to help the student choose his/ her career in higher education.
PO.2.	Understand and appreciate the diversity and complexity of all life forms.
PO.3.	Familiarize with recent advances in various fields of Applied Zoology.
PO.4.	To get acquainted with the recent trends in research and provide opportunities to develop basic research skills and take up independent research work to develop a scientific temper.
PO.5.	Emphasize the need for protection of environment by imparting knowledge of environmental degradation and its impact on living organisms.
PO.6.	Acquire knowledge of the local faunal diversity and understand the importance of its conservation.
PO.7.	Apply the acquired knowledge and skills to promote self-employment.
PO.8.	Gain knowledge of communicable and non-communicable diseases to improve personal and public health.

### PROGRAMME SPECIFIC OUTCOMES (PSO)

PSO.1.	Understand the nature and basic concepts of cell biology, genetics, taxonomy, physiology, ecology and applied Zoology
PSO.2.	Analyse the relationships among animals and plants
PSO.3.	Perform procedures as per laboratory standards in the areas of Taxonomy, Physiology, Ecology, Cell biology, Genetics, Applied Zoology, Clinical science, tools and techniques of Zoology, Toxicology, Entomology, Biochemistry, Fish biology, Animal biotechnology, Toxicology and Immunology.
PSO.4.	Understand the applications of biological sciences in Apiculture, Aquaculture, Sericulture, Dairy, vermitechology and Mictotomy
PSO.5.	Gains knowledge about biostatistics and handle the statistical softwares

<b>COURSE OUTCOMES (CO)</b>	
<b>FIRST SEMESTER</b>	
<b>ANIMAL DIVERSITY (NON - CHORDATA) G508.1</b>	
C01.	Understand animal systematics.
C02.	Identify and classify invertebrate organisms to their respective phyla.
C03.	Describe the general characters and classes of the organisms belonging to the invertebrate phyla.
C04.	Familiarize with evolutionary relationships and basis of life processes in non-chordates.
CO 5.	Analyze the economic importance of invertebrate fauna.
<b>CBCS-OPEN ELECTIVE</b>	
<b>Aquarium maintenance and fish breeding techniques</b>	
<b>G 508.1E (Open Elective)</b>	
C01.	Identify freshwater and marine ornamental fishes both indigenous and exotic.
C02.	Identify invertebrates and aquatic plants that are popular in the aquarium industry.
C03.	Design and set up an aquarium.
C04.	Understand the process of management and maintenance of freshwater aquarium.
CO 5.	Follow biosecurity protocols and ensure safety and hygiene while handling freshwater fishes.
C06.	Execute breeding of common live-bearing and egg-laying ornamental fishes.
<b>SECOND SEMESTER</b>	
<b>ANIMAL DIVERSITY (CHORDATA) G508.2</b>	
C01.	Understand animal systematics.
C02.	Identify and classify vertebrate organisms to their respective phyla.
C03.	Describe the characters, classification of vertebrates under different classes of phyla Protochordata up to Mammalia.
C04.	Analyze his/her role in nature to protect, preserve and promote understanding of their surroundings by learning, observing various life forms.
<b>CBCS - OPEN ELECTIVE</b>	
<b>Apiculture G 508.2E</b>	
C01.	Identify and describe the scientific basis of beekeeping.

C02.	Understand the basic life cycle of the honeybee.
C03.	Familiarize with beekeeping tools and equipment.
C04.	Appreciate the importance of honey bees as beneficial insects involved in food production and in ecosystem sustainability.
CO 5.	Detect bee diseases and pests.
C06.	Execute management practices involved in keeping honey bees healthy and productive for honey production and pollination.
<b>THIRD SEMESTER</b>	
<b>CELL AND MOLECULAR BIOLOGY, IMMUNOLOGY G508.3</b>	
C01.	Understand the concepts of cell and its components, cell organelles, chromosomes, gene mutation and cell division.
C02.	Understand the structures of nucleic acids and genes.
C03.	Analyze the structure and purpose of basic components of prokaryotic and eukaryotic cells, especially the macromolecules, membranes and cell organelles.
C04.	Identify the components of the immune system at the organ, cellular and molecular levels.
CO 5.	Describe the functioning and regulation of the immune system at different levels..
C06.	Apply the understanding of the role of immune system in protection against diseases
<b>CBCS - OPEN ELECTIVE</b>	
<b>Health and lifestyle diseases G 508.3E</b>	
C01.	Understand the consequences of lifestyle on human health.
C02.	Understand the importance of exercise in daily life.
C03.	Identify the specific risk factors that are associated with cancer and coronary heart diseases.
C04.	Analyze the differences between controllable and uncontrollable risk factors of lifestyle diseases.
CO 5.	Apply necessary changes in daily lifestyle to reduce the risk of lifestyle diseases.
<b>BIOCHEMISTRY AND ANIMAL PHYSIOLOGY G508.4</b>	
C01.	Understand the functions of important physiological systems including the digestive, circulatory, respiratory, excretory, reproductive and other metabolic systems.
C02.	Correlate interactions between different organ systems.
C03.	Analyze the consequences of malfunctioning of various metabolic systems.
C04.	Understand the importance of various biomolecules.

CO 5.	Apply the knowledge attained in biochemistry and physiology to lead a healthy life.
<b>CBCS - OPEN ELECTIVE</b>	
<b>Nature and Wildlife photography G 508.4E</b>	
CO1.	Recall the history and evolution of photography.
CO2.	Understand the basic concepts of photography.
CO3.	Identify the various parts of camera, DSLR or SLR
CO4.	Understand the concepts of ISO, shutter speed, aperture and their interconnection.
CO 5.	Apply the techniques of photography to capture nature and wildlife.
CO6.	Execute advanced skills in photography such as autofocus, exposure, composition, post processing techniques using software.
<b>FIFTH SEMESTER</b>	
<b>Histology, Reproductive and Developmental Biology</b>	
<b>G508.5A</b>	
CO1.	Identify the histological structures of various organs in relation with their functions.
CO2.	Understand the basic principles of microtomy and differential staining technique, before focusing on the structure and function of mammalian tissues, and the relationships between them;
CO3.	.Describe the structure, functions and biological principles of reproductive system
CO4.	Identify the developmental stages of chick , frog and human foetus.
CO 5.	Describe the key events in early and systematic embryological development.
CO6.	Apply the understanding of concepts in reproductive biology to life.
<b>ECOLOGY, BIOSTATISTICS, ETHOLOGY AND WILDLIFE BIOLOGY G508.5B</b>	
CO1.	Understand the general principles of ecology as to how they related to terrestrial and aquatic (plant and animal ) conservation and management.
CO2.	Identify species, characteristics, habitat requirements and behaviour of birds, fish, mammals etc.
CO3.	Apply knowledge to solve problems related to wildlife conservation and management.
CO4.	Acquire knowledge of how wildlife conservation and management relates to the economy and environment, both currently and in the future.
CO 5.	Use contemporary biostatistical tools and techniques for studying

	animal populations.
C06.	Familiarize with a variety of laws and regulations that influence how natural resources are used and protected.
<b>SIX SEMESTER GENETICS, EVOLUTION AND PALEONTOLOGY G508.6A</b>	
C01.	Understand the fundamental concepts in Genetics.
C02.	Explain Mendelian segregation, independent assortment and linkage
C03.	Apply the principles of Mendelian inheritance and their extensions (one- and two-locus traits with two or more alleles, gene interactions, sex linkage and linkage) by analyzing inheritance patterns from crosses
C04.	Describe the origin and genetic consequences of mutations and chromosomal abnormalities
C0 5.	Analyze the allele and genotypic frequencies within populations based on the Hardy-Weinberg law
C06.	Familiarize with the basic processes in population genetics such as mutation, migration, natural selection, sexual selection and genetic drift.
C07.	Understand the processes of speciation and extinction and the theories of origin of life.
<b>APPLIED ZOOLOGY, PARASITOLOGY, TOXICOLOGY AND CANCER BIOLOGY G508.6B</b>	
C01.	Identify and classify different species and breeds of cattle, poultry, silk moths, earthworms, honey bees, prawns, fishes and shellfishes.
C02.	Understand the morphology, life cycle of different parasites.
C03.	Explain the epidemiology, diagnosis and treatment of vector-borne diseases.
C04.	Apply the knowledge in parasitology to prevent diseases.
C0 5.	Understand the concepts of Toxicology and cancer biology.
C06.	Analyze the effect of carcinogens and toxins on living organisms.

**FOOD SCIENCE & NUTRITION CODE:G500S****PROGRAMME OUTCOMES (PO)**

PO.1.	Apply the knowledge of fundamentals of food science, food processing techniques, and a specialization to the solution in Food industries and manufacturing companies.
PO.2.	Identify, formulate, review research literature, and analyze complex nutritional problems reaching substantiated conclusions using first principles of dietetics, nutritional sciences, and food sciences.
PO.3.	Design solutions for complex food science and nutrition problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO.4.	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO.5.	Create, select, and apply appropriate techniques, resources, and modern food science and nutrition tools for specialized purposes such as assessment and screening.
PO.6.	Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional Nutritionist practice.
PO.7.	Communicate effectively on food technological activities with the food research community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

**PROGRAMME SPECIFIC OUTCOMES (PSO)**

PSO.1.	Know the chemistry underlying the properties and reactions of various food components, have sufficient knowledge of food chemistry to control reactions in foods, know the major chemical reactions that limit shelf life of foods, use the laboratory techniques common to basic and applied food chemistry and know the principles behind analytical techniques associated with food.
PSO.2.	Identify the important pathogens and spoilage microorganisms in foods and the conditions under which they will grow, inactivated, killed or made harmless in foods and know the principles involving food preservation via fermentation processes.
PSO.3.	Incorporate the principles of food science and nutrition in practical, real-world situations and problems.
PSO.4.	Apply the principles of food science to control and assure the quality of food products and also identify government regulations required for the manufacture and sale of food products.
PSO.5.	List major properties, functions, and important food sources of the nutrients,

	describe human nutrient and energy needs throughout the life span and in physical training and translate human nutrient and energy needs into daily food selection utilizing appropriate standards and guidelines.
PSO.6.	Explain the significance of food practices to nutrition and disease prevention and effectively evaluate meal plans for nutritional adequacy, nutrient density, balance, variety, and calorie control.
<b>COURSE OUTCOMES (CO)</b>	
<b>FIRST SEMESTER</b>	
<b>Fundamentals of Human Physiology G 551.1</b>	
CO.1.	Understand the Structure and Functions of the various organ systems of the body
CO.2.	Relate the Structure with Functions of the tissues and organs
CO.3.	Comprehend the Mechanism of Action of Organs
CO.4.	Relate the Physiology of the human body with Food and Nutritional requirements
CO.5.	Recognize the Clinical Symptoms of Nutritional Deficiencies based on anatomical considerations
<b>CBCS -ELECTIVE PAPER</b>	
<b>Healthy Lifestyles and Nutrition G 551.1E</b>	
CO.1.	Provide knowledge of the physiological role of various nutrients
CO.2.	Enable students to understand the basis of human nutritional requirement and recommendations through the life cycle
CO.3.	Enable students to understand the pharmacological actions of nutrients and their implications
CO.4.	Familiarize students with the recent advances in nutrition.
<b>SECOND SEMESTER</b>	
<b>Brewing and Fermentation Technology G 551.2</b>	
CO.1.	Application of the science of brewing.
CO.2.	Able to conceptualize, implement and evaluate the fermented products
CO.3.	Understand the process of malt whiskies.
CO.4.	Evaluate nutrition information of fermented beverages.
CO.5.	Development of batch and grain whisky distillation.
<b>CBCS -ELECTIVE PAPER</b>	
<b>Nutrition in Physical Fitness G 551.2E</b>	
CO.1.	Understand the role of exercise in daily life
CO.2.	Classify the various types of physical fitness activities
CO.3.	Understand the importance of nutrition in physical fitness

CO.4.	Distinguish between low and high intensity exercises
<b>THIRD SEMESTER</b>	
<b>Food Processing and Preservation G 551.3</b>	
CO.1.	Describes the principles of food preservation and suggest the application of the preservation process depending on the type of food.
CO.2.	Determines the thermal processing conditions (time / temperature) for each type of food and propose a device that matches a particular conservation process.
CO.3.	Chooses the appropriate application of certain conservation processes with regard to the preservation of quality and the satisfactory durability of food products.
CO.4.	Optimizes process parameters for selected conservation processes taking into account the physico-chemical properties of food products.
<b>CBCS -ELECTIVE PAPER</b>	
<b>Food Additives and Adulterants G 551.3E</b>	
CO.1.	Understand the concepts of food additives and adulterants
CO.2.	Determine the upper tolerance level of food additives
CO.3.	Know the laws of food safety and food labelling laws
CO.4.	Compare health claims and labelling of market stock to general standards
CO.5.	Identify naturally occurring and synthetic toxins in food
<b>FOURTH SEMESTER</b>	
<b>Lifespan Nutrition G 551.4</b>	
CO.1.	Comprehend the dietary guidelines in meal planning
CO.2.	Acquainted with meal planning for all age groups
CO.3.	Enable to familiarize with meal management appreciating the physical and physiological changes of individuals
<b>CBCS -ELECTIVE PAPER</b>	
<b>Basic Food Testing Tools G 551.4E</b>	
CO.1.	Provide an understanding of composition of various foodstuffs
CO.2.	Familiarize students with types and methods of food testing and detection of adulterants
CO.3.	Enable students to use the knowledge of food testing in their daily lives
<b>FIFTH SEMESTER</b>	
<b>PAPER-5 Product Development and Sensory Evaluation G551.5a</b>	
CO.1.	Describes sensory analysis in general, the most common methods, and know when to use them and understand the effect of the setting on sensory evaluation
CO.2.	Measures the sensory characteristics of the food products, after selection of appropriate methods, adequate experimental design and statistical

	interpretation of the results. Practical application of the methods learned.
CO.3.	Describes the process of product development and focus on application of descriptive methodologies, and promote some aspects of the development and management of portfolio of new food products.
<b>PAPER-6</b>	
<b>Food Safety and Management System G551.5b</b>	
CO.1.	Critically evaluates the factors that are constraining the quality of food and feed products and use the concept of Process Quality Management to achieve and maintain high quality and safe outputs throughout food and feed production systems.
CO.2.	Analyses the requirements of private standards compared to legislation and related standards and Reflect upon risk analysis and its role in the development of Food Safety Objectives (FSOs).
CO.3.	Have critical insight into the development and enforcement of legislation and related standards and understand the importance of maintaining a written food safety management system to control food safety hazards.
<b>SIXTH SEMESTER</b>	
<b>PAPER-7 Principles of Clinical Nutrition G551.6a</b>	
CO.1.	Understand the concept, purpose and principles of diet therapy and role and types of dietitians
CO.2.	Gain knowledge on the etiological factors and complications, assessment parameters and dietary modifications in obesity and underweight
CO.3.	Learn about the causes, types, biochemical changes, diagnostic tests
CO.4.	Delineate various deficiency disorders with respect to their prevalence, causes, symptoms and preventive measures
<b>PAPER-8 Fundamentals of Dietetics G 551.6b</b>	
CO.1.	Learn about the causes, symptoms and treatment of various disease conditions
CO.2.	Gain knowledge about the role of nutrition in disease conditions.
CO.3.	Develop skills and techniques in the planning and preparation of therapeutic diets for various disease conditions.

## PHYSICAL SCIENCES

<b>CHEMISTRY</b>	
<b>PROGRAMME OUTCOMES (PO)</b>	
PO.1.	To create an awareness of the impact of chemistry on the environment, society and development outside the scientific community.
PO.2.	To provide students with the necessary knowledge and skills to carry out a successful research career in industry or academia or as an entrepreneur.
PO.3.	To help students become self-directional with efficient problem-solving skills at a professional and personal level.
PO.4.	To develop skills in planning and conducting advanced chemical experiments and applying structural-chemical characterization techniques.
PO.5.	To develop a scientific temper and to engage into interdisciplinary research which shall benefit the society.
PO.6.	To familiarise and apply safety practices and chemical hygiene with a sound knowledge of regulations and practices.
PO.7.	To develop effective written and oral communication skills, especially the ability to transmit complex technical information in a clear and concise manner.
<b>PROGRAMME SPECIFIC OUTCOMES (PSO)</b>	
PSO.1.	Students will have a firm foundation in the fundamentals and applications of Chemistry and its multidisciplinary approach towards physical or biological sciences.
PSO.2.	Students will be prepared for various opportunities in the fields of pharmaceuticals, chemical manufacturing, forensic science, food products, environmental monitoring, plastic, cosmetics & agro industries etc. in addition to oil, gas and power sectors as well as defence services.
PSO.3.	Students will be able to gather and process scientific information from a range of sources including libraries, databases and the internet.
PSO.4.	They will be able to identify the new environmentally friendly practices and processes that the chemical industry is adopting.

PSO.5.	They will be able to investigate chemical problems using scientific tools for analysis and interpretation of data.
PSO.6.	Students will be able to qualify various entrance exams, interviews and tests to get into research career or to gain employability.
PSO.7.	To be able to design and carry out scientific experiments as well as accurately record and analyse the results of such experiments.
PSO.8.	Students will be able to understand the impact of chemicals on environment and environmental pollution and formulate alternate measures to overcome environmental problems.
<b>COURSE OUTCOMES (CO)</b>	
<b>FIRST SEMESTER</b>	
<b>LIQUID AND LIQUID CRYSTALS, CHEMICAL BONDING AND ANALYTICAL TECHNIQUES</b>	
CO.1.	To understand the properties of liquids and liquid crystals, methods to determine physical properties and applications
CO.2.	To understand Maxwell's distribution and behaviour of real gases, equation of state, isotherm and law of corresponding states.
CO.3.	To understand the fundamentals of ionic and covalent bonding and predict geometries of simple molecules based on hybridisations.
CO.4.	Students will learn the structure and bonding in organic compounds and some organic reaction mechanisms.
CO.5.	Evaluate strengths and limitations of chromatographic separation and detection methods.
CO.6.	Students will also learn some common laboratory techniques of refluxing, distillation, steam distillation and recrystallization.
<b>CBCS-ELECTIVE PAPER</b>	
<b>ESSENTIALS OF PRACTICAL CHEMISTRY</b>	
CO.1.	Students will be able to learn basic chemical safety and qualitative organic and inorganic methods of analyses.
CO.2.	Gain understanding of basic quantitative modes of analyses and estimation of elements.

<b>SECOND SEMESTER</b>	
<b>SOLVENTS, NUCLEAR CHEMISTRY, INDUSTRIAL CHEMISTRY, ORGANIC DERIVATIVES AND STEREOCHEMISTRY</b>	
CO.1.	To gain a broad understanding of solvent type and characteristics.
CO.2.	To learn the principles concerning solid state structures and crystal structures by applying basic crystallographic concepts.
CO.3.	Understand the basics of nuclear radiations and calculations involving half-life of radioisotopes.
CO.4.	Define catalysis and different types of catalytic processes.
CO.5.	Familiarise with structure, bonding of many organic derivatives (halides, alcohols and ethers) and reaction mechanisms.
CO.6.	Predict and analyse the configurations of optical and geometrical isomers.
<b>CBCS-ELECTIVE PAPER</b>	
<b>FOOD AND INDUSTRIAL CHEMISTRY</b>	
CO.1.	Gain an insight into chemical aspects in the Food industry including the role of lipids, vitamins and food additives.
CO.2.	Familiarize with structure and applications of polymers in consumer goods.
CO.3.	Learn the basic components involved in the manufacture of cement, paints, soap and detergents and their classification.
<b>THIRD SEMESTER</b>	
<b>CHEMICAL KINETICS, PERIODIC ELEMENTS, AROMATIC ORGANIC COMPOUNDS AND SPECTROSCOPIC METHODS</b>	
CO.1.	Learn type of reactions, theories and determination of reaction rates and concepts of steady state approximation.
CO.2.	Familiarize with mechanisms of different types of catalysis and action of catalysts.
CO.3.	Understand the general characteristics of transition elements, oxidation states, colour, magnetic property and calculate their magnetic moments.
CO.4.	To be able to explain the comparative treatment of 4d and 5d series of transition metals as well as lanthanides.
CO.5.	Predict electronic configuration, ionic radii, colour and formation of complexes.

CO.6.	Learn mechanisms of aromatic electrophilic substitution reactions and the effect of substituent groups.
CO.7.	Understand the fundamentals of some spectroscopic methods - Plasma emission, atomic absorption, flame photometry as well as thermo-analytical methods.
<b>CBCS-ELECTIVE PAPER ENVIRONMENTAL CHEMISTRY</b>	
CO.1.	Understand and analyse different types of environmental pollutions - air, water and soil.
CO.2.	To be able to identify the causes and factors leading to these pollutions and suggest scientific methods to control them.
<b>FOURTH SEMESTER THERMODYNAMICS, COORDINATION COMPOUNDS, REAGENTS IN ORGANIC CHEMISTRY AND PHOTOCHEMISTRY</b>	
CO.1.	To understand the concept and laws of thermodynamics and define system, variables, heat, work in thermodynamical method.
CO.2.	Understand the concepts of entropy, reversible and irreversible processes and learn their applications.
CO.3.	Students will learn fundamental theories of coordination compounds, their nomenclature and predict their structures.
CO.4.	Understand the concept of d-orbital splitting in tetrahedral, octahedral and square planar metal complexes.
CO.5.	Familiarise with applications of common reagents in organic synthesis and learn mechanisms of some important named reactions.
CO.6.	Describe and explain various photochemical and photophysical processes and to calculate quantum yields of photochemical reactions.
<b>CBCS-ELECTIVE PAPER CHEMISTRY IN EVERYDAY LIFE</b>	
CO.1.	Realise and appreciate various chemical formulations in Cosmetics and toiletries industry with a focus on environmental and health concerns.
CO.2.	To have a basic knowledge of natural and synthetic polymers used in our daily lives.

<b>FIFTH SEMESTER PAPER-V</b>	
<b>PHASE EQUILIBRIA, TRANSITION METAL COMPLEXES, HETEROCYCLIC AND BIOORGANIC CHEMISTRY</b>	
CO.1.	Define and understand various colligative properties and to differentiate between different liquid mixtures.
CO.2.	Explain the basic definitions and terms in a phase diagram.
CO.3.	Define magnetic behavior of different metal complexes and explain geometry of the complex based on magnetic moment data.
CO.4.	Predict mechanism of electrophilic substitution reactions in heterocyclic compounds.
CO.5.	Compare the basicity of heterocyclic compound containing nitrogen.
CO.6.	Understand significance of metalloporphyrins and its functions in biological system
<b>FIFTH SEMESTER PAPER-VI</b>	
<b>QUANTUM MECHANICS, ROTATIONAL AND ELECTRONIC SPECTROSCOPY, BIOMOLECULES</b>	
CO.1.	Understand the basic concepts of quantum mechanics and to derive expression for Schrodinger wave equation.
CO.2.	Familiarize with concepts of rotational spectra and its application to determine bond length and moment of inertia.
CO.3.	Learn the basics of electronics spectroscopy and able to apply Woodward-Fieser rules for calculating absorption maximum in dienes.
CO.4.	Explain general characteristics of inorganic polymers of silicon, phosphorous, boranes.
CO.5.	Explain the structures of biomolecules (carbohydrates, proteins, enzymes, lipids and hormones) and their role in biological processes.
CO.6.	Summarize the functions of proteins and recognize the importance of the three-dimensional shape of a protein on its function.
<b>SIXTH SEMESTER PAPER-VII</b>	
<b>ORGANIC SPECTROSCOPY, ORGANOMETALLICS, GROUP THEORY AND NANO CHEMISTRY</b>	
CO.1.	Describe molecular vibrations with the interaction of matter and

	electromagnetic waves and identify vibrational degrees of freedom.
CO.2.	Explain the basic concepts in infrared and Raman spectroscopy.
CO.3.	Understand the principle, instrumentation and applications of mass spectroscopy.
CO.4.	Predict thermodynamic and kinetic stabilities of metal complexes and mechanism of substitution in square planar complexes.
CO.5.	Understand bonding and applications of organometallic complexes.
CO.6.	Classify basic symmetry groups and operations in simple molecules.
CO.7.	Understand the concept of enolates and active methylene compounds and their role in organic synthesis.
CO.8.	Understand description of various types of nano materials, host-guest chemistry, self-assembled structures, nano-structured materials, and their applications.
CO.9.	Design multistep organic synthesis by retrosynthetic approach.
<b>SIXTH SEMESTER PAPER-VIII</b>	
<b>ELECTROCHEMISTRY, SUSTAINABLE CHEMISTRY, NMR SPECTROSCOPY, DYES AND NATURAL PRODUCTS</b>	
CO.1.	Understand basic principle of electrochemistry and its applications.
CO.2.	Learn different types of galvanic cells, Nernst equation, calculations of thermodynamic properties and applications of conductometric and potentiometric titrations.
CO.3.	Learn principles and application of Green chemistry in industrial processes.
CO.4.	Understand the importance and theory behind biopolymers and biodegradable polymers.
CO.5.	Understand the basics of NMR spectroscopy and apply it to elucidate the structure of simple organic molecules.
CO.6.	Learn structures of some organic dyes along with some of the alkaloids and terpenes in addition to their extraction process from plants.

## ELECTRONICS

### PROGRAMME OUTCOMES:

PO-1.	Understand, appreciate and apply the concepts of Electronics in various fields science, environment and contribute to improve the quality of life.
PO-2.	Acquire and Enhance basic skills of reasoning, application and hands on experience to use basic tools and methods of Electronics.
PO-3.	Develop broad knowledge and understanding of key concepts of electronic science and equip with advanced scientific/technological capabilities for analyzing and tackling the issues and problems in the field of Electronics.
PO-4.	Create an awareness of the impact of Electronics on the society, and Development outside the scientific community.
PO-5.	Inculcate scientific temper in fellow students and also among the larger scientific community, and society in general.
PO-6.	Use modern techniques and recent methods to imbibe and propagate the concepts of Electronics.
PO-7.	Think, acquire knowledge and skills through logical reasoning and inculcate the culture of self-learning.
PO-8.	Exercise critical thinking and the scientific knowledge to design, carry out, record, analyze and co-relate the results of Electronics practical.

### PROGRAMME SPECIFIC OUTCOMES

PSO1.	Understand the principles of operation of various Electronics components, testing them and study their applications in various circuits.
PSO2.	Learn the fundamentals of analog and digital Electronics, Analyze the relationship between analogue and digital circuits and appreciate the advantages of each in practice.
PSO3.	Learn the theory of amplifiers and oscillators, concept of feedback and its applications, Integrated circuits(IC's) and their linear and nonlinear applications, design and study the performance of any circuit using standard software.
PSO4.	Understand the contribution of Electronic Science in the field of computer science, its applications, artificial intelligence, Medical Electronics and automation.
PSO5.	Develop abilities in students to design and develop innovative solutions for benefits of society, by diligence, leadership, team work and lifelong learning.
PSO6.	Understand the fundamentals of Electronic Communications and working of various Electronic communication systems and role of Electronics in development of data transmission and reception in telephone, cellular phone, internet, social media and defense.
PSO7.	Develop ability to apply knowledge and skills they have acquired to the solution of specific theoretical and applied problems in Electronics.

PSO8.	Understand the use of Electronics in the field Electronic communication, Computer science, signal processing, Electronic Instruments and various other electronic Gadgets PSO8. Demonstrate ability to apply electronics knowledge & experimental skills critically and systematically for assessment and solution of complex electronics problems and issues related to communication systems, embedded systems, computers networks, robotics, VLSI Design and fabrication and other specialized areas of electronics.
PSO9.	Provide students with skills that enable them to get employment in industries or pursue higher studies or research assignments or turn as entrepreneur
PSO10.	Understand the application of Electronics in domestic appliances, Service and maintain small household electrical and Electronics appliances.
<b>Course Outcomes</b>	
<b>Semester-I</b> <b>G 504.1: Fundamentals of Analog and Digital Electronics</b>	
CO-1.	Familiarize various electronic components, measuring and testing Instruments used in Electronics.
CO-2.	Understand the structure, working and characteristics of various passive and active components.
CO-3.	Learn network theorems and analyze dc and ac circuits
CO-4.	Learn the applications of various types of diodes in rectifiers, wave shaping circuits and regulators.
CO-5.	Understand the structure, operation and characteristics of bipolar junction transistor.
CO-6.	To understand the basics of number system, Boolean algebra, logic gates and analysis of Boolean functions
<b>Semester-I</b> <b>G 504.1P: Practical-I</b>	
CO-1.	Identify various active and passive components
CO-2.	Test various active and passive components using multimeter.
CO-3.	Learn soldering skills and rig up the given circuit
CO-4.	Use ammeters, voltmeters, Regulated power supplies, function generator and cathode ray oscilloscope, and conduct specified experiments.
<b>Semester-I</b> <b>G504.1E (Open Elective I): Electronic Devices and Applications</b>	
CO-1.	Learn various electronic devices, know their performance parameters and understand the practical applications.
CO2:	Test various electronic devices using multimeters and decide about their condition.
CO-3.	Learn the basics of constructing Electronic circuits through soldering/Breadboard and PCB.

<b>Semester-II</b> <b>G 504.2: TRANSISTOR BIASING CIRCUITS, SMALL SIGNAL AMPLIFIERS, FIELD EFFECT TRANSISTORS AND DIGITAL CIRCUITS</b>	
CO-1.	Understand Q-point of a transistor, methods of fixing Q-point and biasing circuits.
CO-2.	Learn the performance parameters of amplifiers and different amplifiers using transistor and analyze them.
CO-3.	Learn the concept of feedback in amplifiers and their application of feedback in amplifiers and oscillators
CO-4.	Analyze combinational circuit design procedure with examples.
CO-5.	Understand the elements of Sequential circuits and flip-flops.
CO-6.	Understand the basics of Field effect transistors, their types, characteristics and amplifiers using FET s.
<b>Semester-II.G504.2P: Practical-II</b>	
CO-1.	Design, construct and determine the performance parameters of amplifiers
CO-2.	Handle Electronic instruments with necessary precautions and take readings with least error.
CO-3.	Improve soldering skills so that high frequency noises are eliminated
CO-4.	To design, fabricate and study the performance of Regulated Power Supply and learn the techniques of writing dissertation.
<b>II SEMESTER G504.2E (Open Elective II): SEMICONDUCTORS AND INTEGRATED CIRCUITS</b>	
CO-1.	To understand material processing and steps involved in fabrication of various devices and Components in Integrated form
CO-2.	Get enlightened with various kinds of ICs and their applications.
<b>Semester-III</b> <b>G 504.3: LINEAR INTEGRATED CIRCUITS AND APPLICATIONS, SEQUENTIAL LOGIC CIRCUITS AND LOGIC FAMILIES</b>	
CO-1.	Know the IC steps and techniques involved in fabrication of ICs.
CO-2.	Characteristics of differential amplifier and Operational amplifier
CO-3.	Use of op-amp in amplifiers, oscillators and mathematical operations.
CO-4.	Use of op-amp in active filters and instrumentation amplifiers
CO-5.	Realization of various types of registers using flip-flops,
CO-6.	Characteristics of counters and realization of various types of counters using flip-flops.
<b>Semester-III</b> <b>G504.3P: Practical-III</b>	
CO1:	Design, construction and determine the various performance parameters of amplifiers using op-amp
CO2:	Develop circuit to study the nonlinear applications op-amp

<b>C03:</b>	Verification of characteristics tables of flip-flops and study the applications as registers and counters.
<b>C04:</b>	To apply trouble shooting techniques in simple electronic gadgets.
<b>III SEMESTER</b>	
<b>G504.3E (Open Elective III):Electronic Communication Systems</b>	
<b>C01:</b>	The history and development of Electronic communication system
<b>C02:</b>	different channels of signal propagation in electronic communication systems
<b>C03:</b>	working principles of common communication systems like Radio, television and cell phones
<b>C04:</b>	principles of digital communication-mobile communication, internet and social media
<b>Semester-IV</b>	
<b>G 504.4: BREAKDOWN DEVICES, POWER AMPLIFIERS, FUNDAMENTALS OF ELECTRONIC COMMUNICATION AND DIGITAL COMPUTERS</b>	
<b>C01:</b>	Gain knowledge about the structure, characteristics and application of SCR, DIAC and TRIAC.
<b>C02:</b>	Principles of power amplifiers, circuits and regulated power supplies
<b>C03:</b>	the mechanism of signal transmission in different media and different channels of signal propagation in electronic communication systems
<b>C04:</b>	various techniques of modulation, the basics of analog transmission and digital transmission, working principles of common communication systems like Radio, television and cell phones, the elements of satellite communication systems
<b>C05:</b>	Knows principles of data storage using various memory devices.
<b>C06:</b>	Knows the fundamentals of digital computer and its architecture.
<b>Semester-IV</b>	
<b>G504.4P: Practical-IV</b>	
<b>C01:</b>	Design, construct and study the performance of various filters using op-amp.
<b>C02:</b>	Design, construct and study modulation and demodulation techniques.
<b>C03:</b>	Design and construct a mini project, study its performance and write the dissertation.
<b>Semester-IV</b>	
<b>G 504.4E: PRINCIPLES OF MEDICAL ELECTRONICS AND BIOMEDICAL INSTRUMENTATION</b>	
<b>C01:</b>	Know the human body electro- physiological parameters and recording of bio-potentials.

C02:	Comprehend the non-electrical physiological parameters and their measurement – body temperature, blood pressure, pulse, blood flow meter etc.
C03:	Interpret the various assist devices used in the hospitals viz. pacemakers, defibrillators, dialyzers and ventilators.
C04:	Comprehend physical medicine methods eg. Ultrasonic, shortwave, microwave surgical diathermies, and bio-telemetry principles and methods
<b>V SEM</b>	
<b>G504.5A: ELECTRONIC COMMUNICATION SYSTEMS</b>	
<b>C01:</b>	The history and development of Electronic communication system, various types of Electronic communication system and their areas of application, different channels of signal propagation in electronic communication systems
<b>C02:</b>	Concept, theory and circuits of various techniques of modulation.
<b>C03:</b>	the mechanism of signal transmission in different media the basics of analog transmission and digital transmission
<b>C04:</b>	working principles of common communication systems like Radio, television and cell phones
<b>C05:</b>	the elements of satellite communication systems
<b>C06:</b>	Elements of wireless communication and fibre optic communication systems principles of digital communication-mobile communication, internet and social media.
<b>Semester-V</b>	
<b>G 504.5B: 8085 MICROPROCESSOR AND 8051 MICROCONTROLLER</b>	
C01:	understand the architecture of basic micro processors.
C02:	understand their instruction set and write simple programs in them
C03:	Know the application of microcontrollers in various fields
C04:	understand the architecture of any micro controller,
C05:	Understand the architecture of basic micro processors.
C06:	understand instruction set of microcontrollers and and write simple programs in them.

<b>Semester-V</b> <b>G501.5P: Practical V</b>	
C01:	Analyze and relate the working of Opto-electronic devices.
C02:	Understand and relate the characteristics of optical fibers and their simple applications,
C03:	Write programs in microcontrollers using the instruction set, code and execute the program.
<b>Semester-VI</b> <b>G 504.6a: – BIOMEDICAL INSTRUMENTS, VLSI AND ROBOTICS</b>	
C01:	Know the human body electro- physiological parameters and recording of bio-potentials.
C02:	Comprehend the non-electrical physiological parameters and their measurement – body temperature, blood pressure, pulse, blood flow meter etc.
C03:	Know about recent trends in medical instrumentation, Interpret the various assist devices used in the hospitals viz. pacemakers, defibrillators, dialyzers and ventilators.
C04:	Comprehend physical medicine methods eg. ultrasonic, shortwave, microwave surgical diathermies , and bio-telemetry principles and methods.
C05:	understand the fundamentals of VLSI, techniques and processes involved in developing VLSI.
C06:	Understand principles of Robotics and their role in Automatation technology
<b>Semester-VI</b> <b>ELECTIVE I :G501.6b:8086 MICROPROCESSOR &amp; C LANGUAGE</b>	
C01:	Learn the architecture of 8086 microprocessor.
C02:	Learn the instruction set of 8086 and write programs using them
C03:	Learn modular programming and I/O programming
C04:	Learn various features and structures of high level language by learning C language.
C05:	modular and structured programming techniques in C language.
<b>Semester-VI</b> <b>ELECTIVE 2: G 504.6b: FUNDAMENTALS OF DIGITAL SIGNAL PROCESSING</b>	
C01:	Know characteristics of signal, classification and signal and system relationship.
C02:	Understand representation of signal using Fourier Transformation.
C03:	Understand Z-Transformation of signals and analysis.

CO4:	Understand discrete Fourier Transformation of signals.
<b>Semester-V</b>	
<b>G501.5P: Practical V</b>	
CO1:	After completion of this course students should be able to Understand the architecture and instructions of 8086 microprocessor by writing and executing programs in 8086 microprocessor.
CO2:	Understand and relate the various programming options available in High level languages by writing and executing programs in C language.
CO3:	Gain skills and confidence to develop/service electronic gadgets through project development.
CO4:	To gain art of presenting any scientific findings in the form of a dissertation.

B.SC. MATHEMATICS	
PROGRAMME OUTCOMES	
<b>P01.</b>	<b>Acquisition of Knowledge:</b> be able to possess basic subject knowledge that is required for higher studies, professional and applied courses.
<b>P02.</b>	<b>Eligibility:</b> be eligible for various government exams conducted by UPSC, SSC etc.
<b>P03.</b>	<b>Application in Computer Sciences:</b> be able to solve computer oriented numerical problems as it offers computer courses for students
<b>P04.</b>	<b>Awareness:</b> be aware of and develop solution oriented approach towards various Social and Environmental issues.
<b>P05.</b>	<b>Skill development:</b> develop critical thinking, problem solving skills through practical application along with the domain knowledge in the subjects of science stream
<b>P06.</b>	<b>Entrepreneurship:</b> be equipped to start their own business as software developers, programmers, database administrators, and system analysts.
PROGRAMME SPECIFIC OUTCOMES	
<b>PSO1:</b>	Be familiar with suitable tools of mathematical analysis to handle issues and problems in mathematics and related sciences.
<b>PSO2:</b>	Acquire sufficient knowledge and skills enabling them to undertake further studies in mathematics and its allied areas on multiple disciplines concerned with mathematics.
<b>PSO3:</b>	Be well grounded in the basic manipulative skills of algebra and advanced calculus.
<b>PSO4:</b>	Develop a positive attitude towards mathematics as a technical language and valuable subject of study.
COURSE OUTCOMES	
Semester-I G 503.1 - PAPER 1 CALCULUS	
<b>CO -1</b>	Analyse functions using limits, derivatives and integrals.
<b>CO -2</b>	Recognize the appropriate tools of calculus to solve applied problems.
<b>CO -3</b>	investigate the proof of the Fundamental Theorem of Integral Calculus.
<b>CO -4</b>	evaluate the volumes of the solids using cross sections.
<b>CO -5</b>	apply reduction formulae to evaluate integrals.
<b>CO -6</b>	recognize the conic sections from their functions in standard form and from their graphs.
<b>CO -7</b>	convert a function of a conic section to standard form to determine whether it yields a circle, a parabola, an ellipse, or a hyperbola.
<b>CO -8</b>	write a polar double integral to evaluate the area of a given region.
<b>CO -9</b>	calculate the length of an arc of a curve whose equations are given in parametric and polar forms.

<b>Semester-I</b> <b>G 503.1E (Open Elective): Functions and Applications</b>	
<b>CO -1</b>	improve the mathematical skills necessary to study economics.
<b>CO -2</b>	demonstrate an understanding of the rules of differentiation to solve problems in Economics and Business.
<b>CO -3</b>	use calculus and algebra techniques in economic analysis.
<b>CO -4</b>	analyse basic trends in business using graphical analysis.
<b>Semester-II</b> <b>G 503.2- PAPER 2</b> <b>CALCULUS, NUMBER THEORY AND DIFFERENTIAL EQUATIONS</b>	
<b>CO -1</b>	apply various results to solve problems on limits.
<b>CO -2</b>	use L'Hospital's rule to solve improper integrals.
<b>CO -3</b>	use the concept of vectors to find the arc length of curve in polar coordinate system.
<b>CO -4</b>	solve Linear Diophantine equation in two variables.
<b>CO -5</b>	find the greatest common factor using the Euclidean Algorithm.
<b>CO -6</b>	convert separable and homogenous equations to exact differential equations by integrating factors.
<b>CO -7</b>	solve a few real world problems using the concepts of differential equations.
<b>Semester-II</b> <b>G 503.2E Vector Calculus</b>	
<b>CO -1</b>	define vector equation for lines and planes.
<b>CO -2</b>	analyze vector functions to find limits, derivatives, tangent lines and integrals.
<b>CO -3</b>	evaluate line integrals, surface area and surface integrals.
<b>CO -4</b>	solve a few real world problems based on work, circulation and flux.
<b>CO -5</b>	differentiate between gradient fields and conservative fields.
<b>Semester-III</b> <b>G 503.3-PAPER 3</b> <b>NUMBER THEORY, GROUP THEORY AND MULTIVARIATE CALCULUS</b>	
<b>CO -1</b>	understand the definition of congruences.
<b>CO -2</b>	determine multiplicative inverses modulo n and use to solve linear congruences.
<b>CO -3</b>	verify group properties in particular examples.
<b>CO -4</b>	identify different types of groups.
<b>CO -5</b>	use the definitions and properties of cosets and understand Lagrange's theorem.
<b>CO -6</b>	use the two path criterion to show that a limit does not exist and apply it to

	the problems about limits.
<b>CO -7</b>	evaluate partial derivatives including higher order derivatives and simple cases of chain rule and recognize the various notations used for partial derivatives.
<b>CO -8</b>	determine the area and volume by applying the techniques of double and triple integrals..
<b>Semester-III</b>	
<b>G 503.3E Introduction to LaTeX</b>	
<b>CO -1</b>	Type set mathematical formulae.
<b>CO -2</b>	use nested list and enumerate environments.
<b>CO -3</b>	create tabular and array environments.
<b>CO -4</b>	create and import graphics into the LaTeX document.
<b>CO -5</b>	use beamer to create presentations.
<b>CO -6</b>	use bibtex to generate bibliography.
<b>Semester-IV</b>	
<b>G 503.4 - PAPER-4</b>	
<b>FUNCTIONS OF A COMPLEX VARIABLE, NUMBER THEORY, GROUP THEORY AND REAL ANALYSIS.</b>	
<b>CO -1</b>	understand and use the terms homomorphism and isomorphism.
<b>CO -2</b>	use the Cauchy-Riemann Equations to determine whether/where a function is differentiable and find the derivative of a function.
<b>CO -3</b>	perform basic mathematical operations (arithmetic, powers, roots) with complex numbers in Cartesian and polar forms.
<b>CO -4</b>	determine continuity/differentiability/analyticity of a function and find the derivative of a function.
<b>CO -5</b>	determine if a function is multiplicative using the Euler Phi-function.
<b>CO -6</b>	use the concept of greatest common divisor to prove results relating to primitive Pythagorean triplets.
<b>CO -7</b>	solve the problems of convergence and divergence of sequences and series.
<b>CO -8</b>	determine whether or not real series are convergent by comparison with standard series or using the ratio test.
<b>CO -9</b>	explain the definition of an infinite series as a limit of a sequence of partial sums.
<b>Semester-IV</b>	
<b>G501.4E (Open Elective): Applications of Basic Arithmetic (For other streams)</b>	
<b>CO -1</b>	Have strong basic arithmetic and computational skills.
<b>CO -2</b>	Be able to efficiently calculate and solve numerical problems faster.
<b>CO -3</b>	Be prepared for aptitude based competitive exams.

<b>CO -4</b>	Use tricks and shortcuts to solve problems on Calendar and clocks.
<b>Semester-V</b>	
<b>G 503.5(A) - PAPER 5(A)</b>	
<b>DIFFERENTIAL EQUATIONS, LAPLACE TRANSFORM AND ALGEBRA</b>	
<b>CO -1</b>	Solve the homogeneous linear differential equations with constant coefficients.
<b>CO -2</b>	Use the method “variations of parameters” to find to solution of higher-order linear differential equations with variable coefficients.
<b>CO -3</b>	Relate the concepts of groups and rings.
<b>CO -4</b>	Verify if a given set is a commutative ring or field or integral domain.
<b>CO -5</b>	Explain basic properties of Laplace transform.
<b>CO -6</b>	Find Laplace transform of a function using gamma function and step function.
<b>CO -7</b>	Will be able to use the Laplace transform in finding the solution of linear differential equations.
<b>Semester-V</b>	
<b>G 503.5(b)i :Discrete Mathematics</b>	
<b>CO -1</b>	Verify whether an algorithm works well and perform analysis in terms of memory and time.
<b>CO -2</b>	Formulate and model problems with the concepts and techniques of discrete mathematics.
<b>CO -3</b>	Understand the role of set theory in various concepts of discrete mathematics and connect it to various other disciplines.
<b>CO -4</b>	Apply techniques for constructing mathematical proofs, illustrated by examples in discrete mathematics.
<b>CO -5</b>	Develop an understanding of how graph and tree concepts are used to solve problems arising in the computer science.
<b>CO -6</b>	Understand the importance of difference equations and efficiently solve them.
<b>G 503.5(b)ii: Numerical Methods</b>	
<b>CO -1</b>	Perform an error analysis for some method.
<b>CO -2</b>	Approximate a function using an appropriate numerical method.
<b>CO -3</b>	Solve a linear system of equations using an appropriate numerical method.
<b>CO -4</b>	Derive appropriate numerical methods to solve interpolation based problems.
<b>CO -5</b>	Calculate a definite integral using an appropriate numerical method.
<b>CO -6</b>	Evaluate a derivative at a value using an appropriate numerical method.
<b>G 503.5(b)iii: Graph Theory</b>	
<b>CO -1</b>	Understand the language of graphs and trees.
<b>CO -2</b>	Understand various types of trees and methods for traversing trees.
<b>CO -3</b>	Solve problems using basic graph theory.

CO -4	Solve problems involving vertex and edge connectivity, planarity and crossing numbers.
CO -5	Model real world problems using graph theory.
CO -6	To improve the proof writing skills.
<b>G 503.5(b)iv: Linear programming</b>	
CO -1	Explain basic concepts of optimization, modeling and linear modeling.
CO -2	Distinguish the feasible solution, optimal solution and basic feasible solution.
CO -3	Solve two variable linear programming problems with graphical method.
CO -4	Explain the theory of simplex algorithm and approach.
CO -5	5 apply linear programming concepts to solve problems like transportation problems and assignment problem.
CO -6	Model a problem as a linear programming problem and apply appropriate method to obtain optimal solutions.
<b>G 503.5(b)v: Mathematical Modeling</b>	
CO -1	Recognize the connections between Mathematics and other disciplines, how mathematical ideas are used in it.
CO -2	Master principles and formulation, analysis of mathematical model system.
CO -3	Model real world problems mathematically and analyse those models.
CO -4	Able to identify linear programming assumptions and constraints.
CO -5	Mention and discuss some applications of Mathematical modeling in various other fields.
<b>G 503.5(b)vi: Distribution Theory</b>	
CO -1	Define expectation, and be introduced to its important linearity property.
CO -2	Understand the properties of probability density functions and cumulative distribution functions.
CO -3	Apply selected probability distributions to solve problems.
CO -4	Develop problem-solving techniques needed to accurately calculate probabilities.
CO -5	Acquire knowledge about some probability inequalities, law of large numbers, Central Limit Theorem etc.
CO -6	Use Central Limit Theorem to solve a few real world based problems.
<b>Semester-VI</b> <b>G 503.6(A) - PAPER 6(A)</b> <b>PARTIAL DIFFERENTIAL EQUATIONS, FOURIER SERIES AND LINEAR ALGEBRA</b>	
CO -1	apply different methods to solve the equation of the form $Pdx + Qdy + Rdz = 0$ .
CO -2	explain basic properties of Fourier transform.
CO -3	recognize the concepts of the terms span, linear independence, basis, and

<b>CO -4</b>	dimension, and apply these concepts to various vector spaces and subspaces.
	use matrix algebra and the related matrices to linear transformations.
<b>CO -5</b>	to learn Inner Product spaces and Gram-Schmidt process of orthogonalization.
<b>CO -6</b>	find Eigen values and Eigen vectors of a matrix which is used in the study of various other concepts.

<b>Department of Statistics</b>	
<b>Programme Outcomes</b>	
PO-1.	Develop and demonstrate an ability to understand major concepts in various disciplines of Statistics.
PO-2.	Solve analytical problems independently and draw logical conclusions.
PO-3.	Analyse, interpret the data and hence help policy makers to take a proper decision.
PO-4.	Have a knowledge regarding use of data analytics tools like Excel, SPSS, R programming and Python.
PO-5.	Use modern statistical techniques and statistical Software to understand the concepts of Statistics.
PO-6.	Think, acquire knowledge and skills through logical reasoning and inculcate the culture of self-learning.
PO-7.	Create an awareness about the impact of Statistics in real life and development outside the scientific community.
<b>Programme Specific Outcomes</b>	
PSO 1:	Understand and apply the principles of least squares to fit a model to the given data, study the association between the variables, applications of Probability Theory and Probability Distributions.
PSO 2:	Understand the concept of Sampling Distributions; study the applications of various probability inequalities and Central limit theorem. Apply the statistical inference to real life situations.
PSO 3:	Understand the principles and applications of Total Quality Management, Designs of Experiment, Sampling theory, Regression Model, Simulation and Operation Research.
PSO 4:	Understand the applications of various Statistical Techniques, use of Statistical tools through Excel and SPSS under Choice Based Credit System (CBCS) requirements.

<b>Course Outcomes</b>	
<b>Semester - I</b> <b>G 506.1: Descriptive Statistics and Probability Theory</b>	
CO-1.	Understand the principle of least squares, fitting of various types of curves and the concept of correlation and its applications.
CO-2.	Explain the theory behind Regression analysis and its applications.
CO-3.	Have complete knowledge of demand analysis with the law of demand and supply, Engel's curves and Pareto;s law of income distribution.
CO-4:	Understand probability density function, mean and variance of a random variable and the theorems of probabilities with their applications.
<b>G 506.1a: Descriptive Statistics &amp; Probability Theory Practical.</b>	
CO-1.	Analyse the data through correlation and regression analysis. Understand the applications of mathematical expectation.
CO-2.	Understand the concept of demand analysis with practical examples.
CO-3.	Find the mean and variance of the given random variable.
<b>G 506.1E: Applied Statistics (CBCS)</b>	
CO-1.	Understand the applications of Vital events, Life table in government policies and planning.
CO-2.	Apply the Statistical tools like Index Numbers and Time Series for real life situations.
<b>Semester- II</b> <b>G506.2:Probability Distributions</b>	
CO-1.	Understand the concept of mathematical expectation and its properties.
CO-2.	Have complete knowledge about standard discrete distributions and its applications.
CO-3.	Explain the various continuous probability distributions with mean, variance median, MGF and its applications.
CO-4:	Understand the theory of distribution functions of random variables using mgf and Jacobian transformation.

