



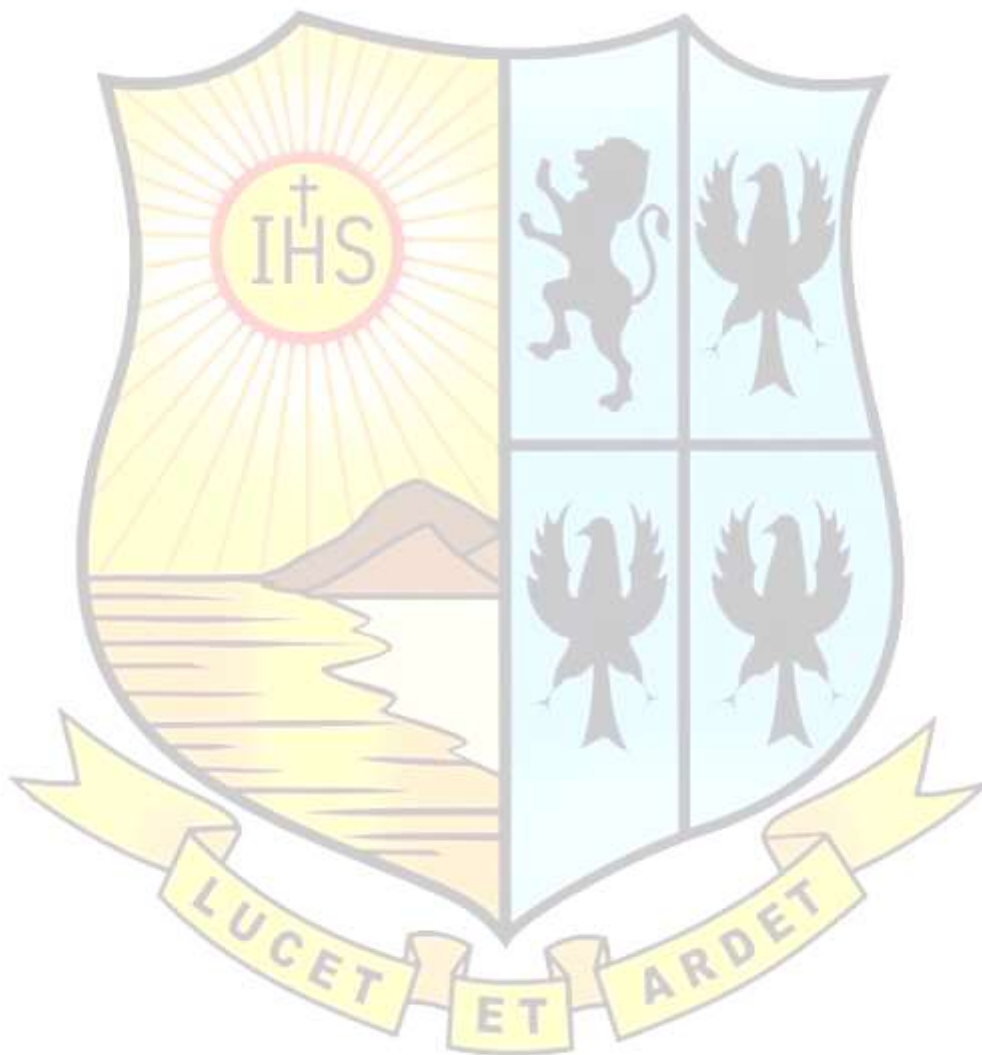
St Aloysius College (Autonomous), Mangaluru

Criterion I: Curricular Aspects

Metric No.: 1.1.1

Year: 2021-2022

1.1.1 Programme Outcomes (POs), Programme Specific outcomes (PSOs), and Course Outcomes (COs) of the Programmes offered by the Institution



ESTD : 1880



P 100

M.A. (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 ideas 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

PH 101.1 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

PH 102.1 ADVANCED REPORTING & EDITING

CO 1: Inculcate writing skills for media.

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.

PH 103.1 CORPORATE COMMUNICATION AND PUBLIC RELATIONS

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

PS 104.1 DEVELOPMENT OF MEDIA

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 field of interest from the historical point of view.

CO 4: Assess and evaluate the current trends and challenges faced by the Indian media

PS 105.1 MEDIA LAW AND ETHICS

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.

SEMESTER II**PH 101.2 COMMUNICATION RESEARCH METHODS**

CO 1: Inculcate the rigour of research techniques and methods at master's programme level

CO 2: Evaluate and utilise statistical tools

CO 3: Demonstrate research acumen by creating research proposals/ projects

PH102.2 INTRODUCTION TO AUDIO VISUAL MEDIA

CO 1: Produce communications for different audiences and purposes through audio visual media

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).

PH 103.2 FILM STUDIES

CO 1: Impart a basic 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.

PS 104.2 DEVELOPMENT COMMUNICATION

CO 1: Understand and critically evaluate development issues and programmes in India.

CO 2: Comprehend the theories and models related to Development Communication.

CO 3: Inculcate a sense of social concern as media professionals.

CO 4: Develop media tools or messages to propagate sustainable development and social change.

PO 105.2 BROADCAST AND COMMUNICATION (OPEN ELECTIVE)

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).

PO 106.2 TRAVEL JOURNALISM (OPEN ELECTIVE)

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

III SEMESTER

PH101.3a TELEVISION PRODUCTION (SPECIALIZATION SUBJECT)

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

PH 101.3b DIGITAL JOURNALISM (SPECIALIZATION SUBJECT)

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

PH 101.3c DIGITAL MEDIA MARKETING (SPECIALIZATION SUBJECT)

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.

PH 102.3a RADIO PRODUCTION (SPECIALISATION SUBJECT)

CO 1: Understand the functioning radio medium.

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

PH 102.3b KANNADA LANGUAGE PRESS (SPECIALISATION SUBJECT)

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.

PH102.3c CREATIVE STRATEGY & COMMUNICATION (SPECIALISATION SUBJECT)

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.

PH 103.3 MARKETING COMMUNICATION AND ADVERTISING

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

PS 105.3 ENVIRONMENT AND MEDIA

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.

PH 104.3 MEDIA INTERNSHIP

Media internship is a 6-week compulsory exercise. The students are expected to join any media organization and have a first-hand experience of working in the field. They are expected to keep a record of all the work they undertake.

A certificate of completion of the 6-week internship must be obtained from the concerned media organization. Students are expected to update on a weekly basis to the concerned faculty about their progress.

The internship must be completed before the end of third semester. An assessment and evaluation of the internship will be conducted to award credits. Internship does not have any academic-related assessment.

PO 106.3 FILM APPRECIATION (OPEN ELECTIVE)

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 preproduction, production and post-production period.

PO 107.3 GENDER AND MEDIA (OPEN ELECTIVE)

CO 1: Understand gender issues prevalent in contemporary times.

CO 2: Analyse the portrayal of women and the third gender or queer perspectives in mainstream media.

CO 3: Evaluate the mainstream media's coverage of gender issues through multifaceted frameworks.

CO 4: Apply the knowledge gained in the course to examine real-life issues outside of the classroom activity.

IV SEMESTER

PH 101.4 DISSERTATION

Objectives of the Dissertation:

The main objective of the Dissertation is to give practical exposure to the students in the field of their study and provide industry-institution interaction. The other objectives are as follows;

Students will be able to develop research interest and culture in their respective field of study

Students explore the social relevance and application of their respective subject

It provides practical knowledge and exposure in their studied area

It enables the students to make in depth study of the particular issue and explore solution to the problems the society facing in the field of journalism and mass communication

PH 102.4a ONLINE AUDIO/VISUAL PRODUCTION

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.

PH102.4b MAGAZINE JOURNALISM (SPECIALIZATION)

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.

PH 102.4c INSTRUCTIONAL DESIGNING AND CONTENT WRITING

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.

PROJECT

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

PS 104.4 MEDIA AND CULTURE STUDIES

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

PS 105.4 POLITICAL COMMUNICATION

CO 1: Evaluate the key concepts and theories in political communication

CO 2: Develop knowledge of practical aspects and paradigms of political communication science

CO 3: Analyse mediatization of politics in elections, campaigns and how media used to achieve policy goals.

P 110

PROGRAMME OUTCOMES

PO 1: To develop an understanding about various concepts and principles in Economics.

PO 2: To be able to describe the working of the economy both domestic and international.

PO 3: To enable the students to recognise the practical possibilities of economic theory in real life.

PO 4: To analyse the various sectors and its performance in the development process.

PO 5: To create awareness on the inter-linkages between the political system and economic theories.

PO 6: To assess the impact of various policies on the welfare of the community.

PO 7: To ensure the application of the economic theories to facilitate sustainable human life.

PO 8: To develop skills to have an orientation to 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: To 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.

PH 111.1: MICRO ECONOMIC ANALYSIS (60 hours)

Objectives:

To equip the students with a rigorous and comprehensive understanding of the fundamentals of microeconomics.

To understand various aspects of consumer behaviour and demand analysis, production theory and behaviour of costs, the theory of traditional markets and equilibrium of firm

The course aims to acquaint the students in decision making in the context of market interdependence, complexity, uncertainty and informational asymmetry.

COURSE OUTCOME

CO 1: The student gets equipped with the knowledge and skill in effective decision making under uncertain market situations.

CO 2: Understand the theories related to different market forms.

CO 3: Able to understand the functioning of the varied markets.

CO 4: The student acquires skills in allocating scarce resources among alternative uses.

CO 5: Able to make decisions in varied economic situations.

CO 6: Able to critical evaluate the functioning of the market.

PH 112.1 DEVELOPMENT ECONOMICS (60 hours)

Objectives:

This course is structured to cover all major theories and models dealing with the issues pertaining to both growth and development.

This will help the learners to realize the nature of the deficiencies of developing nations and to suggest policy measures to rectify them and also to explore new avenues of growth.

COURSE OUTCOME

CO 1: Students will be able to understand the use of economic analysis in addressing important issues of developing countries.

CO 2: To 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.

PH 113.1 STATISTICAL TECHNIQUES FOR ECONOMIC ANALYSIS (60 hours)

Objectives:

To provide students with adequate knowledge of Statistical techniques and operations to analyze economic problems.

To initiate students into various economic concepts which are amenable to statistical treatment.

COURSE OUTCOME:

CO 1: The students will be able to describe and discuss the key terminology, concepts used in statistical techniques for economic analysis.

CO 2: The students can understand the methods used for analysis and the uses and limitations of statistical analysis including a discussion of advantages, disadvantages, and necessary assumptions.

CO 3: To derive the results of the statistical techniques and economic interpretation of those results.

CO 4: To understand and critically discuss the issues surrounding sampling and significance

CO 5: It helps to develop research skills including frame testable hypotheses, select correct statistical tests, locate appropriate data for testing hypotheses, reject/accept hypotheses correctly, analyzes results, and It also contributes to making appropriate decisions in the light of the researcher's findings.

CO 6: To measure the effect of change and discover techniques to improve decision-making process

PS 114.1 ENVIRONMENTAL ECONOMICS (50 hours)

Objectives:

To present theoretical orientation to the environmental concerns of the economy. The course intends to develop a vision to achieve a mission of attaining a sustainable society by studying the subject of environmental economics.

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.

COURSE OUTCOME:

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.

PS 115.1 PRINCIPLES OF BANKING (50 hours)

Objectives:

To provide a detailed analysis of the banking sector and its latest developments in term of both theory and practice.

To develop skills in students in understanding the functioning of various banking activities and touch with banking terminologies.

COURSE OUTCOME:

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: To gain the up-to-date knowledge regarding the banking terminologies.

CO 4: To 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.

PS 116.1 ECONOMICS OF DEMOGRAPHY (50 hours)

Objectives

To make the students aware of the importance of population in economic development and the various theories that explains the growth of population in a country.

To analyse the quantitative and the qualitative aspects and characteristics of the population through various demographic techniques.

To acquire a basic literacy of the leading ideas and research directions in the field of population studies.

To familiarise with basic concepts and sources of data in Demography and also will be able to comprehend the processes and events in Demography and their interactions.

COURSE OUTCOME

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.

PS 117.1 INDUSTRIAL ECONOMICS (50 hours)

Objectives:

To provide a thorough knowledge about the economics of industry in a cogent and analytical manner, particularly in the Indian context.

To familiarize the students with the process of entrepreneurship.

COURSE OUTCOME

CO 1: The student gets the skill of efficient and economic use of scarce resources.

CO 2: Understand the various theories related to wages, labour, firm etc.

CO 3: The student gets equipped with the knowledge and skill in effective decision making under uncertain market situations.

CO 4: Understand the role of unions and its bargaining powers.

CO 5: Critically evaluate the issues related to labour and firms.

CO 6: The student acquires skills in allocating scarce resources among alternative uses.

PH 111.2: MACRO ECONOMIC ANALYSIS (60 hours)**Objectives:**

To equip the students to understand systematic facts and latest theoretical developments for empirical analysis.

Demonstrate a good understanding of macroeconomic principles, concepts, and theories.

Examine the modern developments in labour market.

COURSE OUTCOME

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.

PH 112.2 MATHEMATICAL TECHNIQUES FOR ECONOMIC

ANALYSIS (60 hours)

Objectives:

To train the students to use the techniques of mathematical analysis, which are commonly applied to understand and analyze economic problems.

To develop economic research skills, to locate and retrieve economic data and information and to critically interpret and evaluate this information.

COURSE OUTCOME:

CO1: To familiarize the students with the mathematical economics terminologies

CO2: Able to build models by expressing words in symbols, numbers and equations

CO3: Able to apply economic theory and methods to selected real world economic problems.

CO4: Able to demonstrate analytical and critical thinking skills and to apply and interpret quantitative, qualitative and graphical information in a problem-solving context.

CO5: To equip students with the flexibility and skills necessary to succeed in a constantly changing environment.

CO6: 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.

PH 113.2 INTERNATIONAL ECONOMICS (60 hours)

Objectives:

Globalisation is rapidly changing the scope and nature of international business and trade. Organizational success is highly dependent on the ability to understand and respond to economic issues and forces.

To prepare the students to evaluate the broad principles and theories, which tend to govern the free flow of trade in goods, services and capital — both short-term and long-term — at national and international levels.

COURSE OUTCOME:

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.

PS 114.2 FINANCIAL INSTITUTIONS AND MARKETS (50 hours)

Objectives:

This course aims at providing students with an understanding of the structure, organisation and working of financial markets and institutions in India.

To demonstrate an awareness of variety of financial institutions.

COURSE OUTCOME:

CO1: To outline the basics of Indian financial systems and its components

CO2: To provide students with an introduction to the theory and practice of financial instruments.

CO3: Explain financial institutions and how firms obtain funds in the financial markets.

CO4: To analyze and evaluate financial markets, how securities are traded, mutual funds, investment companies, and investor behavior.

CO5: To explain how the financial services component industries (insurance, banking, securities, real estate and financial planning) interact.

CO6: 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.

PS 115.2 RESEARCH METHODOLOGY AND ETHICS (50 hours)

Objectives:

Generate the capacity of critical thinking and engage the students in the process of research itself.

Enable the students to conceptualize a research problem and develop a number of complementary designs, measurement, and data collection approaches to bring evidence to bear on the problem.

Capacitate the student to prepare a research proposal, and evaluate the quality of evidence in published research.

To understand the ethical issues and practices in research with an awareness of rights and obligations of research participants.

Understand the process of Intellectual property Rights and its different forms and implications

COURSE OUTCOME

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.

Students can summarize and evaluate a body of research including primary literature, and CO 3: 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.

PS 116.2 AGRICULTURAL ECONOMICS (50 hours)

Objectives

To expose the students to the concept, significance and uses of agricultural economics.
To impart adequate knowledge and analytical skills in the field of agricultural marketing issues, and enhance expertise in improving the performance of the marketing institutions and the players in marketing of agricultural commodities.
COURSE OUTCOME
CO 1: Able to understand the theories of agricultural economics.
CO 2: Gain knowledge in the importance of the primary sector in Indian economy.
Write texts in various forms, with an identified purpose, that respond to specific audience CO 3: 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.
PS 117.2 ECONOMICS OF HUMAN RESOURCE DEVELOPMENT (50 hours)
Objectives:
To facilitate an understanding of the concepts, methods and strategies for HRD.
This course aims to improve students understanding of human behavior in organization and the ability to lead people to achieve more effectively toward increased organizational performance.
To familiarize students with the basic concepts of HRM.
To understand the process of OD and nature of planned change.
COURSE OUTCOME
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.

PO 118.2 BANKING AND FINANCE (40 hours)

Objectives:

To equip students with the practical knowledge about the functioning of development banking institutions and financial services in India.

To enable students to learn the dynamics of capital market, money market.

COURSE OUTCOME:

CO1: To understand the Origin and the growth of the Indian Banking System.

CO2: To elucidate the broad functions of various types of banks

CO3: To evaluate the performance of the developmental banking institutions

CO4: Able to demonstrate an awareness of the current structure and regulation of the Indian financial services sector.

CO5: Discuss the impact of government policy and regulations on the banking sector.

CO6: To understand the working of development financial institutions in the development of rural sector, farmers, industries and financial market.

PH 111.3: MONETARY ECONOMICS (60 hours)

Objectives:

This course helps students to understand the conceptual framework of monetary economics.

The Course seeks to cover various theoretical approaches to the determinants and measures of money supply, demand for money and rates of interest.

To generate awareness of the monetary policy formulations, its targets and objectives

COURSE OUTCOME

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.

PH 112.3 ECONOMETRICS (60 hours)

Objectives:

To equip the students with basic theory of econometrics and relevant applications of the methods.

To facilitate an understanding of the methods in econometrics

COURSE OUTCOME

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.

PS 113.3 HEALTH ECONOMICS (50 hours)

Objectives:

To introduce basic issues of health economics. This course will make the students familiar with the demand for and supply of health care and health transition in India.

To devise feasible policies to solve health care system problems using economic analysis.

COURSE OUTCOME

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, its 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.

PS 114.3 LABOUR ECONOMICS (50 hours)

Objectives

To have an understanding of important social issues and public policies involving employment, wages, working conditions, and unemployment.

To understand the functioning of labour markets and labour market policies.

To understand models that describe the labour market and policy effects.

To understand empirical microeconomic research on issues related to labour markets.

COURSE OUTCOME

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.

PS 115.3 DEVELOPMENT BANKING (50 hours)

Objectives:

To equip students with the practical knowledge about the functioning of development banking institutions and financial services in India.

To enable students to learn the dynamics of capital market, money market.

COURSE OUTCOME:

CO1: To understand the growth and structure of development banking Institutions in India

CO2: To analyze the functions of modern banking financial services and its importance

CO3: To enable the students get familiarized with Mutual Funds

CO4: To acquaint the students in respect to the investment decisions related to Derivative market

CO5: To 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.

CO6: Understanding the working of development financial institutions in the development of rural sector, farmers, industries and financial market.

PS 116.3 ENERGY ECONOMICS (50 hours)

Objectives

This course examines environmental and energy issues from an intermediate microeconomics perspective. It discusses aspects of local, national, and global markets for oil, natural gas, coal, electricity, nuclear power, and renewable energy; and examines public policies affecting energy markets

Develop and use tools of economic analysis to understand the main contemporary policy issues related to energy.

COURSE OUTCOME

CO 1: Understand basic economic concepts that underlay energy production and end use.

CO 2: Describe the sources of energy and the scarcity associated 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.

PO 117.3 CONTEMPORARY INDIAN ECONOMY (40 hours)

Objectives:

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.

To provide an insight into the past, present and future functioning of the Indian economy and strengthen their analytical capability.

COURSE OUTCOME

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.

PH 111.4 PUBLIC ECONOMICS (60 hours)

Objectives:

This course contains a comprehensive economic analysis of the public sector which enables the student to understand and analyse public policies and problems.

This course will provide a perceptive vision of fiscal institutions with a careful study of the issues which underline budgetary policies in general and Indian experience in particular.

COURSE OUTCOME

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.

PH 112.4: INDIAN ECONOMY (60 hours)

Objectives:

To acquaint the students with the performance of different sectors of the Indian economy and the policy framework governing them.

To provide them an insight into the past, present and future functioning of the Indian economy and strengthen their analytical capability.

To familiarize the students on Indian Economics as it is a compulsory paper / section in most of the competitive and entrance examinations.

COURSE OUTCOME

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.

PS 114.4 ECONOMICS OF INSURANCE (50 hours)

Objectives:

To provide a comprehensive view of the subject of Insurance sector to students of Financial Economics in order to make them understand the role of the insurance sector in mobilizing a country's savings for channelizing them into capital formation and economic development.

Develop the analytical skills necessary to make optimal decisions relatively to insurance products and alternative strategies

COURSE OUTCOME:

CO1: To understand the insurance terminology and contract features.

CO2- To understand the concept of insurance and its evolution

CO3: To evaluate client insurance and risk management needs.

CO4- To understand the different needs of customers on insurance products

CO5: To Identify and explain features of private and public insurance available to meet each identified need.

CO6: To understand the business operations and market condition in Insurance Companies

PS 115. 4: OPERATIONS RESEARCH FOR ECONOMIC ANALYSIS (50 hours)

Objectives:

This course aims at developing an understanding of the application of operations research models and techniques in diverse fields in making effective decision making.

COURSE OUTCOME

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.

PS 116.4 INTERNATIONAL FINANCE (50 hours)

Objectives:

To provide an understanding about the terms and concepts in the field of international finance and institutions.

Students will be able to understand the decisions taken by economic agents and their interaction in the markets and helps to analyse economic and market indicators, when taking decisions within the organisation.

COURSE OUTCOME

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.

PS 117.4 RURAL BANKING (50 hours)

Objectives:

To provide a conceptual framework and understanding of financial management practices and methods for rural development agencies.

COURSE OUTCOME

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.

P 120

PROGRAMME OUTCOMES (POs)

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

PROGRAMME SPECIFIC OUTCOMES (PSOs)

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

CO (Course Outcomes)

I SEMESTER

PH 121.1 - Paper I: British Literature I (Medieval Literature to Neoclassical Literature)

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

PH 122.1 - Paper II: Literary Criticism

CO 1: To 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

PH 123.1 - Paper III: Research Methodology and Ethics

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

PS 124.1 - Paper IV: Modern Indian Theatre

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

PS 125.1 - Paper V: Children's Literature

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

PS 126.1- Paper VI: Linguistics and Semiotics

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

PS 127.1 - Paper VII: European Literature

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

PS 128.1 - Paper VIII: Ecocriticism

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

PS 129.1 - Paper IX: Literature from Canada, Australia and New Zealand

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

II SEMESTER

PH 121.2 - Paper X British Literature II (The Romantics and the Victorians)

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

PH 122.2 - Paper XI: Literary Theories

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

PH 123.2 - Paper XII: Indian Writing in English I

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

PS 124.2 - Paper XIII: Film Studies

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

PS 125.2 - Paper XIV: Twentieth Century Asian and Middle Eastern Fiction

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.

PS 126.2 - Paper XV: Fantasy Literature

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

PS 127.2 - Paper XVI: Literature from Africa and the Caribbean Islands

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

PO 128.2 -Paper XVII: CBCS – Reading Literature

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

SEMESTER III

PH 121.3- Paper XVIII: British Literature III (Modernism to Postmodernism)

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

PH 122.3- Paper XIX: English Language Teaching

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

PH 123.3-Paper XX: American Literature I

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

PH 124.4-Paper XXI: Indian Writing in English II

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

PS 125.3-Paper XXII: Science Fiction

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

PS 126.3- Paper XXIII: Folklore and Mythology

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

PO 127.3-Paper XXIV: CBCS – Interpreting Literature

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

SEMESTER IV

PH 121.4 - Paper XXV: Postcolonialism

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

PH 122.4 - Paper XXVI: Cultural Studies

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

PH 123.4- Paper XXVII: American Literature II

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

PH 124.4-Paper XXVII Project

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

PS 125.4- Paper XXIX: Cultures of Dakshina Kannada in Translation

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

PS 126.4- Paper XXX: Diaspora Literature

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

PS 127.4- Paper XXXI: Gender Studies

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

PS 128.4-Paper XXXII: Literature from the Margins

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

P 200

Programme Outcomes (PO) and Programme Specific Outcomes (PSO):

PO1. Our graduates will demonstrate professional knowledge of Social Work

They will be able to,

PSO1.1 Gain understanding into the needs of individuals, families, groups and communities and design Social Work intervention strategies

PSO 1.2 Understand and analyze the structure and functions of various social, economic and political institutions

PSO 1.3 Understand the significance of methods of Social Work Profession

PO2. Our graduates demonstrate value based professionalism and volunteerism

They will be able to

PSO2.1 Acquire values and ethics of Social Work Profession

PSO 2.2 Develop concern and commitment for marginalized sections of the society

PSO 2.3 Internalize social justice, cultural pluralism and democratic participation while reaching out to marginalized

PO3. Our graduates will demonstrate the skills to practice Professional Social Work

They will be able to

PSO 3.1 Develop skills of practicing methods of Social Work and addressing social problems at micro and macro levels

PSO 3.2 Develop skills of programme development, management and research

PSO 3.3 Develop skills of effective communication at various levels in their professional life

SEMESTER I

Paper: PH201.1 - SOCIAL WORK: HISTORY AND IDEOLOGIES

Course Outcome

By the end of the course the student will be able to

Understand the history and evolution of Social Work Profession both in India and in the West

Differentiate between professional and voluntary Social Work

Demonstrate the knowledge on methods of Social Work

Recognize the trends in Social Work practice

Paper: PH 202.1 - CASE WORK PRACTICE

Course Outcome

By the end of the course the student will be able to

Acquire proficiency in basic concepts of Social Case Work practice

Obtain effective qualities to establish harmonious relationship between the client and the society

Critically analyze problems of individuals and families and various determinants for human problems

Obtain therapeutic knowledge and skills to work in various settings

Paper: PH 203.1: GROUP WORK PRACTICE

Course Outcome

By the end of the course the student will be able to

Understand group work as a method of Social Work and its significance

Display the knowledge on process, phases of group formation and will learn to identify and deal with the group dynamics

Demonstrate skill of applying group work as a method of social work in social interventions

PH 204.1 CONCURRENT FIELDWORK PRACTICUM - I

Course Outcome

By the end of the course the student will be able to

Understand the functioning of social welfare agencies

and analyse various facilities available for people from Government, social institutions and voluntary organ

Learn the composition and needs of the community

Paper: PS 205.1: DYNAMICS OF HUMAN BEHAVIOUR

Course Outcome

By the end of the course the student will be able to

Acquire a clear understanding on the concepts of human behavior

Gain a conceptual understanding into the various theories of development and its relevance.

Analyse the changes throughout the life span stages and identify problems across these stages.

Relate these developmental changes across the life span with real life situations.

SEMESTER II

Paper: PH 201.2 - COMMUNITY ORGANIZATION AND SOCIAL ACTION

Course Outcome

By the end of the course the student will be able to

- * Understand community organization and social action as a method of Social Work
- * Analyze the situation of subaltern groups and communities in our society
- * Acquire skills of using participatory strategies of community development and social action

Paper: PH 202.2: SOCIAL WORK RESEARCH AND STATISTICS

Course Outcome

By the end of the course the student will be able to

- Acquire knowledge of the scientific method of inquiry for the study of social phenomena
- Develop an understanding of the research process and basic research skills
- Demonstrate an understanding into the different methods of data collection and sampling.
- Gain knowledge of measures of central tendency, measures of dispersion, inferential statistics and its uses in Social work Research.

PH 203.2 CONCURRENT FIELDWORK PRACTICUM- II

Course Outcome

By the end of the course the student will be able to

- Demonstrate the knowledge and skills of case work and group work practice and community organisation
- Acquire knowledge of research project and basic skills of research
- Learn the skills of liasoning between Government and people

Paper: PS 204.2: SOCIAL SCIENCES PERSPECTIVES FOR SOCIAL WORK

Course Outcome

By the end of the course the student will be able to

- Understand the concepts, structure, institutions and processes of Indian Society.

Demonstrate the knowledge on divergent perspectives and necessary skills for analyzing Indian Society.
Develop critical insights on the social problems and challenges confronting Indian Society.
Understand and analyze economic and political systems in India and society –economy –politics linkages.

Paper No: PO 205.2 INDIAN SOCIAL PROBLEMS AND INTERVENTIONS

Course Outcome

By the end of the course the student will be able to

Develop insights into the problems faced by the vulnerable section of the society
Analyse the impact of social issues on the individual and the community
Demonstrate knowledge and skills to mitigate the problems at an initial level
Understand the role of institutional services for the welfare of people

SEMESTER III

Paper: PH 201.3: SOCIAL WELFARE ADMINISTRATION

Course Outcome

By the end of the course the student will be able to

Recognize the concept of social welfare and its relevance in modern India
Analyse the role of social welfare services in societal well being
Understand the functioning of social welfare Organisations
Identify the key elements to manage an Organisation effectively

Paper PS 202.3: HUMAN RIGHTS PERSPECTIVES FOR SOCIAL WORK

Course Outcome

By the end of the course the student will be able to

Understand the concept of human rights and significant UN declarations on human rights
Contextualise the violation of Human rights of the vulnerable and to apply Human Rights framework for their empowerment
Demonstrate knowledge on the role of Social Work Profession in protecting human rights

COMMUNITY DEVELOPMENT SPECIALISATION

PH 203.3a: CONCURRENT FIELDWORK PRACTICUM-III

Course Outcome

By the end of the course the student will be able to

Understand the structure and dynamics of communities
Identify and analyze the needs of the communities
Develop skills of working with communities by applying the Social Work methods - Social Action, Social Work research and Community Organization
Design and implement participatory community development modules and projects

Paper: PS 204.3a: TRIBAL, RURAL AND URBAN DEVELOPMENT

Course Outcome

By the end of the course the student will be able to

Get conceptual clarity of tribal, rural and urban communities and analyse the dynamics in these communities
Demonstrate in depth knowledge on challenges of tribal, rural and urban communities and analyze the intervention of Government and Non-Government Organisations
Acquire skills of working with tribal, rural and urban communities applying the methods of Professional Social Work

Paper: PS 205.3a: CITIZEN PARTICIPATION AND LOCAL SELF-GOVERNANCE

Course Outcome

By the end of the course the student will be able to

Recognize the key concept of citizenship, participation and governance.

Develop critical understanding of the functioning of local government institutions

Acquire understanding of the role of social work in promoting citizen participation in governance

MEDICAL AND PSHYCHIATRIC SPECILISATION

PH 203.3b: CONCURRENT FIELDWORK PRACTICUM - III

Course Outcome

By the end of the course the student will be able to

Understand the functioning of a health setting

Acquire skills in conducting case work (Medical /Psychiatric)

Demonstrate skills of working with patient as well as family in the management of Patient

Exhibit counselling skills and therapeutic treatment techniques to study and assess clients with psychological and socio-economic conditions

Develop skills of planning and conducting health awareness programmes

Demonstrate knowledge on documentation of interventions in health setting

Paper: PS 204.3b: COUNSELLING: THEORY AND PRACTICE

Course Outcome

By the end of the course the student will be able to

Understand the Holistic Concept of Counselling as a tool for help

Recognize and synthesize attitudes and values that enhance investment of Self in the Counsellors' role

Acquire knowledge and skills of using therapeutic approaches

Articulate the role of a Counsellor as a professional in dealing with various issues of life and to work in different settings

Paper: PS 205.3b: PSYCHIATRIC SOCIAL WORK

Course Outcome

By the end of the course the student will be able to

Acquire knowledge on the concept of Mental disorders and Psychiatric Social work.

Develop an understanding of the various classifications of Psychiatric disorders in children, adolescents and adults, their signs, symptoms, causes and Psycho social Interventions.

Demonstrate knowledge and skills in the practice of Social work in Community Mental health and Rehabilitation.

Gain knowledge on the legal provisions for Mental Health.

HUMAN RESOURCE DEVELOPMENT SPECIALISATION

PH 203.3C: CONCURRENT FIELDWORK PRACTICUM-III

Course Outcome

By the end of the course the student will be able to

Exhibit skills of dealing with human resources for Organisational Development

Understand the working conditions and mechanisms of Human Resource Development for employee welfare

PS 204.3c: HUMAN RESOURCE MANAGEMENT AND DEVELOPMENT

Course Outcome

By the end of the course the student will be able to

Describe and analyse the role of HR Department in an Organisation

Recognize the need for employee development function

Identify the challenges faced by the Human Resource professionals and understand ways to resolve it.

Demonstrate knowledge and skills for people management

PS 205.3c: LABOUR LEGISLATIONS AND INDUSTRIAL RELATIONS

Course Outcome

By the end of the course the student will be able to

Understand various Labour legislations and Industrial Relations in India

Interpret and apply relevant laws and acts in specific cases
Critically reflect on issues, limitations and challenges confronting labor laws in India
Gain Insights on labour problems and industrial relations in India and offer meaningful inputs for improvement of labour-industry relations

PO 206.3 - HUMAN RIGHTS AND SOCIAL DEFENCE (Open Elective)

Course Outcome

By the end of the course the student will be able to

Define and explain the concept of human rights and recognize the rights of various marginalized sections of society
Apply human rights framework for understanding vulnerable groups
Acquire competencies of using the legal provisions and social defence systems to protect the vulnerable

SEMESTER IV

PS 201.4: PROJECT PLANNING AND MANAGEMENT

Course Outcome

By the end of the course the student will be able to

Acquire knowledge and skills to facilitate participatory project management
Develop competency to facilitate process of participatory planning with varied groups.
Imbibe values and attitudes that are essential for participatory projects for development

COMMUNITY DEVELOPMENT SPECIALISATION

PH 202.4a: CONCURRENT FIELDWORK PRACTICUM-IV

Course Outcome

By the end of the course the student will be able to

Develop the skills of community organizer

Learn the administrative tasks

Inculcate professional values of community organizer

PS 203.4a: EDUCATION FOR DEVELOPMENT

Course Outcome

By the end of the course the student will be able to

Develop critical perspective on the system of formal as well as non-formal education.

Acquire skills of designing educational programmes for varied groups of disadvantaged learners

Develop Social Work strategies in the field of education.

PS 204.4a CORPORATE SOCIAL RESPONSIBILITY

Course Outcome

By the end of the course the student will be able to

Understand the concepts, need and functioning of CSR in India

Analyze the CSR strategies of various corporate sectors of India

Develop the skills and knowledge of managing CSR projects and socially responsible initiatives

MEDICAL AND PSYCHIATRIC SPECIALISATION

PH 202.4b: CONCURRENT FIELDWORK PRACTICUM - IV

Course Outcome

By the end of the course the student will be able to

Understand the role of Psychiatric and Medical Social Worker in a health setting

Acquire skills in conducting case assessment and diagnosis (Medical /Psychiatric)

Specific Skills in working with patient as well as family in the management of patient

Develop skills in planning and conducting health awareness programmes

Demonstrate knowledge on documentation of interventions in health setting

Exhibit knowledge on specific areas of Medical Social Work in health care settings

PS 203.4b: WORKING WITH CHILDREN AND FAMILIES

Course Outcome

By the end of the course the student will be able to

Gain understanding into the problems of children and adolescents and need for child welfare

Demonstrate knowledge of various child welfare services, programmes, policies and legal provisions.

Develop an understanding of the family life cycle stages, identify problems across these stages and Social work interventions.

Gain insight into working with the changing families.