<b>G506.2a: Probability Distributions Practical.</b>	
CO-1.	Understand the applications of mathematical expectation.
CO-2.	Identify, relate and differentiate probability distributions and apply them in day to day life.
CO-3.	Have the ability to fit a probability distribution to the given data.
<b>G 506.2E: Data Analysis using Ms Excel (CBCS)</b>	
CO-1.	Analyse the data through MS Excel.
CO-2.	Acquire Data Visualization skills.
CO-3.	Have knowledge of statistical measures.
<b>Semester- III G506.3: Statistical Inference I</b>	
CO-1.	Understand the sampling distributions like Chi-square, Student's t Snedecor's F distributions and the distribution of Order statistic.
CO-2.	Impart knowledge about probability inequalities and convergence concepts.
CO-3.	Understand the theory of point estimation, method of maximum likelihood estimation, method of moment and its applications.
CO-4:	Explain the theory of interval estimation and its applications.
<b>G506.3a: Statistical Inference I Practical</b>	
CO-1.	Understand the applications of probability inequalities, central theorem and WLLN.
CO-2.	Understand the applications of methods of point estimation.
CO-3.	Apply the theory of interval estimation to real life.
<b>G 506.3E: Probability Distributions (CBCS)</b>	
CO-1.	Understand the applications of mathematical expectation and its properties.
CO-2.	Have the knowledge of standard discrete probability distribution and its applications.

CO-3.	Understand continuous probability distributions its applications in day to day life.
<b>Semester- IV</b> <b>G506.4: Statistical Inference II</b>	
CO-1.	Understand the basic knowledge about testing of hypotheses and the Statistical basis behind every test. Also to Develop Most Powerful Test and Likelihood Ratio Test.
CO-2.	Apply various large sample, small sample and Chi-square test to real life situations and interpret the results.
CO-3.	Explain sequential testing and applications of Wald's test for probability distributions.
CO-4:	Understand the concept and derive the test statistic for various non- parametric tests. Also the applications of these tests.
<b>G506.4a: Statistical Inference II Practical.</b>	
CO-1.	Measure the probability of two types of errors, power of the Test and the BCR to the given situation and help the policy makers.
CO-2.	Know the applications of various small sample and large sample tests. Also to apply various Chi-square tests and interpret the result.
CO-3.	Apply SPRTTP for various probability distributions and take a Decision about sampling.
CO-4:	Know the applications of various non-parametric tests.
<b>G 506.4E: Statistical Data Analysis using SPSS (CBCS)</b>	
CO-1.	Understand the measures of averages, variation, correlation and regression.
CO-2.	Train the students in data analysis using SPSS software.
CO-3.	Acquire knowledge in data handling and visualization.
<b>Semester- V</b> <b>G506.5a.: Designs of Experiments</b>	
CO-1.	Impart knowledge on applying the technique of ANOVA to design studies, perform analyses, interpret the results appropriately, and make generalizations.

CO-2.	Understanding the advantages & disadvantages of various designs and also learning to apply various designs for agricultural data/agricultural fields.
CO-3.	Describe the analysis of the data from the experiment should be carried out for missing data/ missing plots in the agricultural field.
CO-4:	Familiarize with $2^2$ & $2^3$ factorial experiments and analyze the data for agriculture data and draw meaningful conclusions.
<b>G506.5b.: Elective (1) – Total Quality Management</b>	
CO-1.	Understand the concept of Total Quality Management in the production process and tools of TQM,
CO-2.	Explain the various tools and techniques of TQM and general theory of control charts.
CO-3.	Derive the control limits of various variable and attribute control charts and interpret the same.
CO-4:	Design acceptance sampling methods for attributes and variables
<b>Semester- V</b> <b>G506.5a: Practical based on G506.5 and G506.5a Elective (1)</b>	
CO-1.	Explain the applications of various models of designs of experiment.
CO-2.	Analyse factorial experiments for real life.
CO-3.	Understand the applications of control charts in industry and analyse the given data.
CO-4:	Understand how to design a proper Acceptance Sampling Plan.
<b>G506.5b. Elective (2) – Regression Analysis</b>	
CO-1.	Explain the meaning of Regression models, point and interval estimation using the regression equation, prediction and residual analysis.
CO-2.	Understand Multiple regression model, estimation of parameter testing and confidence intervals and prediction.
CO-3.	Build a regression model and analyse the given data.
CO-4:	Understand how to use various variable selection procedure and multiple

	regression approach to analysis of variance and experimental design.
<b>G506.5a: Practical based on G506.5 and G506.5a Elective (2)</b>	
CO-1.	Explain the applications of various models of designs of experiment.
CO-2.	Analyse factorial experiments for real life.
CO-3.	Apply the regression analysis to analyse real life data.
CO-4:	Understand how to use multiple regression and variable selection procedure.
<b>Semester- VI G506.6a: Sampling Theory</b>	
CO-1.	Understand the importance of sampling in analysing data and the methods of determining size of the sample.
CO-2.	Understand the difference between simple random sampling with replacement and without replacement, estimation of various population parameters and precision of these estimates.
CO-3.	Have complete knowledge of Stratified random sampling and its application. Also to identify the efficiency of various sampling methods with Stratified sampling.
CO-4:	Understand theoretical concept of Systematic and Cluster sampling with applications in real life.
<b>G506.6:Elective (1) – Operation Research</b>	
CO-1.	Understand the concept of OR, Linear programming problem various methods of solving linear programming problem and its applications in industry.
CO-2.	Gain knowledge about transportation problems, applying various methods to real life situations and obtaining optimum solutions.
CO-3.	Understand the concepts of Assignment problem and Game Theory with their applications.
CO-4:	Familiarize the concepts of inventory problems and apply various types of EOQ models to solve the problems of industry.
<b>G506.6a.: Practical based on G506.6 and G506.6a Elective (1)</b>	

CO-1.	Understand how to draw a simple random sample with replacement and without replacement and find best estimates for the population.
CO-2.	Find out the efficiency of various methods of sampling and decide the best method for the situations under consideration.
CO-3.	Understand the applications of various optimal tools in industry.
CO-4:	Take a proper decision about the selection of one of the tools of optimization.
<b>G506.6a:Elective (2) Simulation</b>	
CO-1.	Understand the technique of Simulation and its areas of applications.
CO-2.	Explain the method of random number generation and applications of various tests for random numbers.
CO-3.	Understand various random variate generation methods and how to apply these methods for different continuous probability distributions.
CO-4:	Apply Variance Reduction technique.
<b>G506.6a.: Practical based on G506.6 and G506.6a Elective (2)</b>	
CO-1.	Understand how to draw a simple random sample with replacement and without replacement and find best estimates for the population.
CO-2.	Find out the efficiency of various methods of sampling and decide the best method for the situations under consideration.
CO-3.	Understand the applications of various simulation techniques.

## Department of Physics

### Programme Outcomes

PO-1.	Develop and demonstrate an ability to understand major concepts in various disciplines of Physics.
PO-2.	Solve analytical problems, think methodically, independently to draw logical conclusions.
PO-3.	Exercise critical thinking and the scientific knowledge to design, carryout, record, analyze and co-relate the results of Physics practical.
PO-4.	Have the capability to solve problems by using research based knowledge and research methods
PO-5.	Inculcate scientific temper in fellow students and also among the larger scientific community and society in general.
PO-6.	Use modern techniques and recent methods to imbibe and propagate the concepts of Physics.
PO-7.	Think, acquire knowledge and skills through logical reasoning and inculcate the culture of self-learning.
PO-8.	Create an awareness of the impact of Physics on the society, and development outside the scientific community.

### Programme Specific Outcomes

PSO 1:	Understand and apply the principles of Properties of matter, Thermal Physics, Basic Electricity, Mechanics, Relativity and Photonics.
PSO 2:	Understand and apply the principles of Acoustics, Optics, Networks Electromagnetism and Advanced Electricity.
PSO 3:	Understand the principles of Atomic Physics, Solid State Physics, Nuclear Physics and Analogue Electronics, Communication and Digital Electronics and Special properties of materials.
PSO 4:	Understand the principles of Electrical circuits and network skills, Physics workshop skills, Basic instrumentation skills, Renewable energy and energy harvesting under Choice Based Credit System (CBCS) requirements.

<b>Course Outcomes</b>	
<b>Semester-I</b>	
<b>G501.1: Properties of Matter, Thermal Physics and Electricity-1</b>	
CO-1.	Have the required basic knowledge when the student opt for higher studies in Physics.
CO-2.	Understand the basic concepts of Elasticity
CO-3.	Gain the knowledge about the properties of materials
CO-4.	Study the motion of viscous fluid
CO-5.	Explain the basic thermodynamic properties and derive and discuss the laws of thermodynamics.
CO-6.	Enrich the knowledge of thermo electricity
CO-7.	Effectively use measuring instruments
<b>Semester-I</b>	
<b>G501.1P: Practical-I</b>	
CO-1.	Successfully handle and complete practical problems connected with the experiments related to properties of matter.
<b>Semester-I</b>	
<b>G501.1E (Open Elective): Electrical Circuits and Network Skills</b>	
CO-1.	Acquire necessary skills/hands on experience/working knowledge of multimeters, ammeters, voltmeters and electrical components.
CO-2.	Be proficient in electrical wiring.
<b>Semester-II</b>	
<b>G501.2: Mechanics, Relativity and Photonics</b>	
CO-1.	Understand the principles and methods used in analyzing motion of Particle, Verify Conservation laws and gain knowledge about the Rigid body mechanics.
CO-2.	Grasp the ideas of Classical theory of relativity, Special theory of relativity.
CO-3.	Understand Laser fundamentals, Types of LASER, Optical fibers and Photonic Crystals and its application.
<b>Semester-II</b>	
<b>G501.2P: Practical-II</b>	
CO-1.	Have the ability to plan a scientific experiment based on compound pendulum like systems, energy storage systems using flywheels.
CO-2.	Have the ability to carry out a scientific experiment to estimate the stability of the material under stress and strain.
<b>Semester-II</b>	
<b>G501.2E (Open Elective): Physics Workshop Skills</b>	
CO-1.	Acquire skills/ hands-on experience/working knowledge on various machine tools like lathes, shapers, drilling machines, cutting tools, welding sets and also different gear systems.
CO-2.	Acquire skills in usage of multimeters, soldering iron, oscilloscopes, power supplies and relays.
<b>Semester-III</b>	
<b>G501.3: Acoustics, Optics and Networks</b>	
CO-1.	Interpret Free and forced oscillations, analyze the propagation of progressive waves.
CO-2.	Acquire the knowledge about properties of sound.

CO-3.	Identify Interference, Diffraction and Polarization of light in day-to-day life.
CO-4.	Understand Network Theorems and apply them to solve complex circuits.
<b>Semester-III</b> <b>G501.3P: Practical-III</b>	
CO-1.	Analyze the devices based on interference and diffraction phenomena used in telecommunication and in optical fiber communication systems.
CO-2.	Interpret and determine the refractive index of various materials used in measuring instruments.
<b>Semester-III</b> <b>G 501.3E (Open Elective): Basic Instrumentation Skills</b>	
CO-1.	Gain the necessary knowledge on accuracy, precision, resolution, range and errors in measurements.
CO-2.	Acquire hands-on skills in usage of oscilloscopes, multimeters, rectifiers, amplifiers, oscillators, LCR meters and high voltage probes.
<b>Semester-IV</b> <b>G501.4: Electromagnetism, Electricity-II and Electronics-I</b>	
CO-1.	Gain knowledge about Scalar and Vector fields
CO-2.	Set up the Maxwells wave equation in free space and material media.
CO-3.	Understand representation of Alternating Currents through phasors, Frequency response of Electrical filters, Modes of Power Transmission and applications of p-n diode.
CO-4.	Understand working principle of Transistors and design of Transistor Biasing Circuits.
<b>Semester-IV</b> <b>G501.4P: Practical-IV</b>	
CO-1.	Understand theoretical principles behind electrical networks and grids.
CO-2.	Acquire the working knowledge of electrical devices such as ammeter voltmeter, oscillator and oscilloscopes.
<b>Semester-III</b> <b>G501.4E (Open Elective): Renewable Energy and Energy harvesting.</b>	
CO-1.	Define basic properties of renewable energy sources.
CO-2.	Decide on the viability of a given energy harvesting technology in any given environment.
CO-3.	Acquire knowledge of energy storing systems.
CO-4.	Realize the environmental impact of renewable energy harvesting technologies.
<b>Semester-V</b> <b>G501.5a: Atomic Physics</b>	
CO-1.	Understand Atoms. Various Models, and Atomic Spectra
CO-2.	Interpret the Wave properties of Particles
CO-3.	Comprehend Schrodinger equation and its applications in the case of 1-D and 3-D potential well
CO-4.	Analyze Electron spectra, Molecular Spectra, coherent and incoherent scattering.

<b>Semester-V</b>	
<b>G501.5b: Solid State Physics</b>	
CO-1.	Understand the principles of Statistical Physics and apply it to understand the physical properties of bulk materials
CO-2.	Get acquainted with the Classical theory of Metals, Quantum theory of Metals and understand the origin of band theory of solids.
CO-3.	Familiarize with General properties of crystals, non crystalline solids, X-ray Crystallography
CO-4.	Explain the origin of Magnetic and Dielectric properties of various materials.
<b>Semester-V</b>	
<b>G501.5P: Practical V</b>	
CO-1.	Confirm the theoretical observation with the experimental values.
<b>Semester-VI</b>	
<b>G501.6a: Nuclear Physics and Analog Electronics</b>	
CO-1.	Understand Nuclear Decay and spectra of nuclear radiation, scattering from nucleus and knowing nuclear structure
CO-2.	Familiarize Artificial Transmutation of Elements, Nuclear Fission and Fusion, Radiation Hazards.
CO-3.	understand working principle of particle accelerators and detectors and their applications.
CO-4	Design and understand the working of Transistor Amplifiers, oscillators, Operational Amplifiers and its applications.
<b>G501.6a: Communication and Digital Electronics and, Special properties of materials</b>	
CO-1.	Understand the fundamental concepts of modulation and demodulation, working of transmitter and receivers, comprehend the basic concept of TV communication.
CO-2.	Understand the basics of Boolean Algebra and gain knowledge about designing of arithmetic logic and sequential circuits.
CO-3.	Design flip flops, registers and counters.
CO-4.	Comprehend the importance of superconductors, nano materials and nonlinear optical materials, understand the principles and discuss their applications
<b>G501.6P: Practical VI</b>	
CO-1.	Understand the diode and transistor characteristics.
CO-2.	Design and construct oscillators and amplifier circuits using Op-amp.
CO-3	Determine the energy gap of thermistor and Germanium & Silicon diodes.

<b>B.Sc Economics</b>	
<b>PROGRAMME OUTCOMES</b>	
PO 1:	To facilitate the understanding of basic economic theories.
PO 2:	A comprehensive understanding of the various courses in the discipline.
PO 3:	Enable to apply quantitative techniques suitable for the discipline.
Po 4:	Analyse the policies of the government in solving economic problems.
PO 5:	Develop skills required to blend the subject learned and the real life situations.
PO 6:	Able to evaluate the working of the economy, its interconnection with the social, political, cultural, environmental, ethical issues in a comprehensive manner.
<b>PROGRAMME SPECIFIC OUTCOMES</b>	
PSO 1:	To enable the students with the knowledge of Economics both theoretical and applied.
PSO 2:	To develop a comprehensive understanding of the various aspects of the branches of Economics related to micro and macro aspects.
PSO 3:	To understand the working of the domestic and foreign economy.
PSO 4:	To enable the students to apply the theoretical knowledge of Economics in applying to the real life situations.
PSO 5:	To analyse the issues related to various problems like unemployment, balance of payments, poverty, inequality, inflation facing the economy.
PSO 6:	To develop skills to integrate and organise the interlinkages between and among the varied divisions of the economy.
PSO 7:	To have a critical assessment of the working of the economy, the interconnections between the various sectors and the policies linked to the development .
<b>COURSE OUTCOME</b>	
<b>PRINCIPLES OF ECONOMICS -I :G 513.1</b>	
CO 1:	To understand the basic concepts and nature of economics.
CO 2 :	To analyse different approaches of economics.
CO 3 :	To get thorough understanding of the consumer behaviour and apply the knowledge acquired in various concepts related to buying, selling and maximization of satisfaction.
CO 4 :	Be familiar with the concept of production and enable the students to apply quantitative techniques to see the dynamics of production.
CO 5 :	Helps to acquire the knowledge of different types of costs.
CO 6 :	To be informative about different types of market structures

	<b>HUMAN RESOURCE ECONOMICS: G 513.1E</b>
CO 1:	To develop the understanding of the concept of human resource and to understand its relevance in organizations.
CO 2 :	Helps to understand basic concepts of Human Resource Management.
CO 3 :	To analyse the strategic issues and strategies required to select and develop manpower resources.
CO 4 :	To know the basic concepts of Human Resource Development.
CO 5 :	To know the development, implementation, and evaluation of employee recruitment and selection.
CO 6 :	To have a basic knowledge on organizational development.
	<b>PRINCIPLES OF ECONOMICS -II :G 513.2</b>
CO 1:	A thorough understanding of the various theories behind pricing of products and factors in different market environment.
CO 2:	Ability to identify and evaluate the main models of market structures and to appreciate the theories behind policy prescriptions.
CO 3 :	Develop skill in economic reasoning and helps to know the relevance of government decisions in Wage policy, monetary policy & fiscal policy, etc. in the day to day life.
CO 4 :	Helps the student to understand different concepts of national income and equip them with appropriate tools of analysis to measure and solve the real socio-economic problems like standard of living, inequality and poverty etc.
CO 5 :	To develop suitable solutions for practical policy purpose which are very much expected by the society.
CO 6 :	To equip the students with various skills like reasoning, inference & analysis to understand the time to time changes in business cycles.
	<b>HEALTH ECONOMICS G 513.2E</b>
CO 1:	Get a working knowledge of economics of health.
CO 2:	Understand the present health condition of India and the world.
CO 3:	To be informative and able to understand the different health indicators.
CO 4:	Describe key behaviours that affect a consumer's health status and the cost of health care overall.

CO 5:	Identify the concepts of healthcare financing and payment for healthcare.
CO 6:	Be able to provide an overview of how health insurance works and to compare and contrast different types of health insurance.
	<b>MONETARY ECONOMICS : G 513.3</b>
CO 1:	Understand origin and development of money.
CO 2:	Obtain the knowledge and understanding of the theoretical basis for money circulation, monetary policy, mechanisms of money creation.
CO 3:	Be informative about different theories of value of money.
CO 4:	Understand the concept of value of money and its determination, working of monetary economy, banking system, money and capital markets, international financial institutions and their relationship with India.
CO 5:	Informative about currencies and exchange values of different countries currencies.
CO 6:	Understand the role of central bank of the country and its functioning.
	<b>INDIAN ECONOMY G 513.3E</b>
CO 1:	Understand the nature of Indian Economy, GDP, demographic profile, natural resources.
CO 2:	Informative about all the three sectors and sectoral reforms, economic planning and steps taken for development of Indian Economy.
CO 3:	Students will be knowledgeable about fundamental problems of Indian economy.
CO 4:	Be informative about various initiatives of the Government of India to irradiate poverty and provide employment.
CO 5:	Be aware about reforms of different sectors of Indian economy.
CO 6:	Students will understand the importance of different institution like NITI Aayog and Panchayath Raj in India.
	<b>INTERNATIONAL TRADE AND PUBLIC FINANCE :G 513.4</b>
CO 1:	The student will be acquainted with economic concepts and models of international trade .
CO 2:	Explain the different concepts of terms of trade , the structure of BOP, disequilibrium in BOP, causes of disequilibrium , describe the foreign exchange rate and determine its equilibrium exchange rate and explain the objectives of IMF and IBRD.
CO 3:	Understand the meaning of public finance; its nature, subject matter, explain the

	differences between public finance and private finance and differentiate between the public and private goods
CO 4:	Classify the public revenue and its various sources; revenue receipts and non-revenue receipts, understand the tax and no-tax revenues, the causes of increasing public expenditure in the modern economies
CO 5:	Explain the varying effects of public expenditure on the economy and role of public expenditure in a developing economy
CO 6:	Understand the various sources of government borrowing and the reasons behind the growing public debt, describe how the debt is repaid, the role of public debt in developing countries, explain the concept of debt trap.
	<b>QUANTITATIVE ECONOMICS G 513.4E</b>
CO 1:	Helps to understand the basic concepts of economics.
CO2:	To train the students to use linear functions and its applications in economic analysis.
CO 3 :	To equip the students to use non-linear functions in economic problems.
CO 4:	Helps to have basic knowledge on production and market equilibrium.
CO 5 :	To be able to understand revenue and cost analysis.
	CO 6 : Helps to understand various types of market structures using differential and integral calculus.
	<b>MATHEMATICAL ECONOMICS G 513.5A</b>
CO1:	Demonstrate a knowledge and understanding of the mathematical concepts and methods used in economics
CO2:	Demonstrate the facility to express economic ideas in the language of mathematics.
CO3:	Analyze and evaluate economic models by using formal mathematical methods.
CO4:	Demonstrate an understanding of the rules of differentiation as they apply to multivariable functions
CO5:	Find solutions to unconstrained optimization problems by identifying relative and global maximums and minimums of single and multivariable functions
	CO6: Use integration and matrix algebra techniques in economic analysis
	<b>DEVELOPMENT ECONOMICS G 513.5B</b>

CO 1:	A comprehensive understanding of economic progress and welfare. Students will be equip to calculate various indices like HDI, GDI, GII & MPI.
CO 2 :	A detail analysis on various country profiles and understanding the development models adopted by those countries.
CO 3 :	Helps to select appropriate model for the economic development and growth of the countries.
CO 4 :	Capital budgeting tools equip the students to make a best decision in selecting the projects.
CO 5 :	An attempt is made to critically evaluate population as growth promoting factor or retarding factor.
CO 6 :	Helps to understand the interlinkages between agriculture and industry, there by economic development
	<b>INDIAN ECONOMICS G 513.6A</b>
CO 1:	Understand the nature of Indian Economy, GDP, demographic profile, natural resources.
CO 2:	Informative about all the three sectors and sectoral reforms, economic planning and steps taken for development of Indian Economy.
CO 3:	Students will be knowledgeable about fundamental problems of Indian economy.
CO 4:	Be informative about various initiatives of the Government of India to irradiate poverty and provide employment.
CO 5:	Be aware about reforms of different sectors of Indian economy.
CO 6:	Students will understand the importance of different institution like NITI Aayog and Panchayath Raj in India.
	<b>ECONOMETRICS G 513.6B</b>
CO 1:	Helps to understand the application of econometrics in various field like commerce, management, science and economics etc.
CO 2 :	Regression model in the economic theories & problems will be applied to find the best statistical inference.
CO 3 :	A comprehensive understanding of dummy variable using statistical software.
CO 4 :	To equip the students to understand the inconsistency of OLS method.
CO 5 :	To understand the game theory and its applications.
CO 6 :	Research methodology helps to study the different paradigms of research and its applications in various fields.

## **Gender Equity- Foundation Course**

### **Program Specific outcomes**

PSO1	Understand and Recognise the epistemological and methodological diversity and character of various concepts related to gender and sex
PSO2	Analyse the impact of various social institutions and power structures on the lives of women
PSO3	Evaluate the various state, national and global initiatives to reduce the gender gap
PSO4	Engage in promoting gender justice and human rights

### **Course outcomes**

CO 1	Understand and differentiate the basic concepts of gender, sex, patriarchy, matriarchy, roles and stereotypes.
CO 2	Discuss and analyse the status of women in India during different periods of history to the modern times
CO3	Explain gender inequities, social practices and its impact on women's health, nutrition, access to education, economic and reproductive rights.
CO4	Articulate and contextualise the connections between regional, national and global contemporary women's issues.
CO 5	Aware of the constitutional rights, laws and legislations governing the rights of women
CO6	Describe the national and state initiatives taken to address the gender inequities and promote gender justice.

**FOUNDATION COURSE IN HUMAN RIGHTS**  
**II DEGREE (COMPULSORY PAPER)**  
**G 701.3 (III Semester BBA/ BCOM/BSc/BA / BC**

<b>PROGRAMME SPECIFIC OUTCOMES (PSOS)</b>	
PS01:	Discuss the philosophy, and history of Human Rights to recognize the nature and evolution of Human Rights and learn the conceptualisation of Human Rights
PS02:	Demonstrate empathetic social concerns and equity-centred global development and the ability to act with an informed awareness to interpret and create responses to prevent violation of Human Rights.
PS03:	Generate social concern and interdisciplinary perspective to critically assess the challenges in promoting justice, thereby inculcate the values of tolerance, progressiveness and fraternity to promote healthy and prosperous global society.
<b>Course Outcomes (COs)</b>	
CO1:	Define and describe the concept, nature, origin and classification of Human Rights
CO2:	Explain the role of IGO's and NGO's, and recall the articles related to Covenants and UDHR
CO3:	Assess the marginalised groups in connection with Human Rights
CO4:	Examine the status of rights in India and develop ways to address the issues and challenges
CO5:	Analyze and assess the remedies available against Human Rights violations in India

## FOUNDATION COURSE IN INDIAN CONSTITUTION

<b>PROGRAMME SPECIFIC OUTCOMES (PSOS)</b>	
PS01:	Discuss the philosophy, Fundamental Rights, Duties and Directive Principles of State Policy as prescribed by the Indian Constitution and to recognize the nature and working procedures of legislature, executive and judiciary in India.
PS02:	Demonstrate empathetic social concerns and equity-centred national development and the ability to act with an informed awareness of issues to participate in civic life through volunteering.
PS03:	Generate an interdisciplinary perspective among students and thereby inculcate the values of tolerance, progressiveness and fraternity that contributes towards the making of a healthy and prosperous society.
<b>Course Outcomes (COs)</b>	
CO1:	State the need for a constitution the process of constitution-making basic principles enshrined in the Constitution of India
CO2:	Recall the intent of the framers of the Constitution and its interpretation in the context of balancing Justice Rights Directive Principles of State Policy Preamble and Governance.
CO3:	Describe the powers and functions of Government- Legislature Executive and Judiciary
CO4:	Discuss the functioning of regulatory authorities in India NITI Aayog Lobbying institutions such as trade unions farmers association etc.
CO5:	Demonstrate the importance of peace harmony rules regulations rights and duties for a responsible citizen.

## FOUNDATION COURSE IN ENVIRONMENTAL SCIENCE

<b>PROGRAMME SPECIFIC OUTCOMES (PSOS)</b>	
PSO1:	Ability to recognize the need for learning the topic and develop foundational knowledge on the topic.
PSO2:	Ability to develop critical thinking and problem solving skills to solve interdisciplinary issues related to the topic.
PSO3:	Ability to understand the relationships between natural and man-made system.
PSO 4:	Ability to spread awareness about the environment around us, sustainable development and conduct outreach activities.
PSO 5:	Ability to gain empirical knowledge on the topic and contribute in decision making
<b>Course Outcomes (COs)</b>	
CO1:	Knowledge of the environment and the role of human beings in shaping the environment
CO2:	Understand various components of the environment and interfa
CO3:	Critically appreciate the environmental concerns of today

<b>B.VOC-RETAIL MANAGEMENT</b>	
<b>PROGRAMME OUTCOMES</b>	
<b>P01</b>	To make students capable of the applicable National Occupational Standards (NOS) in the Retail Management industry in the national and global context
<b>P02</b>	Students will be able to apply techniques, frameworks and tools to arrive at informed decisions in profession and practice.
<b>P03</b>	Graduates will have a solid foundation to pursue professional careers and take up higher learning courses such as M. Voc., MBA, , M. Phil, Ph.D as well as research.
<b>P04</b>	Graduates with a flair of self-employment will be able to initiate and build upon entrepreneurial ventures or demonstrate entrepreneurship for their employer organizations.
<b>P05</b>	Graduate will recognize the need for adapting to change and have the aptitude and ability to engage in independent and life – long learning in the broadest context of socio-economic, technological and global change.
<b>P06</b>	To provide students with a comprehensive understanding of the theoretical and applied aspects of retail management.
<b>P07</b>	To inculcate all the desired skills to meet the needs of today’s customer by procuring the desired merchandise from the retail stores for their personal use.
<b>P08</b>	To equip students with skills required to bring the customers into the store and respond to their buying needs
<b>PROGRAMME SPECIFIC OUTCOMES</b>	
PSO	Develop the knowledge, skill and attitude to creatively and systematically apply in the Retail Management field
PSO	Develop fundamental in-depth knowledge and understanding of the techniques, principles, concepts, values, substantive rules and development of the core areas of Retail Management.
PSO	Function effectively as an individual, and as a member or leader in teams, and in multidisciplinary settings by demonstrating life skills, coping skills and human values.
PSO	Explain theoretical framework of Retail Management Demonstrate the job

	role of Sales Associate
PSO	Demonstrate the job role of Team leader in retailing sector Demonstrate the job role of Departmental Manager in an organised retail sector
<b>COURSE OUTCOMES</b>	
<b>BV 114.1</b>	<b>INTRODUCTION TO RETAILING</b> Establish and satisfy customer needs Monitor and manage store performance Provide leadership for your tea
<b>BV 115.1</b>	<b>ELEMENTS OF SALESMANSHIP</b> This paper provides comprehensive knowledge of Store Location, layout and operations
<b>BV116.1</b>	<b>BV 116.1 PRINCIPLES OF MANAGEMENT</b> Describe what management is. Explain the primary functions of management. List and describe the types of plans and common planning tools.
<b>BV 117.1</b>	<b>FUNDAMENTALS OF CUSTOMER SERVICE</b> To help students understand the critical need for service orientation in the current business scenario. To help customers choose right products To create a positive image of self and organization in the customers mind
<b>BV 118.1</b>	<b>STORE OPERATIONS-I PRACTICAL TRAINING</b> This module explains the different operating processes and their significance in running retail operations smoothly. It also helps develop necessary skills for planning, monitoring and controlling merchandise in a retail store.
<b>BV 114.2</b>	<b>STORES LAYOUT AND DESIGN</b> It provides comprehensive knowledge of Store Location, layout and operations
<b>BV115.2</b>	<b>BUSINESS ORGANIZATION AND ENVIRONMENT</b> Understanding the different environment in the business climate Understanding the minor and major factors affecting the business in various streams

<b>BV116.2</b>	<p><b>BRAND MANAGEMENT AND CONSUMER MARKETING</b></p> <p>Understanding key principles of branding</p> <p>Explaining branding concepts and ideas in their own words</p> <p>Understanding and conduct the measurement of brand equity and brand performance</p>
<b>BV 117.2</b>	<p><b>HUMAN RESOURCE MANAGEMENT AND INDUSTRIAL RELATION</b></p> <p>Developing the understanding of the concept of human resource management and to understand its relevance in organizations.</p> <p>Developing necessary skill set for application of various HR issues.</p> <p>Analyzing the strategic issues and strategies required to select and</p>
<b>BV 111.3</b>	<p><b>Personality And Soft Skills</b></p> <p>Making the students groom their personality and prove themselves as good Samaritans of the Society.</p> <p>Consisting of individual or in-group class presentations pertaining to the applications of concepts, Theories or issues in human development</p>
<b>BV 112.3</b>	<p><b>Health Safety And Environment</b></p> <p>Accident prone areas and adopt methods for reducing accidents following safety precautions.</p> <p>Marking and evaluate performance of explosives. 4. Prepare profile with an appropriate accuracy as per safety precaution in workshop.</p>
<b>BV114.3</b>	<p><b>RETAIL MANAGEMENT-</b></p> <p>Establish and satisfy customer needs</p> <p>Monitor and manage store performance</p> <p>Provide leadership for your team</p>
<b>BV 115.3</b>	<p><b>ADVERTISING AND SALES PROMOTION-</b></p> <p>To make the students understand the importance of advertising and medias' role in advertising and Brand management.</p> <p>Establish and satisfy customer needs To process the sale of products</p>
<b>BV116.3</b>	<p><b>VISUAL MERCHANDISING –</b></p> <p>This module aims at learning basic visual merchandising concepts and theories essential in the store image, its merchandise, and displays.</p>
<b>BV117.3</b>	<p><b>MARKETING FOR SERVICES</b></p> <p>Examine the nature of services, and distinguish between products and</p>

	<p>services Identify the major elements needed to improve the marketing of services</p> <p>Develop an understanding of the roles of relationship marketing and customer service in adding value to the customer's perception of a service</p>
<b>BV111.4</b>	<p><b>BEHAVIORAL SKILLS</b></p> <p>Demonstrate the applicability of the concept of organizational behavior to understand the behavior of people in the organization.</p> <p>Demonstrate the applicability of analyzing the complexities associated with management of individual behavior in the organization.</p>
<b>BV 113.4</b>	<p>Taxation Law &amp; Practice In Business</p> <p>Compute the assessable value of transactions related to goods and services for levy and determination of duty liability.</p> <p>Identify and analyse the procedural aspects under different applicable statutes related to indirect taxation</p>
<b>BV114.4</b>	<p><b>FUNDAMENTAL OF ACCOUNTING -</b></p> <p>1.This paper is aimed at providing comprehensive knowledge of maintenance of accounts under different agreements.</p> <p>Manage a budget</p> <p>to maintain the availability of goods for sale to customers</p>
<b>BV115.4</b>	<p><b>RETAIL CONSUMER BEHAVIOUR</b></p> <p>Measure, critique and interpret consumer behavior.</p> <p>Infer research data to create marketing strategies as a means of increasing consumer sales.</p>
<b>BV 116.4</b>	<p><b>RETAIL SUPPLY CHAIN MANAGEMENT-</b></p> <p>To create awareness about the supply chain activities taken in order to deliver the goods</p> <p>To organize the delivery of reliable service</p> <p>To maintain the availability of goods for sale to customers</p>
<b>BV 117.4</b>	<p><b>MALL MANAGEMENT</b></p> <p>Student are able operate Overall operation and maintenance of the entire building infrastructure, including the services and utilities, ensuring that they are used in a way that are consistent with the purpose for which it</p>

	was acquired.
<b>BV112.5</b>	<p><b>Legal And Ethical Aspects Of Business</b></p> <p>Explain fundamental aspects of laws relevant for a business entity</p> <p>Understand the principles of corporate governance and ability to implement and report compliance</p> <p>Create awareness and understanding of the ethical values</p>
<b>BV113.5</b>	<p><b>BV 113.5 Entrepreneurship</b></p> <p>Understand the concept of Entrepreneurship</p> <p>Explain the competencies of an Entrepreneur</p> <p>Explain the concept of types of feasibility study</p>
<b>BV 114.5</b>	<p><b>GENERAL ECONOMICS-</b></p> <p>This paper is to make the student understand how the business organizations work by applying economic principles in their Business Management.</p> <p>Establish and satisfy customer needs</p>
<b>BV 115.5</b>	<p><b>MARKETING MANAGEMENT</b></p> <p>Critically evaluate the key analytical frameworks and tools used in <b>marketing</b>.</p> <p>Apply key <b>marketing</b> theories, frameworks and tools to solve <b>Marketing</b> problems.</p>
<b>BV 116.5</b>	<p><b>CUSTOMER RELATIONSHIP MANAGEMENT-</b></p> <p>This course will enable the students to learn the basics of Customer Relationship Management.</p> <p>Understood Relationship Marketing Learnt Sales Force Automation</p> <p>Learnt Database Marketing</p>
	<p><b>BUSINESS ECONOMICS-</b></p> <p>This paper is to make the student understand how the business organizations work by applying economic principles in their Business Management.</p> <p>Establish and satisfy customer needs</p>
<b>BV 117.5</b>	<p><b>E-COMMERCE-</b></p> <p>Analyze the impact of <b>E-commerce</b> on business models and strategy.</p> <p>Describe the major types of <b>E-commerce</b>.</p>

<b>BV111.6</b>	<p><b>General Project Management</b></p> <p>The students will able to explain complex management situations based on knowledge and facts and respect for different</p>
<b>BV112.6</b>	<p><b>Inventory Management</b></p> <p>Understand terms that are frequently used in warehouse management Identify the goals and objectives of inventory management and measure your process against these goals</p>
<b>BV 113.6</b>	<p><b>.INDUSTRIAL AND RURAL MARKETING</b></p> <p>Categorize issues in rural &amp; Industrial markets an Analyse marketing environment, consumer behaviour, distribution channels, marketing strategies, etc. in the context of rural and Industrial markets in India</p>
<b>BV 114.6</b>	<p><b>RETAIL LOGISTICS MANAGEMENT]</b></p> <p>Acquire practical application that is founded on sound theoretical knowledge and• learning Acquire a comprehensive and balanced understanding of both the retail and logistic• components</p>
<b>BV 115.6</b>	<p><b>. IT AND ADMINISTRATION]</b></p> <p>Explain how electronic data transmission is used for product and financial management. Evaluate the application of electronic data transmission for marketing, data management, loyalty and customer tracking.</p>
<b>BV 116.6</b>	<p><b>OPERATIONS MANAGEMENT</b></p> <p>Apply the 'transformation model' to identify the inputs, transformation processes and outputs of an organisation Describe the boundaries of an operations system, and recognise its interfaces with other functional areas within the organisation and with its external environmen</p>
<b>BV 117.6</b>	<p><b>FRANCHISING MANAGEMENT</b></p> <p>Describe the different franchising methods Identify the various advantages and disadvantages of franchising Discuss how prospective franchising can evaluate a franchisor and franchising opportunity</p>

	Describe and understand the reasons for franchising a business
	<p><b>PROJECT WORK</b> –Subject Outcomes.:</p> <ol style="list-style-type: none"> <li>1. To learn students the practical tactics of retail business</li> <li>2. to process credit applications for purchases</li> <li>3. to keep store secure</li> </ol>
	<p><b>COMPUTER PRACTICALS-</b></p> <p>To enhance the knowledge about the usage of the Computer and IT in retail business</p>
	<p><b>SOFT SKILLS -</b></p> <ol style="list-style-type: none"> <li>1. After completion of the course students will be familiar with different aspects of personality and role of soft skills in personality development</li> <li>2. To help customers choose right product</li> <li>3. To create a positive image of self and organisation in the customers mind</li> </ol>
	<p><b>ENVIRONMENTAL STUDIES-</b></p> <ol style="list-style-type: none"> <li>1.This paper is aimed at providing a comprehensive knowledge of mechanism of Ecological System</li> <li>2. To maintain health and safety</li> </ol>

<b>B.VOC IN FOOD PROCESSING AND ENGINEERING</b>	
<b>PROGRAMME OUTCOMES</b>	
<b>PO1</b>	Develop skill and expertise in post graduate scholars to work on projects for value addition of various food products.
<b>PO2</b>	PO 2. Generate adequate trained man power to work in food processing industries.
<b>PO3</b>	PO 3. Develop cadre of scholars for achieving entrepreneurial skills and self-employment opportunities in food processing sector.
<b>PROGRAMME SPECIFIC OUTCOMES</b>	
PSO	To relate the chemical composition of <b>foods</b> to their functional properties
PSO	To understand, plan, perform and analyse a range of chemical investigations with an emphasis on <b>food</b> analysis
PSO	To give a molecular rationalization for the observed physical properties and reactivity of major <b>food</b> component
<b>COURSE OUTCOME</b>	
<b>BV-134.1 BASICS OF FOOD PROCESSING</b>	
Outline the process of red and white meat slaughter, explain meat structure and inspect meat quality parameters.	
Demonstrate processing techniques used to produce a variety of Food Products.	
Work in teams to develop communication skills and company Good Manufacturing Practices	
<b>BV-135.1 FUNDAMENTALS OF FOOD &amp; NUTRITION</b>	
Demonstrate knowledge and understanding of the fundamental concepts in food and nutrition.	
Demonstrate an in-depth knowledge of the roles and functions of principal nutrients and an awareness of functional foods.	
Demonstrate an understanding of the processes involved in digestion, absorption, metabolism and utilisation of each of the macronutrients and major vitamins and	

minerals.

**BV-136.1- BASICS OF FOOD SAFETY AND REGULATORY ACT**

To create understanding of quality control and assurance system in food industry.

To understand the risk assessments procedure for food sector.

GMPs and GHP regulations in the food sector.

**BV-135.2-FUNDAMENTAS OF FOOD CHEMISTRY AND MICROBIOLOGY**

1. Students shall be aware of the underlying chemistry, properties and effects of processing on food components.

2. Understanding of food components reactions and their impact on sensory, nutritional, and functional properties of foods.

3. Ability to integrate chemistry and biochemistry principles into real-world food science and nutritional problems.

**BV-136.2: INTRODUCTION TO FRUIT AND VEGETABLE PROCESSING**

1. The students shall be able to understand Biological, Chemical & Physical Properties of Fruits & Vegetables.

2. The students shall be able to understand Technologies involved in Processing, Preservation & Value- Addition of Fruits & Vegetables.

3. Students shall be able to understand Industrial Processes for Commercial Production of Jams, Jellies, Marmalade, Fruit Juices, Concentrates

**BV 134.3- INTRODUCTION TO BAKERY, AND CONFECTIONERY PROCESSING**

To teach about the baking and production principles of bakery and confectionery products.

To understand the terms in bakery and confectionery.

To exhibit the use of sanitation and safety practices in bakery production.

**BV 135.3- FOOD ENGINEERING AND INSTRUMENTATION**

To Emphasis the various properties of the raw material used in food processing, different processing technologies required in transforming them into quality food products and material handling equipment involved in food processing operations.

**BV 136.3- INTRODUCTION TO DAIRY TECHNOLOGY**

1. How to do sampling of milk and milk products.
2. Physical, Chemical & Microbial analysis of milk and milk products.
3. Development of different milk products.

**BV 134.4- INTRODUCTION TO MEAT, FISH AND POULTRY PROCESSING**

1. Student shall know about the significance & necessity of organized animal product sector.
2. Students shall acquire the ability of value- addition to Meat, Poultry, Egg & Fish.
3. Student shall be well versed with processing, preservation & quality control of Meat, Egg & Fish in Food Industry

**BV 135.4- BASICS OF FOOD PACKAGING**

1. The different types of materials and media used for packaging foods.
2. Manufacturing processes for different packaging materials.
3. Quality testing techniques for different packaging materials.

**BV 135.4-FOOD ADDITIVES AND PRESERVATIVES**

1. Student shall gain a thorough knowledge of Chemical Nature, Analysis, Risk & Benefits of Food Additives.
2. Student shall gain a thorough knowledge of Antimicrobial Agents, Antioxidants & Anti Browning Agents.
3. Student shall gain a thorough knowledge of Synthetic Food Additives (Coloring Agents, Flavoring Agents).

**BV 134.5- FOOD DRYING AND CONCENTRATION TECHNIQUES**

To gain knowledge on drying principles and psychometric chart To apply the principles to solve problem on drying.

To understand different types of dryers for different food materials and assess the concept behind industrial dryers.

The basis for extension of storage life of foods by dehydration and compare and contrast methods for dehydrating different foods, and the onsequences in terms of food quality.

**BV 135.5- SPICES AND PLANTATION CROP TECHNOLOGY**

To gain knowledge in processing of plantation crops and spices and also its value

added products.

To outline ways in which quality loss can be minimised during preparation and processing

To develop value added products from plantation products and spices

**BV 136.5- INTRODUCTION TO FERMENTATION TECHNOLOGY**

Evaluate factors that contribute in enhancement of cell and product formation during fermentation process.

Analyse kinetics of cell and product formation in batch, continuous and fed-batch cultures

**BV 134.6: - WASTE MANAGEMENT IN FOOD INDUSTRY**

Students will attain knowledge about the methods of managing food wastes.

Students will gain knowledge on the methods for utilization of food wastes.

Students will gain knowledge on getting value-added products from wastes

<b><u>B.VOC. IN ANIMATION &amp; MULTIMEDIA</u></b>	
<b>PROGRAMME OUTCOMES</b>	
<b>PO1</b>	Animation Technology. To develop competencies and skills needed for becoming an effective Animator
<b>PO2</b>	Mastering traditional & digital tools to produce stills and moving images. Exploring different approaches in computer animation
<b>PO3</b>	To enable students to manage Animation Projects from its Conceptual Stage to the final• Product creation
<b>PROGRAMME SPECIFIC OUTCOMES</b>	
PSO	Understand the basic elements of art and/or design through art analysis
PSO	Learn how to use materials, tools and processes, effectively and safely to create original works of art.
PSO	Develop creative problem-solving strategies as a means to create strong artwork. Identify Western art in detail
<b><u>COURSE OUTCOME</u></b>	
<b><u>COMPUTER FUNDAMENTALS LAB</u></b>	
<ol style="list-style-type: none"> <li>1. introduced to computer hardware and its various components.</li> <li>2. Understanding different hardware devices and their applications.</li> <li>3. Get the knowledge of MS Office, its options, features.</li> </ol>	
<b><u>COMPUTER GRAPHICS LAB -</u></b>	
Gain awareness of common computer graphics software.	
To understand different vector and Bitmap shapes and designs.	
Enhance their ability to design and learn implementation of colors	
<b><u>FOUNDATION ARTS</u></b>	
<ul style="list-style-type: none"> <li>• Understand the basic elements of art and/or design through art analysis.</li> <li>• Learn how to use materials, tools and processes, effectively and safely to create original works of art.</li> <li>• Develop creative problem-solving strategies as a means to create strong artwork.</li> </ul>	

### **HISTORY OF ANIMATION-**

- Describe past history of origin of animation.
- Understand the emergence of animation from different countries.
- Understand the importance and the rise of computer animation

### **SCRIPT WRITING & STORY BOARD**

- Create a story which involves turning points, setups, climax. etc.
- Create a series of legible storyboard as required by the script.
- Understand Pre- Production process.

### **PRODUCTION TECHNIQUES**

- Understanding the process of voice tracking.
- Implementing the concepts of transitions, layering, Video capture.
- Learning different types of audio/ video formats

### **INTRODUCTION TO 3D TEXTURING**

- Give detailed texturing and colouring to 3D characters or objects.
- Learn the importance of shaders and how to apply it.
- Understand different mapping done to enhance the details of the object.

### **2D ANIMATION LAB -**

- Gain knowledge about fundamental skills to produce traditional style animation.
- Have a better understanding about timeline, tools and features of the software.

### **VIDEO EDITING LAB-**

- Understand the concepts of transitions, layering.
- Get acquainted with different audio/ video formats.
- Understanding the concept of video capture.

### **WEB TECHNOLOGY**

Create and design websites.

Understand the development process and its principles to create a website.

Create different types of websites themes and do different modifications onto websites.

### **3D LIGHTING & CAMERA LAB**

- Get detailed understanding of 3D cameras.
- Create camera animations.
- Understand different alignments. Parameters and lens settings

### **COMPOSITING LAB**

Composite footages like color correction, color grading, Tracking, Stabilizing and adding various effects.

The program is widely used by motion-graphics professionals, website designers, and visual effect artists for post-production on digital films, DVD, video,

### **CINEMATOGRAPHY -**

Meet the demands of the rapidly expanding media production industries or in the field of Photography or Videography and equip them with core skills.

Take up jobs with newspapers, magazines, advertising agencies, government agencies, industrial houses or work as freelancers.

### **3D RIGGING & ANIMATION-**

Develop skills in creating objects and character animations. Understand the fundamental features of different controllers, wraps and modifiers, poses and postures.

Work with bone parameters and IK Solvers.

### **ADVANCED CHARACTER DESIGN-**

- Understand different types of characters needed for animation and gaming.
- Understand lightings for different conditions.
- Create their own characters with construction.

### **VISUAL EFFECTS LAB**

Study user interface of Fusion along with features & applications.

Develop skills in understanding node based features.

Get acquainted with the knowledge of rotoscoping, keying, tracking etc using node based technology.

### **DYNAMICS & EFFECTS**

1. Create dynamic particle effects using particle systems.
2. Gain knowledge about 2D and 3D Fluid systems.
3. To Understand Active Passive Colliders.

### **ADVANCED 3D GRAPHICS LAB-**

Create realistic digital sculpting using ZBrush.

Understand the workspace, buttons and palettes and use it more efficiently.

Create desired UV textures to give more subtle look to 3D characters or objects.