PS 204.4b: MEDICAL SOCIAL WORK

Course Outcome

By the end of the course the student will be able to

Demonstrate knowledge on communication strategies for promotion of health in prevention, care and management.

Critically appraise policies, programmes and advocacy strategies of various national and inter-national organizations in the field of health and care services

Articulate personal and professional values and promote skills required to perform as valued professionals in a multidisciplinary health settings

Utilize community resources for purposes of consultation, collaboration, advocacy, referral, and networking on behalf of clients and families and reinforce the needs of clients.

HUMAN RESOURCE DEVELOPMENT

PH 202.4C: CONCURRENT FIELDWORK PRACTICUM-IV

Course Outcome

By the end of the course the student will be able to

Acquire social work knowledge and professionalism in the areas of Human Resource Development

Develop critical understanding on applicability of labour legislations in various organizational set- up

PS 203.4c: EMPLOYEE WELFARE IN INDIA

Course Outcome

By the end of the course the student will be able to

Demonstrate proficiency in the concept of Employee Welfare

Relate the role of Human Resource professionals in development of employee conditions

Propose and implement employee welfare programmes

Interpret labour laws and apply provisions for employee/organisational development

PS 204.4c: ORGANIZATIONAL BEHAVIOUR AND DEVELOPMENT

Course Outcome

By the end of the course the student will be able to

Understand the concepts and foundations of organizational behaviour

Develop capacity to analyze the motivations and implications of individual and group behaviour on organizations.

Demonstrate knowledge on nature of organizational set up.

Critically analyze the dynamics of organizational behaviour and to reflect on the essentials of organizational development

PS 205.4 RESEARCH PROJECT

Course Outcome

By the end of the course the student will be able to	
Understand the nature of social science research and its distinctive characteristics	
Understand the requirements and components of social science research	
Develop a critical perspective of the subject matter in the backdrop of review of literature	
ology for research, data collection and analysis relevant to research area and to organize research in accordance w	
P 300	
P 310	
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 businessgoals 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 multidisciplinaryteams.	
PROGRAM SPECIFIC OUTCOMES	
PSO 1: Develop entrepreneurial skills through effective Industry InstituteInteractions.	
PSO 2: Qualify in various competitive examinations related to career growth and succeed in procuring best opportunities in the corporate and academia	

P 350	M.Com. (Finance and Analytics)
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PROGRAMME 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	Possess knowledge of the values and beliefs of multiple corporate cultures and a global perspective.
PROGRAMME 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, PSPP and R for analysis of data
COURSE OUTCOMES	
I Semester PH 353.1 - Income tax	
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.
PS356.1 Economic Analysis for Decision making	
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
PH351.1 Financial Statement Analysis	
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
PS 357.1 Financial Management and Policy	
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
PH352.1 Working capital management	
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
PS354.1P EXCEL for Business and Finance	
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 research with necessary critical thinking skills using excel."
PS 355.1 Business Statistics	
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.
II Semester PH 351.2 - Accounting for Managerial Decisions	
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- b a s e 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.
PH352.2 Corporate Financing and Investment Decisions	
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
PS 353.2P Tally for Business Applications	
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
PS 354.2 Goods and Services Tax & Customs	
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
PS 355.2 Research Methodology and Ethics	
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
PS 356.2 E-Business	
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.
PO357.2 Personal Finance and Investment Planning	
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.
PS 358.2 Internship	
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- s o l v i n g 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
III Semester PH 353.3 - Investment Banking and Financial Services	
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 forfaiting in real business operations.
CO 5:	Critically evaluate the importance and workings of credit rating institutions, depository systems and other financial institutions
PO 357.3 - Corporate Culture and Ethics	
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.
PS 355.3 Corporate Tax Planning	
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
PH352.3 Mergers, Acquisition and Corporate Restructuring	
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
PS356.3 Insurance and Risk Management	
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
PS 354.3P Data Analysis using SPSS	
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
IV Semester PS 355.4 - Financial Derivatives	
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
PH 352.4 Cost Analysis for Managerial Decisions	
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.
PS 356.4 - Corporate Law, Ethics and Governance	
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

PH 353.4P R for Data Analysis	
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
PS 358.4 Portfolio Theory and Management	
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
PH 351.4 International Financial Management	
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'
PS 357.4 Business Analysis and Valuation	
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
PH354.4 Project	

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
P 500	M.Sc. (Biotechnology)

Programme Objectives:
To provide state-of-the-art knowledge and skills in the field of Biotechnology.
To generate manpower trained in Biotechnology suited to meet the needs of the industry and academia.
To train students to pursue committed research in the field of Biotechnology.
To train students for practical oriented project work.
To have a positive impact on human and animal health, agriculture and environment in the region.
To have 100 % placement for all the students who take up this course.
Programme Specific Outcomes (PSOs):
A post-graduate student upon completion of the programme is expected to gain the following attributes:
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.

PSO13: Environmental awareness vis-à-vis bio-waste generation, disposal and management and safety and security issues.

Semester I

PH 501.1 BIOCHEMISTRY AND METABOLISM

Course Objectives:

This course enables the students to:

Appreciate the structure and functions of carbohydrate, protein, lipid and nucleic acid.

Understand how the structure of biological molecules dictates its function.

Have knowledge about biochemical pathways involved in intermediary metabolism of carbohydrate, protein, lipid

Interrelate each of the metabolic pathways and their contributions in various metabolic disorders.

Course Outcomes:

At the end of the course, a student should be able to:

Understand the structure, function and interrelationships of various biomolecules and consequences of deviation from the

Translate the importance of biological macromolecules and their role in living systems.

Identify the molecular metabolic pathway involved in carbohydrate, lipid, amino acid and nucleic acid metabolism, their inter

Evaluate information relevant to concepts on cellular regulation of different metabolic pathways.

PH 502.1 MICROBIOLOGY

Course objectives:

This course enables the students to:

Understand the diversity in microbial world and the concept of microbial taxonomy and phylogeny.

e mechanisms of various interactions that exist between the microbes, microbes and higher forms of life/en

Distinguish principles of virus taxonomy, structure, life cycle, and host-virus

interactions that often lead to disease.

Appraise the applications of relevant microbes in agriculture, healthcare and environment.

Course Outcomes:

At the end of the course, a student should be able to:

Apply the principles in classifying microbial systems and know their beneficial and harmful effects.

Employ various cultivation methods starting from screening to preservation of the desired microbe.

and the major virus groups with their elementary features that is responsible for causing the most dreaded d

ial diversity and their interactions, and design suitable strategies to tackle unsustainable agricultural and en

PH 503.1 CELL AND MOLECULAR BIOLOGY

Course Objectives:

This course enables the students to:

Understand molecular organization of membranes and membrane functions.

Appreciate cellular processes and cell signaling.

Understand the flow of information from genes to proteins.

Comprehend cell transformation mechanisms.

Course Outcomes:

At the end of the course, a student should be able to:

Describe the organization of macromolecules on membranes and cellular processes.

Differentiate the various cell signaling pathways.

Illustrate regulation of gene expression in eukaryotes.

Take up research in the field of cell and molecular biology.

PH 504.1 P BIOCHEMISTRY & METABOLISM PRACTICALS

Course Objectives:

This course enables the students to:

Appreciate various quantitative analysis of the macromolecules in the given sample and analyse the results.

Preparation of buffers, reagents, standard solutions for various methods of estimation of proteins, carbohydrates

and obtain deep insight of the various methods and techniques used in microbial isolation, staining, enumeration and pr

andard methods and techniques in biochemistry with the appropriate analysis and interpretation of data and

Course Outcomes:

At the end of the course, a student should be able to:

chemistry and metabolism in various cellular functions, and the application of research involved in various

tigate and analyse the unknown carbohydrate or amino acid compound present in the given sample qualitatively

nical questions, carrying out laboratory investigations to answer those questions, and critically analysing, in

Construct the standard curve, analyse the data and interpret the results.

PH 505.1 P MICROBIOLOGY PRACTICALS

Course Objectives:

This course enables the students to:

Understand and appreciate the laboratory safety protocols.

Examine the presence and central roles of microorganisms in nature and in our daily lives.

microbiological techniques to isolate, investigate the structure and physiology, identify and preserve the iso

Become proficient in laboratory skills and critical thought required to implement the skills.

Course Outcome:

At the end of the course, a student should be able to:

Evaluate the various physical and chemical growth requirements of bacteria and equip

various methods of bacterial growth measurement.

Execute microbial techniques for the isolation of pure cultures of bacteria.

staining procedures, aseptic techniques and be able to perform routine culture handling tasks safely and effe

Comprehend the various methods for identification of unknown microorganisms.

PH 506.1 P CELL AND MOLECULAR BIOLOGY PRACTICALS

Course Objectives:

This course enables the students to:

Have hands-on-training in cell and molecular biology techniques.

Calculate and prepare reagents.

Comprehend the underlying principle of quantitative and qualitative experiments.

Identify suitable model organisms to perform experiments.

Student Learning Outcomes:

At the end of the course, a student should be able to:

Assess membrane transport.

Prepare slides.

Differentiate cell divisions.

Isolate macromolecules and perform qualitative and quantitative assays.

PS 507.1 MOLECULAR AND HUMAN GENETICS

Course Objectives:

This course enables the students to:

Understand the classical concepts of Mendelian genetics, gene interactions and the repair mechanisms.

Categorize the genetic recombination in bacteria and inspect the molecular mechanism of recombination.

Acquire a deep insight on some of the chromosomal abnormalities and their diagnosis.

Comprehend the concepts of population genetics, the theories and genetics of evolution.

Course Outcomes:

On completion of this course, a student should be able to:

Discuss the chromosomal mechanisms of sex determination and dosage compensation.

to distinguish between a normal and an abnormal karyotype and the underlying causes of genetic disorders

ize the different methods available for genetic testing and for the treatment and management of genetic dis

Construct pedigrees and analyse the patterns of inheritance in the families.

PS 508.1 IMMUNOLOGY

Course Objectives:

This course enables the students to:

Provide an insight into various organs and cell types involved in immune responses and associated functions.

Compare and contrast the innate versus adaptive immune systems.

Distinguish and characterize antibody isotypes, development, functions and antigen- antibody reactions.

Provide students with knowledge on how the immune system works during bacterial infection and viral infection.

Course Outcomes:

At the end of the course, a student should be able to:

Describe which cell types and organs present in the immune response.

Apply basic techniques for identifying antigen-antibody interactions.

Exemplify the adverse effect of immune system including allergy, hypersensitivity and autoimmunity.

Elucidate the reasons for immunization and aware of different vaccination

PS 510.1P MOLECULAR AND HUMAN GENETICS PRACTICALS

Course Objectives:

This course enables the students to:

Acquire the required laboratory skills to perform, interpret and analyze the results.

Demonstrate the handling of *Drosophila melanogaster*, the model organism for genetic studies.

Describe the principles and procedures of genetic techniques in biological experiments.

Perform and elucidate the reasons for the given karyotype.

Course Outcome:

At the end of the course, a student should be able to:

*Describe the salient features of *Drosophila melanogaster*.*

Apply the basic technique of separation of the eye pigments of *D. melanogaster* by chromatographic technique.

Analyze the different types of syndrome and their karyotype.

Elaborate the knowledge on sex determination and chromosomal aberrations.

PS 511.1P IMMUNOLOGY PRACTICALS

Course Objectives:

This course enables the students to acquire adequate skills and knowledge to:

Stain and identify different cells of immune system.

Perform agglutination and precipitation reactions.

Identify blood groups and types.

Visit blood bank to understand the blood donation, packing, separation of blood products.

Course Outcome:

At the end of the course, a student should be able to:

Acquire technical skills and knowledge on staining, identify various immune cells and enumerate them.

Competently perform antigen-antibody interaction for diagnostic test.

Analyze the components of human sera by performing agarose gel electrophoresis.

Perform blood Donation and its procedure, product packing, separation of blood products and labeling.

Semester II

PH 501.2 GENETIC ENGINEERING

Course objectives:

This course enables the students to:

Understand the tools and techniques employed in genetic engineering.

Describe various methods of gene transfer, selection and screening of recombinants.

Comprehend forward and reverse primer design.

Learn recent developments in PCR and Transcriptomic analysis.

Course Outcomes:

At the end of the course, a student should be able to:

Demonstrate the ability to design recombinant molecules.

Design forward and reverse primer to amplify a gene of interest.

Explain transcriptomic analysis and major RNA-Seq platforms.

Apply learned knowledge to their future research.

PH 502.2 ENZYMOLOGY

Course objectives:

This course enables the students to:

Comprehend the fundamentals of enzyme nomenclatures, properties, and the methods for the discovery of novel enzymes.

Gain in-depth knowledge about enzymes, which catalyse the diverse biochemical reactions in life processes, providing basic concepts of their, kinetics mechanism of action, regulation, inhibition, and wide-ranging applications.

Understand the importance of enzymes as cellular catalysts.

Appraise the applications of enzymes in industry, research and human health.

Course Outcomes:

On completion of this course, a student should be able to:

Describe the structure, functions and the mechanisms of action of enzymes.

Demonstrate the kinetics of enzyme catalyzed reactions and regulatory processes.

Explain the different immobilization techniques and industrial and clinical scope of enzymes.

Apply the principles of enzyme inhibitions in clinical research.

PH 503.2 P GENETIC ENGINEERING PRACTICALS

Course Objectives:

This course enables the students to:

Impart hands-on-training in various techniques in genetic engineering.

Acquire different methodologies in genetic engineering.

Enable students to design a cloning experiment.

Comprehend the application of Polymerase Chain Reaction.

Course Outcomes:

On completion of this course, a student should be able to:

Isolate and purify genomic DNA/RNA.

Demonstrate restriction digestion and ligation experiment.

Standardize a PCR protocol for amplification of a specific target gene.

Gather a thorough knowledge in genetic engineering methods practiced in research.

PH 504.2 P ENZYMOLOGY PRACTICALS

Course Objectives:

This course enables the students to:

Comprehend the principles of enzyme catalysed reactions.

Learn the preparation of reagents, standard solutions and isolation of enzymes.

Appreciate various qualitative and quantitative methods of enzyme assay.

Execute a laboratory experiment using the standard methods and techniques, with the appropriate analysis and interpretation of data and results.

Course Outcome:

At the end of the course, a student should be able to:

Design the experiments related to isolation and purification of enzymes.

Apply and extend their knowledge and understanding of enzyme catalysis in research.

Develop accurate skills in enzyme assays.

Construct the standard curve, critically analyse the data and interpret the results.

PS 505.2 RESEARCH METHODOLOGY, ETHICS AND SCIENTIFIC COMMUNICATION

Course Objectives:

This course enables the students to:

Comprehend the purpose of research in academics.

Understand the methodologies used to do research.

Understand scientific communication.

Appreciate scientific ethics.

Student Learning Outcomes:

At the end of the course, a student should be able to:

Explain the differences between research methodologies.

Design a small research project with appropriate research method.

Apply correct ways of referencing to and citing from scientific literature.

Analyze, contrast, compare and criticize scientific literature and write a research report/ thesis.

PS 506.2 ANALYTICAL TECHNIQUES IN BIOTECHNOLOGY

Course Objectives:

This course enables the students to:

Design a blueprint for the analysis of biomolecules using various analytical techniques.

Demonstrate the principles and instrumentation of various chromatographic, spectroscopic methods used in biotechnology.

Interpret the results of various bio analytical techniques scientifically.

Describe the role of microscopy and radioisotopes in the visualization of cellular components and macromolecules.

Course Outcomes:

At the end of the course, a student should be able to:

Discuss the principle and instrumentation of HPTLC, HPLC, GC for identification, and characterization of compounds.

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.

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.

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.

PRACTICALS

Course Objectives:

This course enables the students to:

Identify the importance of research in Biosciences.

Conduct/manage research with integrity.

Assess plagiarism using the software.

Communicate the scientific findings.

Course Outcomes:

At the end of the course, a student should be able to:

Explain key research designs and techniques.

Identify various sources of information for literature review.

Read, comprehend, and explain research articles in their academic discipline.

Collect, analyze and represent their data and write a research report/ thesis.

PS 510.2 P ANALYTICAL TECHNIQUES IN BIOTECHNOLOGY PRACTICALS

Course Objectives:

This course enables the students to:

monstrate the handling and applications of various spectrophotometric techniques in biological investigations

Describe the principles and procedure of Electrophoresis and SEM in biological investigations/experiments

Apply the principle and procedure of TLC and gel filtration chromatography for detection and purification of

Select appropriate analytical technique to design the experiment.

Course Outcome:

At the end of the course, a student should be able to:

Identify and characterize various biomolecules using UV Vis spectroscopy, AAS and flame photometry

Demonstrate the strengths, limitations and use of various chromatographic techniques including paper, TLC, gel filtration and HPLC for the analysis of various biomolecules.

Interpret and analyse the result obtained from various colorimetric assays of protein by plotting a standard curve.

Examine the topography, morphology and composition of various samples by creating the 3D images using SEM.

OPEN ELECTIVE

PO 513.2 QUALITY ASSURANCE AND QUALITY CONTROL IN PRODUCT DEVELOPMENT

Course Objectives:

This course enables the students to:

Understand the best practices, tools and techniques in quality management.

Acquire knowledge about the principles and applications of the GMP.

Outline the main GMP requirements related to premises, equipments and personnel from its regulatory and application perspective.

Comprehend the requirement of Good Documentation Practices and data integrity for medicinal products.

Course Outcomes:

At the end of the course, a student should be able to:

Apply quality tools for quality management and main guidelines & requirements of GMP thus contributing to the organization when it comes to understanding industry standards.

Integrate the principles of the GMP quality system and quality control and the important procedures when dealing with complaints and recalls.

Justify the requirements for good documentation practice and complete appropriate documents in compliance with regulatory guidelines.

Execute and adopt quickly into the GMP environment.

Semester III

PH 501.3 ANIMAL BIOTECHNOLOGY

Course Objectives:

This course enables the students to:

Describe laboratory design.

Gain hands on knowledge of the various animal cell culture techniques.

Understand the applications of animal biotechnology.

Meet the challenges of the new and emerging areas of biotechnology industry.

Course Outcomes:

At the end of the course, a student should be able to:

Demonstrate aseptic techniques and good laboratory practices.

Describe the bioprocess technology for economically important products.

Apply the knowledge for improvement of farm animals.

Take up animal based biological research /relevant biotech industry.

PH 502.3 PLANT BIOTECHNOLOGY

Course Objectives:

This course enables the students to:

Acquire information about design of plant tissue culture lab, culture environment, learn varied sterilization techniques.

Comprehend the principles, methods and application of plant tissue culture.

Acquire knowledge about molecular markers in plant breeding and computational tools and resources in plant genome informatics.

Describe the application of genetically modified plants in crop improvement, get exposure about gene editing and methods involved.

Course Outcomes:

At the end of the course, a student should be able to:

Understand the organization of plant genome and intergenomic interaction.

Appraise various methods of marker assistant selection in plant breeding.

Describe various genes used in plant transformation and the role of transgenic plants in human welfare.

Translate the concepts in future studies and debate on the issue related to GMOs and evaluate its significances

PH 503.3P ANIMAL BIOTECHNOLOGY PRACTICAL

Course Objectives:

This course enables the students to:

Impart hands-on-training in sterilization of laboratory

Acquire expertise in various sterilization techniques.

Make the reagents, media.

Prepare various types of tissues/cells for culture.

Course Outcomes:

At the end of the course, a student should be able to:

Apply Good Laboratory practices and aseptic techniques.

Initiate primary explant culture and maintain cell lines.

Isolate cells from tissues.

Determine cytotoxicity and growth kinetic

PH 504.3P PLANT BIOTECHNOLOGY PRACTICALS

Course Objectives:

This course enables the students to:

Acquire knowledge about layout of plant tissue culture lab, culture environment, learn varied sterilization techniques.

Impart hands-on-training in anther culture and micropropagation of plants.

Comprehend protoplast isolation, purification and culture techniques.

Understand RAPD marker assisted selection of plants for crop improvement.

Course Outcomes:

On completion of this course, a student should be able to:

Apply Good Laboratory practices and aseptic techniques.

Prepare the media and other reagents, initiate primary cell culture, Estimate the viability of cells as well as cell concentration.

Perform identification of correct stage of anther for haploid culture and establish and the establishment of secondary embryogenic tissues.

Apply knowledge for large scale clonal propagation of plants through various micropropagation techniques.

PS 505.3 INDUSTRIAL BIOTECHNOLOGY

Course objectives: This course enables the students to:

Infer the need for sustainable innovation, and how biotechnology and biobased production can contribute to this.

Comprehend the isolation and strain improvement of microorganisms of potential industrial interests.

Impart knowledge on design and operation of fermentation processes with all its prerequisites.

Understand various downstream processing for product recovery.

Course Outcomes:

At the end of the course, a student should be able to:

Explain the screening, strain improvement and design of fermentation media.

Assess the conditions for efficient and sustainable design of bioprocesses.

Integrate scientific and technological knowledge on the use of bioprocesses for industrial products on the cell and process level.

Analyze the processes and their application in healthcare, agriculture, energy and the environment.

PS 506.3 ENVIRONMENTAL BIOTECHNOLOGY

Course Objectives:

This course enables the students to:

Assimilate the interaction of organisms with one another and the environment, species distribution on earth, and key threats and biodiversity conservation approaches.

Evaluate the key environmental issues and their consequences.

Assess the biotechnological solutions to address the negative impacts of microbial processes on materials.

Comprehend the utilization of microorganisms in wastewater treatment, bioremediation, and biomining.

Course Outcomes:

At the end of the course, a student should be able to:

Explain and appreciate the concepts of ecology.

Critically examine biodiversity and human linkages, and appreciate the need for

biodiversity conservation and contribute to the developmental pathways and policy framework.

Relate an environmental issue with its cause and take an initiative in solving them.

Investigate and develop new biological technologies to mitigate environmental problems.

PS 509.3 P INDUSTRIAL BIOTECHNOLOGY PRACTICALS

Course Objectives:

This course enables the students to:

Implement the principle of isolation, growth, maintaining the cultures, techniques of strain improvement.

Apply the role of micro-organism in production of organic acids, alcohols, wine, vinegar, enzymes, vitamins, antibiotics, amino-acids and steroids.

Design the criteria for fermentor and operation of bioreactor, submerged and solid- state fermentation for the production of enzymes and therapeutics from biological systems and calculation of yield.

Analyze the course of downstream processing of proteins including centrifugation, precipitation, dialysis and ion exchange chromatography.

Course Outcomes:

At the end of the course, a student should be able to:

Execute various selective isolation, replica plating, growth kinetics and the role of various factors affecting the process of microbial growth.

Purify proteins by using various proteins including centrifugation, precipitation, dialysis and ion exchange chromatography.

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.

Demonstrate proficiency in methodologies and equipment employed.

PS 510.3 P ENVIRONMENTAL BIOTECHNOLOGY PRACTICALS

Course Objectives:

This course enables the students to:

Relate the theoretical knowledge with practical experiences and experience that practical processes can deviate from theoretically expected behavior.

Comprehend the interactions of pollutants in water, air, and sub-surface environments.

Design and execute experiments, and analyze and interpret the outcomes.

Evaluate environmental pollution problem involving biological and environmental systems.

Course Outcomes:

At the end of the course, a student should be able to:

Execute scientific collection and preservation of samples.

Perform the analytical tests aimed at establishing the concentration of pollutants in a water sample.

Examine the water quality by microbiological tests.

Demonstrate proficiency in methodologies and equipment employed for the analysis of samples.

PO 513.3 CLINICAL DRUG DEVELOPMENT AND IPR

Course Objectives:

This course enables the students to:

Comprehend GLP, GMP and ethical issues in biological research.

Understand ethical aspects related to animal experimentation, animal rights, various in vitro and in silico model in preclinical research.

Gain knowledge regarding ICH-GCP, phases in clinical trial, bioethics in clinical research.

Comprehend intellectual property rights, procedure for granting a patent, and their implications in biological research and product

development.

Course Outcomes:

At the end of the course, a student should be able to:

Demonstrate an understanding of the steps involved in the drug discovery and design process.

Demonstrate an understanding of the importance of strict quality control and regulation in the drug development process, and an awareness of GMP, GLP and GDocP.

Design and manage various essential documents for the conduct of a clinical trial.

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.

Semester IV

PH 501.4 FOOD BIOTECHNOLOGY

Course Objectives:

This course enables the students to:

Understand the regulatory aspects of food biotechnology.

Acquire knowledge on the role of microbes in food production and food spoilage.

stand the basic principles of preservation techniques and the unit operations employed in a food processing

Gain in-depth understanding of biotechnology of fermented foods.

Course Outcomes:

On completion of the course, a student should be able to:

Explain the importance of food laws, acts, quality control and sensory evaluations.

Describe the factors affecting growth of microorganisms.

Apply the knowledge of processing and preservation techniques in

increasing the shelf life of food products.

Produce different oriental and traditional fermented foods.

PH 502.4 MOLECULAR DIAGNOSTICS AND IMMUNOTECHNIQUES

Course Objectives:

This course enables the students to:

Acquire in-depth knowledge in PCR based molecular diagnosis of infectious diseases.

Sensitize students about recent advances in biomarkers in disease diagnostics.

Provide a thorough understanding of the various immunotechniques.

Teach students with a deep insight about monoclonal antibody production and antibody engineering.

Course Outcomes:

On completion of this course, students should be able to:

Design PCR based diagnostic method for infectious diseases.

Understand genomics, proteomics and metabolomics that could be employed in early diagnosis and prognosis of human diseases.

Execute this knowledge in the processes of antibody engineering, vaccine development, immunization and cancer therapy.

Apply techniques of molecular biology/immunology in research work/pharma industries and other relevant biotech industries.

PH 503.4 PROJECT DISSERTATION/ INTERNSHIP REPORT AND VIVA VOCE

PH 504.4P FOOD BIOTECHNOLOGY PRACTICALS

Course Objectives:

This course enables the students to:

Utilize laboratory techniques to enumerate the microorganisms in food.

Acquire skills on various methods of assessing food quality.

Understand the various tests to detect adulterants in various food samples.

Acquire in-depth knowledge on the methodology of production of fermented beverage.

Course Outcomes:

On completion of the course students will be able to:

Explain the different microorganisms associated with food and evaluate the microbial estimation in food.

Identify and control adulterants in various foods and evaluate food quality.

Apply the technique of growing mushrooms as an alternative food product.

Comprehend the knowledge of wine production and launch a startup.

PH 505.4P MOLECULAR DIAGNOSTICS AND IMMUNOTECHNIQUES PRACTICALS

Course Objectives:

This course enables the students to:

Apply PCR for amplification of a gene of interest.

Understand the application of Nested PCR in detection of a microorganism.

Comprehend various antigen-antibody reactions.

Acquire in-depth knowledge in immunotechniques.

Course Outcomes:

At the end of the course, a student should be able to:

Design and conduct PCR based experiments for disease diagnostics.

Perform nested PCR experiments for identification of a microorganism.

Demonstrate Real Time PCR.

Perform various immunotechniques like ELISA, western blotting.

PS 506.4 CLINICAL RESEARCH, IPR AND PATENTS

Course Objectives:

This course enables the students to:

Learn GLP, GMP and ethical issues in biological research.

Understand ethical aspects related to animal experimentation, animal rights, various in vitro and in silico model in preclinical research.

Gain knowledge regarding ICH-GCP, phases in clinical trial, bioethics in clinical research.

Comprehend intellectual property rights, procedure for granting a patent, and their implications in biological research and product development.

Course Outcomes:

At the end of the course, a student should be able to:

Demonstrate an understanding of the steps involved in the drug discovery and design process.

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.

Design and manage various essential documents for the conduct of a clinical trial.

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.

P 510

Programme Objectives:

To provide state-of-the-art knowledge and skills in the field of Biotechnology.

To generate manpower trained in Biotechnology suited to meet the needs of the industry and academia.

To train students to pursue committed research in the field of Biotechnology.

To train students for practical oriented project work.

To have a positive impact on human and animal health, agriculture and environment in the region.

To have 100 % placement for all the students who take up this course.

Programme Specific Outcomes (PSOs):

A post-graduate student upon completion of the programme is expected to gain the following attributes:

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.

PSO13: Environmental awareness vis-à-vis bio-waste generation, disposal and management and safety and security issues.

Semester I

PH 501.1 BIOCHEMISTRY AND METABOLISM

Course Objectives:

This course enables the students to:

Appreciate the structure and functions of carbohydrate, protein, lipid and nucleic acid.

Understand how the structure of biological molecules dictates its function.

Have knowledge about biochemical pathways involved in intermediary metabolism of carbohydrate, protein, lipid and nucleic acid.

Interrelate each of the metabolic pathways and their contributions in various metabolic disorders.

Course Outcomes:

At the end of the course, a student should be able to:

Describe the structure, function and interrelationships of various biomolecules and consequences of deviation from the normal state.

Translate the importance of biological macromolecules and their role in living systems.

Identify the molecular metabolic pathway involved in carbohydrate, lipid, amino acid and nucleic acid metabolism, their interrelationships and regulation.

Evaluate information relevant to concepts on cellular regulation of different metabolic pathways.

PH 502.1 MICROBIOLOGY

Course objectives:

This course enables the students to:

Understand the diversity in microbial world and the concept of microbial taxonomy and phylogeny.

Understand the mechanisms of various interactions that exist between the microbes, microbes and higher forms of life/en

Distinguish principles of virus taxonomy, structure, life cycle, and host-virus

interactions that often lead to disease.

Appraise the applications of relevant microbes in agriculture, healthcare and environment.

Course Outcomes:

At the end of the course, a student should be able to:

Apply the principles in classifying microbial systems and know their beneficial and harmful effects.

Employ various cultivation methods starting from screening to preservation of the desired microbe.

Identify and the major virus groups with their elementary features that is responsible for causing the most dreaded d

Understand microbial diversity and their interactions, and design suitable strategies to tackle unsustainable agricultural and en

PH 503.1 CELL AND MOLECULAR BIOLOGY

Course Objectives:

This course enables the students to:

Understand molecular organization of membranes and membrane functions.

Appreciate cellular processes and cell signaling.

Understand the flow of information from genes to proteins.

Comprehend cell transformation mechanisms.

Course Outcomes:

At the end of the course, a student should be able to:

Describe the organization of macromolecules on membranes and cellular processes.

Differentiate the various cell signaling pathways.

Illustrate regulation of gene expression in eukaryotes.

Take up research in the field of cell and molecular biology.

PH 504.1 P BIOCHEMISTRY & METABOLISM PRACTICALS

Course Objectives:

This course enables the students to:

Appreciate various quantitative analysis of the macromolecules in the given sample and analyse the results.

Preparation of buffers, reagents, standard solutions for various methods of estimation of proteins, carbohydrates.

Gain insight of the various methods and techniques used in microbial isolation, staining, enumeration and preservation.

Standard methods and techniques in biochemistry with the appropriate analysis and interpretation of data and graphs.

Course Outcomes:

At the end of the course, a student should be able to:

Understand the principles of biochemistry and metabolism in various cellular functions, and the application of research involved in various fields.

Investigate and analyse the unknown carbohydrate or amino acid compound present in the given sample qualitatively.

Answer theoretical questions, carrying out laboratory investigations to answer those questions, and critically analysing, interpreting and presenting the results.

Construct the standard curve, analyse the data and interpret the results.

PH 505.1 P MICROBIOLOGY PRACTICALS

Course Objectives:

This course enables the students to:

Understand and appreciate the laboratory safety protocols.

Examine the presence and central roles of microorganisms in nature and in our daily lives.

microbiological techniques to isolate, investigate the structure and physiology, identify and preserve the iso

Become proficient in laboratory skills and critical thought required to implement the skills.

Course Outcome:

At the end of the course, a student should be able to:

Evaluate the various physical and chemical growth requirements of bacteria and equip

various methods of bacterial growth measurement.

Execute microbial techniques for the isolation of pure cultures of bacteria.

staining procedures, aseptic techniques and be able to perform routine culture handling tasks safely and effe

Comprehend the various methods for identification of unknown microorganisms.

PH 506.1 P CELL AND MOLECULAR BIOLOGY PRACTICALS

Course Objectives:

This course enables the students to:

Have hands-on-training in cell and molecular biology techniques.

Calculate and prepare reagents.

Comprehend the underlying principle of quantitative and qualitative experiments.

Identify suitable model organisms to perform experiments.

Student Learning Outcomes:

At the end of the course, a student should be able to:

Assess membrane transport.

Prepare slides.

Differentiate cell divisions.

Isolate macromolecules and perform qualitative and quantitative assays.

PS 507.1 MOLECULAR AND HUMAN GENETICS

Course Objectives:

This course enables the students to:

Understand the classical concepts of Mendelian genetics, gene interactions and the repair mechanisms.

Categorize the genetic recombination in bacteria and inspect the molecular mechanism of recombination.

Acquire a deep insight on some of the chromosomal abnormalities and their diagnosis.

Comprehend the concepts of population genetics, the theories and genetics of evolution.

Course Outcomes:

On completion of this course, a student should be able to:

Discuss the chromosomal mechanisms of sex determination and dosage compensation.

to distinguish between a normal and an abnormal karyotype and the underlying causes of genetic disorders

ize the different methods available for genetic testing and for the treatment and management of genetic dis

Construct pedigrees and analyse the patterns of inheritance in the families.

PS 508.1 IMMUNOLOGY

Course Objectives:

This course enables the students to:

rovide an insight into various organs and cell types involved in immune responses and associated functions

Compare and contrast the innate versus adaptive immune systems.

Distinguish and characterize antibody isotypes, development, functions and antigen- antibody reactions.

vide students with knowledge on how the immune system works during bacterial infection and viral infecti

Course Outcomes:

At the end of the course, a student should be able to:

Describe which cell types and organs present in the immune response.

Apply basic techniques for identifying antigen-antibody interactions.

Exemplify the adverse effect of immune system including allergy, hypersensitivity and autoimmunity.

Elucidate the reasons for immunization and aware of different vaccination

PS 510.1P MOLECULAR AND HUMAN GENETICS PRACTICALS

Course Objectives:

This course enables the students to:

Acquire the required laboratory skills to perform, interpret and analyze the results.

Demonstrate the handling of *Drosophila melanogaster*, the model organism for genetic studies.

Describe the principles and procedures of genetic techniques in biological experiments.

Perform and elucidate the reasons for the given karyotype.

Course Outcome:

At the end of the course, a student should be able to:

*Describe the salient features of *Drosophila melanogaster*.*

Apply the basic technique of separation of the eye pigments of *D. melanogaster* by chromatographic technique.

Analyze the different types of syndrome and their karyotype.

Elaborate the knowledge on sex determination and chromosomal aberrations.

PS 511.1P IMMUNOLOGY PRACTICALS

Course Objectives:

This course enables the students to acquire adequate skills and knowledge to:

Stain and identify different cells of immune system.

Perform agglutination and precipitation reactions.

Identify blood groups and types.

Visit blood bank to understand the blood donation, packing, separation of blood products.

Course Outcome:

At the end of the course, a student should be able to:

Acquire technical skills and knowledge on staining, identify various immune cells and enumerate them.

Competently perform antigen-antibody interaction for diagnostic test.

Analyze the components of human sera by performing agarose gel electrophoresis.

Perform blood Donation and its procedure, product packing, separation of blood products and labeling.

Semester II

PH 501.2 GENETIC ENGINEERING

Course objectives:

This course enables the students to:

Understand the tools and techniques employed in genetic engineering.

Describe various methods of gene transfer, selection and screening of recombinants.

Comprehend forward and reverse primer design.

Learn recent developments in PCR and Transcriptomic analysis.

Course Outcomes:

At the end of the course, a student should be able to:

Demonstrate the ability to design recombinant molecules.

Design forward and reverse primer to amplify a gene of interest.

Explain transcriptomic analysis and major RNA-Seq platforms.

Apply learned knowledge to their future research.

PH 502.2 ENZYMOLOGY

Course objectives:

This course enables the students to:

Comprehend the fundamentals of enzyme nomenclatures, properties, and the methods for the discovery of novel enzymes.

Gain in-depth knowledge about enzymes, which catalyse the diverse biochemical reactions in life processes, providing basic concepts of their, kinetics mechanism of action, regulation, inhibition, and wide-ranging applications.

Understand the importance of enzymes as cellular catalysts.

Appraise the applications of enzymes in industry, research and human health.

Course Outcomes:

On completion of this course, a student should be able to:

Describe the structure, functions and the mechanisms of action of enzymes.

Demonstrate the kinetics of enzyme catalyzed reactions and regulatory processes.

Explain the different immobilization techniques and industrial and clinical scope of enzymes.

Apply the principles of enzyme inhibitions in clinical research.

PH 503.2 P GENETIC ENGINEERING PRACTICALS

Course Objectives:

This course enables the students to:

Impart hands-on-training in various techniques in genetic engineering.

Acquire different methodologies in genetic engineering.

Enable students to design a cloning experiment.

Comprehend the application of Polymerase Chain Reaction.

Course Outcomes:

On completion of this course, a student should be able to:

Isolate and purify genomic DNA/RNA.

Demonstrate restriction digestion and ligation experiment.

Standardize a PCR protocol for amplification of a specific target gene.

Gather a thorough knowledge in genetic engineering methods practiced in research.

PH 504.2 P ENZYMOLOGY PRACTICALS

Course Objectives:

This course enables the students to:

Comprehend the principles of enzyme catalysed reactions.

Learn the preparation of reagents, standard solutions and isolation of enzymes.

Appreciate various qualitative and quantitative methods of enzyme assay.

Execute a laboratory experiment using the standard methods and techniques, with the appropriate analysis and interpretation of data and results.

Course Outcome:

At the end of the course, a student should be able to:

Design the experiments related to isolation and purification of enzymes.

Apply and extend their knowledge and understanding of enzyme catalysis in research.

Develop accurate skills in enzyme assays.

Construct the standard curve, critically analyse the data and interpret the results.

PS 505.2 RESEARCH METHODOLOGY, ETHICS AND SCIENTIFIC COMMUNICATION

Course Objectives:

This course enables the students to:

Comprehend the purpose of research in academics.

Understand the methodologies used to do research.

Understand scientific communication.

Appreciate scientific ethics.

Student Learning Outcomes:

At the end of the course, a student should be able to:

Explain the differences between research methodologies.

Design a small research project with appropriate research method.

Apply correct ways of referencing to and citing from scientific literature.

Analyze, contrast, compare and criticize scientific literature and write a research report/ thesis.

PS 506.2 ANALYTICAL TECHNIQUES IN BIOTECHNOLOGY

Course Objectives:

This course enables the students to:

Design a blueprint for the analysis of biomolecules using various analytical techniques.

Demonstrate the principles and instrumentation of various chromatographic, spectroscopic methods used in biotechnology.

Interpret the results of various bio analytical techniques scientifically.

Describe the role of microscopy and radioisotopes in the visualization of cellular components and macromolecules.

Course Outcomes:

At the end of the course, a student should be able to:

Discuss the principle and instrumentation of HPTLC, HPLC, GC for identification, and characterization of compounds.

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.

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.

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.

**PS 509.2 P RESEARCH METHODOLOGY AND SCIENTIFIC COMMUNICATION
PRACTICALS**

Course Objectives:

This course enables the students to:

Identify the importance of research in Biosciences.

Conduct/manage research with integrity.

Assess plagiarism using the software.

Communicate the scientific findings.

Course Outcomes:

At the end of the course, a student should be able to:

Explain key research designs and techniques.

Identify various sources of information for literature review.

Read, comprehend, and explain research articles in their academic discipline.

Collect, analyze and represent their data and write a research report/ thesis.

PS 510.2 P ANALYTICAL TECHNIQUES IN BIOTECHNOLOGY PRACTICALS

Course Objectives:

This course enables the students to:

monstrate the handling and applications of various spectrophotometric techniques in biological investigation

Describe the principles and procedure of Electrophoresis and SEM in biological investigations/experiments

ply the principle and procedure of TLC and gel filtration chromatography for detection and purification of

Select appropriate analytical technique to design the experiment.

Course Outcome:

At the end of the course, a student should be able to:

e identification and characterization of various biomolecules using UV Vis spectroscopy, AAS and flame p

Demonstrate the strengths, limitations and use of various chromatographic techniques including paper, TLC, gel filtration and HPLC for the analysis of various biomolecules.

Interpret and analyse the result obtained from various colorimetric assays of protein by plotting a standard curve.

Examine the topography, morphology and composition of various samples by creating the 3D images using SEM.

OPEN ELECTIVE

PO 513.2 QUALITY ASSURANCE AND QUALITY CONTROL IN PRODUCT DEVELOPMENT

Course Objectives:

This course enables the students to:

Understand the best practices, tools and techniques in quality management.

Acquire knowledge about the principles and applications of the GMP.

Outline the main GMP requirements related to premises, equipments and personnel from its regulatory and application perspective.

Comprehend the requirement of Good Documentation Practices and data integrity for medicinal products.

Course Outcomes:

At the end of the course, a student should be able to:

Apply quality tools for quality management and main guidelines & requirements of GMP thus contributing to the organization when it comes to understanding industry standards.

Integrate the principles of the GMP quality system and quality control and the important procedures when dealing with complaints and recalls.

Justify the requirements for good documentation practice and complete appropriate documents in compliance with regulatory guidelines.

Execute and adopt quickly into the GMP environment.

Semester III

PH 501.3 ANIMAL BIOTECHNOLOGY

Course Objectives:

This course enables the students to:

Describe laboratory design.

Gain hands on knowledge of the various animal cell culture techniques.

Understand the applications of animal biotechnology.

Meet the challenges of the new and emerging areas of biotechnology industry.

Course Outcomes:

At the end of the course, a student should be able to:

Demonstrate aseptic techniques and good laboratory practices.

Describe the bioprocess technology for economically important products.

Apply the knowledge for improvement of farm animals.

Take up animal based biological research /relevant biotech industry.

PH 502.3 PLANT BIOTECHNOLOGY

Course Objectives:

This course enables the students to:

Acquire information about design of plant tissue culture lab, culture environment, learn varied sterilization techniques.

Comprehend the principles, methods and application of plant tissue culture.

Acquire knowledge about molecular markers in plant breeding and computational tools and resources in plant genome informatics.

Describe the application of genetically modified plants in crop improvement, get exposure about gene editing and methods involved.

Course Outcomes:

At the end of the course, a student should be able to:

Understand the organization of plant genome and intergenomic interaction.

Appraise various methods of marker assistant selection in plant breeding.

Describe various genes used in plant transformation and the role of transgenic plants in human welfare.

Translate the concepts in future studies and debate on the issue related to GMOs and evaluate its significances

PH 503.3P ANIMAL BIOTECHNOLOGY PRACTICAL

Course Objectives:

This course enables the students to:

Impart hands-on-training in sterilization of laboratory

Acquire expertise in various sterilization techniques.

Make the reagents, media.

Prepare various types of tissues/cells for culture.

Course Outcomes:

At the end of the course, a student should be able to:

Apply Good Laboratory practices and aseptic techniques.

Initiate primary explant culture and maintain cell lines.

Isolate cells from tissues.

Determine cytotoxicity and growth kinetic

PH 504.3P PLANT BIOTECHNOLOGY PRACTICALS

Course Objectives:

This course enables the students to:

Acquire knowledge about layout of plant tissue culture lab, culture environment, learn varied sterilization techniques.

Impart hands-on-training in anther culture and micropropagation of plants.

Comprehend protoplast isolation, purification and culture techniques.

Understand RAPD marker assisted selection of plants for crop improvement.

Course Outcomes:

On completion of this course, a student should be able to:

Apply Good Laboratory practices and aseptic techniques.

Prepare the media and other reagents, initiate primary cell culture, Estimate the viability of cells as well as cell concentration.

Perform identification of correct stage of anther for haploid culture and establish and the establishment of secondary embryogenic tissues.

Apply knowledge for large scale clonal propagation of plants through various micropropagation techniques.

PS 505.3 INDUSTRIAL BIOTECHNOLOGY

Course objectives: This course enables the students to:

Infer the need for sustainable innovation, and how biotechnology and biobased production can contribute to this.

Comprehend the isolation and strain improvement of microorganisms of potential industrial interests.

Impart knowledge on design and operation of fermentation processes with all its prerequisites.

Understand various downstream processing for product recovery.

Course Outcomes:

At the end of the course, a student should be able to:

Explain the screening, strain improvement and design of fermentation media.

Assess the conditions for efficient and sustainable design of bioprocesses.

Integrate scientific and technological knowledge on the use of bioprocesses for industrial products on the cell and process level.

Analyze the processes and their application in healthcare, agriculture, energy and the environment.

PS 506.3 ENVIRONMENTAL BIOTECHNOLOGY

Course Objectives:

This course enables the students to:

Assimilate the interaction of organisms with one another and the environment, species distribution on earth, and key threats and biodiversity conservation approaches.

Evaluate the key environmental issues and their consequences.

Assess the biotechnological solutions to address the negative impacts of microbial processes on materials.

Comprehend the utilization of microorganisms in wastewater treatment, bioremediation, and biomining.

Course Outcomes:

At the end of the course, a student should be able to:

Explain and appreciate the concepts of ecology.

Critically examine biodiversity and human linkages, and appreciate the need for

biodiversity conservation and contribute to the developmental pathways and policy framework.

Relate an environmental issue with its cause and take an initiative in solving them.

Investigate and develop new biological technologies to mitigate environmental problems.

PS 509.3 P INDUSTRIAL BIOTECHNOLOGY PRACTICALS

Course Objectives:

This course enables the students to:

Implement the principle of isolation, growth, maintaining the cultures, techniques of strain improvement.

Apply the role of micro-organism in production of organic acids, alcohols, wine, vinegar, enzymes, vitamins, antibiotics, amino-acids and steroids.

Design the criteria for fermentor and operation of bioreactor, submerged and solid- state fermentation for the production of enzymes and therapeutics from biological systems and calculation of yield.

Analyze the course of downstream processing of proteins including centrifugation, precipitation, dialysis and ion exchange chromatography.

Course Outcomes:

At the end of the course, a student should be able to:

Execute various selective isolation, replica plating, growth kinetics and the role of various factors affecting the process of microbial growth.

Purify proteins by using various proteins including centrifugation, precipitation, dialysis and ion exchange chromatography.

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.

Demonstrate proficiency in methodologies and equipment employed.

PS 510.3 P ENVIRONMENTAL BIOTECHNOLOGY PRACTICALS

Course Objectives:

This course enables the students to:

Relate the theoretical knowledge with practical experiences and experience that practical processes can deviate from theoretically expected behavior.

Comprehend the interactions of pollutants in water, air, and sub-surface environments.

Design and execute experiments, and analyze and interpret the outcomes.

Evaluate environmental pollution problem involving biological and environmental systems.

Course Outcomes:

At the end of the course, a student should be able to:

Execute scientific collection and preservation of samples.

Perform the analytical tests aimed at establishing the concentration of pollutants in a water sample.

Examine the water quality by microbiological tests.

Demonstrate proficiency in methodologies and equipment employed for the analysis of samples.

PO 513.3 CLINICAL DRUG DEVELOPMENT AND IPR

Course Objectives:

This course enables the students to:

Comprehend GLP, GMP and ethical issues in biological research.

Understand ethical aspects related to animal experimentation, animal rights, various in vitro and in silico model in preclinical research.

Gain knowledge regarding ICH-GCP, phases in clinical trial, bioethics in clinical research.

Comprehend intellectual property rights, procedure for granting a patent, and their implications in biological research and product

development.

Course Outcomes:

At the end of the course, a student should be able to:

Demonstrate an understanding of the steps involved in the drug discovery and design process.

Demonstrate an understanding of the importance of strict quality control and regulation in the drug development process, and an awareness of GMP, GLP and GDocP.

Design and manage various essential documents for the conduct of a clinical trial.

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.

Semester IV

PH 501.4 FOOD BIOTECHNOLOGY

Course Objectives:

This course enables the students to:

Understand the regulatory aspects of food biotechnology.

Acquire knowledge on the role of microbes in food production and food spoilage.

stand the basic principles of preservation techniques and the unit operations employed in a food processing

Gain in-depth understanding of biotechnology of fermented foods.

Course Outcomes:

On completion of the course, a student should be able to:

Explain the importance of food laws, acts, quality control and sensory evaluations.

Describe the factors affecting growth of microorganisms.

Apply the knowledge of processing and preservation techniques in

increasing the shelf life of food products.

Produce different oriental and traditional fermented foods.

PH 502.4 MOLECULAR DIAGNOSTICS AND IMMUNOTECHNIQUES

Course Objectives:

This course enables the students to:

Acquire in-depth knowledge in PCR based molecular diagnosis of infectious diseases.

Sensitize students about recent advances in biomarkers in disease diagnostics.

Provide a thorough understanding of the various immunotechniques.

Teach students with a deep insight about monoclonal antibody production and antibody engineering.

Course Outcomes:

On completion of this course, students should be able to:

Design PCR based diagnostic method for infectious diseases.

Understand genomics, proteomics and metabolomics that could be employed in early diagnosis and prognosis of human diseases.

Execute this knowledge in the processes of antibody engineering, vaccine development, immunization and cancer therapy.

Apply techniques of molecular biology/immunology in research work/pharma industries and other relevant biotech industries.

PH 503.4 PROJECT DISSERTATION/INTERNSHIP REPORT AND VIVA VOCE

PH 504.4P FOOD BIOTECHNOLOGY PRACTICALS

Course Objectives:

This course enables the students to:

Utilize laboratory techniques to enumerate the microorganisms in food.

Acquire skills on various methods of assessing food quality.

Understand the various tests to detect adulterants in various food samples.

Acquire in-depth knowledge on the methodology of production of fermented beverage.

Course Outcomes:

On completion of the course students will be able to:

Explain the different microorganisms associated with food and evaluate the microbial estimation in food.

Identify and control adulterants in various foods and evaluate food quality.

Apply the technique of growing mushrooms as an alternative food product.

Comprehend the knowledge of wine production and launch a startup.

PH 505.4P MOLECULAR DIAGNOSTICS AND IMMUNOTECHNIQUES PRACTICALS

Course Objectives:

This course enables the students to:

Apply PCR for amplification of a gene of interest.

Understand the application of Nested PCR in detection of a microorganism.

Comprehend various antigen-antibody reactions.

Acquire in-depth knowledge in immunotechniques.

Course Outcomes:

At the end of the course, a student should be able to:

Design and conduct PCR based experiments for disease diagnostics.

Perform nested PCR experiments for identification of a microorganism.

Demonstrate Real Time PCR.

Perform various immunotechniques like ELISA, western blotting.

PS 506.4 CLINICAL RESEARCH, IPR AND PATENTS

Course Objectives:

This course enables the students to:

Learn GLP, GMP and ethical issues in biological research.

Understand ethical aspects related to animal experimentation, animal rights, various in vitro and in silico model in preclinical research.

Gain knowledge regarding ICH-GCP, phases in clinical trial, bioethics in clinical research.

Comprehend intellectual property rights, procedure for granting a patent, and their implications in biological research and product development.

Course Outcomes:

At the end of the course, a student should be able to:

Demonstrate an understanding of the steps involved in the drug discovery and design process.

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.

Design and manage various essential documents for the conduct of a clinical trial.

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.

P 520	M.Sc. (Bioinformatics)
P 530	M.Sc. (Software Technology)
Educational	
PE01	Communicate Software Technology concepts, designs, and solutions effectively and professionally with real life examples and experiences.

PE02	Apply knowledge of computing to bring out effective designs and solutions for specific problems across various domains.
PE03	Ability to use various software development tools, multiple software systems, and modern computing platforms, with priority on the emerging technologies.

<p>PE04</p>	<p>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.</p>
<p>Software Techn</p>	
<p>Syllabus fr</p>	

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.

PO10	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.
P 540	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

PH 543.1 : PHYSICAL CHEMISTRY

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

PS 544.1 : PRINCIPLES OF ANALYTICAL CHEMISTRY & SEPARATION TECHNIQUES

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

PS 545.1 BIOORGANIC CHEMISTRY

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

PS 546.1 RESEARCH METHODOLOGY

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.

PS 547.1P : INORGANIC CHEMISTRY PRACTICALS – I

CO 1: Estimate the quantity and quality of different compounds and metal ions using gravimetry, volumetry and complexometric techniques.

PS 548.1P : ORGANIC CHEMISTRY PRACTICALS – I

CO 1: Carry out multi-step organic synthesis

Purify the synthesized organic compounds

PS 549.1P : PHYSICAL CHEMISTRY PRACTICALS – I

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.

SECOND SEMESTER

PH 541.2: ADVANCED INORGANIC CHEMISTRY

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

PH 542.2: ADVANCED ORGANIC CHEMISTRY

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

PH 543.2: ADVANCED PHYSICAL CHEMISTRY

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

PS 544.2: MOLECULAR SYMMETRY AND MOLECULAR SPECTROSCOPY

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

PS 545.2 : CHEMISTRY OF BIOMOLECULES

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

PS 546.2P : INORGANIC CHEMISTRY PRACTICALS – II

CO 1: Estimate binary mixtures of metallic ions in solution

CO 2: Analyse the presence of inorganic salts qualitatively

PS 547.2P : ORGANIC CHEMISTRY PRACTICALS – II

CO 1: Separate and analyse the binary mixture of Organic Compounds

PS 548.2P : PHYSICAL CHEMISTRY PRACTICALS – II

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.

PO 549.2- ANALYTICAL TECHNIQUES

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

THIRD SEMESTER

PH 541.3 :ORGANOMETALLIC, BIOINORGANIC AND COORDINATION CHEMISTRY

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.

PH 542.3: ELECTROANALYTICAL RADIOCHEMICAL AND THERMOANALYTICAL TECHNIQUES

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.

PS 543.3: MOLECULAR SPECTROSCOPY

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

PS 544.3 : MEDICINAL CHEMISTRY

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

PS 546.3P: COMPUTERS FOR CHEMISTS

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

PS 545.3P: ANALYTICAL CHEMISTRY PRACTICALS – I

CO 1: Analyze the common and rare cations in a mixture by different titration techniques.

CO 2: Handle spectrophotometry for various determinations

PS 546.3P ANALYTICAL CHEMISTRY PRACTICALS – II

CO 1: Have clear understanding of different analytical instruments.

CO 2: Apply chromatographic techniques as analytical tool in chemistry.

PO547.3 OPTICAL METHODS OF ANALYSIS

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.

FOURTH SEMESTER

PH 541.4: ORGANIC SYNTHETIC METHODS

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

PH 542.4: SPECTROSCOPIC METHODS OF ANALYSIS

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

PH 543.4: CHEMISTRY OF POLYMERS AND NATURAL PRODUCTS

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.

PH 544.4P ANALYTICAL CHEMISTRY PRACTICALS – III

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

PH 546.4 : APPLIED ANALYSIS AND AUTOMATION

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.

PS 547.4 : RADIATION AND PHOTOCHEMISTRY

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

P 550

PROGRAM OUTCOMES

PO1 Prepare human resource professionals /Corporate psychologists with a multidisciplinary approach to address legal, ethical and multicultural issues and challenges in the corporate.

PO2 Develop leadership skills and core competencies required to stay ahead in the corporate / industry

PO3 Develop employability skills to manage global human resources

PO4 Contribute to employee performance, organizational effectiveness through a scientist practitioner approach

PO5 Build organizations by focusing on people, process, products and profits.

PO6 Engage actively in socially responsible activities to promote health, harmony, human welfare and well- being in the society.

PO7 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.

SEMESTER I

PH 551.1 PSYCHOLOGICAL PROCESSES (Hard Core)

Credits: 4 Instruction hours: 50hr

COURSE OUTCOMES:

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 Analyse the dynamics of human behavior and individual differences in the work context.

CO7 Application of the psychological concepts to understand real time work place issues .

PH 552.1 PSYCHOLOGICAL ASSESSMENT (Hard Core)

Credits: 4 Instruction hours: 50hrs

COURSE OUTCOMES:

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

PH 553.1 HUMAN RESOURCE MANAGEMENT (Hard Core)

Credits: 4 Instruction Hours: 50hrs
Course Outcomes:
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
CPH 554 .1P PSYCHOMETRIC TESTING - I (Hard Core)
Credits: 4 Instruction hours: 50hr
COURSE Outcomes
CO1 : Describe the history and process of test construction of different psychological tests
CO2 : Assess the various psychological constructs or variables as applicable to workplace set up
: Measure the components of personality and compare it with the normative data in the organizational context
CO4 : Apply the required test in the workplace context to determine the quality of work life balance
CO5 : Use the tests to assess and understand the organizational climate of the workplace
CO6 : Determine the test to assess and measure specific aspect related to individual or workplace
PH 555.1P INTERPERSONAL SKILLS TRAINING - I (Hard Core)

Credits: 4 Instruction hours: 50hr
COURSE Outcomes
1 : Understand the theoretical background and relevant conceptual framework of different interpersonal skills
CO2 : Know the importance and need of the practical skills in the ever growing challenging world
CO3 : Develop in depth understanding of different interpersonal skills
CO4 : Design and prepare independent modules by incorporating the theory and practical activities
CO5 : Build competence and confidence in using skills in personal and professional life
CO6 : Teach the skills to others through conducting training programmes
CO7 : Conduct the various interpersonal skill development programme independently
PS 556.1 ORGANIZATIONAL PSYCHOLOGY (Soft Core)
Credits: 3 Instruction Hours: 40hrs
Course Outcomes:
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.

SEMESTER II

PH 551.2 TRAINING AND DEVELOPMENT (Hard Core)

Credits: 4 Instruction Hours: 50hrs

Course Outcomes:

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 Analyz the various methods of training evaluation and determe 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

PH 552.2 CORPORATE CULTURE AND DIVERSITY (Hard Core)

Credits: 4 Instruction hours: 50hrs

Course Outcomes:

Course Outcomes:

CO 1 Understand the importance of culture in organizations

CO 2 Understand the concept of culture in connection with corporate firms and cross cultural

Aspects

CO 3 Understand 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.

CO7 Learn strategies to manage cultural diversity in organizations

PS 553.2 STATISTICS AND RESEARCH METHODOLOGY (Soft Core)

Credits: 3 Instruction hours: 40 hrs

Course Outcomes:

CO 1 Competent knowledge base in scientific thinking and Scientific method as a model for research

CO 2 Provide theoretical foundations in quantitative and qualitative research methods.

PS 555.2 MANAGERIAL ECONOMICS (Soft Core)

Credits :3 Instruction hours:40hrs

Course Outcomes:

Course Outcomes:

CO 1 Understanding of basic economic concepts.

CO 2 Use economic approaches in managerial decision making.

CO 3 Understand the applications of economic theories in business decision.

CO 4 Explain the principles of demand and supply and apply it in business

CO 5 Compare and analyse the different types of costs

PO 558.2 BEHAVIOUR AND SOCIETY (Open Elective)

Credits: 3 Instruction hours: 40 hrs

Course Outcomes:

CO 1 Understand how people think, feel and act in the context of society

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 prosocial behaviour and strategies to enhance helping behaviour

CO 6 Apply the principles of social psychology to challenge prejudice, discrimination, stereotype attitudes and promote peace

SEMESTER III

PH 551.3 CORPORATE LEADERSHIP (Hard Core)

Credits :4 Instruction hours : 50hrs

Course Outcomes

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

PH 552.3 ORGANISATIONAL CHANGE AND DEVELOPMENT (Hard Core)

Credits: 4 Instruction hours : 50hrs

COURSE OUTCOMES
CO1 Synthesize theories and models of organisational 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
CO3 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
PS 553.3 CORPORATE REPORTING AND ACCOUNTABILITY (Soft Core)
Credits: 3 Instruction hours: 40hrs
<u>COURSE OUTCOMES :</u>

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 the corporate accountability with relevant financial and managerial accounting tools.

PS 554.3 CORPORATE ETHICS AND GOVERNANCE (Soft Core)

Course Outcomes:

CO 1 Understand the concept of ethics and its essentials in corporate sector

CO 2 Analyze the ethical issues in different areas of management

CO 3 Design and develop the comprehensive and relevant ethics programme in the given context

CO 4 Identify the need of corporate social responsibility and its importance in the changing global conditions

CO 5 Describe the different CSR models in the international scenario

CO 6 Compare the different existing corporate governance practices in India and abroad.

CO 7 Apply the ethical concerns while using technology in the organisations

CO 8 Assess the role of ethics in performance of different departments like marketing, finance, HRM

Understand the concept of ethics and its essentials in corporate, analyze the ethical issues in different areas of management; study the importance of corporate social responsibility, corporate governance practice in India and abroad.

PS 555.3 INDUSTRIAL RELATIONS AND LABOUR LAWS

Credits :3 Instruction hours :40hrs

Course Outcomes:

CO 1 Understand the evolution and development of Industrial Relations and the history of enactments of Labour laws in India.

PS 558.3P CORPORATE SELECTION AND DEVELOPMENT (Soft Core)

Credits :3 Instruction hours:40hrs

Course Outcomes

CO 1 Develop the confidence and competence in applying HRM concepts in reality

ulate the job description and job specification for a job under consideration in the given organization

CO 3 Develop the skills required for new age jobs

prepare a payroll by calculating various schemes and benefits available to the employees of the organization

interviews independently and analyzing the impact of relevant and suitable question generation during

CO 6 Acquire and enhance the knowledge of utilizing online modes of service to interact with others

PO 559.3 Basic Counseling Skills (Open Elective)

Credits :3 Instruction Hours :40

Course outcomes

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.

SEMESTER IV

DISSERTATION

COURSE OUTCOME:

CO 1 Understand the application of psychological research in the field of human resource management

CO 2 Develop research skills in organizational research

CO 3 Conduct need based organizational research (Evidence based research)

CO 4 Competent to identify research problems in the field of corporate psychology

·CO 5 Suggest research-based interventions to real time organizational issues.

INTERNSHIP

COURSE OUTCOMES

CO 1 Practical training enables the trainees will achieve high level competencies and skill to work with organizations

CO 2 Develop an appreciation for the linkage between organization and its macro environment

CO 3 On the job training exposure on HR practices in different types of organizations so as to reduce the gap between theory and practice

·CO 4 Apply psychological principles in organizational setting

P 560	M.Sc. (Mathematics)
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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	
COURSE OUTCOMES		
I Semester PH561.1 Algebra I		

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	
PH 562.1 Linear Algebra I		
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:		underst and 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		
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	
PS 564.1 Graph Theory		
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.	
PS 565.1 Fluid Mechanics		
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	
PS 566.1 Operations Research		
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.	
PS 567.1 Ordinary Differential Equations		
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.	

II Semester PH 561.2 Algebra II		
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	
PS 562.2 Research Methodology and Ethics		
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.	
PH 563.2 Real Analysis II		
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.	
PS 564.2 Linear Algebra II		
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	
PS 565.2 Lattice Theory		
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.	
PO 566.2 Basic Tools in Mathematics (OE)		
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	
PS 567.2P Computational Lab -1 (using FOSS and Problem working)		
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	
III Semester		
PH 561.3 Complex Analysis I		
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	
PH 562.3 Topology		

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.	
PH 563.3 Numerical Analysis with Computational Lab		
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.	
PS 564.3 Commutative Algebra		
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.	
PS 565.3 Multivariate Calculus and Geometry		
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 R^3 .	
CO 4:	explain the geometry of surfaces on R^3	
PS 566.3 Probability Theory		
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.	
PO 567.3 Differential Equations and Applications (OE)		

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.	
IV Semester		
PH 561.4 Measure Theory and Integration		
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	
PH 562.4 Complex Analysis II		
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.	
PS 564.4 Functional Analysis		
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	
PS 565.4 Partial Differential Equations		
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.	
PS 566.4 Algebraic Number Theory		
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	
PS 567.4 Cryptography		
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.	
PS 568.4 Distribution Theory		
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.	
PS 569.4P Computational Lab -2 using FOSS and Problem Working		
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	

P 570	M.Sc. (Physics)
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Program Outcomes

PO 1 : Acquire 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; 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; 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.

PO 2: 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.

PO 3: Recognize the importance of mathematical modelling, simulation and computing, and the role of approximation and mathematical approaches to describe the physical world.

PO 4 : 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

PO 5 : Demonstrate relevant generic skills and global competencies such as

i. Problem-solving skills that are required to solve different types of Physics- related problems with well-defined solutions, and tackle open-ended problems that belong to the disciplinary area boundaries;

ii. Investigative skills, including skills of independent investigation of Physics- related issues and problems;

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;

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;

v. ICT skills; Personal skills such as the ability to work both independently and in a group.

PO 6: Demonstrate professional behaviour such as 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; the ability to identify the potential ethical issues in work-related situations; appreciation of intellectual property, environmental and sustainability issues and Promoting safe learning and working environment

Programme Specific Outcomes

PSO 1: Fundamental understanding of the

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.

Course Outcomes

PH 571.1 Mathematical Physics I

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.

PH 572.1 Classical Mechanics

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

PH 573.1 Classical Electrodynamics

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.

PH 574.1 Electronics

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.
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Semester II

PH 571.2 Mathematical Physics II

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.

PH 572.2 Quantum Mechanics I

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

CO5 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 O11 To understand Partial wave analysis in quantum mechanical scattering and also to apply Born approximation

PH 573.2 Condensed Matter Physics- I

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.

PS 574.2 Research Methodology and Ethics

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.

PO 577.2 Biophysics

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

Semester III

PH 571.3 Quantum Mechanics II

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.

PH 572.3 Condensed Matter Physics- II

C O 1 To understand various types of crystal defects and imperfections in crystal growth process.

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 electric materials and their applications.

PH 573.3 Thermodynamic and Statistical Physics

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

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C O 10 Understand the random walk problem

PS 573.3 Relativity and Cosmology

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.

PS 574.3 Optics

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.

PO 577.3 Experimental Techniques

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.

Semester IV PH 571.4 Atomic and Molecular Physics

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.

PH 572.4 Nuclear and particle Physics

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

PS 574.4 Communication Theory

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.

PS 575.4 Laser, Vacuum Techniques and Nonlinear Optics

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

PS 576.4 Condensed Matter Physics- III

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.

PS 577.4 Nuclear Structure

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.

P 580

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: 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

PSO 4: Able to successfully prepare for the competitive examinations like CSIR-NET, GATE and State Level eligibility test for Lectureship

COURSE OUTCOMES

I Semester

PH 581.1 : 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 582.1: 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

PH 583.1 : PHYSICAL CHEMISTRY

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

PS 584.1 : PRINCIPLES OF ANALYTICAL CHEMISTRY & SEPARATION TECHNIQUES

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

PS 585.1 BIOORGANIC CHEMISTRY

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

PS 586.1 RESEARCH METHODOLOGY

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.

PS 587.1P : INORGANIC CHEMISTRY PRACTICALS – I

CO 1: Estimate the quantity and quality of different compounds and metal ions using gravimetry, volumetry and complexometric techniques.

PS 588.1P : ORGANIC CHEMISTRY PRACTICALS – I

CO 1: Carry out multi-step organic synthesis

Purify the synthesized organic compounds

PS 589.1P : PHYSICAL CHEMISTRY PRACTICALS – I

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.

SECOND SEMESTER

PH 581.2: ADVANCED INORGANIC CHEMISTRY

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

PH 582.2: ADVANCED ORGANIC CHEMISTRY

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

PH 583.2: ADVANCED PHYSICAL CHEMISTRY

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

PS 584.2: MOLECULAR SYMMETRY AND MOLECULAR SPECTROSCOPY

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

PS 585.2 : CHEMISTRY OF BIOMOLECULES

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

PS 586.2P : INORGANIC CHEMISTRY PRACTICALS – II

CO 1: Estimate binary mixtures of metallic ions in solution

CO 2: Analyse the presence of inorganic salts qualitatively

PS 587.2P : ORGANIC CHEMISTRY PRACTICALS – II

CO 1: Separate and analyse the binary mixture of Organic Compounds

PS 588.2P : PHYSICAL CHEMISTRY PRACTICALS – II

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.

PO 589.2- ANALYTICAL TECHNIQUES

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

THIRD SEMESTER

PH 581.3 :ORGANOMETALLIC, BIOINORGANIC AND COORDINATION CHEMISTRY

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.

PH 582.3: ELECTROCHEMISTRY AND THERMO-ANALYTICAL METHODS

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.

PS 583.3: MOLECULAR SPECTROSCOPY

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

PS 584.3 : MEDICINAL CHEMISTRY

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

PS 586.3P: COMPUTERS FOR CHEMISTS

CO 1: Understand about the different operating systems and softwares

PS 585.3P: INORGANIC CHEMISTRY PRACTICALS – III

CO 1: Estimate binary mixtures of metallic ions in solution

CO 2: Detects the presence of certain types of ions in water.

PS 586.3P ORGANIC CHEMISTRY PRACTICALS – III

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.

PS 587.3P : PHYSICAL CHEMISTRY PRACTICALS – III

CO 1: Carry out experiments related to Polarography, Conductometry and Potentiometry.

CO 2: Verify some laws of electrochemistry.

PO588.3 BIO-INORGANIC CHEMISTRY, GREEN CHEMISTRY AND ENVIRONMENTAL CHEMISTRY

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.

FOURTH SEMESTER

PH 581.4: ORGANIC SYNTHETIC METHODS

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

PH 582.4 : RADIATION AND PHOTOCHEMISTRY

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

PH 583.4: CHEMISTRY OF POLYMERS AND NATURAL PRODUCTS

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.

PH 584.4P ORGANIC CHEMISTRY PRACTICALS – IV

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

PH 585.4P : INORGANIC CHEMISTRY PRACTICALS – IV

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

PS 587.4 : SOLID STATE AND NANO CHEMISTRY

CO 1: Understand the theory of diffraction techniques

CO 2: Gain a domain knowledge about crystal systems and defects

CO 3: Understand the importance and basic concepts of Nano chemistry

P 590	M.Sc. (Food Science and Technology)
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M.Sc. FOOD SCIENCE AND TECHNOLOGY

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.
PROGRAM SPECIFIC OUTCOMES	
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 becomes capable to start-up their own businesses.
COURSE OUTCOMES	
I Semester	
PH 591.1 Food Chemistry	
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.
PH 592.1 Principles of Food Processing and Preservation	
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.
PH 593.1 Fruits and Vegetables Processing Technology	
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.
PS 596.1 Processing of Milk and Dairy Products	
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.
PS 597.1 Waste Management and Environmental Sustainability	

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.
II Semester	
PH 591.2 Food Process Engineering and Instrumentation	
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.
CO 5	Comprehend the recent advancement in the major cereal grain's quality and processing aspects.
PH 592.2 Processing Technology of Cereals, Pulses and Oil Seeds	
CO 1	Students will be able to identify and describe various processing techniques for cereals, pulses, and oil seeds, including cleaning, sorting, grading, milling, and extrusion.
CO 2	Students will be able to evaluate the quality of processed cereal, pulse, and oil seed products, including factors such as nutritional value, sensory attributes, and shelf life.
CO 3	Students will be able to identify and describe the equipment and machinery used in cereal, pulse, and oil seed processing, and understand their functions and operating principles.