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## POSTGRADUATE PROGRAMMES

<b>M.A English</b>	
<b>PROGRAMME OUTCOMES</b>	
PO 1:	Greatly enhance their foundational knowledge about the history, literature, gender, culture, race and other perspectives of comprehending human experience.
PO 2:	Independently enquire into the pre-existing knowledge sources and assess them.
PO 3:	Efficiently take up competitive exams, interviews and other similar situations to excel.
Po 4:	Design and undertake individual research which will contribute significantly to the future ideological and societal developments.
PO 5:	Analyze and articulate the range of position that challenges the prevailing social, political, economic, ontological and ethical framework.
PO 6:	Integrate various theories and methodologies with social and environmental consciousness
<b>PROGRAMME SPECIFIC OUTCOMES</b>	
PSO 1:	Create a social awareness in terms of society, culture, ethnicity, ecology and gender backgrounds of literature.
PSO 2:	Utilize the different critical approaches and demonstrate them in the prescribed texts.
PSO 3:	Develop skills of research through interpretation, critical thinking and clear writing.
PSO 4:	Compile their research by applying research methodology.
PSO 5:	Evaluate teaching-learning process through various teaching aids.
PSO 6:	Identify the significance of internationally acclaimed works through the writings of highly celebrated writers including translated versions.
PSO 7:	Recognize the significance of their social and professional responsibilities as citizens with integrity.
PSO 8:	Develop analytical, research-oriented and organizational skills

<b>COURSE OUTCOMES:</b>	
<b>PH 121.1 - Paper I: British Literature I (Medieval Literature to Neoclassical Literature)</b>	
CO 1:	Enabling the students to understand the beginnings of English Literature
CO 2:	To gain an in-depth knowledge about the age and authors
CO 3:	To gauge how the era began to formulate the notions of England and English
CO 4:	Express the socio-cultural and religious practices of British people during that period
<b>PH 122.1 - Paper II: Literary Criticism</b>	
CO 1:	introduce the students to the concept of Literary Criticism
CO 2:	To create a working knowledge of the different types of 'criticisms'
CO 3:	Understanding the 'establishing' of the canon
CO 4:	To be able to apply some criticism to the texts
<b>PH 123.1 - Paper III: Research Methodology and Ethics</b>	
CO 1:	To introduce the students to the basics of doing research
CO 2:	The paper will focus on how to use the correctly write and document the thesis
CO 3:	Give information various approaches to studying and doing research in literature
CO 4:	Will guide the students to do ethical and original research
<b>PS 124.1 - Paper IV: Modern Indian Theatre</b>	
CO 1:	To introduce the students to origins of theatre in in India
CO 2:	To help students to critically learn to evaluate and read plays
CO 3:	Understand the contributions made by the theaters to Indian art and culture
CO 4:	To be made familiar with the various techniques employed in plays
<b>PS 125.1 - Paper V: Children's Literature</b>	
CO 1:	Introduce the students to the genre as a serious academic activity
CO 2:	Highlight the way in how a children's text can be 'read'
CO 3:	Discuss the complexities of the genre, Children's Literature
CO 4:	Examine the role and popularity of the authors of these texts
<b>PS 126.1- Paper VI: Linguistics and Semiotics</b>	
CO 1:	equip the students with the various techniques of phonology, morphology,

	syntax
CO 2:	Understand and analyse the relationship between language and society
CO 3:	Analyse the nuances associated with study of semiotics
CO 4:	Practical experience in reading and analyzing signs
<b>PS 127.1 - Paper VII: European Literature</b>	
CO 1:	To help students read texts in the wider context of European history.
CO 2:	Contextualize the text and read it in relation to the immediate present.
CO 3:	Understand the contributions of the authors to European Art and Culture
CO 4:	Understand the nuances of various movements associated with European Literature
<b>PS 128.1 - Paper VIII: Ecocriticism</b>	
CO 1:	Introduce the students to the genre of Ecocriticism
CO 2:	Examine the relation between environment and humanity
CO 3:	Analyse the texts to enable a deeper understanding of the complexities of our environment and its protection
CO 4:	Understand related theoretical frameworks like ecofeminism, eco aesthetics, so on
<b>PS 129.1 - Paper IX: Literature from Canada, Australia and New Zealand</b>	
CO 1:	Understand the contribution of Canada, Australia and New Zealand to Literature in English
CO 2:	Master the major literary trends in these countries
CO 3:	Analyse the ethnic and cultural diversity present in these countries
CO 4:	Examine the art form of these place's Literature
<b>II SEMESTER</b>	
<b>PH 121.2 - Paper X British Literature II (The Romantics and the Victorians)</b>	
CO 1:	To introduce the Romantic and Victorian eras to the students
CO 2:	To critically analyse the texts of the authors of the time
CO 3:	To gauge the rise of industries and technology in the socio-cultural context
CO 4:	Comprehend Britain's growing domination around the world
<b>PH 122.2 - Paper XI: Literary Theories</b>	
CO 1:	Introduce the students to the concept of "Literary Theories"
CO 2:	Develop a thorough understanding of the texts prescribed for study
CO 3:	Enhance their critical skills by learning to read and interpret texts

CO 4:	Application of relevant theories to the concerned texts
<b>PH 123.2 - Paper XII: Indian Writing in English I</b>	
CO 1:	Understand the origins of the term, Indian Writing in English
CO 2:	Critically examine the writers in the early days of Indian Writing in English
CO 3:	Examine the term Indian and the nuances associated with it
CO 4:	Evaluate the role of English in the context of the Indian subcontinent
<b>PS 124.2 - Paper XIII: Film Studies</b>	
CO 1:	To learn and have a greater understanding on how to read and analyze film
CO 2:	To familiarize major film theories and movements
CO 3:	To understand major concerns in Indian Films
CO 4:	To study the cultures as represented in Kannada films on the region Dakshina Kannada
<b>PS 125.2 - Paper XIV: Twentieth Century Asian and Middle Eastern Fiction</b>	
CO 1:	Introduce the students to the canon fiction of Asia and the Middle East.
CO 2:	Examine the role played by these writers in the literary scenario of their country
CO 3:	Understand the individual countries culture and ideology
CO 4:	Understand the diversity of cultures, ideologies and beliefs that are present in the world.
<b>PS 126.2 - Paper XV: Fantasy Literature</b>	
CO 1:	Examine the origins of the, genre Fantasy Literature
CO 2:	Evaluate the role played by the authors in the development of the genre
CO 3:	Understand and evaluate the various worlds of fantasy
CO 4:	Understand and evaluate Fantasy as a serious academic pursuit
<b>PS 127.2 - Paper XVI: Literature from Africa and the Caribbean Islands</b>	
CO 1:	Introduce the students to the Literature from Africa and the Caribbean Islands
CO 2:	Evaluate the cultural diversities present in the texts prescribed for study
CO 3:	Understand the histories of these people
CO 4:	Examine the texts from the perspectives of colonisation and slavery
<b>PO 128.2 -Paper XVII: CBCS – Reading Literature</b>	
CO 1:	Introduce students to the various genres in literature
CO 2:	Evaluate the concept of the text, the work and the canon
CO 3:	Help students develop the basic skills in reading the texts

CO 4:	Employ Reading strategies to analyse the text
<b>SEMESTER III</b>	
<b>PH 121.3- Paper XVIII: British Literature III (Modernism to Postmodernism)</b>	
CO 1:	Introduction of the terms Modernism and Postmodernism
CO 2:	Evaluate the devastating histories of the time and its impact
CO 3:	Examine the rise of new movements in art
CO 4:	Evaluate the texts prescribed for study on the basis of the socio cultural circumstances
<b>PH 122.3- Paper XIX: English Language Teaching</b>	
CO 1:	Familiarize the learners with the basics of language teaching
CO 2:	Make the learners understand the basics of language learning
CO 3:	Help the students in learning how testing is done for English as a discipline
CO 4:	Make them understand the process of generating learning material
<b>PH 123.3-Paper XX: American Literature I</b>	
CO 1:	Identify and recognize the modes and motifs of American Literature
CO 2:	Compare, contrast and co-relate American literature with other national and regional literatures
CO 3:	Evaluate the history to understand the formation of the American State
CO 4:	Evaluate the texts to understand the essence of American Culture
<b>PH 124.3-Paper XXI: Indian Writing in English II</b>	
CO 1:	To understand the latter trends in Indian Writing in English
CO 2:	To examine the formation of India as an independent state
CO 3:	Evaluate the continued role played by the English in the Indian Subcontinent
CO 4:	Discuss the role played by the authors in the final development of the genre
<b>PS 125.3-Paper XXII: Science Fiction</b>	
CO 1:	Examine the origins of the, genre Science Fiction
CO 2:	Evaluate the role played by the authors in the development of the genre
CO 3:	Understand and evaluate the various worlds of Science Fiction
CO 4:	To evaluate the cultural nuances present in the science fiction world
<b>PS 126.3- Paper XXIII: Folklore and Mythology</b>	
CO 1:	Familiarize the students with the theories of folklore and myths
CO 2:	Introduce them to the inter-disciplinary nature of the study of folklore and myth

CO 3:	Examine the rendition of the original myths and the texts prescribed for study
CO 4:	Develop interpretative skills to analyse folktales and myths on their own
<b>PO 127.3-Paper XXIV: CBCS – Interpreting Literature</b>	
CO 1:	To understand some basic literary criticism concepts
CO 2:	To understand the application of criticism to select texts
CO 3:	The students will be able to interpret the text by themselves
CO 4:	To be able to apply some basic theory to the texts chosen
<b>SEMESTER IV</b>	
<b>PH 121.4 - Paper XXV: Postcolonialism</b>	
CO 1:	To make the students familiar with terms of colonial, postcolonial, neocolonial, so on
CO 2:	Make use of postcolonial critical concepts to analyse cultural and sociopolitical conditions
CO 3:	Critique the specific meanings of the postcolonial condition
CO 4:	Will be able to understand the dimensions of colonialism in the postcolonial world
<b>PH 122.4 - Paper XXVI: Cultural Studies</b>	
CO 1:	To make students familiar with the term, Culture and its nuances
CO 2:	Evaluate the role how culture is a social construct that needs to be analysed
CO 3:	Evaluate the role of hegemony, media, institutions, so on in creating culture
CO 4:	Analyse the texts from the perspective of Cultural Studies
<b>PH 123.4- Paper XXVII: American Literature II</b>	
CO 1:	To continue examine the growth of American Nation into a super power
CO 2:	To discuss the experiences of other ethnic groups in America
CO 3:	To evaluate the texts from the perspective of various theories
CO 4:	To evaluate modern day America as a melting pot
<b>PH 124.4-Paper XXVII Project</b>	
CO 1:	To produce a research project at the end of the academic year
CO 2:	To follow all rules related to academic and research writing
CO 3:	To produce quality research
CO 4:	To try to publish the work if possible
<b>PS 125.4- Paper XXIX: Cultures of Dakshina Kannada in Translation</b>	
CO 1:	To introduce the students to basic concepts in translation.

CO 2:	Highlight the rich tradition available in the regional literature of Dakshina Kannada
CO 3:	Enable students to form their own interpretations of the multihued culture of modern day India
CO 4:	Be able to perform some basic translation activities
<b>PS 126.4- Paper XXX: Diaspora Literature</b>	
CO 1:	To critically examine the term, Diaspora and Dispora theory
CO 2:	To examine the texts and understand the nuances of Diaspora
CO 3:	To evaluate the problems of the diaspora community
CO 4:	To understand the culture and needs of the diaspora community
<b>PS 127.4- Paper XXXI: Gender Studies</b>	
CO 1:	To critically examine the term, Gender
CO 2:	To evaluate the problems of the groups that forms the gender minority
CO 3:	To critically evaluate on the role of patriarchy in society
CO 4:	To examine the texts and understand the nuances of gender
<b>PS 128.4-Paper XXXII: Literature from the Margins</b>	
CO 1:	To critically examine the term, subaltern, hegemony, margins, so on
CO 2:	To examine the plight of the various oppressed classes around
CO 3:	To critically evaluate the role of hegemonic institutions in creating the marginalized
CO 4:	To examine the texts and understand the plight of the marginalized

## M.A ECONOMICS

### PROGRAMME OUTCOMES

PO 1:	Develop an understanding about various concepts and principles in Economics.
PO 2:	Be able describe the working of the economy both domestic and international.
PO 3:	Enable the students recognise the practical possibilities of economic theory in real life.
PO 4:	Analyze the various sectors and its performance in the development process.
PO 5:	Create awareness on the inter-linkages between the political system and economic theories.
PO 6:	Assess the impact of various policies on the welfare of the community.
PO 7:	Ensure the application of the economic theories facilitate sustainable human life.
PO 8:	Develop skills have an orientation do fruitful research in the discipline.

### PROGRAMME SPECIFIC OUTCOMES

PSO 1:	To prepare the students with a laborious and broad understanding of the fundamentals of economics with various aspects of consumer behaviour, demand analysis, production theory, costs, theory of traditional markets and equilibrium of the firm. This will enable the students to take decision in the context of market interdependence, complexity, uncertainty and informational asymmetry.
PSO 2:	To cover all major theories and models dealing with the issues pertaining to economic growth and development where the learners will be able to realize the nature of the deficiencies of developing nations, need for sustainable growth, reconstruction & development and to suggest policy measures to rectify them and also to explore new avenues of growth.
PSO 3:	The extremes of poverty and wealth will be adequately addressed through a comprehensive economic analysis of the public sector which empowers the student to understand and analyse public policies and problems with an insightful vision of fiscal institutions which underline budgetary policies in general and Indian experience in particular.
PSO 4:	To provide adequate knowledge of statistical techniques to analyse economic problems through the development of research skills includes, framing testable

	hypotheses, selection of precise statistical tests, locate appropriate data for testing hypotheses, reject/accept hypotheses correctly, evaluates results, and write up the research findings.
PSO 5:	o develop a vision to achieve a mission of attaining a sustainable society by applying theoretical and empirical analysis of sources of and solutions to environmental problems, with application to local pollution challenges and global environmental issues such as climate change.
PSO 6:	To make the students aware of the quantitative and the qualitative aspects and characteristics of the population through various demographic techniques, importance of population in economic development, various theories that explains the growth of population and research directions in the field of population studies in a country.
PSO 7:	To train the students on latest theoretical developments in macroeconomics for empirical analysis, integrate method and technique to evaluate policy measures, understanding developments in labour market and gauge the trade-off in the deployment of resources to alternative ends.
PSO 8:	To prepare the students to understand and respond to economic issues and forces of Globalisation, free flow of trade in goods, governance of services and capital and it's rapidly changing scope and nature in international business and trade.
<b>COURSE OUTCOMES:</b>	
<b>PH 113.1 STATISTICAL TECHNIQUES FOR ECONOMIC ANALYSIS (60 hours)</b>	
CO 1:	Students will be able to understand the use of economic analysis in addressing important issues of developing countries.
CO 2:	Understand how the presence of externalities could influence the growth process let us focus on learning by doing externality. There are a number of firms in the economy and each uses the same production technology with diminishing returns.
CO 3:	Understand the role of agriculture, industry, and trade in the development process of the less developed countries.
CO 4:	Understand the extent to which economic theories may be helpful in the design of development policies in the less developed countries.

CO 5:	Learners should understand the need for sustainable growth, reconstruction and development. As the inequalities of the past and present - especially the extremes of poverty and wealth - cannot be adequately addressed by conventional socio-economic policies alone, other innovations can also be explored.
CO 6:	Use theories (models) to analyse real and hypothetical economic circumstances and to derive policy solutions to the problems posed in these circumstances.
<b>PS 114.1 ENVIRONMENTAL ECONOMICS (50 hours)</b>	
CO 1:	Understand the relationship between environment and economic growth; how economic growth affects environment; how environment development programmes affect economic growth; the tradeoff.
CO 2:	create basic ideas of the cost of environmental growth and sustainable policy approach to prevent environmental degradation, green accounting, methods of environmental valuation, Environmental concerns, environmental education, environmental awareness, environmental laws, environmental hazards and economics of recycling.
CO 3:	Enable the student to focus on economic effects of environmental policies around the world. It is a science emphasis on natural resources and its efficient allocation, management with alternatives, and environmental indemnities like air, water soil pollution, solid waste management, and global warming etc.
CO 4:	Explain how something can be both “environmentally destructive” and “economically optimal”; and how something can be environmentally beneficial and economically suboptimal.
CO 5:	Helps to examine the relationship between the economy and the environment in the context many activities started by environmental economists, activists and nature lovers.
CO 6:	Identify factors to find solutions to environment problems that are relevant to protect the welfare of the people.
<b>PS 115.1 PRINCIPLES OF BANKING (50 hours)</b>	
CO 1:	The students ‘will get the knowledge of the structure and role of banking in an

	economy.
CO 2:	To develop skills in students in understanding the functioning of various banking activities
CO 3:	Gain the up-to-date knowledge regarding the banking terminologies.
CO 4:	Categorize and analyze banker – customer relationship
CO 5:	Able to understand the payment and collection procedure of negotiable instruments
CO 6:	Able to understand the facilities available and utilization of the same at different circumstances.
	<b>PS 116.1 ECONOMICS OF DEMOGRAPHY (50 hours)</b>
CO 1:	Students are able to explore population changes over time; elements of demography; child survival and mortality; family and households and demographic change.
CO 2:	Understand the demography of social and economic inequality, role of women, urbanization, migration and fertility.
CO 3:	Examine world demographic patterns, synthesizing the data and issues surrounding the importance of population to public health.
CO 4:	Able to critically evaluate the issues related to demography.
CO 5:	Comprehend the basic concepts and definitions in demography and identify the various sources of data in demography.
CO 6:	Prepare the students for variety of challenging careers through innovation in teaching and research.
	<b>PS 117.1 INDUSTRIAL ECONOMICS (50 hours)</b>
CO 1:	<b>COURSE OUTCOME</b>
CO 2:	The student gets the skill of efficient and economic use of scarce resources.
CO 3:	Understand the various theories related to wages, labour, firm etc.
CO 4:	The student gets equipped with the knowledge and skill in effective decision making under uncertain market situations.
CO 5:	Understand the role of unions and its bargaining powers.
CO 6:	Critically evaluate the issues related to labour and firms.
	The student acquires skills in allocating scarce resources among alternative uses.

<b>PH 111.2: MACRO ECONOMIC ANALYSIS (60 hours)</b>	
CO 1:	Explain the functioning of various sectors of the economy.
CO 2:	Develop an understanding of the various theories related to macro variables.
CO 3:	Demonstrate an understanding of the macroeconomic implications of decisions made by diverse economic entities.
CO 4:	Able to comprehend the link of various sectors in an economy.
CO 5:	Integrate theoretical knowledge to evaluate policy measures
CO 6:	Analyse trade-off in the deployment of resources to alternative ends.
<b>PH 112.2 MATHEMATICAL TECHNIQUES FOR ECONOMIC ANALYSIS (60 hours)</b>	
CO 1:	To familiarize the students with the mathematical economics terminologies
CO 2:	Able to build models by expressing words in symbols, numbers and equations
CO 3:	Able to apply economic theory and methods to selected real world economic problems.
CO 4:	Able to demonstrate analytical and critical thinking skills and to apply and interpret quantitative, qualitative and graphical information in a problem-solving context.
CO 5:	To equip students with the flexibility and skills necessary to succeed in a constantly changing environment.
CO 6:	A new dimension of scientific, logical and critical thinking, which will assist the mind to solve personal, professional and social problems and guide the students to take wise decisions.
<b>PH 113.2 INTERNATIONAL ECONOMICS (60 hours)</b>	
CO 1:	Identify and analyse different theoretical models of international economics in light of 'real world' situations.
CO 2:	Understand major issues in international finance, be able to deal with them analytically, and identify possible resolutions for those issues.
CO 3:	Analyse the determinants, patterns and effects of international trade within a general equilibrium framework, where the interrelationships amongst product and factor markets in an economy are explicitly taken into consideration.
CO 4:	Distinguish between the efficiency implications and distributional consequences of trade and trade policy.

CO 5:	Discuss and explain specific policy issues such as 'environmentalism as protectionism'; international dumping; the choice of exchange rate regime; the desirability of free capital flows.
CO 6:	This course advances understanding of economics across business and the public sector with critical skills and competencies.
	<b>PS 114.2 FINANCIAL INSTITUTIONS AND MARKETS (50 hours)</b>
CO 1:	Outline the basics of Indian financial systems and its components
CO 2:	Provide students with an introduction to the theory and practice of financial instruments.
CO 3:	Explain financial institutions and how firms obtain funds in the financial markets.
CO 4:	Analyze and evaluate financial markets, how securities are traded, mutual funds, investment companies, and investor behavior.
CO 5:	Explain how the financial services component industries (insurance, banking, securities, real estate and financial planning) interact.
CO 6:	Understand the importance of the financial sector in directing the use of scarce capital and able to analyze the various financial sector reforms in India.
	<b>PS 115.2 RESEARCH METHODOLOGY AND ETHICS (50 hours)</b>
CO 1:	Students can develop testable hypotheses, differentiate research design and/or statistics, evaluate aptness of research conclusions, and generalize them appropriately.
CO 2:	Students can design and conduct quantitative or qualitative research studies in laboratory or field settings. Students use research data to formulate or evaluate new research questions, using reason and persuasion in a logical argument.
CO 3:	Students can summarize and evaluate a body of research including primary literature, and can compare psychology's methods with other disciplines' methods.
CO 4:	Demonstrate a logical argument, analyse and interpret data and evaluate alternative perspectives on the basis of objective reasoning. Communicate and present complex arguments in oral and written form with clarity and succinctness.

CO 5:	More awareness on Intellectual property Rights and Patents.
CO 6:	Able to write original research articles following ethical guidelines and practices in conducting the research and publication of papers.
	<b>PS 116.2 AGRICULTURAL ECONOMICS (50 hours)</b>
	<b>COURSE OUTCOME</b>
CO 1:	Able to understand the theories of agricultural economics.
CO 2:	Gain knowledge in the importance of the primary sector in Indian economy.
CO 3:	Write texts in various forms, with an identified purpose, that respond to specific audience needs, incorporate research or existing knowledge, and use applicable documentation and appropriate conventions of format and structure.
CO 4:	Capable of using mathematical, computational, statistical or formal reasoning (including reasoning based on principles of logic) to solve problems, draw inferences and determine reasonableness.
CO 5:	Students will be able to identify an appropriate theoretical framework, a suitable analytical method, and undertake an informed empirical analysis.
CO 6:	Students will have a good general understanding of agricultural production functions, cost and profit functions, math programming models, and non-optimizing simulation models.
	<b>PS 117.2 ECONOMICS OF HUMAN RESOURCE DEVELOPMENT (50 hours)</b>
CO 1:	Knowledge of Industrial Organizational Behavior, Development, & Change Strategies: Given an organization's target for development or change, analyze organizational and work behavior in relation to the target, evaluate the need for and influences of change on the organization and organizational members, and apply appropriate models, theories, and principles to facilitate healthy change and development.
CO 2:	Competency in Diversity as it Applies to Industrial Organizational Practices: Analyze and evaluate how diversity influences industrial organizational issues, and develop change strategies that demonstrate an appreciation of how diversity influences individuals and groups within the organization.
CO 3:	Students may obtain frameworks and tools to effectively analyze and approach various organizational situations.

CO 4:	Develop an organisational culture in which superior-subordinate relationships, teamwork and association among sub-units are solid and contribute to the proficient wellbeing, motivation and pride of employees.
CO 5:	Obtain or refine competences essential to achieve numerous roles connected with students current or anticipated impending roles.
CO 6:	The study of human resource development emphasis on efficiency of individuals as productivity in itself is an important organisational and personal goal.
<b>PO 118.2 BANKING AND FINANCE (40 hours)</b>	
CO 1:	To understand the Origin and the growth of the Indian Banking System.
CO 2:	To elucidate the broad functions of various types of banks
CO 3:	To evaluate the performance of the developmental banking institutions
CO 4:	Able to demonstrate an awareness of the current structure and regulation of the Indian financial services sector.
CO 5:	Discuss the impact of government policy and regulations on the banking sector.
CO 6:	To understand the working of development financial institutions in the development of rural sector, farmers, industries and financial market.
<b>PH 111.3: MONETARY ECONOMICS (60 hours)</b>	
CO 1:	Develops the skill to know the interdependence and complexity of the economic system.
CO 2:	Skill is developed to understand the monetary policy and its working in the system as a stabiliser.
CO 3:	Able to understand the various theory related to monetary economics.
CO 4:	Recognise the interrelation of the money and product market in the economy.
CO 5:	Understand the working of the monetary policies in the stabilization process.
CO 6:	Critically evaluate the policies related to stabilising the economy.
<b>PH 112.3 ECONOMETRICS (60 hours)</b>	
CO 1:	Able to explain the relation between economic theory and Econometrics.
CO 2:	Develop the capacity to understand the various tools in Econometrics.
CO 3:	Ability to understand the usefulness of econometric tools.
CO 4:	Skills developed to analyse economic problems using econometric tools.
CO 5:	Analyse the problems associated with econometric models.

CO 6:	Formulate econometric models in problem solving.
	<b>PS 113.3 HEALTH ECONOMICS (50 hours)</b>
CO 1:	Helps to analyse the importance of health as a major determinant of economic growth.
CO 2:	Gain a deeper understanding of evaluating and creating dynamic and flexible strategies for healthcare delivery.
CO 3:	Have competence to apply economic concepts and models to the fields of demand for health, demand for health services, demand for health insurance, provision of health insurance and provision of health care.
CO 4:	Be able to design public drives in preventive medicine and apply social marketing techniques, both addressing public will and individual behaviors.
CO 5:	Provide useful insights into the delivery of health care, it's economic evaluation that provides the bulk of health economists' work and is of most relevance to managers and practitioners.
CO 6:	The course helps to understand the increasing importance of precision medicine and real-world situation that impacting medical affairs professionals, medical science liaisons, and have to be able to have meaningful conversations with healthcare providers about health economics concepts. Comprehend the structures of marketing management in healthcare organisations, and the steps through which marketing helps an organisation to identify the needs of and focus on its customers.
	<b>PS 114.3 LABOUR ECONOMICS (50 hours)</b>
CO 1:	By the end of this course, students will be able to understand the basic theories of labour markets
CO 2:	Able to understand the labour market policy outcomes.
CO 3:	Able to analyse how theoretical understanding of the labour market and empirical approaches to the labour markets are related.
CO 4:	Able to identify the role of government policies in labour welfare.
CO 5:	Show understanding of commonly used data and methods in applied labour market research.
CO 6:	Demonstrate the ability to acquire and convey content in international scientific literature in the field of research.

<b>PS 115.3 DEVELOPMENT BANKING (50 hours)</b>	
CO 1:	understand the growth and structure of development banking Institutions in India
CO 2:	analyze the functions of modern banking financial services and its importance
CO 3:	enable the students get familiarized with Mutual Funds
CO 4:	acquaint the students in respect to the investment decisions related to Derivative market
CO 5:	understand the dynamics of capital market, money market and to learn the importance to be updated on the developments of the banking sector and practice the same.
CO 6:	Understanding the working of development financial institutions in the development of rural sector, farmers, industries and financial market.
<b>PS 116.3 ENERGY ECONOMICS (50 hours)</b>	
CO 1:	Understand basic economic concepts that underlay energy production and end use.
CO 2:	Describe the sources of energy and the scarcity associate with it.
CO 3:	Able to identify how local, regional, and global institutions affect energy markets and prices.
CO 4:	Apply the uses of energy resources efficiently in alternative uses.
CO 5:	Become familiar with historical and contemporary public policy issues related to energy globally.
CO 6:	Be able to apply this knowledge to analysis of specific energy industries and policy questions.
<b>PO 117.3 CONTEMPORARY INDIAN ECONOMY (40 hours)</b>	
CO 1:	Students are able to have a critical understanding of the Indian economy so that they may be able to engage meaningfully in debates regarding the country's economy
CO 2:	Understand the formulation of economic policies and its analysis.
CO 3:	Able to comprehend the broad contours like the status, issues and policies of the Indian economy at the aggregate as well as sectoral levels.
CO 4:	Describe the experiences in the pre as well as post reform years, keeping the colonial experience at the background.

CO 5:	Have a general understanding of the corporate, geo-political, cultural and social factors that define the Indian economic, cultural and technological landscape at the present time.
CO 6:	Critical understanding of the global policies influencing Indian economy.
	<b>PH 111.4 PUBLIC ECONOMICS (60 hours)</b>
CO 1:	Perform economic policy analysis by applying microeconomic principles and theories
CO 2:	Theoretical and practical expertise on a selected field of Public Economics and competence in applying advanced economic theory and methods in investigating issues concerning Public Economics.
CO 3:	Use models to describe economic phenomena; analyze and make predictions about the impact of government intervention and changing market conditions on consumer and producer behavior and well-being.
CO 4:	Employ economic theory, broadly defined, to provide an original analysis of current or historical events, to analyze social problems, and evaluate alternative public policy choices.
CO 5:	Be aware of the complex nature of public finance reform – the political dimension, change management, capacity development, the constraining dimension of functional linkage. Be able to question the nature of relevance of some popularly promoted public finance reforms – such as performance budgeting, budgeting by objectives, activity-based budgeting.
CO 6:	Understand the idea of sequencing in public finance reform and improvement, and that any sequencing must be adapted to the situation in any country; identify why sequencing is important because "things" take time and "things" should take time.
	<b>PH 112.4: INDIAN ECONOMY (60 hours)</b>
CO 1:	Students are able to have a critical understanding of the Indian economy so that they may be able to engage meaningfully in debates regarding the country's economy
CO 2:	Understand the formulation of economic policies and its analysis.
CO 3:	Able to comprehend the broad contours like the status, issues and policies of the Indian economy at the aggregate as well as sectoral levels.

CO 4:	Describe the experiences in the pre as well as post reform years, keeping the colonial experience at the background.
CO 5:	Have a general understanding of the corporate, geo-political, cultural and social factors that define the Indian economic, cultural and technological landscape at the present time.
CO 6:	Critical understanding of the global policies influencing Indian economy.
<b>PS 114.4 ECONOMICS OF INSURANCE (50 hours)</b>	
CO 1:	Understand the insurance terminology and contract features.
CO 2:	Understand the concept of insurance and its evolution
CO 3:	Evaluate client insurance and risk management needs.
CO 4:	Understand the different needs of customers on insurance products
CO 5:	Identify and explain features of private and public insurance available to meet each identified need.
CO 6:	Understand the business operations and market condition in Insurance Companies
<b>PS 115. 4: OPERATIONS RESEARCH FOR ECONOMIC ANALYSIS (50 hours)</b>	
CO 1:	Able to understand the usefulness of operations research in solving economic problems.
CO 2:	Describe the various techniques of operations research.
CO 3:	Students are equipped to use the tools like transportation table, assignment to analyse and solve problems relating to cost, marketing, production etc.
CO 4:	Be able to understand the characteristics of different types of decision-making environments and the appropriate decision making approaches and tools to be used in each type.
CO 5:	Able to prioritise the specific use of the techniques of operations research.
CO 6:	Be able to design new simple models.
<b>PS 116.4 INTERNATIONAL FINANCE (50 hours)</b>	
CO 1:	Familiarity with financial concepts and analytical techniques and introduce their application to international transactions.
CO 2:	Ability to relate concepts and knowledge in different areas which support the learner to solve problems and help to take decisions in complex as well as changing environments.

CO 3:	Provide an in-depth understanding of the process and techniques used to make international investment decisions.
CO 4:	Ability to analyse the causes of historical exchange rate movements and apply the models to solve the wide range of current issues in international finance.
CO 5:	Review the problems of dealing in foreign currency and the advantages and disadvantages of overseas funding.
CO 6:	Obtain a good working knowledge of the crucial questions adjacent to international capital flows, FDI, foreign exchange rate determination and exposure management, international capital markets and institutions, and develop an understanding of the working of the financial management of a multinational firm.
<b>PS 117.4 RURAL BANKING (50 hours)</b>	
CO 1:	Understand the working of banks in rural areas.
CO 2:	Students get the knowledge of the credit structure in the rural economy.
CO 3:	Helps to understand the various problems of the rural economy without adequate credit facility.
CO 4:	Students are able to grasp the importance of various sources of rural credit in the development of an economy.
CO 5:	Assess the role of rural economy in the development of a nation.
CO 6:	Analyse the usefulness of effective policy measure in improving rural credit.

**MSC CORPORATE PSYCHOLOGY**

**PROGRAM OUTCOMES**

PO 1:	Prepare human resource professionals /Corporate psychologists with a multidisciplinary approach to address legal, ethical and multicultural issues and challenges in the corporate.
PO 2:	Develop leadership skills and core competencies required to stay ahead in the corporate / industry
PO 3:	Develop employability skills to manage global human resources
PO 4:	Contribute to employee performance, organizational effectiveness through a scientist practitioner approach
PO 5:	Build organizations by focusing on people, process, products and profits.
PO 6:	Engage actively in socially responsible activities to promote health, harmony, human welfare and well- being in the society.
PO 7:	Adopt and Display values of ethics and integrity in their organizational practices reflecting the core values of Jesuit education.

**PROGRAM SPECIFIC OUTCOMES**

PSO 1:	Demonstrate the ability to think critically and scientifically about human behaviour and apply this knowledge specifically in the work context.
PSO 2:	Competence in understanding and developing scientific and need based interventions to enhance human resource in the corporate sector.
PSO 3:	Design, develop and conduct training programs to enhance human resource in Organizations.
PSO 4:	Assess, Design and Conduct need based research in the organizational context.
PSO 5:	Examine, explain, recognize, and address multi-cultural issues in the organizations using proven theories and models.
PSO 6:	Design, Construct and standardize psychometric tools applicable to workplace setting.
PSO 7:	Explore, integrate, assess, learn and apply the skills and knowledge in real time through Internship in organizations.

**COURSE OUTCOMES**

**PH 551.1 PSYCHOLOGICAL PROCESSES (Hard Core)**

CO 1:	Understand the basic psychological processes underlying behavior.
CO 2:	Knowledge of how information is organized, synthesized and integrated.
CO 3:	Identify and manage emotions both at intra and interpersonal level to enhance the quality of relationship in personal and professional life
CO 4:	Apply the principles of learning to modify behaviour and enhance workplace productivity.
CO 5:	Recognize the subtle social forces at work like conformity, group influence, attitudinal and behavioural manifestations of social relations.
CO 6:	Analyze the dynamics of human behavior and individual differences in the work context.
CO 7:	Application of the psychological concepts to understand real time work place issues.
<b>PH 552.1 PSYCHOLOGICAL ASSESSMENT (Hard Core)</b>	
CO 1:	Understand the technical, ethical and legal foundations of psychological tests.
CO 2:	Compare the different methods of assessment and learn to use them effectively for the purpose of assessment.
CO 3:	Become aware of multicultural concerns related to testing, and integrate test scores into a meaningful communication in the form of a psychological report
CO 4:	Understand the basic statistical concepts which forms the basis for psychometric tool development
CO 5:	Competence to develop a Psychological tool
CO 6:	Critique psychometric instruments with respect to normative data provided in the technical manual
CO 7:	Competence to assess workplace behavior and write reports of psychological assessment following APA guidelines
<b>PH 553.1 HUMAN RESOURCE MANAGEMENT (Hard Core)</b>	
CO 1:	Understand the significance of Human Resource Management in growing competitive economy.
CO 2:	Use the tools and techniques of Human resource management in the selection and recruitment process
CO 3:	Explain the process of career development and succession planning
CO 4:	Analyze the methods of performance appraisal and errors in evaluation
CO 5:	Assess training needs and plan training programs
CO 6:	Explain and suggest relevant compensation methods in organizations
CO 7:	Apply principles of Psychology to enhance human resource in organizations

<b>CPH 554 .1P PSYCHOMETRIC TESTING - I (Hard Core)</b>	
CO 1:	Describe the history and process of test construction of different psychological tests
CO 2:	Familiarize with the various psychological constructs applicable to workplace set up
CO 3:	Measure components of personality and compare it with the normative data in the organizational context.
CO 4:	Apply test in the workplace context to determine the quality of work life balance, organizational climate, wellbeing tests, motivation, Emotional Intelligence and Job value
CO 5:	Administer psychological tests, analyze and write test reports.
CO 6:	Use psychometric tools to assess employees at different levels based on the need of the organizations.
<b>PH 555.1P INTERPERSONAL SKILLS TRAINING - I (Hard Core)</b>	
CO 1:	Have a positive attitude towards work and relationship
CO 2:	Articulate their thoughts verbally and in writing
CO 3:	Develop skill sets necessary for good interpersonal communication
CO 4:	Become reliable, responsible and empathetic leaders who will align with the organizational goals
CO 5:	Impart life skills training effectively in the organizations and social situations
CO 6:	Develop need-based modules for the corporate
CO 7:	Trained to be trainers
<b>PS 556.1 ORGANIZATIONAL PSYCHOLOGY (Soft Core)</b>	
CO 1:	Understand the complicated systems of individual and group psychological processes involved in the world of work
CO 2:	Connect and apply the basic principles of Industrial / Organizational Psychology to Personnel and Human Resource management within organizations
CO 3:	Adopt a scientist practitioner approach in organizations, design and conduct need based research.
CO 4:	Analyze the relevance of motivation theories and suggest interventions to enhance motivation in employees

CO 5:	Identify the cause of counterproductive behaviour and suggest strategies to promote productive behaviour
CO 6:	Enhance worker wellbeing by identifying and addressing maladaptive behaviours at the workplace.
<b>SEMESTER II</b>	
<b>PH 551.2 TRAINING AND DEVELOPMENT (Hard Core)</b>	
CO 1:	Describe the importance and need of training and development in the organization and challenges associated with implementation of training programmes
CO 2:	Assess the training needs in the organization at different levels and explaining the process of training needs assessment
CO 3:	Learn the process of training design and analyse the effectiveness of various methods to deliver the training programme
CO 4:	Analyze the various methods of training evaluation and determine the cost and benefits of training to the organization
CO 5:	Knowledge of strategic training programme and assessing the requirement of different strategic training methods and management development programmes
CO 6:	Explain different models of training department and understand its implications in the future of training in the organization
CO 7:	Compare the benefits and limitations of inbuilt training program and outsourcing of training in the Organization
CO 8:	Design need-based training Programs
<b>PH 552.2 CORPORATE CULTURE AND DIVERSITY (Hard Core)</b>	
CO 1:	Understand the importance of culture in organizations
CO 2:	Connect the concept of culture with corporate firms and cross-cultural aspects
CO 3:	Identify and evaluate the underlying psychological processes involved in organizations in the changing cultural context
CO 4:	Analyze the mechanism of communication in cross cultural corporate setup and the impact of corporate culture upon organizational communication
CO 5:	Compare the global teams in connection with ethics in international context
CO 6:	Evaluate the concept of foreign assignments and challenges.
CO 7:	Learn strategies to manage cultural diversity in organizations

<b>PS 553.2 RESEARCH METHODOLOGY,ETHICS AND STATISTICS (Soft Core)</b>	
CO 1:	Competent knowledge base in scientific thinking and Scientific method as a model for research
CO 2:	Strong theoretical foundations in quantitative and qualitative research methods.
CO 3:	Understand, describe and use the various traditions of research methodologies in organizational psychologyand engage in context based multidisciplinary research.
CO 4:	Competent in writing research proposal, design and conduct research
CO 5:	Analyses of data using advanced software and statistical tools.
CO 6:	Critically analyze the findings, Report the findings, and implement them.
<b>PS 554.2 ORGANISATIONAL BEHAVIOUR (Soft Core)</b>	
CO 1:	Manage and develop human resources at work.
CO 2:	Understand work place behavior through micro and macro perspectives in organizations.
CO 3:	Discuss strategies to manage the workforce to achieve greater results.
CO 4:	Assess the impact of power and politics on employee'sbehaviour at the workplace
CO 5:	Describe the various types of organizational structure and identify the limitations and strengths of different organizational structures
CO 6:	Develop the ability and skill to identify and modify conflict causing situations at the workplace and strategies of negotiation
<b>PS 555.2 MANAGERIAL ECONOMICS (Soft Core)</b>	
CO 1:	Understand Fundamentals of Economics and its relation to complex business realities
CO 2:	Associate the current economic phenomena with existing theory and contemporary economic issues.
CO 3:	Explain the cost of choices and trade-offs and demonstrate how changes in the determinants of supply and demand affect the equilibrium price and quantity of a good or service.
CO 4:	Enumerate short run and long run costs, associate economies and dis economies of scale to returns to scale.
CO 5:	Calculate and graphically illustrate the firms fixed, variable, averagemarginal and total cost, and determining the profit maximizing output level.
CO 6:	Apply the principle of macroeconomics in explaining the behavior of macro-

	economic variables at national as well as global level.
<b>PS 556.2P PSYCHOMETRIC TESTING II (SOFT Core)</b>	
CO 1:	Describe the history and process of test construction of different psychological tests
CO 2:	Familiarize with the various psychological constructs applicable to workplace set up
CO 3:	Apply test in the workplace context to determine motivation, leadership, strategic talent management, human resource development and job involvement.
CO 4:	Prepared to handle HR issues through simulation exercises in collective bargaining, in basket Exercises, leaderless group discussion.
CO 5:	Administer psychological tests, analyze and write test reports.
CO 6:	Use psychometric tools to assess employees at different levels based on the need of the organizations
<b>PS 557.2P INTERPERSONAL SKILLS TRAINING LAB II (SOFT Core)</b>	
CO 1:	CO 1 Have a positive attitude towards work and relationship
CO 2:	CO 2 Articulate their thoughts verbally and in writing
CO 3:	CO 3 Develop skill sets like assertiveness, conflict resolution, team building necessary for good interpersonal communication
CO 4:	CO 4 Become reliable, responsible and empathetic leaders who will align with the organizational goals
CO 5:	CO 5 Impart life skills training effectively in the organizations and social situations
CO 6:	CO 6 Develop need-based modules for the corporate
CO 7 :	Trained to be trainers
<b>PO 558.2 BEHAVIOUR AND SOCIETY (Open Elective)</b>	
CO 1:	Understand how people think, feel and act in the social context
CO 2:	Describe how individuals think about, influence and relate to one another
CO 3:	Analyse the outcome of social interactions on impression formation, attitude, prejudice, romantic attraction, friendship and aggression
CO 4:	Discuss and analyze the reasons for social conflicts and steps to alleviate conflicts

CO 5:	Assess the reasons for prosocialbehaviour and strategies to enhance helping behaviour
CO 6:	Apply the principles of social psychology to challenge prejudice, discrimination, stereotype attitudes and promote peace
<b>SEMESTER III</b>	
<b>PH 551.3 CORPORATE LEADERSHIP (Hard Core)</b>	
CO 1:	Understand leadership and various leadership processes
CO 2:	Learn various leadership models and their efficiency
CO 3:	Compare different leadership styles, theories, and business leaders
CO 4:	Analyze changing role of a leader and the relationships between leader – followers and leader - situations
CO 5:	Evaluate ethical leadership and its impact on society
CO 6:	Challenge Gender stereotypes and accept the role and contributions of women corporate leaders
CO 7:	Develop leadership abilities
<b>PH 552.3 ORGANISATIONAL CHANGE AND DEVELOPMENT (Hard Core)</b>	
CO 1:	Synthesize theories and models of organizational behaviour, organisational change and development and their critiques
CO 2:	Identify and describe the historical and contemporary transformations impacting the workplace and how those factors impact organizations and their work
CO 3:	Apply principles of systems thinking and relevant theories that are foundational to organizational change, current research concerning individuals, groups, and organizations to the process of change
CO 4:	Recognize common symptoms and reactions to change in the workplace and recommended interventions to address the reactions/resistance
CO 5:	Critique the range of change interventions in relation to their appropriateness to a range of research and evaluate critically the impact organisational change interventions at all levels of an organisation
CO 6:	Evaluate and assess an organizational change program & Develop an awareness of influencing and facilitating change
CO 7:	Design and plan the implementation of multiple OD interventions & enact human relations principles in the change process
CO 8:	Understanding the impact of technological interventions and the way it facilitates change
<b>PS 553.3 CORPORATE REPORTING AND ACCOUNTABILITY (Soft Core)</b>	
CO 1:	Understand the basics of accounting with practical experience.

CO 2:	Assess various financial statements and its applicability in corporate sector.
CO 3:	Analyze various Managerial accounting tools with practical knowledge.
CO 4:	Understand financial reporting and its relevance in corporate accountability.
CO 5:	Examine the various psychological factors influencing accounting scams with case analysis.
CO 6:	Assess corporate accountability with relevant financial and managerial accounting tools.
<b>PS 554.3 CORPORATE ETHICS AND GOVERNANCE (Soft Core)</b>	
CO 1:	CO 1 Understand the basics of ethics, ethical dilemma and concepts of corporate
CO 2:	Governance.
CO 3:	CO 2 Discuss the role of ethics in different departments in corporate setup.
CO 4:	CO 3 Evaluate and develop CSR models and practice in professional lives.
CO 5:	CO 4 Discuss, analyze and apply the various models of governance
CO 6:	CO 5 Analyze corporate governance practice in India and internationally.
CO 7:	CO6 Demonstrate the ability to apply the core principles of governance like accountability, responsibility and transparency.
<b>PS 555.3 INDUSTRIAL RELATIONS AND LABOUR LAWS</b>	
CO 1:	Understand the evolution and development of Industrial Relations and the history of enactments of Labour laws in India.
CO 2:	Describe the different roles of stake holders in Industrial Relations in India.
CO 3:	Explain the causes of industrial conflicts and the role of various stake holders in resolving industrial Conflicts
CO 4:	Aware of the statutory provisions for working conditions, health, and safety of workforce in India and provisions relating to the Trade unions, retrenchment, lay-offs, and lockouts
CO 5:	Prepare payroll and monitor social security measures.
<b>PS 556.3 MARKET BEHAVIOUR AND ANALYSIS (soft core)</b>	
CO 1:	Understand the behavior of consumers within the marketing system in a society
CO 2:	Analyze the underlying psychosocial processes involved in consumer behavior
CO 3:	Explain the different consumer decision making models, its uses and limitations.
CO 4:	Aware of ethical considerations while influencing the buyers' decisions to acquire things.
CO 5:	Understand and analyse brand personality image through personality theories
CO 6:	Apply the understanding of consumer decision making process to enhance sales

<b>PS 557.3P CORPORATE COUNSELLING (Soft Core)</b>	
CO 1:	Understand the need for Employee counselling and learn the working of employee Assistance Programs in organizations and its limitations
CO 2:	Develop core conditions and skills in counselling (both basic and advanced) by Practicing hypothetical case scenarios.
CO 3:	Compare and use different counselling models to suit the issues and the needs of the client
CO 4:	Use Transactional analysis and Rational emotive cognitive behaviour therapeutic techniques
CO 5:	Conduct counselling sessions independently, identify addictive behaviors and initiate the process of referrals for admission to hospitals and rehabilitation centers.
CO 6:	Conduct psycho education sessions to maintain psychological and social well-being of employees
CO 7:	Follow the ethical code of conduct of APA while conducting counselling sessions.
<b>PS 558.3P CORPORATE SELECTION AND DEVELOPMENT (Soft Core)</b>	
CO 1:	Understand the role of HR department/HR professional in the organization
CO 2:	Learn the HR cycle from Recruitment to exit interview
CO 3:	Compare the best HR practices and strategies applicable to different industries
CO 4:	Trained to recruit, retain and manage talent, as an entry level HR professional.
CO 5:	Apply the knowledge gained in the entire course to practical use. (HRM, Labour Laws, Organization Behaviour , Training and Development,
<b>PO 559.3 BASIC COUNSELING SKILLS (Open Elective)</b>	
CO 1:	Describe the difference between counselling and other forms of communication
CO 2:	Compare the application of different Psychological theories in counselling
CO 3:	Practice and adopt the skills required for better communication
CO 4:	Describe the stages involved in the process of counselling
CO 5:	Challenge and embrace universal human values for better interpersonal relations.
CO 6:	Incorporate Counselling skills in everyday interaction.
<b>SEMESTER IV</b>	
<b>DISSERTATION</b>	
CO 1:	Apply knowledge of psychological research in the field of human resource management

CO 2:	Develop research skills in organizational research
CO 3:	Competent to identify research problems in the field of corporate psychology
CO 4:	Conduct need based organizational research (Evidence based research)
CO 5:	Suggest research-based interventions to real time organizational issues.
<b>INTERNSHIP</b>	
CO 1:	Practical training enables the trainees to achieve high level of competency and skill to work in organizations
CO 2:	Develop an appreciation for the linkage between organization and its macro environm
CO 3:	On the job training exposure in HR practices in different types of organizations so as
CO 4:	to reduce the gap between theory and practice
CO 5:	Apply, evaluate and debate theory and practice of Psychological principles and Human resource Management in organizations
CO 6:	Job Ready and opportunity for employment.

**MA JOURNALISM AND MASS COMMUNICATION****PROGRAM OUTCOMES**

PO 1:	Demonstrate an understanding of Conceptual and Theoretical aspects of Journalism and Mass Communication.
PO 2:	Develop thoughts and idea for multiple formats including print, audio/visual and digital media.
PO 3:	Apply analytical and vertical thinking to formulate solutions to contemporary societal issues.
PO 4:	Inculcate a robust understanding of the practical aspects of writing skills, which forms the basis of all other media.
PO 5:	Acquire reporting and editing skills for print, audio/visual and digital platforms.
PO 6:	Demonstrate in-depth knowledge of emerging media platforms such as blogs, microblogs, business networking, digital video, digital photography, augmented / virtual reality.
PO 7:	Understand and apply concepts of professionalism, ethics and morality in various media platforms.
PO 8:	Acquire skills to understand and appreciate multicultural issues and evaluate social and ethical role of the media.
PO 9:	Create industry standards creative campaigns in advertising, public relations, digital media marketing, podcasting etc.
PO 10:	Analyse working of media and infotainment industries through research based studies and project work.

**PROGRAM SPECIFIC OUTCOMES**

PSO 1:	Improved communication and media production skills.
PSO 2:	Adequate theoretical and practical knowledge (technical and application oriented) to be employable in media industry.
PSO 3:	Ability to demonstrate social concerns, professional ethics and competence to aid in progress and development of the society.
PSO 4:	Awareness of environmental, developmental, women and gender related aspects of media industry and its impact on society.
PSO 5:	Ability to analyse, apply and evaluate latest technologies to solve problem in media industry and innovate sustainable solutions for future.

**COURSE OUTCOMES****I Semester****THEORIES OF COMMUNICATION**

CO 1:	Trace the development of theoretical inquiry critically in the field of communication
CO 2:	Inculcate knowledge of basic theories in the various areas of study within the communication discipline
CO 3:	Recognize how communication theories apply outside of the classroom and in research

CO 4:	Analyse the effects mass media on socio-economic fabrics of a society
CO 5:	Students create their own models of communication
<b>CORPORATE COMMUNICATION AND PUBLIC RELATIONS</b>	
CO 1:	Understand and demonstrate the use of basic and advanced corporate communication techniques that today's business communication demands
CO 2:	Apply conceptual thinking in the area of corporate communication and public relations.
CO 3:	Create strategic corporate communication and public relations campaigns using effective research and development tools and techniques
<b>ADVANCED REPORTING &amp; EDITING</b>	
CO 1:	Inculcate writing skills for media and other intellectual pursuits.
CO 2:	Demonstrate comprehensive knowledge of journalistic skill of reporting and editing
CO 3:	Develop critical and analytical skills while writing for and producing a newspaper
CO 4:	Daily analysis of newspaper coverage to understand the nuances of print media industry
<b>DEVELOPMENT OF MEDIA</b>	
CO 1:	Understand the nuances of communication and its development through multiple communication revolutions
CO 2:	Develop a comprehensive knowledge of media history in the, international, national and regional contexts.
CO 3:	Make media studies as a relevant filed of interest from the historical point of view.
CO 4:	Assess and evaluate the current trends and challenges faced by the Indian media
<b>MEDIA LAW AND ETHICS</b>	
CO 1:	Comprehension and upholding of constitutional values and principles for effective and authentic media profession.
CO 2:	Develop sincerity and credibility in media profession and inculcate ethical values in any field of media profession
CO 3:	Acquire comprehensive understanding of media laws and safe guard them in daily profession.
<b>COMMUNICATION RESEARCH METHODS</b>	
CO 1:	Inculcate the rigour of research techniques and methods at masters programme level
CO 2:	Evaluate and utilise statistical tools employed while conducting research
CO 3:	Demonstrate research acumen by creating research proposals and quasi

	research projects
CO 4:	Make research an enjoyable task and a multidisciplinary exercise
<b>INTRODUCTION TO AUDIO VISUAL MEDIA</b>	
CO 1:	Produce communications for different audiences and purposes through audio visual media using a variety of technologies
CO 2:	Plan and create in-depth, research-based broadcast pieces
CO 3:	Create and evaluate broadcast packages with the elements of sound, interviews, videography, and narration (written script)
<b>FILM STUDIES</b>	
CO 1:	Impart a fundamental understanding of film form and technique, including a knowledge of basic film terms.
CO 2:	Appreciate and utilize different methodological approaches to film
CO 3:	Analyse and write about film and incorporate appropriate film terminology and film scholarship into the writing.
CO 4:	Apply narrative principles in students' film works.
<b>DEVELOPMENT COMMUNICATION</b>	
CO 1:	Understand development issues and programmes in India and make efforts in critically evaluating them
CO 2:	Comprehend the theories and models related to Development Communication.
CO 3:	Inculcate an optimal sense of social responsibility as media professionals.
CO 4:	Develop media tools or messages to propagate sustainable development and social change.
<b>BROADCAST AND COMMUNICATION (CBCS)</b>	
CO 1:	Understand the basics of communication and broadcast media
CO 2:	Produce communications for different audiences and purposes through audio visual media using a variety of technologies
CO 3:	Comprehend and evaluate broadcast packages with the elements of sound, interviews, videography, and narration (written script)
<b>TRAVEL JOURNALISM (CBCS)</b>	
CO 1:	Explore and understand the concepts and importance of travel journalism

CO 2:	Develop technical skills in writing and photography for creating travel blogs
CO 3:	Understand travel and tourism trends in the contemporary world
CO 4:	Generate interest for tourism and cultural exposure in India
<b>III SEMESTER</b>	
<b>TELEVISION PRODUCTION (SPECIALIZATION 1)</b>	
CO 1:	Develop advanced skills and techniques in television production
CO 2:	Understand and equip the different stages of pre-production, production and post production in television industry
CO 3:	Expedite the role of crew and talents in television production through role-play and real life industry projects
<b>DIGITAL JOURNALISM(SPECIALIZATION)</b>	
CO 1:	Develop creative online content and create reliable platform for them
CO 2:	Learn to host and manage a full-fledged blog creating visibility and publicity of their contents
CO 3:	Evaluate and implement the web design principles and promote them on different digital platforms
<b>DIGITAL MEDIA MARKETING (SPECIALIZATION 3)</b>	
CO 1:	Understand how and why to use digital marketing for multiple goals within a larger marketing and/or media strategy
CO 2:	Evaluate and apply techniques to plan content marketing, develop content for different target audience, and measure its impact.
CO 3:	Develop knowledge of Google Analytics and other marketing analytics tools to help get started with website data analytics.
<b>RADIO PRODUCTION (SPECIALISATION 4)</b>	
CO 1:	Understand the functioning radio medium and produce relevant radio programmes.
CO 2:	Develop socially relevant radio programmes
CO 3:	Create recognizable presence of students on the campus based community radio- Sarang.
CO 4:	Analyse the functioning of different radio stations in the city and during the industrial tours and encourage students on job opportunities in radio programme production

<b>KANNADA LANGUAGE PRESS (SPECIALISATION 5)</b>	
CO 1:	Discover the relevant role played by journalism in Kannada and develop a taste for it
CO 2:	Create or produce and effective journalistic content and publish them on relevant platforms.
CO 3:	Inculcate the knowledge and journalism skills with the undergraduate students through peer learning.
<b>MALYALAM LANGUGAE PRESS (SPECIALISATION 6)</b>	
CO 1:	Discover the relevant role played by journalism in regional languages, especially in Malayalam and develop a taste for it.
CO 2:	Create or produce and effective journalistic content and publish them on relevant platforms.
CO 3:	Inculcate the knowledge and journalism skills with the regional undergraduate students through peer learning and critically analyse them.
<b>CREATIVE STRATEGY &amp; COMMUNICATION</b>	
CO 1:	Inculcate knowledge about the theoretical foundations of creative strategy in advertising and marketing communications.
CO 2:	Exposure to the issues and concerns in creative strategy and research.
CO 3:	Identify and evaluate key concepts within the professional and academic fields of modern-day creative strategy and communication.
<b>ADVERTISING AND MARKETING COMMUNICATION</b>	
CO 1:	Inculcate a working knowledge and knowhow about marketing communications strategies and techniques
CO 2:	Develop marketing communication strategies along with planning and implementation
CO 3:	Evolve ability to solve real marketing communication problems by using scientific methods and procedures
<b>ENVIRONMENT AND MEDIA</b>	
CO 1:	Develop a comprehensive knowledge with regard to environment issues and programmes across the world.
CO 2:	Learn about environmentalists and get into environmental advocacy through different media fields.