CO 4	Students will have a good understanding of the safety and hygiene considerations involved in cereal, pulse, and oil seed processing, including food safety regulations, hazard analysis, and critical control point (HACCP) procedures.
CO 5	Students shall be able to develop processing strategies for specific cereal, pulse, and oil seed products, taking into account factors such as raw material quality, processing parameters, and end-product requirements.
PS 595.2 Spices and Plantation Crops Technology	
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.
PS 596.2 Research Methodology and Ethics	
CO 1	To understand the intricacies of each micronutrient in growth and development of humans
CO 2	To understand the basis of human nutritional requirement and recommendations through the life cycle
CO 3	To analyze the nutrient – nutrient and nutrients – drug interaction. Students will be familiar with factors affecting for the absorption of nutrients
CO 4	To understand the implications of deficiency and toxicity of micronutrients and to assess their status in the body
CO 5	Demonstrate knowledge of research processes (reading, evaluating, and developing)
CO 6	Perform literature reviews using print and online databases
CBCS – ELECTIVE PAPER	
P0 598.2 Essentials of Food Science	
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.
III Semester	
PH 591.3 Food Microbiology	
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.
PH 592.3 Nutraceuticals and Functional Foods in Human Health	
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.
CBCS – ELECTIVE PAPER	
PO 595.3 Basics of Food Safety and Labelling	
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.
IV Semester	

PH 591.4 Meat, Fish, and Poultry Processing Technology	
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 by-product utilization
CO 5	Understand egg production practices and egg preservation methods
CO 6	Understand factors affecting egg quality and measures of egg quality.
PH 592.4 Food Packaging	
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.
PH 593.4 Food Biotechnology	
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

PS 595.4 Food Safety and Quality Control	
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 5	Comprehend the need of hygiene and sanitation for ensuring food safety
P 600 A	M.C.A.
PEO 1	Excel in professional career and/or higher education by acquiring knowledge in various sub-domains related to the field of computer science and applications
PEO 2	Analyze real life problems, design computing systems appropriate to its solutions that are technically sound, economically feasible and socially acceptable
PEO 3	To develop the abilities to face the changing trends and career opportunities in computer application
PEO 4	Exhibit professionalism, ethical attitude, communication skills, team work in their profession and adapt to current trends by engaging in life long learning
PROGRAM SPECIFIC OUTCOMES (PSO's)	
PSO 1	Design, develop and implement interdisciplinary application software projects to meet the demands of industry requirements using modern tools and technologies.
PSO 2	Analyze the societal needs to provide novel solutions through technological based research
MME OUTCOM	
PO1	Computational Knowledge: Apply knowledge of mathematics, computing fundamentals, data analytics, software engineering concepts and application development knowledge appropriate for the computing specialization

PO2	Problem Analysis: Identify, formulate, design and develop applications to analyze and solve computer science related problems
PO3	Design /Development of Solutions: 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.
PO4	Conduct investigations of complex Computing problems: Use appropriate review literatures, research methodologies, techniques and tools, design, conduct experiments, analyze and make inferences from the resulting data.
PO5	Modern Tool Usage: Create, Select, Integrate and apply efficiently appropriate techniques, resources, and modern computing tools to solve complex problem, with an understanding of the limitations.
PO6	Professional Ethics: Understand and work with a professional context pertaining to ethics with appropriate societal and cyber regulations in a global economic environment
PO7	Life-long Learning: Recognize and develop the passion for a continued career development and progress as a computer professional
PO8	Project management and finance: Apply the principles of management with computing knowledge to manage the projects effectively both as a team leader and team member on multidisciplinary environments
PO9	Communication Efficacy: 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.
PO10	Societal and Environmental Concern: 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
PO11	Individual and Team Work: Develop the ability to act as a member or leader for the fulfillment of diverse teams in multidisciplinary environments.
PO12	Innovation and Entrepreneurship: Develop and design innovative methodologies to create value as a successful entrepreneur and wealth for betterment of individual and society at large.
PEO's	
PEO 1	Excel in professional career and/or higher education by acquiring knowledge in various sub-domains related to the field of computer science and applications
PEO 2	Analyze real life problems, design computing systems appropriate to its solutions that are technically sound, economically feasible and socially acceptable
PEO 3	To develop the abilities to face the changing trends and career opportunities in computer application

PEO 4	Exhibit professionalism, ethical attitude, communication skills, team work in their profession and adapt to current trends by engaging in life long learning
CIFIC OUT	
PSO 1	Design, develop and implement interdisciplinary application software projects to meet the demands of industry requirements using modern tools and technologies.
PSO 2	Analyze the societal needs to provide novel solutions through technological based research
MME OUTCOM	
PO1	Computational Knowledge: Apply knowledge of mathematics, computing fundamentals, data analytics, software engineering concepts and application development knowledge appropriate for the computing specialization
PO2	Problem Analysis: Identify, formulate, design and develop applications to analyze and solve computer science related problems
PO3	Design /Development of Solutions: 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.
PO4	Conduct investigations of complex Computing problems: Use appropriate review literatures, research methodologies, techniques and tools, design, conduct experiments, analyze and make inferences from the resulting data.
PO5	Modern Tool Usage: Create, Select, Integrate and apply efficiently appropriate techniques, resources, and modern computing tools to solve complex problem, with an understanding of the limitations.
PO6	Professional Ethics: Understand and work with a professional context pertaining to ethics with appropriate societal and cyber regulations in a global economic environment
PO7	Life-long Learning: Recognize and develop the passion for a continued career development and progress as a computer professional
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PO11	Individual and Team Work: Develop the ability to act as a member or leader for the fulfillment of diverse teams in multidisciplinary environments.
PO12	Innovation and Entrepreneurship: Develop and design innovative methodologies to create value as a successful entrepreneur and wealth for betterment of individual and society at large.
P 600 B	MCA -lateral
P 800	M.Sc. (Big Data Analytics)
PROGRAM OUTCOMES	

PO1 Statistical computing:
Ability to understand the basic concepts of how to explore the datasets using
statistical analysis techniques in Python and R.
PO2 Mathematical Skills:
Ability to understand and implement various algorithms which require strong
hold on the mathematical skills
PO3 Database management:
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

PO4 Implementation using various software:

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.

PO5 Machine learning:

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.

PO6 Enabling technologies:

Learn about the relationship between data science and natural language and

audio-visual content processing

PO7 Natural language processing:

Understand approaches to syntax, semantics in NLP, to discourse, generation,

dialogue and summarization within NLP and Understand current methods for

statistical approaches to machine translation.

PO8 Value thinking:

Recognize important ethical issues that arise in various business contexts and

professional practice; To Demonstrate an understanding of the ethical, social

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and economic environments in which those occur.

PO9 Advanced Statistical Analysis:

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.

PO10 Societal development:

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.

PO11 Application of Skills:

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.

Programme Specific Outcomes

PSO1 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.

PSO2 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.

PSO3 Apply the concepts of Analytics to the real-world problems by converting

datasets to models in order to make better business decisions.

PSO4 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.

COURSE OUTCOMES:

SEMESTER – I

PH 801.1: STATISTICAL METHODS

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.

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CO 4 To analyze statistical data graphically using frequency distributions.

CO 5 To Construct and interpret Contingency Tables

PH 802.1: PROBABILITY & STOCHASTIC PROCESS

CO 1 To calculate the probabilities and identify the various types.

CO 2 To express the features of discrete random variables and formulate the distribution functions.

CO 3 To express the features of continuous random variables and formulate the distribution 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

PH 803.1: LINEAR ALGEBRA & LINEAR PROGRAMMING

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.

PH 804.1P: COMPUTING FOR DATA SCIENCES LAB

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.

PS 805.1: DATABASE MANAGEMENT SYSTEM

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

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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

PS 806.1: PYTHON PROGRAMMING

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

PS 807.1 P: DBMS & PYTHON PROGRAMMING LAB

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

SEMESTER – II

PH 801.2: MACHINE LEARNING - I

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

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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

PH 802.2: ENABLING TECHNOLOGIES FOR DATA SCIENCE – I

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.

Electives (Choose 1)

PH 803.2 (E1): OPERATIONS RESEARCH

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.

PH 803.2 (E2): CLOUD COMPUTING

CO 1 After successfully completing the course the students will have an understanding of:

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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.

PH 803.2 (E3): NATURAL LANGUAGE PROCESSING

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.

PH 803.2 (E4): UNIX PROGRAMMING

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

PH 803.2(E5): OPERATING SYSTEMS

CO 1 Students are able to understand the basics of operating systems with need and

working.

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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.

PH 803.2 (E6): MULTIVARIATE STATISTICS:

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.

PH 804.2P: MACHINE LEARNING AND DATA SCIENCE LAB - I

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.

PS 805.2: FOUNDATIONS OF DATA SCIENCE

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

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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

PS 806.2: ADVANCED STATISTICAL METHODS

CO 1 To estimate population parameters using point and interval estimates.

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.

PS 807.2: VALUE THINKING

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.

PS 808.2P: PROGRAMMING FOR BIG DATA AND ADVANCED STATISTICAL

METHODS LAB

CO 1 To perform machine learning techniques such as clustering and classification

effectively.

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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.

Research Methodology and Ethics (Non -Credit Course)

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.

[OPEN ELECTIVE – OFFERED TO OTHER DEPTS]

OE 809.2: STATISTICAL DATA ANALYSIS USING R

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 sharpiro-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.

SEMESTER – III

PH 801.3: MACHINE LEARNING - II

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

PH 802.3: ENABLING TECHNOLOGIES FOR DATA SCIENCE - II

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CO 1 Read data from persistent storage and load it into Apache Spark, - manipulate data with Spark

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, Spark SQL 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

PH 803.3 P: MACHINE LEARNING AND DATA SCIENCE LAB - II

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.

PS 804.3: DATA VISUALIZATION WITH TABLEAU & MODELLING IN OPERATIONS

MANAGEMENT

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

PS 805.3 (E1): INTRODUCTION TO ECONOMETRICS & FINANCE

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.

PS 805.3 (E2): TIME SERIES ANALYSIS & FORECASTING

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.

PS 805.3 (E3): BIOINFORMATICS

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

PS 805.3 (E4): BIG DATA TECHNOLOGIES AND ARCHITECTURE

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.

PS 806.3 (E1): INTELLECTUAL PROPERTY RIGHTS IPR

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

PS 806.3 (E2): CYBER SECURITY

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

PS 806.3 (E3): TEXT MINING

CO 1 Ability to analyse structured, unstructured and semi-structured data.

Understand about user experience of information seeking behaviour.

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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.

PS 806.3 (E4): ADVANCED ANALYTICS

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.

PS 807.3 P: DATA VISUALIZATION WITH TABLEAU & OPERATION MANAGEMENT

LAB

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

PS 808.3: LAB ON ELECTIVES 1 & 2

CO 1 Model times series data 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

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OE 809.3: BIG DATA & DESIGN THINKING

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.

SEMESTER – IV:

PH 801.4: INDUSTRY INTERNSHIP / PROJECT WORK / DISSERTATION

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.

PS 802.4: DOMAIN KNOWLEDGE PROJECT

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.

P 810	M.Sc. (Food Science, Nutrition and Dietetics)
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M.Sc. FOOD SCIENCE NUTRITION AND DIETETICS

PROGRAM OUTCOMES

PO 1	Human Nutrition: Apply the knowledge of nutrition and metabolism in understanding the nutritional needs of both healthy and compromised population. The students will learn about the nutrient-nutrient, nutrient-drug interaction and also the fundamentals of each macro and micro nutrient for humans. In addition, they will also learn to apply knowledge of nutrition and metabolism in relation to physical exercises / sports.
PO 2	Nutritional diagnosis: Identify, formulate and review cases of nutritional diseases in order to provide a nutritional diagnosis, reached substantiated conclusions using the principles of nutrition and dietetics and provide nutritional intervention.
PO 3	Design/development of diet plans: Assessed nutritional problems and design diet components or plans that meet the specified needs of an individual / group taking into proper consideration for the existing disease conditions and co-morbidities and also the demographic and economic status of the individual / group. To designed diet interventions in order to improve exercises and sports performance.
PO 4	Conduct investigations of challenging cases: Use research-based knowledge and research methods including advancement in nutrient / diet provision, nutrient profiling, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	Use of advance methods and skills: Derived, choose, and apply modern techniques and resources in diet counseling; application of modern food analytical techniques; modification and derivation of improved tools needed for human nutrition population studies; use of in-vivo and in-vitro methods for nutrient bioavailability studies.
PO 6	Nutrition and the community: Apply reasoning skills by relating public health and nutrition knowledge to assess societal health, food and nutrition security, food safety and cultural issues to understand the responsibilities relevant to the professional nutritional practice.
PO 7	Environment and sustainability: Comprehend the impact of nutrition-based solutions in societal and environmental contexts and promulgate the knowledge to strategize

	food base approaches for sustainable development.
PO 8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the nutritional and dietetic practice.
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 nutritionist or dietitian.
PO 10	Interpersonal Skills: Listening and effective speaking on nutritional problem with the nutrition and health community 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	Research capabilities and Project management: Demonstrate and indulge in a higher understanding of the food science, clinical nutrition and dietetics principles and apply these to one's own research; ability to comprehend research data and convert them to scientific manuscript for wide publication; participate as a member and leader in a team in order to manage multidisciplinary projects.
PO 12	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 Nutrition.

PROGRAM SPECIFIC OUTCOMES

PSO 1	Ability to assessed and diagnose nutritional problems and complication at individual and population level for the purpose of providing effective nutritional interventions; ability to developed skills on food analysis and research.
PSO 2	Ability to use the assessed and diagnostic information to formulate specialized and customized diet plans/ services for patients / clients / community / health / sports centers; ability to use the food analytical data for identifying nutrients, photochemicals and toxins in foods thereby ensuring food and nutrient safety to one and all and also to identify high nutritional food species for propagation, preservation and development of nutraceutical products.
PSO 3	Ability to use all the above-mentioned nutritional skills and knowledge to establish oneself as a nutritionist or a registered dietitian, a health coach / sport

COURSE OUTCOMES

I Semester

PH 811.1 Food Chemistry

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.
PH 812.1 Principles of Food Processing and Preservation	
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.
PH 813.1 Human Nutrition	
CO 1	The role of macronutrients in growth and development
CO 2	To evaluate the methodology and derivation of requirements for specific macronutrients.
CO 3	The metabolic functions of macronutrient and their role in health and disease
CO 4	The implications of deficiency and toxicity of macronutrients
PS 816.1 Human Physiology	
CO 1	Postgraduates should be able to understand the molecular biology of the cell.
CO 2	Students should be able to understand and recognize the role, physiology and anatomy of all the systems in the body.
CO 3	Students should be able to understand and acquaint with the diseases related to the malfunctioning of the organ systems.
PS 817.1 Essentials of Micronutrients	
CO 1	To understand the intricacies of each micronutrient in growth and development of humans
CO 2	To understand the basis of human nutritional requirement and recommendations through the life cycle
CO 3	To analyze the nutrient – nutrient and nutrients – drug interaction. Students will be familiar with factors affecting for the absorption of nutrients
CO 4	To understand the implications of deficiency and toxicity of micronutrients and to assess their status in the body

II Semester	
PH 811.2 Clinical and Therapeutic Nutrition	
CO 1	Students will be able to intervene the metabolic anomalies of acute and chronic diseases
CO 2	They are able to demonstrate counselling techniques to facilitate behavior change
CO 3	They will get knowledge to plan menu for various diseases based on their nutritional status and dietary needs
CO 4	The students will know the importance of a dietician in hospitals.
CO 5	The students will be able to know the feeding therapy's to be flowed in hospitalized/ critically ill patients
PH 812.2 Dietetics	
CO 1	Students will have the knowledge of pathophysiology and causes, symptoms, risk factors and dietary management of different disease conditions and disorders
CO 2	Students will have a thorough understanding the responsible of a dietician with respect to different Disease
CO 3	The students will be able know nutrition support systems during emergency.
CO 4	Students able to understand principles of diet therapy, modification of normal diet for therapeutic purposes
CO 5	Students will be able to interpret and apply nutrition concepts to evaluate and improve the nutritional health of individuals with medical conditions
PS 815.2 Research Methodology and Ethics	
CO 1	To understand the intricacies of each micronutrient in growth and development of humans
CO 2	To understand the basis of human nutritional requirement and recommendations through the life cycle
CO 3	To analyze the nutrient – nutrient and nutrients – drug interaction. Students will be familiar with factors affecting for the absorption of nutrients
CO 4	To understand the implications of deficiency and toxicity of micronutrients and to assess their status in the body
CO 5	Demonstrate knowledge of research processes (reading, evaluating, and developing)
CO 6	Perform literature reviews using print and online databases
PS 816.2 Nutrition through Life Cycle	
CO 1	Determine nutrient requirements/needs of individuals at different stages of life

CO 2	Discuss the major nutrition related concerns at each stage of life.
CO 3	Understand the nutritional needs during pregnancy and lactation, physiological changes and hormones involved during pregnancy and lactation
CO 4	Understand the effects of ageing and life expectancy
CBCS – ELECTIVE PAPER	
PO 818.2 Basic Nutrition	
CO 1	Understand the functions and sources of nutrients, role of nutrients in maintenance of good health
CO 2	Understand the role of macro and micro nutrients in the growth and development
CO 3	Obtain the knowledge on role and importance of nutrition in weight management
CO 4	Gain knowledge about food pyramid, food guide, menu planning and balanced diet
III Semester	
PH 811.3 Food Microbiology	
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.
PH 812.3 Nutraceuticals and Functional Foods in Human Health	
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.
CBCS – ELECTIVE PAPER	
PO 815.3 Health and Fitness	
CO 1	To know the role and importance of nutrition management in exercise and sport performance
CO 2	To emphasize the importance of proper fueling for physical activity, pre- and post-workout
CO 3	To understand the concepts of diet and physical fitness
IV Semester	

PH 811.4 Nutritional Biochemistry	
CO 1	To describe the concepts and chemistry of major nutrients
CO 2	To explain the macronutrient metabolism and its bioenergetics
CO 3	To describe protein synthesis and nucleic acid metabolism
CO 4	To gain basic knowledge on the synthesis and role of hormones
CO 5	To understand the biological processes and systems as applicable to human nutrition.
PH 812.4 Community Nutrition	
CO 1	The students will be able to assess the health status of the community
CO 2	Students Will know the various organizations related with food and nutrition with its functions
CO 3	They are able to provide nutrition counselling and education to individuals, groups, and communities throughout the lifespan using a variety of communication strategies
PH 813.4 Sports Nutrition	
CO 1	Understand the characteristics, physiology and body composition
CO 2	Obtain knowledge on role and importance of nutrition management in exercise and sport performance
CO 3	Be familiar with the macro and micronutrient needs of athletes
CO 4	Understand the role of nutrition in recovery from injury
PS 815.4 Food Safety and Quality Control	
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 5	Comprehend the need of hygiene and sanitation for ensuring food safety
P 900	M.Sc. Data Science
G 100 A	Economics; History

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.

BASIC ECONOMICS - I

CO 1: Identify the facets of an economic problem.

CO 2: Learn basic economic concepts and terms.

CO 3: Explain the operation of a market system.

CO 4: Analyze the production and cost relationship of a business firm.

CO 5: Evaluate the market decisions under different structure.

CO 6: Use basic cost benefit calculations as a means of decision making.

CONTEMPORARY INDIAN ECONOMY

CO 1: Students will be informative about the nature of Indian Economy.

CO 2: Students will be able to understand the current problems of Indian economy.

CO 3: Students will be able evaluate the impact of LPG policies on economic growth in India.

CO 4: Students will be able to review various the sector specific policies adopted for achieving the aspirational goals.

DEVELOPMENT STUDIES

CO 1: Students will develop a critical understanding of the contemporary issues in Indian economic development.

CO 2: Students will thus be better prepared to face the professional world and can use this knowledge base in a variety of jobs, including in the corporate.

BASIC ECONOMICS

CO 1: Explain how consumers make rational choices using the concept of utility

CO 2: To understand the concept of consumer surplus.

CO 3: Analyse the factors that affect market demand and market supply and illustrate their interaction for achieving equilibrium in price and quantity.

CO 4: Analyse how producer applies the marginal decision rule to maximize the profit in producing goods or services.

PRE-REFORMS INDIAN ECONOMY

CO 1: Trace the evolution of Indian economy.

CO 2: Students will be able to understand structural features of Pre reform Indian economy

CO 3: Students will be able evaluate the planning model and policies on economic growth in India.

CO 4: Students will be able to analyse various sector specific policies adopted for achieving the aspirational goals.

BUSINESS ECONOMICS

CO 1: Acquired the concepts, tools and techniques of economics in analyzing and interpreting the business decisions.

CO 2: Developed the insight of the functioning of the economy

BASIC ECONOMICS - II

CO 1: Understand about the operation of the overall economic system.

CO 2: Calculate national income and related aggregates.

CO 3: Explain the relationship between macroeconomic aggregates

CO 4: Analyse the nature of business cycles and policies to control them.

CO 5: Evaluate the macroeconomic policies for solving major problems like poverty and unemployment.

KARNATAKA ECONOMY

CO 1: Understand the nature, growth and problems of economy of Karnataka.

CO 2: Explain the process of growth of Karnataka Economy.

CO 3: Evaluate the policies and programmes undertaken by the Govt. of Karnataka for bringing about socio economic development.

ECONOMICS OF BUSINESS ENVIRONMENT

CO 1: Explain the elements of Business environment.

CO 2: Identify the environmental constraints in the growth of a business firm.

CO 3: Analyze the ways to utilise the current environmental conditions to achieve higher business growth.

MANAGERIAL ECONOMICS

CO 1:To know the basic knowledge of managerial economics.

CO 2:To understand the dynamics of business.

CO 3:To know about the managerial concept of business

CO 4:Helps the consumers and producers to take apt decisions

CONTEMPORARY INDIAN ECONOMY

CO 1: Students will be informative about the nature of Indian Economy.

CO 2: Students will be able to understand the current problems of Indian economy.

CO 3: Students will be able evaluate the impact of LPG policies on economic growth in India.

CO4: Students will be able to review various the sector specific policies adopted for achieving the aspirational goals.

MONETARY ECONOMICS

CO 1: Understand the current monetary policy and problems

CO 2: Identify and analyse monetary instruments

CO 3: Review the various trends and functions of monetary and financial institutions

SUSTAINABLE DEVELOPMENT

CO 1: Understand the interconnection within the ecosystem of all living beings.

CO 2:Identify the importance of sustainability.

CO 3:Identify factors to find solutions to environment problems that are relevant to protect the welfare of the people.

CO4:Analyse the sustainable goals at the national and international levels.

MICRO ECONOMCS

CO 1:Identify the facets of an economic problem.

CO 2:Learn basic economic concepts and terms.

CO 3:Explain the operation of a market system.

CO 4:Analyze the production and cost relationship of a business firm.

CO 5:Evaluate the market decisions under different structure.

CO 6:Use basic cost benefit calculations a s a means of decision making.

STATISTICS FOR ECONOMICS

CO 1:Calculate basic descriptive and inferential statistics.

CO 2:Interpret descriptive and inferential statistics.

CO 3:Explain the process of hypothesis testing.

ECONOMICS OF INSURANCE

CO 1: Understand various types of Insurance

CO 2: Understand various risks and Benefits of Insurance

MONEY AND PUBLIC FINANCE

CO 1: 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 2: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 3:Explain the varying effects of public expenditure on the economy and role of public expenditure in a developing economy

CO 4: 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.

MACRO ECONOMICS

CO 1: On successful completion of the course the student is expected to get

CO2: a thorough understanding of the various theories behind pricing of products and factors in different market environment.

CO 3: Ability to identify and evaluate the main models of market structures and to appreciate the theories behind policy prescriptions.

CO 4: 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.

MATHEMATICS FOR ECONOMICS

CO 1: Perform basic operations in Vectors and Matrix algebra.

CO 2: Calculate limits, derivatives and integrals of functions of multiple variables.

CO 3 : Calculate Optima for constrained and unconstrained optimization problems encountered in Economics.

ENTREPRENEURIAL ECONOMICS

CO 1: Understand various concepts of entrepreneurship

CO 2: Absorb Skills of entrepreneurship

CO 3: Understand various sources of financing project

INTERNATIONAL ECONOMICS

CO 1: Able to identify and analyse different theoretical models of international economics in light of real world situations.

CO 2: Understand major issues in international finance

CO 3: Able to deal with the problems of international finance analytically

CO 4: 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.

History

Programme Outcome

History/Pol. Sci. /Economics/English Major/Kannada Major/ Communicative English

The subject History is taught along with Political Science, Economics, English Major, Kannada Major, Communicative English under the three major combination in the Department of History.

Following completion of this Programme/course-

The student who is studying History along with these subjects would be able to recognize the past and present society holistically, because study of History is essential to understand the other subjects taught.

It would make a student of history competent and knowledgeable, an ingredient essential to be a successful person in one's life goal.

The student who studies would be able to imbibe considerable knowledge of the other subjects which are taught along, with ease, since studying history is complementary to other subjects and vice versa.

The students would recognize the economic life/conditions, political life/conditions and social life/conditions which are included in all the History programmes/courses.

Programme Specific Outcome.

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 balanced curriculum in the under graduate level keeping with the emphasis of world, regional, national and local histories.

The student who studies this programme/papers will acquire a fair knowledge of these subjects.

On the completion of the course a student with this knowledge which is essential for getting into any service/employment be it government or private, will be able to pass the competitive exams, since eligibility tests to enter such service requires the student to know these subjects.

Apart from this competence, a student who as an individual and a citizen would acquire a fair amount of knowledge of History of different spheres national, regional and so on.

The students would also recognize various countries, extent of various kingdoms and empires and places through the map study

The study tours will enable the students to recognize the heritage centers/symbols and history as case studies.

The Department prepares such knowledgeable students/citizens and offers them to the nation.

Semester 1

G101 DC1.1

DISCIPLINE CORE (DSC)-1

Course Title: Political history of Karnataka (BCE-3 to 10 CE) Part-1

Course Outcomes (COs):

At the end of the course the student would be able to:

Understand the continuity of political developments and strategies.

Analyse the importance of causes for the rise of regional political dynasties.

Understand contextual necessities which influenced the era of political supremacy.

Understand and describe the contemporary political history. Appreciate the confluence of diverse political elements.

G101 DC2.1

DISCIPLINE CORE (DSC)-2

Course Title: CULTURAL HERITAGE OF INDIA

Course Outcomes (COs):

At the end of the course the student would be able to:

Provide an insight about an extensive survey of heritage of India

Familiarize Indian history and culture

Have an expertise to analyse further development of culture of India

Analyse the factor responsible for origin and decline of culture

Provide the opportunity to understand the process of cultural development

G101 OE1.1

OPEN ELECTIVE (OE)-1

COURSE TITLE: CULTURAL HISTORY OF KARNATAKA (CE 3- CE 10) PART -1

Course Outcomes (COs):

At the end of the course the student would be able to:

Provide an insight about the cultural development of Karnataka.

Familiarize Karnataka history and culture.

Have an expertise to analyze further development of culture of Karnataka.

Analyze the factors responsible for origin and decline of dynasties.

Provide the opportunity to understand the process of cultural diversities.

G101 DC1.2 DISCIPLINE CORE (DSC)-3

COURSE TITLE: POLITICAL HISTORY OF KARNATAKA (CE11- 1750 CE) PART-2

Course Outcomes (COs):

At the end of the course the student would be able to:

Understand the rise and fall of Political dynasties in Karnataka.

Familiarize with the patterns of administration.

Analyze the traditional values and ethos of political development.

Understand the rise and fall of regional variations.

Study the complexities involved in polity of the time.

G101 DC2.2

DISCIPLINE CORE (DSC)-4

COURSE TITLE: CULTURAL HERITAGE OF KARNATAKA

Course Outcomes (COs):

At the end of the course the student would be able to:

Understand the concept of cultural heritage of Karnataka Study various cultural factors which influence the flow of

Familiarize the factors which influenced in influencing culture and society

Analyze the factors responsible for formation of pluralistic society

Understand the concept "Unity in diversity".

Semester 2

G101 OE1.2 OPEN ELECTIVE (OE)-2

COURSE TITLE: CULTURAL HISTORY OF KARNATAKA (11 CE TO 1750 CE) PART - 2

Course Outcomes (COs):

At the end of the course the student would be able to:

Understand the concept of cultural heritage of Karnataka

Study various cultural factors which influence the flow of culture

Familiarize the factors which influenced in influencing culture and society

Analyze the factors responsible for formation of pluralistic society

Understand the concept "Unity in diversity".

BA

Semester 3

DSC-5

Course Title: Political History of India (From Indus Culture to 1206 AD)- Part 1

Course Outcomes (Cos):

At the end of the course the students should be able to:

Understand the history and culture of Political History of India region.

Analyse the importance of causes for backwardness of this region.

Understand the influence of political influence on the people and culture of this region.

Understand the political, Social, Religious and Cultural history of the region.

Appreciate the divergent cultural and communal harmony of this region.

Semester 3

DSC-6

Course Title: Regional History - History of Coastal Karnataka and Coorg (From the beginning to 1799 A.D.)

Course Outcomes (Cos):

At the end of the course the students should be able to:

Understand the history and culture of Tulunadu.

Analyse the importance of causes for backwardness of this region.

Understand the influence of political influence on the people and culture of this region.

Understand the political, Social, Religious and Cultural history of the region.

Appreciate the divergent cultural and communal harmony of this region.

BA

OE-3 III Semester

Title of the Course: Freedom Movement in Karnataka (1800-1947)

Course Outcomes (Cos):

At the end of the course the students should be able to:

Understand the Freedom Movement in Karnataka (1800-1947)

importance of causes for backwardness of this region. Understand the influence of Freedom Movement in Karnataka

Understand the political, Social, Religious and Cultural history of the region.

Appreciate the divergent cultural and communal harmony of this region.

Semester 4

DSC-7

Title of the Course: Political History of India (History of Medieval India AD 1206 -1761) Part-2

Course Outcomes (Cos):

At the end of the course the students should be able to:

Understand the Political History Medieval India (from 1206 to 1761). Analyse the importance of causes for backwardness of t

Understand the influence of Political History Medieval India (from 1206 to 1761).

Understand the political, Social, Religious and Cultural history of the region.

Appreciate the divergent cultural and communal harmony of this region.

BA

Semester 4

DSC-8

Course Title: Cultural History of India (From Saraswati - Indus Culture to 1206 CE).

Course Outcomes (Cos):

At the end of the course the students should be able to:

of Cultural History of India (From Saraswati - Indus Culture to 1206 CE). Analyse the importance of causes for back

Understand the influence of History of Cultural History of India (From Saraswati - Indus Culture to 1206 CE).

Understand the political, Social, Religious and Cultural history of the region.

Appreciate the divergent cultural and communal harmony of this region.

BA

Semester 4- Open Elective

Course Title: Freedom Movement in India (1885-1947)

Course Outcomes (Cos):

At the end of the course the students should be able to:

Understand the History of Freedom Movement in India (1885-1947). Analyse the importance of causes for backwardness of India.

Understand the influence of History of Freedom Movement in India (1885-1947).

Understand the political, Social, Religious and Cultural history of the region.

Appreciate the divergent cultural and communal harmony of this region.

BA

Semester 5

5.1 DSC-9, History of Western Civilization-(6BC-1200AD)

Course Outcome:

At the end of the course the students should be able to:

Have an overview of Western Civilization to the students through which they could understand the development of Civilization in other parts of the World as well as how the western societies have evolved.

They would have the knowledge on World Civilization and antiquities of Modern World order.

They would have insights on general knowledge of all civilizations for the understanding of mankind

BA

Semester 5

5.2 DSC-10, Colonialism and Nationalism in Asia (1900-1970)

Course Outcome:

At the end of the course the students should be able to:

Have an overview of Colonialism and Nationalism in Asia to the students through which they could understand the imperialism of the Western countries on Asia

Have the knowledge on how nationalism sprang up to meet the colonial challenges and western exploitation.

Have insights on general knowledge of Asian societies and how they fought for their rights and self determination

BA

Semester 5

5.3 DSE-1, History of Tourism in India

Course Outcome:

At the end of the course the students should be able to:

country and how history of the country is an essential ingredient in it. The rich heritage of Indian culture and the inter connections from the point of view of competitive exams. They would be also be ready to face inter

BA

Semester 5

5.6. VOC- Principles of Field Study

Course Outcome:

At the end of the course the students should be able to:

Have the knowledge of research to students and how to go about it.

They would understand the various thesis prepared by scholars about various subjects so that they understand the intricacies and complexities of societies in general.

G 100 B	Economics ; Political science
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Political science						
POs, PSOs and COs for all the 4 semesters to be given in word document						
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
PROGRAMME SPECIFIC OUTCOMES	
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
Course Title: BASIC CONCEPTS IN POLITICAL SCIENCE	
Course Code: G 103 DC1.1	
1. Have an understanding of the fundamental concepts and aspects related to Political Science.	
2. Have an appreciation and internalization of the values of responsible and active citizenry.	
3. Be prepared for constructive engagement with the political system with an awareness of the core values and principles of sound political order.	

4. Have a nuanced understanding of the dimensions of politics - society linkages, and the priorities and concerns essential in complex political choices.

Course Title: POLITICAL THEORY

Course Code: G 103 DC2.1

CO 1. Have a nuanced understanding of the aspects and constructs of Political Theory.

CO2. Develop a conceptual framework and a capacity to grasp political ideas and issues from a normative perspective.

CO3. Comprehend the logic, ideological foundations and implications of the political ideas and issues backed by theoretical insights and apply the insights in practice.

CO4. Have an ability to formulate and construct logical arguments with an awareness of the ontological premises of the argument.

G 103

OE1.1

Human Rights

CO1 Understand and appreciate the value and basis of human rights.

CO2. Have necessary knowledge of the legal provisions and requirements for effective implementation of human rights as well as mechanisms available for implementation of human rights.

CO3. Be able to identify, contextualise and use knowledge about human rights in a given situation.

CO4. Have the knowledge and skill to analyse the trends and challenges to human rights, and to apply human rights standards to societal issues with a solution to overcome the problem.

Course Title: WESTERN POLITICAL THOUGHT

Course Code: G 103 DC1.2

CO1. Have an understanding of the distinct features and diverse intellectual traditions of the west.

CO2. Identify the main currents in western political thought and their impact on the shaping of western political values

CO3. Grasp the society-state-politics interface and institutional arrangements in western political tradition and its implications.

CO4. Develop a critical perspective on the western political thought on governance and political order.

Course Title: INDIAN NATIONAL MOVEMENT AND CONSTITUTIONAL DEVELOPMENT

Course Code: G 103 DC2.2

CO1. Be able to reflect on the nature of Indian nationalism and the Constitution with historical perspectives and insights						
CO2. Understand and appreciate the values and design of the Indian Constitution resulting from the diverse intellectual traditions, ideas, and concerns of freedom fighters						
CO3. Have a nuanced understanding of the stages and settings in which Constitutional measures and reforms were initiated, contested and modified culminating in the making of the Indian Constitution						
CO4. Have a lucid understanding of the intentions and visions of Constitution makers in the design and inclusion of distinct aspects in the Indian Constitution						
Course Title: INDIAN POLITY: ISSUES AND CONCERNS						
Course Code: G 103 OE1.2						
CO1. Have perceptive thinking on the interconnectedness between politics and society, and its larger implications.						
CO2. Grasp the dynamics and forces that influence the polity.						
CO3. Be able to identify and critically reflect on the nature and trends in Indian politics.						
CO4. Have a concerned and critical understanding of the major issues of Indian polity with insights for solutions.						
Course Title: LEGAL LITERACY IN INDIA						
Course Code: G 103 OE1.2.1						
CO1. 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.						
CO2. Demonstrate the knowledge on criminal justice system, civil procedure code, various family laws, laws relating to contract and property in India.						
CO3. 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						
IDEOLOGY AND POLITICS IN INDIA						
G 103.3						
CO1. Recall the constitutional articles related to fundamental rights, directive principles and federal structure of the Indian state.						
CO2. Distinguish between constitutional philosophy and party ideologies in realising the constitutional goals.						
CO3. Compare and contrast the Indian political system with that of other countries.						

CO4. Apply India's constitutional principles and philosophy to the working of the government through electoral and political processes						
CO5. Appraise and develop solutions to the challenges to the constitution's foundational principles.						
CO6. Analyse the merits and demerits of security and other recent acts within the context of India's constitution.						
III SEMESTER - G103.3E						
CONFLICT, PEACE AND RECONCILIATION						
CO1. Identify and interpret the relationship between social conditions and conflicts						
Co2. Evaluate the roots of conflict and apply strategies of reconciliation						
CO3. Design strategies for developing the social, political, economic, and ecological conditions for peacebuilding						
IV Semester						
POLITICAL INSTITUTIONS AND PROCESSES IN COMPARATIVE PERSPECTIVE						
G 103.4						
CO1. Compare and contrast major democratic political systems						
CO2. Discuss and apply various approaches to the study of political systems						
CO3. Examine the foundational principles enshrined in the constitution						
CO4. Identify types of political parties and analyze their ideologies						
CO5. 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						
CO6. Review major formal political institutions as well as some informal institutions.						
IV SEMESTER - G103.4E						
ECOLOGY, SUSTAINABILITY AND DEVELOPMENT						
CO1. Describe and draw the meaning and significance of ecological sustainability and the interrelationship between resource use, politics and environment						
CO2. 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						
CO3. Develop skills to assess Environmental Impact, Environment friendly technologies and education in sustainability and Promote to think Globally and Act Locally						
III BA Political Science-V Semester I Paper (Core)						

INTERNATIONAL RELATIONS						
103.5a						
CO1. Indicate the extent and importance of the study of International Relations						
CO2. Apply mathematical models to the study of International Relations						
CO3. Discuss the limitations of national power						
CO4. Locate and explain the realm of diplomacy						
CO5. Discuss the dynamics of Cold War politics and promote the understanding on the need for disarmament						
CO6. Assess the Emerging Centres of power in the World today						
III BA- Political Science V Semester -II Paper (Core)						
PUBLIC ADMINISTRATION						
G 103.5b						
CO1. Distinguish between the public administration and private administration.						
CO2. Organise the journey of discourse in public administration for ex: how the old public administration view was contested by the idea of new public administration						
CO3. Explain the attributes of Development Administration						
CO4. Analyse Personnel Administration and demonstrate the need for capacity building and training.						
CO5. Define and describe Financial Administration and Gendering of Budget						
III BA- Political Science-Semester V – paper III (Optional)						
POLITICAL SOCIOLOGY						
G 103.5c						
CO1. Explain and draw the emerging perspectives on Political Sociology and Political Socialization						
CO2. Describe Political Participation, Political Culture, and Political Apathy						
CO3. Organise the trends in Modernity & Post Modernity						
CO4. Describe the trends in Nationalism, Secularism, Communalism, Regionalism and Women Movements						
CO5. Discuss and arrange the components of Civil Society Organization and indicate the need for Right to information						
III BA Political Science-VI Semester Paper-I (Core)						
INTERNATIONAL POLITICS						

G 103.6a						
CO1. Describe the recent developments in the International Bodies.						
CO2. Identify the activities of the International Bodies						
CO3. Identify the complexities of changing International Politics						
CO4. Describe the need for reform of the Security Council						
CO5. Demonstrate the conceptions of Soft Power and India's Foreign Policy						
CO6. Indicate the contours Foreign Policy of the US and to review the policy of Convergence in South Asia						
III BA- Political Science VI Semester II Paper (Core)						
FUNDAMENTALS OF MANAGEMENT						
103.6b						
CO1. Discuss and draw the functions and principles of management						
CO2. Demonstrate the skills of Developing Excellent Managers						
CO3. Corelate the various schools of Management Thought						
CO4. Review the limitations of Planning and Techniques of Control						
CO5. Develop leadership skills and to assess employee motivation and comprehend corporate strategy						
CO6. Describe the need for valuing diversity, its dimensions and attitudes						
III BA- Political Science-VI Semester -Paper III (Optional)						
LEADERSHIP						
G 103.6						
CO1. Describe the need for Traditional, Legal-rational, Charismatic, Authoritarian and Democratic Leadership						
CO2. Define and explain Political, Civic, literary, and Cultural Leadership						
CO3. Explain the importance of spiritual leadership						
CO4. Describe different mores of leadership						
CO5. Define and describe corporate leadership and labour leadership						

G 100 C	Economics; English Major
English Major	

G 100 D	Economics; Sociology
Sociology	

PROGRAMME OUTCOMES: BA SOCIOLOGY (As a part of the Triple Major System)

B.A.(Economics, Political Science, Sociology): G 100 B

B.A.(Political Science, Sociology, Kannada Major): G 100 D

B.A.(Sociology, Psychology, Communicative English): G 100 I

B.A.(Social Work, Psychology, Sociology): G 100 O

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.

PO 4: 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.

PO 5: 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.

PO 6: The programme provides a holistic base for every student to become a responsible citizen.

PROGRAMME SPECIFIC OUTCOMES: BA SOCIOLOGY

PSO1: Demonstrate knowledge of fundamental theoretical approaches and core disciplinary concepts.

PSO2: Understand sociological phenomena, social structures, social institutions, cultural practices, and multiple axes of difference and/or inequality.

PSO3: Understand the Indian society, both the rural and urban communities, and the institutions therein with their complex functioning.

PSO4: Possess knowledge of the history and evolution of the industrial society and its functioning in current times.

PSO5: 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.

PSO6: Possess knowledge and analyse various social problems engulfing India and suggest remedies for the same.

PSO7: Demonstrate the ability to use several of the major classical or contemporary perspectives in social theory and apply the same in contemporary society.

PSO8: Understand the current social welfare programmes in India and their importance for the growth and progress of India keeping the vulnerable groups in mind.

THIRD SEMESTER

Indian Society: Rural and Urban

CO1: Understand the Indian village system

CO2: Identify the features of an Indian village

CO3: Classify the Indian villages

CO4: Analyse the problems of Indian villages

CO5: Explain the Panchayati Raj system

CO6: Understand the joint family system and identify its characteristics

CO7: Classify the joint family

CO8: Understand the caste system

CO9: Critically examine mobility in caste system

CO10: Critically analyse the relevance and the recent changes in the institutions of joint family and caste system

CO11: Understand the tribal community

CO12: Explain the distribution of tribals across India

CO13: Examine the problems faced by the tribal community in India

CO14: Understand the urban community

CO15: Differentiate between the concepts of urbanism and urbanization

CO16: Explain the urban administration system

CO17: Identify the urban infrastructure and its problems

CO18: Critically examine the urban problems and its causes

CO19: Propose solutions to the urban problems

FOURTH SEMESTER

Industrial Sociology

CO1: Understand a specialized area of Sociology – Industrial Sociology

CO2: Explain the evolution of industry

CO3: Identify the various types of productive system

CO4: Explain the actors of industrial relations

CO5: Analyse collective bargaining

CO6: Describe participative management

CO7: Analyse corporate social responsibility

CO8: Understand industrial disputes

CO9: Identify the types of industrial disputes

CO10: Explain the Industrial Disputes Act 1947

CO11: Examine various processes of settling disputes

CO12: Analyse the labour welfare measures

CO13: Explain the trade union movement and its origin and development

CO14: Identify the objectives and functions of trade unions

CO15: Describe the types of trade unions

CO16: Critically examine the weakness of trade union

CO17: Analyse and suggest remedies to the problems of trade unions

FIFTH SEMESTER

Social Problems in India

CO1: Understand the concept of social problems

CO2: Examine the causes of social problems

CO3: Apply theoretical approaches to understand social problems

CO4: Explain family disorganization

CO5: Analyse the causes and effects of family disorganization

CO6: Propose solutions to family disorganization

CO7: Understand crime and juvenile delinquency and their causes

CO8: Explain the various theories of punishment

CO9: Examine the preventive, reformatory and rehabilitation measures

CO10: Explain alcoholism and drug addiction

CO11: Describe the causes and effects of alcoholism and drug addiction

CO12: Explain the remedial measures for alcoholism and drug addiction

CO13: Understand communalism and communal violence

CO14: Analyse communalism in the Indian context

CO15: Describe the National Integration Movement

CO16: Examine the various theories of communalism

CO17: Critically analyse the role of government and media in communalism

CO18: Describe the problems of the aged

CO19: Critically examine the changing role of the aged in the family

CO20: Analyse the care and welfare of the aged

Research Methodology

CO1: Understand social research

CO2: Examine the problems in social research

CO3: Describe the steps in social research

CO4: Apply research designs

CO5: Differentiate between types of sources of data

CO6: Describe sampling

CO7: Apply various techniques of sampling

CO8: Describe observation as a method of data collection

CO9: Describe questionnaire as a method of data collection

CO10: Create a questionnaire

CO11: Describe interview as a method of data collection

CO12: Analyse the process of interview

CO13: Create an interview schedule

CO14: Describe the planning and organization of a report

CO15: Create a complete primary research report

SIXTH SEMESTER

Sociological Thought and Modern Theories

CO1: Understand Sociological thought

CO2: Differentiate between social thought and sociological thought

CO3: Analyse the transition from Social philosophy to Sociology

CO4: Describe the contributions of early sociological thinkers like Comte, Spencer, Durkheim, Weber and Marx.

CO5: Critically examine theories of the early Sociological thinkers

CO6: Apply the early theories in the present times

CO7: Explain the growth of modern sociological theories

CO8: Analyse the theories of modern thinkers like Parsons, Merton, Coser, Mead and Blumer

CO9: Critically examine the modern theories in Sociology and analyse their significance and interdisciplinary application

Social Policy and Welfare in India

CO1: Understand the concept of social policy and social welfare

CO2: Examine the agencies of social welfare, both government and non-government agencies

CO3: Describe civil society

CO4: Describe the National Policy for Children

CO5: Examine the various programmes for welfare of children

CO6: Understand children in conflict with law

CO7: Analyse child labour and the problem of the girl child

CO8: Describe the National Youth Policy

CO9: Describe youth programmes

CO10: Analyse the importance of youth and sports

CO11: Understand the problems of women

CO12: Examine the various government policies and programmes for women

CO13: Analyse violence against women

CO14: Describe the Domestic Violence Act 2005

CO15: Describe the National Health Policy

CO16: Understand health education

CO17: Describe the special nutrition programme and the Population Policy

CO18: Explain the family welfare programme

CO19: Critically examine the role of media in family welfare

CO20: Understand the marginalized groups

CO21: Explain the backward classes

CO22: Examine the welfare of SCs, STs and OBCs

CO23: Critically analyse the reservation policy

THIRD SEMESTER

Indian Society

CO1: Understand the Indian Society and its composition

CO2: Critically examine India as a pluralistic society

CO3: Describe the social institution of marriage among Hindus, Muslims and Christians in India

CO4: Understand kinship

CO5: Describe the institution of family and its functions in India

CO6: Analyse the recent changes in the institution of family

CO7: Critically examine the changes in Indian society

CO8: Analyse casteism, regionalism and secularism in modern India

SEMESTER IV

Sociology of Health

CO1: Understand the origin and development of Sociology of health.

PROGRAMME SPECIFIC OUTCOMES: BA SOCIOLOGY

PSO1: Demonstrate knowledge of fundamental theoretical approaches and core disciplinary concepts.

PSO2: Understand sociological phenomena, social structures, social institutions, cultural practices, and multiple axes of difference and/or inequality.

PSO3: Understand the Indian society, both the rural and urban communities, and the institutions therein with their complex functioning.

PSO4: Possess knowledge of the history and evolution of the industrial society and its functioning in current times.

PSO5: 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.

PSO6: Possess knowledge and analyse various social problems engulfing India and suggest remedies for the same.

PSO7: Demonstrate the ability to use several of the major classical or contemporary perspectives in social theory and apply the same in contemporary society.

PSO8: Understand the current social welfare programmes in India and their importance for the growth and progress of India keeping the vulnerable groups in mind.

BA Semester 1

TITLE: Understanding Sociology
COURSE OUTCOMES
CO1: Understand the discipline of Sociology
CO2: Trace the origin of Sociology
CO3: Analyse the relevance of Sociology in contemporary times
CO4: Describe the fundamental theoretical approaches
CO5: Apply the theories to conceptualize a sociological problem
CO6: Understand the specialized branches of Sociology and various career opportunities
CO7: Analyse the importance of the specialized branches of Sociology in the global context
CO8: Understand the sociological thinking of the founders of Sociology.
CO9: Understand the concept of culture
CO10: Explain the process of socialization
CO11: Apply socialization in the daily social lives
CO12: Comprehend the uniqueness of sociological imagination in the study of society
CO13: Impart critical thinking to interpret the social scenario.
BA Semester 1
TITLE: Changing Social Institutions of India
COURSE OUTCOMES
CO1. Understand the nature of inequalities in the society
CO2. Learn the dynamics of social groupings and discrimination
CO3. Understand the ideologies behind social stratification and mobility.

CO4. The modes of social improvement people use

CO5. Assess the reservation policy and its implications.

CO6. Learn the nature of social mobility

CO7. Identify the new forms taken by institutions of family and marriage

CO8. Examine the relationship between religion and science

BA Semester 2

TITLE: Foundations of Sociological Theory

COURSE OUTCOMES:

CO1. Understand the emergence of Sociology.

CO2. Know the foundations of Sociology.

CO3. Understand the contributions of early sociologists.

CO4. Impart critical thinking

CO5. Inculcate analytical ability to interpret the social scenario.

CO6. Understand the forces in the rise of sociological theory.

CO7. Understand the concepts of early sociologists

BA Semester 2

TITLE: Sociology of Rural Life in India

COURSE OUTCOME:

CO1. Analyze rural problems in India

CO2. Knowledge of rural governance.

CO3. Skills to reconstruct rural institutions and rural development.

CO4. Sociological understanding of society in India

CO5. Basic concepts in rural studies

CO6. Development programmes to plan, monitor and evaluate.

CO7. Understanding of the linkages between urban and rural reality

B.A. Semester I - Open Elective**TITLE: Indian Society: Continuity and Change****Course Outcomes:**

CO1. Understand social issues and problems of contemporary India.

CO2. Change agents - governmental and non-governmental organizations.

CO3. Structural linkages and interrelationships of social issues.

CO4. Emerging social issues and problems of contemporary India

CO5. Sociological understanding of issues and problems

CO6. Empower to deal with issues and problems

CO7. Better understanding of their own situation and region.

B.A. Semester II - Open Elective

TITLE: Society through Gender Lens

Course Outcomes:

CO1. Understand gender determination and gender roles.

CO2. Analyse gendered nature of major social institutions

CO3. Understand the challenges to gender inequality

CO4. Theories of gender relation in Indian society.

CO5. Gender as a category of social analysis.

CO6. Basic concepts of gender and gender inequality

CO7. Gendered nature of major social institutions

CO8. Social construction of gender and gender roles

CO9. Identify gender bias and discrimination in everyday social interaction

G 100 E	Economics;
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	Journalism
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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:

PH :INTRODUCTION TO COMMUNICATION AND REPORTING

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.

1

PH : G 105.2 PRINT AND ONLINE JOURNALISM

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

PH : G105.2E BLOGGING AS MEDIA PRACTICE (OPEN ELECTIVE)

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.

PH : 105.3 Broadcast Journalism

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

PH 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

2

television

-

PH : 105.3 E FOLK MEDIA COMMUNICATION (OPEN ELECTIVE)

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

PH : G105.4 EDITING PRACTICE

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

PH:G105.4E MEDIA AND GENDER ISSUES (OPEN ELECTIVE)

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

PH : G 105.5(a) FILM STUDIES

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.

PH G 105.5(b)- ADVERTISING AND PUBLIC RELATIONS

CO 1: Understand basic laws related to media

3

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

G 105.6(b)Paper VIII Media Management

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.

G 100 F	Journalism; English Major
Done previously	
G 100 G	Journalism; Social Work
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.	

CHILD WELFARE (OPEN ELECTIVE)	
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	
COURSE OUTCOMES:	
THIRD SEMESTER	
G111.3: COMMUNITY ORGANIZATION AND SOCIAL ACTION	
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.	

THIRD SEMESTER	
SOCIAL DEVELOPMENT &SUSTAINABLE DEVELOPMENT (OPEN ELECTIVE)	
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	
COURSE OUTCOMES:	
FOURTH SEMESTER	
G111.4: HEALTH CARE AND EDUCATION	
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	
FOURTH SEMESTER	
DISASTER MANAGEMENT: PREPAREDNESS AND RESPONSE (OPEN ELECTIVE)	
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	

implementation and evaluation framework skills in various settings.	
CO 4: Display oral, written and presentation skills of communication in social work settings	
FIFTH SEMESTER	
SOCIAL WORK FIELD PRACTICUM (60 hours of work)	
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.	
COURSE OUTCOMES:	
SIXTH SEMESTER	
SUBALTERN STUDIES	

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.	
SIXTH SEMESTER	
G111.6b: CRIMINAL JUSTICE SYSTEM AND CORRECTIONAL SOCIAL WORK	
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

SIXTH SEMESTER

SOCIAL WORK FIELD PRACTICUM (48 hours of work)

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.

<p>G 100 H</p>	<p>S o c i a l W o r k ; S</p>
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	o c c i o l o g y
Previously done	
G 100 I	J o u r n a l i s m ; P s y c h o l o g y
<u>Program Out come : BA Psychology</u>	
PO 1 Develop a strong knowledge base in psychology	
PO 2 Use scientific reasoning to interpret psychological phenomenon	
PO 3 Design and conduct psychological 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.	

PO 6 Engage actively in service-learning activities to promote health, harmony, Human welfare and Well- being.

PO 7 Adopt and Display values of hope, empathy, compassion, integrity and trust required to Build community, accept diversity, establish and maintain a sense of well-being.

PROGRAM SPECIFIC OUTCOMES

PSO 1 : Demonstrate the ability to think critically and scientifically about human behaviour in different areas of study.

PSO 2 : Competence in understanding and developing scientific interventions to enhance human experience in various settings such as schools, industry, hospitals and community.

PSO 4 : Reflect, experience and use skills to bring about personal and social change.

PSO 5 : Understand the various manifestations of psychopathology and therapeutic techniques.

PSO 6 : Apply the basic principles of psychology to enhance human behavior at the workplace.

PSO 7 : Develop an understanding and application of the complex interplay of Bio psycho social factors impacting Health.

PSO 8 : Display competence in administering, scoring, reporting and analysis of psychometric testing.

I SEMESTER

G106 DC1.1 FOUNDATIONS OF BEHAVIOUR I

OBJECTIVES :

To Provide a scientific foundation in the basic psychological Concepts theories and approaches to understand Human behaviour

To recognise and apply the principles of psychology to our everyday Lives

COURSE OUTCOMES:

CO1 Understand the roots, history, its evolution and the goals governing the scientific study of human behaviour

CO2 Think critically and scientifically about behaviour and mental processes.

CO3 Compare and contrast major perspectives in psychology.

CO4 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.

CO 7 Exercise ethical principles and guidelines in psychological research.

CO 8 Display competence in administering, scoring, reporting and analysis of psychometric tests.

Open Elective course (OEC)

G106 OE1.1 PSYCHOLOGY OF HEALTH AND WELLBEING

42hrs (3hrs/week) Credit: 3

COURSE OUTCOMES :

CO1: Understand the spectrum of health and illness for better health management

CO2: Identify stresses in one's life and how to manage them

CO3: Understand a variety of health announcing health protective and health compromising behaviours and to be able to know their application in illness management

CO4: Know to identify human strengths and life enhancement

G106 DC1.2 FOUNDATIONS OF BEHAVIOUR II

OBJECTIVES:

To Provide a scientific foundation in the basic psychological Concepts, theories and approaches to understand Human behaviour

To recognise and apply the principles of psychology to our everyday Lives

COURSE OUTCOMES:

CO1 Understand the roots, history, its evolution and the goals governing the scientific study of human behaviour

CO2 Think critically and scientifically about behaviour and mental processes.

CO3 Compare and contrast major perspectives in psychology.

CO4 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, learning, memory, motivation, emotion, personality and intelligence to everyday life.

CO7 Exercise ethical principles and guidelines in psychological research.

CO8 Display competence in administering, scoring, reporting and analysis of psychometric tests.

G106 OE1.2 YOUTH, GENDER AND IDENTITY (Open Elective)

42 hrs (3 hrs/week) Credit: 2

COURSE OUTCOMES

CO1: Evaluate and understand the Gender identity and Gender role

CO2: Critically evaluate and identify determinants youth relationships

CO3: Demonstrate an awareness of the international context of Gender Identity.

CO4: Exhibit the consciousness of issues related to youth, gender and identity

CO5: Understand the importance of Law and Youth

	c h o l o g y
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Done previously

	S o c i o l o g y ; P s y c h o l o g y
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G 100 K

Done previously

	S o c i a l W
--	---------------------------------

G 100 L

	o r k ; P s y c h o l o g y
--	--

Done previously

	H i s t o r y ; P o l i t i c a l S c i e n c e
--	--

G 100 M

Done previously

<p>G 100 N</p>	<p>H i s t o r y ; E n g l i s h M a j o r</p>
<p>Done previously</p>	
<p>G 100 O</p>	<p>J o u r n a l i s m ; C o m p u t e</p>

Computer Animation

DEPARTMENT OF COMPUTER ANIMATION	
PROGRAMME OUTCOMES	
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.
PROGRAMME SPECIFIC OUTCOMES	
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	
COURSE OUTCOMES		
Semester-I		
Graphic Design for Animation		
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	
Semester-I		
Graphic Design Lab		
CO-1.	Create Different types of Vector Art, Background design, Logos, Greeting Card etc	
CO-2.	Creating GIF animation clips for the websites	
Environment & Character Sketching		
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.	
Semester-II		

Pre Production and 2D Animation	
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.
2D Animation Lab	
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.
Digital Designing (OPEN ELECTIVE)	
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.

Semester-III	
G 512.3: Multimedia Techniques	
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.
G 512.3P:: Practical-III Multimedia Editing Lab	
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.			
G 512.3E (Open Elective): Graphic Design				
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			
Semester-IV				
G 512.4: 3D Modeling				
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.			
G 512.4P: Practical-IV -3D Modeling				
CO-1	Understand the different types of 3D modeling & Creating interior & exterior models			
CO-2	Acquire the working knowledge 3 Dimension space			
G512.4E (Open Elective): Video editing				
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			
Semester-V				
G 512.5a: 3D Texturing, Camera & Lighting (Paper 5)				
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.			
G 512.5b: : Web Technology (Paper 6)				
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.			
G 512.5P: Practical - 3D Texturing, Camera & Lighting Lab - Paper 5				
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		
G 512.5P: Practical - Web Technology Lab - Paper 6			
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.		
Semester-VI			
G 512.6a:: 3D Rigging & Animation - (Paper 7)			
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.		
G 512.6P:: Practical -: 3D Rigging & Animation Lab - (Paper 7)			
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		
G 512.6b: Media & Interactive animation - (Paper 8)			
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.		
G 512.6P: Practical - Interactive animation Lab (Paper 8)			

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.			

G 100 P	Sociology; Political Science
Done previously	
G 100 Q	Social Work; Computer Animation
Done previously	
G 200	B.S.W.

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

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.

COURSE OUTCOMES:

SECOND SEMESTER

G111.2: SOCIAL CASE WORK AND SOCIAL GROUP WORK

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

SECOND SEMESTER

CHILD WELFARE (OPEN ELECTIVE)

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

COURSE OUTCOMES:

THIRD SEMESTER

G111.3: COMMUNITY ORGANIZATION AND SOCIAL ACTION

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.

THIRD SEMESTER

SOCIAL DEVELOPMENT &SUSTAINABLE DEVELOPMENT (OPEN ELECTIVE)

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

COURSE OUTCOMES:

FOURTH SEMESTER

G111.4: HEALTH CARE AND EDUCATION

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

FOURTH SEMESTER

DISASTER MANAGEMENT: PREPAREDNESS AND RESPONSE (OPEN ELECTIVE)

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

COURSE OUTCOMES:

FIFTH SEMESTER

G111.5a: SOCIAL WORK WITH FAMILIES

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

FIFTH SEMESTER

RESEARCH METHODOLOGY

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

FIFTH SEMESTER

SOCIAL WORK FIELD PRACTICUM (60 hours of work)

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.

COURSE OUTCOMES:

SIXTH SEMESTER

SUBALTERN STUDIES

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.

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COURSE OUTCOMES:

SIXTH SEMESTER

SUBALTERN STUDIES

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.

SIXTH SEMESTER

G111.6b: CRIMINAL JUSTICE SYSTEM AND CORRECTIONAL SOCIAL WORK

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

SIXTH SEMESTER

SOCIAL WORK FIELD PRACTICUM (48 hours of work)

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.

G 300 A	B.Com. (Regular)
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PROGRAMME OUTCOMES

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.

PROGRAMME SPECIFIC OUTCOMES

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 ecofriendly 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.

Name of the Program: Bachelor of Commerce (B.Com.)

Course Code: G310DC1.1

Financial Accounting

CO 1- Understand the theoretical framework of accounting as well accounting standards.

CO 2 - Demonstrate the preparation of financial statement of manufacturing and non-manufacturing entities of sole proprietors.

CO 3- Exercise the accounting treatments for consignment transactions & events in the books of consignor and consignee.

CO 4 - Understand the accounting treatment for royalty transactions & articulate the Royalty agreements.

CO 5 - Outline the emerging trends in the field of accounting.

Course Code: G310DC2.1

Name of the Course: Management Principles and Applications

- Understand and identify the different theories of organizations, which are relevant in the present context.

CO 2 - Design and demonstrate the strategic plan for the attainment of organizational goals.

CO 3 - Differentiate the different types of authority and choose the best one in the present context.

CO 4 - Compare and chose the different types of motivation factors and leadership styles.

CO 5- Choose the best controlling techniques for better productivity of an organisation

Course Code: G310DC3.1

Name of the Course: Principles of Marketing

CO 1- Understand the basic concepts of marketing and asses the marketing environment.

CO 2- Analyze the consumer behaviour in the present scenario and marketing segmentation.

CO 3- Discover the new product development & identify the factors affecting the price of a product in the present context.

CO 4- Judge the impact of promotional techniques on the customers & importance of channels of distribution.

CO 5- Outline the recent developments in the field of marketing.

Course Code: G3100E1.1 (Open Elective Course)

Name of the Course: Managerial Economics

CO 1- Describe the importance of managerial economics in decision making process.

CO 2- Learners would be able to apply the concepts and principles in their day to daylife.

CO 3- Analyze how economic agents make decisions and choices using theoretical knowledge & practical approach.

Course Code: G3100E2.1 (Open Elective Course)

Name of the Course: Accounting for Everyone

Analyze various terms used in accounting;

Make accounting entries and prepare cash book and other accounts necessary while running a business;

Prepare accounting equation of various business transactions;

Analyze information from company's annual report;

Comprehend the management reports of the company.

Course Code: G3100E3.1 (Open Elective Course)

Name of the Course: Financial Literacy

CO 1- Describe the importance of financial literacy and list out the institutions providing financial services;

CO 2- Prepare financial plan and budget and manage personal finances;

CO 3- Open, avail, and manage/operate services offered by banks;

CO 4- Open, avail, and manage/operate services offered by post offices;

Plan for life insurance and property insurance & select instrument for investment in shares

Course Code: G310DC1.2

Name of the Course: Advanced Financial Accounting

CO 1- Understand & compute the amount of claims for loss of stock & loss of Profit.

CO 2- Learn various methods of accounting for hire purchase transactions.

CO 3- Deal with the inter-departmental transfers and their accounting treatment.

CO 4- Demonstrate various accounting treatments for dependent & independent branches.

CO 5- Prepare financial statements from incomplete records.

Course Code: G310DC2.2

Name of the Course: Business Mathematics

CO 1- Understand the number system and indices applications in solving basic business problems.

CO 2- Apply concept of commercial arithmetic concepts to solve business problems.

CO 3 - Make use of theory of equation in solving the business problems in the present context.

CO 4 - Understand and apply the concepts of Set Theory, Permutations & Combinations and Matrices solving business problems.

CO 5- Apply measurement of solids in solving simple business problems.

Course Code: G310DC3.2

Name of the Course: Corporate Administration

CO 1 - Understand the framework of Companies Act of 2013 and different kind of companies.

CO 2 - Identify the stages and documents involved in the formation of companies in India.

CO 3 - Analyze the role, responsibilities and functions of Key management Personnel in Corporate Administration.

CO 4 - Examine the procedure involved in the corporate meeting and the role of company secretary in the meeting.

CO 5 - Evaluate the role of liquidator in the process of winding up of the company.

Course Code: G310DC4.2

Name of the Course: Law and Practice of Banking

CO 1 - Summarize the relationship between Banker & customer and different types of functions of banker.

CO 2 - Analyse the role, functions and duties of paying and collecting banker.

CO 3 - Make use of the procedure involved in opening and operating different accounts.

CO 4 - Examine the different types of negotiable instrument & their relevance in the present context.

CO 5 - Estimate possible developments in the banking sector in the upcoming days.

Course Code: G 310 OE1.2 (Open Elective Course)

Name of the Course: PUBLIC FINANCE

CO 1 - Identify the basis of Money and sources of Public Finance

CO 2- Identify the stages of business cycles and take appropriate decisions.

Course Code : G 310 OE2.2 (Open Elective Course)

Name of the Course: Financial Environment

CO 1 - Understand the fundamentals of Indian Economy and its significance.

CO 2 - Evaluate the impact of monetary policy on the stakeholders of the Economy.

CO 3 - Assess the impact of fiscal policy on the stakeholders of the Economy.

CO 4- Examine the status of inflation, unemployment and labour market in India

Inference the financial sector reforms in India.

Course Code: G 310 OE3.2 (Open Elective Course)

Name of the Course: Investing in Stock Markets

CO 1 - Explain the basics of investing in the stock market, the investment environment as well as risk & return.

CO 2 - Analyze Indian securities market;

CO 3 - Examine EIC framework and conduct fundamental analysis;

CO 4 - Perform technical analysis; Invest in mutual funds market.

Semester III

G 301.3 Financial Accounting-III

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

G302.3 Cost Accounting-I

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.

G303.3 Income Tax-I

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

G304.3 Principles of Marketing

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..

Elective 1

G306.3E Entrepreneurship

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

Elective 2

G307.3E Soft skills training and development

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

Elective 3

G308.3E Stock Market Operations

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

Elective 4 G309.3E Consumer Protection

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.

Elective 5 G310.3E Advertising

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

Elective 6 G311.3E Retail Management

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

Elective 7 G312.3E Investment Management

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

Semester I G301.4 Financial Accounting-IV

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

G302.4 E-Commerce and Accounting

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

G301.4 Financial Accounting-IV

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

G302.4 E-Commerce and Accounting

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

G303.4 Cost of Accounting-II

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.

G304.4 Income Tax-II

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.

Elective 1 G306.4E Tourism Management

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

Elective 2 G307.4E Event Management

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

Elective 3 G308.4E Personal Tax Planning

CO-1: Acquire practical knowledge of assessment of income of an individual

CO-2: Apply the knowledge of computation of tax liability of individuals and make proper tax planning.

CO-3: Execute filing of IT returns

Elective 4 G309.4E Stock Market operations

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.

Semester V

G301.5 Corporate Accounting-I

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

G302.5 International Business

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

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G303.5 Principles and Practice of Auditing

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

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G304.5 Business Law

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

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G305.5 Financial Management

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

G306.5 Business Taxation

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

Semester VI

G301.6 Corporate Accounting-II

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

G302.6 Foreign Exchange Management

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

G303.6 GST and Customs Law

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.

G304.6 Corporate Law and Governance

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

G305.6 Management Accounting

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

G306.6 Security Analysis and Portfolio Management

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

Semester VI

G301.6 Corporate Accounting-II

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

G302.6 Foreign Exchange Management

- 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

G303.6 GST and Customs Law

- 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.

G304.6 Corporate Law and Governance

- 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

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CO-7: Apply the techniques of financial forecasting

G306.6 Security Analysis and Portfolio Management

CO-1: Acquire theoretical and practical background in the field of investments.

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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

G 300 B	B.Com. - (C.A. Integrated)
G 300 C	B.Com. – (ACCA Embedded)
G 300 E	B.Com. (Apprenticeship/ Internship Embedded)
G 400 A	B.B.A

BBA	
PROGRAMME OUTCOMES	
PO 1	Understand concepts and principles of management/business; identify the opportunities in the corporate environment and manage the challenges
PO 2	Demonstrate the knowledge of management science to solve complex corporate problems using limited resources. Display enhanced personality and soft skills.
PO 3	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 4	Demonstrate entrepreneurial competencies

PO 5	Exhibit managerial skills in the areas of marketing, finance, HR, etc.
PO 6	Identify business opportunities, design and implement innovations in workspace.
PO 7	Possess a sturdy foundation for higher education.

BBA	
PROGRAMME SPECIFIC OUTCOMES	
PSO 1	Acquire practical learning through summer internship, industrial visit and Business Plan etc.
PSO 2	Demonstrate analytical and problem-solving skills through specialization in Finance, Human Recourse, and Marketing to solve the business issues.

PSO 3	Understand and develop the new dimensions of knowledge through open electives to cater the need of the industry
PSO 4	Comprehend the core concepts, methods and practices in management
PSO 5	Venture into his/her own business or excel in executive roles in private /government sector.
PSO 6	Demonstrate the ability to create business plans
PSO 7	Develop an understanding of business that reflects the moral responsibility of business to all relevant stakeholders and the natural environment.