CO 3:	Develop a keen eye for current environment trends and news and respond to them effectively
CO 4:	Organise environmental media campaigns on different media platforms.
<b>FILM APPRECIATION (CBCS)</b>	
CO 1:	Learn various components of film and film making and appreciate them from a critical point of view
CO 2:	Develop a hands on knowledge in writing film scripts and compare them with reviewed films
CO 3:	Identify different aspects of films like – mise-en-scene and film making techniques in pre production, production and post-production period.
<b>GENDER AND MEDIA (CBCS)</b>	
CO 1:	Learn various components of film and film making and appreciate them from a critical point of view
CO 2:	Develop a hands on knowledge in writing film scripts and compare them with reviewed films
CO 3:	Identify different aspects of films like – mise-en-scene and film making techniques in pre production, production and post-production period.
<b>IV SEMESTER</b>	
<b>DISSERTATION</b>	
CO 1:	Develop research interest and culture in respective field of study
CO 2:	Explore the social relevance and application of their respective subject
CO 3:	Inculcate knowledge and exposure area of study
CO 4:	Conduct in-depth study of a particular issue and explore solution to the societal problems through media research.
<b>ONLINE BROADCASTING (SPECIALIZATION-1)</b>	
CO 1:	Discover the research methods utilized in gathering data for developing and evaluating online broadcasting strategy
CO 2:	Evaluate and analyse audio and video techniques to enhance online productions.
CO 3:	Develop an awareness and appreciation of ethical pitfalls of online broadcasting.
<b>MAGAZINE JOURNALISM (SPECIALIZATION)</b>	

CO 1:	Identify and apply the principles of graphic design to magazines.
CO 2:	Develop a correlation between editorial content and visual presentation specific to magazines
CO 3:	Identify stories that lend themselves to different kind of presentations, including photos, audio, video and infographics.
<b>INSTRUCTIONAL DESIGNING AND CONTENT WRITING (SPECIALIZATION 3)</b>	
CO 1:	Evaluate various technology skills with application of learning theory to maximize the effectiveness of education.
CO 2:	Analyse diverse models of instructional design and content writing best practices
CO 3:	Create effective business and technical content through related content writing and techniques.
<b>PROJECT</b>	
CO 1:	Develop industry standard projects in the field of student's chosen field of specialization
CO 2:	Understand how to contribute to society's progress and development through practical implication of media concepts.
CO 3:	Inculcate crucial industry specific attitudes like project management, time management and stress management.
<b>MEDIA AND CULTURE STUDIES</b>	
CO 1:	Develop a critical perspective towards culture and hegemony.
CO 2:	Evaluate the relationship between power and media, which promotes cultural traits in society
CO 3:	Analyze the relationship between visual culture and global capitalism
CO 4:	Develop skills to carry out cultural analysis of media
<b>POLITICAL COMMUNICATION</b>	
CO 1:	Evaluate the key concepts and theories in political communication
CO 2:	Understand the fundamental strand of political communication science
CO 3:	Develop knowledge of practical aspects and paradigms of political communication science
CO 4:	Analyse mediatisation of politics in elections, campaigns and how media used to achieve policy goals.

<b>MSW</b>	
<b>Programme Outcomes (PO)</b>	
PO 1	Demonstrate professional knowledge of Social Work
PO 2	Demonstrate value based professionalism and volunteerism
PO 3	Demonstrate the skills to practice Professional Social Work
PO 4	Will demonstrate professional knowledge of Social Work
PO 5	Demonstrate value based professionalism and volunteerism
PO 6	Our graduates will demonstrate the skills to practice Professional Social Work
<b>Programme Specific Outcomes (PSO):</b>	
PSO 1	Gain understanding into the needs of individuals, families, groups and communities and design Social Work intervention strategies
PSO 2	Understand and analyze the structure and functions of various social, economic and political institutions
PSO 3	Understand the significance of methods of Social Work Profession
PSO 4	Acquire values and ethics of Social Work Profession
PSO 5	Develop concern and commitment for marginalized sections of the society
PSO 6	Internalize social justice, cultural pluralism and democratic participation while reaching out to marginalized
PSO 7	Develop skills of practicing methods of Social Work and addressing social problems at micro and macro levels
PSO 8	Develop skills of programme development, management and research
PSO 9	Develop skills of effective communication at various levels in their professional life
PSO 10	Gain understanding into the needs of individuals, families, groups and communities and design Social Work intervention strategies.
PSO 11	Understand and analyze the structure and functions of various social, economic and political institutions
PSO 12	Understand the significance of methods of Social Work Profession
PSO 13	Acquire values and ethics of Social Work Profession
PSO 14	Develop concern and commitment for marginalized sections of the society
PSO 15	Internalize social justice, cultural pluralism and democratic participation

	while reaching out to marginalized
PSO 16	Develop skills of practicing methods of Social Work and addressing social problems at micro and macro levels
PSO 17	Develop skills of programme development, management and research
PSO 18	Develop skills of effective communication at various levels in their professional life
<b>SEMESTER I</b>	
<b>PH201.1 - SOCIAL WORK: HISTORY AND IDEOLOGIES</b>	
CO 1	Understand the history and evolution of Social Work Profession both in India and in the West
CO 2	Differentiate between professional and voluntary Social Work
CO 3	Demonstrate the knowledge on methods of Social Work
CO 4	Recognize the trends in Social Work practice
<b>Paper: PH 202.1 - CASE WORK PRACTICE</b>	
CO 1	Acquire proficiency in basic concepts of Social Case Work practice
CO 2	Obtain effective qualities to establish harmonious relationship between the client and the society
CO 3	Critically analyze problems of individuals and families and various determinants for human problems
CO 4	Obtain therapeutic knowledge and skills to work in various settings
<b>Paper: PH 203.1: GROUP WORK PRACTICE</b>	
CO 1	Understand group work as a method of Social Work and its significance
CO 2	Display the knowledge on process, phases of group formation and will learn to identify and deal with the group dynamics
CO 3	Demonstrate skill of applying group work as a method of social work in social interventions
<b>PH 204.1 CONCURRENT FIELDWORK PRACTICUM - I</b>	
CO 1	Understand the functioning of social welfare agencies
CO 2	Understand and analyse various facilities available for people from Government, social institutions and voluntary organisations
CO 3	Learn the composition and needs of the community
<b>PS 205.1: DYNAMICS OF HUMAN BEHAVIOUR</b>	

CO 1	Acquire a clear understanding on the concepts of human behavior
CO 2	Gain a conceptual understanding into the various theories of development and its relevance.
CO 3	Analyse the changes throughout the life span stages and identify problems across these stages.
CO 4	Relate these developmental changes across the life span with real life situations.
<b>SEMESTER II</b>	
<b>PH 201.2 - COMMUNITY ORGANIZATION AND SOCIAL ACTION</b>	
CO 1	Understand community organization and social action as a method of Social Work
CO 2	Analyze the situation of subaltern groups and communities in our society
CO 3	Acquire skills of using participatory strategies of community development and social action
<b>PH 202.2: SOCIAL WORK RESEARCH AND STATISTICS</b>	
CO 1	Acquire knowledge of the scientific method of inquiry for the study of social phenomena
CO 2	Develop an understanding of the research process and basic research skills
CO 3	Demonstrate an understanding into the different methods of data collection and sampling.
CO 4	Gain knowledge of measures of central tendency, measures of dispersion, inferential statistics and its uses in Social work Research.
<b>PH 203.2 CONCURRENT FIELDWORK PRACTICUM- II</b>	
CO 1	Demonstrate the knowledge and skills of case work and group work practice and community organisation
CO 2	Acquire knowledge of research project and basic skills of research
CO 3	Learn the skills of liasoning between Government and people
<b>PS 204.2: SOCIAL SCIENCES PERSPECTIVES FOR SOCIAL WORK</b>	
CO 1	Understand the concepts, structure, institutions and processes of Indian Society.
CO 2	Demonstrate the knowledge on divergent perspectives and necessary skills for analyzing Indian Society.
CO 3	Develop critical insights on the social problems and challenges confronting Indian Society.

CO 4	Understand and analyze economic and political systems in India and society – economy –politics linkages.
<b>PO 205.2 INDIAN SOCIAL PROBLEMS AND INTERVENTIONS</b>	
CO 1	Develop insights into the problems faced by the vulnerable section of the society
CO 2	Analyse the impact of social issues on the individual and the community
CO 3	Demonstrate knowledge and skills to mitigate the problems at an initial level
CO 4	Understand the role of institutional services for the welfare of people
<b>SEMESTER III</b>	
<b>PH 201.3: SOCIAL WELFARE ADMINISTRATION</b>	
CO 1	Recognize the concept of social welfare and its relevance in modern India
CO 2	Analyse the role of social welfare services in societal well being
CO 3	Understand the functioning of social welfare Organisations
C O 4	Identify the key elements to manage an Organisation effectively
<b>PS 2023.3: HUMAN RIGHTS PERSPECTIVES FOR SOCIAL WORK</b>	
CO 1	Understand the concept of human rights and significant UN declarations on human rights
CO 2	Contextualise the violation of Human rights of the vulnerable and to apply Human Rights framework for their empowerment
CO 3	Demonstrate knowledge on the role of Social Work Profession in protecting human rights
<b>PH 203.3b: CONCURRENT FIELDWORK PRACTICUM - III</b>	
CO 1	Understand the functioning of a health setting
CO 2	Acquire skills in conducting case work (Medical /Psychiatric)
CO 3	Demonstrate skills of working with patient as well as family in the management of Patient
C O 4	Exhibit counselling skills and therapeutic treatment techniques to study and assess clients with psychological and socio-economic conditions
C O 5	Develop skills of planning and conducting health awareness programmes
C O 5	Demonstrate knowledge on documentation of interventions in health setting
<b>PS 204.3b: COUNSELLING: THEORY AND PRACTICE</b>	
CO 1	Understand the Holistic Concept of Counselling as a tool for help
CO 2	Recognize and synthesize attitudes and values that enhance investment of

	Self in the Counsellors' role
CO 3	Acquire knowledge and skills of using therapeutic approaches
C O 4	Articulate the role of a Counsellor as a professional in dealing with various issues of life and to work in different settings
<b>PS 205.3b: PSYCHIATRIC SOCIAL WORK</b>	
CO 1	Acquire knowledge on the concept of Mental disorders and Psychiatric Social work.
CO 2	Develop an understanding of the various classifications of Psychiatric disorders in children, adolescents and adults, their signs, symptoms, causes and Psycho social Interventions.
CO 3	Demonstrate knowledge and skills in the practice of Social work in Community Mental health and Rehabilitation.
C O 4	Gain knowledge on the legal provisions for Mental Health.
<b>PH 203.3C: CONCURRENT FIELDWORK PRACTICUM-III</b>	
CO 1	Exhibit skills of dealing with human resources for Organisational Development
CO 2	Understand the working conditions and mechanisms of Human Resource Development for employee welfare
<b>PS 204.3c: HUMAN RESOURCE MANAGEMENT AND DEVELOPMENT</b>	
CO 1	Describe and analyse the role of HR Department in an Organisation
CO 2	Recognize the need for employee development function
CO 3	Identify the challenges faced by the Human Resource professionals and understand ways to resolve it.
C O 4	Demonstrate knowledge and skills for people management
<b>PS 205.3c: LABOUR LEGISLATIONS AND INDUSTRIAL RELATIONS</b>	
CO 1	Understand various Labour legislations and Industrial Relations in India
CO 2	Interpret and apply relevant laws and acts in specific cases
CO 3	Critically reflect on issues, limitations and challenges confronting labor laws in India
C O 4	Gain Insights on labour problems and industrial relations in India and offer meaningful inputs for improvement of labour-industry relations
<b>PO 206.3a - HUMAN RIGHTS AND SOCIAL DEFENCE (Open Elective)</b>	

CO 1	Define and explain the concept of human rights and recognize the rights of various marginalized sections of society
CO 2	Apply human rights framework for understanding vulnerable groups
CO 3	Acquire competencies of using the legal provisions and social defence systems to protect the vulnerable
<b>SEMESTER IV</b>	
<b>PS 201.4: PROJECT PLANNING AND MANAGEMENT</b>	
CO 1	Acquire knowledge and skills to facilitate participatory project management
CO 2	Develop competency to facilitate process of participatory planning with varied groups.
CO 3	Imbibe values and attitudes that are essential for participatory projects for development
<b>PH 202.4a: CONCURRENT FIELDWORK PRACTICUM-IV</b>	
CO 1	Develop the skills of community organizer
CO 2	Learn the administrative tasks
CO 3	Inculcate professional values of community organizer
<b>PS 203.4a: EDUCATION FOR DEVELOPMENT</b>	
CO 1	Develop critical perspective on the system of formal as well as non-formal education.
CO 2	Acquire skills of designing educational programmes for varied groups of disadvantaged learners
CO 3	Develop Social Work strategies in the field of education.
<b>PS 204.4a CORPORATE SOCIAL RESPONSIBILITY</b>	
CO 1	Understand the concepts, need and functioning of CSR in India
CO 2	Analyze the CSR strategies of various corporate sectors of India
CO 3	Develop the skills and knowledge of managing CSR projects and socially responsible initiatives
<b>PH 202.4b: CONCURRENT FIELDWORK PRACTICUM - IV</b>	
CO 1	Understand the role of Psychiatric and Medical Social Worker in a health setting
CO 2	Acquire skills in conducting case assessment and diagnosis (Medical /Psychiatric)

CO 3	Specific Skills in working with patient as well as family in the management of patient
CO 4	Develop skills in planning and conducting health awareness programmes
CO 5	Demonstrate knowledge on documentation of interventions in health setting
CO 6	Exhibit knowledge on specific areas of Medical Social Work in health care settings
<b>PS 203.4b: WORKING WITH CHILDREN AND FAMILIES</b>	
CO 1	Gain understanding into the problems of children and adolescents and need for child welfare
CO 2	Demonstrate knowledge of various child welfare services, programmes, policies and legal provisions.
CO 3	Develop an understanding of the family life cycle stages, identify problems across these stages and Social work interventions.
CO 4	Gain insight into working with the changing families.
<b>PS 204.4b: MEDICAL SOCIAL WORK</b>	
CO 1	Demonstrate knowledge on communication strategies for promotion of health in prevention, care and management.
CO 2	Critically appraise policies, programmes and advocacy strategies of various national and inter-national organizations in the field of health and care services
CO 3	Articulate personal and professional values and promote skills required to perform as valued professionals in a multidisciplinary health settings
CO 4	Utilize community resources for purposes of consultation, collaboration, advocacy, referral, and networking on behalf of clients and families and reinforce the needs of clients.
<b>PH 202.4C: CONCURRENT FIELDWORK PRACTICUM-IV</b>	
CO 1	Acquire social work knowledge and professionalism in the areas of Human Resource Development
CO 2	Develop critical understanding on applicability of labour legislations in various organizational set- up
<b>PS 203.4c: EMPLOYEE WELFARE IN INDIA</b>	
CO 1	Demonstrate proficiency in the concept of Employee Welfare
CO 2	Relate the role of Human Resource professionals in development of employee

	conditions
CO 3	Propose and implement employee welfare programmes
CO 4	Interpret labour laws and apply provisions for employee/organisational development
<b>PS 204.4c: ORGANIZATIONAL BEHAVIOUR AND DEVELOPMENT</b>	
CO 1	Understand the concepts and foundations of organizational behaviour
CO 2	Develop capacity to analyze the motivations and implications of individual and group behaviour on organizations.
CO 3	Demonstrate knowledge on nature of organizational set up.
CO 4	Critically analyze the dynamics of organizational behaviour and to reflect on the essentials of organizational development
<b>PS205.4 RESEARCH PROJECT</b>	
CO 1	Understand the nature of social science research and its distinctive characteristics
CO 2	Understand the requirements and components of social science research
CO 3	Develop a critical perspective of the subject matter in the backdrop of review of literature
CO 4	Adopt appropriate plan and methodology for research, data collection and analysis relevant to research area and to organize research in accordance with the methodological requirements.

**M.Com****PROGRAM OUTCOMES**

PO 1:	Apply knowledge of management theories and practices to solve contemporary and complex business problems.
PO 2:	Ability to lead themselves and others in the achievement of business goals through value based leadership skills
PO 3:	Ability to analyse and communicate global, economic, financial, legal, and ethical aspects of business.
PO 4:	Understand the values of life-long learning.
PO 5:	Ability to work in a team of core competence or multidisciplinary teams.

**PROGRAM SPECIFIC OUTCOMES**

PSO 1:	Develop entrepreneurial skills through effective Industry Institute Interactions.
PSO 2:	Qualify in various competitive examinations related to career growth and succeed in procuring best opportunities in the corporate and academia

**COURSE OUTCOMES****Semester I****PH 311.1 Accounting Theory and Practice**

CO 1:	Evaluate the notions & ideas of thought that have shaped a theoretical basis for accounting.
CO 2:	Examine the relationship between accounting theory and practice.
CO 3:	Examine the role of Conceptual framework in the standard setting process.
CO 4:	Apply critical thinking by identifying and analyzing accounting issues using relevant accounting frameworks.
CO 5:	Prepare Financial Statements in accordance with appropriate standards.

**PH 312.1 Financial Management and Policy**

CO 1:	Demonstrate the applicability of the concept of Financial Management to understand the managerial Decisions and Corporate Capital Structure.
CO 2:	Familiarize with cost of capital and capital structure to support managerial decisions.
CO 3:	Apply the Leverage and EBIT EPS Analysis associate with Financial Data in the corporate.
CO 4:	Analyse the complexities associated with management of cost of funds in the capital Structure.

**PH 313.1 Income Tax**

CO 1:	Acquire profound clarity on concepts pertaining to personal tax.
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CO 2:	Understand relevance of investments to be made for better tax planning.
CO 3:	Recognize the modes of tax planning with respect to chosen occupation.
CO 4:	Inculcate decision making power in managing investments with regard to tax.
CO 5:	Decide on Investment gestation based on tax policies of the country.
<b>PS 314.1 Economic Environment and Policy</b>	
CO 1:	Recognize the state of any given economy based on sovereign characteristics.
CO 2:	Identify the modes of channelizing capital into the economy.
CO 3:	Understand, analyze and recommend policies for better economic framework.
CO 4:	Conceptual clarity on legal rights of individuals as citizens of the country pertaining to business.
<b>PS 315.1 Corporate Law, Ethics and Governance</b>	
CO 1:	Acquaint with the knowledge of corporate law and its administration in India.
CO 2:	Recognize the inherent conflict of interest in many business decisions and Demonstrate an understanding of common ethical problems in businesses.
CO 3:	Demonstrate a critical appreciation of the growing importance of corporate social responsibility and how it relates to corporate strategy.
CO 4:	Critically evaluate the concepts and committees of corporate governance.
<b>PS 316.1 - Quantitative Techniques for Decision Making</b>	
CO 1:	Understand managerial decision-making processes in organizations and appreciate the use of various quantitative techniques in making decision;
CO 2:	Apply quantitative techniques to solve a variety of business problems
CO 3:	Comprehend the concept of a Transportation Model and develop the initial solution for the same.
<b>PS 317.1 Working Capital Management</b>	
CO 1:	Analyse working capital management policies and their impact on the firm's profitability, liquidity and operating flexibility.
CO 2:	Understand the importance of working capital management and its role in meeting the firm's strategic objectives and value creation.
<b>Semester II</b>	
<b>PH 311.2 Corporate Accounting and Reporting</b>	
CO 1:	Build a solid foundation in accounting and reporting requirements.
CO 2:	Develop comprehensive understanding of the advanced issues in accounting for assets, liabilities and owner's equity.
CO 3:	Account for a range of advanced financial accounting issues.

CO 4:	Prepare the accounts of companies undergoing amalgamation & external reconstruction.
CO 5:	Prepare consolidated accounts for a corporate group.
CO 6:	Analyse the various issues & problems related to published financial statements.
<b>PH 312.2 Corporate Financing and Investment Decisions</b>	
CO 1:	Calculate the yearly cash flows of different types of capital budgeting project and evaluate how the choice of depreciation method affects the cashflows
CO 2:	Apply several capital budgeting techniques appreciating the strengths and weaknesses of the different techniques
CO 3:	Understand how to incorporate risk and uncertainty into capital budgeting decisions
CO 4:	Assess the factors affecting international investment decisions and opportunities presented to an organisation
CO 5:	Evaluate alternative sources of financing options and investment opportunities and their suitability in particular circumstances
<b>PS 313.2 Business Taxation</b>	
CO 1:	Acquire conceptual clarity in the model of GST.
CO 2:	Have sound knowledge on technical jargons in relation to the tax system.
CO 3:	Understand the channel of working of dual GST system.
CO 4:	Make the best advantage of the tax prospects provided through GST regime.
CO 5:	Have profound knowledge on Customs Act and the modes of assessment.
<b>PS 314.2 Business Statistics</b>	
CO 1:	Understand data and draw inference from data
CO 2:	Calculate and interpret statistical values by using statistical tool (correlation & regression)
CO 3:	Demonstrate an ability to apply various statistical tool to solve business problems
<b>PS 315.2 Research Methodology and Ethics</b>	
CO 1:	Identify research output with philosophical base and greater relevance to the society
CO 2:	Undertake quality research with scientific methodology
CO 3:	Produce good Research Reports
CO 4:	Undertake original Research following ethical guidelines and practices in conducting the research and publication of papers.
<b>PS 316.2 E-Business</b>	
CO 1:	Able to understand concepts of E-Commerce and E- business

CO 2:	Analyze different types of portal technologies commonly used in the industry.
CO 3:	Integrate theoretical frameworks with business strategies
<b>PO 318.2 Personal Finance and Investment Planning</b>	
CO 1:	Identify the major types of investment alternatives.
CO 2:	Describe how safety, risk, income, growth, and liquidity affect your investment decisions.
CO 3:	Figure out the future value of money using future value charts.
<b>Semester III</b>	
<b>PH 311.3 Equity Research and Security Market Operation</b>	
CO 1:	Explore different avenues of investment.
CO 2:	Understand the elements of Equity Research & different approaches to Security Analysis.
CO 3:	Understand the securities market & the trading systems in the market.
<b>PH 312.3 Mergers, Acquisitions and Corporate Restructuring</b>	
CO 1:	Analyse the challenges associated with each phase of the M&A process from developing acquisition plans through post-closing integration.
CO 2:	Apply financial modelling tools to evaluate mergers and acquisitions.
CO 3:	Understand how to create corporate value by restructuring a company or by combining businesses.
CO 4:	Equip with the knowledge of selecting appropriate takeover tactics depending upon the types of anti-takeover defenses.
CO 5:	Understand the impact of the regulatory environment on the M&A deals.
<b>PH 313.3 Investment Banking and Financial Services</b>	
CO 1:	Identify distinguishing features of investment banks and their working.
CO 2:	Learn the process and procedure involved in public issue and other alternate capital raising technique and the hands-on partnership with investment banks for the same.
CO 3:	Learn the techniques on meeting the statutory requirements from the perspective of an investment bank along with segregation of their duties and responsibilities.
CO 4:	Be skeptical and have practical approach towards choices made on use of alternative financial services.
CO 5:	Understand the relevance of third-party validation for business integrity.
<b>PS 314.3 Corporate Tax Planning</b>	
CO 1:	Describe how the provisions in the corporate tax laws can be used for tax planning.
CO 2:	Obtain a profound outline on corporate tax laws.

CO 3:	State the use of deductions of expenses to reduce the taxable income.
<b>PS 315.3 Contemporary Issues in Accounting</b>	
CO 1:	Identify & evaluate the issues related to the regulation of external financial reporting.
CO 2:	Research & analyse complex Contemporary financial accounting issues and formulate well reasoned and coherent arguments and reach well considered conclusions in relation to those issues.
CO 3:	Critically evaluate contemporary external company reporting practices
<b>PS 316.3 Insurance and Bank Management</b>	
CO 1:	Understand the risks faced by banks and ways to overcome them.
CO 2:	Understand how to choose life insurance policies based on their need
<b>PO 317.3 Entrepreneurial Development</b>	
CO 1:	Understand the function of an entrepreneur in the successful, commercial application of innovations
CO 2:	Confirm an entrepreneurial business idea
CO 3:	Identify personal attributes that enable best use of entrepreneurial opportunities
CO 4:	Explore entrepreneurial, leadership and management styles.
<b>Semester IV</b>	
<b>PH 312.4 International Financial Management</b>	
CO 1:	Attain proficiency in the working and need of international financial management and the global monetary systems.
CO 2:	Prepare and analyse BOP of a country and strategies to mitigate deficit.
CO 3:	Learn to be a shrewd dealer in forex market and understand the pitfalls of the system to make the best advantage of the market scenarios.
CO 4:	Assess the relevant risks adjacent to forex dealings and strategize for optimal management.
CO 5:	Learn on latest currency introduction ,working capital management and alternative modes of finance in international business.
<b>PH 313.4 Derivatives and Risk Management</b>	
CO 1:	Have a discussion and explain in detail derivatives products such as options, futures, swaps and other derivative securities.
CO 2:	Understand the importance of risk management and be able to describe the main tools for managing risks
CO 3:	Develop theoretical valuation methods to price futures and options.
CO 4:	Develop strategies to profit from mispriced derivative assets and Hedge underlying positions using derivatives

CO 5:	Explain the binomial model and its extension in continuous time to the Black-Scholes model.
CO 6:	Understand the mechanics of interest rate and currency swaps
<b>PH 314.4 Cost and Management Accounting</b>	
CO 1:	Critically analyse & provide recommendations to improve the operations of organisations through the application of management accounting techniques.
CO 2:	Demonstrate mastery of Costing Systems, Cost Management Systems and Performance Measurement Systems.
CO 3:	Demonstrate the need for a balance between financial and non – financial information in decision making, control and performance evaluation applications of management accounting.
CO 4:	Evaluate the costs and benefits of different conventional and contemporary costing systems
<b>PS 315.4 Portfolio Theory and Management</b>	
CO 1:	Value Debt & Equity instruments.
CO 2:	Design & manage bond as well as equity portfolios in the real world.
CO 3:	Measure the Portfolio Performance.
CO 4:	Practically apply the investment ideas of Warren Buffet, Benjamin Graham, John Bogle and John Templeton to an equity investment strategy in the Indian context.
<b>PS 316.4 Computer Applications in Business</b>	
CO 1:	Explain the guiding principles of professional behavior in computing
CO 2:	Expertise in the marketing strategies involved in E-Business
CO 3:	Explain the concepts and terminology used in the operation of application systems in a business environment
<b>PS 317.4 Marketing Management</b>	
CO 1:	Interpret complex marketing issues and problems using relevant theories, concepts and methods.
CO 2:	Critically evaluate the marketing function and the role it plays in achieving organisational objectives.
CO 3:	Analyse external and internal marketing environment and identify and prioritise appropriate marketing strategies

**M.Com (Finance and Analytics)****PROGRAM OUTCOMES**

PO 1:	Apply knowledge of Accounting, Finance, Taxation and Business principles and concepts to complex business situation and problems
PO 2:	Reach to conclusions on problems using the principles of accounting, finance and analytical tools
PO 3:	Possess knowledge, skill and abilities so as to realize potential for employment and meet requirements of industry
PO 4:	Apply ethical principles and commits to professional ethics and norms of the practice in the field of accounting , finance and taxation
PO 5:	Develop a sense of inquiry and capability for asking relevant/appropriate questions, problematizing, synthesising and articulating; Ability to recognise cause-and-effect relationships, define problems, formulate hypotheses, test hypotheses, analyse, interpret and draw conclusions from data, establish hypotheses, predict cause-and-effect relationships; ability to plan, execute and report the results of an experiment or investigation
PO 6:	Possess knowledge of the values and beliefs of multiple corporate cultures and a global perspective; and capability to effectively engage in a multicultural society and interact respectfully with diverse groups.

**PROGRAM SPECIFIC OUTCOMES**

PSO 1:	Develop an understanding of the concepts, principles and provisions of income-tax law, goods and services tax law, and international taxation, and to apply such knowledge to make computations and address application oriented issues.
PSO 2:	Develop the capability to use ICT in a variety of learning situations, access and evaluate relevant information sources using Microsoft Excel, Tally Prime, SPSS and R for analysis of data
PSO 3:	Develop the ability to apply financial management theories and techniques in strategic decision making.
PSO 4:	Understand the financial services rendered by intermediaries and banks and their role and activities in the financial market in general and capital markets in particular and apply such knowledge to address issues in practical scenarios.

PSO 5:	Develop the ability to apply specific accounting standards and legislations to different transactions and events, in preparation and presentation of financial statements of various business entities.
PSO 6:	Develop skills of analysis, synthesis and evaluation in cost management to address challenges and issues which influence the management of performance and decision making within organisations.
<b>COURSE OUTCOMES</b>	
<b>I Semester</b>	
<b>PH 353.1 - Income tax</b>	
CO 1:	Summarize the basics of taxation and process of computing residential status.
CO 2:	Critically examine exemptions and Scope of total income
CO 3:	Calculate taxable income under different heads
CO 4:	Analyse Clubbing and Set off of losses
CO 5:	Calculate tax liability of Individuals along with deductions available.
<b>Economic Analysis for Decision making</b>	
CO 1:	Describe the nature and scope of managerial economics
CO 2:	Apply the micro and macroeconomic concepts for analysing effective functioning of a Firm and Industry.
CO 3:	Examine demand and supply analysis and growth model of the firm.
CO 4:	Discuss the techniques of production function and cost analysis
CO 5:	Apply the pricing techniques to determine the price of factors of production in different market forms
CO 6:	Describe the business cycles in the open economy and its impact of the firm
<b>Financial Statement Analysis</b>	
CO 1:	Explain the Legal requirements of financial statements
CO 2:	Analyse the accounting concepts applicable to Balance Sheet and Income Statements
CO 3:	Demonstrate the Meaning of Ratio and Ratio Analysis and types
CO 4:	Preparation of Cash flow and Fund Flow Statement
CO 5:	Demonstrate advantages of consolidated financial statements; AS – 21;

	consolidation procedure
CO 6:	Discuss need for inflation accounting; limitations of historical accounting
<b>Financial Management Policy</b>	
CO 1:	Explain the role of finance in the business.
CO 2:	Analyse the different components of cost of capital and dividend Policy.
CO 3:	Study leverages and capital structure Theories.
CO 4:	Analyse the different components of cost of capital and dividend Policy.
CO 5:	Explain the concept financial planning and strategic financial planning
<b>Working capital management</b>	
CO 1:	Explain the concept , objectives and the components of working capital management
CO 2:	Demonstrate the different Working Capital needs of different types of business, Factors determining Working Capital requirements
CO 3:	Describe the basic principles of cash management and budgeting
CO 4:	Analyse the sources of working capital finance
CO 5:	Explain the sources and types of float
CO 6:	Explain the objectives of inventory management and objectives of inventory management techniques
CO 7:	Analyse the factors affecting the formulation of accounts receivable and accounts payable
<b>EXCEL for Business and Finance</b>	
CO 1:	Acquiring necessary technical, scientific as well as management, financial procedures to analyse and solve real world problems within their work domain.
CO 2:	Mastering the use of some of Excel's functions and build financial models for forecasting and to make projected financial statements.
CO 3:	Design and maintain large sets of Excel data in a list or table so as to apply modelling tools and techniques for valuation.
CO 4:	Equip students with various research analytical tools used in business researchwith necessary critical thinking skills using excel."
<b>Business Statistics</b>	
CO 1:	Learn about the applications of statistical tools and techniques in decision

	making.
CO 2:	Enhance the knowledge on descriptive and inferential statistics.
CO 3:	Emphasize the need for statistics and decision models in solving business problems
CO 4:	Acquire new skills on the application of statistical tools and techniques in Business decision-making, Popular Quantitative Tools used in Business, practical exposure on calculation of measures of average, correlation and regression
CO 5:	Develop an understanding of the theory of probability, rules of probability and probability distributions.
<b>II Semester</b>	
<b>PH 351.2 - Accounting for Managerial Decisions</b>	
CO 1:	Identify differences between various forms of accounting– Financial, Managerial and Cost and the role of a Management Accountant
CO 2:	Prepare different forms of budgetary statements
CO 3:	Explain the concept of zero base budgeting, life cycle budgeting, Kaizen budgeting and performance budgeting.
CO 4:	Analyse the cost and performance of the responsibility centres
CO 5:	Explain creative Accounting and Forensic Accounting along with the concepts of corporate frauds and the measures to prevent it.
CO 6:	Critically examine the concept of Economic Value added, market value added, value added statements and Carbon Credits.
<b>Corporate Financing and Investment Decisions</b>	
CO 1:	Analyse and evaluate capital projects under different situations using appropriate capital budgeting techniques
CO 2:	Identify the cash flow patterns
CO 3:	Evaluation of statistical and conventional techniques for risk analysis
CO 4:	Evaluate the investment decisions, risk and uncertainty
CO 5:	Analyse the techniques for risk analysis
CO 6:	Explain the financial instruments and bonds
<b>Tally for Business Applications</b>	
CO 1:	Creation of Company, Accounting Groups & Ledgers

CO 2:	Identify the documents, prepare payment voucher, modes of payment and update payment voucher
CO 3:	Prepare the customer purchase order, payment terms, delivery challan and sales journal.
CO 4:	Preparation of Trial Balance, Cash book, Purchase Book, Sales Book, Purchase returns book, Sales return book
CO 5:	Displaying of Subsidiary book, Record keeping, Trading Account & Profit & Loss A/C, Balance Sheet
<b>Goods and Services Tax &amp; Customs</b>	
CO 1:	Compare the earlier indirect tax system and present indirect tax system
CO 2:	Explain the structure of GST, benefits of GST
CO 3:	Describe the functions, powers and structure of GST Council and GSTN
CO 4:	Describe the provisions, types and procedures of Registration
CO 5:	Define basic concepts and terms under CGST Act and IGST Act
CO 6:	Explain importance and benefits of Input Tax Credit
<b>Business Research Methods</b>	
CO 1:	Formulate the research problem and apply the major research designs with required questionnaire
CO 2:	Understand various sampling techniques, data collection and fieldwork.
CO 3:	Analyse data using various techniques and to learn how to communicate the results and follow up.
CO 4:	Demonstrate knowledge of data analysis, interpretation and report writing
<b>E-Business</b>	
CO 1:	Summarise the fundamentals of entrepreneurship with its role in economic development and to motivate them towards E-business activities.
CO 2:	Use the concept of entrepreneurial leadership and stimulate them to think innovative as entrepreneurs to implement in E-business
CO 3:	Assess technologies and business points of view to show the business cases that are viable right now.
CO 4:	Develops an understanding of transacting electronically and emerging technology for the same
CO 5:	Design business entity in the light of the legal and regulatory

	framework in India.
<b>Personal Finance and Investment Planning</b>	
CO 1:	Describe the premise of financial planning and financial goals
CO 2:	Critically evaluate the investment instruments suitable for different financial goals in different time span
CO 3:	Analyse the behaviour of equity markets and money market with investment tactics
CO 4:	Construct the portfolio by using the ideas of great investors in equity investment
CO 5:	Apply appropriate financial instruments to manage individuals finances.
<b>Internship</b>	
CO 1:	Demonstrate the application of knowledge and skill sets acquired from the course and workplace in the assigned job function/s;
CO 2:	Solve real life challenges in the workplace by analysing work environment and conditions, and selecting appropriate skill sets acquired from the course;
CO 3:	Demonstrate ideas to improve work effectiveness and efficiency by analysing challenges and considering viable options
CO 4:	Analyse career options by considering opportunities in company, sector, industry, professional and educational advancement
CO 5:	Use critical thinking and problem solving skills by analysing underlying issue/s to challenges;
CO 6:	Demonstrate appreciation and respect for diverse groups of professionals by engaging harmoniously with different company stakeholders
<b>III Semester</b>	
<b>PH 353.3 - Investment Banking and Financial Services</b>	
CO 1:	Explain the basic concepts and activities under investment banking and financial services
CO 2:	Compare and contrast commercial banking, investment banking and merchant banking
CO 3:	Evaluate the concepts under issue management and private equity
CO 4:	Analyse the importance and workings of Underwriting, leasing and

	forfeiting in real business operations.
CO 5:	Critically evaluate the importance and workings of credit rating institutions, depository systems and other financial institutions
<b>PO 357.3 - Corporate Culture and Ethics</b>	
CO 1:	Describe the nature and scope of ethics, contrast between the ethics and moral, personal ethics and professional/business ethics
CO 2:	Evaluate the conflict of interest and ethical dilemma and measures to mitigate unethical practices in various fields
CO 3:	Examine the impact of corporate culture on ethics.
CO 4:	Identify the ethical codes and value system in the work culture.
CO 5:	Analyse business ethics in the light of consumer and environment protection with real life examples of corporate social Responsibility and critically evaluate its different dimensions.
<b>Corporate Tax Planning</b>	
CO 1:	Identify the difference between Tax Evasion, Tax Planning and Tax Avoidance.
CO 2:	Analyse various deductions, rebates and reliefs to reduce the taxable income and tax liability of companies
CO 3:	Asses tax aspects of Transfer pricing
CO 4:	Discuss the application of Deductions and Collection of Tax at Source for Corporate
CO 5:	Summarize Double Taxation Avoidance Agreement.
CO 6:	Demonstrate tax planning in respect of corporate reorganization
<b>Mergers, Acquisition and Corporate Restructuring</b>	
CO 1:	Understand M&A with its different classifications, strategies, theories, synergy etc.
CO 2:	Conduct financial evaluation of M&A,Analyse the results after evaluation
CO 3:	valuation of various tangible and intangible assets
CO 4:	Evaluate different types of M&A, takeover and antitakeover strategies
CO 5:	Critically evaluate IPOs, M&As, Bankruptcy cases
<b>Insurance and Risk Management</b>	
CO 1:	Discuss the risk identification and measurement.

CO 2:	Describe the various concepts under insurance
CO 3:	Examine the operations of insurance companies
CO 4:	Analyse the concept of insurance premium and financial statements of insurance companies
CO 5:	Summarize the regulatory aspects of insurance
<b>Data Analysis using SPSS</b>	
CO 1:	Analyse any type of numerical data using SPSS with confidence
CO 2:	Develop an ability to independently analyse and treat data, plan and carry out new research work based on your research interest
CO 3:	Understand the research design and results presented in high quality by presenting results in a standard format
<b>IV Semester</b>	
<b>PS 355.4 - Financial Derivatives</b>	
CO 1:	Describe various concepts, types and terminologies used in financial derivatives.
CO 2:	Analyse valuation models for pricing the derivatives.
CO 3:	Construct the hedging strategies and arbitrage opportunities using Futures and Options.
CO 4:	Design financial swaps for risk management
CO 5:	Explain the concept of credit derivatives
<b>Cost Analysis for Managerial Decisions</b>	
CO 1:	Describe strategic cost analysis techniques and apply these techniques for performance evaluation and managing a profitable and competitive enterprise.
CO 2:	Explain the concept of target costing, life costing techniques, and Kaizen costing
CO 3:	Design a strategic decision using techniques in various spheres of organizational operations.
CO 4:	Identify price setting strategies and their implementation in terms of preparing of activity based budgets in comparison traditional budgets.
CO 5:	Explain the management of JIT system and decision making under constraints.

CO 6:	
<b>PS 356.4 - Corporate Law, Ethics and Governance</b>	
CO 1:	Evaluate the regulatory aspects and the broader procedural aspects involved in different types of companies covering the Companies Act 2013 and Rules there under.
CO 2:	Equip with framework provided for safe investments and companies surveillance by SEBI
CO 3:	Explain the accountability of corporates towards its stakeholders to create an integrated value framework for sustainability
CO 4:	Critically evaluate Corporate Social Responsibility with real life examples and its different dimensions.
CO 5:	Create a framework for effective corporate governance by understanding the role and responsibility of different stakeholders in large business corporations
<b>R for Data Analysis</b>	
CO 1:	Analyse the basics in R programming in terms of constructs, control statements, string functions
CO 2:	Organize, Import, review, manipulate and summarize data-sets in R
CO 3:	Utilize data-sets to create testable hypotheses and identify appropriate statistical tests
CO 4:	Evaluate R programming from a statistical perspective
<b>Portfolio Theory and Management</b>	
CO 1:	Describe the environment of investment and risk return framework.
CO 2:	Evaluate portfolios along with a deep understanding of Capital market theory and associated models.
CO 3:	Examine the equity investments using Portfolio Evaluation & Performance measures
CO 4:	Construct the portfolio by using the ideas of great investors in equity investment
<b>International Financial Management</b>	
CO 1:	Discuss the relevance and implications of global imbalances.

CO 2:	Explain the factors affecting exchange rates and the inter linkages among them
CO 3:	Analyse the evolution of the international monetary system both in terms of historical construct and its implications for the contemporary system
CO 4:	Preparation of BOP statements
CO 5:	Explain the currency exposure strategies
CO 6:	Demonstrate the objectives and explain the issues in international working capital management'
<b>Business Analysis and Valuation</b>	
CO 1:	Critically evaluate Business valuation and valuation process
CO 2:	Familiarize with the standard techniques of corporate valuation
CO 3:	Develop analytical skills relevant for corporate valuation and value based management
CO 4:	Analyse historical performance and estimate the relative valuation
<b>Project</b>	
CO 1:	Identify project characteristics and various stages of a project.
CO 2:	Build conceptual clarity about project organization and feasibility analysis
CO 3:	Summarize the techniques for Project planning, scheduling and Execution Control.
CO 4:	Compile the knowledge from various areas of learning related to the project topic
CO 5:	Organise in depth study of the particular issue to explore solution to the problems the society facing in the field of commerce and management

## M.SC BIOCHEMISTRY

### PROGRAM OUTCOMES

PO 1:	Comprehensive knowledge of Biochemistry with inter-disciplinary perspective of other branches of life sciences
PO 2:	Competence to use modern biochemical and molecular techniques to perform experiments to test scientific hypotheses, analyse data, trouble - shoot and draw conclusions from the experimental data in labs.
PO 3:	Ability to write research thesis, and present and defend their findings to scientific audiences at regional or national levels.
PO 4:	Capacity to work independently, while still promoting teamwork and collaboration skills.

### PROGRAM SPECIFIC OUTCOMES

PSO 1:	<b>Fundamental understanding of Biochemistry</b> , structure and function of biological molecule, mechanisms of biological processes and bioenergetics.
PSO 2:	Competence to understand theories and methods that can be used <b>to link Biochemistry to related subjects</b> such as biotechnology, molecular biology, genetics, pharmacology, immunology, genetic engineering and Biostatistics and informatics
PSO 3:	Ability to make quantitative measurements of parameters that are routinely encountered in <b>practical/ experimental biochemistry</b> and apply a range of techniques that are commonly used in biomolecule analysis.
PSO 4:	Ability to <b>analyse and interpret biochemical data</b> acquired from the experimental procedures and demonstrates analytical and problem-solving skills with regard to biochemical principles of life processes.
PSO 5:	Competence in <b>research and innovation</b> in Biochemistry and in related field of specialization and the ability to critically review scientific literature for development of new theories and testable hypothesis.
PSO 6:	<b>Basic professional skills</b> pertaining to biochemical analysis, and the ability to use these skills in specific areas such as technology development, industrial production and skills that are relevant to biochemistry-related jobs and employment opportunities
PSO 7:	Skill of <b>articulation of ideas, scientific writing</b> , authentic reporting, scientific conversation and writing, capacity for decision making with regard

	to scientific progress, personal development and career choice.
PSO 8:	<b>Entrepreneurial and social competence</b> , the ability to plan and manage projects in order to achieve objectives
PSO 9:	<b>Leadership and organizational skills</b> , ability to work independently, while still promoting team work and collaboration skills.
PSO 10:	Ability to <b>translate knowledge of biochemistry to address environment issues</b> including, waste disposal management, safety and security issues, nature conservation, sustainability development etc
PSO 11:	Relevant <b>generic and technical skills</b> including communication skills effective interaction with others, listening, speaking, observational skills, utilization of e-resources and ICT.
PSO 12:	Professional behavior with respect to attribute like <b>ethical values, integrity, honesty</b> , and sense of responsibility
<b>COURSE OUTCOMES</b>	
<b>PH. 511.1. BIOMOLECULES</b>	
CO 1:	Explain the basic aspects of amino acids, peptides, organization of protein structure, carbohydrates, lipids and nucleic acids
CO 2:	Describe the structure - function relationship of proteins and nucleic acids.
CO 3:	State the role of various biomolecules in health and disease.
CO 4:	Interpret the different structures of biomolecules and their implications on different disease states.
CO 5:	Explain classification and properties of various biomolecules.
<b>PH. 512.1 BIOCHEMICAL TECHNIQUES</b>	
CO 1:	List the basic instruments used in analytical biochemistry and state their applications.
CO 2:	Explain the principles and applications of important techniques used in isolation, purification and characterization of various biomolecules.
CO 3:	Interpret the various molecular spectrum obtained from different spectral techniques.
CO 4:	Explain preparation and analysis of different samples biological samples to be subjected to various analytical techniques.

CO 5:	Gain technical competency in different advanced techniques with a comprehensive understanding of their principle, instrumentation and applications.
<b>PH.513.1P BIOQUANTITATION</b>	
CO 1:	Learn good laboratory practices and be able to prepare basics of solutions
CO 2:	Perform and explain the principle of colorimetric analysis of various biomolecules.
CO 3:	Interpret and present scientific and technical information derived from laboratory experiments.
<b>PS. 514.1 ORGANIC AND PHYSICAL BIOCHEMISTRY</b>	
CO 1:	Explain the basic concepts of different types of chemical bonds, that can be useful to understand the chemical nature of biomolecules.
CO 2:	Describe the thermodynamic parameters and their variations in homeostasis of cells and its biomolecules and their interaction with water.
CO 3:	Acquire knowledge about preparation of radioisotopes, their applications in studying the cellular metabolic processes.
CO 4:	Display skills in problem solving, critical thinking and analytical reasoning as applied to problems in organic and physical chemistry
<b>PS. 515.1PHYSIOLOGY &amp; NUTRITION</b>	
CO 1:	Explain the functions of important physiological systems including the cardio-respiratory, reproductive renal, and metabolic systems
CO 2:	Explain the integration of the different organs in maintaining homeostasis
CO 3:	Discuss diseases, disorders, and conditions that result from a homeostatic imbalance
CO 4:	State the role of nutrients, caloric requirements and the deficiency disorders
<b>PS. 516.1 GENERAL MICROBIOLOGY</b>	
CO 1:	Acquire knowledge about the microorganisms around us, development of the discipline of Microbiology and the contributions made by prominent scientists in this field.
CO 2:	Differentiate between the useful and harmful microorganisms and explain the structure and functions of microscopic organisms
CO 3:	Explain <i>sterilization</i> of media and assessment of sterility.

CO 4:	Understand the importance of microorganisms as model systems in genetics and biochemistry.
<b>PS.517.1P ANALYTICAL TECHNIQUES</b>	
CO 1:	Get hands on training for different types of chromatographic techniques
CO 2:	Perform different types of electrophoretic techniques used to separate proteins and analyse the results.
CO 3:	Perform various extraction procedures used to extract different molecules from biological samples.
<b>PS.518.1P EXPERIMENTAL MICROBIOLOGY</b>	
CO 1:	Isolate microbes from provided samples and perform bacterial cultures in different media.
CO 2:	Perform routine microbiological practices such as sterilization, media preparation, maintenance of microbial culture, and staining.
CO 3:	Culture and screen microbes for antibiotic resistance.
<b>II Semester</b>	
<b>PH. 511.2 ENZYMOLOGY</b>	
CO 1:	Classify and explain the general properties of enzymes
CO 2:	Describe and use the equations of enzyme kinetics.
CO 3:	Describe the catalytic mechanisms of most well-characterized enzymes
CO 4:	Describe the mechanisms of enzyme regulation
CO 5:	Explain the applications of enzymes in diagnosis, monitoring, and therapy.
<b>PH. 512.2 METABOLISM</b>	
CO 1:	Describe the metabolism of carbohydrates, and its regulation
CO 2:	Describe the metabolism of lipids and its regulation
CO 3:	Explain the importance of high energy compounds, electron transport chain, and synthesis of ATP.
CO 4:	Explain the integration of carbohydrate and lipid metabolism
CO 5:	Correlate synthesis and breakdown of biomolecules with various metabolic disorders
<b>PH.513.2P Practical Enzymology</b>	
CO 1:	Demonstrate practical understanding of enzyme kinetics and its applications.

CO 2:	Demonstrate practical applications of monosubstrate and bisubstrate assays and an overall understanding of using various biochemical kinetic reactions for isolating and purifying specific analytes.
CO 3:	Isolate and purify enzymes using downstream processing
CO 4:	Conduct quantitative assay of clinically important enzymes
<b>PS.514.2 RESEARCH METHODOLOGY AND ETHICS</b>	
CO 1:	Demonstrate an understanding of research design, procedures of sampling, data collection, analysis and reporting.
CO 2:	Describe the appropriate statistical methods required for a particular research design and apply appropriate statistical methods for analyzing one or two variables..
CO 3:	Display an understanding of imperative issues in research ethics, like responsibility for research, scientific misconduct and ethical evaluation
CO 4:	Demonstrate awareness on Intellectual property rights and patents
<b>PS. 515.2 BIOTECHNOLOGY</b>	
CO 1:	Explain strain improvement methods, isolation of industrial important microorganisms, different types of fermentation process and different recovery process of the final product formed.
CO 2:	Demonstrate an understanding of animal cell culture, cell lines, application in tissue engineering and hybridoma technology.
CO 3:	Explain basic concepts of Plant Biotechnology and its applications in agriculture like micro-propagation, haploid plants, embryo culture, hybrids
CO 4:	Enlist the applications of microbiology in waste management, environmental pollution control.
<b>PS. 516.2. NEUROBIOCHEMISTRY</b>	
CO 1:	Demonstrate basic understanding of the nervous system and its functions.
CO 2:	Explain basic concepts of physiology and structure of nervous system
CO 3:	Describe the nature of neurotransmitters and its role in neuronal signal transmission
CO 4:	Demonstrate concrete understanding of neuronal processes that involves key aspects of learning and memory.

<b>PS. 517.2P PRACTICAL BIOTECHNOLOGY</b>	
CO 1:	Gain practical knowledge on tissue culture laboratory set-up, sterilization and media preparation
CO 2:	Perform animal and plant cell culture techniques
CO 3:	Perform toxicity and cell viability assays on animal tissues and conduct water quality testing
<b>PS. 518.2P Experimental Neurobiochemistry</b>	
CO 1:	Quantify and analyse the effect of drugs/toxins on brain tissue
CO 2:	Prepare tissue homogenates required for various biological assays and perform biochemical and histological assays to understand neuronal activity
CO 3:	Evaluate the behavioural changes that take place under conditions of stress and anxiety and apply the information obtained
<b>PO.519.2. Biochemistry of Diseases (Open Elective I)</b>	
CO 1:	Demonstrate an understanding of the mechanisms of diseases- cause, transmission, detection, treatment and prevention.
CO 2:	Understand general health check-ups, diagnosis and samples for disease analysis.
CO 3:	Relate to any existing or emerging infection as well as will learn about drug resistance and its mechanisms.
CO 4:	Acquire know-how to health research and develop new tools for their management.
<b>PH. 511.3 MOLECULAR BIOLOGY</b>	
CO 1:	Give an overview of the central dogma of life and the historical discoveries that led to our current understanding of molecular mechanisms of life
CO 2:	Describe the organization of prokaryotic and eukaryotic chromosome
CO 3:	Explain the processes of transcription/translation, posttranscriptional/posttranslational modifications.
CO 4:	Differentiate <i>prokaryotic and eukaryotic</i> gene expression and regulation
CO 5:	Identify the stages of the cell cycle, and explain the important checkpoints that a cell passes through during the cell cycle
<b>PH. 511.3 MOLECULAR BIOLOGY</b>	

CO 1:	Give an overview of the central dogma of life and the historical discoveries that led to our current understanding of molecular mechanisms of life
CO 2:	Describe the organization of prokaryotic and eukaryotic chromosome
CO 3:	Explain the processes of transcription/translation, posttranscriptional/posttranslational modifications.
CO 4:	Differentiate <i>prokaryotic and eukaryotic</i> gene expression and regulation
CO 5:	Identify the stages of the cell cycle, and explain the important checkpoints that a cell passes through during the cell cycle
<b>PH. 512.3 NITROGEN METABOLISM &amp; PLANT BIOCHEMISTRY</b>	
CO 1:	Discuss nitrogen metabolism and general mechanisms of amino acid metabolism.
CO 2:	Describe pathways of degradation of proteins, purines and pyrimidines and Inborn errors of amino acid degradation
CO 3:	Identify important metabolites in plants and animals that are important to understand the significance of various metabolic pathways.
CO 4:	Explain the process of photosynthesis; metabolism of photo assimilates and the role of plant hormones.
CO 5:	Discuss photobiology and stress physiology in plants
<b>PH.513.3P Metabolism and Clinical Biochemistry</b>	
CO 1:	Demonstrate ability to perform experiments to estimate metabolic parameters.
CO 2:	Perform microscopic & chemical analysis of Blood & urine
CO 3:	Analyse and interpret clinical and biochemical changes taking place in blood and urine under normal and pathological conditions.
CO 4:	Identify the normal and abnormal constituents present in urine samples and quantify them.
<b>PH.514.3P CELL &amp; MOLECULAR BIOLOGY</b>	
CO 1:	Evaluate and apply knowledge of modern techniques in cellular biology for observation and identification of tissues and cells
CO 2:	Extract DNA, RNA and perform their analysis at molecular level.
CO 3:	Learn the different phases of cell division using molecular techniques.

CO 4:	Handle, maintain <i>Drosophila melanogaster</i> and perform experiments related to the model organism
<b>PS.515.3 CELLULAR BIOCHEMISTRY</b>	
CO 1:	Outline the structure of various cellular organelles and describe the relationship between various cellular structures and their corresponding functions.
CO 2:	Describe the structure and properties of biological membranes and the processes of transport across cell membranes.
CO 3:	Discuss the general principles of cell communication and cell signaling.
CO 4:	Describe various cellular signal transduction pathways, specifically muscle contraction.
<b>PS. 516.3. CLINICAL BIOCHEMISTRY</b>	
CO 1:	Understand the basic concepts and principles of Clinical Biochemistry, detail on the collection, preservation and storage of biological samples
CO 2:	Explain principles of laboratory automation and quality control in a clinical laboratory
CO 3:	Describe the different biochemical tests carried out in blood and urine for the diagnosis and prognosis of various disease conditions.
CO 4:	Clinically assess the laboratory indicators of physiologic conditions and diseases
<b>PO.517.3 EVOLUTION AND ECOLOGY</b>	
CO 1:	Discuss the scientific <i>theory of evolution and</i> explain the points of the Modern Synthesis of evolutionary theory.
CO 2:	Demonstrate broad-based knowledge of the fundamentals of Ecology, and Evolution and the relationships among these disciplines
CO 3:	Describe the principal interactions between different species and how they affect the respective species.
CO 4:	Discuss the biogeochemical cycles, pollution, natural resource conservation and management
<b>PH.511.4 IMMUNOLOGY</b>	
CO 1:	Define central immunological concepts and demonstrate basic knowledge of immunological processes at a cellular and molecular level.

CO 2:	Describe the cells and organs involve in immune response and compare and contrast innate and adaptive immunity
CO 3:	Elaborate on the concept of antigen, immunoglobulins and apply basic techniques for identifying antigen-antibody interactions.
CO 4:	Outline key events in antigen presentation, and the cell-mediated and humoral immune responses.
CO 5:	Explain the basis of immunological tolerance, autoimmunity, hypersensitive reactions, cancer immunology and principles governing vaccination.
<b>PH. 512.4. GENETICS</b>	
CO 1:	Describe basic concepts of classical Genetics, Mendelian inheritance, extrachromosomal inheritance, sex-linked inheritance and population genetics
CO 2:	Elaborate on the concept of gene, genome organization, linkage and genetic mapping and recombination.
CO 3:	Discuss the different organisms used as models for studies in genetics
CO 4:	Comparing and contrasting different mutation and DNA repair mechanisms and relate variations in chromosome structure and number to phenotypic variation.
CO 5:	Describe the relationship between cell cycle and cancer and summarize the mechanism of transformation of cells
<b>PH.513.4 PROJECT WORK</b>	
CO 1:	Demonstrate and understanding on the scope of research in their assigned dissertation research topic, troubleshoot, and successfully outline the aims and objectives for subsequent dissertation work.
CO 2:	Critically review literature, find gaps in research, select a research problem/ test hypothesis and design experiments.
CO 3:	Perform experiments, collect data, draw conclusions and interpret the results and discuss the work in the light of work previously done by other researchers.
CO 4:	Communicate in oral and written form by integrating data and interpretation and relate to the concept of ethics in research
<b>PS.514.4 GENETIC ENGINEERING AND BIOINFORMATICS</b>	
CO 1:	Acquire knowledge about the advances in modification, and recombination of DNA or other nucleic acid molecules to modify an organism.

CO 2:	Enlist the vectors used in <i>genetic engineering</i> and discuss their application
CO 3:	Discuss tools and techniques of genetic engineering like transformation, hybridization, transcriptome analysis, sequencing and more.
CO 4:	Describe and use the biological databases, perform structured query, data retrieval and analyse and discuss the results
<b>PS.514.2 CLINICAL TOXICOLOGY</b>	
CO 1:	Describe the general principles of clinical toxicology and discuss factors that influence toxicity.
CO 2:	Explain the basics of pharmacodynamics, pharmacokinetics and PK/PD correlation.
CO 3:	Recognize system-specific and organ-specific toxic effects and discuss metabolism of toxicants
CO 4:	Describe pharmacological actions, uses & adverse effects of drugs
<b>PS. 516.4-FOOD BIOCHEMISTRY</b>	
CO 1:	Discuss the concept of food and nutrition
CO 2:	Enlist macro- and micronutrients, their sources and functions in the human body.
CO 3:	Explain the concept of nutraceuticals and their role in treatment and prevention of various disease conditions
CO 4:	Discuss the biochemical changes caused by microorganisms in context of fermented food and food spoilage
<b>PS.517.4P Experiments in Genetic Engineering and Bioinformatics</b>	
CO 1:	Learn to use tools and techniques in genetic engineering
CO 2:	Demonstrate and explain transformation techniques and selection of transformants
CO 3:	Perform biological database search, retrieve data and analyse the data employing various bioinformatics tools
<b>PS.518.4P EXPERIMENTS IN FOOD SCIENCE</b>	
CO 1:	Explain principles behind analytical techniques associated with food.
CO 2:	Perform various food analysis techniques and interpret the results
CO 3:	Identify the biochemical component of various foods and assess the nutritive value of food sample.

## **M.SC BIOTECHNOLOGY**

### **PROGRAM OUTCOMES**

PO 1:	Provide state-of-the-art knowledge and skills in the field of Biotechnology.
PO 2:	Generate manpower trained in Biotechnology suited to meet the needs of the industry and academia.
PO 3:	Train students to pursue committed research in the field of Biotechnology.
PO 4:	Train students for practical oriented project work.
PO 5:	Have a positive impact on human and animal health, agriculture and environment in the region.
PO 6:	Have 100 % placement for all the students who take up this course.

### **PROGRAM SPECIFIC OUTCOMES**

PSO 1:	In-depth knowledge of Biotechnology with inter-disciplinary perspective of other branches of life sciences.
PSO 2:	Develop an ability to solve, analyze and interpret data generated from experiments done in project work or practical courses.
PSO 3:	Competence for research and innovation in Biotechnology as a skilled experimentalist.
PSO 4:	Analytical and problem-solving skills with regard to biochemical principles of life processes and technologies for combating human diseases.
PSO 5:	Critical thinking about the concepts in Biotechnology and ability to critically review scientific literature for development of new theories and testable hypothesis.
PSO 6:	Capacity for decision making with regard to scientific progress personal development and career choice.
PSO 7:	Ability to work independently, while still promoting team work and collaboration skills.
PSO 8:	Oratory (public speaking), scientific conversation and writing skills.
PSO 9:	Leadership and organizational skills.
PSO 10:	Execute their professional roles in society as biotechnology professionals, employers and employees in various industries, regulators, researchers, educators and managers.
PSO 11:	Demonstration of integrity, honesty, ethical behaviour and sense of responsibility.
PSO 12:	Appreciation of diversity in scientific community and responsibility towards society and nation.
PSO 13 :	Environmental awareness vis-à-vis bio-waste generation, disposal and management and safety and security issues.

<b>COURSE OUTCOMES</b>	
<b>I Semester</b>	
<b>PH 501.1 BIOCHEMISTRY AND METABOLISM</b>	
CO 1:	Delineate structure, function and interrelationships of various biomolecules and consequences of deviation from the normal.
CO 2:	Translate the importance of biological macromolecules and their role in living systems.
CO 3:	Execute a particular metabolic pathway involved in carbohydrate, lipid, amino acid and nucleic acid metabolism, their interconnections.
CO 4:	Evaluate information relevant to concepts on cellular regulation of different metabolic pathways.
<b>PH 502.1 MICROBIOLOGY</b>	
CO 1:	Apply the principles in classifying microbial systems and know their beneficial and harmful effects.
CO 2:	Employ various cultivation methods starting from screening to preservation of the desired microbe.
CO 3:	Understand the major virus groups with their elementary features that is responsible for causing the most dreaded diseases.
CO 4:	Appreciate the microbial diversity and their interactions, and design suitable strategies to tackle unsustainable agricultural and environmental practices.
<b>PH 503.1 CELL AND MOLECULAR BIOLOGY</b>	
CO 1:	Describe the organization of macromolecules on membranes and cellular processes.
CO 2:	Differentiate the various cell signaling pathways.
CO 3:	Illustrate regulation of gene expression in eukaryotes.
CO 4 :	Take up research in the field of cell and molecular biology.
<b>PH 504.1 P BIOCHEMISTRY &amp; METABOLISM PRACTICALS</b>	
CO 1:	Apply knowledge of biochemistry and metabolism in various cellular functions, and the application of research involved in various biochemical processes.
CO 2:	Investigate and analyse the unknown carbohydrate or amino acid compound present in the given sample qualitatively.
CO 3:	Demonstrate a proficiency in developing relevant biochemical questions, carrying out laboratory investigations to answer those questions, and critically analyzing, interpreting, and presenting the results of their

	experiments.
CO 4:	Construct the standard curve, analyse the data and interpret the results.
<b>PH 505.1 P MICROBIOLOGY PRACTICALS</b>	
CO 1:	Evaluate the various physical and chemical growth requirements of bacteria and equip various methods of bacterial growth measurement.
CO 2:	Execute microbial techniques for the isolation of pure cultures of bacteria.
CO 3:	Master staining procedures, aseptic techniques and be able to perform routine culture handling tasks safely and effectively.
CO 4:	Comprehend the various methods for identification of unknown microorganisms.
<b>PH 506.1 P CELL AND MOLECULAR BIOLOGY PRACTICALS</b>	
CO 1:	Assess membrane transport.
CO 2:	Prepare of slides.
CO 3:	Differentiate cell divisions.
CO 4 :	Isolate macromolecules and perform qualitative and quantitative assays.
<b>PS 507.1 MOLECULAR AND HUMAN GENETICS</b>	
CO 1:	Discuss the chromosomal mechanisms of sex determination and dosage compensation.
CO 2:	Demonstrate the ability to distinguish between a normal and an abnormal karyotype and the underlying causes of genetic disorders at the molecular level.
CO 3:	Categorize the different methods available for genetic testing and for the treatment and management of genetic disorders.
CO 4:	Construct pedigrees and analyse the patterns of inheritance in the families.
<b>PS 508.1 IMMUNOLOGY</b>	
CO 1:	Describe which cell types and organs present in the immune response.
CO 2:	Apply basic techniques for identifying antigen-antibody interactions.
CO 3:	Exemplify the adverse effect of immune system including Allergy, hypersensitivity and autoimmunity.
	Elucidate the reasons for immunization and aware of different vaccination.
<b>PS 509.1 DEVELOPMENTAL BIOLOGY</b>	
CO 1:	Describe the main stages of development common to most multicellular organisms.
CO 2:	Demonstrate the cellular behaviors that lead to morphological change

	during development.
CO 3:	Illustrate how gene activation plays a role in differentiation.
CO 4:	Apply the knowledge gained in the field of research.
<b>PS 510.1P MOLECULAR AND HUMAN GENETICS PRACTICALS</b>	
CO 1:	Describe the salient features of <i>Drosophila melanogaster</i> .
CO 2:	Apply the basic technique of separation of the eye pigments of <i>D. melanogaster</i> by chromatographic technique.
CO 3:	Analyze the different types of syndrome and their karyotype.
CO 4:	Elaborate the knowledge on sex determination and chromosomal aberrations.
<b>PS 511.1P IMMUNOLOGY PRACTICALS</b>	
CO 1:	Staining, Identify various immune cells and enumerate them.
CO 2:	Competently perform antigen-antibody interaction for diagnostic test.
CO 3:	Analyze the components of human sera by performing agarose gel electrophoresis.
CO 4:	Blood Donation and its Procedure, product packing , separation of blood products and labeling.
<b>PS 512.1P DEVELOPMENTAL BIOLOGY PRACTICALS</b>	
CO 1:	Know the importance of model organisms in developmental biology.
CO 2:	Distinguish between the stages of development of different organisms.
CO 3:	Develop practical skills in isolation and staining.
CO 4:	Apply the knowledge in contribution towards research.
<b><u>SEMESTER II</u></b>	
<b>PH 501.2 GENETIC ENGINEERING</b>	
CO 1:	Demonstrate the ability to design recombinant molecules.
CO 2:	Design forward and reverse primer to amplify a gene of interest.
CO 3:	Explain transcriptomic analysis and major RNA-Seq platforms.
CO 4:	Apply learned knowledge to their future research.
<b>PH 502.2 ENZYMOLOGY</b>	
CO 1:	Describe the structure, functions and the mechanisms of action of enzymes.
CO 2:	Demonstrate the kinetics of enzyme catalyzed reactions and regulatory processes.
CO 3:	Explain the different immobilization techniques and industrial and clinical

	scope of enzymes.
CO 4:	Apply the principles of enzyme inhibitions in clinical research.
<b>PH 503.2 P GENETIC ENGINEERING PRACTICALS</b>	
CO 1:	Isolate and purify genomic DNA/RNA.
CO 2:	Demonstrate restriction digestion and ligation experiment.
CO 3:	Standardize a PCR protocol for amplification of a specific target gene.
CO 4:	Obtain a thorough knowledge in genetic engineering methods practiced in research.
<b>PH 504.2 P ENZYMOLOGY PRACTICALS</b>	
CO 1:	Design the experiments related to isolation and purification of enzymes.
CO 2:	Apply and extend their knowledge and understanding of enzyme catalysis in research.
CO 3:	Develop accuracy skills in enzyme assays.
CO 4:	Construct the standard curve, critically analyse the data and interpret the results.
<b>PS 505.2 RESEARCH METHODOLOGY, ETHICS AND SCIENTIFIC COMMUNICATION</b>	
CO 1:	Explain the differences between research methodologies.
CO 2:	Design a small research project with appropriate research method.
CO 3:	Apply correct ways of referencing to and citing from scientific literature.
CO 4:	Analyze, contrast, compare and criticize scientific literature and write a research report/ thesis.
<b>PS 506.2 ANALYTICAL TECHNIQUES IN BIOTECHNOLOGY</b>	
CO 1:	Discuss the principle and instrumentation of HPTLC, HPLC, GC for identification, and characterization of compounds.
CO 2:	Apply the principles and theory of UV-Vis spectroscopy, MS (MALDI-TOF and LC-MS/MS), NMR and XRD for the identification and characterization of organic compounds.
CO 3:	Select an appropriate method of centrifugation or electrophoresis for the separation and identification of analyte molecule by applying the theory and principle of various methods of centrifugation and electrophoresis.
CO 4:	Explain the application of radioisotopes in biology and Instrumentation of Geiger-Muller counter and Solid, Liquid scintillation counters and autoradiography for detection of radio activity.

<b>PS 507.2</b>		<b>MULTIOMICS</b>	
CO 1:		Gain knowledge of various computational tools and methods in bioinformatics.	
CO 2:		Discern the crucial concepts and techniques applied in genomics, transcriptomics and proteomics.	
CO 3:		Understand the importance of genomics, proteomics, metabolomics and their applications in various applied areas of biology.	
CO 4:		Formulate and assess experimental design for solving theoretical and experimental problems in Genomics, Proteomics and metabolomics.	
<b>PS 508.2</b>		<b>BIOSAFETY AND BIOETHICS</b>	
CO 1:		Evaluate biosafety and bioethics in the context of modern biotechnology.	
CO 2:		Describe the standard operating procedures for biotechnology research and assign Biosafety levels.	
CO 3:		Appraise the relevance of different international agreements and protocols for biosafety.	
CO 4:		Develop the skills to think critically about risks and risk mitigation strategies needed in their own scientific environment.	
<b>PS 509.2 P</b>		<b>RESEARCH METHODOLOGY AND SCIENTIFIC COMMUNICATION PRACTICALS</b>	
CO 1:		Explain key research designs and techniques.	
CO 2:		Identify various sources of information for literature review.	
CO 3:		Read, comprehend, and explain research articles in their academic discipline.	
CO 4:		Collect, analyze and represent their data and write a research report/ thesis.	
<b>PS 510.2 P</b>		<b>ANALYTICAL TECHNIQUES IN BIOTECHNOLOGY PRACTICALS</b>	
CO 1:		Perform the identification and characterization of various biomolecules using UV Vis spectroscopy, AAS and flame photometry.	
CO 2:		Demonstrate the strengths, limitations and use of various chromatographic techniques including paper, TLC, gel filtration and HPLC for the analysis of various biomolecules.	
CO 3:		Interpret and analyse the result obtained from various colorimetric assays of protein by plotting a standard curve.	
CO 4:		Examine the topography, morphology and composition of various samples by creating the 3D images using SEM.	
<b>PS 511.2 P</b>		<b>MULTIOMICS PRACTICALS</b>	

CO 1:	Search the nucleotide sequence data of the given species using NCBI / EMBL / DDBJ.
CO 2:	Search the protein sequence of the species using PIR and Swissprot / UniProt.
CO 3:	Find the structure of protein using PDB. → View the 3D structure of a protein using RASMOL software.
CO 4:	Carry out the multiple sequence alignment of the proteins with Clustal OMEGA. → Search the database of proteins / nucleic acids using BLAST program
<b>PS 512.2P BIOSAFETY AND BIOETHICS PRACTICAL</b>	
CO 1:	Demonstrate good laboratory procedures and practices.
CO 2:	Examine the design of confinement facilities at different Biosafety levels.
CO 3:	Apply the risk analysis framework to their own or their peers' scientific activities.
CO 4:	Develop a research career in the relevant area, to handle various situations he/she encounters, with adequate caution and care.
<b>OPEN ELECTIVE</b>	
<b>PO 513.2 QUALITY ASSURANCE AND QUALITY IN PRODUCT DEVELOPMENT</b>	
CO 1:	Apply quality tools for quality management and main guidelines & requirements of GMP thus contributing to the organization when it comes to understanding industry standards.
CO 2:	Learn and adopt quickly in a GMP environment.
CO 3:	Integrate the principles of the GMP quality system and quality control and the important procedures when dealing with complaints and recalls.
CO 4:	Justify the requirements for good documentation practice and complete appropriate documents in compliance with regulatory guidelines.
<b>PO 514.2 RECENT TRENDS IN BIOTECHNOLOGY</b>	
CO 1:	Demonstrate deep understanding of various methods for gene transfer, gene therapy and <i>in vitro</i> fertilisation of animals.
CO 2:	Discuss and analyze scientific questions related to transgenic plants, role of microbes in industry and agriculture.
CO 3:	Learn and implement the techniques used in molecular diagnostics.
CO 4:	Discover the development of biosensor technology in Healthcare, Food technology and Environmental monitoring.
<b><u>SEMESTER – III</u></b>	

<b>PH 501.3 ANIMAL BIOTECHNOLOGY</b>	
CO 1:	Perform aseptic techniques and good laboratory practices.
CO 2:	Describe the bioprocess technology for economically important products.
CO 3:	Apply the knowledge for improvement of farm animals.
CO 4:	Take up animal based biological research /relevant biotech industry.
<b>PH 502.3 PLANT BIOTECHNOLOGY</b>	
CO 1:	Understand the organization of plant genome and intergenomic interaction.
CO 2:	Appraise various methods of marker assistant selection in plant breeding.
CO 3:	Describe various genes used in plant transformation and the role of transgenic plants in human welfare.
CO 4:	Translate the concepts in future studies and debate on the issue related to GMOs and evaluate its significances
<b>PH 503.3P ANIMAL BIOTECHNOLOGY PRACTICAL</b>	
CO 1:	Apply Good Laboratory practices and aseptic techniques.
CO 2:	Initiate primary explant culture and maintain cell lines.
CO 3:	Isolate cells from tissues.
CO 4:	Determine cytotoxicity and growth kinetics.
<b>PH 504.3P PLANT BIOTECHNOLOGY PRACTICALS</b>	
CO 1:	Apply Good Laboratory practices and aseptic techniques.
CO 2:	Prepare the media and other reagents, Initiate primary cell culture, Estimate the viability of cells as well as cell concentration.
CO 3:	Perform identification of correct stage of anther for haploid culture and establish the establishment of secondary embryogenic tissues.
CO 4:	Apply knowledge for large scale clonal propagation of plants through various micropropagation techniques.
<b>PS 505.3 INDUSTRIAL BIOTECHNOLOGY</b>	
CO 1:	Explain the screening, strain improvement and design of fermentation media.
CO 2:	Assess the conditions for efficient and sustainable design of bioprocesses.
CO 3:	Integrate scientific and technological knowledge on the use of bioprocesses for industrial products on the cell and process level.
CO 4:	Analyze the processes and their application in healthcare, agriculture, energy and the environment.
<b>PS 506.3 ENVIRONMENTAL BIOTECHNOLOGY</b>	
CO 1:	Explain and appreciate the concepts of ecology.

CO 2:	Critically examine biodiversity and human linkages, and appreciate the need for biodiversity conservation and contribute to the developmental pathways and policy framework.
CO 3:	Relate an environmental issue with its cause and take an initiative in solving them.
CO 4:	Investigate and develop new biological technologies to mitigate environmental problems.
<b>PS 507.3 PLANT BREEDING AND SEED TECHNOLOGY</b>	
CO 1:	Demonstrate an understanding of the automation in plant micropropagation.
CO 2:	Determine the most appropriate method for the breeding of self, cross pollinated and vegetatively propagated crop plants.
CO 3:	Develop a management plan to eliminate pathogens from plant parts and produce Tissue Culture raised plants with Export potentials.
CO 4:	Apply various acts and guidelines in production of certified seeds and plant breeding.
<b>PS 508.3 MARINE BIOTECHNOLOGY</b>	
CO 1:	Comprehend the uses of seaweeds and their products.
CO 2:	Develop the methods of identification of therapeutic agents from several marine species.
CO 3:	Understand the marine fish hatchery, Shrimp hatchery and farming techniques.
CO 4:	Use biotechnological principles for feed formulation and its manufacturing.
<b>PS 509.3 INDUSTRIAL BIOTECHNOLOGY PRACTICALS</b>	
CO 1:	Execute various selective isolation, replica plating, growth kinetics and the role of various factors affecting the process of microbial growth.
CO 2:	Purify proteins by using various proteins including centrifugation, precipitation, dialysis and ion exchange chromatography.
CO 3:	Evaluate different pathways followed in or by the microbes involved in production of these bio-chemicals. Method of manipulating these pathways to get desired yield.
CO 4:	Demonstrate proficiency in methodologies and equipment employed.
<b>PS 510.3 ENVIRONMENTAL BIOTECHNOLOGY PRACTICALS</b>	
CO 1:	Execute scientific collection and preservation of samples.
CO 2:	Perform the analytical tests aimed at establishing the concentration of pollutants in a water sample.
CO 3:	Examine the water quality by microbiological tests.

CO 4:	Demonstrate proficiency in methodologies and equipment employed for the analysis of samples.
<b>PS 511.3 PPLANT BREEDING AND SEED TECHNOLOGY PRACTICALS</b>	
CO 1:	Demonstrate various layering, grafting and budding techniques.
CO 2:	Perform the genetic analysis of variation in plants.
CO 3:	Design and perform plant hybridization experiments.
CO 4:	Produce synthetic seeds, perform the cryopreservation and evaluate the viability of the seeds.
<b>PS 512.3 PMARINE BIOTECHNOLOGY PRACTICALS</b>	
CO 1:	Understand the techniques and applications of fisheries and aquaculture.
CO 2:	Identify therapeutic agents from marine species.
CO 3:	Contribute feed formulation and its manufacturing.
CO 4:	Become entrepreneur in ornamental fish farming.
<b>PO 513.3 CLINICAL DRUG DEVELOPMENT AND IPR</b>	
CO 1:	Demonstrate an understanding of the steps involved in the drug discovery and design process.
CO 2:	Demonstrate an understanding of the importance of strict quality control and regulation in the drug development process, and an awareness of GMP, GLP and GDoP.
CO 3:	Design and manage various essential documents for the conduct of a clinical trial.
CO 4:	Apply intellectual property law principles (including copyright, patents, designs and trademarks) to real problems and analyze the social impact of intellectual property law and policy.
<b>PO 514.3 BIOREMEDIATION TECHNIQUES</b>	
CO 1:	Describe the concept and applications of bioremediation.
CO 2:	Evaluate the manipulation of prokaryotic and eukaryotic cells in culture, and to apply specific cellular and molecular techniques.
CO 3:	Appraise when each bioremediation strategy would be most applicable, based on the polluted site characteristics.
CO 4:	Develop a new and suitable technique to clean-up the environmental contaminants using the knowledge in bioremediation techniques.
<b>IV SEMESTER</b>	
<b>PH 501.4 FOOD BIOTECHNOLOGY</b>	
CO 1:	Explain the importance of food laws, acts, quality control and sensory evaluations.
CO 2:	Describe the factors affecting growth of microorganisms.
CO 3:	Apply the knowledge of processing and preservation techniques in

	increasing the shelf life of food products.
CO 4:	Produce different oriental and traditional fermented foods.
<b>PH 502.4 MOLECULAR DIAGNOSTIS AND IMMUNOTECHNIQUES</b>	
CO 1:	Design PCR based diagnostic method for infectious diseases.
CO 2:	Understand genomics, proteomics and metabolomics that could be employed in early diagnosis and prognosis of human diseases.
CO 3:	Use this knowledge in the processes of antibody engineering, vaccine development, immunization and cancer therapy.
CO 4:	Apply techniques of molecular biology/immunology in research work/pharma industries and other relevant biotech industries.
<b>PH 504.4P FOOD BIOTECHNOLOGY PRACTICALS</b>	
CO 1:	Explain the different microorganisms associated with food and evaluate the microbial estimation in food.
CO 2:	Identify and control adulterants in various foods and evaluate food quality.
CO 3:	Apply the technique of growing mushrooms as an alternative food product.
CO 4:	Comprehend the knowledge of wine production and launch a startup.
<b>PH 505.4P MOLECULAR DIAGNOSTIS AND IMMUNOTECHNIQUES PRACTICALS</b>	
CO 1:	Design and conduct PCR based experiments for disease diagnostics.
CO 2:	Perform nested PCR experiments for identification of a microorganism.
CO 3:	Demonstrate Real Time PCR.
CO 4:	Perform various immunotechniques like ELISA, western blotting.
<b>PS 506.4 CLINICAL RESEARCH, IPR AND PATENTS</b>	
CO 1:	Demonstrate an understanding of the steps involved in the drug discovery and design process.
CO 2:	Demonstrate an understanding of the importance of strict quality control and regulation in the drug development process, and an awareness of GMP, GLP and GDoP.
CO 3:	Design and manage various essential documents for the conduct of a clinical trial.
CO 4:	Apply intellectual property law principles (including copyright, patents, designs and trademarks) to real problems and analyze the social impact of

	intellectual property law and policy.
<b>PS 507.4</b>	<b>STEM CELL TECHNOLOGY AND REGENERATIVE MEDICINE</b>
CO 1:	Demonstrate knowledge of different types of stem cells and their specific characteristics, sources of stem cells, their isolation and characterization.
CO 2:	Understand the clinical need for stem cell therapy and tissue engineering in regenerative medicine.
CO 3:	Understand the innovation and technological progress of stem cell research in recent years.
CO 4:	Lead a professional career in stem cell technology and cell/tissue engineering in a wide range of health care establishments.
<b>PS 508.4BIO-ENTREPRENEURSHIP</b>	
CO 1:	Prepare business plan for biotechnology entrepreneurship.
CO 2:	Address the market challenges for a new enterprise.
CO 3:	Assess the global market scenario of their product.
CO 4:	Manage technology transfer for new biotechnology product and launch a startup.

**M.SC FOOD SCIENCE****PROGRAM OUTCOMES**

PO 1:	Scientific Knowledge: Knowledge on the fundamentals of food science and nutrition, food chemistry and biochemical changes during processing and preservation, nutraceuticals, also students will be able to understand and apply sensory evaluation of food.
PO 2:	Design/development of solutions: Design solutions for complex food engineering problems or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations. Students will also develop an ability to work in modern tools and equipment's to analyze food composition, identify microorganism responsible for food spoilage.
PO 3:	Problem analysis: Understand the principles behind analytical techniques used in evaluating the biochemical properties of food; they will be able to identify the microorganism responsible for food spoilage and the methods to control the food spoilage.
PO 4:	Modern tool usage: Demonstrate knowledge in various engineering properties of food and its application in food industry, concept of mass balance and energy balance, unit operations in food processing, conventional and advanced methods of food preservation, methods of packing, post-harvest practices so as to develop food products and develop device for food industry.
PO 5:	Skill development and application: Develop specific skill based on their interest in bakery and confectionery, meat, poultry and fish processing, food fermentation, dairy processing. Students will also be able to apply the principles of Hazard Analysis and Critical Control Points (HACCP) to ensure safe food processing, Students will also have knowledge in regulations governing the manufacture and sales of the food products.
PO 6:	Research capabilities and Project management: Demonstrate the ability to apply knowledge through critical thinking, inquiry, analysis, and communication to produce scholarly and creative works in the form of an original oral scientific presentation, master's thesis/report, scientific manuscript for wide publication; participate as a member and leader in a

	team in order to manage multidisciplinary projects.
PO 7:	Ethics: Demonstrate awareness of their responsibilities (professional integrity, ethical behavior, etc.) and commit to the highest standards of academic and professional integrity and ethical values.
PO 8:	Environment and sustainability: Comprehend the impact food technologies and food waste processing solutions in societal and environmental contexts and promulgate the knowledge to strategize various approaches for sustainable development.
PO 9:	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings which are basic qualities for a Food technologist.
PO 10:	Interpersonal Skills: Listening and effective speaking on food science problem with the small, medium and large-scale food business operators and with the society at large. For instance, ability to comprehend and published effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11:	Life-long learning: Identify the need for and be prepared to engage in independent and life-long learning in the most extensive context of methods and technological advancement in the field of food science and technology.
<b><u>PROGRAM SPECIFIC OUTCOMES</u></b>	
PSO 1:	To inculcate technical writing and communicating ability for effective documentation and presentations and develop strong research aptitude through research work to enable the students to opt for higher levels of learning in the field of Food science and Technology.
PSO 2:	To acquaint and equip students with professional and intellectual integrity, ethics of research and scholarship, impact of research outcomes on professional practices and responsibilities to contribute positively in the sustainable development of society.
PSO 3:	To enable the students to get engaged in lifelong learning independently with the vigor and zeal and become capable to start-up their own businesses.

<b>COURSE OUTCOMES</b>	
<b>I Semester</b>	
<b>PH 591.1 Food Chemistry</b>	
CO 1:	Know the chemistry underlying the properties and reactions of various food components
CO 2:	Have sufficient knowledge of food chemistry to control reactions in foods.
CO 3:	Know the major chemical reactions that limit shelf life of foods.
CO 4:	Use the laboratory techniques common to basic and applied food chemistry.
CO 5:	Know the principles behind analytical techniques associated with food.
<b>PH 592.1 Principles of Food Processing and Preservation</b>	
CO 1:	Describe the source and variability of raw food material and their impact on food processing operations.
CO 2:	Explain the spoilage and deterioration mechanisms in foods and methods to control deterioration and spoilage.
CO 3:	Describe the unit operations required to produce a given food product.
CO 4:	Explain the principles and current practices of processing techniques and the effects of processing parameters on product quality.
<b>PH 593.1 Fruits and Vegetables Processing Technology</b>	
CO 1:	Better understanding of the concepts of physiological characteristics of fruits and vegetables.
CO 2:	Better insight about fruit losses during storage and ways to prevent it.
CO 3:	Thorough Knowledge and understandings of the specific processing technologies used for different foods and the various products derived from these materials.
CO 4:	The students acquire insight into specific product and process related factors in the processing of fruits and vegetables.
<b>PS 596.1 Processing of Milk and Dairy Products</b>	
CO 1:	Understand the processes related to storage, processing and distribution of milk and milk products.
CO 2:	Perceive the different properties of milk and milk products and apprehend the thermal processing of milk.

CO 3:	Grasp the technology of fat rich dairy products and Comprehend the technology of condensed milk, dried milk, cheese, yoghurt and indigenous products will be understood.
CO 4:	Have knowledge regarding hygiene and sanitation practices in the milk and milk products industry.
<b>PS 597.1 Waste Management and Environmental Sustainability</b>	
CO 1:	Learn physical/chemical/biological characteristics of and the evaluation technique form various industrial waste water.
CO 2:	Understand the theory, engineering application, and design technique for the industrial wastewater treatment unit processes.
CO 3:	Design various environmental structures like water treatment plants, waste water treatment systems and air pollution control equipment's.
CO 4:	Know solid waste remedial measures and their importance and Undertake projects related to solid waste management.
CO 5:	Make decision based on the environmental consequences of proposed actions and promote environmentally sound and sustainable development by identifying appropriate measures.
CO 6:	A sound understanding of the principal environmental policy issues confronting managers in diverse geographical and culture situations.
CO 7:	A range of relevant practical skills, particularly in the fields of impact assessment, audit and law.
<b>PH 591.2 Food Process Engineering and Instrumentation</b>	
CO 1:	Comprehend the recent advancement in the major cereal grains quality and processing aspects.
CO 2:	Understand the mechanism underlying the interaction of various flour components and their role in end use quality.
CO 3:	Grasp the basic and advanced milling methods for wheat, rice, maize.
CO 4:	Know about by-product utilization of various grains.
<b>PS 595.2 Spices and Plantation Crops Technology</b>	
CO 1:	Students will understand practical knowledge on specialized production techniques of vegetables and spices.
CO 2:	Students understand will Importance of vegetables & spices in human

	nutrition improved and national economy.
CO 3:	Students will be acquainted with the knowledge of profitable crop Production technology.
CO 4:	To understand the scientific cultivation methods of plantation crops like coconut, arecanut, cashew, tea, coffee & rubber.
CO 5:	To know more about origin, area, climate, soil, improved varieties and cultivation practices such as time and methods of sowing, transplanting techniques, planting distance, fertilizer requirements, irrigation, weed management, harvesting and yield.
<b>CBCS -ELECTIVE PAPER</b>	
<b>P0598.2 Essentials of Food Science</b>	
CO 1:	Understand the history and evolution of food processing
CO 2:	Acquire knowledge of the structure, composition, nutritional quality and post-harvest changes in various plant foods.
CO 3:	Understand the structure and composition of various animal foods.
<b>THIRD SEMESTER</b>	
<b>PH 591.3 Food Microbiology</b>	
CO 1:	Learn the fundamentals of food microbiology.
CO 2:	Identify the novel methods for detection of immunological components.
CO 3:	Acquire the knowledge on various criteria for microbiological assessments in various food products.
<b>PH 592.3 Nutraceuticals and Functional Foods in Human Health</b>	
CO 1:	Acquire knowledge on various bio molecules showing health benefits.
CO 2:	Understand various physiological and biochemical aspects of life threatening and chronic diseases.
CO 3:	Apply their knowledge regarding extraction, isolation, characterization and application of nutraceuticals in food industries.
CO 4:	Identify various aspects about safety, quality and toxicology of food products including, nutraceutical and functional foods.
<b>CBCS -ELECTIVE PAPER</b>	
<b>PO 595.3 Basics of Food Safety and Labelling</b>	
CO 1:	Understand the concept of food safety, types of hazards and their control

	measures.
CO 2:	Identify and prevent potential sources of food contamination and comprehend the need of hygiene and sanitation for ensuring food safety.
CO 3:	Understand National and International Food Safety Laws and Regulations.
CO 4:	Practical knowledge to detect and quantify microorganisms from various routes of contamination of food.
CO 5:	Understand various areas of Food Safety & Quality Assurance.
CO 6:	Grasp knowledge of the quality assessments of food products.
CO 7:	Comprehend food quality managements systems.
CO 8:	Apprehend the Indian and International food laws.
CO 9:	Conceive the concept of adulteration in food products.
<b>FOURTH SEMESTER</b>	
<b>PH 591.4 Meat, Fish, and Poultry Processing Technology</b>	
CO 1:	Understand the need and importance of livestock, egg and poultry industry
CO 2:	Understand the structure, composition and nutritional quality of animal products.
CO 3:	Understand the concept and methods of processing and preservation of animal foods.
CO 4:	Understand the technology behind preparation of various animal food products and byproduct utilization
CO 5:	Understand egg production practices and egg preservation methods
CO 6:	Understand factors affecting egg quality and measures of egg quality.
<b>PH 592.4 Food Packaging</b>	
CO 1:	Comprehend the overview of the scientific and technical aspects of food packaging
CO 2:	Understand packaging machinery, systems, testing
CO 3:	An insight to food packaging laws and regulations
CO 4:	An understanding of packaging requirement and packaging designing of food.
CO 5:	Comprehend advance knowledge on the properties and production of various packaging materials and effect of various indicators used in supply chain management to indicate the food quality
CO 6:	Understand various types of scavengers and emitters for improving the food shelf life.

CO 7:	Learn about consumer response about new packaging systems and safety and legislative requirements
CO 8:	Acquaint about food-package interaction between package-flavour, gas storage systems for food storage, recycling and use of green plastics for reducing the pollution and their effect on food quality.
<b>PH 593.4 Food Biotechnology</b>	
CO 1:	Students shall become aware of fundamentals of food biotechnology, genetics and also gain basic knowledge of cell culture technology.
CO 2:	Have developed an understanding of the application of biotechnology in animal, plant and food production.
CO 3:	Have acquired practical skills in using nucleic acids sequences and bioinformatics data on computers.
CO 4:	Be able to recommend appropriate measures to solve technical problems
<b>PS 595.4 Food Safety and Quality Control</b>	
CO 1:	Understand, use and apply the knowledge, skills of quality management in food processing.
CO 2:	Understand and critically evaluate the presence of contaminants in food quality assurance.
CO 3:	Understand the chemical, technological and toxicological aspects of food additives in food preservation.
CO 4:	Understand the concept of food safety, types of hazards and their control measures
CO 4:	Comprehend the need of hygiene and sanitation for ensuring food safety

<b>M.Sc Chemistry</b>	
<b><u>PROGRAM OUTCOMES</u></b>	
PO 1:	Inculcate critical thinking to carry out scientific investigation objectively in industry and academia by following scientific approach to knowledge development.
PO 2:	Equip the student with necessary skills to analyse scientific problems, formulate hypothesis, evaluate and validate results, and draw conclusions from the data obtained
PO 3:	Equip the student with the knowledge for clear understanding of the subject related concepts to lead them for interdisciplinary and trans disciplinary research
PO 4:	Induce the sense of professional and ethical responsibility and enhance the cross cultural competency
PO 5:	Demonstrate an understanding of major concepts in all disciplines of chemistry
PO 6:	Get an awareness of the impact of chemistry on the environment, society, and other cultures outside the scientific community
<b><u>PROGRAM SPECIFIC OUTCOMES</u></b>	
PSO 1:	To acquire basic knowledge of the analytical chemistry of important techniques that will provide the basis for their industrial production methods.
PSO 2:	To provide an adequate mastery of analytical methods used for the determination of commercial/domestic raw materials and finished product quality.
PSO 3:	To Able to carry out independent research through application of spectroscopic knowledge which in turn facilitates the submission of project/research article.
PSO 4:	Able to successfully prepare for the competitive examinations like CSIR-NET, GATE and State Level eligibility test for Lectureship
PSO 5:	Develop strong analytical skills and strong background in the Chemical sciences to join Chemical and Pharmaceutical industry
<b><u>COURSE OUTCOMES</u></b>	
<b>I Semester</b>	
<b>PH 581.1 : INORGANIC CHEMISTRY</b>	
CO 1:	Describe the types of bonds and molecular shape of compounds with emphasis on VSEPR, VB and MO theory of complexes.
CO 2:	Explain the chemistry of acids, bases, non-aqueous solvents and the concepts of hard and soft acids and bases

CO 3:	Discuss the properties of the non-transition elements like C, B and Si and their frameworks
CO 4:	Illustrate the properties of Nitrogen, Phosphorus, Sulphur and noble gas compounds.
<b>PH 582.1 : ORGANIC CHEMISTRY</b>	
CO 1:	Explain the basic concepts of organic chemistry
CO 2:	Explain the reaction intermediates and mechanisms.
CO 3:	Demonstrate the importance of conformation and stereochemistry in understanding the reactivity and stability of organic molecules
CO 4:	Detail the synthesis and stereochemistry of carbohydrate
<b>PH 583.1 : PHYSICAL CHEMISTRY</b>	
CO 1:	Understand the basic concepts of thermodynamics and its applications.
CO 2:	Gather the knowledge about chemical kinetics and its applications
CO 3:	Familiarize with the various concepts in heterogeneous catalysis.
CO 4:	Detail the study of the principle and applications of electrochemistry
<b>PS 584.1 : PRINCIPLES OF ANALYTICAL CHEMISTRY &amp; SEPARATION TECHNIQUES</b>	
CO 1:	Gain a domain knowledge about various sampling techniques and errors.
CO 2:	Evoke the fundamental concepts in different titration techniques
CO 3:	Understand the principle of different chromatography techniques and apply that knowledge for the separation and purification of different samples
<b>PS 585.1 BIOORGANIC CHEMISTRY</b>	
CO 1:	Understand the chemical principles of living cells, their biomolecules and biocatalytic reactions.
CO 2:	Study the basic principles of nucleic acid chemistry.
CO 3:	Explain the structure determination, synthesis and classification of biomolecules like vitamins and lipids
<b>PS 586.1 RESEARCH METHODOLOGY</b>	
CO 1:	Evaluate Research output with philosophical base and greater relevance to the society
CO 2:	Identify the parameters of Quality research with scientific methodology
CO 3:	Understand the concepts Original Research, ethical guidelines and practices in conducting the research and publication of papers.
CO 4:	Create awareness on Intellectual property Rights and Patents.
<b>PS 587.1P : INORGANIC CHEMISTRY PRACTICALS – I</b>	
CO 1:	Estimate the quantity and quality of different compounds and metal ions using gravimetry, volumetry and complexometric techniques.

<b>PS 588.1P : ORGANIC CHEMISTRY PRACTICALS - I</b>	
CO 1:	Carry out multi-step organic synthesis Purify the synthesized organic compounds
<b>PS 589.1P : PHYSICAL CHEMISTRY PRACTICALS - I</b>	
CO 1:	Carry out experiments related to viscometry, Polarimetry, Refractometry, Conductometry, Potentiometry and pH metry.
CO 2:	Determine the $K_a$ of various acids by different electroanalytical techniques.
<b>SECOND SEMESTER</b>	
<b>PH 581.2: ADVANCED INORGANIC CHEMISTRY</b>	
CO 1:	Understand the Chemistry of d block elements, Lanthanides and Actinides and explain the magnetic and electronic properties of them
CO 2:	Describe the VB and MO theory of complexes and electronic and bonding reactivities of transition metals
CO 3:	Describe the basic concepts of organometallic chemistry and their bonding patterns especially with unsaturated ligands
CO 4:	Explain the spectral and magnetic properties of metal complexes
<b>PH 582.2: ADVANCED ORGANIC CHEMISTRY</b>	
CO 1:	Describe the mechanisms of different types organic reactions.
CO 2:	Understand the chemistry of radical reactions and its applications.
CO 3:	Understand the mechanism of additions to various Carbon based multiple bonds
CO 4:	Achieve skills in constructing homo/heterocyclic rings of significant molecules
<b>PH 583.2: ADVANCED PHYSICAL CHEMISTRY</b>	
CO 1:	Gather the knowledge in the Quantum Chemistry and its application
CO 2:	Explain the approximation methods in quantum mechanics
CO 3:	Describe the quantum mechanical explanation of chemical bonding
CO 4:	Explain the relationship between microscopic properties of molecules with macroscopic thermodynamic observables
<b>PS 584.2: MOLECULAR SYMMETRY AND MOLECULAR SPECTROSCOPY</b>	
CO 1:	Apply the principles of group theory in chemical bonding.
CO 2:	Define aspects of specific spectroscopic techniques, applications of molecular symmetry in Microwave and Vibrational spectroscopy
CO 3:	Define aspects of specific spectroscopic techniques, applications of molecular symmetry in Rotational and Raman spectroscopy
<b>PS 585.2 : CHEMISTRY OF BIOMOLECULES</b>	
CO 1:	Explain the structure and role of biomolecules like peptide, proteins and lipids

CO 2:	Understand the chemical principles of living cells, their biomolecules and biocatalytic reactions.
CO 3:	Detail the synthesis and stereochemistry of carbohydrate
<b>PS 586.2P : INORGANIC CHEMISTRY PRACTICALS - II</b>	
CO 1:	Estimate binary mixtures of metallic ions in solution
CO 2:	Analyse the presence of inorganic salts qualitatively
<b>PS 587.2P : ORGANIC CHEMISTRY PRACTICALS - II</b>	
CO 1:	Separate and analyse the binary mixture of Organic Compounds
<b>PS 588.2P : PHYSICAL CHEMISTRY PRACTICALS - II</b>	
CO 1:	Determine cryoscopic constants, dissociation constants and various other physical properties of compounds
CO 2:	Carry out kinetic experiments to determine the order, rate of various chemical reactions.
<b>PO 589.2- ANALYTICAL TECHNIQUES</b>	
CO 1:	Gain a domain knowledge about biomolecules and the chemistry related to it
CO 2:	Understand different electro-analytical techniques
CO 3:	Understand the chemistry of Polymers
<b>THIRD SEMESTER</b>	
<b>PH 581.3 :ORGANOMETALLIC, BIOINORGANIC AND COORDINATION CHEMISTRY</b>	
CO 1:	Describe the basic concepts, synthesis, reaction chemistry of organometallic compounds and the structure and bonding patterns.
CO 2:	Detail the mechanism of different organometallic reactions and catalysis and their application as industrial catalysts.
CO 3:	Understand the role and interaction of Metal ions in biological systems.
CO 4 :	Understand the nomenclature, metal-ligand reactions and their mechanism and identify the bonding, structure, and reactivity of selected coordination complexes.
<b>PH 582.3: ELECTROCHEMISTRY AND THERMO-ANALYTICAL METHODS</b>	
CO 1:	Detail the structure of electrode-electrolyte interface with various models such as Helmholtz - Perrin, Gouy - Chapman and Stern model of electrical double layers.
CO 2:	Describe the physical principles of Photo electrochemistry and its classification.
CO 3:	Understand the basic principles of corrosion science.
CO 4 :	Describe the methods of corrosion protection and explain the principles of corrosion protection.
<b>PS 583.3: MOLECULAR SPECTROSCOPY</b>	
CO 1:	Gather knowledge about various spectroscopic techniques such as IR, NMR, UV and Mass spectroscopy analysis.