PSO 8	Matured Individuals and responsible Citizens to the country
PSO 9	Demonstrate Ability to work in Groups
BBA	
COURSE OUTCOMES SEMESTER-I (NEP – 2020)	
G401 DC1.1 Management Principles & Practice	
CO 1	The ability to understand concepts of business management, principles and function of management.
CO 2	The ability to explain the process of planning and decision making
CO 3	The ability to create organization structure based on authority, task and responsibilities.
CO 4	The ability to explain the principles of direction, importance of communication, barrier of communication, motivation theories and leadership styles.
CO 5	The ability to understand the requirement of good control system and control techniques.
G 401 DC2.1 Fundamentals of Business Accounting	
CO 1	Understand the framework of accounting as well accounting standards.

CO 2	Ability to analyze journal entry and Prepare Ledger account.
CO 3	Ability to prepare subsidiary books and bank reconciliation statement.
CO 4	Ability to prepare Trial Balance and final accounts of proprietary concern
CO 5	Understand the basic framework of tally and construct final accounts through application of tally.
G 401 DC3.1 Marketing Management	
CO 1	Understand the concepts and functions of marketing.
CO 2	Analyse marketing environment impacting the business
CO 3	Segment the market and understand the consumer behaviour
CO 4	Describe the 4 Ps of marketing and also strategize marketing mix
CO 5	Describe 7 Ps of service marketing mix

G 401 OE1.1 Business Organization (OEC)	
CO 1	An understanding of the nature, objectives and social responsibilities of business
CO 2	An ability to describe the different forms of organisations

CO 3	An understanding of the basic concepts of management
CO 4	An understanding of functions of management.
CO 5	An understanding of different types of business combinations
G 401 OE 2.1 Office Organization and Management (OEC)	
CO 1	An understanding of basic knowledge of office organisation and management
CO 2	Demonstrate skills in effective office organisation
CO 3	Ability to maintain office records
CO 4	Ability to maintain digital record.

CO 5	Understanding of different types of organisation structures and responsibilities as future office managers
G 401 OE 3.1 Basic Economics (OEC)	
CO 1	Explain how consumers make rational choices using the concept of utility
CO 2	To understand the concept of consumer surplus.
CO 3	Analyse the factors that affect market demand and market supply and illustrate their interaction for achieving equilibrium in price and quantity.
CO 4	Analyse how producer applies the marginal decision rule to maximize the profit in producing goods or services

CO 5	Explain how consumers make rational choices using the concept of utility
SEMESTER-II (NEP – 2020)	
G 401 DC 2.2 Corporate Accounting and Reporting	
CO 1	The ability to understand the process of public issue of shares, alteration of shares and accounting for the same
CO 2	The ability to prepare final accounts of joint stock companies.
CO 3	The ability to understand different ways of valuing corporate shares and goodwill.

CO 4	The ability to prepare and evaluate vertical and horizontal analysis of financial statements and the skill of preparing financial reports,
CO 5	The ability to understand company's annual reports.
G401 DC 1.2 Human Resource Management	
CO 1	To describe the role and responsibility of Human resource management functions on business and also to understand the recent trends in HR practices.

CO 2	To understand the concepts such as HRP, Recruitment and Selection process HR Demand Forecasting, HR supply forecasting, Job Analysis, Specification, Job Enlargement, Job Rotation, Job Enrichment, Psychometric tests for Selection.
CO 3	To infuse the concept of induction, training and compensation aspects.
CO 4	To explain the concepts of performance appraisal and its process. Also explain the concepts of Right Sizing of Work Force, Need for Right Sizing.

CO 5	To demonstrate Employee Engagement and Psychological Contract, Employee Engagement (EE): Drivers of Engagement -Measurement of EE, Benefits of EE.
G401 DC 3.2 Business Environment	
CO 1	An Understanding of components of business environment.
CO 2	Ability to analyse the environmental factors influencing business organisation.
CO 3	Ability to demonstrate Competitive structure analysis for select industry.

CO 4	Ability to explain the impact of fiscal policy and monetary policy on business.
CO 5	Ability to analyse the impact of economic environmental factors of business.
G401 DC3.2 Business Mathematics	
CO 1	The Understanding of the basic concepts of business math and apply them to create solve and interpret application problems in business
CO 2	Ability to solve problems on various types of equation.
CO 3	Ability to solve problems on Matrices and execute the laws of indices, law of logarithm and evaluate them.

CO 4	Ability to apply the concept of simple interest and compound interest bills discounted etc. and apply them in day-to-day life.
CO 5	Ability to solve problems on Arithmetic progression, Geometric progression and construct logical application of these concepts.
G 401 OE 1.2 People Management	
CO 1	Ability to examine the difference between People Management with Human resource Management
CO 2	Ability to explain the need for and importance of People Management.

CO 3	Ability to explain role of manager in different stages of performance management process
CO 4	Ability to list modern methods of performance and task assessment.
CO 5	Ability to analyse the factors influencing the work life balance of an working individual.
G 401 OE 2.2 Retail Management	
CO 1	An understanding of the types and forms of Retail business, Analysis of Retail life cycle. Also help understand the factors influencing present Indian retail scenario.

CO 2	Ability to examine Consumer Behaviour in various environments and its implication on retailing.
CO 3	Ability to analyse various Retail operations and evaluate them, also understand the concepts of Market area analysis, Trade area analysis, Rating Plan method and Site evaluation.
CO 4	Ability to analyse various marketing mix elements in retail operations including Supply channel – SCM principles – Retail logistics – computerized replenishment system – corporate replenishment policies

CO 5	Understand the workings of Integrated systems and networking – EDI – Bar coding – Electronic article surveillance – Electronic shelf labels – Customer database management system.
G 401 OE 3.2 Managerial Economics	
CO 1	To know the basic knowledge of managerial economics.
CO 2	To understand the dynamics of business.
CO 3	To know about the managerial concept of business
CO 4	Helps the consumers and producers to take apt decisions
SEMESTER-III (2019 Batch Onwards)	
Group-1 G 401.3 Corporate Accounting-I	

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 familiarize 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.
G 402.3 Public Finance	
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.
G 403.3 Direct Taxes – Paper I	
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.
G 404.3 Commercial Law	
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.
G 405.3 Financial Management	
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.
Group -2 Elective G 406.3E Business Etiquettes	
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.
G 407.3E Training the trainer	
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.
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G 408.3E Personal Selling

CO 1	Study the types of personal selling and the importance of trust and ethics.
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CO 2	Learn the skills required to understand the market, the buying process, and the communication skills needed to build customer relationships.
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CO 3	Study the sales dialogues, sales presentations, and demonstration methods.
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G 409.3E Corporate Social Responsibility

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.

SEMESTER-IV (2019 batch onwards)

Group-1

G 401.4 Corporate Accounting-II

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
G 402.4 Indian Economy	
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.
G 403.4 Direct Taxes- Paper II	
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.
G 404.4 Corporate Law	
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.
G 405.4 Research Methodology	
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.
Group-2 Elective G 405.4E Personal Investment and Tax Planning	
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

G 406.4E Fundamentals of Accounting		
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.	
G 407.4E Travel and Tourism Management		
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.	
G 408.4E New Venture Creation and Entrepreneurship		

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.
SEMESTER-V (2019 batch onwards)	
G 401.5 Cost Accounting	

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
G402.5 Operations Management	

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
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G403.5 Advance Taxation – Paper I	
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CO 1	Understanding the procedure of set-off and carry forward of losses while arriving at Gross Total Income of an Assessee.
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CO 2	Assessing basic deductions under Section 80 with practical learning applicable while filing the return by an Assessee.
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CO 3	Understanding assessment procedure of Individual and firm by determining tax liability of firm.
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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.
G404.5 Auditing	
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
G404.5 Project/ Internship	
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.
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G405.5 Organizational Behaviour	
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CO 1	To understand the origins of organizational behaviour and influences on personality.
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CO 2	To examine those elements of the cognitive process that contributes to employee behaviour.
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CO 3	To analyse styles of leadership and its effects on the psychology of the organization.
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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
G406.5 Working Capital Management (Finance Specialisation)	
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.
G407.5 Strategic Human Resource (HR Specialisation)	
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.
G408.5 Rural Marketing (Marketing Specialisation)	
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.

SEMESTER-VI (2019 batch onwards)

G401.6 Cost and Management Accounting

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.
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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
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G402.6 Investment Management

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	<p>To understand the concept of mutual fund while building the portfolio and to study the facilitating services of banking operations.</p> <p>To analyse the modalities incorporated in estate-planning and to study the laws governing estate-planning in India.</p>
G403.6 Advance Taxation – Paper II	
CO 1	<p>Understand the basic concepts of Goods and Services tax and assess the applicability of GST in India.</p>
CO 2	<p>Assessing the practical learning of GST by understanding the fundamental principles and various rates involved in GST.</p>

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.
G404.6 Logistics and Supply Chain Management	

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

G405.6 Entrepreneurship Development

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
G406.6 Financial Statement Analysis (Finance Specialisation)	
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.

G407.6 Industrial Relations and Labour Welfare (HR Specialisation)

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.
G408.6 Advertising Management (Marketing Specialisation)	
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.
G 400 C	B.B.A (Professional)
BBA	
PROGRAMME OUTCOMES	
PO 1	Understand concepts and principles of management/business; identify the opportunities in the corporate environment and manage the challenges
PO 2	Demonstrate the knowledge of management science to solve complex corporate problems using limited resources. Display enhanced personality and soft skills.

PO 3	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 4	Demonstrate entrepreneurial competencies
PO 5	Exhibit managerial skills in the areas of marketing, finance, HR, etc.
PO 6	Identify business opportunities, design and implement innovations in workspace.
PO 7	Possess a sturdy foundation for higher education.
BBA	
PROGRAMME SPECIFIC OUTCOMES	

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BBA

**COURSE OUTCOMES
SEMESTER-I (NEP – 2020)**

G401 DC1.1 Management Principles & Practice

CO 1

The ability to understand concepts of business management, principles and function of management.

CO 2	The ability to explain the process of planning and decision making
CO 3	The ability to create organization structure based on authority, task and responsibilities.
CO 4	The ability to explain the principles of direction, importance of communication, barrier of communication, motivation theories and leadership styles.
CO 5	The ability to understand the requirement of good control system and control techniques.
G 401 DC2.1 Fundamentals of Business Accounting	
CO 1	Understand the framework of accounting as well accounting standards.
CO 2	Ability to analyze journal entry and Prepare Ledger account.
CO 3	Ability to prepare subsidiary books and bank reconciliation statement.
CO 4	Ability to prepare Trial Balance and final accounts of proprietary concern
CO 5	Understand the basic framework of tally and construct final accounts through application of tally.
G 401 DC3.1 Marketing Management	
CO 1	Understand the concepts and functions of marketing.
CO 2	Analyse marketing environment impacting the business

CO 3	Segment the market and understand the consumer behaviour
CO 4	Describe the 4 Ps of marketing and also strategize marketing mix
CO 5	Describe 7 Ps of service marketing mix
G 401 OE1.1 Business Organization (OEC)	
CO 1	An understanding of the nature, objectives and social responsibilities of business
CO 2	An ability to describe the different forms of organisations
CO 3	An understanding of the basic concepts of management
CO 4	An understanding of functions of management.
CO 5	An understanding of different types of business combinations

G 401 OE 2.1 Office Organization and Management (OEC)	
CO 1	An understanding of basic knowledge of office organisation and management
CO 2	Demonstrate skills in effective office organisation
CO 3	Ability to maintain office records
CO 4	Ability to maintain digital record.
CO 5	Understanding of different types of organisation structures and responsibilities as future office managers
G 401 OE 3.1 Basic Economics (OEC)	
CO 1	Explain how consumers make rational choices using the concept of utility
CO 2	To understand the concept of consumer surplus.

CO 3	Analyse the factors that affect market demand and market supply and illustrate their interaction for achieving equilibrium in price and quantity.
CO 4	Analyse how producer applies the marginal decision rule to maximize the profit in producing goods or services
CO 5	Explain how consumers make rational choices using the concept of utility
SEMESTER-II (NEP – 2020)	
G 401 DC 2.2 Corporate Accounting and Reporting	

CO 1	The ability to understand the process of public issue of shares, alteration of shares and accounting for the same
CO 2	The ability to prepare final accounts of joint stock companies.
CO 3	The ability to understand different ways of valuing corporate shares and goodwill.
CO 4	The ability to prepare and evaluate vertical and horizontal analysis of financial statements and the skill of preparing financial reports,
CO 5	The ability to understand company's annual reports.
G401 DC 1.2 Human Resource Management	

CO 1	To describe the role and responsibility of Human resource management functions on business and also to understand the recent trends in HR practices.
CO 2	To understand the concepts such as HRP, Recruitment and Selection process HR Demand Forecasting, HR supply forecasting, Job Analysis, Specification, Job Enlargement, Job Rotation, Job Enrichment, Psychometric tests for Selection.
CO 3	To infuse the concept of induction, training and compensation aspects.

CO 4	To explain the concepts of performance appraisal and its process. Also explain the concepts of Right Sizing of Work Force, Need for Right Sizing.
CO 5	To demonstrate Employee Engagement and Psychological Contract, Employee Engagement (EE): Drivers of Engagement -Measurement of EE, Benefits of EE.
G401 DC 3.2 Business Environment	
CO 1	An Understanding of components of business environment.

CO 2	Ability to analyse the environmental factors influencing business organisation.
CO 3	Ability to demonstrate Competitive structure analysis for select industry.
CO 4	Ability to explain the impact of fiscal policy and monetary policy on business.
CO 5	Ability to analyse the impact of economic environmental factors of business.
G401 DC3.2 Business Mathematics	
CO 1	The Understanding of the basic concepts of business math and apply them to create solve and interpret application problems in business

CO 2	Ability to solve problems on various types of equation.
CO 3	Ability to solve problems on Matrices and execute the laws of indices, law of logarithm and evaluate them.
CO 4	Ability to apply the concept of simple interest and compound interest bills discounted etc. and apply them in day-to-day life.
CO 5	Ability to solve problems on Arithmetic progression, Geometric progression and construct logical application of these concepts.

G 401 OE 1.2 People Management

CO 1	Ability to examine the difference between People Management with Human resource Management
CO 2	Ability to explain the need for and importance of People Management.
CO 3	Ability to explain role of manager in different stages of performance management process
CO 4	Ability to list modern methods of performance and task assessment.
CO 5	Ability to analyse the factors influencing the work life balance of an working individual.
G 401 OE 2.2 Retail Management	

CO 1	An understanding of the types and forms of Retail business, Analysis of Retail life cycle. Also help understand the factors influencing present Indian retail scenario.
CO 2	Ability to examine Consumer Behaviour in various environments and its implication on retailing.
CO 3	Ability to analyse various Retail operations and evaluate them, also understand the concepts of Market area analysis, Trade area analysis, Rating Plan method and Site evaluation.

CO 4	Ability to analyse various marketing mix elements in retail operations including Supply channel – SCM principles – Retail logistics – computerized replenishment system – corporate replenishment policies
CO 5	Understand the workings of Integrated systems and networking – EDI – Bar coding – Electronic article surveillance – Electronic shelf labels – Customer database management system.
G 401 OE 3.2 Managerial Economics	
CO 1	To know the basic knowledge of managerial economics.
CO 2	To understand the dynamics of business.

CO 3	To know about the managerial concept of business
CO 4	Helps the consumers and producers to take apt decisions
SEMESTER-III (2019 Batch Onwards)	
Group-1 G 401.3 Corporate Accounting-I	
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 familiarize 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.
G 402.3 Public Finance	
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.
G 403.3 Direct Taxes – Paper I	

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.
G 404.3 Commercial Law	
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.
G 405.3 Financial Management	

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.
Group -2 Elective G 406.3E Business Etiquettes	

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.
G 407.3E Training the trainer	
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.
G 408.3E Personal Selling	

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.
G 409.3E Corporate Social Responsibility	
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.

SEMESTER-IV (2019 batch onwards)

**Group-1
G 401.4 Corporate Accounting-II**

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
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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
G 402.4 Indian Economy	
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.
G 403.4 Direct Taxes- Paper II	
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.
G 404.4 Corporate Law	
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.
G 405.4 Research Methodology	
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.
Group-2 Elective G 405.4E Personal Investment and Tax Planning	
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
G 406.4E Fundamentals of Accounting	
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.
G 407.4E Travel and Tourism Management	
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.
G 408.4E New Venture Creation and Entrepreneurship	
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.
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SEMESTER-V (2019 batch onwards)	
G 401.5 Cost Accounting	
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
G402.5 Operations Management	
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

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.
G404.5 Auditing	
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
G404.5 Project/ Internship	
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.

G405.5 Organizational Behaviour	
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
G406.5 Working Capital Management (Finance Specialisation)	
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.
G407.5 Strategic Human Resource (HR Specialisation)	
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.
G408.5 Rural Marketing (Marketing Specialisation)	
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.

SEMESTER-VI (2019 batch onwards)

G401.6 Cost and Management Accounting

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
G402.6 Investment Management	

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	<p>To understand the concept of mutual fund while building the portfolio and to study the facilitating services of banking operations.</p> <p>To analyse the modalities incorporated in estate-planning and to study the laws governing estate-planning in India.</p>
G403.6 Advance Taxation – Paper II	
CO 1	<p>Understand the basic concepts of Goods and Services tax and assess the applicability of GST in India.</p>
CO 2	<p>Assessing the practical learning of GST by understanding the fundamental principles and various rates involved in GST.</p>

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.

G404.6 Logistics and Supply Chain Management

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

G405.6 Entrepreneurship Development

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
G406.6 Financial Statement Analysis (Finance Specialisation)	
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.

G407.6 Industrial Relations and Labour Welfare (HR Specialisation)

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.
G408.6 Advertising Management (Marketing Specialisation)	
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.
G 500P A	B.Sc. (PHYSICS, CHEMISTRY)

1.1.1 Program Outcomes (PO's)	
PO-1: Discipline Knowledge: Knowledge of science and ability to apply to relevant areas.	
PO-2: Problem solving: Execute a solution process using first principles of science to solve problems related to respective discipline.	
PO-3: Modern tool usage: Use a modern scientific, engineering and IT tool or technique for solving problems in the areas of their discipline.	
PO-4: Ethics: Apply the professional ethics and norms in respective discipline.	
PO-5: Individual and teamwork: Work effectively as an individual as a team member in a multidisciplinary team.	
PO-6: Communication: Communicate effectively with the stake holders, and give and receive clear instructions	
Programme specific outcomes (PSO's)	
PSO 1: Students will improve their English reading and interpreting skills on issues at national and regional level and through their contemporaneity will contextualize language to critically articulate their	

thoughts in classroom discussions. Hence students should be able to distinguish between formal, colloquial, journalistic, poetic, scientific forms and registers of English language.

PSO 2: Understand and apply the principles and concepts in various disciplines of Physics.

PSO 3: Develop the ability in Physics to solve analytical problems, think methodically, independently to draw logical conclusions.

PSO 4: Students will have a firm foundation in the fundamentals and applications of Chemistry and its multidisciplinary approach towards physical or biological sciences.

PSO 5: Students through the study of Chemistry 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 6: To be familiar with suitable tools of mathematical analysis to handle issues and problems in Mathematics and related sciences.

PSO 7: Acquire sufficient knowledge and skills to undertake further studies in Mathematics and its allied areas on multiple disciplines concerned with Mathematics.

Semester - I	
Course Title: Mechanics and Properties of matter Course Code: G 501 DC1.1	Course Credits: 4
Course Outcomes (Cos)	

Co-1: will learn to deduce the dimensions of a physical quantity, will learn about accuracy of measurement and sources of errors, importance of significant figures.

co-2: will perceive the nuances of motion in one dimension and the ideas connected with it and understand the invariance of physical laws under translations.

co-3. understand the basic concepts of elasticity, gain the knowledge about the properties of materials

co-4. study the motion of viscous fluids	
co-5. effectively use measuring instruments to quantify observable phenomena	
co-6. understand the principles and methods used in analyzing motion of particle, verify conservation laws and gain knowledge about the rigid body mechanics.	
co-7. grasp the ideas of classical theory of relativity, special theory	
TS AND WIRIN	
SEMESTER -I	

<p>Open Elective Paper Course Title: Electrical Circuits And Wiring Course Code: G 501 OE1.1</p>	<p>Course Credits:3</p>
<p>Total Contact Hours: 40</p>	<p>Duration of ESA:</p>
<p>Formative Assessment Marks: 15</p>	<p>Summative Assessment Marks: 35</p>
<p>Course Outcomes (COs)</p>	
<p>CO - 1: Will learn the various terms needed to understand the basics of current electricity.</p>	
<p>CO - 2: Will acquire sufficient working knowledge to identify and appreciate the merit of various passive</p>	

circuit elements.	
CO - 3: Will get a foothold on the need and applications of electrical circuits.	
CO - 4: Will graduate into understanding different sources of EMF and working of motors.	
CO - 5: Will acquire skills in electrical protection systems.	
CO-6: Will gain an understanding of electrical cables used in both domestic and industrial situations.	
CO-7: Will learn to calculate the electrical energy consumed by various	

appliances	
Semester - II	
Course Title: Electricity and Magnetism Course Code: G 501 DC1.2	Course Credits: 4
Total Contact Hours: 52 (theory)	Duration of ESA: 2 Hrs.
Formative Assessment Marks: 60	Summative Assessment Marks: 40
Course Outcomes (COs) / Program Outcomes (POs)	
CO-1: Will learn the requires mathematical skills to understand concepts of electricity, magnetism and electromagnetism.	

CO-2: Will gain the needed knowledge of the fundamental laws of electrostatics and their application in electrostatics

CO-3: Will acquire the ability to differentiate between the effect of steady and variable currents in electrical circuits.

CO-4: Will understand the intimate connection between electricity and magnetism

<p>CO-5: Using the ideas obtained from variable currents will comprehend the concepts of converting other forms of energy into electrical energy</p>	
<p>CO-6: Will realise that light waves are electromagnetic waves</p>	
<p>Semester: II</p>	
<p>RGY AND ENER</p>	
<p>Open Elective Paper Course Title: Renewable Energy and Energy harvesting Course Code: G 501 OE1. 2</p>	<p>Course Credits:3</p>
<p>Total Contact Hours: 40</p>	<p>Duration of ESA:</p>
<p>Formative Assessment Marks: 15</p>	<p>Summative Assessment Marks: 35</p>

Course Outcomes (COs) / Program Outcomes (POs)	
CO - 1: Will be able to learn about different energy sources and know the difference between renewable and non-renewable sources of energy.	
CO - 2: Will know the significance of solar energy and of different techniques to harness solar energy.	

<p>CO - 3: Will gain an idea about formation of waves and standing wave patterns and analysis of longitudinal and transverse waves.</p>	
<p>CO - 4: Will acquire knowledge of wind energy and methods to tap energy from the blowing wind to generate electrical power.</p>	
<p>CO - 5: Will gain familiarity about conventional energy sources and their impact on climate.</p>	

Semester-III
G501.3: Acoustics, Optics and Networks

Course Outcomes

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.

Semester-III
G501.3P: Practical-III

Course Outcomes

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.
Semester-III G 501.3E (Open Elective): Basic Instrumentation Skills	
Course Outcomes	
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.
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<p>Semester-IV G501.4: Electromagnetism, Electricity-II and Electronics-I</p>	
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<p>Course Outcomes</p>	
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CO-1.	Gain knowledge about Scalar and Vector fields
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CO-2.	Set up the Maxwells wave equation in free space and material media.
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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.
Semester-IV G501.4P: Practical-IV	
Course Outcomes	
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.
Semester-IV G501.4E (Open Elective): Renewable Energy and Energy harvesting (Credits: 01) Theory: 30 Lectures	
Course Outcomes	
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-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.
Semester-V G501.5b: Solid State Physics	
Course Outcomes	
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.
Semester-V G501.5P: Practical V	
Course Outcomes	
CO-1.	Confirm the theoretical observation with the experimental values.

Semester-VI
G501.6a: Nuclear Physics and Analog Electronics

Course Outcomes

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.
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FAL ELECTRO

G501.6b: Communication and Digital Electronics and, Special properties of materials

Course Outcomes

CO-1.	Understand the fundamental concepts of modulation and demodulation, working of transmitter and receivers, comprehend the basic concept of TV communication.
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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
G501.6P: Practical VI	
Course Outcomes	

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.

Program Outcomes:
By the end of the program the students will be able to,
PO. 1: Develop enthusiasm for Chemistry and its application in various fields of life.
PO. 2: Have a broad and balanced knowledge and understanding of key concepts in Chemistry.
PO. 3: Develop a range of practical skills to understand and assess risks and work safely measures to be followed in the laboratory.
PO. 4: Develop the ability to apply standard methodology to the solution of problems in Chemistry.
PO. 5: Gain knowledge and skill towards employment or higher education in Chemistry or multi-disciplinary areas involving Chemistry.
PO. 6: Plan and carry out experiments independently and assess the significance of outcomes and to

cater to the demands of chemical Industries of well-trained graduates.

PO. 7: Adapt and apply methodology to the solution of unfamiliar types of problems.

PO. 8: Critically aware of advances at the forefront of chemical sciences, prepare effectively for professional employment or research degrees in chemical sciences and to develop an independent and responsible work ethics.

Semester 1

Course Outcomes (COs):

At the end of the course the student should be able to understand,

CO 1: The concepts of chemical analysis, accuracy, precision and statistical data treatment.

CO 2: The errors in chemical analysis and methods of minimizing.

CO 3: The preparation of standard solutions and dilution of stock solution.

CO 4: The concept of volumetric and gravimetric analysis and deducing the conversion factor for determination.

CO 5: General purification techniques and different types of chromatographic methods.

CO 6: Handling of toxic chemicals, concentrated acids and organic solvents and practice safety procedures.

organic reactions and techniques of writing the movement of electrons, bond breaking, bond forming and reactive in

CO 8: The concepts of aromaticity, resonance and hyperconjugation.

CO 9: Understand the preparation of alkanes, alkenes, dienes and their reactions.

CO 10: Understand the mechanism of nucleophilic, electrophilic reactions.

Semester 2

At the end of the course the student should be able to understand,

CO 1: The concepts of quantum physics.

CO 2: The Schrodinger equation, Heisenberg uncertainty principle.

CO 3: The concept of periodic table, elements in the periodic table.

CO 4: The concept of hydrides, complexes, boranes and diboranes .

CO 5: General concept of p-block elements.

CO 6: Concept of real gases and ideal gases.

CO 7: The concepts of physical phenomena like viscosity, surface tension refractive index.

CO 8: The concepts of liquid crystals, properties of solids, X-ray diffraction .

CO 9: Able to use viscometer, stalagmometer to estimate viscosity and surface tension.

CO 10: Able to estimate mass of substance gravimetrically.

CBCS Scheme: Chemistry

B.Sc. (PHYSICS, CHEMISTRY, MATHEMATICS)

PROGRAMME OUTCOMES

PO 1: Students will improve English language skills and gain confidence to use an international language and become competent global citizens in the age of globalization.

PO 2: Develop and demonstrate an ability to understand major concepts in various disciplines of Physics while exercising critical thinking and the scientific knowledge to design, carry out, record, analyze and co-relate the results of Physics practical.

PO 3: Create an awareness of the impact of Physics on the society and development outside the scientific community.

PO 4: To create an awareness on the impact of Chemistry on the global environment, society at national, regional and local levels, and one its development outside the scientific community.

PO 5: To provide students with the necessary knowledge and skills imparted through the discipline of Chemistry to carry out a successful research career in industry or academia or as an entrepreneur.

PO 6: Acquisition of knowledge in Mathematics in order to be able to possess basic subject knowledge that is required for higher studies, professional and applied courses.

PO 7: Application of Mathematics, to develop solution-oriented approach towards various Social and Environmental issues and in general to develop critical thinking, problem solving skills through practical application along with the domain knowledge in the subjects of science stream

PSO 1: Students will improve their English reading and interpreting skills on issues at national and regional level and through their contemporaneity will contextualize language to critically articulate their thoughts in classroom discussions. Hence students should be able to distinguish between formal, colloquial, journalistic, poetic, scientific forms and registers of English language.

PSO 2: Understand and apply the principles and concepts in various disciplines of Physics.

PSO 3: Develop the ability in Physics to solve analytical problems, think methodically, independently to draw logical conclusions.

PSO 4: Students will have a firm foundation in the fundamentals and applications of Chemistry and its multidisciplinary approach towards physical or biological sciences.

PSO 5: Students through the study of Chemistry 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 6: To be familiar with suitable tools of mathematical analysis to handle issues and problems in Mathematics and related sciences.

PSO 7: Acquire sufficient knowledge and skills to undertake further studies in Mathematics and its allied areas on multiple disciplines concerned with Mathematics

B.Sc. (CHEMISTRY, ZOOLOGY, BOTANY)

PROGRAMME OUTCOMES

PO 1: Students will improve English language skills and gain confidence to use an international language and become competent global citizens in the age of globalization.

PO 2: To create an awareness on the impact of Chemistry on the global environment, society at national, regional and local levels, and one its development outside the scientific community.

PO 3: To provide students with the necessary knowledge and skills imparted through the discipline of Chemistry to carry out a successful research career in industry or academia or as an entrepreneur.

Po 4: Create awareness of various branches in Zoology to pursue higher education, to understand recent advances in various fields of Applied Zoology, and to take up independent research work to develop a scientific temper.

PO 5: Acquire knowledge of the global, national, regional and local faunal diversity and understand the importance of its conservation through Zoology.

PO 6: Develop an awareness towards the environment, biodiversity, conservation and their significance through the study of Botany.

PO 7: Enhance the scope of higher studies. research, and employability by obtaining all-round knowledge in the allied subjects along with Botany.

PROGRAMME SPECIFIC OUTCOMES

PSO 1: Students will improve their English reading and interpreting skills on issues at national and regional level and through their contemporaneity will contextualize language to critically articulate their thoughts in classroom discussions. Hence students should be able to distinguish between formal, colloquial, journalistic, poetic, scientific forms and registers of English language.

PSO 2: Students will have a firm foundation in the fundamentals and applications of Chemistry and its multidisciplinary approach towards physical or biological sciences.

PSO 3: Students through the study of Chemistry 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 4: Understand the nature and basic concepts of cell biology, genetics, taxonomy, physiology, ecology and applied Zoology

PSO 5: Analyse the relationships among animals and plants through Zoology

PSO 6: Understand the basic Botany concepts of plant taxonomy, pathology, anatomy, embryology, evolution, physiology, genetics , molecular biology, , plant biotechnology, phytochemistry, pharmacognosy, ecology & sustainable development

PSO 7: 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

B.Sc. (PHYSICS, ELECTRONICS, MATHEMATICS)

PROGRAMME OUTCOMES

PO 1: Students will improve English language skills and gain confidence to use an international language and become competent global citizens in the age of globalization.

PO 2: Develop and demonstrate an ability to understand major concepts in various disciplines of Physics while exercising critical thinking and the scientific knowledge to design, carry out, record, analyze and co-relate the results of Physics practical.

PO 3: Create an awareness of the impact of Physics on the society and development outside the scientific community.

PO 4: Understand, appreciate and apply the concepts of Electronics in various fields science, environment and contribute to improve the quality of life.

PO 5: Create an awareness of the impact of Electronics on the society, and Development outside the scientific community.

PO 6: Acquisition of knowledge in Mathematics in order to be able to possess basic subject knowledge that is required for higher studies, professional and applied courses.

PO 7: Application of Mathematics, to develop solution oriented approach towards various Social and Environmental issues and in general to develop critical thinking, problem solving skills through practical application along with the domain knowledge in the subjects of science stream

PROGRAMME SPECIFIC OUTCOMES

PSO 1: Students will improve their English reading and interpreting skills on issues at national and regional level and through their contemporaneity will contextualize language to critically articulate their thoughts in classroom discussions. Hence students should be able to distinguish between formal, colloquial, journalistic, poetic, scientific forms and registers of English language.

PSO 2: Understand and apply the principles and concepts in various disciplines of Physics.

PSO 3: Develop the ability in Physics to solve analytical problems, think methodically, independently to draw logical

conclusions.

PSO 4: Understand the theories, principles and fundamentals of Electronics to develop the ability in order to apply knowledge and skills acquired to the solution of specific theoretical and applied problems in Electronics.

PSO 5: Develop abilities in students to design and develop innovative solutions for benefits of society, by diligence, leadership, team work and lifelong learning.

PSO 6: To be familiar with suitable tools of mathematical analysis to handle issues and problems in Mathematics and related sciences.

PSO 7: Acquire sufficient knowledge and skills to undertake further studies in Mathematics and its allied areas on multiple disciplines concerned with Mathematics.

CHEMISTRY, MICROBIOLOGY, ZOOLOGY

PROGRAMME OUTCOMES

PO 1: Students will improve English language skills and gain confidence to use an international language and become competent global citizens in the age of globalization.

PO 2: To create an awareness on the impact of Chemistry on the global environment, society at national, regional and local levels, and one its development outside the scientific community.

PO 3: To provide students with the necessary knowledge and skills imparted through the discipline of Chemistry to carry out a successful research career in industry or academia or as an entrepreneur.

PO 4: To inculcate the basic concepts of biochemistry including an understanding of the fundamental biochemical principles and apply the major theories and research procedures to contemporary social problems. The programme will also provide a general understanding of the inter disciplines with a holistic approach in biological sciences.

PO 5: 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.

PO 6: Create awareness of various branches in Zoology to pursue higher education, to understand recent advances in various fields of Applied Zoology, and to take up independent research work to develop a scientific temper.

PO 7: Acquire knowledge of the global, national, regional and local faunal diversity and understand the importance of its conservation through Zoology.

PROGRAMME SPECIFIC OUTCOMES

PSO 1: Students will improve their English reading and interpreting skills on issues at national and regional level and through their contemporaneity will contextualize language to critically articulate their thoughts in classroom discussions. Hence students should be able to distinguish between formal, colloquial, journalistic, poetic, scientific forms and registers of English language.

PSO 2: Students will have a firm foundation in the fundamentals and applications of Chemistry and its multidisciplinary approach towards physical or biological sciences.

PSO 3: Students through the study of Chemistry 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 4: Acquired knowledge and understanding of the Microbiology concepts and theories as applicable to diverse areas such as medical, industrial, environment, genetics, agriculture, food among others.

PSO 5: Develop a broader perspective on Microbiology as a discipline for sake of identifying the challenging societal problems and plan for one's professional career to develop innovative solutions for such problems.

PSO 6: Understand the nature and basic concepts of cell biology, genetics, taxonomy, physiology, ecology and applied Zoology

PSO 7: Analyse the relationships among animals and plants through Zoology

B.Sc. (CHEMISTRY, MICROBIOLOGY, BOTANY)

PROGRAMME OUTCOMES

PO 1: Students will improve English language skills and gain confidence to use an international language and become competent global citizens in the age of globalization.

PO 2: To create an awareness on the impact of Chemistry on the global environment, society at national, regional and local levels, and one its development outside the scientific community.

PO 3: To provide students with the necessary knowledge and skills imparted through the discipline of Chemistry to carry out a successful research career in industry or academia or as an entrepreneur.

PO 4: To inculcate the basic concepts of biochemistry including an understanding of the fundamental biochemical principles and apply the major theories and research procedures to contemporary social problems. The programme will also provide a general understanding of the inter disciplines with a holistic approach in biological sciences.

PO 5: 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.

PO 6: Develop an awareness towards the environment, biodiversity, conservation and their significance through the study of Botany.

PO 7: Enhance the scope of higher studies. research, and employability by obtaining all-round knowledge in the allied subjects along with Botany.