CO 2:	Understand theory and application to mass spectrometry, ultraviolet and visible spectroscopy, infrared spectroscopy, nuclear magnetic resonance spectroscopy.
CO 3:	Apply NMR, IR, MS, UV-Vis spectroscopic techniques in solving structure of organic molecules
<b>PS 584.3 : MEDICINAL CHEMISTRY</b>	
CO 1:	Explain the mechanism of drug action and drug designing.
CO 2:	Understand the classification, structure and mechanism of action of drugs.
CO 3:	Develop an understanding on various CNS depressants
<b>PS 586.3P: COMPUTERS FOR CHEMISTS</b>	
CO 1:	Understand about the different operating systems and softwares
<b>PS 585.3P: INORGANIC CHEMISTRY PRACTICALS - III</b>	
CO 1:	Estimate binary mixtures of metallic ions in solution
CO 2:	Detects the presence of certain types of ions in water.
<b>PS 586.3P ORGANIC CHEMISTRY PRACTICALS - III</b>	
CO 1:	Separate and perform systematic qualitative analysis of binary mixtures of organic compounds containing both mono and bifunctional groups and preparation of suitable derivatives.
<b>PS 587.3P : PHYSICAL CHEMISTRY PRACTICALS - III</b>	
CO 1:	Carry out experiments related to Polarography, Conductometry and Potentiometry.
CO 2:	Verify some laws of electrochemistry.
<b>PO588.3 BIO-INORGANIC CHEMISTRY, GREEN CHEMISTRY AND ENVIRONMENTAL CHEMISTRY</b>	
CO 1:	Understand the role and interaction of Metal ions in biological systems.
CO 2:	Understand the principle and importance of green chemistry.
CO 3:	Identify environmental problems related to pollution
CO 4 :	Identify and utilize eco- friendly methods to protect environment
CO 5:	Understand and apply green chemical methods to solve the problems related to environmental pollution.
<b>FOURTH SEMESTER</b>	
<b>PH 581.4: ORGANIC SYNTHETIC METHODS</b>	
CO 1:	Understand and apply the various reagents in organic synthesis and design organic synthetic reactions.
CO 2:	Describe the applications of oxidation and reduction techniques in organic syntheses.

CO 3:	Prefer suitable reagent for important reactions/building appropriate bonds.
CO 4 :	Understand the principles and applications of protecting groups in chemistry
<b>PH 582.4 : RADIATION AND PHOTOCHEMISTRY</b>	
CO 1:	Demonstrate a systematic understanding of the key aspects of nuclear chemistry and their analytical applications
CO 2:	Acquire the knowledge of nucleus, nuclear reaction, radioactive techniques and application of radioisotopes.
CO 3:	Describe the methods of measurements and kinetics of photochemical reactions
CO 4 :	Discuss the principle of absorption and emission of radiation and explain the mechanism of Jablonski diagram
CO 3:	Get training on using subject specific softwares.
CO 4 :	Get a hands-on experience to use the relevant softwares
<b>PH 583.4: CHEMISTRY OF POLYMERS AND NATURAL PRODUCTS</b>	
CO 1:	Understand preparation methods, property uses of some industrially important polymers.
CO 2:	Describe the morphology, structure thermal, physical, and mechanical properties of polymers.
CO 3:	Gather knowledge about the classification, isolation techniques, understand the various synthetic approaches in Natural Products synthesis structural elucidation of natural products.
CO 4 :	Explain the basics and applications of concerted reactions and pericyclic reactions. Develop an in-depth knowledge of the basics and applications with mechanistic understanding in concerted reactions apply those in the synthesis of organic compounds.
<b>PH 584.4P ORGANIC CHEMISTRY PRACTICALS - IV</b>	
CO 1:	Detail the various organic reactions and their synthetic procedures.
CO 2:	Analyze the separation processes of various organic compound mixtures and their quality checking processes
<b>PH 585.4P : INORGANIC CHEMISTRY PRACTICALS - IV</b>	
CO 1:	Estimate binary mixtures of metallic ions in solution.
CO 2:	Study structure of the prepared complexes using conductance and magnetic susceptibility measurements, recording the electronic and infrared spectra
<b>PS 587.4 : SOLID STATE AND NANO CHEMISTRY</b>	
CO 1:	Understand the theory of diffraction techniques
CO 2:	ain a domain knowledge about crystal systems and defects
CO 3:	Understand the importance and basic concepts of Nano chemistry

**M.Sc Analytical Chemistry****PROGRAM OUTCOMES**

PO 1:	Inculcate critical thinking to carry out scientific investigation objectively in industry and academia by following scientific approach to knowledge development.
PO 2:	Equip the student with necessary skills to analyse scientific problems, formulate hypothesis, evaluate and validate results, and draw conclusions from the data obtained
PO 3:	Equip the student with the knowledge for clear understanding of the subject related concepts to lead them for interdisciplinary and trans disciplinary research
PO 4:	Induce the sense of professional and ethical responsibility and enhance the cross cultural competency
PO 5:	Demonstrate an understanding of major concepts in all disciplines of chemistry
PO 6:	Get an awareness of the impact of chemistry on the environment, society, and other cultures outside the scientific community

**PROGRAM SPECIFIC OUTCOMES**

PSO 1:	Apply advanced concepts of organic, analytical, physical and inorganic chemistry to solve complex problems of industry and academia
PSO 2:	Design experiments, analyse and interpret data to provide solutions to various industrial glitches by working in the pure, inter and multi-disciplinary areas of chemical sciences.
PSO 3:	Able to independently carry out research / investigation to solve practical problems and write / present a substantial technical report/document.
PSO 4:	Able to successfully prepare for the competitive examinations like CSIR-NET, GATE and State Level eligibility test for Lectureship
PSO 5:	Develop strong analytical skills and strong background in the Chemical sciences to join Chemical and Pharmaceutical industry

**COURSE OUTCOMES****I Semester****PH 541.1 : INORGANIC CHEMISTRY**

CO 1:	Describe the types of bonds and molecular shape of compounds with emphasis on VSEPR, VB and MO theory of complexes.
CO 2:	Explain the chemistry of acids, bases, non-aqueous solvents and the concepts of hard and soft acids and bases
CO 3:	Discuss the properties of the non-transition elements like C, B and Si and their frameworks
CO 4:	Illustrate the properties of Nitrogen, Phosphorus, Sulphur and noble gas compounds.

**PH 542.1 : ORGANIC CHEMISTRY**

CO 1:	Explain the basic concepts of organic chemistry
CO 2:	Explain the reaction intermediates and mechanisms.
CO 3:	Demonstrate the importance of conformation and stereochemistry in understanding the reactivity and stability of organic molecules
CO 4:	Detail the synthesis and stereochemistry of carbohydrate
<b>PH 543.1 : PHYSICAL CHEMISTRY</b>	
CO 1:	Understand the basic concepts of thermodynamics and its applications.
CO 2:	Gather the knowledge about chemical kinetics and its applications
CO 3:	Familiarize with the various concepts in heterogeneous catalysis.
CO 4:	Detail the study of the principle and applications of electrochemistry
<b>PS 544.1 : PRINCIPLES OF ANALYTICAL CHEMISTRY &amp; SEPARATION TECHNIQUES</b>	
CO 1:	Gain a domain knowledge about various sampling techniques and errors.
CO 2:	Evoke the fundamental concepts in different titration techniques
CO 3:	Understand the principle of different chromatography techniques and apply that knowledge for the separation and purification of different samples
<b>PS 545.1 BIOORGANIC CHEMISTRY</b>	
CO 1:	Understand the chemical principles of living cells, their biomolecules and biocatalytic reactions.
CO 2:	Study the basic principles of nucleic acid chemistry.
CO 3:	Explain the structure determination, synthesis and classification of biomolecules like vitamins and lipids
<b>PS 546.1 RESEARCH METHODOLOGY</b>	
CO 1:	Evaluate Research output with philosophical base and greater relevance to the society
CO 2:	Identify the parameters of Quality research with scientific methodology
CO 3:	Understand the concepts Original Research, ethical guidelines and practices in conducting the research and publication of papers.
CO 4:	Create awareness on Intellectual property Rights and Patents.
<b>PS 547.1P : INORGANIC CHEMISTRY PRACTICALS - I</b>	
CO 1:	Estimate the quantity and quality of different compounds and metal ions using gravimetry, volumetry and complexometric techniques.
<b>PS 548.1P : ORGANIC CHEMISTRY PRACTICALS - I</b>	
CO 1:	Carry out multi-step organic synthesis Purify the synthesized organic compounds
<b>PS 549.1P : PHYSICAL CHEMISTRY PRACTICALS - I</b>	

CO 1:	Carry out experiments related to viscometry, Polarimetry, Refractometry, Conductometry, Potentiometry and pH metry.
CO 2:	Determine the Ka of various acids by different electroanalytical techniques.
<b>SECOND SEMESTER</b>	
<b>PH 541.2: ADVANCED INORGANIC CHEMISTRY</b>	
CO 1:	Understand the Chemistry of d block elements, Lanthanides and Actinides and explain the magnetic and electronic properties of them
CO 2:	Describe the VB and MO theory of complexes and electronic and bonding reactivities of transition metals
CO 3:	Describe the basic concepts of organometallic chemistry and their bonding patterns especially with unsaturated ligands
CO 4:	Explain the spectral and magnetic properties of metal complexes
<b>PH 542.2: ADVANCED ORGANIC CHEMISTRY</b>	
CO 1:	Describe the mechanisms of different types organic reactions.
CO 2:	Understand the chemistry of radical reactions and its applications.
CO 3:	Understand the mechanism of additions to various Carbon based multiple bonds
CO 4:	Achieve skills in constructing homo/heterocyclic rings of significant molecules
<b>PH 543.2: ADVANCED PHYSICAL CHEMISTRY</b>	
CO 1:	Gather the knowledge in the Quantum Chemistry and its application
CO 2:	Explain the approximation methods in quantum mechanics
CO 3:	Describe the quantum mechanical explanation of chemical bonding
CO 4:	Explain the relationship between microscopic properties of molecules with macroscopic thermodynamic observables
<b>PS 544.2: MOLECULAR SYMMETRY AND MOLECULAR SPECTROSCOPY</b>	
CO 1:	Apply the principles of group theory in chemical bonding.
CO 2:	Define aspects of specific spectroscopic techniques, applications of molecular symmetry in Microwave and Vibrational spectroscopy
CO 3:	Define aspects of specific spectroscopic techniques, applications of molecular symmetry in Rotational and Raman spectroscopy
<b>PS 545.2 : CHEMISTRY OF BIOMOLECULES</b>	
CO 1:	Explain the structure and role of biomolecules like peptide, proteins and lipids
CO 2:	Understand the chemical principles of living cells, their biomolecules and biocatalytic reactions.

CO 3:	Detail the synthesis and stereochemistry of carbohydrate
<b>PS 546.2P : INORGANIC CHEMISTRY PRACTICALS - II</b>	
CO 1:	Estimate binary mixtures of metallic ions in solution
CO 2:	Analyse the presence of inorganic salts qualitatively
<b>PS 547.2P : ORGANIC CHEMISTRY PRACTICALS - II</b>	
CO 1:	Separate and analyse the binary mixture of Organic Compounds
<b>PS 548.2P : PHYSICAL CHEMISTRY PRACTICALS - II</b>	
CO 1:	Determine cryoscopic constants, dissociation constants and various other physical properties of compounds
CO 2:	Carry out kinetic experiments to determine the order, rate of various chemical reactions.
<b>PO 549.2- ANALYTICAL TECHNIQUES</b>	
CO 1:	Gain a domain knowledge about biomolecules and the chemistry related to it
CO 2:	Understand different electro-analytical techniques
CO 3:	Understand the chemistry of Polymers
<b>THIRD SEMESTER</b>	
<b>PH 541.3 :ORGANOMETALLIC, BIOINORGANIC AND COORDINATION CHEMISTRY</b>	
CO 1:	Describe the basic concepts, synthesis, reaction chemistry of organometallic compounds and the structure and bonding patterns.
CO 2:	Detail the mechanism of different organometallic reactions and catalysis and their application as industrial catalysts.
CO 3:	Understand the role and interaction of Metal ions in biological systems.
CO 4 :	Understand the nomenclature, metal-ligand reactions and their mechanism and identify the bonding, structure, and reactivity of selected coordination complexes.
<b>PH 542.3: ELECTROANALYTICAL RADIOCHEMICAL AND THERMOANALYTICAL TECHNIQUES</b>	
CO 1:	Describe the principles of electrochemistry and applications of electromotive force.
CO 2:	Explain the principles of irreversible thermodynamics and bioenergetics
CO 3:	Demonstrate a systematic understanding of the key aspects of nuclear chemistry and their analytical applications.
CO 4 :	Understand and apply various electro-analytical techniques in qualitative and quantitative analysis.

<b>PS 543.3: MOLECULAR SPECTROSCOPY</b>	
CO 1:	Gather knowledge about various spectroscopic techniques such as IR, NMR, UV and Mass spectroscopy analysis.
CO 2:	Understand theory and application to mass spectrometry, ultraviolet and visible spectroscopy, infrared spectroscopy, nuclear magnetic resonance spectroscopy.
CO 3:	Apply NMR, IR, MS, UV-Vis spectroscopic techniques in solving structure of organic molecules
<b>PS 544.3 : MEDICINAL CHEMISTRY</b>	
CO 1:	Explain the mechanism of drug action and drug designing.
CO 2:	Understand the classification, structure and mechanism of action of drugs.
CO 3:	Develop an understanding on various CNS depressants
<b>PS 546.3P: COMPUTERS FOR CHEMISTS</b>	
CO 1:	Understand about the different operating systems and softwares
CO 2:	Get training on using subject specific softwares
CO 3:	Get a hands-on experience to use the relevant softwares
<b>PS 545.3P: ANALYTICAL CHEMISTRY PRACTICALS – I</b>	
CO 1:	Analyze the common and rare cations in a mixture by different titration techniques.
CO 2:	Handle spectrophotometry for various determinations
<b>PS 546.3P ANALYTICAL CHEMISTRY PRACTICALS – II</b>	
CO 1:	Have clear understanding of different analytical instruments.
CO 2:	Apply chromatographic techniques as analytical tool in chemistry.
<b>PO547.3 OPTICAL METHODS OF ANALYSIS</b>	
CO 1:	Understand the basic principles, working and application of atomic absorption spectroscopy
CO 2:	Will be able to describe the physical principles of photochemistry and explain the methods of fluorescence spectroscopy.
CO 3:	To learn and analyze the optical properties of solids using various instrumentation techniques.
<b>FOURTH SEMESTER</b>	

<b>PH 541.4: ORGANIC SYNTHETIC METHODS</b>	
CO 1:	Understand and apply the various reagents in organic synthesis and design organic synthetic reactions.
CO 2:	Describe the applications of oxidation and reduction techniques in organic syntheses.
CO 3:	Prefer suitable reagent for important reactions/building appropriate bonds.
CO 4 :	Understand the principles and applications of protecting groups in chemistry
<b>PH 542.4: SPECTROSCOPIC METHODS OF ANALYSIS</b>	
CO 1:	Learn the fundamental principles of instrumental measurements,
CO 2:	Develop and understand the basic principles and application of Electron spin resonance (ESR) spectroscopy, Photoelectron, NQR and Mossbauer spectroscopy for the structural elucidation of compounds.
CO 3:	Understand the underlying principle of different biophysical methods and will be able to describe the physical principles of photochemistry
<b>PH 543.4: CHEMISTRY OF POLYMERS AND NATURAL PRODUCTS</b>	
CO 1:	Understand preparation methods, property uses of some industrially important polymers.
CO 2:	Describe the morphology, structure thermal, physical, and mechanical properties of polymers.
CO 3:	Gather knowledge about the classification, isolation techniques, understand the various synthetic approaches in Natural Products synthesis structural elucidation of natural products.
CO 4 :	Explain the basics and applications of concerted reactions and pericyclic reactions. Develop an in-depth knowledge of the basics and applications with mechanistic understanding in concerted reactions apply those in the synthesis of organic compounds.
<b>PH 544.4P ANALYTICAL CHEMISTRY PRACTICALS - III</b>	
CO 1:	Understand of different analytical instruments.
CO 2:	Experimental verification of fundamental concept

CO 3:	Application of spectroscopic techniques as analytical tool in chemistry
<b>PH 546.4 : APPLIED ANALYSIS AND AUTOMATION</b>	
CO 1:	To be able to determine the reaction rates
CO 2:	Be able to describe the chemical and biochemical properties of major food constituents, poisonous materials and have an overview of the automated systems
CO 3:	An ability to ensure the quality of production processes within the field of chemistry so as to guarantee effective output.
<b>PS 547.4 : RADIATION AND PHOTOCHEMISTRY</b>	
CO 1:	Demonstrate a systematic understanding of the key aspects of nuclear chemistry and their analytical applications
CO 2:	Acquire the knowledge of nucleus, nuclear reaction, radioactive techniques and application of radioisotopes.
CO 3:	Describe the methods of measurements and kinetics of photochemical reactions
CO 34:	Discuss the principle of absorption and emission of radiation and explain the mechanism of Jablonski diagram

## M.Sc Mathematics

### PROGRAM OUTCOMES

PO 1:	Understand the fundamental axioms in Mathematics and develop problem solving skills.
PO 2:	Develop analytical thinking and logical reasoning.
PO 3:	Pursue careers in academia, industry and the other areas of Mathematics.
PO 4:	Apply knowledge of Mathematics in all fields of learning including higher research and its extensions.
PO 5:	Crack lectureship and fellowship exams approved by UGC like CSIR-NET, KSET, GATE etc.\

### PROGRAM SPECIFIC OUTCOMES

PSO 1:	Understand formal mathematical definitions, concepts and apply them to prove statements in Analysis
PSO 2:	Develop problem solving skills using Matrix Theory in Linear Algebra and will be able to apply in other fields.
PSO 3:	Understand the concepts of groups, rings, fields and other algebraic structures.
PSO 4:	Understand the importance and applications of Operations Research to find solutions to real life problems.
PSO 5:	Understand various properties of topological spaces and be able to prove Lindelof's theorem, Urysohn's Lemma, Tietze Extension theorem, etc.
PSO 6:	Understand the concept of Graphs and its wide range of applications in physical, biological, social and information systems
PSO 7:	Learn techniques of Complex Analysis, describe domains and compute limits in the complex plane, use the Cauchy-Riemann equations to obtain the derivative of complex functions, evaluate integrals using Residue theorem.
PSO 8:	Apply the fundamental concepts of Numerical Analysis, Ordinary Differential Equations and Partial Differential Equations
PSO 9:	Understand the fundamental applications of Functional Analysis and the concepts associated with the dual of a linear space.
PSO 10:	To solve problems using FOSS and prepare documents using Latex software which will be very useful for their research programs

<b>COURSE OUTCOMES</b>	
<b>I Semester</b>	
CO 1:	Identify the concept of Normal groups and Quotients groups.
CO 2:	Investigate symmetry using group theory.
CO 3:	Analyze Permutation groups and counting principle.
CO 4:	Perform computations in symmetric groups
CO 5:	Explain Sylow theorem and its applications.
CO 5:	Provide information on ideals and Quotient rings, Field of Quotient of an integral domai
<b>PH 562.1 Linear Algebra I</b>	
CO 1:	gain knowledge of theory of matrices, and their operations solve linear system of equations
CO 2:	learn the concepts of subspace, basis, linear independence, dimension of vector spaces and linear transformations
CO 3:	understand the concept of Eigen values, eigen vectors
CO 4:	understand the concept of diagonalization of matrices solve system of differential equations using matrix theory and compute matrix exponentials
CO 5:	gain knowledge of theory of matrices, and their operations solve linear system of equations
<b>PS 564.1 Graph Theory</b>	
CO 1:	Understand basic properties of $\mathbb{R}$ , such as its characterization as a complete ordered field, Archimedean Property, density of $\mathbb{Q}$ , countability and uncountability of sets.
CO 2:	Classify and explain open and closed sets, limit points, compactness, connectedness etc. in a metric space.
CO 3:	Use the definitions of convergence as they apply to sequences and series.
CO 4:	Determine the continuity of functions in metric spaces
CO 5:	Find the derivative of functions defined on subsets of the real line.
CO 6:	Understand the differentiation of vector valued functions
<b>PS 564.1 Graph Theory</b>	
CO 1:	Write precise and accurate mathematical definitions of basics concepts in

	graph theory.
CO 2:	Study the properties of trees and connectivity.
CO 3:	Apply results to identify both Eulerian graphs and Hamiltonian graphs.
CO 4:	Understand the concepts Planarity including Euler identity.
CO 5:	Discuss and understand the importance of Coloring.
CO 6:	Understand and apply various proof techniques in proving theorems in graph theory.
<b>PS 565.1 Fluid Mechanics</b>	
CO 1:	the types of fluid flows, and understand the basic laws
CO 2:	the principles and phenomena in the area of fluid mechanics
CO 3:	derive Euler's equation of Motion and deduce Bernoulli's equations
CO 4:	to solve problems related to kinematics and dynamics of fluids, losses in a flow system, flow
CO 5:	through pipes and flow past immersed bodies
<b>PS 566.1 Operations Research</b>	
CO 1:	Define and formulate linear programming problems and appreciate their limitations.
CO 2:	Solve linear programming problems using appropriate techniques and interpret the results obtained.
CO 3:	Explain the primal-dual relationship.
CO 4:	Develop mathematical skills to analyse and solve transportation and assignment models arising from a wide range of applications.
CO 5:	Understand the concept of game theory and learn its applications in different social situations.
<b>PS 567.1 Ordinary Differential Equations</b>	
CO 1:	Use the Wronskian to determine if a set of functions is linearly independent, construct a second solution to a second order differential equation by reduction of order.
CO 2:	Find the complete solution of a homogeneous differential equation with constant coefficients by examining the characteristic equation and its roots.
CO 3:	Find the complete solution of a nonhomogeneous differential equation with constant coefficients by the method of undetermined coefficients and by the method of variation
CO 4:	of parameters.
CO 5:	Solve basic application problems described by second order linear differential equations with constant coefficients.
CO 6:	Identify ordinary and singular points and find power series solutions about ordinary points and singular points.

<b>II Semester</b>	
<b>PH 561.2 Algebra II</b>	
CO 1:	Understand the notion of irreducibility, primes and unique factorization
CO 2:	Derive and apply Gauss Lemma, Eisenstein criterion for irreducibility of polynomials. Understand the concept of Factorization and ideal theory in the polynomial ring, the structure of Primitive polynomials
CO 3:	Explain the concepts of Field extensions and characterization of finite normal extensions as splitting fields
CO 4:	Understand the structure and construction of finite fields
CO 5:	Analyze splitting fields, Galois extensions and Galois groups
<b>PS 562.2 Research Methodology and Ethics</b>	
CO 1:	Understand the meaning of quality research with scientific methodology
CO 2:	Produce of good Research Reports
CO 3:	Understand original Research following ethical guidelines and practices in conducting the research and publication of papers.
CO 4:	Get awareness on Intellectual property Rights and Patents.
<b>PH 563.2 Real Analysis II</b>	
CO 1:	Understand the definition of integrals and their properties
CO 2:	Determine the Riemann-Stieltjesintegrability of a bounded function and prove a selection of theorems concerning integration
CO 3:	Recognize the difference between pointwise and uniform convergence of sequences and series of functions.
CO 4:	Illustrate the effect of uniform convergence on the limit function with respect to continuity, differentiability and integrability.
CO 5:	Evaluate improper integrals
CO 6:	To gain knowledge on functions of several variables -The contraction principle, inverse function theorem and implicit function theorem.
<b>PS 564.2 Linear Algebra II</b>	
CO 1:	Understand the concept of bilinear forms on vector spaces
CO 2:	Derive spectral theorems for various types of operators on vector spaces
CO 3:	Explain the theory of modules
CO 4:	Apply the theory in diagonalization of matrices over rings
<b>PS 565.2 Lattice Theory</b>	
CO 1:	Understand the concept of Partially ordered sets and Their Properties.
CO 2:	Identify Lattices as posets and as Algebraic Structures and explain the theory of lattices in general.
CO 3:	Explain the concept of Complete Lattices and understand their properties.

CO 4:	Explain the concept of Modular and Distributive Lattices.
<b>PO 566.2 Basic Tools in Mathematics (OE)</b>	
CO 1:	know about the number system, countability and uncountability of sets
CO 2:	use the definitions of convergence as they apply to sequences and series
CO 3:	Determine the limits, continuity and differentiability of functions defined on subsets of the real line.
CO 4:	know about optimization of functions of one variable
CO 5:	solve system of linear equations using Matrix theory
CO 6:	compute eigen values and eigen vectors
<b>PS 567.2P Computational Lab -1 (using FOSS and Problem working)</b>	
CO 1:	understand the usefulness of FOSS in Mathematical computations
CO 2:	solve problems in matrix theory using FOSS
CO 3:	do computations with algebraic structures such as groups, rings and fields with the aid of FOSS
CO 4:	test the continuity, differentiability of functions and evaluate limits
<b>III Semester PH 561.3 Complex Analysis I</b>	
CO 1:	Represent complex numbers algebraically and geometrically
CO 2:	Define and analyze limits and continuity for complex functions.
CO 3:	Apply the concept and consequences of analyticity and the Cauchy-Riemann equations
CO 4:	Apply the Cauchy integral theorem in its various versions, and the Cauchy integral formula
CO 5:	To classify singularities and poles
<b>PH 562.3 Topology</b>	
CO 1:	Define a topology , a basis for a topology and various types of topologies
CO 2:	To construct topological spaces from metric spaces.
CO 3:	Gains knowledge on general properties of neighborhoods, open sets, closed sets, basis and sub-basis.
CO 4:	Apply the properties of open sets, closed sets, interior points, accumulation points and derived sets in deriving the proofs of various theorems.
CO 5:	Understand the concepts and properties of compact and connected topological spaces.
CO 6:	Gain knowledge on the concepts of countable spaces and separable spaces.
<b>PH 563.3 Numerical Analysis with Computational Lab</b>	
CO 1:	Apply appropriate algorithms to solve selected problems, both manually and by writing computer programs.

CO 2:	Compare different algorithms with respect to accuracy and efficiency of solution.
CO 3:	Analyze the errors obtained in the numerical solution of problems.
CO 4:	Demonstrate the use of interpolation methods to find intermediate values in given graphical and/or tabulated data.
CO 5:	Using appropriate numerical methods, determine approximate solutions for problems of differentiation and integration.
CO 6:	Using appropriate numerical methods, determine approximate solutions to ordinary differential equations.
<b>PS 564.3 Commutative Algebra</b>	
CO 1:	basic definitions concerning elements in rings, classes of rings, and ideals in commutative rings.
CO 2:	constructions of rings of fractions and modules of fractions, localization at prime ideals
CO 3:	the concept of Noetherian rings and Hilbert basis theorem.
CO 4:	The primary decomposition of ideals in Noetherian rings.
<b>PS 565.3 Multivariate Calculus and Geometry</b>	
CO 1:	account for important theorems and concepts in multivariate analysis.
CO 2:	account for the most common multivariate methods.
CO 3:	explain the geometry of curves on $\mathbb{R}^3$ .
CO 4:	explain the geometry of surfaces on $\mathbb{R}^3$ .
<b>PS 566.3 Probability Theory</b>	
CO 1:	Develop problem-solving techniques needed to accurately calculate probabilities
CO 2:	Apply problem-solving techniques to solving real-world events.
CO 3:	Understand the properties of discrete and continuous random variables with their joint, marginal, and conditional distributions
CO 4:	Apply selected probability distributions to solve problems.
<b>PO 567.3 Differential Equations and Applications (OE)</b>	
CO 1:	Find solution of first order and second order ordinary differential equations using different methods.
CO 2:	Apply different techniques to solve differential equations in Applied Mathematics.
CO 3:	Find solution of first order and second order partial differential equations using different methods.
CO 4:	Find solution of wave equation and Heat equation.
<b>IV Semester</b>	
<b>PH 561.4 Measure Theory and Integration</b>	

CO 1:	give a more rigorous introduction to the theory of measure.
CO 2:	Understand the notions of measurable sets and functions
CO 3:	develop the ideas of Lebesgue integration and its properties.
CO 4:	Identify measurable functions.
CO 5:	construct the Lebesgue integral and understand properties of the Lebesgue integral.
CO 6:	Learn inequalities in $L^p$ Spaces, signed measures and their derivatives
<b>PH 562.4 Complex Analysis II</b>	
CO 1:	To understand and apply results on analytic, harmonic and entire functions.
CO 2:	Gain knowledge on simply connected and multiply connected regions
CO 3:	Represent functions as Taylor, power and Laurent series,
CO 4:	Classify singularities and poles, find residues
CO 5:	Evaluate complex integrals using the residue theorem.
<b>PS 564.4 Functional Analysis</b>	
CO 1:	Explain the fundamental concepts of functional analysis.
CO 2:	Understand the definitions of linear functional and prove theorems such as the Hahn-Banach theorem, Open Mapping theorem and Uniform Boundedness Principle.
CO 3:	Define linear operators, self-adjoint, isometric and unitary operators on Hilbert spaces
CO 4:	Explain the concept of the spectrum of a bounded linear operator
<b>PS 565.4 Partial Differential Equations</b>	
CO 1:	Study surfaces and curves in three-dimension space.
CO 2:	Classify partial differential equations and transform into canonical form
CO 3:	Solve linear partial differential equations of both first and second order
CO 4:	Analyze the origin of first order partial differential equations and solving them using Charpit's method
CO 5:	Apply partial derivative equation techniques to predict the behavior of certain phenomena.
<b>PS 566.4 Algebraic Number Theory</b>	
CO 1:	Define and interpret the concepts of congruence, and use the theory of congruences in applications.
CO 2:	Prove and apply properties of multiplicative functions such as the Euler phi-function and of quadratic residues.
CO 3:	Apply the Law of Quadratic Reciprocity and other methods to classify numbers as quadratic residues, and quadratic non-residues

CO 4:	To study the number theoretic applications of unique factorization and solving some Diophantine equations Factorization of ideals in Dedekind domains
<b>PS 567.4 Cryptography</b>	
CO 1:	Have knowledge on fundamentals of number theory.
CO 2:	Understand the operations with congruences, linear and non-linear congruence equations.
CO 3:	Understand basics of Cryptography and Network Security.
CO 4:	Be able to secure a message over insecure channel by various means.
CO 5:	Learn about how to maintain the Confidentiality, Integrity and Availability of data.
CO 6:	Understand various protocols for network security to protect against the threats in the networks.
<b>PS 568.4 Distribution Theory</b>	
CO 1:	Demonstrate the random variables and its functions
CO 2:	Infer the expectations for random variable functions and generating functions.
CO 3:	Demonstrate various discrete and continuous distributions and their usage
CO 4:	Study Marginal and conditional distributions.
CO 5:	The Poisson Distribution and The Gamma and Chi-square distributions to solve problems.
CO 6:	Study the t & F distributions and their applications.
<b>PS 569.4P Computational Lab -2 using FOSS and Problem Working</b>	
CO 1:	understand the usefulness of FOSS in Mathematical computations
CO 2:	solve differential equations using FOSS
CO 3:	classify second order PDE's
CO 4:	Solve problems in complex analysis effectively using FOSS

**M.Sc Physics****Programme Outcomes**

PO 1	<p>Acquire</p> <p>(i) a fundamental/systematic or coherent understanding of the academic field of Physics, its different learning areas and applications in basic Physics like Quantum Mechanics, Astrophysics, Materials Science, Nuclear and Particle Physics, Condensed Matter Physics, Atomic and Molecular Physics, Mathematical Physics, Analytical Dynamics, Space Sciences, and its relevance with related disciplinary areas/subjects like Chemistry, Mathematics, Life Sciences, Environmental Sciences, Atmospheric Physics, Computer Sciences, Information Technology;</p> <p>(ii) procedural knowledge that creates different types of professionals related to the disciplinary/subject area of Physics, including professionals engaged in research and development, teaching and government/public service;</p> <p>(iii) skills in areas related to one's specialization area within the disciplinary/subject area and the current and emerging developments in the field of Physics.</p>
PO 2	<p>Demonstrate the ability to use skills in Physics and its related areas of technology for formulating and tackling Physics-related problems, and identifying and applying appropriate physical principles and methodologies to solve a wide range of problems associated with Physics.</p>
PO 3	<p>Recognize the importance of mathematical modelling, simulation and computing, and the role of approximation and mathematical approaches to describe the physical world.</p>
PO 4	<p>Plan and execute Physics-related experiments or investigations, analyze and interpret data/information collected using appropriate methods, including the use of appropriate software such as programming languages and purpose-written packages, and report accurately the findings of the experiment/investigations while relating the conclusions/findings to relevant theories of Physics.</p>
PO 5	<p>Demonstrate relevant generic skills and global competencies such as</p> <p>(i) problem-solving skills that are required to solve different types of</p>

	<p>Physics-related problems with well-defined solutions, and tackle open-ended problems that belong to the disciplinary area boundaries;</p> <p>(ii) investigative skills, including skills of independent investigation of Physics-related issues and problems;</p> <p>(iii) communication skills involving the ability to listen carefully, to read texts and research papers analytically and to present complex information in a concise manner to different groups/audiences of technical or popular nature;</p> <p>(iv) analytical skills involving paying attention to detail and ability to construct logical arguments using correct technical language related to Physics and ability to translate them with popular language when needed;</p> <p>(v) ICT skills; personal skills such as the ability to work both independently and in a group.</p>
PO 6	<p>Demonstrate professional behaviour such as</p> <ol style="list-style-type: none"> <li>I. being objective, unbiased and truthful in all aspects of work and avoiding unethical, irrational behavior such as fabricating, falsifying or misrepresenting data or committing plagiarism;</li> <li>II. the ability to identify the potential ethical issues in work-related situations;</li> <li>III. appreciation of intellectual property, environmental and sustainability issues and Promoting safe learning and working environment.</li> </ol>
<b>Programme Specific Outcomes</b>	
PSO 1	Fundamental understanding of the field
PSO 2	Application of basic Physics concepts
PSO 3	Linkages with related disciplines
PSO 4	Procedural knowledge for professional subjects
PSO 5	Skills in related field of specialization
PSO 6	Ability to use in Physics problem
PSO 7	Skills in Mathematical modelling
PSO 8	Skills in performing analysis and interpretation of data
PSO 9	Develop investigative Skills
PSO 10	Skills in problem solving in Physics and related discipline
PSO 11	Develop technical communication skills

PSO 12	Developing analytical skills and popular communication
PSO 13	Developing ICT skills
PSO 14	Demonstrate professional behaviour with respect to attributes like objectivity, ethical values, self reading, etc.
<b>Course Outcomes</b>	
<b>PH 571.1 Mathematical Physics I</b>	
C O 1	To review the knowledge of vectors and scalar quantities.
C O 2	To learn the concepts of vector calculus such as divergence, curl, line integrals, surface integrals, volume integrals.
C O 3	To study fundamental theorems like The Green's theorem, Stokes' theorem and their applications in Physics.
C O 4	To learn the concepts of curvilinear coordinates and to learn the concepts of vector calculus in curvilinear coordinates.
C O 5	To learn the basic properties of matrices and to study the properties of special types of matrices like Hermitian, Unitary and Orthogonal matrices.
C O 6	To study similarity and unitary transformations, concept of eigenvalues and eigenfunctions, Cayley-Hamilton's Theorem and Diagonalization of matrices.
C O 7	To learn basic definitions of tensors and transformation laws of coordinates. Different types of tensors and algebra of tensors including quotient law.
C O 8	To learn about first and second order partial differential equations, their classification.
C O 9	To solve special equations like Heat equation, Laplace's equation, Poisson's equation.
C O 10	To learn to solve a differential equation using the method of power series.
C O 11	To learn different special functions like Legendre polynomials, Bessel's function, Laguerre polynomials and Hermite's polynomials and to study orthogonality conditions and different recurrence relations of these functions.
<b>PH 572.1 Classical Mechanics</b>	
C O 1	Define and understand the basic concepts related to single particle and a system of particles
C O 2	Describe the motion of a mechanical system using Lagrange and Hamilton formalism.

C O 3	Understand the principles of collisions and learn about the concept of centre of mass and laboratory coordinate system
C O 4	Acquire the basic knowledge of the Phase space and Phase trajectory
C O 5	Learn about the canonical transformation
C O 6	Learn about the concept of two body problem
C O 7	Learn the conservation theorems
C O 8	Acquire the knowledge about equation of the orbit and orbit's classification
C O 9	Learn the Kepler's laws of planetary motion
C O 10	Learn the general description and the concept of Scattering
C O 11	Learn the dynamics of the rigid body
C O 12	Understand the rigid body dynamics
C O 13	Learn the theory of small oscillation
<b>PH 573.1 Classical Electrodynamics</b>	
C O 1	To learn to apply the fundamentals of electrostatics and boundary conditions to solve various problems
C O 2	To learn the fundamentals of magnetostatics and magnetism
C O 3	To learn the electromagnetic theory through Maxwell equations and underlying theories
C O 4	To get a grip on gauge symmetries and transformations and also on radiation emission of a moving or oscillating charge
C O 5	To arrive at the plane wave equation of the electromagnetic fields and studying the plane wave solutions
C O 6	Analysis of reflection and transmission of waves: using electromagnetic boundary conditions.
C O 7	To learn the theory of waveguides and solve the problem of rectangular waveguide.
C O 8	To derive the Lorentz transformation equations and understanding basic relativistic dynamics.
C O 9	Lorentz transformation and relativistic dynamics is learnt to be written in four vector (tensor) notation.
C O 10	Basic laws of electrodynamics, continuity equation, Maxwell's equations, Gauge transformations and potential theory in tensor notation.

<b>PH 574.1 Electronics</b>	
C O 1	Understand characteristics of an ideal operational amplifier (Op-amp) and a practical operational amplifier, open loop and closed loop applications of op-amp; use Op-amp for basic mathematical operations like addition, subtraction, multiplication, integration and differentiation applications and a few special applications such as filtering and comparators.
C O 2	Learn the use of op-amp for wave form generation applications and the applications of timer IC 555.
C O 3	Understand the meaning and types of power amplifiers and their applications. The student will be able to learn specialized applications of SCR, signal conditioning and other varieties of transducer circuits.
C O 4	Will be able to review basics of digital circuits, few aspects of registers and digital data storage, synchronous and asynchronous counter applications, memory devices and basics of a microprocessor.
<b>Semester II</b>	
<b>PH 571.2 Mathematical Physics II</b>	
C O 1	To review the concepts of complex numbers and functions of complex variables.
C O 2	To study calculus of complex functions, Cauchy Riemann conditions and differentiability.
C O 3	To learn integration of complex functions, Cauchy integral theorem, concepts of poles, singularities, residues.
C O 4	To study integration of complex functions using residue theorem also to get a good hold in the concept of mapping and conformal mapping.
C O 5	To review the understanding in Group theory and study the concept of transformation group and symmetry groups.
C O 6	To study representation of groups and understand the concepts of irreducible representations.
C O 7	To learn Lie groups and their application in Physics.
C O 8	To apply the Green's functions to solve various differential equations.
C O 9	Reviewing and understanding the concepts of Fourier series and studying the concepts of Fourier transform and their applications in Physics and

	Electronics.
C O 10	To study Laplace's transforms and their applications in Physics.
C O 11	To learn to interpolate a function using various numerical methods.
C O 12	To study the method of solving non linear equations and also differential equations using numerical methods.
C O 13	To learn integration of various functions by numerical methods.
<b>PH 572.2 Quantum Mechanics I</b>	
C O 1	To setup the Schrödinger equation and to understand the physical interpretation of a quantum mechanical wave function.
C O 2	To study in detail the fundamental postulates of quantum mechanics.
C O 3	To understand the concepts of eigenvalues, eigenfunctions and degeneracy being applied to quantum mechanics.
C O 4	To study various commutation relations and to understand its meaning.
C O 5	To setup the Time Independent Schrödinger equation and to learn the concept of stationary states.
C O 6	To solve various problems like potential well, potential barrier and harmonic oscillator and to study the properties of stationary states of these problems.
C O 7	To study the concept of angular momentum in quantum mechanics and to arrive at the eigenvalues and eigenfunctions of angular momentum and hence to understand the concept of space quantization.
C O 8	To study the applications of angular momentum to spherically symmetric systems and to study parity.
C O 9	To solve the problem of Hydrogen like atoms in atomic physics.
C O 10	To review the concept of scattering and to study quantum mechanical scattering.
C O 11	To understand Partial wave analysis in quantum mechanical scattering and also to apply Born approximation.
<b>PH 573.2 Condensed Matter Physics- I</b>	
C O 1	A brief idea about crystalline materials-lattice- unit cell-miller indices- reciprocal lattice etc.
C O 2	Production and applications of X-ray. X-ray diffraction. Point groups and space groups and quasi crystals
C O 3	Crystal binding- types of bonds, concept of phonon vibration, phonon

	scattering, thermal expansion of solids and lattice thermal conductivity
C O 4	Free electron models of metals, quantum free electron theory, F.D Statistics, Electron in aperiodic potential, Bloch theorem, metals, semimetals and semiconductors.
C O 5	Semiconductors-types, Impurity atoms, electrical conductivity, quantized Hall Effect, amorphous semiconductors, organic semiconductors.
<b>PS 574.2 Research Methodology and Ethics</b>	
C O 1	To have clear understanding of the meaning and purpose of Research in academics, research philosophy and strategies of Research.
C O 2	To acquaint with the knowledge of methodology involved in a scientific Research
C O 3	To know writing of a good Research Report.
C O 4	To understand the ethical issues and practices in research with an awareness of rights and obligations of research participants.
C O 5	Understand the process of Intellectual property Rights and its different forms and implications
C O 6	To know how to write research papers and publish research papers.
<b>PO 577.2 Biophysics</b>	
C O 1	To study the basic concepts of radioactivity and the dose measurements using dosimetry
C O 2	To study the interaction of radiations like charged particles, electrons, electromagnetic radiation and the neutrons with matter and their energy loss.
C O 3	The detection of nuclear radiation using gas filled detector, semiconductor detectors and neutron detectors
C O 4	To explain the effect of radiation on DNA and DNA repair mechanisms.
C O 5	To explain the effect of radiation on chromosome and to study the radiation dose response of chromosomal aberrations.
C O 6	Biological applications of delocalization of molecules
C O 7	DNA and RNA structure and the effect of radiation on them
C O 8	Study of proteins, enzyme and carcinogenic activities

<b>Semester III</b>	
<b>PH 571.3 Quantum Mechanics II</b>	
C O 1	To review the concepts of linear algebra studied in Mathematical Physics I (PH 571.1) so that it can be applied to quantum mechanical calculations.
C O 2	To learn the method of Dirac's ket and bra notations and to learn about general uncertainty relation and theorems like Schwartz inequality.
C O 3	To learn the Schrödinger, Heisenberg and interaction picture and to derive equations of motion and hence to get a broad idea of the process of quantization of a system.
C O 4	To solve the harmonic oscillator and angular momentum problem by matrix method.
C O 5	To study the concept of spin and addition of angular momenta.
C O 6	To study various approximation techniques in quantum mechanics like Perturbation theory, WKB approximation and variational technique.
C O 7	To study the above techniques with real quantum mechanical examples.
C O 8	To setup a relativistic wave equation (Klein-Gordon equation) and to understand the existence of negative probability density.
C O 9	To setup the Dirac's equation, to study the properties of the Dirac's matrices and to arrive at the solutions of Dirac's equation and hence to give the concept of anti particles through the negative energy solutions of the Dirac's equations.
C O 10	To introduce the concept of quantization of fields by first quantizing a classical field and then for a Schrödinger's field and relativistic fields.
<b>PH 572.3 Condensed Matter Physics- II</b>	
C O 1	To understand various types of crystal defects and imperfections in crystal growth process.
C O 2	To familiarise luminescence and related phenomenon.
C O 3	To understand thermodynamics phase transitions, order-disorderness and theories of phase transitions.
C O 4	To review magnetic properties of materials and theories of magnetism. Applications of magnetic properties- Magnetometer, NMR, Resonance.
C O 5	Domain theory of magnetic materials.
C O 6	To understand dielectric materials and their applications.

<b>PH 573.3 Thermodynamic and Statistical Physics</b>	
C O 1	To understand the relevant quantities used to describe macroscopic systems and thermodynamic potential
C O 2	Understand the macroscopic and microscopic description of temperature, entropy and free energy
C O 3	Learn the theory of probability
C O 4	Understand the concept ensembles and theory of ensembles
C O 5	Understand macrostates and microstates
C O 6	Learn partition functions and their importance
C O 7	Learn the various distribution functions and their uses in classical and quantum mechanical non-interacting assemblies of systems
C O 8	Describe the transport phenomena and understand the diffusion coefficients
C O 9	Learn the concept of fluctuation
C O 10	Understand the random walk problem
<b>PH 573.3 Thermodynamic and Statistical Physics</b>	
C O 1	To understand the relevant quantities used to describe macroscopic systems and thermodynamic potential
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C O 8	Describe the transport phenomena and understand the diffusion coefficients
C O 9	Learn the concept of fluctuation
C O 10	Understand the random walk problem
<b>PS 573.3 Relativity and Cosmology</b>	
C O 1	To learn the concepts of Special Theory of Relativity in Tensor notations and also to understand the concepts like Momentum transformations.
C O 2	To study tensor analysis as a prerequisite for the General Theory of relativity

	and understand the meaning of a metric, geodesic and covariant differentiation.
C O 3	To learn the theory of General Relativity starting from the Principle of Equivalence and General Covariance by deriving the Einstein's field equations.
C O 4	To solve the Einstein's field equation for a weak metric case and arrive at Schwarzschild solutions and also to learn about the Schwarzschild radius and Black holes.
C O 5	To study the various experimental predictions of General Relativity in detail.
C O 6	To understand various principles underlying the study of Cosmology.
C O 7	To study various cosmological models that explain the birth and evolution of universe.
<b>PS 574.3 Optics</b>	
C O 1	To study the various natures of progressive plane waves with relevant solutions to the plane wave equations.
C O 2	To learn the Fermat's principle and Helmholtz and Lagrangian equations in magnification.
C O 3	To study the wave theory by Huygen in detail and to deduce the laws of reflection and refraction using the same.
C O 4	To study the phenomena of Interference, Diffraction and Polarization with rigorous mathematics and physical examples.
C O 5	To study Electro-optic effect and to learn to draw the index ellipsoid for crystals.
C O 6	To study the phenomenon of Acousto-optic effect and to understand Raman-Nath and Bragg diffraction in crystals.
<b>PO 577.3 Experimental Techniques</b>	
C O 1	Understand the properties of laser
C O 2	Learn about the specific laser and their applications in day to day life
C O 3	Learn about the theory of nonlinear optics
C O 4	Learn about the second and third harmonic generation
C O 5	Learn the concept of nonlinear absorption coefficients, nonlinear refractive index and nonlinear susceptibility
C O 6	Learn the method of Z-scan technique

C O 7	Learn the concept of vacuum and its units
C O 8	Learn about the techniques to measure vacuum
C O 9	Learn about the working principle of different vacuum pumps
C O 10	Understand the working principles of TEM, SEM, XPS etc.
<b>Semester IV</b>	
<b>PH 571.4 Atomic and Molecular Physics</b>	
C O 1	To review the Bohr model and Vector model of the atom based on the experiments determining space quantization.
C O 2	To understand the structure of the simplest atomic system, the hydrogen atom by studying its various spectra.
C O 3	The interactions within the atomic system is studied using the perturbation theory for a detailed understanding of the fine and hyperfine atomic structure.
C O 4	Zeeman effect, Stark effect elucidate the influence of an external magnetic and electric field on the atomic system.
C O 5	X-ray spectra of the atoms are studied.
C O 6	The transition processes by absorption, stimulated and spontaneous emission, when an atom interacts with an electromagnetic field are studied in detail.
C O 7	The probability of transitions, rates, selection rules, lifetime of atomic states, spectral line widths, line shapes and broadening are understood.
C O 8	Molecular structure is understood for a simple diatomic molecule by studying the spectra.
C O 9	Microwave spectroscopy, infrared spectroscopy, ultraviolet-visible spectroscopy techniques of the molecular systems are studied with detailed theory, instrumentation and application.
C O 10	Raman spectroscopy, nuclear magnetic resonance (NMR) spectroscopy, electronic spin resonance (ESR) spectroscopy, Mossbauer spectroscopy are studied with the fundamental theoretical background, instrumentation and applications to specific systems.
<b>PH 572.4 Nuclear and particle Physics</b>	
C O 1	The internal properties like mass, charge and size of atomic nuclei
C O 2	The external properties like binding energy, spin, electronic and magnetic moment.

C O 3	To study in detail the concept of Radioactivity.
C O 4	Detailed study on nuclear decays and their selection rules
C O 5	To study the radiation energy loss by charged particles, electrons, electromagnetic radiation and the neutrons with matter and their energy loss.
C O 6	The radiation detection through gas filled detector, semiconductor detectors and neutron detectors
C O 7	Two review the different properties of Nuclear forces like short range, saturation, charge independence, spin dependence.
C O 8	To study the ground state of the deuteron problem using square well potential and as a mixture of S and D states and to learn the electric and magnetic quadrupole moments of the Deuteron bound state.
C O 9	Yukawa's theory of nuclear forces and to explain the anomalous magnetic moment of nucleus.
C O 10	To describe basic models like liquid drop model and shell model of the atomic nucleus.
C O 11	Explain processes of nuclear collisions, nuclear reactions and cross section
C O 12	To study the classification of fundamental forces and conservation laws
C O 13	Classification of elementary particles and the properties of the particles
C O 14	Gell-Mann-Nishijima formula and CPT theorem
C O 15	Application of symmetry arguments to particle reactions
<b>PS 574.4 Communication Theory</b>	
C O 1	Transmission Lines, types and line parameters such as impedance, reflection coefficient, propagation constant. Line distortion and attenuation. Quarter and half wavelength lines. Impedance matching, quarter wave transformer, stub matching. Smith chart and its applications.
C O 2	Wave guides and antenna: Basic concepts, TE and TM waves, types. Cavity resonators. Directional couplers. Electromagnetic radiation, elementary doublet, current and voltage distribution, resonant and non resonant antennas and their characteristics, grounded and ungrounded antennas. Effect of antenna height. Microwave antennas.
C O 3	Microwave devices -Multicavity klystron, reflex klystron, parametric amplifiers, Gunn diode, Microwave transistors, FETs. Communication

	subsystems, description of the communication system transponders, spacecraft antennas, frequency reuse antennas, multiple access schemes, FDMA, TDMA, CDMA. Satellite communication.
<b>PS 575.4 Laser, Vacuum Techniques and Nonlinear Optics</b>	
C O 1	Understand the properties of laser
C O 2	Learn about the specific laser and their applications in day to day life
C O 3	Learn about the theory of nonlinear optics
C O 4	Learn about the second and third harmonic generation
C O 5	Learn the concept of nonlinear absorption coefficients, nonlinear refractive index and nonlinear susceptibility
C O 6	Learn the method of Z-scan technique
C O 7	Learn the concept of vacuum and its units
C O 8	Learn about the techniques to measure vacuum
C O 9	Learn about the working principle of different vacuum pumps
C O 10	Understand the working principles of TEM, SEM, XPS etc techniques
<b>PS 576.4 Condensed Matter Physics- III</b>	
C O 1	Different techniques of thin film preparation, thickness measurement techniques and theory of nucleation, properties and applications.
C O 2	Superconductivity Principle, Types, Thermodynamics of superconductivity, BCS theory. Josephson effect and applications.
C O 3	Smart materials of types, preparation and properties.
C O 4	Nanostructural materials - synthesis, characterization, organization and application.
<b>PS 577.4 Nuclear Structure</b>	
C O 1	To study Deuteron problem as a mixture of S and D states and to learn the electric and magnetic quadrupole moments of the Deuteron bound state.
C O 2	Two review different properties of Nuclear forces like charge independence, spin dependence, tensor character and exchange character.
C O 3	To study Meson exchange theory and many body potential that describes the nuclear forces.
C O 4	To analyse the n-p and p-p scattering at low energies using partial wave analysis and to understand the spin dependence of nuclear forces.