PROGRAMME SPECIFIC OUTCOMES

PSO 1: Students will improve their English reading and interpreting skills on issues at national and regional level and through their contemporaneity will contextualize language to critically articulate their thoughts in classroom discussions. Hence students should be able to distinguish between formal, colloquial, journalistic, poetic, scientific forms and registers of English language.

PSO 2: Students will have a firm foundation in the fundamentals and applications of Chemistry and its multidisciplinary approach towards physical or biological sciences.

PSO 3: Students through the study of Chemistry 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 4: Acquired knowledge and understanding of the Microbiology concepts and theories as applicable to diverse areas such as medical, industrial, environment, genetics, agriculture, food among others.

PSO 5: Develop a broader perspective on Microbiology as a discipline for sake of identifying the challenging societal problems and plan for one's professional career to develop innovative solutions for such problems.

PSO 6: Understand the basic Botany concepts of plant taxonomy, pathology, anatomy, embryology, evolution, physiology, genetics, molecular biology, plant biotechnology, phytochemistry, pharmacognosy, ecology & sustainable development

PSO 7: 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

G 500P B	B.Sc. (CHEMISTRY, MATHEMATICS)
MATHEMATICS	

PO 1

Disciplinary Knowledge: Bachelor degree in Mathematics is the culmination of in-depth knowledge of Algebra, Calculus, Geometry, differential equations and several other branches of pure and applied mathematics. This also leads to study the related areas such as computer science and other allied subjects

PO 2

Critical thinking and analytical reasoning: The students undergoing the programme acquire ability of critical thinking and logical reasoning and capability of recognizing and distinguishing the various aspects of real life problems.

PO 3

Problem Solving: The Mathematical knowledge gained by the students through the programme develop an ability to analyze the problems, identify and define appropriate computing requirements for its solutions. This programme enhances students overall development and also equip them with mathematical modelling ability, problem solving skills.

PO 4

Research related skills: Student completing the program will develop the capability of inquiring about appropriate questions relating to the Mathematical concepts in different areas of Mathematics.

<p>PO 5</p>	<p>Lifelong learning: The programme provides self-directed learning and lifelong learning skills. The programme helps the learner to think independently and develop algorithms and computational skills for solving real word problems.</p>
<p>Programme Specific Outcomes (PO):</p>	
<p>PSO 1</p>	<p>To be familiar with suitable tools of mathematical analysis to handle issues and problems in Mathematics and related sciences.</p>

PSO 2	Acquire sufficient knowledge and skills to undertake further studies in Mathematics and its allied areas on multiple disciplines concerned with Mathematics.
PSO 3	Develop a positive attitude towards mathematics as a technical language and valuable subject of study.

SEMESTER - I

G 503 DC1.1: Number Theory - I, Algebra-I and Calculus-I

Course Learning Outcomes: This course will enable the students to

Understand the elementary concepts of Number Theory.

Solve the system of homogeneous and non-homogeneous m linear equations in n variables.

Sketch curves in Cartesian and polar co-ordinates.

Identify and apply intermediate value theorem, mean value theorems and L'Hospital rule.

Open Elective Course

G 503 OE1.1: Mathematics - I

Course Learning Outcomes: This course will enable the students to

Understand the elementary concepts of Number Theory.

Solve the system of homogeneous and non-homogeneous m linear equations in n variables.

Identify and apply intermediate value theorem, mean value theorems and L'Hospital rule.

SEMESTER – II

G 503 DC1.2: Number Theory – II, Algebra-II and Calculus-II

Course Learning Outcomes: This course will enable the students to

Understand the Euler's ϕ -function and finite continued fractions.

Recognize the mathematical objects called Groups.

Identify cyclic and non-cyclic groups

Link the fundamental concepts of groups and symmetries of geometrical objects.

Understand the concept of partial derivatives of functions of several variables.

Find the Taylor's and Maclaurin's series of functions of two variables.

Find the extreme values of functions of two variables.

Understand the concepts of line integrals, multiple integrals and their applications.

Open Elective

(For students of Science stream who have not chosen Mathematics as one of the Core subjects)

G 503 OE1.2: Mathematics – II

Course Learning Outcomes: This course will enable the students to

Recognize the mathematical objects called Groups.

Identify cyclic and non-cyclic groups

Link the fundamental concepts of groups and symmetries of geometrical objects.

Find the extreme values of functions of two variables.

Understand the concepts of line integrals, multiple integrals and their applications.

Third Semester

G 503.3-paper 3

Number theory, group theory and multivariate calculus

Course Learning Outcomes: This course will enable the students to

understand the definition of congruences.

determine multiplicative inverses modulo n and use to solve linear congruences.

verify group properties in particular examples.

identify different types of groups.

use the definitions and properties of cosets and understand Lagrange's theorem.

use the two path criterion to show that a limit does not exist and apply it to the problems about limits.

evaluate partial derivatives including higher order derivatives and simple cases of chain rule and recognize the various notations used for partial derivatives.

determine the area and volume by applying the techniques of double and triple integrals.

III Semester Open Elective

G 503.3E Introduction to LaTeX

Course Learning Outcomes: This course will enable the students to

Type set mathematical formulae.

use nested list and enumerate environments.

create tabular and array environments.

create and import graphics into the LaTeX document.

use beamer to create presentations.

FOURTH SEMESTER

G 503.4 - paper-4

Functions of a complex variable, Number theory, group theory and real analysis.

Course Learning Outcomes: This course will enable the students to

use the Cauchy-Riemann Equations to determine whether/where a function is differentiable and find the derivative of a function.

perform basic mathematical operations (arithmetic, powers, roots) with complex numbers in Cartesian and polar forms.

determine continuity/differentiability/analyticity of a function and find the derivative of a function.

determine if a function is multiplicative using the Euler Phi-function.

use the concept of greatest common divisor to prove results relating to primitive Pythagorean triplets.

solve the problems of convergence and divergence of sequences and series.

determine whether or not real series are convergent by comparison with standard series or using the ratio test.

explain the definition of an infinite series as a limit of a sequence of partial sums.

IV Semester Open Elective

G 503.4E Applications of Basic Arithmetic (For other streams)

Course Learning Outcomes: This course will enable the students to

Have strong basic arithmetic and computational skills.

Be able to efficiently calculate and solve numerical problems faster.

Be prepared for aptitude based competitive exams.

Use tricks and shortcuts to solve problems on Calendar and clocks.

IV Semester Open Elective

G 503.4E Applications of Basic Arithmetic (For other streams)

30 Hours, 2 hours/week

Course Learning Outcomes: This course will enable the students to

Have strong basic arithmetic and computational skills.

Be able to efficiently calculate and solve numerical problems faster.

Be prepared for aptitude based competitive exams.

Use tricks and shortcuts to solve problems on Calendar and clocks.

Fifth Semester

G 503.5(a) - PAPER 5(a)

DIFFERENTIAL EQUATIONS, LAPLACE TRANSFORM AND ALGEBRA

Course Learning Outcomes: This course will enable the students to

Solve the homogeneous linear differential equations with constant coefficients.

Use the method “variations of parameters” to find to solution of higher-order linear differential equations with variable coefficients.

Relate the concepts of groups and rings.

Explain basic properties of Laplace transform.

Find Laplace transform of a function using gamma function and step function.

Will be able to use the Laplace transform in finding the solution of linear differential equations.

Sixth Semester

G 503.6(a) - PAPER 6(a)

PARTIAL DIFFERENTIAL EQUATIONS, FOURIER SERIES AND LINEAR ALGEBRA

Course Learning Outcomes: This course will enable the students to

apply different methods to solve the equation of the form

explain basic properties of Fourier transform.

recognize the concepts of the terms span, linear independence, basis, and dimension, and apply these concepts to various vector spaces and subspaces.

use matrix algebra and the related matrices to linear transformations.

to learn Inner Product spaces and Gram-Schmidt process of orthogonalization.

find Eigen values and Eigen vectors of a matrix which is used in the study of various other concepts.

DISCRETE MATHEMATICS

Course Learning Outcomes: This course will enable the students to

Verify whether an algorithm works well and perform analysis in terms of memory and time.

Formulate and model problems with the concepts and techniques of discrete mathematics.

Understand the role of set theory in various concepts of discrete mathematics and connect it to various other disciplines.

Apply techniques for constructing mathematical proofs, illustrated by examples in discrete mathematics.

Develop an understanding of how graph and tree concepts are used to solve problems arising in the computer science.

Understand the importance of difference equations and efficiently solve them.

NUMERICAL METHODS

Course Learning Outcomes: This course will enable the students to

Perform an error analysis for some method.

Approximate a function using an appropriate numerical method.

Solve a linear system of equations using an appropriate numerical method.

Derive appropriate numerical methods to solve interpolation based problems.

Calculate a definite integral using an appropriate numerical method.

Evaluate a derivative at a value using an appropriate numerical method.

GRAPH THEORY

60 hours; 5hrs/week; 150marks

Course Learning Outcomes: This course will enable the students to

Understand the language of graphs and trees.

Understand various types of trees and methods for traversing trees

Solve problems using basic graph theory.

Solve problems involving vertex and edge connectivity, planarity and crossing numbers.

Model real world problems using graph theory.

LINEAR PROGRAMMING

60 hours; 5hrs/week; 150marks

Course Learning Outcomes: This course will enable the students to

Explain basic concepts of optimization, modeling and linear modeling.

Distinguish the feasible solution, optimal solution and basic feasible solution.

Solve two variable linear programming problems with graphical method.

Explain the theory of simplex algorithm and approach.

Apply linear programming concepts to solve problems like transportation problems and assignment problem.

Model a problem as a linear programming problem and apply appropriate method to obtain optimal solutions.

MATHEMATICAL MODELING

60 hours, 5hrs/week; 150marks

Course Learning Outcomes: This course will enable the students to

Recognize the connections between Mathematics and other disciplines, how mathematical ideas are used in it.

Master principles and formulation, analysis of mathematical model system.

Model real world problems mathematically and analyse those models.

Able to identify linear programming assumptions and constraints.

Mention and discuss some applications of Mathematical modeling in various other fields.

Distribution Theory

60 hours, 5hrs/week; 150marks

Course Learning Outcomes: This course will enable the students to

Define expectation, and be introduced to its important linearity property.

Understand the properties of probability density functions and cumulative distribution functions.

Apply selected probability distributions to solve problems.

Develop problem-solving techniques needed to accurately calculate probabilities.

Acquire knowledge about some probability inequalities, law of large numbers, Central Limit Theorem etc.

Use Central Limit Theorem to solve a few real world based problems.

G 500P C	B.Sc. (PHYSICS, MATHEMATICS)
Done previously	
G 500P D	B.Sc. (PHYSICS, COMPUTER ANIMATION)
Done previously	
G 500P E	B.Sc. (MATHEMATICS, COMPUTER ANIMATION)

Done previously	
G 500P F	B.Sc. (MATHEMATICS, COMPUTER SCIENCE)
COMPUTER SCIENCE	

G 500P G	B.Sc. (PHYSICS, COMPUTER SCIENCE)
Done previously	
G 500P H	B.Sc. (STATISTICS, COMPUTER SCIENCE)
STATISTICS	

	<p>After successful completion of three year B.Sc. degree programme with Statistics as one of the major subjects in three major system, a student of Statistics should be able to;</p>
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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

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Course Outcomes

Semester - I

G 506.1: Descriptive Statistics and Probability Theory

**Course
Objectives**

Enable the students to understand the concepts of descriptive statistics.

Have a broad idea about the fields of application of the topics offered in the course.

After completion of this course students should be able to

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

	<p>Semester - I G 506.1a: Descriptive Statistics & Probability Theory Practical.</p>
<p>Course Objectives</p>	<p>Empower the students with the ability to understand and apply the statistical tools.</p> <p>Have a broad idea about the fields of application of the topics offered in the course</p>

Course Outcomes	<p>After completion of this course students should be able to</p> <p>CO-1. Analyse the data through correlation and regression analysis. Understand the applications of mathematical expectation.</p> <p>CO-2. Understand the concept of demand analysis with practical examples.</p> <p>CO-3. Find the mean and variance of the given random variable.</p>
	<p>Semester-I G 506.1E: Applied Statistics (CBCS)</p>

<p>Course Objectives</p>	<p>To understand the applications of Statistics through these measures.</p> <p>To give a broad idea about applications of Statistics in governance.</p>
<p>Course Outcomes</p>	<p>After completion of this course students should be able to</p> <p>CO-1. Understand the applications of Vital events, Life table in government policies and planning.</p> <p>CO-2. Apply the Statistical tools like Index Numbers and Time Series for real life situations.</p>
	<p>Semester- II G506.2:Probability Distributions</p>

Course Objectives	<p>Empower the students with the ability to know the theory behind various Probability Distributions.</p> <p>Understand the theoretical nature and properties of various probability distributions.</p> <p>Have a broad idea about the fields of application of various probability distributions.</p>
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<p>Course Outcomes</p>	<p>After completion of this course students should be able to</p> <p>CO-1: Understand the concept of mathematical expectation and its properties.</p> <p>CO-2: Have complete knowledge about standard discrete distributions and its applications.</p> <p>CO-3. Explain the various continuous probability distributions with mean, variance median, MGF and its applications.</p> <p>CO-4: Understand the theory of distribution functions of random variables using mgf and Jacobian transformation.</p>
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	<p>Semester- II G506.2a: Probability Distributions Practical.</p>
<p>Course Objectives</p>	<p>Empower the students with mathematical expectation with properties and theorems of expectation.</p> <p>To understand the various discrete and continuous Probability distributions with their properties and applications in real life.</p>

Course Outcomes	<p>After completion of this course students should be able to</p> <p>CO-1: Understand the applications of mathematical expectation. CO-1: Identify, relate and differentiate probability distributions and apply them in day to day life. CO-2: Have the ability to fit a probability distribution to the given data.</p>
	<p>Semester - II G 506.2E: Data Analysis using Ms Excel (CBCS)</p>

Course Objectives	To develop the Data Processing skill in MS Excel. To develop the Data Analysis and Data Visualization skill.
Course Outcomes	After completion of this course students should be able to CO-1: Analyse the data through MS Excel. CO-2: Acquire Data Visualization skills. CO-3. Have knowledge of statistical measures.
	Semester- III G506.3: Statistical Inference I

Course Objectives	<p>Familiarise the students with the importance of sample and population.</p> <p>Acquaint the students about the concept of a sampling distribution and order statistics.</p> <p>To understand the concept of Estimation theory with point and Interval estimation and make use of these tools in day to day life.</p>
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<p>Course Outcomes</p>	<p>After completion of this course students should be able to</p> <p>CO-1. Understand the sampling distributions like Chi-square, Student's t Snedecor's F distributions and the distribution of Order statistic.</p> <p>CO-2. Impart knowledge about probability inequalities and convergence concepts.</p> <p>CO-3. Understand the theory of point estimation, method of maximum likelihood estimation, method of moment and its applications.</p> <p>CO-4. Explain the theory of interval estimation and its applications.</p>
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	Semester- III G506.3a: Statistical Inference I, Practical
Course Objectives	This course will help the students to understand theory and applications of various probability inequalities, central limit theorem, point estimation and interval estimation.

Course Outcomes	<p>After completion of this course students should be able to</p> <p>CO-1. Understand the applications of probability inequalities, central theorem and WLLN.</p> <p>CO-2. Understand the applications of methods of point estimation.</p> <p>CO-3. Apply the theory of interval estimation to real life.</p>
	<p>Semester- III G 506.3E: Probability Distributions (CBCS)</p>

Course Objectives	Providing students with the applications of mathematical expectation. Equipping students with the knowledge of standard discrete and continuous probability distributions with their applications.
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Course Outcomes	<p>After completion of this course students should be able to</p> <p>CO-1. Understand the applications of mathematical expectation and its properties.</p> <p>CO-2. Have the knowledge of standard discrete probability distribution and its applications.</p> <p>CO-3. Understand continuous probability distributions its applications in day to day life.</p>
	<p>Semester- IV G506.4: Statistical Inference II</p>

Course Objectives	<p>This course will help in introducing the students to the fundamental knowledge of testing of Hypothesis and its applications in real life.</p> <p>Empower the students with the ability to be proficient for applying various Chi-square tests and interpret the result.</p> <p>Train the students in the applications of parametric and non-parametric tests.</p>
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<p>Course Outcomes</p>	<p>After completion of this course students should be able to</p> <p>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.</p> <p>CO-2: Apply various large sample, small sample and Chi-square test to real life situations and interpret the results.</p> <p>CO-3: Explain sequential testing and applications of Wald's test for probability distributions.</p> <p>CO-4: Understand the concept and derive the test statistic for various non-parametric tests. Also the applications of these tests.</p>
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	Semester- IV G506.4a: Statistical Inference II Practical.
Course Objectives	This course will help the students to make Statistical analysis of the real life situations and help policy makers to take a right decision.

<p>Course Outcomes</p>	<p>After completion of this course students should be able to</p> <p>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.</p> <p>CO-2. Know the applications of various small sample and large sample tests. Also to apply various Chi-square tests and interpret the result.</p> <p>CO-3. Apply SPRTTP for various probability distributions and take a Decision about sampling.</p> <p>CO-4. Know the applications of various non-parametric tests.</p>
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	<p>Semester- IV G 506.4E: Statistical Data Analysis using SPSS (CBCS)</p>
<p>Course Objectives</p>	<p>Expose the students to the analysis of statistical data.</p> <p>Train the students SPSS software.</p>
<p>Course Outcomes</p>	<p>After completion of this course students should be able to</p> <p>CO-1. Understand the measures of averages, variation, correlation and regression.</p> <p>CO-2. Train the students in data analysis using SPSS software.</p> <p>CO-3. Acquire knowledge in data handling and visualization.</p>
	<p>Semester- V G506.5a.: Designs of Experiments</p>

Course Objectives	<p>Acquaint students with the basics and some advanced concepts of Analysis of Variance (ANOVA).</p> <p>Imparting knowledge on planning the design of experiments and the design of experiments and methodologies used to obtain the maximum result.</p> <p>Enable to conduct experiments efficiently and effectively for missing data in the design.</p> <p>Analyzing the factorial data to obtain objective meaningful conclusions.</p>
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After completion of this course students should be able to

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

	<p>Semester- V G506.5b.: Elective (1) – Total Quality Management</p>
<p>Course Objectives</p>	<p>Give an awareness of applications of statistical tools in industry.</p> <p>Train the students in the analysis of various control charts.</p> <p>Expose the students for various methods of acceptance sampling plan.</p>

Course Outcomes	<p>After completion of this course students should be able to</p> <p>CO-1. Understand the concept of Total Quality Management in the production process and tools of TQM,</p> <p>CO-2. Explain the various tools and techniques of TQM and general theory of control charts.</p> <p>CO-3. Derive the control limits of various variable and attribute control charts and interpret the same.</p> <p>CO-4. Design acceptance sampling methods for attributes and variables</p>
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	<p>Semester- V G506.5a: Practical based on G506.5 and G506.5a Elective (1)</p>
<p>Course Objectives</p>	<p>Apply the various control charts for the problems related to production industry.</p> <p>Train the students to identify the best acceptance sampling method.</p> <p>Train the students for real applications of designs of experiment.</p>

Course Outcomes	<p>After completion of this course students should be able to</p> <p>CO-1. Explain the applications of various models of designs of experiment.</p> <p>CO-2. Analyse factorial experiments for real life.</p> <p>CO-3. Understand the applications of control charts in industry and analyse the given data.</p> <p>CO-4. Understand how to design a proper Acceptance Sampling Plan.</p>
	<p>Semester- V G506.5b. Elective (2) – Regression Analysis</p>

Course Objectives	Train the students for the applications of regression tools. Familiarize the students for multiple regression analysis.
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Course Outcomes	<p>After completion of this course students should be able to</p> <p>CO-1. Explain the meaning of Regression models, point and interval estimation using the regression equation, prediction and residual analysis.</p> <p>CO-2. Understand Multiple regression model, estimation of parameters testing and confidence intervals and prediction.</p> <p>CO-3. Build a regression model and analyse the given data.</p> <p>CO-4. Understand how to use various variable selection procedure and multiple regression approach to analysis of variance and experimental design.</p>
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	<p>Semester- V G506.5a: Practical based on G506.5 and G506.5a Elective (2)</p>
<p>Course Objectives</p>	<p>Apply the various control charts for the problems related to production industry.</p> <p>Train the students to identify the best acceptance sampling method.</p> <p>Train the students for real applications of designs of experiment.</p>

Course Outcomes	<p>After completion of this course students should be able to</p> <p>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.</p>
	<p>Semester- VI G506.6a: Sampling Theory</p>

Course Objectives	<p>Empower students to understand the importance of sample survey to make a decision about the population.</p> <p>Familiarise students with various sampling techniques and its applications.</p> <p>Train the students to take proper decision regarding the sampling method.</p>
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After completion of this course students should be able to

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

	<p>Semester- VI G506.6:Elective (1) – Operation Research</p>
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<p>Course Objectives</p>	<p>To impart knowledge in concepts and tools of Operations Research.</p> <p>To apply these techniques constructively to make effective business decisions.</p> <p>Ability to formulate mathematical models, understand and analyze managerial problems in industry so that they are able to use resources more effectively.</p> <p>Analyzing different situations in the industrial/ business scenario involving limited resources and finding the optimal solution within constraints.</p>
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	<p>After completion of this course students should be able to:</p> <p>CO-1. Understand the concept of OR, Linear programming problem, various methods of solving linear programming problem and its applications in industry.</p> <p>CO-2. Gain knowledge about transportation problems, applying various methods to real life situations and obtaining optimum solutions.</p> <p>CO-3. Understand the concepts of Assignment problem and Game Theory with their applications.</p> <p>CO-4. Familiarize the concepts of inventory problems and apply various types of EOQ models to solve the problems of industry.</p>
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**Course
Outcomes**

	<p>Semester- VI G506.6a.: Practical based on G506.6 and G506.6a Elective (1)</p>
<p>Course Objectives</p>	<p>Train the students for the applications of sampling theory in real life.</p> <p>Analyze the efficiency of various methods of sampling.</p> <p>Train the students for the applications of various optimisation tools.</p>

Course Outcomes	<p>After completion of this course students should be able to:</p> <p>CO-1. Understand how to draw a simple random sample with replacement and without replacement and find best estimates for the population.</p> <p>CO-2. Find out the efficiency of various methods of sampling and decide the best method for the situations under consideration.</p> <p>CO-3. Understand the applications of various optimal tools in industry.</p> <p>CO-4. Take a proper decision about the selection of one of the tools of optimization.</p>
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	Semester- VI G506.6a:Elective (2) Simulation
Course Objectives	<p>Expose the students to the concept of Simulation, areas of applications, systems and models of simulation.</p> <p>Familiarise students with the methods of Random number generation, random variate generation and variance reduction technique and their applications.</p>

Course Outcomes	<p>After completion of this course students should be able to:</p> <p>CO-1. Understand the technique of Simulation and its areas of applications.</p> <p>CO-2. Explain the method of random number generation and applications of various tests for random numbers.</p> <p>CO-3. Understand various random variate generation methods and how to apply these methods for different continuous probability distributions.</p> <p>CO-4. Apply Variance Reduction technique.</p>
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	<p>Semester- VI G506.6a.: Practical based on G506.6 and G506.6a Elective (2)</p>
<p>Course Objectives</p>	<p>Train the students for the applications of sampling theory in real life.</p> <p>Analyze the efficiency of various methods of sampling.</p> <p>Familiarise the students for the applications of various techniques of simulation and generation of random numbers from continuous distributions.</p>

	<p>After completion of this course students should be able to:</p> <p>CO-1. Understand how to draw a simple random sample with replacement and without replacement and find best estimates for the population.</p> <p>CO-2. Find out the efficiency of various methods of sampling and decide the best method for the situations under consideration.</p> <p>CO-3. Understand the applications of various simulation techniques.</p>
<p>Course Outcomes</p>	
<p>G 500P I</p>	<p>B.Sc. (ELECTRONICS, COMPUTER SCIENCE)</p>

ELECTRONICS	
G 500P J	B.Sc. (ECONOMICS, STATISTICS)
ECONOMICS	

Department of Economics BA

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.

BASIC ECONOMICS - I

CO 1: Identify the facets of an economic problem.

CO 2:Learn basic economic concepts and terms.

CO 3:Explain the operation of a market system.

CO 4:Analyze the production and cost relationship of a business firm.

CO 5:Evaluate the market decisions under different structure.

CO 6:Use basic cost benefit calculations as a means of decision making.

CONTEMPORARY INDIAN ECONOMY

CO 1:Students will be informative about the nature of Indian Economy.

CO 2:Students will be able to understand the current problems of Indian economy.

CO 3:Students will be able evaluate the impact of LPG policies on economic growth in India.

CO 4:Students will be able to review various the sector specific policies adopted for achieving the aspirational goals.

DEVELOPMENT STUDIES

CO 1: Students will develop a critical understanding of the contemporary issues in Indian economic development.

CO 2: Students will thus be better prepared to face the professional world and can use this knowledge base in a variety of jobs, including in the corporate.

BASIC ECONOMICS

CO 1: Explain how consumers make rational choices using the concept of utility

CO 2: To understand the concept of consumer surplus.

CO 3: Analyse the factors that affect market demand and market supply and illustrate their interaction for achieving equilibrium in price and quantity.

CO 4: Analyse how producer applies the marginal decision rule to maximize the profit in producing goods or services.

PRE-REFORMS INDIAN ECONOMY

CO 1: Trace the evolution of Indian economy.

CO 2: Students will be able to understand structural features of Pre reform Indian economy

CO 3: Students will be able evaluate the planning model and policies on economic growth in India.

CO 4: Students will be able to analyse various sector specific policies adopted for achieving the aspirational goals.

BUSINESS ECONOMICS

CO 1: Acquired the concepts, tools and techniques of economics in analyzing and interpreting the business decisions.

CO 2: Developed the insight of the functioning of the economy

BASIC ECONOMICS - II

CO 1: Understand about the operation of the overall economic system.

CO 2: Calculate national income and related aggregates.

CO 3: Explain the relationship between macroeconomic aggregates

CO 4: Analyse the nature of business cycles and policies to control them.

CO 5: Evaluate the macroeconomic policies for solving major problems like poverty and unemployment.

KARNATAKA ECONOMY

CO 1: Understand the nature, growth and problems of economy of Karnataka.

CO 2: Explain the process of growth of Karnataka Economy.

CO 3: Evaluate the policies and programmes undertaken by the Govt. of Karnataka for bringing about socio economic development.

ECONOMICS OF BUSINESS ENVIRONMENT

CO 1: Explain the elements of Business environment.

CO 2: Identify the environmental constraints in the growth of a business firm.

CO 3: Analyze the ways to utilise the current environmental conditions to achieve higher business growth.

MANAGERIAL ECONOMICS

CO 1: To know the basic knowledge of managerial economics.

CO 2: To understand the dynamics of business.

CO 3:To know about the managerial concept of business

CO 4:Helps the consumers and producers to take apt decisions

CONTEMPORARY INDIAN ECONOMY

CO 1: Students will be informative about the nature of Indian Economy.

CO 2: Students will be able to understand the current problems of Indian economy.

CO 3: Students will be able evaluate the impact of LPG policies on economic growth in India.

CO4: Students will be able to review various the sector specific policies adopted for achieving the aspirational goals.

MONETARY ECONOMICS

CO 1: Understand the current monetary policy and problems

CO 2: Identify and analyse monetary instruments

CO 3: Review the various trends and functions of monetary and financial institutions

SUSTAINABLE DEVELOPMENT

CO 1: Understand the interconnection within the ecosystem of all living beings.

CO 2: Identify the importance of sustainability.

CO 3:Identify factors to find solutions to environment problems that are relevant to protect the welfare of the people.

CO4:Analyse the sustainable goals at the national and international levels.

MICRO ECONOMCS

CO 1:Identify the facets of an economic problem.

CO 2:Learn basic economic concepts and terms.

CO 3:Explain the operation of a market system.

CO 4:Analyze the production and cost relationship of a business firm.

CO 5: Evaluate the market decisions under different structure.

CO 6: Use basic cost benefit calculations as a means of decision making.

STATISTICS FOR ECONOMICS

CO 1: Calculate basic descriptive and inferential statistics.

CO 2: Interpret descriptive and inferential statistics.

CO 3: Explain the process of hypothesis testing.

ECONOMICS OF INSURANCE

CO 1: Understand various types of Insurance

CO 2: Understand various risks and Benefits of Insurance

MONEY AND PUBLIC FINANCE

CO 1: 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 2: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 3:Explain the varying effects of public expenditure on the economy and role of public expenditure in a developing economy

CO 4: 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.

MACRO ECONOMICS

CO 1: On successful completion of the course the student is expected to get

CO2: a thorough understanding of the various theories behind pricing of products and factors in different market environment.

CO 3: Ability to identify and evaluate the main models of market structures and to appreciate the theories behind policy prescriptions.

CO 4: 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.

MATHEMATICS FOR ECONOMICS

CO 1: Perform basic operations in Vectors and Matrix algebra.

CO 2: Calculate limits, derivatives and integrals of functions of multiple variables.

CO 3 : Calculate Optima for constrained and unconstrained optimization problems encountered in Economics.

ENTREPRENEURIAL ECONOMICS

CO 1: Understand various concepts of entrepreneurship

CO 2: Absorb Skills of entrepreneurship

CO 3: Understand various sources of financing project

INTERNATIONAL ECONOMICS

CO 1: Able to identify and analyse different theoretical models of international economics in light of real world situations.

CO 2: Understand major issues in international finance

CO 3: Able to deal with the problems of international finance analytically

CO 4: 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.

B.Sc

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.

MICRO ECONOMICS I

CO 1: Analyse the economic behaviour of the consumer and the firm.

CO 2: Explain the relationship between various variables such as Input and output, cost and output, price of the product and quantity demand.

CO 3: Product and Factor pricing under different market structure.

MATHEMATICS FOR ECONOMICS

CO 1: Perform basic operations in Vectors and Matrix algebra.

CO 2: Calculate limits, derivatives and integrals of functions of multiple variables.

CO 3: Calculate Optima for constrained and unconstrained optimization problems encountered in Economics.

DEVELOPMENT STUDIES

CO 1: Students will develop a critical understanding of the contemporary issues in Indian economic development.

CO 2: Students will thus be better prepared to face the professional world and can use this knowledge base in a variety of jobs, including in the corporate.

MACRO ECONOMICS I

CO 1: Explain the concept of National Income and methods of its estimation.

CO 2: Analyse the relationship between Macroeconomic variables.

CO 3: Understand the determination of income and employment under Classical and Keynesian framework

STATISTICS FOR ECONOMICS

CO 1: Calculate basic descriptive and inferential statistics.

CO 2: Interpret descriptive and inferential statistics.

CO 3: Explain the process of hypothesis testing.

ECONOMICS OF BUSINESS ENVIRONMENT

CO 1: Explain the elements of Business environment.

CO 2: Identify the environmental constraints in the growth of a business firm.

CO 3: Analyze the ways to utilise the current environmental conditions to achieve higher business growth.

MICRO ECONOMICS II

CO 1: Identify the facets of an economic problem.

CO 2: Learn basic economic concepts and terms.

CO 3: Explain the operation of a market system.

CO 4: Analyze the production and cost relationship of a business firm.

CO 5: Evaluate the market decisions under different structure.

CO 6: Use basic cost benefit calculations as a means of decision making.

BASIC ECONOMETRICS

CO 1: To know the basic knowledge of Econometrics.

CO 2: To understand the concepts like multicollinearity, heteroscedasticity, Autocorrelation and their applications.

CO 3: Helps the students to solve analytical problems related to regression.

ECONOMICS OF INSURANCE

CO 1: Understand various types of Insurance

CO 2: Understand various risks and Benefits of Insurance

MACRO ECONOMICS II

CO 1: On successful completion of the course the student is expected to get

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: 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.

APPLIED ECONOMETRICS

CO 1:To know the basic knowledge of Econometrics.

CO 2:To understand the dynamic econometric models.

CO 3:Helps to improve analytical skills.

ENTREPRENEURIAL ECONOMICS

CO 1:Understand various concepts of entrepreneurship

CO 2:Absorb Skills of entrepreneurship

CO 3:Understand various sources of financing project

G 500P K	B.Sc. (ECONOMICS, MATHEMATICS)
Done previously	

G 500P L	B.Sc. (PHYSICS, ELECTRONICS)
Done previously	
G 500P M	B.Sc. (MATHEMATICS, ELECTRONICS)
Done previously	
G 500P N	B.Sc. (MATHEMATICS, STATISTICS)
Done previously	
G 500B A	B.Sc. (BIOCHEMISTRY, ZOOLOGY)
BIOCHEMISTRY	
CHEMISTRY (
AMME OUTCO	
PO 1	To create interest in Biochemistry and appreciation for chemical basis of biological processes.

P02	To inculcate the spirit of inquiry and value of systematic study of a discipline. Provides general understanding of the related disciplines with a holistic knowledge generation in biological sciences.
P03	To provide an in-depth understanding of chemical reaction mechanisms in biological processes.
P04	To provide a flavor of historical developments of enzymes and their applications in research, diagnostics and various industries.

P05	Gain proficiency in basic laboratory techniques and be able to apply the scientific method to the processes of experimentation, hypothesis testing, data interpretation and logical conclusions.
P06	Develop problem solving and analytical skills through case studies, research papers and hands-on-experience
P07	To appreciate biochemical mechanistic basis of physiological processes, metabolism under normal and pathological conditions importance and levels of metabolic regulations.

PO8	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.
PO9	To bridge the knowledge and skill gap between academic out and industry requirements.
PO10	To give students experience in conducting independent, hypothesis-driven, biological research, project planning and management

PO 11	To provide skills to publish research findings, and awareness of IP rights, and scientific publication ethics and problems of plagiarism.
PO 12	To prepare competent human resource with better knowledge, hands-on-experience and scientific attitude, at national and global levels for careers in research and development, academia and Pharma-, biotech- and agro-, and food processing industries.

PROGRAMME SPECIFIC OUTCOME (PSO)

On successful completion of this program student will specifically able to
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.
Describe methods to study the structures of these molecules and to synthesize them.
Describe the mechanisms by which the structures of proteins determine their functions and by which their functions are regulated.
Explain how enzymes function in terms of thermodynamics, transition states, and kinetics. Perform

SEMESTER I

COURSE CODE:- G510 DC.1.1

Course Outcome:

This will inculcate confidence and clarity of mind in students to understand the chemistry of Biomolecules and Biological reactions.

COURSE CODE:- G510 OE 1.1

Course Outcome:

This open elective course offering to students of various streams gives knowledge about biomolecules in their cellular environment. Further, they will learn basic chemistry of amino acids, peptides, sugars, polysaccharides, nucleosides, nucleotides, nucleic acids, lipids, vitamins, coenzymes and metal ions.

COURSE CODE:- G510 DC 2.1P

Course Outcome:

This course aims to familiarize students with the principles of analytical chemistry and basic analytical techniques such as volumetric analysis. Course objective is to provide experimental practice of quantitative volumetric analysis. Upon successful completion students should be able to make solutions of various molar, normal concentrations and determine the amount of a substance in a given sample.

SEMESTER II

COURSE CODE:- G510 DC 1.2

Course Outcome

These topics will enable students to understand the fundamentals of chemical processes in biological systems.