C O 5	To learn the effective range theory, coherent scattering and examples for hydrogen in scattering studies.
C O 6	To compare the theoretical understandings and predictions with the experimental results of n-p and p-p scattering.
C O 7	To study quantitatively the Fermi gas model, Independent particle model, the collective model and the Nilsson model.

**M.Sc. SOFTWARE TECHNOLOGY****PROGRAMME OUTCOMES**

P01	To prepare software professional with expertise in system design principals and development.
P02	Identify, understand and analyze scientific problems to formulate substantiated conclusions using first principles of mathematics, natural sciences, and applied sciences.
P03	Design solutions for complex problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations
P04	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
P05	Understand the impact of the professional software engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
P06	Apply ethical principles and commit to professional ethics and responsibilities and norms of the scientific practice.
P07	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings
P08	Communicate effectively on complex activities with the scientific community and with the society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
P09	Demonstrate knowledge understanding of the scientific and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
P010	Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional practice.

<b>Programme Educational Objectives</b>	
<b>PEO1</b>	Communicate Software Technology concepts, designs, and solutions effectively and professionally with real life examples and experiences.
<b>PEO2</b>	Apply knowledge of computing to bring out effective designs and solutions for specific problems across various domains.
<b>PEO3</b>	Ability to use various software development tools, multiple software systems, and modern computing platforms, with priority on the emerging technologies.
<b>PEO4</b>	Comprehend the advances of technology in light of its impact on society and the social, legal, ethical and cultural ramifications of computer technology and their usage.
<b>COURSE OUTCOMES</b>	
<b>PH 531.1 DATA STRUCTURES AND ANALYSIS OF ALGORITHMS</b>	
PO 1	To program using structures, function pointers, classes and objects.
PO 2	To implement and apply stack, queue and list data structures in different applications
PO 3	To program binary tree, binary search tree, AVL tree and other tree data structures and traverse and represent expressions using tree data structure.
PO 4	To program different searching and sorting algorithms using c++ programming language, and also able to select suitable techniques based on the situation
PO 5	To create graph using array and using linked list. Ability to find shortest path in graph, able to traverse the graph
<b>PH 532.1 RELATIONAL DATABASE MANAGEMENT SYSTEMS</b>	
PO 1	Have good understanding about data and database systems. Describe the fundamental elements of relational database management systems.
PO 2	Understand the design of relational databases through the use of Entity-Relationship Diagrams and Normalization procedures and Develop basic skills in the use of SQL in defining and creating a database, inserting and modifying entries in a table.
PO 3	Gain Knowledge about Transaction, concurrency control and Lock management for database design.

PO 4	Have awareness about how data is stored in different storage media and how data is indexed.
PO 5	Prepare the students to understand the power of Query languages and also write PL/SQL transactions and to create different data objects.
<b>PH 533.1 OBJECT ORIENTED PROGRAMMING WITH JAVA</b>	
PO 1	An ability to understand the Object Oriented Concepts well and relate it with real world problems, develop solutions with programming constructs
PO 2	An understanding on classes, objects, methods, attributes, constructors and arrays and also write efficient programs using these concepts
PO 3	An ability to do string manipulation, understand and apply reusability using inheritance and also use Interfaces for efficient programming
PO 4	An understanding and clear knowledge about Exceptions and Exception handling, File I/O streams and also collection frameworks
PO 5	An ability to develop and understand multithreaded applications with synchronization and apply generic programming concepts wherever required
<b>PH 534.1: WEB DESIGN WITH PHP and MYSQL</b>	
PO 1	To use knowledge of HTML and CSS code and an HTML editor to create personal and/or business websites following current professional and/or industry standards. Use critical thinking skills to design and create websites.
PO 2	To create effective scripts using JavaScript.
PO 3	To enhance the end user experience using JQuery.
PO 4	Students can be employed on entry-level jobs of PHP based web development in software industry
PO 5	To develop interactive and dynamic website using PHP and database connectivity
<b>PS 537.1 SOFTWARE ENGINEERING WITH UML</b>	
PO 1	Plan and deliver an effective software engineering process, based on development lifecycle models.
PO 2	Make effective use of UML, along with design strategies such as defining a software architecture, separation of concerns and design

	patterns.
PO 3	Capture, document, analyze requirements and translate a requirements specification into an implementable design, a structured and organized process.
PO 4	Understanding the different system design concepts such as coupling, cohesion and architectural styles.
PO 5	Formulate a testing strategy for a software system, employing techniques such as unit testing, test driven development and functional testing.
<b>II Semester</b>	
<b>PH 531.2 PROGRAMMING WITH PYTHON</b>	
PO 1	To design and program Python applications, use lists, tuples, and dictionaries in Python programs.
PO 2	To identify Python object types, use indexing and slicing to access data in Python programs.
PO 3	To build and package Python modules for reusability and to read and write files in Python.
PO 4	To design object oriented programs with Python classes and use class inheritance in Python for reusability.
PO 5	To use exception handling in Python applications for error handling.
<b>PH 532.2 MOBILE APPLICATION DEVELOPMENT WITH ANDROID</b>	
PO 1	Understand the architecture, working and environmental setup of Android
PO 2	Design and Implement simple GUI based Android Apps that handle user input and provide information
PO 3	Implement Android apps that are able to receive broadcasted messages, act as content provider or receiver and run background services.
PO 4	Create Android Apps that can manipulate data from various data stores such as internal, external memory and also SQLite as a Database.
PO 5	Design and Work with advanced sensors of the phone and manipulate Telephony and SMS in an Android Phone.
<b>PS 534.2 E1 FOUNDATIONS OF DATA SCIENCE</b>	
PO 1	Select appropriate statistical techniques for summarizing and displaying of data.
PO 2	Identify outliers and use the right techniques to treat them in order to give a better understanding of the data.
PO 3	Analyze and draw inferences from data using appropriate statistical methods.
PO 4	Perform correlation and regression, and be able to make predictions and interpret the results

PO 5	Identify the types of learning and apply the appropriate tools to derive information from the data.
<b>PS 534.2 E2 DATA WAREHOUSING AND DATA MINING</b>	
PO 1	Understand and implement classical models and algorithms in data warehouses.
PO 2	Display a comprehensive understanding of different data mining tasks and the algorithms most appropriate for addressing them.
PO 3	Evaluate models/algorithms related to Association rule mining with respect to their accuracy.
PO 4	Perform a self directed piece of practical work that requires the application of data mining techniques in classification and prediction.
PO 5	Conceptualize a data mining solution to a practical problem in clustering and outlier analysis.
<b>PS 535.2 E1 ARTIFICIAL INTELLIGENCE AND COGNITIVE COMPUTING</b>	
PO 1	To Design intelligent agents for problem solving, reasoning and planning.
PO 2	To implement AI systems with different approaches of knowledge representation, design AI systems with heuristic search techniques
PO 3	To implement AI systems using statistical and symbolic reasoning, designing AI models using Bayes rule
PO 4	Apply AI technique on current applications with cognitive psychology using connectionist approach
PO 5	To design applications using computational cognitive neuroscience by applying techniques of cognitive computing and neural network theory.
<b>PS 535.2 E2 MACHINE LEARNING AND DEEP LEARNING</b>	
PO 1	To implement Machine Learning with Bayes algorithm, to work out the concept of dimensionality reduction using PCA & LDA
PO 2	To implement Machine Learning with SVM, Decision tree and clustering methods
PO 3	To use MLP, HMM for classification and also to measure the performance of the classification algorithm, to design models using reinforcement learning
PO 4	To implement CNN and RNN for Deep Learning models by applying all the methods for creating optimal model
PO 5	To implement Transfer learning and Auto encoders for Deep Learning models
<b>[OPEN ELECTIVE - OFFERED TO OTHER DEPTS] PO 537.2 (E1): ENTERPRISE INFORMATION SYSTEMS</b>	
PO 1	Understand the enterprise need of integrating information assets, and be able to articulate the advantages and tradeoffs of different information integration designs of organizations.
PO 2	Understand the key components of Enterprise Information Systems such as Enterprise
PO 3	Resource Planning, Customer Relationship Management, Supplier

	Relationship
PO 4	Management and Business Intelligence.   Understand the key issues in implementing and managing EIS.
PO 5	Understand the emerging business models of enterprise system vendors
<b>PO 537.2 (E2): MARKETING ANALYTICS</b>	
PO 1	Have a high- level understanding of the benefits and objectives of marketinganalytics.
PO 2	Apply metrics -driven techniques to improve marketing decisions.
PO 3	Understand best practices through case studies.
PO 4	Learn by doing through hands-on computer spreadsheet models and metric
PO 5	Design and analyze appropriate predictive models.& apply statistical tools foranalysis
<b>Research Methodology and Ethics</b>	
PO 1	Research output with philosophical base and greater relevance to the society
PO 2	Quality research with scientific methodology
PO 3	Production of good Research Reports
PO 4	Original Research following ethical guidelines and practices in conducting the research and publication of papers.
PO 5	More awareness on Intellectual Property Rights and Patents.
<b>Semester III</b>	
<b>PH531.3 CLOUD COMPUTING WITH AMAZON WEB SERVICES</b>	
PO 1	Describe the key technologies, architecture, strengths, limitations and applications ofcloud computing
PO 2	Explain the types and service models of cloud and Understand security implications in cloud computing
PO 3	Design Cloud Services and Set a private cloud
PO 4	Create and automate infrastructure to design cost-effective, highly available applications
PO 5	Integrate AWS services with your application to meet and exceed non-functionalrequirements
<b>PH 532.3: WEB TECHNOLOGIES and .NET FRAMEWORK</b>	
PO 1	Learn to develop correct, well documented programs using C#

	programming language.
PO 2	Create visually rich and attractive Web applications with ASP.NET controls and controls in the AJAXControl Toolkit
PO 3	Display dynamic data from a data source by using Microsoft ADO.NET, LINQ and EF.
PO 4	Create MVC Models and write code that implements business logic within Model methods, properties, and events. Dynamic web applications, create and consume web services, understand the Microsoft Web Technologies stack.
PO 5	Write an application that can create, edit, and view data from a database using ASP.Net Core, and create
PO 6	Single Page Applications (SPAs) and Navigation, Routing, State Management, Security.
<b>PS534.3 E1 INTERNET OF THINGS and APPLICATIONS</b>	
PO 1	Understand why IoT is used and how it is implemented and how networks and communication is used to implement IoT
PO 2	Understand how identity management models are used in IoT, also understand why trust management is important for IoT environment
PO 3	Understand the use of protocols which are used in different layers and how it is combined with other protocols down the layers to carry out the communication
PO 4	Understand how data is stored in cloud and how it is represented using different application to carry out or execute different data analytics tools
PO 5	Understand the concepts of data science for IoT analytics, how to organize data for analytics, and how to get benefits from IoT analytical tools.
<b>PS534.3 E2 NATURAL LANGUAGE PROCESSING</b>	
PO 1	Ability to create morphemes and perform morphological analysis. Construct simple DFA. Perform POS tagging
PO 2	Ability to construct parse trees for sentences when CFG is given. Perform leftmost and rightmost derivations. Perform top-down and bottom-up parsing. Perform ambiguity analysis and word sense disambiguation.
PO 3	Perform reference resolution on sentences. Differentiate Cohesion and Coherence.
PO 4	Differentiate pipelined, interleaved and integrated architecture of NLG.
PO 5	Compare direct MT system with transfer system. Implement a simple MT system.
<b>PS535.3 E1 BIG DATA ANALYTICS WITH SCALA AND SPARK</b>	
PO 1	Understand what Functional programming is and will know why

	classical dataanalysis techniques are no longer adequate
PO 2	Understand the benefits that Spark and Spark SQL offers for processing structuredand unstructured data.
PO 3	Understand conceptually how Spark SQL is used for Data Exploration, DataMunging and Data Streaming.
PO 4	Understand how Spark can be used for Machine Learning.
PO 5	Understand the use of PySpark and Spark
<b>PS 535.3 E2: BIG DATA ANALYTICS with MAP REDUCE &amp; HADOOP</b>	
PO 1	Identify and distinguish big data analytics applications from other applications and the use of Big Data.
PO 2	Describe No SQL databases and understanding different concepts related to NoSQL and its applications using MongoDB.
PO 3	Understanding Hadoop and its advantage over the traditional database applications in solving practical problems
PO 4	Writing programs using mapper and reducer.
PO 5	Using Hive and Pig for analyzing and querying data and knowing the advantagesover the traditional Data handling solutions.
<b>PO 537.3 E1 SOCIAL MEDIA ANALYTICS</b>	
PO 1	Apply multiple quantitative and qualitative methods
PO 2	Understand sources and limitations of web-based data
PO 3	Perform social network analysis to identify important social actors, subgroups andnetwork properties in social media.
PO 4	Use appropriate information visualization technique to gain insights into largedatasets
PO 5	Apply best practices in Search Engine Optimization
<b>PO537.3 E2 STREAMING ANALYTICS</b>	
PO 1	Describe and use a wide variety of streaming analytics methods in a business or anindustry.
PO 2	Understand how analytics can be used in business development using Kafka and Flume.
PO 3	Learn to use and to apply a selection of modern business analytics tools and software to solving real-world problems with real-world data
PO 4	Demonstrate hands-on skills using visualization in applying business analytics
PO 5	Demonstrate hands-on skills in applying analytics into real-world business usingstatistical approximation and sketching.
<b>SEMINAR AND TECHNICAL COMMUNICATION</b>	
PO 1	Gather, organize, summarize and interpret literature with the purpose of

	formulating a proposal.
PO 2	Write a technical report summarizing state-of-the-art on an identified topic.
PO 3	Present the study using graphics and multimedia techniques.
PO 4	Define intended future work based on the technical review.
<b>Semester IV</b>	
<b>PS535.4 DOMAIN KNOWLEDGE PROJECT</b>	
PO 1	Gather, organize, summarize and interpret literature with the purpose of formulating a Research problem and working on it to propose a solution.
PO 2	Write a technical paper summarizing state-of-the-art on an identified topic.
PO 3	Present the study using graphics and multimedia techniques.
PO 4	Define intended future work based on the technical review.
PO 5	Publish the work in a reputed Journal of interest or present it in an international/national State/Regional conferences.
<b>PH 531.4/532.4/533.4/534.4: INDUSTRY INTERNSHIP / PROJECT WORK / DISSERTATION</b>	
PO 1	The Internship / Project work / Dissertation for credit requires students to spend the majority of their time in technical, analytical, or administrative work that will contribute to their learning as outlined in the course objectives.
PO 2	Work of a clerical nature must be limited to a maximum of 15 percent of the time spent on the job.
PO 3	Prior to beginning an internship for credit, students must receive an internship orientation at the Training and Placement Cell of AIMIT.
PO 4	A meeting with the faculty advisor / Guide to cover the ground rules and requirements.
PO 5	Submission of the Final Report within seven days of the completion of the internship

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## **M.Sc BIG DATA AND ANALYTICS**

### **PROGRAM OUTCOMES**

<b>P01</b>	<b>Statistical computing:</b> Ability to understand the basic concepts of how to explore the datasets using statistical analysis techniques in Python and R.
<b>P02</b>	<b>Mathematical Skills:</b> Ability to understand and implement various algorithms which require strong hold on the mathematical skills
<b>P03</b>	<b>Database management:</b> Ability to Execute queries, implement views and joins, use MongoDB for various operations on unstructured data. Ability to Optimize business decisions and create competitive advantage with Big Data analytics and understand architectural concepts of Hadoop and map reduce paradigm
<b>P04</b>	<b>Implementation using various software:</b> This enables the students to develop strong programming skills required to handle complex data and build algorithms that will provide efficient solutions to the problem at hand.
<b>P05</b>	<b>Machine learning:</b> Understand a wide variety of learning algorithm, how to evaluate models generated from data and apply the algorithms to a real problem, optimize the models learned and report on the expected accuracy that can be achieved by applying the models.
<b>P06</b>	<b>Enabling technologies:</b> Learn about the relationship between data science and natural language and audio-visual content processing
<b>P07</b>	<b>Natural language processing:</b> Understand approaches to syntax, semantics in <i>NLP</i> , to discourse, generation, dialogue and summarization within <i>NLP and</i> Understand current methods for statistical approaches to machine translation.
<b>P08</b>	<b>Value thinking:</b> Recognize important ethical issues that arise in various business contexts and professional practice; To Demonstrate an understanding of the ethical, social

	and economic environments in which those occur.
<b>P09</b>	<b>Advanced Statistical Analysis:</b> Mastering of a suite of methods and workflow styles that will enable the student to produce several new statistical analysis correctly and efficiently present the results from those analyses.
<b>P010</b>	<b>Societal development:</b> Identify the information security models and their characteristics, by analyzing the different types of cryptographic and forensic methods. Identify and solve different cyber security threats that hamper the society.
<b>P011</b>	<b>Application of Skills:</b> Provide the knowledge and necessary skills to accomplish various analytics with respect to areas like health, HR, Travel, ... so that they are able to provide efficient analysis and interpretation.
<b>Programme Specific Outcomes</b>	
<b>PS01</b>	To practice big data analytics and machine learning approaches, which include the study of modern computing using big data technologies and machine learning techniques focusing on industry applications.
<b>PS02</b>	To develop Numerical and Statistical skills that will play an important role in their Job role as data Scientist / data analytics in analyzing the problem at hand and give the appropriate and efficient solution.
<b>PS03</b>	Apply the concepts of Analytics to the real-world problems by converting datasets to models in order to make better business decisions.
<b>PS04</b>	Apply the skills gained in the course to improve the research which would have a great impact on the societal development by emphasizing on how data can be collected and used in ethical and socially sensitive ways.
<b>COURSE OUTCOMES:</b>	
<b><u>SEMESTER – I</u></b>	
<b><u>PH 801.1: STATISTICAL METHODS</u></b>	
CO 1	To design appropriate instruments to collect data effectively.
CO 2	To provide effective data visualization that will provide new insights from the data.
CO 3	To Organize, manage and present data effectively.

CO 4	To analyze statistical data graphically using frequency distributions.
CO 5	To Construct and interpret <i>Contingency Tables</i>
<b>PH 802.1: <u>PROBABILITY &amp; STOCHASTIC PROCESS</u></b>	
CO 1	To calculate the probabilities and identify the various types.
CO 2	To express the features of discrete random variables and formulate the <i>distribution</i> functions.
CO 3	To express the features of continuous random variables and formulate the <i>distribution</i> functions
CO 4	To Classify a stochastic process according to whether it operates in continuous or discrete time and whether it has a continuous or a discrete state space. To Understand the concept of Markov chains and study the transition diagram.
CO 5	To apply the concept of stationarity to the analysis of time series data in various contexts
<b>PH 803.1: <u>LINEAR ALGEBRA &amp; LINEAR PROGRAMMING</u></b>	
CO 1	Understand the basic concepts of linear Algebra
CO 2	Understand the concept of Random Numbers and its properties.
CO 3	Understand the principles of solving a set of linear equations,
CO 4	Familiarize with the methods involved in solving a set of linear equations.
CO 5	To model a problem as a linear programming problem
CO 6	Use the simplex method to solve small linear programming models by hand, given a basic feasible point.
<b>PH 804.1P: <u>COMPUTING FOR DATA SCIENCES LAB</u></b>	
CO 1	To perform data analysis using the appropriate techniques.
CO 2	To know how convergence, takes place and use the appropriate methods.
CO 3	To generate random numbers and understand how a system can be simulated using them.
<b>PS 805.1: <u>DATABASE MANAGEMENT SYSTEM</u></b>	
CO 1	Draw an ER Diagram for a given system by analysing the requirements
CO 2	Normalize the tables atleast to 3N form and perform various operations on tables that are thus created
CO 3	Appreciate and apply Graph database

CO 4	Execute queries, implement views and joins, use MongoDB for various operations on unstructured data
CO 5	Work with Hadoop Ecosystem and also implement database security in SQL, NoSQL and Hadoop
<b>PS 806.1: PYTHON PROGRAMMING</b>	
CO 1	Choose the right data type or Collection module for any given set of data.
CO 2	Use conditional statements and loops to manipulate; Create, use & reuse functions created from python
CO 3	Open, Read and Write a File from Python and also to import and use various logical modules in python
CO 4	Handle any type of exceptions that might be raised from a typical program
CO 5	Create classes and objects to perform operations and also to perform CRUD Operations on a SQLite Database
<b>PS 807.1 P: DBMS &amp; PYTHON PROGRAMMING LAB</b>	
CO 1	Solve real world problems using python as a programming language
CO 2	Create applications that handle files and include various packages to solve complex issues
CO 3	Create a completely data driven application that includes exception handling and perform all database related operations.
CO 4	Create a table, Execute complex and nested queries, create views and joins and also execute cursors and triggers using Oracle SQL
CO 5	Use MongoDB to create Database, Collection, Document etc. and also understand Hadoop Ecosystem
<b><u>SEMESTER – II</u></b>	
<b>PH 801.2: MACHINE LEARNING - I</b>	
CO 1	To implement machine learning models with linear regression
CO 2	To design applications using Logistic regression by using the methodology to avoid overfitting
CO 3	To design systems using Perceptron algorithm

CO 4	To implement machine learning systems using SVM
CO 5	To implement machine learning models using k-means clustering by applying dimensionality reduction and anomaly detection
<b>PH 802.2: <u>ENABLING TECHNOLOGIES FOR DATA SCIENCE – I</u></b>	
CO 1	To understand data mining principles and will identify appropriate datamining algorithms to solve real-world problems. To understand the strength and weakness of algorithms.
CO 2	To design a data mart or data warehouse for any organization. To design data warehouse with dimensional modelling and apply OLAP operations.
CO 3	To learn methods in integrating and interpreting the data sets and improving effectiveness, efficiency and quality for data analysis.
CO 4	To predict categorical class labels (discrete or nominal) and classifies data (constructs a model) based on the training set and the values (class labels) in a classifying attribute and uses it in classifying new data and also predicts unknown or missing values.
CO 5	To identify clusters in multivariate data, apply normalization techniques, and correctly interpret the output of different clustering procedures. And to describe complex data types with respect to spatial and temporal data mining.
<b><u>Electives (Choose 1)</u></b>	
<b>PH 803.2 (E1): <u>OPERATIONS RESEARCH</u></b>	
CO 1	To Proficiently deal with the tools for optimization.
CO 2	To Develop an understanding of the foundation of classic continuous optimization problems and to identify the convexity, smoothness, feasible region and dual reformulation.
CO 3	To proficiently allocate scarce resources to optimize and maximize profit or minimize loss and facilitates the optimal method of allocating jobs to persons.
CO 4	To facilitate with mathematical and computational modeling of real decision-making problems.
CO 5	To construct and analyse priority queuing systems.
<b>PH 803.2 (E2): <u>CLOUD COMPUTING</u></b>	
CO 1	After successfully completing the course the students will have an understanding of:

CO 2	Apply the fundamental concepts in data centers to understand the trade-offs in power, efficiency and cost.
CO 3	Discuss system virtualization and outline its role in enabling the cloud computing system model.
CO 4	Illustrate the fundamental concepts of cloud storage and demonstrate their use in storage systems
CO 5	Illustrate the fundamental concepts of web services.
CO 6	Analyze various cloud programming models and apply them to solve problems on the cloud.
<b>PH 803.2 (E3): <u>NATURAL LANGUAGE PROCESSING</u></b>	
CO 1	Analyse syntax, semantics, and pragmatics of NLP. Ability to develop simple N-gram models
CO 2	Perform POS tagging on simple English sentences using Hidden Markov model
CO 3	Develop grammars for some simple English sentences, ability to draw parse trees. Apply different parsing techniques
CO 4	Analyse syntactic, semantic and pragmatic ambiguities, learn to apply supervised and unsupervised word-sense disambiguation.
CO 5	Analyse different Machine translation approaches.
<b>PH 803.2 (E4): <u>UNIX PROGRAMMING</u></b>	
CO 1	Students are able to know an overview of Unix operating system and uses of shell commands.
CO 2	Students will able to understand the concept of I-node and its use with applications of grep commands.
CO 3	Students get know about user and program interface with some system calls requirement and its applications.
CO 4	Students are able to know use of signaling and importance of Inter process communications.
CO 5	Students will understand the importance and application of inter-process communications
<b>PH 803.2(E5): <u>OPERATING SYSTEMS</u></b>	
CO 1	Students are able to understand the basics of operating systems with need and working.

CO 2	Students will able understand the fundamentals of UNIX operating system with signals and system class.
CO 3	Students will able to understand fundamentals of concurrent process and concept of mutual exclusion and implementation of semaphores.
CO 4	Students are able to understand importance of Inter process communications resulting deadlocks which can be prevented or avoided with some algorithms.
CO 5	Students will understand the importance and benefits of virtual memory. The file structure of UNIX operating system.
<b>PH 803.2 (E6): <u>MULTIVARIATE STATISTICS:</u></b>	
CO 1	To identify the most appropriate statistical techniques for a multivariate dataset and carry out and apply commonly used multivariate data analysis techniques, and interpret results
CO 2	To carry out a principal component's analysis Assess how many principal components are needed and Interpret principal component scores.
CO 3	To classify data using appropriate algorithms.
CO 4	To describe the difference between Factor Analysis (FA) and Principal Component Analysis (PCA) and will be able to extract factors that describe the data.
CO 5	To Create a document retrieval system using k-nearest neighbors. -Identify various similarity metrics for text data.
<b>PH 804.2P: <u>MACHINE LEARNING AND DATA SCIENCE LAB - I</u></b>	
CO 1	Examine the concepts of data warehousing and OLAP;
CO 2	Apply the concepts of BI and DM techniques for clustering, association, and classification;
CO 3	Understand the operation procedures of BI projects in an organization;
CO 4	Select appropriate DM tools and methods to manipulate and achieve data;
CO 5	Apply DM concepts for formulating business strategies and programs to enhance business intelligence.
<b>PS 805.2: <u>FOUNDATIONS OF DATA SCIENCE</u></b>	
CO 1	Solve problems using basic graph theory
CO 2	Applying various concepts relevant with high-dimensional data.
CO 3	Understanding large structures, like the web and social networks, in building

	models.
CO 4	Applying the use of singular value decomposition (SVD) for dimension reduction of high-dimensional data sets, and multi-dimensional scaling and its connection to principle component analysis.
CO 5	Applying the concept of frequency moments of data streams and matrix algorithms in streaming model
<b>PS 806.2: <u>ADVANCED STATISTICAL METHODS</u></b>	
CO 1	To <i>estimate</i> population parameters using point and interval <i>estimates</i> .
CO 2	To recognize the logic behind a hypothesis test and how it relates to the P-value.
CO 3	To know the theoretical foundation of applied linear modeling, starting with the univariate models and then with multivariate data
CO 4	To apply multiple linear regression analysis, differentiate between simple linear regression analysis and multiple linear regression analysis and predict the model and interpret it.
CO 5	To apply the functional form of the logistic model and how to interpret model coefficients.
<b>PS 807.2: <u>VALUE THINKING</u></b>	
CO 1	Recognize important ethical issues that arise in various business contexts and professional practice;
CO 2	Demonstrate an understanding of the ethical, social and economic environments in which those occur;
CO 3	Demonstrate critical thinking skills required for the successful practice of management and the professions within the framework of societal values;
CO 4	Demonstrate confidence in introducing ethical considerations into professional and managerial decision making and explaining their importance to others; and
CO 5	Use their ethical imaginations in resolving dilemmas and enhancing business decision-making.
<b>PS 808.2P: <u>PROGRAMMING FOR BIG DATA AND ADVANCED STATISTICAL METHODS LAB</u></b>	
CO 1	To perform machine learning techniques such as clustering and classification effectively.

CO 2	To apply the concepts of BI and DM techniques for clustering, association, and classification;
CO 3	To apply the graph theory algorithms to real data and analyze appropriately.
CO 4	To use appropriate statistical testing criteria based on the problem.
CO 5	To evaluate and apply ANOVA to the problem at hand.
CO 6	To identify and apply appropriate regression models considering all the assumptions.
CO 7	To perform binary output models using logistic regression.
<b>Research Methodology and Ethics (Non -Credit Course)</b>	
CO 1	Research output with philosophical base and greater relevance to the society
CO 2	Quality research with scientific methodology
CO 3	Production of good Research Reports
CO 4	Original Research following ethical guidelines and practices in conducting the research and publication of papers.
CO 5	More awareness on Intellectual Property Rights and Patents.
CO 6	Provide a better research perspective in the field of Data Analytics.
CO 7	Application of various Machine learning to the real-world problems.
<b>[OPEN ELECTIVE - OFFERED TO OTHER DEPTS]</b>	
<b>OE 809.2: <u>STATISTICAL DATA ANALYSIS USING R</u></b>	
CO 1	Ability install R programming language on windows, Linux and Mac operating systems and able to program simple R programs.
CO 2	Ability to use inbuilt R functions to work on objects, matrix, vectors, data frames and tables.
CO 3	Ability to program summary and cumulative commands to apply it on tables and objects.
CO 4	Ability to use stem and leaf plot on the dataset, histograms to represent the data and ability to use shapiro-wilk test, Kolmogorov-Smirnov test etc.
CO 5	Ability to use students t-test, U-test, chi squared test montecarlo simulation and able apply these on different data sets.
<b><u>SEMESTER - III</u></b>	
<b>PH 801.3: <u>MACHINE LEARNING - II</u></b>	
CO 1	To implement classification models with decision tree and probabilistic classifiers; regression models with regression tree classifiers
CO 2	To implement predictive models using SVM and Perceptron with usage of loss functions and gradient descent
CO 3	To implement machine learning models with k-means clustering; models with collaborative filtering and implement EM algorithm
CO 4	To implement machine learning systems using Ensemble models and graphical models
CO 5	To implement models with genetic algorithm and working out gradient descent for large datasets
<b>PH 802.3: <u>ENABLING TECHNOLOGIES FOR DATA SCIENCE - II</u></b>	

CO 1	Read data from persistent storage and load it into Apache <i>Spark</i> , - manipulate data with <i>Spark</i>
CO 2	Understand working of spark sessions, functions to manipulate and analyze data using Spark data frames
CO 3	Warehouse your data efficiently using Hive, <i>Spark SQL</i> and Spark Data Frames
CO 4	Manipulate data using Scala and write programs that effectively use parallel collections to achieve performance
CO 5	Recognize and apply design principles of functional programs
<b>PH 803.3 P: <u>MACHINE LEARNING AND DATA SCIENCE LAB - II</u></b>	
CO 1	Demonstrate the knowledge of big data, data science, data analytics, distributed file systems, parallel Map Reduce paradigm, NoSQL, machine learning, etc.
CO 2	Program and implement examples of big data and NoSQL applications using open source Hadoop, HDFS, Spark, Scala, etc.
CO 3	Read current research papers and implement example research group project in big data.
<b>PS 804.3: <u>DATA VISUALIZATION WITH TABLEAU &amp; MODELLING IN OPERATIONS MANAGEMENT</u></b>	
CO 1	Understand and apply the fundamental concepts and techniques in data visualization
CO 2	Design, develop, and evaluate effective visualizations and dashboards using various development tools
CO 3	Solve specific real-world problems related to the Visualization and interpretation of data analysis results
CO 4	Making use of patterns and insights in healthcare analytics
CO 5	Visualize the analyzed data pertaining to retail industry
<b>PS 805.3 (E1): <u>INTRODUCTION TO ECONOMETRICS &amp; FINANCE</u></b>	
CO 1	To apply the above theories to empirical data or be able to develop new econometric theory
CO 2	To apply the generalized method of moments (GMM) estimation and interpret the results.
CO 3	To Use various economic models and methods to interpret and analyze real data in economics and finance.
CO 4	To test cointegration among times series data using appropriate tests.
CO 5	To perform Autoregressive conditional heteroscedasticity model and interpret the coefficients.
<b>PS 805.3 (E2): <u>TIME SERIES ANALYSIS &amp; FORECASTING</u></b>	
CO 1	Know the basic time series structure and identify patterns.
CO 2	Define the concept of stationarity and describe its importance in time series analysis
CO 3	Test for non-stationarity that exists in the time series data by applying suitable tests.

CO 4	Model times series data and use them efficiently to forecast.
CO 5	Identify and deal with the missing data values in time series data.
<b>PS 805.3 (E3): <u>BIOINFORMATICS</u></b>	
CO 1	Gain knowledge in using tools for implementing sequence alignment (BLAST, FASTA), MSA (ClustalW, T-Coffee etc), variants of BLAST
CO 2	To implement Gibbs sampling and genetic mapping using tools available
CO 3	Gain knowledge in using tools for implementing gene recognition and Transcriptomics
CO 4	Gain knowledge in using tools for implementing HMM, finding motifs
CO 5	Gain knowledge in using tools for implementing lattice models
<b>PS 805.3 (E4): <u>BIG DATA TECHNOLOGIES AND ARCHITECTURE</u></b>	
CO 1	Identify the use of Hadoop for processing the data, configuring Hadoop cluster and exploring Hadoop distributed file system.
CO 2	Describe No SQL databases and understanding different concepts related to No SQL and its applications using Hive and Hbase.
CO 3	Writing map reduce programs using mapper and reducer.
CO 4	Writing map-reduce programs to perform K-Means clustering customizing partitioner and sort comparator.
CO 5	Learning the role of Inverted Index and usage of hadoop as a database.
<b>PS 806.3 (E1): <u>INTELLECTUAL PROPERTY RIGHTS IPR</u></b>	
CO 1	Understand and distinguish between different Intellectual properties and also identify the procedures to protect Intellectual property
CO 2	Protect his own invention under patent and copyright specifically related to software. And also understand how one can derive revenue from protection of patents/copyrights
CO 3	Identify the importance of industrial design and its protection
CO 4	Recognizes the importance of different types of digital contracts and also finds mechanisms to protect digital documents
CO 5	Identify different types of cybercrimes and also will understand what are the remedies available under cyber law in the case of such unlawful activities
<b>PS 806.3 (E2): <u>CYBER SECURITY</u></b>	
CO 1	Understand the basics of security attacks and threat model
CO 2	Appreciate the vulnerabilities and threats posed by criminals, terrorist and nation states to national infrastructure
CO 3	Have a strong understanding of different cryptographic protocols and techniques and be able to use them.
CO 4	Apply methods for authentication, access control, intrusion detection and prevention.
CO 5	Identify and mitigate software security vulnerabilities in existing systems
<b>PS 806.3 (E3): <u>TEXT MINING</u></b>	
CO 1	Ability to analyse structured, unstructured and semi-structured data. Understand about user experience of information seeking behaviour.

CO 2	Ability to analyse linguistic foundations, and various approaches to text mining.
CO 3	To analyse various text types, document formats and conversion, character encodings. Perform parts-of-speech tagging for simple English sentences.
CO 4	To distinguish few tasks of text extraction – keyword extraction, named entity recognition. Perform simple extraction from small text.
CO 5	To understand computational grammars, design and construction.
<b>PS 806.3 (E4): <u>ADVANCED ANALYTICS</u></b>	
CO 1	Understand why IoT is used and how it is implemented and how networks and communication is used to implement IoT
CO 2	Understand how identity management models are used in IoT, also understand why trust management is important for IoT environment
CO 3	Understand the use of protocols which are used in different layers and how it is combined with other protocols down the layers to carry out the communication
CO 4	Understand how data is stored in cloud and how it is represented using different application to carry out or execute different data analytics tools
CO 5	Understand the concepts of data science for IoT analytics, how to organize data for analytics, and how to get benefits from IoT analytical tools.
<b>PS 807.3 P: <u>DATA VISUALIZATION WITH TABLEAU &amp; OPERATION MANAGEMENT</u></b>	
<b><u>LAB</u></b>	
CO 1	Understand and apply the fundamental concepts and techniques in data visualization
CO 2	Design, develop, and evaluate effective visualizations and dashboards using various development tools
CO 3	Solve specific real-world problems related to the Visualization and interpretation of data analysis results
CO 4	Making use of patterns and insights in healthcare analytics
CO 5	Visualize the analyzed data pertaining to retail industry
<b>PS 808.3: <u>LAB ON ELECTIVES 1 &amp; 2</u></b>	
CO 1	Model times series data and and use them efficiently to forecast.
CO 2	Use various models/ algorithms to gain information from the data and use it for better decision making
CO 3	Architect multiple real life use cases
CO 4	Apply the concepts of data science for IoT analytics, how to organize data for analytics, and how to get benefits from IoT analytical tools.
CO 5	Analyze various text types, document formats and conversion, character encodings. Perform parts-of-speech tagging for simple English sentences

<b>OE 809.3: <u>BIG DATA &amp; DESIGN THINKING</u></b>	
CO 1	Develop viable solutions to user challenges using the design thinking and hypothesis-driven innovation processes.
CO 2	Gain user empathy through observation and interviewing, and develop user insights to identify unmet needs.
CO 3	Use multiple brainstorming techniques to find innovative solutions.
CO 4	Prototype a solution to a user challenge.
CO 5	Develop and test a business model or business case to support the viability of the solution.
<b><u>SEMESTER – IV:</u></b>	
<b>PH 801.4: INDUSTRY INTERNSHIP / PROJECT WORK / DISSERTATION</b>	
CO 1	Provide a structure that will enable students to make connections between what they learn in the classroom and on the job, to further develop analytical and interpersonal skills, and to practice business writing skills.
CO 2	Ability to select and implement machine learning techniques and computing environment that are suitable for the applications under consideration.
CO 3	Ability to recognize and implement various ways of selecting suitable model parameters for different machine learning techniques.
CO 4	Ability to integrate machine learning libraries and mathematical and statistical tools with modern technologies like Hadoop and map reduce.
<b>PS 802.4: DOMAIN KNOWLEDGE PROJECT</b>	
CO 1	Help the students to work on a specific research area by identifying the research gaps and building their topic.
CO 2	Help the students to know the complete process of model building and apply the same based on the area of study.
CO 3	Build the confidence to work on any project by considering all the aspects of research questions that needs to be addressed.
CO 4	Develop the capability of the students to Create, Analyze and critically evaluate different analytical solutions.
CO 5	Holistic approach to a problem-solving ability will be well developed.

<b>MBA</b>	
<b>PROGRAMME OUTCOMES (POs)</b>	
<b>PO1:</b>	Business Acumen: To apply acquired KSA (Knowledge, Skills and Abilities) in the domain of management sciences to detect, diagnose, predict and resolve Business problems.
<b>PO2:</b>	Analytical and critical thinking: To adopt analytical and critical thinking for scenario analysis based decision-making.
<b>PO3:</b>	Ethical leadership: To exhibit ethical behaviour in managerial choices as responsible corporate citizens.
<b>PO4:</b>	Team management: To lead diverse cross-functional teams in a globalized organizational environment to optimize the welfare of stakeholders.
<b>PO5:</b>	Ideation: To be able to generate, develop and communicate new ideas.
<b>PO6:</b>	Catalytic Innovation: To approach social problems in an innovative way to create viable, feasible, sustainable solutions.
<b>PO7:</b>	Ecological sustainability: To spear head environmentally responsible decisions that cater to the needs of the present without compromising the future.
<b>PO8:</b>	Developmental alliances: To develop an association at the individual and organizational level for mutual attainment of objectives and goals.
<b>PO9:</b>	Continual learning: To adopt experiential learning for reflection on real world situations and ensure life-long learning.
<b>PO10:</b>	Value based education: To internalise values that promote effective learning and reinforce continuous improvement of the personal, social, moral, and economic wellbeing.
<b>PO11:</b>	Professional development: To refine the industry readiness and agility of business professionals
<b>PO12:</b>	Community Spirit: To engage in service oriented activities so as to empowering and benefiting social stakeholders.
<b>PROGRAMME SPECIFIC OBJECTIVES (PSOs)</b>	
	<b>ECONOMICS AND FINANCE:</b>
<b>PSO1:</b>	To identify, evaluate and select the available investment avenues that enhance wealth maximization.
<b>PSO2:</b>	To critically analyze sources of capital which lead to optimal capital structure decisions
<b>PSO3:</b>	To apply the knowledge of accounting, financial analytical tools and costing techniques to crystallize decision making strategies for global business.
<b>PSO4:</b>	To apply the fundamentals of finance and demonstrate an ability to assess the market value of corporate securities and to manage complex short term finance decisions.
<b>PSO5:</b>	To integrate the areas of business activity to solve the complex unstructured business problems.
	<b>BUSINESS ANALYTICS:</b>
<b>PSO1:</b>	To select and apply advanced data analytical techniques and tools for data driven decision-

	making.
<b>PSO2:</b>	To fashion professionals to have an innovator's attitude to technology which fosters technical adaptability in the dynamic business environment
<b>PSO3:</b>	To enhance analytical capability and process the information to produce result oriented data sets for effective decision making.
<b>PSO4:</b>	To mature as an independent data scientist with robust cross-domain skills to manage analytics driven organization.
<b>PSO5:</b>	To generate meaningful insights across diverse functional domains to develop innovative data analytics solutions.
	<b>MARKETING</b>
<b>PSO1:</b>	To identify key principles in marketing practice in today's new , more connected , more engaging marketing world going beyond traditional tried-and -true marketing concepts
<b>PSO2:</b>	To incorporate creating and capturing customer value and engagement in the digital and social age as a fundamental bulwark of marketing
<b>PSO3:</b>	To apply traditional and trending concepts like customer engagement marketing, omni-channel marketing and retailing , customer cocreation , marketing content creation and native advertising and many more to solve complex marketing problems.
<b>PSO4:</b>	To facilitate the development of the customer engagement framework -creating direct and continuous customer involvement in shaping brands, brand conversations, brand experiences and brand communities
<b>PSO5:</b>	To demonstrate critical-thinking and problem solving skills in today's complex global environment via application of "marketing accountability and "sustainable marketing" skills
	<b>HUMAN RESOURCE MANAGEMENT</b>
<b>PSO1:</b>	To apply the fundamental functions of Human Resource Management in contrast with the contemporary dynamic business environment.
<b>PSO2:</b>	To design selection process based on assessment of manpower planning and formulate a suitable compensation package to keep the human resource extrinsically driven
<b>PSO3:</b>	To develop, implement and evaluate employee orientation, training and development programmes to enhance productivity and facilitate professional advancement in the organization.
<b>PSO4:</b>	To recognize and comply with the policies and practices governing labour markets in India and abroad.
<b>PSO5:</b>	To foster distinctive practices that are designed to attract and retain the most talented human capital of the organization.
<b>COURSE OUTCOMES</b>	
<b>I SEMESTER MBA</b>	
<b>PH 301.1 PRINCIPLES OF ACCOUNTING</b>	

CO 1	To demonstrate knowledge of accounting concepts and techniques and to make sound financial and economic decisions in real world settings.
CO 2	To analyze the effect of business transactions using debits and credits.
CO 3	To evaluate financial statement and access a range of different outcomes and the ability to justify the chosen outcome.
CO 4	To identify and evaluate worksheet and closing entries for an organization.
CO 5	To evaluate the most common components of shareholders' equity.
<b>PH 302.1 ORGANISATIONAL BEHAVIOUR</b>	
CO 1	To apply the concept of organizational behavior to understand the behavior of people in the organization.
CO 2	To consider personality traits, attitude, emotion, values, learning and perception of individuals in the workplace and act accordingly to increase individual's productivity and job satisfaction.
CO 3	To apply motivation theories to analyze the performance problems.
CO 4	To demonstrate skills required for working in groups including leadership skill and manage power, politics and conflict.
CO 5	To be able to implement change effectively in an ever-dynamic organisation environment
<b>PH 303.1 ECONOMICS FOR MANAGERS</b>	
CO 1	To apply the principle of marginal analysis and opportunity cost in real-world managerial decisions.
CO 2	To use the demand and supply analysis to evaluate the competitive position of a company.
CO 3	To assess the functional relationship between production and factors of production and to determine the least cost production function.
CO 4	To design appropriate competitive and price strategy based on the nature of product market.
CO 5	To assess the state of an economy using Gross Domestic Product and its components.
<b>PH 304.1 STATISTICS FOR BUSINESS DECISIONS</b>	
CO 1	To apply statistical concepts, techniques and applications to analyses current business problems

CO 2	To analyze data using univariate and bivariate statistical tools.
CO 3	To enable optimum decision making adopting probability concepts in ambiguous managerial environment.
CO 4	To employ the appropriate statistical inferential techniques and apply it to generalize data on population
CO 5	To apply ANOVA to make inferences on more than two population data sets.
<b>PH 305.1 PRINCIPLES OF STRATEGIC MANAGEMENT</b>	
CO 1	To analyze strategy as a unique activity and to distinguish it from operational effectiveness.
CO 2	To analyze the impact of and role of external environment in the prospects of business and to develop strategies using external environment analysis.
CO 3	To conduct internal analysis of companies and to generate feasible paths to create capabilities and distinctive competencies in organizations.
CO 4	To generate and to execute corporate level, business level and functional level strategies.
CO 5	To apply recent developments in strategic management to achieve sustainable competitive advantage.
<b>PH 306.1 PRINCIPLES OF MARKETING</b>	
CO 1	Understanding and acquainting with the basic concepts of marketing management
CO 2	Understanding the components, and categorizing type and levels of product offered to the customer
CO 3	Ability in determining the pricing strategy for the product offering
CO 4	Acquainting with the concepts of distribution and its role and importance in marketing
CO 5	Apprising the need and importance of promotion in marketing function
<b>PS 307.1 CONTEMPORARY BANKING</b>	
CO 1	Incorporate the knowledge and understanding of a range of areas on Banking Technology
CO 2	Awareness of the latest trends and developments in banking
CO 3	Understanding of the basic terminology in Banking
CO 4	Applying acquired skills and competencies to help to manage the diverse range

	of situations which occur in a dynamic banking environment
CO 5	Reviewing the challenges of the Indian Banking Sector in the LPG era and implementing of strategic mechanism to cope with the challenges
<b>PS 308.1 PRINCIPLES OF HUMAN RESOURCE MANAGEMENT</b>	
CO 1	To Effectively manage and plan key human resource functions within organizations
CO 2	To develop job description and specification and successfully accomplish human resource planning of the organization.
CO 3	To be able to apply the relevant skill set which is required to address the current issues, trends, practices in Recruitment, Selection and Orientation
CO 4	To develop and implement training, and development programme and design performance management system
CO 5	To design compensation package and be cable to manage industrial relations.
<b>PS 309.1 MANAGEMENT DATA ANALYTICS</b>	
CO 1	To apply principles and skills of economics, marketing, and decision making to contexts and environments in data science
CO 2	To build and enhance business intelligence capabilities by adapting the appropriate technology and software solutions
CO 3	To acquire the ERP concepts for real world applications
CO 4	To understand Data Warehouse fundamentals and Data Mining principles
CO 5	To communicate effectively using Data Visualization with MS Excel
<b>PS 310.1 EXECUTIVE COMMUNICATION</b>	
CO 1	To develop strategies for improving organizational communication
CO 2	To effectively use verbal and non-verbal communication in business discourse
CO 3	To compose business messages by using appropriate formats of messages
CO 4	To formulate strategies for writing appropriate letters for various purposes
CO 5	To prepare a professional resume and cover letter
<b>PS 311.1 SOCIAL MARKETING</b>	
CO 1	To internalize the basic concept of and need for social marketing
CO 2	To transform into practice-ready social marketers ready to juxtapose and carry along social marketing and corporate marketing objectives harmoniously
CO 3	To apply the systematic and comprehensive framework of social marketing

CO 4	To bring into effect the influential new 3Cs model (Containment, Counter-Marketing, and Critical Capacity Building)
CO 5	To embody the spirit of social marketing which involves the application of marketing techniques to social ends
<b>II SEMESTER MBA</b>	
<b>PH 301.2 OPERATIONS MANAGEMENT</b>	
CO 1	To formulate the input–process–output framework and apply it to a wide range of operations
CO 2	To identify the elements of operations management and various transformation processes to enhance productivity and competitiveness
CO 3	To analyze and design the work systems by calculating the basic, allowed and standard time and also be able to identify and efficiently manage bottlenecks.
CO 4	To apply different forecasting models/techniques both quantitative and qualitative
CO 5	To analyze and evaluate various facility alternatives and their capacity decisions, develop a balanced line of production & scheduling and sequencing techniques in operation environments.
<b>PH 302.2 INTERNATIONAL BUSINESS ENVIRONMENT</b>	
CO 1	To identify the development of pattern of international trade with the help of trade theories
CO 2	To analyse the role of globalisation in modern times and to evaluate the multilateral agreements while framing global business strategies
CO 3	To design internationalisation strategies for firms and to utilise the benefits of expansion of firms in foreign markets especially emerging markets
CO 4	To analyse international business environment evaluating various cultural, social, economic and demographic elements and to design business tactics according to market dynamics.
CO 5	To identify the various means for international investment and to appraise the significance of each with the help of various theories.
<b>PH 303.2 BUSINESS RESEARCH METHODOLOGY</b>	
CO 1	To apply research and knowledge acquired in business decisions.
CO 2	To critically evaluate secondary data and apply it for optimum business

	decision making.
CO 3	To apply knowledge of research process and practices to assess business environment and solve business problems.
CO 4	To apply survey research concepts, methods and techniques in modern day research problem.
CO 5	To draft research proposals, report with citation techniques.
<b>PH 304.2 BUSINESS LAW</b>	
CO 1	To develop a practical understanding of the basic concepts of those laws which regulate businesses
CO 2	To apply legal ideas, principles and concepts understood earlier through concrete business case law
CO 3	To recognize the linkages between law and other fields like marketing, finance, economics and information systems
CO 4	To apply the basic principles of Contract Law and Company Law in business
CO 5	To foresee the impact of relevant economic laws and laws relating to intellectual property
<b>PH 305.2 COST AND MANAGEMENT ACCOUNTING</b>	
CO 1	To apply both conventional and emerging concepts to facilitate managerial decision making.
CO 2	To assess the impact of costing methods on valuation of stock and net profit.
CO 3	To adopt the cost volume profit analysis for short- and long-term decision making.
CO 4	To formulate master budget and functional budgets for organizational planning and control purposes.
CO 5	To measure the deviations that arise in organizations as compared to the standards set and take corrective action.
<b>PH 306.2 ENTREPRENEURSHIP MANAGEMENT</b>	
CO 1	To develop the spirit of entrepreneurship among the young management graduates and contribute towards the Economic Development
CO 2	To develop next generation innovators, intrapreneurs, entrepreneurs and change-makers
CO 3	To direct the budding entrepreneurs to start up their own venture following the

	legal formalities and be equipped with the required capital.
CO 4	To formulate and present the business plans in a professional manner to all the stakeholders.
CO 5	To be able to effectively manage the various stages of growth of an entrepreneurial firm
<b>PS 307.2 CORPORATE FINANCIAL MANAGEMENT</b>	
CO 1	To apply theoretical framework for considering corporate finance problems, and issues.
CO 2	To review the impact of allocation, management and funding of financial resources.
CO 3	To assess risk and return based on the given scenario.
CO 4	To evaluate the financial objectives of various types of organizations and the requirements of all the stakeholders
CO 5	To assess the sources of corporate finance which lead to optimal capital structure decisions
<b>II SEMESTER MBA</b>	
<b>PS 308.2 LEADERSHIP IN BUSINESS ORGANISATIONS</b>	
CO 1	To synthesize leadership development through application of theoretical knowledge.
CO 2	To Identify and develop traits and characteristics essential for leadership development.
CO 3	To appraise the application of charismatic and transformational leadership styles in the contemporary business organizations.
CO 4	To measure implementation of contingency theories of leadership in varying business conditions.
CO 5	To justify ethical leadership in contemporary business organizations.
<b>PS 309.2 SERVICES MARKETING</b>	
CO 1	Successfully navigate the challenges of services marketing and develop distinct strategies and tactics more attuned to services
CO 2	To develop strong customer relationships through service quality to organizations whose core product is service and to organizations that depend on service excellence for competitive advantage
CO 3	To apply frameworks for customer focussed management and increase

	customer satisfaction and retention through service quality
CO 4	To successfully implement service strategies for competitive advantage across industries
CO 5	To generate the service advantage by measuring and managing service quality enabling cocreation and cross functional treatment of issues through integration of marketing with other domains in the organization
<b>PS 310.2 ECONOMETRIC ANALYSIS</b>	
CO 1	To translate business problems into formal testable hypothesis within regression model
CO 2	To construct linear regression equations to model business decision making problems
CO 3	To draw inference from estimated regression results
CO 4	To identify and develop solutions to the problems that results from violating the assumptions of classical regression model
CO 5	To estimate and validate linear regression models using E-Views, STATA and R
<b>PH 301.3 BUSINESS ETHICS</b>	
CO 1	To inculcate a sense of ethical values and ethical behaviour at personal, professional and corporate governance level.
CO 2	To Understand Human Person as unique and a foundation for any ethical issues.
CO 3	Distinguish the ethical and unethical issues and practices in the marketing management and Human Resource Management of a firm.
CO 4	Examine the implications of issues and unethical practices in the area of finance and accounts.
CO 5	To examine the implications of issues and unethical practices in the area of Environment and Technological Development.
<b>PH 302(a).3 LOGISTICS AND SUPPLY CHAIN MANAGEMENT</b>	
CO 1	Acquainting with the basic concepts, processes, and scope and key elements of a supply chain.
CO 2	Apprising role, functions, strategies and decision making in Warehousing function
CO 3	To develop the understanding of classification, role, policies and costs in Inventory management

CO 4	Analyzing and applying the structure, logistical program and make decisions in designing of distribution channel
CO 5	Exploring the developments taking place in the field of logistics and supply chain
<b>PH 302(b).3 CREATIVITY AND INNOVATION MANAGEMENT</b>	
CO 1	Identifying the role of Industrial Revolution 4.0 and Innovation in designing Sustainable Development practices.
CO 2	Apprising the role of Creativity, Innovation and Imagination in Experience engineering.
CO 3	Understand the role of different types of innovations to respond to the agile business environment.
CO 4	Interpreting and practicing the pattern of Innovation with the help of various models of innovation.
CO 5	Designing the right customer solutions and to create customer value propositions using design thinking and to generate innovative ideas for social change
<b>(FINANCE SPECIALIZATION)</b>	
<b>PS 303(a).3 INVESTMENT ANALYSIS AND PORTFOLIO MANAGEMENT</b>	
CO 1	Become informed, independent and ethical investors in various financial instruments.
CO 2	Find attractive career as advocates of capital markets, investment advisers and portfolio managers.
CO 3	Grow as campaigners of investor's awareness programs and make more and more knowledgeable investing community.
CO 4	Fashion as crusaders against the financial market fraudsters and safeguard the investors' interest.
CO 5	Become champions in new financial products development.
<b>(FINANCE SPECIALIZATION)</b>	
<b>PS 303(b).3 SHORT TERM DECISION MAKING IN FINANCE</b>	
CO 1	Underling the management of current assets and current liabilities
CO 2	Evaluating the ability of a firm to continue its operations
CO 3	Comprehending the capacity of a firm to meet its maturing short-term debt and

	upcoming operational expenses.
CO 4	Assessing the various components of working capital
CO 5	Determining factors that affect firm's liquidity, risk and shareholder wealth.
<b>(FINANCE SPECIALIZATION)</b>	
<b>PS 303(c).3 INTERNATIONAL FINANCIAL MANAGEMENT</b>	
CO 1	To demonstrate basic understanding of the global business environment and the international monetary system
CO 2	To compute the Balance of Payments and evaluate various aspects of capital account liberalization.
CO 3	To demonstrate the significance of various market participants and components of the international financial markets.
CO 4	To forecast exchange rates based on the parity conditions that should apply between spot rates, forward rates, inflation rates, and interest rates.
CO 5	To demonstrate how international capital budgeting can be applied to determine whether an international project should be implemented.
<b>PS 303(d).3 MERCHANT BANKING AND FINANCIAL SERVICES</b>	
CO 1	Articulating the significant role played by Financial Services sector in the realm of Economic Development of a Country.
CO 2	Deliberate on the prominent components of the financial sector providing specialized services
CO 3	Illustrate specialized knowledge in existing and emerging areas of the Financial Services.
CO 4	Enhance the technical knowhow of the Banking and Financial market.
CO 5	Understanding of how credit rating and its regulatory framework functions.
<b>PS 304(a).3 INDUSTRIAL RELATIONS</b>	
CO 1	Successfully navigate the challenges of managing all aspects of work and employment between the parties to an employment contract
CO 2	To develop strong skills in resolving issues relating to people as groups/collectives vis a vis management in unionized and in non-unionized situations
CO 3	To apply frameworks for managing conflict in the industry including techniques like arbitration, mediation and conciliation

CO 4	To successfully implement human resource management strategies for successfully managing industrial relations which in turn will influence and affect the performance of organizations
CO 5	To generate the human capital advantage by being mature business personnel who recognize and understand the need for labour to collectivise in India even in the era of the fourth industrial revolution
<b>PS 304(b).3 ORGANISATIONAL CHANGE AND DEVELOPMENT</b>	
CO 1	To implement change successfully in an organization
CO 2	To apply the concept of organizational renewal in the workplace in order to create an agile organization.
CO 3	To act as an Organization Development practitioner and design various Organization development interventions.
CO 4	To align organization culture and structure with the change and development strategy of the organization.
CO 5	To use Information Technology effectively in organizational design
<b>PS 304(c).3 TALENT MANAGEMENT</b>	
CO 1	To assess the role of Talent management in achieving organizational objectives and to design a Talent Management system
CO 2	To evaluate the role of Talent management in the current volatile environment using various Talent management models
CO 3	To build an effective employer brand with the help of employee value proposition and to attract the best talent with the employer brand
CO 4	To develop suitable Talent development strategies using potential identification, executive development programs and Talent pipeline management strategies
CO 5	To design the right Talent retention strategy with the help of employee engagement initiatives and to align Talent strategy to business strategy
<b>PS 304(d).3INTERNATIONAL AND STRATEGIC HUMAN RESOURCE MANAGEMENT</b>	
<b>COURSE OUTCOME</b>	
CO 1	Develop understanding to manage human resources in the global context.
CO 2	Involving in recruiting, selection and training the staff for international assignments

CO 3	Actively participating in designing and developing of international performance management & compensation system
	Becoming instrumental in aligning HR Strategy to the Organizational Strategy
CO 5	Involve in strategizing the HR process
<b>(MARKETING SPECIALIZATION)</b>	
<b>PS 305(a).3 SALES AND DISTRIBUTION MANAGEMENT</b>	
CO 1	To propose emerging functions of sales management in modern business organizations.
CO 2	To plan personal selling strategies for successful salesmanship activities.
CO 3	To design the functions for selecting and retaining efficient salesmen for the sales organization.
CO 4	To defend the role of distribution management in creating place and time utility.
CO 5	To revise the activities of intermediaries in delivering value for customers in the modern business scenario.
<b>PS 305(b).3 RURAL MARKETING</b>	
CO 1	Awareness creation about Indian rural market
CO 2	Understanding the consumer behavior and decision making process in rural markets
CO 3	Understanding and application of the marketing mix practiced in the rural market
CO 4	Sensitizing the need of innovative distribution system required in the rural market
CO 5	Apprising the need of innovative research techniques to understand the rural market better
<b>PS 305(c).3 STRATEGIC BRAND MANAGEMENT</b>	
CO 1	To gain valuable perspectives on the challenges in creating and nurturing strong brands.
CO 2	To provide managers with concepts and techniques to improve the long term profitability of their brand strategies
CO 3	To combine a comprehensive theoretical foundation with enough practical insights to assist them in their day to day and long term brand decisions
CO 4	To create profitable brand strategies by building, measuring and managing

	brand equity.
CO 5	To recognise the effects of their day to day marketing decisions on brand performance
<b>PS 305(d).3 CONSUMER BEHAVIOUR</b>	
CO 1	To develop appropriate marketing strategies by applying the knowledge of consumer behavior in segmenting markets.
CO 2	To apply personality traits and consumer perceptions in positioning products and predicting buyer behavior.
CO 3	To strategize entry into new market segments and devise strategies for customer retention based on formation of customer attitudes and to apply attitude changing models to attract/ woo competitor's loyals to switch.
CO 4	To attract global markets by penetrating the products based on social, economic and cultural dimensions.
CO 5	To prepare plans/policies relating to corporate social responsibility and pave the way for ethical conduct of business.
<b>PS 306(a).3 FACILITY LOCATION AND PROCESS DESIGN</b>	
CO 1	Enhanced understanding of facility location and layout decisions
CO 2	Comprehensive knowledge of factors affecting facility location and layout decisions
CO 3	Strategize on best possible process to implement based upon product profile of the Organization.
CO 4	Implement and evaluate process flow based on product attribute and process competencies.
CO 5	Insight of operations process design-selection of equipment and technology.
<b>PS 306(b).3 INVENTORY AND WAREHOUSE MANAGEMENT</b>	
CO 1	Articulate knowledge of inventory systems its valuations, decision and control techniques used in inventory management.
CO 2	Develop and manage effective and efficient warehouse management system.
CO 3	Understanding of relationship between warehousing, inventories and supply chain planning.
CO 4	Effect of managerial decisions in functional area of Warehouse management.
CO 5	Implement feasible, effective and efficient warehousing system in retail setup.

<b>PS 306(c).3 MATERIALS AND PROCUREMENT MANAGEMENT</b>	
CO 1	Understand elementary idea of material management linkages with other areas of management, supply chain management and production processes.
CO 2	Critique successful supply chain management practices.
CO 3	Integrate a biblical worldview within the context of material management.
CO 4	Deliberate the role of materials mmanagement in other areas of management functions.
<b>PS 306(d).3 SERVICE OPERATIONS MANAGEMENT</b>	
CO 1	Getting acquainted to the nature, classification, framework and delivery systems of services
CO 2	Evaluating criteria for site selection for service industry
CO 3	Understanding the concept of yield management and its importance and application to the service industry
CO 4	Analyzing and applying Inventory management in service industry
CO 5	Apprising digital application in service sector
<b>PS 307(a).3 FINANCIAL MODELING</b>	
CO 1	To perform accurate financial calculations with the help of packages like MS Excel and R.
CO 2	To create interactive financial models which help in quick decision making.
CO 3	To scrutinize the dividend payment pattern of the corporations and their implications.
CO 4	To construct the financial statements and to predict the future financial positions of the companies.
CO 5	To analyze the implications of corporate events on the share prices and to take informed investment decisions.
<b>PS 307(b).3 PEOPLE ANALYTICS</b>	
CO 1	To enable to make data-driven decisions to attract, manage, and retain employees
CO 2	To effectively manage the challenges involved in implementing analytics
CO 3	To develop data driven, proactive workforce planning and take appropriate workforce-related decisions.
CO 4	To use the talent sourcing analytics, talent acquisition analytics and predictive

	analytics for making HR decisions.
CO 5	To apply analytics in onboarding and performance management system.
<b>PS 307(c).3 DATA DRIVEN MARKETING</b>	
CO 1	To conduct descriptive marketing analysis using excel
CO 2	To predict market swings based on price fluctuations
CO 3	To forecast sales adopting various statistical forecasting tools
CO 4	To estimate life time customer value and allocation of resources for customer acquisition and retention
CO 5	To segment markets and predict duration of future sales
<b>PS 307(d).3 FORECASTING ANALYTICS</b>	
CO 1	To disentangle the components of time series data
CO 2	To construct data driven models of forecasting, such as naïve models, moving average models and exponential smoothing models
CO 3	To build and validate stationary time series models
CO 4	To apply multivariate and volatility models for forecasting, such as VAR, Granger Causality, ARCH and GARCH Models
CO 5	To construct and evaluate time series models using E-Views/R
<b>PH 301.4 CORPORATE GOVERNANCE</b>	
CO 1	To interpret the fundamental concepts and issues in corporate governance in conjunction with the current Indian business scenario.
CO 2	To appraise the theories and models of corporate governance applied in business organizations across the world.
CO 3	To review the application of committee recommendations in business organizations in India.
CO 4	To Justify the role of boards and committees in the healthy governance of business organizations.
CO 5	To predict the future of corporate governance and plan best practices for the future.
<b>PH 302(a).4 DECISION MAKING MODELS</b>	
CO 1	To apply Linear Programming Models and Transportation Problems for tackling business environment challenges quantitatively to allocate limited resources.
CO 2	To employ the Decision Theory techniques to analyze current business

	problems under risk certainty and uncertainty.
CO 3	To apply the Replacement Models techniques in planning of replacing of items keeping cost considerations.
CO 4	To apply Network Modelling of activities to ensure optimum utilization of human and other resources like time and cost.
CO 5	To employ simulation tools for real world business problems where mathematical modeling may not be applied and make strategic decisions
<b>PH 302(b).4 KNOWLEDGE MANAGEMENT</b>	
CO 1	To be able to relate the concepts of knowledge management to the real world.
CO 2	To apply complex theories of knowledge management to a wide range of scenarios;
CO 3	To exhibit the skills and competences to work as an effective knowledge managers and knowledge workers in a knowledge-based organization.
CO 4	To use the effective tools for knowledge transfer and sharing.
CO 5	To be able align organizational culture in knowledge application.
CO 6	To implement various KM strategies and metrics for the success of knowledge management.
CO 7	To lead knowledge knowledge-based organization from ethical, and legal perspective
<b>PS 304(a).4 FINANCIAL REPORTING AND ANALYSIS</b>	
CO 1	Evaluate different types of performance measurement systems in accounting and commonly used financial control systems.
CO 2	Interpret financial statement based on different techniques of analysis.
CO 3	Design appropriate business policies and strategies to meet stakeholder and shareholder needs in the light of the recent changes in financial reporting.
CO 4	Create, evaluate financial statement and access a range of different outcomes and the ability to justify the chosen outcome.

<b>PS 304(b).4 TAXATION FOR MANAGERS</b>	
CO 1	Expose students to real life situations involving taxation and to equip them with techniques for taking tax-sensitive decisions.
CO 2	Assess the value of goods and services for payment of GST.

CO 3	Exhibit a clear understanding of various provisions of GST system and utilisation of input tax credit.
CO 4	Demonstrate the ability to draw meaningful conclusions about tax compliance of individuals, business firms and companies.
	Advise on valuation of goods for payment of customs duty.
<b>PS 304 (c).4 PROJECT FINANCING AND APPRAISAL</b>	
CO 1	Comprehend the conceptual clarity about project organization and feasibility analyses -Market, Technical, Financial and Economic.
CO 2	Analyse and understand the techniques for Project planning, scheduling and Execution Control.
CO 3	Apply the risk management plan and analyse the role of stakeholders.
CO 4	Apprehend Project Procurement, generation and screening of project ideas to excel in the industry.
CO 5	Analyse the prerequisites for successful Project Implementation considering the human perspectives for the benefit of the society at large.
<b>PS 304(d).4 DERIVATIVES AND RISK MANAGEMENT</b>	
CO 1	To enhance the investment basket by including the various financial derivative products.
CO 2	To become independent investor/trader in the derivatives market.
CO 3	To apply the derivative trading strategies to hedge the positions against risk.
CO 4	To face the practical challenges in the application of derivative instruments.
CO 5	To formulate alternative trading strategies to the conventional strategies.
<b>PS 305(a).4 TRAINING AND DEVELOPMENT</b>	
CO 1	Attain basic concepts of training and development and its process
CO 2	Assimilate best of all the components of training and development and familiarize it.
CO 3	Gain a deeper understanding of the tools and techniques of the training process.
CO 4	Familiarize training strategy with corporate strategy.
CO 5	Learn new approaches to the training programme in a changed environment.
<b>PS 305(b).4 LABOUR LAW</b>	
CO 1	To examine the constitutional provisions of Labour Legislations and to incorporate the newly introduced labour codes in the work place

CO 2	To assess the various challenges faced by trade unions and to evaluate the various provisions of Trade unions Act, 1926 and to examine the various statutory requirements of Industrial Disputes Act, 1947.
CO 3	To analyse and to incorporate the different provisions of Factories Act, 1948.
CO 4	To assess the various statutory requirements as specified by wage legislations and to critically analyse different wage legislations
CO 5	To evaluate social security as a human right and to apply the various provisions of Social Security legislations in the work place
<b>PS 305(c).4 STAFFING AND COMPENSATION MANAGEMENT</b>	
CO 1	To implement effective staffing system and strategy in the organization
CO 2	To be able to manage staffing activities in the workplace.
CO 3	To apply the concept of compensation and reward management in firms
CO 4	To administer wage and salary system effectively.
CO 5	To practice performance-based reward system in the organization setting.
<b>PS 305(d).4 PUBLIC RELATIONS</b>	
CO 1	To demonstrate an understanding of the public relations practice.
CO 2	To practice public relations based on the theoretical foundation.
CO 3	To use Media and Communication in Public Relations activities.
CO 4	To recognize the importance of community relations in building public relations.
CO 5	To manage crisis situation with effective public relations practice.
<b>PS 306(a).4 ADVERTISING MANAGEMENT</b>	
CO 1	To gain valuable perspectives on the internal and external environmental challenges involved in managing and integrating a firms marketing communication
CO 2	To provide managers with concepts and techniques to conceptualise and execute creative advertising in various media
CO 3	To combine a comprehensive theoretical foundation with enough practical insights to assist them in practical communication management
CO 4	To expertly optimise the use of all major marketing communication tools like sales promotion, direct marketing, public relations and publicity.
CO 5	To create profitable marketing communication strategies by optimising media

	planning and putting creative ideas to the test of fixed budgets and defined objectives through the process of evaluation
<b>PS 306(b).4 NEW PRODUCT DEVELOPMENT</b>	
CO 1	Understanding the strategic importance, classification and hierarchy of products
CO 2	Involving in the nuances of concept generation and evaluation in the new product development process
CO 3	Involving in the process of evaluation and selection of concepts in new product development process
CO 4	Acquainting with the process of product development, design and team management in the NPD process
CO 5	Recognizing the importance of product testing and commercialization phase in the NPD process
<b>PS 306(d).4 DIGITAL MARKETING</b>	
CO 1	Acknowledging the impact of digital movement in the present marketing scenario
CO 2	Understanding the social media impact in the present marketing scenario
CO 3	Acquainting with the drivers in the social marketing domain
CO 4	Enabling to adopt and experiment with the online tools for marketing function
CO 5	Apprising the developments in digital domain and impacts on the marketing domain
<b>PS 307(a).4 OPERATIONS ANALYTICS</b>	
CO 1	Development of analytical and problem solving skills, confidence to use tools, ability to visualize data and infer decisions.
CO 2	Develop a multi-dimensional approach to problem solving/decision making
CO 3	Exposure to practical analysis tools in decision making and problem solving in operations
CO 4	Model future demand uncertainties, to predict the outcomes of competing policy choices and to choose the best course of action in the face of risk.
CO 5	Find an attractive career in the area of operations analytics.
<b>PS 307(b).4 PURCHASE MANAGEMENT</b>	
CO 1	Comprehensive understanding of process of the purchase management and

	practical aspects involved in it.
CO 2	Find an attractive career in purchase division of the well-known business houses
CO 3	Become an expert consultant in the area of purchase and procurement.
CO 4	Develop modern and customized purchase system and help the corporates to achieve greater efficiency in purchasing.
CO 5	Emerge as an expert negotiator between the corporate buyers and sellers.
<b>PS 307(c).4 STRATEGIC OPERATIONS MANAGEMENT</b>	
CO 1	Understanding the the importance of strategic operations management.
CO 2	Understanding the scope of operations management to gain competitive advantage.
CO 3	Building step by step operations strategy.
CO 4	Implementing the strategic operations strategies to meet the objectives of the firm.
<b>PS 307(d).4 TOTAL QUALITY MANAGEMENT</b>	
CO 1	To achieve the objectives of quality control by understanding the need for total quality management.
CO 2	To implement and use the theories developed by the various philosophers in creating customer focus and achieving customer satisfaction.
CO 3	To apply various statistical tools to measure quality and to analyze the quality-cost relationship.
CO 4	To be able to measure customer satisfaction by the use of the Kano Model and Teboul Model.
CO 5	To identify and analyze the cost of benchmarking and to utilize the tools of concurrent engineering in total quality management.
<b>PS 307 (e).4 PROJECT FINANCING AND APPRAISAL</b>	
CO 1	Comprehend the conceptual clarity about project organization and feasibility analyses -Market, Technical, Financial and Economic.
CO 2	Analyse and understand the techniques for Project planning, scheduling and Execution Control.
CO 3	Apply the risk management plan and analyse the role of stakeholders.
CO 4	Apprehend Project Procurement, generation and screening of project ideas to

	excel in the industry.
CO 5	Analyse the prerequisites for successful Project Implementation considering the human perspectives for the benefit of the society at large.
<b>PS 308(a).4 FINANCIAL ANALYTICS</b>	
CO 1	To become expert in different software packages in technical analysis and to guide others.
CO 2	To inculcate the problem solving ability whenever need arises in the area investment management.
CO 3	To become self-reliant investors and traders in financial products.
CO 4	To obtain an attractive career in the field of investment analysis.
CO 5	To create awareness among the investing community about the fraudulent investment tips providers.
<b>PS 308(b).4 TALENT ANALYTICS</b>	
CO 1	To measure talent engagement and make a strong organizational culture to improve performance
CO 2	To enable the students with the technique of predicting the attrition rate using analytics
CO 3	To leverage big data to significantly improve the value of the workforce.
CO 4	To optimize employee wellness, health and workplace with predictive analytics
CO 5	To be competent to handle the future demands of talent analytics

## MASTER OF COMPUTER APPLICATION (MCA)

### PROGRAMME OUTCOMES (PO'S)

P01	<p><b>Computational Knowledge:</b> Apply knowledge of mathematics, computing fundamentals, data analytics, software engineering concepts and application development knowledge appropriate for the computing specialization</p>
P02	<p><b>Problem Analysis:</b> Identify, formulate, design and develop applications to analyze and solve computer science related problems</p>
P03	<p><b>Design /Development of Solutions:</b> Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.</p>
P04	<p><b>Conduct investigations of complex Computing problems:</b> Use appropriate review literatures, research methodologies, techniques and tools, design, conduct experiments, analyze and make inferences from the resulting data.</p>
P05	<p><b>Modern Tool Usage:</b> Create, Select, Integrate and apply efficiently appropriate techniques, resources, and modern computing tools to solve complex problem, with an understanding of the limitations.</p>
P06	<p><b>Professional Ethics:</b> Understand and work with a professional context pertaining to ethics with appropriate societal and cyber regulations in a global economic environment</p>
P07	<p><b>Life-long Learning:</b> Recognize and develop the passion for a continued career development and progress as a computer professional</p>
P08	<p><b>Project management and finance:</b> Apply the principles of management with computing knowledge to manage the projects effectively both as a team leader and team member on multidisciplinary environments</p>
P09	<p><b>Communication Efficacy:</b> Communicate effectively with the computing community as well as society by being able to make effective presentations and design documentation with respect to appropriate standards.</p>
P010	<p><b>Societal and Environmental Concern:</b> Ability to utilize the computing knowledge efficiently in projects to analyze the global and local impact of business solutions for societal, environmental, and cultural aspects</p>
P011	<p><b>Individual and Team Work:</b> Develop the ability to act as a member or leader for the fulfillment of diverse teams in multidisciplinary environments.</p>

PO12	<b>Innovation and Entrepreneurship:</b> Develop and design innovative methodologies to create value as a successful entrepreneur and wealth for betterment of individual and society at large.
<b>PROGRAMME OUTCOMES (PSO'S)</b>	
PS01	Excel in professional career and/or higher education by acquiring knowledge in various sub-domains related to the field of computer science and applications
PS02	Analyze real life problems, design computing systems appropriate to its solutions that are technically sound, economically feasible and socially acceptable
PS03	To develop the abilities to face the changing trends and career opportunities in computer application
PS04	Exhibit professionalism, ethical attitude, communication skills, team work in their profession and adapt to current trends by engaging in lifelong learning
<b>COURSE OUTCOMES</b>	
<b>I Semester</b>	
<b>PH 601.1 [E1]: DATABASE MANAGEMENT SYSTEMS</b>	
CO 1	Very good understanding about data and database systems.
CO 2	Describe the fundamental elements of relational database management systems
CO 3	Understand the design of relational databases through the use of Entity-Relationship Diagrams and Normalization procedures
CO 4	Develop basic skills in the use of SQL in defining and creating a database, inserting and modifying entries in a table, creating views and other data objects
CO 5	Effective way of manipulating the database to produce useful decision making information for management & analytics. Using data in the distributed environment
<b>PH 601.1 [E2] :DATABASE DESIGN AND IMPLEMENTATION</b>	
CO 1	Upon successful completion of this course, students should be able to:
CO 2	Understand the limitations of traditional file management systems, different data models
CO 3	Understand the need for an efficient management system to administer the

	data repository of any organization, designing relational database systems with normalization concept
CO 4	Identify the importance of data consistency and also how data integrity ignorance affects any business organization
CO 5	Providing data security through different means (such as Views)
CO 6	Identifying the power of Query language - generating flexible and customized reports
CO 7	Providing complex integrity constraints through the use of Triggers
CO 8	Know the Power of procedural SQL, writing Stored procedures, functions and packages
CO 9	Gain knowledge about the emerging trends in database technology and also schema less database
<b>PH 601.1 [E3]: NoSQL with MongoDB</b>	
CO 1	After successful completion of the course students should be able to
CO 2	Understand that data need not be structured for storage, retrieval and manipulation
CO 3	Define, compare and use the four types of NoSQL Databases (Document-oriented, Key Value Pairs, Column-oriented and Graph).
CO 4	Demonstrate an understanding of the detailed architecture, define objects, load data, query data and performance tune Column-oriented NoSQL databases.
CO 5	Explain the detailed architecture, define objects, load data, query data and performance tune Document-oriented NoSQL databases.
CO 6	Using NoSQL tools efficiently in the academic projects
CO 7	Understands different types of Indexing/shading and marinating NoSQL data, Comparing the power of different NoSQL tools
<b>PH 602.1 [E1] DATA STRUCTURES AND ANALYSIS OF ALGORITHMS</b>	
CO 1	Ability to understand and implement algorithms and are able to calculate the time and space complexities.
CO 2	Able to implement and apply stack and queue data structure in different applications.
CO 3	Ability to implement linked list and concepts and apply list concepts to solve

	different problems.
CO 4	Ability to implement tree data structure and tree data structure to solve expressions
CO 5	Ability to implement and apply different searching and sorting methods.
<b>PH 602.1 (E2) DATA STRUCTURES AND GRAPH THEORY</b>	
CO 1	Ability to program using structures, function pointers, classes and objects.
CO 2	Ability to implement and apply stack, queue and list data structures in different applications.
CO 3	Ability to implement and apply tree data structure in different applications
CO 4	Ability to program different searching and sorting methods and how to apply these in different applications
CO 5	Ability to implement and apply different graph methods in different applications
<b>PH 602.1 (E3) ADVANCED DATA STRUCTURES AND ALGORITHMS</b>	
CO 1	Understand what is data structure and able to implement different programs using structures, functions, pointer and memory allocation functions
CO 2	Skill to program stack, queue using array and apply these algorithms to different applications.
CO 3	Ability to program binary tree, binary search tree, AVL tree and other tree data structures and traverse and represent expressions using tree data structure.
CO 4	Ability to program different searching and sorting algorithms using C++ programming language.
CO 5	Ability to create graph using array and using linked list, find shortest path in graph, able to traverse the graph
<b>PH 603.1 [E1]: OBJECT ORIENTED PROGRAMMING WITH JAVA</b>	
CO 1	Develop simple Java applications using control structures
CO 2	Design user defined classes and create instances for them, Learn to invoke methods on those objects, Create programs to execute various methods of String and StringBuffer classes.
CO 3	Develop applications to illustrate simple inheritance and multilevel inheritance, Simulate multiple inheritance with the help of interfaces.
CO 4	Develop programs to illustrate synchronization between multiple threads, also

	to handle exceptions caused by them.
CO 5	Students will be able to build Java applications where they can read from and write to files. Design generic classes and test them.
<b>PH 603.1 [E2]: ENTERPRISE COMPUTING WITH ADVANCED JAVA</b>	
CO 1	To analyze various JEE components. To understand about distributed applications
CO 2	To develop server-side programs using Servlets
CO 3	To develop server-side web applications using JSP
CO 4	Update and retrieve the data from the databases using Apache Derby
CO 5	Create session and entity beans using EJB
<b>PH 603.1 [E3]: ENTERPRISE COMPUTING: JAVA EE Frameworks</b>	
CO 1	Developing server-side web applications using Servlet, JSP
CO 2	Update and retrieve the data from the databases using Apache Derby, develop web applications using various JSTL tags
CO 3	Develop enterprise applications using EJB
CO 4	Create simple web applications using JSF framework
CO 5	Map Java classes to database tables using Hibernate
<b>PH 604.1 [E1]: WEB DESIGN with HTML 5, CSS, Java Script</b>	
CO 1	Students will be able to develop websites and web-based projects.
CO 2	Students can be employed on entry-level jobs of web development in software industry.
CO 3	Students will be able to develop interactive and dynamic webpages
<b>PH 604.1[E2]: WEB PROGRAMMING WITH PHP and MYSQL</b>	
CO 1	Students will be able to develop static webpages using HTML elements
CO 2	Students will be able to design HTML forms, Perform graphics design using CANVAS, SVG, Play audio and video in web pages
CO 3	Ability to style HTML pages using CSS
CO 4	Develop simple JavaScript programs
CO 5	Ability to develop interactive web pages using JavaScript
<b>PH 604.1[E3] WEB APPLICATION DEVELOPMENT USING PYTHON</b>	
CO 1	Define the structure and components of a Python program and to design and program Python applications.

CO 2	Learn how to use lists, tuples, dictionaries in Python programs, to read and write files in Python, to design object-oriented programs with Python classes.
CO 3	Learn how to use exception handling in Python applications for error handling and do CRUD operations.
CO 4	To use various libraries in Python and successfully configure and install DjangoFramework
CO 5	To develop a secure and robust web applications using Django framework
<b>PS 606.1 [E1] STATISTICAL TECHNIQUES FOR COMPUTING</b>	
CO 1	Select appropriate statistical techniques for summarizing and displaying data
CO 2	Analyze and draw inferences from data using appropriate statistical methods.
CO 3	Analyze the dispersion in the data and draw inference.
CO 4	Understand the concept of a frequency distribution for sample data and be able to summarize the distribution by diagrams and statistics.
CO 5	Understand correlation and regression, and be able to make predictions and understand their limitations.
<b>PS 606.1 [E2] PROBABILITY AND STOCHASTIC PROCESS</b>	
CO 1	Calculate the probabilities and identify the various types.
CO 2	Apply inverse probability concepts and solve problems.
CO 3	Express the features of discrete random variables and formulate the <i>distribution</i> functions.
CO 4	Identify the various distributions and apply them.
CO 5	Classify a stochastic process according to whether it operates in continuous or discrete time and whether it has a continuous or a discrete state space, to understand the concept of Markov chains and study the transition diagram.
<b>PS 606.1 [E3] OPERATIONS RESERACH</b>	
CO 1	Calculate the probabilities and identify the various types.
CO 2	Apply inverse probability concepts and solve problems.
CO 3	Express the features of discrete random variables and formulate the <i>distribution</i> functions.
CO 4	Identify the various distributions and apply them.
CO 5	Classify a stochastic process according to whether it operates in continuous or discrete time and whether it has a continuous or a discrete state space.
CO 6	Tounderstand the concept of Markov chains and study the transition diagram.

<b>PS 607. 1 P Java &amp; Web Development Lab</b>	
CO 1	Use the Java SDK & JRE Environment to Create, Debug and Run Simple Java Programs.
CO 2	Analyze the Problem, Identify the Requirements & Features of Applications and Utilities
CO 3	Implement Object Oriented Concepts for Solving Real Problem.
CO 4	Develop Small Applications, Utilities, and Web Applications Using AWT, Event and Layout Manager
<b>PS 608.1 Foundations of Entrepreneurship</b>	
CO 1	Define basic terms, analyse the business environment in order to identify business opportunities
CO 2	Identify the elements of success of entrepreneurial ventures,
CO 3	Consider the legal and financial conditions for starting a business venture
CO 4	Evaluate the effectiveness of different entrepreneurial strategies and specify the basic performance indicators of entrepreneurial activity,
CO 5	Explain the importance of marketing and management in small businesses venture, interpret their own business plan
<b>II Semester PH 601.2 [E1] CLOUD COMPUTING WITH AMAZON WEB SERVICES</b>	
CO 1	On the successful completion of the course, students will be able to
CO 2	Describe the key technologies, architecture, strengths, limitations and applications of cloud computing
CO 3	Explain the types and service models of cloud
CO 4	Understand security implications in cloud computing
CO 5	Design Cloud Services and Set a private cloud
CO 6	Create and automate infrastructure to design cost-effective, highly available applications
CO 7	Integrate AWS services with your application to meet and exceed non-functional requirements
<b>PH 601.2 [E2] Grid and Cluster Computing</b>	
CO 1	Understand fundamentals of cluster computing and Environments
CO 2	To enable resource sharing across networks.
CO 3	To integrate heterogeneous computing systems and data resources with the

	aim of providing a global computing space.
CO 4	To manage and schedule the resources in grid environments.
CO 5	To know the standards and protocols used.
CO 6	To Know the middleware in grid computing.
CO 7	To understand the latest advances in the field of computation to optimize the utilization of resources.
<b>PH 601. 2 [E3] HIGH PERFORMANCE COMPUTING</b>	
CO 1	To Study various computing technology architecture.
CO 2	To know Emerging trends in computing technology.
CO 3	To highlight the advantage of deploying computing technology.
CO 4	Demonstrate understanding of learned concepts of parallel algorithm design, performance evaluation, communication operators by writing algorithms and programs exploiting parallel architecture
CO 5	Analyze the efficiency of parallel algorithms designed for matrix, graph and sorting operations
<b>PH 602.2 E1: SOFTWARE ENGINEERING and UML</b>	
CO 1	Plan and deliver an effective software engineering process, based on development lifecycle models.
CO 2	Employ group working skills including general organization, planning and time management and negotiation.
CO 3	Apply software engineering principles and techniques.
CO 4	Understand the principles of large scale software systems, and the processes that are used to build them
CO 5	Analyze a problem, and identify and define the computing requirements appropriate to its solution.
CO 6	Design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs.
<b>PH 602.2 E2: OBJECT ORIENTED SOFTWARE ENGINEERING</b>	
CO 1	Display understanding and the ability to apply object-oriented programming principles.
CO 2	Have detailed knowledge of the software development lifecycle.
CO 3	Apply skills relevant for academic progression and career development within

	the sector.
CO 4	Explore and analyze different analysis and design models, such as OO Models, Structured Analysis and Design Models, etc.
CO 5	Show an ability to use the graphical UML representation using tools.
CO 6	Apply software engineering perspective through software design and construction, requirements analysis, verification, and validation, to develop solutions to modern problems such as security, data science, and systems engineering.
<b>PH 602.2 E3: AGILE SOFTWARE DEVELOPMENT</b>	
CO 1	Understand concept of agile software engineering and its advantages in software development.
CO 2	Recognize various agile methods.
CO 3	Understand the principles behind the agile approach to software development
CO 4	Deconstruct user stories into tasks and ideal day estimates.
CO 5	Differentiate between the testing role in agile projects compared with the role of testers in non-agile projects.
<b>PH 603.2 (E1): Mobile Application Development using Android</b>	
CO 1	Understand the architecture, working and environmental setup of Android
CO 2	Design and Implement simple GUI based Android Apps that handle user input and provide information
CO 3	Implement Android apps that are able to receive broadcasted messages, act as content provider or receiver and run background services.
CO 4	Create Android Apps that can manipulate data from various data stores such as internal, external memory and also SQLite as a Database.
CO 5	Design and Work with advanced sensors of the phone and manipulate Telephony and SMS in an Android Phone.
<b>PH 603.2 (E2): Cross Mobile App Development using React Native</b>	
CO 1	Write JavaScript code for any particular scenario and also be familiar with the syntax of JavaScript
CO 2	Create simple React JS based User Interfaces and UI Components
CO 3	Create React Native apps that simultaneously work in Android and iOS
CO 4	To Use Widgets and components to create professional mobile applications

CO 5	To Create Cross Platform apps that makes use of all the advanced features that React Native has to offer.
<b>PH 603.2 (E3): Mobile App Development for iOS with Swift</b>	
CO 1	Understand the working of mobile devices compared to the various architectures available
CO 2	Do programming with the Swift Language
CO 3	Use advanced concepts of Swift to solve complex problems
CO 4	Use Widgets and components to create professional iOS applications
CO 5	Develop iOS apps to perform the various advanced tasks like Database handling.
<b>PH 604.2 P Cloud Computing and Mobile App Development Lab</b>	
CO 1	Understand the business models that underlie Cloud Computing
CO 2	Understand the importance of protocols and standards in computing.
CO 3	Understand the issues involved in distributed computing
CO 4	Ability to deploy applications using the Unicore Grid middleware
CO 5	Ability to programme using the APIs of Cloud Computing
CO 6	Ability to create Virtual Machine images and to deploy them on a Cloud.
<b>PS 605.2 [E1]: NATURAL LANGUAGE PROCESSING</b>	
CO 1	Understand natural language processing and to learn how to apply basic algorithms in this field.
CO 2	Understand POS tagging and context free grammar for English language
CO 3	Learn how model linguistic phenomena with formal grammars; and to design, implement and test algorithms for NLP problems
CO 4	Understand the mathematical and linguistic foundations underlying approaches to the various areas in NLP
CO 5	Apply NLP techniques to design real world NLP applications such as machine translation, text categorization, text summarization, information extraction
<b>PS 605.2 [E2]: IMAGE PROCESSING AND PATTERN RECOGNITION</b>	
CO 1	Understand image formation, role of human visual system plays in perception of gray and color image data.
CO 2	Apply image processing techniques in both the spatial and frequency (Fourier) domains. Apply different de-noising models to recover original image.

CO 3	Design image analysis techniques, image segmentation and to evaluate the Methodologies for segmentation. Conduct independent study and analysis of feature extraction techniques.
CO 4	Identify different pattern recognition techniques and apply them in real world problems.
CO 5	Learn how to classify patterns. And build a statistical classifier and will learn how to use other classifiers.
CO 6	Be able to write programs in Matlab language/Python for digital manipulation of images; image acquisition; preprocessing; segmentation; Fourier domain processing.
<b>PS 605.2 [E3] : Bioinformatics Algorithms, Databases and Tools</b>	
CO 1	Gain a knowledge of simple biology and Bioinformatics
CO 2	Gain knowledge of database and tools with respect to Genomics and Proteomics; usage of different biological databases for understanding protein domains and families
CO 3	Understand the algorithmic complexity of Biological algorithms; application of algorithms to find motifs in proteins
CO 4	Usage of gene prediction algorithms and its statistical approaches
CO 5	Usage of HMM for Profiling; applying graph algorithm for protein sequencing
<b>PS 606.2 [E1] : DATA WAREHOUSING AND DATA MINING</b>	
CO 1	List the definitions, concepts and architectures of data warehousing and data mining
CO 2	Demonstrate the impact of business reporting, information visualization and dashboards
CO 3	Explain data mining, support vector machines and text mining.
CO 4	Define social impacts of data mining.
CO 5	Handle classification through statistical methods used in prediction.
<b>PS 606.2 [E2] : BUSINESS INTELLIGENCE &amp; ADVANCED DATA MINING</b>	
CO 1	Identify the major frameworks of business intelligence (BI).
CO 2	List the definitions, concepts and architectures of data mining
CO 3	Demonstrate the impact of business reporting, information visualization and dashboards

CO 4	Handle classification through statistical methods used in prediction.
CO 5	Explain data mining, neural networks, support vector machines, text mining, web mining and social network analysis.
<b>PS 606.2 [E3]: DATA SCIENCE AND ANALYTICS</b>	
CO 1	Use data management techniques to store data
CO 2	Use statistical methods and visualization to quickly explore data
CO 3	Apply statistical and computational analysis to make predictions based on data
CO 4	Implement data-intensive computations on cluster and cloud infrastructures.
CO 5	Effectively communicate the outcome of data analysis using descriptive statistics and visualizations
<b>PS 607. 2 P Advanced Computing and Data Mining Lab</b>	
CO 1	Examine the concepts of data warehousing and OLAP;
CO 2	Apply the concepts of BI and DM techniques for clustering, association, and classification;
CO 3	Understand the operation procedures of BI projects in an organization;
CO 4	Select appropriate DM tools and methods to manipulate and achieve data;
CO 5	Apply DM concepts for formulating business strategies and programs to enhance business intelligence.
<b>PH 608.2: MINI PROJECT AND ADVANCED ENTREPRENEURSHIP</b>	
CO 1	Explore and experience the joy of creating unique solutions to market opportunities
CO 2	Create and exploit innovative business ideas and market opportunities
CO 3	Turn market opportunities into a business plan
CO 4	Build a mind-set focusing on developing novel and unique approaches to market opportunities
CO 5	Demonstrate and present successful work, collaboration and division of tasks in a multidisciplinary and multicultural team
CO 6	Demonstrate understanding and application of the tools necessary to create sustainable and viable businesses
<b>PA 609.2 Seminar &amp; Technical Communication - I</b>	
CO 1	How to Gather, organize, summarize and interpret literature with the purpose of formulating a proposal.

CO 2	Write a technical report summarizing state-of-the-art on an identified topic.
CO 3	Present the study using graphics and multimedia techniques.
CO 4	Define intended future work based on the technical review.
<b>III Semester</b>	
<b>PH 601.3 [E1]: FUNCTIONAL PROGRAMMING PARADIG</b>	
CO 1	Understand the basic fundamentals data types, and function structure required for Haskell programming language.
CO 2	Implementation of functions, loops, arrays, objects, and working with JSON data.
CO 3	Implementation of files, I/O and Buffering.
CO 4	Understand the basic fundamentals object-oriented, Scalars, Collections and functions required for Clojure programming language.
CO 5	Implementation of vectors, list, queues and function for Clojure programming language.
<b>PH 601.3 [E2]: INTERNET OF THINGS AND APPLICATIONS DEVELOPMENT</b>	
CO 1	Understand the basic networking model, internet/Web, networking equipment required for design of IoT.
CO 2	Understand the basic IoT protocols, architecture, reference architecture, data representation, required for design of IoT.
CO 3	Understand the basic of data link layer protocols and their feature for the design of IoT.
CO 4	Understand the basic of user experience in design of IoT and multipurpose computer concepts, sensor for IoT design.
CO 5	Understand the basic of networking, issues, challenges, communication patterns for the IoT design.
<b>PH 601.3 [E3]: AUGMENTED AND VIRTUAL REALITY</b>	
CO 1	Understand the basic fundamental topics to consider for the design of Augment and Virtual Reality.
CO 2	Understand the Software and Hardware needed for Augment and Virtual Reality.
CO 3	Knowledge on fundamentals of Wearable Computers, scope, augmented Reality and their challenges.
CO 4	Knowledge on fundamentals of Input, Output interface required for the design of

	Virtual Reality.
CO 5	Knowledge on fundamentals of technology, features and visualization techniques required for design of Augment Reality.
<b>PH 602.3 [E1] WEB DEVELOPMENT WITH ANGULAR .JS, NODE .JS</b>	
CO 1	Get introduced in the area of JavaScript's Role in recent web applications.
CO 2	Acquire knowledge about client side java framework angularJs
CO 3	Acquire knowledge about Building Applications using Angular JS.
CO 4	Acquire knowledge about server side framework nodeJS
<b>PH 602.5 [E2] CONTENT MANAGEMENT WITH JOOMLA &amp; WORDPRES</b>	
CO 1	Create and deploy websites using CMS, including creating and editing content, adding functionality, and creating custom templates and themes.
CO 2	Understand ongoing maintenance considerations with CMS websites.
<b>PH 602.3 [E3] Blockchain Technology with Ethereum</b>	
CO 1	Understand what and why of Blockchain
CO 2	Explore the major components of Blockchain
CO 3	Learn about Hyperledger Fabric model and its Architecture
CO 4	Learn about Hyperledger Composer and Explorer
CO 5	Learn about Bitcoin, Ethereum
CO 6	Learn about Ethereum Virtual machine, The Ethereum network. Applications development on Ethereum.
<b>PH 603.3 (E1) Computing with C# and .NET Framework</b>	
CO 1	Understand what is .NET Framework and how does it work
CO 2	Develop Programs using various C# concepts
CO 3	Design and develop full-fledged UWP applications using C#
CO 4	Use any DB technology and create a dynamic UWP.
CO 5	Gain knowledge in the area of .NET Core and develop applications using .NET Core
<b>PH 603.3 (E2): Web Technologies and .NET Framework</b>	
CO 1	To study the elements of the .NET Framework platform and its working
CO 2	To understand what is ASP.NET and what it has to offer in Web Development
CO 3	Understand the architecture and main classes of ADO.NET, LINQ and EF to develop Data Driven Applications
CO 4	To Develop Web Services using ASP.NET and to understand ASP.NET AJAX and

	MVC
CO 5	To Introduce ASP.NET Core MVC Programming Paradigm
<b>PH 603.3 (E3) Cross Platform Development using .NET Core</b>	
CO 1	Understand what is .NET Framework and Develop Programs using various C# concepts
CO 2	Design and develop full-fledged applications using .NET Core
CO 3	Use DB technologies like Entity Framework and LINQ with .NET Core
CO 4	Create and Deploy Web Applications using ASP.NET Core
CO 5	Develop Professional Websites using ASP.NET Core, ASP.NET MVC Core and Razor View Engine
<b>PH 604.3 P Web Application Development &amp; .NET Lab</b>	
CO 1	Identify important events and individuals in the history of human-computer interfaces.
CO 2	Design and develop Windows application using different Windows technologies that use a variety of GUI controls and classes to fulfill specific user requirements.
CO 3	Explain how event driven applications use threading to perform time-consuming operations.
CO 4	Demonstrate how to use specific features of the C# programming language to write object-oriented programs and handle run-time errors.
CO 5	Explain in a public presentation how user interfaces should be designed to accommodate human physiology and limitations.
<b>PS 605.3 [E1]: Cognitive Computing and Artificial Intelligence</b>	
CO 1	To design applications using computational cognitive neuroscience by applying techniques of cognitive computing and neural network theory
CO 2	To Design intelligent agents for problem solving, reasoning and planning.
CO 3	To implement AI systems with different approaches of knowledge representation, design AI systems with heuristic search techniques
CO 4	To implement AI systems using statistical and symbolic reasoning, designing AI models using Bayes rule
<b>PS 605.3 [E2] : Computational Intelligence and Machine Learning</b>	
CO 1	Gain a working knowledge of knowledge-based systems using neural networks
CO 2	Implement intelligent systems technologies with neural network and fuzzy logic
CO 3	Implement typical computational intelligence systems with various performance metrics and conducting the analysis

CO 4	To implement machine learning models using Bayesian algorithm; implement applications using k-means clustering.
CO 5	To implement machine learning models using decision trees & LDA and analyze the results.
<b>PS 605.3 [E3] Deep Learning and Neural Networks</b>	
CO 1	To implement a neural network for an application of your choice using an available tool
CO 2	To implement different memory network using programming language; develop applications using fuzzy logic.
CO 3	Apply fuzzy logic to many real world problems.
CO 4	To design and implement deep learning models using CNN and RNN
CO 5	To implement deep learning models using autoencoders and transfer learning
<b>PS 606.3 [E1]: BIG DATA ANALYTICS with MAP REDUCE AND HADOOP</b>	
CO 1	Identify and distinguish big data analytics applications from other applications and the use of Big Data.
CO 2	Describe No SQL databases and understanding different concepts related to No SQL and its applications using MongoDB.
CO 3	Understanding Hadoop and its advantage over the traditional database applications in solving practical problems
CO 4	Writing programs using mapper and reducer.
CO 5	Using Hive and Pig for analyzing and querying data and knowing the advantages over the traditional Data handling solutions.
<b>PS 606.3 [E2]: BIG DATA ANALYTICS WITH SCALA AND SPARK</b>	
CO 1	Understand what Functional programming is and will know why classical data analysis techniques are no longer adequate
CO 2	Understand the benefits that Spark and Spark SQL offers for processing structured and unstructured data.
CO 3	Understand conceptually how Spark SQL is used for Data Exploration, Data Munging and Data Streaming.
CO 4	Understand how Spark can be used for Machine Learning.
CO 5	Understand the use of PySparrk and SparkR
<b>PS 606.3 [E3] : BIG DATA VISUALIZATION USING TABLEAU</b>	

CO 1	Knowing the impact of Data visualization techniques and how it helps to better understand the data Topics in information design, interaction design and user engagement.
CO 2	Understand and apply the fundamental concepts and techniques in data visualization
CO 3	Solve specific real-world problems related to the visualization and interpretation of data analysis results using charts and maps.
CO 4	Getting to know Tableau public and using its various features.
CO 5	Working with different real time examples and understanding the impact of visualization in real life situations.
<b>PS 607. 3 P Machine Learning &amp; Big Data Lab</b>	
CO 1	Examine the concepts of data warehousing and OLAP;
CO 2	Apply the concepts of BI and DM techniques for clustering, association, and classification;
CO 3	Understand the operation procedures of BI projects in an organization;
CO 4	Select appropriate DM tools and methods to manipulate and achieve data;
CO 5	Apply DM concepts for formulating business strategies and programs to enhance business intelligence.
<b>PH 608.3 BUSINESS CONSULTANCY PROJECT</b>	
CO 1	Considerably more in-depth knowledge of the major subject/field of study, including deeper insight into current research and development work.
CO 2	Concepts to address specific management needs at the individual, team, division and/or organizational level
CO 3	Practical applications of project management to formulate strategies allowing organizations to achieve strategic goals
CO 4	A perspective of leadership effectiveness in organizations
CO 5	Team-building skills required to support successful performance
CO 6	Critical-thinking and analytical decision-making capabilities to investigate complex business problems to propose project-based solutions
CO 7	Skills to manage creative teams and project processes effectively and efficiently

<b>PA 609.3 SEMINAR AND TECHNICAL COMMUNICATION - II</b>	
CO 1	How to Gather, organize, summarize and interpret literature with the purpose of formulating a proposal.
CO 2	Write a technical report summarizing state-of-the-art on an identified topic.
CO 3	Present the study using graphics and multimedia techniques.
CO 4	Define intended future work based on the technical review.
<b>VI SEMESTER</b>	
<b>PH 601.6 : INDUSTRY INTERNSHIP / PROJECT WORK</b>	
CO 1	Gather,organize,summarizeandinterpretliteraturewiththepurposeofformulatin ga Research problem and working on it to propose a solution.
CO 2	Writeatechnical papersummarizingstate-of-the-artonanidentifiedtopic.
CO 3	Presentthestudyusinggraphicsandmultimediatechniques.
CO 4	Defineintendedfutureworkbasedonthetechnicalreview.
CO 5	Publish the work in a reputed Journal of interest or present it in an international/national State/Regional conferences.

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