COURSE CODE:- G510 OE 1.2

Course Outcome

Proteins: The course aims to introduce proteins and their importance to modern Biochemistry, highlighting their structural features and unique characteristics that help them participate in every physiological process in life.

Enzymes: The objective of this course is to integrate the practical aspects of enzymology with the kinetic theories to provide a mechanistic over view of enzyme activity and regulation in the cell.

To prepare students to confidently and competently work with enzyme systems in both Academia and industry.

COURSE CODE:- G510 DC 2.2P

Course Outcome:

The Course Objective is to provide experimental practice of quantitative and qualitative analysis. Also it provides training in physical chemistry laboratory techniques. Upon successful completion, students should develop skills in handling instruments and understand its application in research work.

SEMESTER III

COURSE CODE: - G510 DC 1.3

Course Outcome

These topics will enable students to understand the fundamentals of organic chemistry pertinent to their importance in understanding biochemical reactions.

COURSE CODE:- G510 OE 1.3

Course Outcome

These topics will enable students to develop competence in handling various chromatographic, electrophoretic and isotopic techniques and apply them in isolating and characterizing different biological molecules.

COURSE CODE:- G510 DC 2.3P

Course Outcome:

This course aims to familiarize students with the principles of organic chemistry and basic qualitative analysis of organic compounds. Course objective is to provide experimental practice of preparation of organic compounds and extraction of biologically important compounds.

SEMESTER IV

COURSE CODE:- G510 DC 1.4

Course Outcome

These topics will enable students to develop competence in handling various chromatographic, electrophoretic and isotopic techniques and apply them in isolating and characterizing different biological molecules.

COURSE CODE:- G510 OE 1.4

Course Outcome

These topics will enable the students to

Understand the plant cell, photosynthesis, transporters, and important primary metabolites.

Illustrate plant growth regulators, plant's responses to various biotic and abiotic stresses.

Explain about plant secondary metabolites and their functional importance.

COURSE CODE:- G510 DC 2.4P

Course Outcome:

This course aims to provide experimental practice of analytical techniques in Biochemistry. Upon successful completion, students should develop skills in handling instruments and understand its application in research work.

Sourcing and handling biological samples.

Develop skill and proficiency in basic techniques

Centrifugation
Chromatography
Electrophoresis and
Spectroscopy
<u>SEMESTER V</u>
COURSE CODE:- G510.5a
<u>Course Outcome</u>
ZOOLOGY

G 500B B	B.Sc. (BIOCHEMISTRY, BOTANY)
Botany	
BOTANY	
PROGRAME OUTCOMES (PO)	
P01.	Get an opportunity in further studies, research and employment in various areas of life sciences

P02.	Enhance their knowledge in the field of life sciences and are able to handle laboratory equipments and experimentation for higher education leading to research
P03.	Enhance the scope of employability by obtaining all-round knowledge in the allied subjects along with Botany.
P04.	Develop an awareness towards the environment, biodiversity, conservation and their significance.
P05.	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
PROGRAMME SPECIFIC OUTCOMES (PSO)	
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
COURSE OUTCOMES (CO)	
FIRST SEMESTER VIRUS, BACTERIA &ALGAE	
CO1.	Acquire the basic knowledge of classification in lower groups of organisms
CO2.	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

**CBCS -ELECTIVE PAPER
ORGANIC FARMING**

C01.	Understand the concept and importance of organic farming
C02.	Maintain and improve soil health condition
C03.	Understand sustainable management of natural resources

**SECOND SEMESTER
FUNGI, PLANT PATHOLOGY, BRYOPHYTES AND PLANT ANATOMY**

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
CBCS -ELECTIVE PAPER PLANT NUTRACEUTICALS	

C01.	Understand the benefits of food and nutraceuticals
C02.	Understand the effects on human health and potential applications in risk reduction of diseases
THIRD SEMESTER PTERIDOPHYTES, GYMNOSPERMS, MORPHOLOGY AND EMBRYOLOGY OF ANGIOSPERMS	
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
CBCS - ELECTIVE PAPER MEDICINAL BOTANY	
C01.	Understand the concept of plant based medicine
C02.	Know the Medico-ethnobotanical sources
C03.	Identify local wild edible and medicinal plants
FOURTH SEMESTER PLANT TAXONOMY, ETHNOBOTANY AND ECONOMIC BOTANY	

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
CBCS - ELECTIVE PAPER NURSERY MANAGEMENT AND GARDENING	
C01.	Understand the concept and importance of gardening
C02.	Maintain a nursery

C03.	Commercialize the knowledge
FIFTH SEMESTER	
PAPER V PLANT ECOLOGY & SUSTAINABLE DEVELOPMENT	
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.
PAPER VI CYTO GENETICS AND MOLECULAR BIOLOGY	
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.
SIXTH SEMESTER	
PAPER VII PLANT PHYSIOLOGY	

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
PAPER VIII PLANT BIOTECHNOLOGY, PHYTOCHEMISTRY AND PHARMACOGNOSY	
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

CO3.	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
CO4.	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
G 500B C	B.Sc. (BIOCHEMISTRY, CHEMISTRY)
Done previously	
G 500B D	B.Sc. (BIOTECHNOLOGY, CHEMISTRY)
BIOTECHNOLOGY	

NEP I and II semester PO's, PSO's, CO
Program Outcomes:

By the end of the program the students will be able to:

PO 1. Understand concepts of Biotechnology and demonstrate interdisciplinary skills acquired in cell biology, genetics, biochemistry, microbiology, and molecular biology.

PO 2. Apply the knowledge and skills gained in the fields of plant biotechnology, animal biotechnology and microbial technology in pharma, food, agriculture, beverages, herbal and nutraceutical industries.

PO 3. Critically analyze environmental issues and apply the biotechnology knowledge gained for conserving the environment and resolving environmental problems.

PO 4. Demonstrate comprehensive innovations and skills in the fields of biomolecules, molecular biology, enzyme technology, bioprocess engineering and genetic engineering of plants, microbes, and animals with respect to applications for human welfare.

PO 5. Apply the knowledge and skills of immunology, bioinformatics, computational modelling of proteins, drug design and simulations to test models and aid in drug discovery.

PO 6. Critically analyze, interpret data, and apply tools of bioinformatics and multi-omics in various sectors of biotechnology including health and food.

PO 7. Demonstrate communication skills, scientific writing, data collection and interpretation abilities in all the fields of biotechnology.

PO 8. Learn and practice professional skills in handling microbes, animals and plants and demonstrate the ability to identify ethical issues related to recombinant DNA technology, genetic engineering, animals handling, intellectual property rights, biosafety, and biohazards.

PO 9. Explore the biotechnological practices and demonstrate innovative thinking in addressing the current day and future challenges with respect to food, health, and environment.

PO 10. Demonstrate thorough knowledge and application of good laboratory and good manufacturing practices in biotech industries.

PO 11. Apply the molecular biology principles and techniques in forensic and clinical biotechnology.

PO 12. Demonstrate entrepreneurship abilities, innovative thinking, planning, and setting up of small-scale enterprises or CROs.

SEMESTER – I

G 511 DC1.1 CELL BIOLOGY AND GENETICS	56 hours
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Course Outcomes:

After successful completion of this Course, students will be able to:

CO 1. Acquire a deep insight on the concepts of cell biology and genetics.

CO 2. Describe the ultrastructure of cells, structure and function of organelles, cytosol and cytoskeleton

CO 3. Illustrate the phases of cell cycle, cell division, reductional division in gametes, molecular mechanisms that regulate life and death of a cell including programmed cell death or apoptosis and differentiation in plants

CO 4. Comprehend the organization and structure of chromosomes, banding techniques and Mendelian laws of inheritance, deviations, and exceptions to these laws.

CO 5. Describe mutations and its types, genetic or hereditary disorders.

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G 511 DC2.1P CELL BIOLOGY AND GENETICS PRACTICAL 56 hours
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Course outcome:

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After successful completion of this Course, students will be able to:

CO 1. Interpret the different stages of cell division and to calculate the mitotic index.

CO.2. Measure the size of cells and to count the number of cells using haemocytometer.

CO 3. Demonstrate the handling of *Drosophila melanogaster*, the model organism for genetic studies.

CO 4. Describe the principles and procedures of genetic techniques in biological experiments.

CO 5. Perform the perform the karyotyping analysis and solve various genetics problems

Open Elective Courses SEMESTER – I

G 511 OE1.1 BIOTECHNOLOGY FOR HUMAN WELFARE 42 hours

Course Outcomes:

After successful completion of this Course, students will be able to: CO 1. Apply the biotechnological concepts in the industry

CO 2. Implement the biotechnological techniques in environmental management

CO 3. Describe application of biotechnology to forensic science

CO 4. Comprehend contributions of biotechnology to biomedical fields, such as diagnostics, genomics and therapeutics

Skill Enhancement Course SEMESTER – I

BIOTECHNOLOGICAL SKILLS AND ANALYTICAL TECHNIQUES 14 hours

Course Outcomes:

After successful completion of this Course, students will demonstrate the:

CO 1. Skill enhancement as per National Occupational Standards (NOS) of “Lab Technician/ Assistant” Qualification Pack issued by Life Sciences Sector Skill Development Council – LFS/Q0509, Level 3.

CO 2. Knowledge about major activities of biotech industry, regulations, and compliance, environment, health, and safety (EHS), good laboratory practices (GLP), standard operating procedures (SOP) and GMP as per the industry standards.

CO 3. Soft skills, such as decision making, planning, organizing, problem solving, analytical thinking, critical thinking, and documentation.

SEMESTER – II

G 511DC1.2 MICROBIOLOGICAL METHODS AND TECHNIQUES 56 hours

Course Outcomes:

After successful completion of this Course, students will be able to: CO 1. Employ the principles of microscopy to study microorganisms CO 2. Apply the analytical techniques in microbiology.

CO 3. Comprehend the importance and methods of sterilization in microbiological work

CO 4. Delineate the formulation of media, culture methods and staining techniques for isolation, characterization of microbes

CO 5. Apply the knowledge of antimicrobial agents in anti- microbial assays.

G 511 DC 2.2P Microbiological methods and techniques Practical

Course Outcomes:

After successful completion of this Course, students will be able to:

CO 1. Handle and use instruments used in Microbiology and Biotechnology laboratories CO 2. Use analytical techniques for work using microorganisms

CO 3. Experiment with various methods of sterilization in microbiological work

CO 4. Prepare different types of media, perform culture methods and staining techniques for isolation, characterization of microbes

CO 5. Handle and use antimicrobial agents and perform anti-microbial assays

SEMESTER – II Open Elective Courses

G 511 OE1.2 APPLICATIONS OF BIOTECHNOLOGY IN AGRICULTURE 42 hours

Course Outcomes:

After successful completion of this Course, students will be able to: CO 1. Employ the biotechnological approaches in agriculture

CO 2. Apply biotechnological methods in plant tissue culture

CO 3. Comprehend the pros and cons of GM crops and their plant products

Biotechnology CBCS scheme
B.Sc. (BIOTECHNOLOGY, CHEMISTRY, ZOOLOGY)
PROGRAMME OUTCOMES
PO 1: Students will improve English language skills and gain confidence to use an international language and become competent global citizens in the age of globalization.
PO 2: Ability to acquire, articulate, retain knowledge relevant to Biotechnology and integrate technologies through an inter-disciplinary learning habit
PO 3: Ability 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 globally and nationally.
PO 4: To create an awareness on the impact of Chemistry on the global environment, society at national, regional and local levels, and one its development outside the scientific community.
PO 5: To provide students with the necessary knowledge and skills imparted through the discipline of Chemistry to carry out a successful research career in industry or academia or as an entrepreneur.
PO 6: Create awareness of various branches in Zoology to pursue higher education, to understand recent advances in various fields of Applied Zoology, and to take up independent research work to develop a scientific temper.
PO 7: Acquire knowledge of the global, national, regional and local faunal diversity and understand the importance of its conservation through Zoology.
PROGRAMME SPECIFIC OUTCOMES
PSO 1: Students will improve their English reading and interpreting skills on issues at national and regional level and through their contemporaneity will contextualize language to critically articulate their thoughts in classroom discussions. Hence students should be able to distinguish between formal, colloquial, journalistic, poetic, scientific forms and registers of English language.

PSO 2: To understand the concepts and principles of Biotechnology with an ability to design, conduct experiments, analyze and interpret data for investigating problems in Biotechnology and allied fields.

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: Students will have a firm foundation in the fundamentals and applications of Chemistry and its multidisciplinary approach towards physical or biological sciences.

PSO 5: Students through the study of Chemistry 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 6: Understand the nature and basic concepts of cell biology, genetics, taxonomy, physiology, ecology and applied Zoology

PSO 7: Analyse the relationships among animals and plants through Zoology

B.Sc. (BIOTECHNOLOGY, CHEMISTRY, BOTANY)

PROGRAMME OUTCOMES

PO 1: Students will improve English language skills and gain confidence to use an international language and become competent global citizens in the age of globalization.

PO 2: Ability to acquire, articulate, retain knowledge relevant to Biotechnology and integrate technologies through an inter-disciplinary learning habit

PO 3: Ability 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 globally and nationally.

PO 4: To create an awareness on the impact of Chemistry on the global environment, society at national, regional and local levels, and one its development outside the scientific community.

PO 5: To provide students with the necessary knowledge and skills imparted through the discipline of Chemistry to carry out a successful research career in industry or academia or as an entrepreneur.

PO 6: Develop an awareness towards the environment, biodiversity, conservation and their significance through the study of Botany.

PO 7: Enhance the scope of higher studies, research, and employability by obtaining all-round knowledge in the allied subjects along with Botany.

PROGRAMME SPECIFIC OUTCOMES

PSO 1: Students will improve their English reading and interpreting skills on issues at national and regional level and through their contemporaneity will contextualize language to critically articulate their thoughts in classroom discussions. Hence students should be able to distinguish between formal, colloquial, journalistic, poetic, scientific forms and registers of English language.

PSO 2: To understand the concepts and principles of Biotechnology with an ability to design, conduct experiments, analyze and interpret data for investigating problems in Biotechnology and allied fields.

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: Students will have a firm foundation in the fundamentals and applications of Chemistry and its multidisciplinary approach towards physical or biological sciences.

PSO 5: Students through the study of Chemistry 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 6: Understand the basic Botany concepts of plant taxonomy, pathology, anatomy, embryology, evolution, physiology, genetics, molecular biology, plant biotechnology, phytochemistry, pharmacognosy, ecology & sustainable development

PSO 7: 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

THIRD SEMESTER MICROBIOLOGY AND IMMUNOLOGY G511.3

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

CBCS -ELECTIVE PAPER PLANT TISSUE CULTURE & MUSHROOM CULTURE TECHNIQUES G511.3E

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

FOURTH SEMESTER Molecular Biology and Recombinant DNA Technology G511.4

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.

CBCS -ELECTIVE PAPER IMMUNE SYSTEM AND DISEASE MANAGEMENT G511.4E

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.

FIFTH SEMESTER PAPER-5 Plant Biotechnology G511.5a

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

PAPER-6 Animal Biotechnology G511.5b

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.6. How transgenic animals are generated, what are the pros and cons along with ethical issues associated with transgenesis.

SIXTH SEMESTER PAPER-7 ENVIRONMENTAL BIOTECHNOLOGY G511.6a

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.

PAPER-8 Bioprocess Technology G511.6b

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

G 500B E	B.Sc. (BIOTECHNOLOGY, BOTANY)
Done previously	
G 500B F	B.Sc. (BIOTECHNOLOGY, ZOOLOGY)
Done previously	
G 500B G	B.Sc. (BOTANY, ZOOLOGY)
Done previously	
G 500B H	B.Sc. (CHEMISTRY, BOTANY)

Done previously	
G 500B I	B.Sc. (MICROBIOLOGY, BOTANY)

DEPARTMENT OF MICROBIOLOGY
NEP 1st and 2nd Semester POs, PSOs, and, COs
1. PO. Have a knowledge and understanding of concepts of microbiology and its application in the pharma, food, agriculture, beverages, and nutraceutical industries.
2. PO. Understand the distribution, morphology, and physiology of microorganisms and demonstrate skills in aseptic handling of microbes including isolation, identification, and maintenance.
3. PO. Competent to apply the knowledge gained for conserving the environment and resolving environmental-related issues.
4. PO. Learning and practicing professional skills in handling microbes and contaminants in laboratories and production sectors.
5. PO. Exploring the microbial world and analyzing the specific benefits and challenges.
6. PO. Applying the knowledge acquired to undertake studies and identify specific remedial measures for the challenges in the health, agriculture, and food sectors.
7. PO. Thorough knowledge and application of good laboratory and good manufacturing practices in microbial quality control.
8. PO. Understanding biochemical and physiological aspects of microbes and developing broader perspectives to identify innovative solutions for present and future challenges posed by microbes.
9. PO. Understanding and application of microbial principles in forensic and working knowledge about clinical microbiology.
10. PO. Demonstrate the ability to identify ethical issues related to recombinant DNA technology, GMOs, intellectual property rights, biosafety, and biohazards.
11. PO. Demonstrate the ability to identify key questions in microbiological research, optimize research methods, and analyze outcomes by adopting scientific methods, thereby improving employability.

12. PO. Enhance and demonstrate analytical skills and apply basic computational and statistical techniques in the field of microbiology.

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PSO.1. Acquired knowledge and understanding of the microbiology concepts as applicable to diverse areas such as medicine, industry, environment, genetics, agriculture, food, and others.

PSO.2. 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.

PSO.3. Competent enough to use microbiology knowledge and skills to analyze problems involving microbes, articulate these with peers/ team members/ other stakeholders, and undertake remedial measures/studies, etc.

PSO.4. 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.

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I SEMESTER

G 509 DC1.1 General Microbiology

Course Outcomes

Outcome 1. Have developed a good knowledge of the development of the discipline of Microbiology and the contributions made by prominent scientists in this field.

Outcome 2. Have developed a very good understanding of the characteristics of different types of microorganisms, methods to organize/classify these, and basic tools to study these in the laboratory.

Outcome 3. Describe the nutritional requirements of bacteria for growth; developed knowledge and understanding that besides common bacteria there are several other microbes that grow under extreme environments.

Outcome 4. Perform basic laboratory experiments to study microorganisms; methods to preserve bacteria in the laboratory; calculate generation time of growing bacteria.

Outcome 5. Are able to perform basic experiments to grow and study microorganisms in the laboratory.

OE: Microorganisms for Human Welfare -G509.IOE

Course Outcomes

Outcome 1. Acquire knowledge of the importance of microbes in human welfare.

Outcome 2. Acquire knowledge of the importance of microbes in agriculture.

Outcome 3. Acquire knowledge of the importance of microbes in pharmacy.

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II SEMESTER

G 509 DC1.2. Microbial Biochemistry and Physiology

Course Outcomes

Outcome 1. Have developed a good knowledge of biochemical concepts with regard to the chemical bonds in biological compounds.

Outcome 2. Have developed a very good understanding of the characteristics of Structure and properties of Water as a universal solvent, polarity, hydrophilic and hydrophobic interactions, properties of water, Acids, bases, electrolytes, hydrogen ion concentration, pH, and buffers.

Outcome 3. Describe the definition, classification, structure, and properties of carbohydrates and amino acids and proteins, lipids; fatty acids: types and classification, Vitamins

Outcome 4. Have an understanding of the principles of bioenergetics and the role of respiration in the synthesis of energy molecules.

Outcome 5. Perform biochemical tests with the application of biochemical principles.

G509.2OE: Bacteriology**Course Outcomes**

Outcome 1. Acquire knowledge of bacteria.

Outcome 2. Acquire knowledge of the control of microorganisms.

Outcome 3. Acquire knowledge of the nutrition of microbes.

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CBCS Scheme: MICROBIOLOGY

B.Sc. (Chemistry, Microbiology, Botany)

B.Sc. (Chemistry, Microbiology, Zoology)

PROGRAMME OUTCOMES (POs)

PO 1: Students will improve their English language skills and gain confidence to use an international language and become competent global citizens in the age of globalization.

PO 2: To create an awareness of the impact of Chemistry on the global environment, society at national, regional, and local levels, and its development outside the scientific community.

PO 3: To provide students with the necessary knowledge and skills imparted through the discipline of Chemistry to carry out a successful research career in industry or academia or as an entrepreneur.

PO 4: To inculcate the basic concepts of biochemistry including an understanding of the fundamental biochemical principles and apply the major theories and research procedures to contemporary social problems. The program will also provide a general understanding of the inter disciplines with a holistic approach in biological sciences.

PO 5: The program will prepare students to plunge into various fields of higher education or related profession in various disciplines, armed with a plethora of knowledge, hands-on experience, and scientific attitude, at national and global levels.

PO 6: Develop an awareness of the environment, biodiversity, conservation, and their significance through the study of Botany.

PO 7: Enhance the scope of higher studies. research, and employability by obtaining all-around knowledge in allied subjects along with Botany.

PROGRAMME SPECIFIC OUTCOME (PSOs)

PSO 1. Acquired knowledge and understanding of the microbiology concepts as applicable to diverse areas such as medicine, industry, environment, genetics, agriculture, food, and others.

PSO2. 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.

PSO3. Competent enough to use microbiology knowledge and skills to analyze problems involving microbes, articulate these with peers/ team members/ other stakeholders, and undertake remedial measures/ studies, etc.

PSO4. 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.

THIRD SEMESTER

Microbial Physiology and Metabolism G 509.3

CO.1. Understand the basics of bioenergetics and the role of ATP in Metabolism. Other Energy rich molecule's structure and significance.

CO.2. Describing the growth characteristics of the microorganisms capable of growing under the unusual environmental condition of temperature, oxygen, and solute and water activity.

CO3. Describing the growth characteristics of the microorganisms which require different nutrients for growth and the associated mechanisms of energy generation for their survival like autotrophs, heterotrophs, chemolithoautotrophs, etc.

CO 4. Differentiating concepts of aerobic and anaerobic respiration and how these are manifested in the form of different metabolic pathways in microorganisms.

CO.5. Describe the biogeochemical cycles and mineral transformation by microbes.

CBCS -ELECTIVE PAPER

Basic Concepts of Food Safety. G509.3E

CO.1. Understand the concepts of food safety and the significance of food safety.

CO.2. Have developed a very good understanding of sanitation and hygiene in the food sector.

CO.3. Gained knowledge of a variety of methods of pest control to ensure food safety.

FOURTH SEMESTER

Microbial Ecology and Environmental Microbiology. G509.4

CO.1. Has 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.

CO.2. Are able to identify the important role microorganisms play in maintaining a 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

CO. 3. Have understood the significance of microbes in air and air sanitation.

CO.4. Have developed practical skills for conducting experiments.

CO-5 Is able to understand the methods of examination of soil microbes.

CBCS -ELECTIVE PAPER Solid Waste Management G 509.4E

CO.1. Understand the concepts and categories of solid waste

CO.2. Have developed a very good understanding of types of e-waste.

CO.3. Gained knowledge of a variety of methods of safe disposal of solid and e-waste.

FIFTH SEMESTER

PAPER-5 Medical Microbiology and Immunology G509.5a

CO.1 Understand the basic concepts of immunology and the types of the immune system.

CO.2. 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. CO.3. Developed a thorough understanding of common bacterial, viral, fungal, and parasitic diseases of human beings including some very important diseases of the animals also.

CO.4. 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.

CO.5 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)

PAPER-6 Plant Microbiology and Bioremediation G509.5b

CO.1. Developed a clear understanding of the multifarious roles of microorganisms in the soil, in association with plants. CO.2. Are able to describe the role of microorganisms in the production of plant diseases and biological control.

CO.3. Are able to identify the role of microorganisms in the causation of diseases in plants.

CO.4. Understand the role of microorganisms in the biodegradation of organic pollutants and natural compounds.

CO.5. Develop a clear understanding of composting organic waste and the role of microbes in composting.

SIXTH SEMESTER

PAPER-7 Principles of Bacterial Genetics, Genetic Engineering, and Bioinformatics G509.6a

CO.1. Has acquired knowledge of genes, their expression, and regulation of expression. Has acquired a fairly good understanding of mechanisms of genetic exchange, mutations, and their implications.

CO.2. Has developed practical skills for the isolation of bacteria/plasmid DNA

CO3. Has acquired a fairly good knowledge of the tools and methods for genetic engineering.

CO 4. Developed skills to use computers for the analysis of biological data.

CO.5. Skill to use important biological databases, using tools to retrieve data, and comparing the data of the biological macromolecules. Developed basic skills for data retrieval, representation, analysis, and interpretation.

PAPER-8 Applied Microbiology G509.6b

CO.1. Has acquired a fairly good knowledge of microbes in food and their role in food spoilage.

CO.2. Has acquired knowledge of various methods of food preservation.

CO3. Has acquired knowledge of spoilage of selective foods and their preservation

CO 4. Has acquired knowledge of fermentation types and production of organic acids, alcohols, enzymes, antibiotics, and various foods in the industry.

CO.5. Has acquired knowledge of how microbes are involved in milk spoilage and milk preservation.

G 500B J	B.Sc. (CHEMISTRY, ZOOLOGY)
Done previously	
G 500B K	B.Sc. (CHEMISTRY, MICROBIOLOGY)
Done previously	

G 500B L	B.Sc. (FOOD SCIENCE, CHEMISTRY)
Programme Outcomes (PO):	
By the end of the program it is expected that the students will be benefited by the following:	
PO 1	<p style="text-align: center;">Disciplinary Knowledge: Bachelor degree in Food Technology helps to apply the knowledge of science, engineering fundamentals, and mathematical concepts to the solution in the field of food technology, science and other allied subjects</p>

PO 2	Communication Skills: Communicate effectively and write effective reports and design documentation, make effective presentations through seminars, project dissertations
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PO 3	<p>Critical thinking and analytical reasoning: Recognize the need for, and have the preparation and ability to engage in independent/as an entrepreneur and life-long learning in the broadest context of technological change logical reasoning and capability of recognizing and distinguishing the various aspects of real-life problems.</p>
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PO 4	<p>.Problem Solving: Identify, formulate, review research literature, and analyze complex Food Technology/ applications problems and Design solutions for complex problems and design system components or processes that meet the specified needs with appropriate consideration for the food sustainability.</p>
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PO 5	Research related skills: Acquire the practical knowledge and demonstrate the ability to design, conduct/trouble shoot experiments and analyze data in the field of food technology
PO 6	Information/digital Literacy: The completion of this programme will enable the learner to use appropriate software's to apply for bulk scale/industrial production of technology-based food products

PO 7	Self-directed learning: The student completing this program will develop inability of working independently and to make an in-depth study of various disciplines of food technology.
PO 8	Moral and ethical awareness/reasoning: Understand the impact of the professional food technology solutions in societal and environmental contexts, and apply ethical principles and commit to professional ethics and responsibilities

<p>PO 9</p>	<p>Lifelong learning: This programme provides self-directed learning and lifelong learning skills to think independently and develop problem solving skills with respect to food industry</p>
<p>PO 10</p>	<p>Ability to peruse advanced studies and research in Allied fields of Foodscience.</p>
<p>Programme Specific Outcomes (PO):</p>	

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.
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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.
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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.
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PSO 6	<p>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.</p>
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SEMESTER - I
G 514 DC1.1: FUNDAMENTALS OF FOOD SCIENCE & NUTRITION
Course Outcomes:
After successful completion of this Course, students will be able to:
To enable students
CO 1. Obtain knowledge of different food groups, their composition and role in diet.
CO 2. To gain knowledge of different plant and animal derived foods and their nutritive values and properties.
CO 3. Different methods of processing and cooking.
CO 4. Critically assess and analyze food science information available in the public domain in an innovative and ethical way.
Open Elective Course
G 514 OE1.1: Food and Nutrition
Course Learning Outcomes: This course will enable the students to

Understand the Nutritional benefits in Food and their role in healing process..

Evaluate and calculate the nutritional requirements for any stage of life in a healthy.

The nutrition education program was found significantly effective for changing the intention to consume healthy food .

SEMESTER - II

G 514 DC1.2: Food Processing And Preservation

Course Learning Outcomes: This course will enable the students to

Describes the principles of food preservation and suggest the application of the preservation process depending on the type of food.

2 . Determines the thermal processing conditions (time / temperature) for each type of food and propose a device that matches a particular conservation process.

3. Chooses the appropriate application of certain conservation processes with regard to the preservation of quality and the satisfactory durability of food products.

4. Optimizes process parameters for selected conservation processes taking into account the physico-chemical properties of food products.

Open Elective

(For students of Science stream who have not chosen Mathematics as one of the Core subjects)

G 514 OE1.2: Food safety

Course Learning Outcomes: This course will enable the students to

CO 1. Analyse and understand the export quality control procedures.

CO 2. Provide frame work on the concepts of Quality Control Activities

CO 4. Detect the adulteration in food samples

CO 5. Review of legislative approaches for the management of food safety

Third Semester

G 514 DC1.3-paper 3

Basics of Food Safety and Quality Control

Course Learning Outcomes: This course will enable the students to

CO 1. Analyse and understand the export quality control procedures.

CO 2. Provide frame work on the concepts of Quality Control Activities

CO 3. Learn about the applications of safety management in food industry.

CO 4. Define different food laws and regulations for quality management in food industry.

CO 4. Detect the adulteration in food samples

CO 5. Review of legislative approaches for the management of food safety

III Semester Open Elective

G 514 OE1.3 Healthy Lifestyles and Nutrition

Course Learning Outcomes: This course will enable the students to

Type set Nutritional formulae.

use nested list and enumerate environments.

create Nutrition diet for the healthy lifestyles.

To impart a systematic knowledge of basic and applied aspects of food chemistry

FOURTH SEMESTER

G 503.4 - paper-4

Fundamentals of food chemistry and microbiology.

Course Learning Outcomes: This course will enable the students to

CO 1. Students will have a thorough understanding of structure and classification various Components of food..

CO 2. The students will know the process of complete digestion and assimilation of food Component.

CO 3. Students will have a thorough understanding of various factors responsible for food Spoilage.

CO 4. Define and have an overview on food chemistry including composition and the importance of water.

IV Semester Open Elective

G 514 OE1.4 Nutrition in Physical Fitness (For other streams)

Course Learning Outcomes: This course will enable the students to

CO 1. Students will have a thorough understanding of structure and classification various Components of food..

CO 2. The students will know the process of complete digestion and assimilation of food Component.

G 500B M	B.Sc. (MICROBIOLOGY, ZOOLOGY)
Done previously	
G 600	B.C.A.
Bachelor of Computer Applications (BCA)	
Program Outcome(PO)	

PO1:	Understand, Analyze and Develop computer programs in the areas related to Object-oriented concepts, Web designing and Algorithms.
PO2:	Develops the necessary skills to make a career in the field of computers.
PO3:	Inculcate various software development practices.
PO4:	Develops the ability to select modern computing tools, skills and technique necessary for innovative software solutions.
PO5:	Developing ability to identify, analyze the complex computing problem using fundamentals of computer science and application domain.

PO6:	Building ability to work as a member or leader of a team in multidisciplinary environment.
Program Specific Outcome(PSO)	
PSO1:	Producing knowledgeable and skilled human resources to be employable in IT Industry.
PSO2:	Exploring the skills of students to become entrepreneurs who can develop customized solutions for small and medium enterprises.
PSO3:	Giving skills and information not only about computer and information technology but also about organization and management.

Course Code: G 601 DC 1.1	Course Title: Fundamentals of Computers

Course Outcomes (COs):

After completing this course satisfactorily, a student will be able to:

Understand the fundamentals of computer system

Identify different components within the computer system

Understand different types of input and output devices

Demonstrate the working concepts of different devices connected to computer

Explain different generations of programming languages and their significance

Understand the use of Word processing, Spreadsheet, Presentation and DBMS applications

Understand Digital computer and digital systems functioning

Course Code: G 601 DC 2.1	Course Title: Programming in C
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Course Outcomes (COs):

After completing this course satisfactorily, a student will be able to:

Confidently operate Desktop Computers to carry out computational tasks

Understand working of Hardware and Software and the importance of operating systems

Understand programming languages, number systems, peripheral devices, networking, multimedia and internet concepts

Read, understand and trace the execution of programs written in C language

Write the C code for a given problem

Perform input and output operations using programs in C

Write programs that perform operations on arrays

Course Code: 601 DC 3.1	Course Title: Mathematical Foundation
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Course Outcomes (COs):

Study and solve problems related to connectives, predicates and quantifiers under different situations.

Develop basic knowledge of matrices and to solve equations using Cramer's rule.

Know the concept of Eigen values.

To develop the knowledge about derivatives and know various applications of differentiation.

Understand the basic concepts of Mathematical reasoning, set and functions

Course Code: G601 OE 1.1	Course Title: Business Statistics
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Course Outcomes (COs):

Upon the completion of this course students should be able to:

Frame and formulate management decision problems.

Understand the basic concepts underlying quantitative analysis.

Use sound judgment in the applications of quantitative methods to management decisions.

Course Code: G 601 DC 1.2	Course Title: Data Structures using C
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Course Outcomes (COs):

After completing this course satisfactorily, a student will be able to:

Describe how arrays, records, linked structures, stacks, queues, trees, and graphs are represented in memory and used by algorithms

Describe common applications for arrays, records, linked structures, stacks, queues, trees, and graphs

Write programs that use arrays, linked structures, stacks, queues, trees, and graphs

Demonstrate different methods for traversing trees

Compare alternative implementations of data structures with respect to performance

Describe the concept of recursion, give examples of its use

Discuss the computational efficiency of the principal algorithms for sorting, searching, and hashing

Course Code: G 601 DC 2.2	Course Title: Object Oriented Programming with JAVA
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Course Outcomes (COs):

After completing this course satisfactorily, a student will be able to:

Understand the features of Java and the architecture of JVM

Write, compile, and execute Java programs that may include basic data types and control flow constructs and how type casting is done

Identify classes, objects, members of a class and relationships among them needed for a specific problem and demonstrate the concepts of polymorphism and inheritance

The students will be able to demonstrate programs based on interfaces and threads and explain the benefits of JAVA's Exceptional handling mechanism compared to other Programming Language

Write, compile, execute Java programs that include GUIs and event driven programming and also programs based on files

Course Code: G 601 DC 3.2	Course Title: Discrete Mathematical Structures
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Course Outcomes (COs):

After completing this course satisfactorily, a student will be able to:

To understand the basic concepts of Mathematical reasoning, set and functions.

To understand various counting techniques.

Understand the concepts of various types of relations, partial ordering and equivalence relations.

To understand the concept of probability and mathematical induction.

Familiarize the fundamental concepts of graph theory and shortest path algorithm.

To understand the concept of binary tree representation.

Course Code: G601 OE 1.2	Course Title: Applied Statistics
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Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

Understand the Price and Quantity Index numbers and their different measures, understand the applicability of cost-of-living Index number.

Know the components and Need for Time series, understand the different methods of studying trend and Seasonal Index.

Study the concept of vital statistics, sources of data, different measures of Fertility and Mortality, Understand the Growth rates- GRR and NRR and their interpretations.

Know the concept of Population, Sample, Sampling unit, sampling design, sampling frame, sampling scheme, need for sampling, apply the different sampling methods for designing and selecting a sample from a population, explain sampling and non-sampling errors.

G 601.3: JAVA PROGRAMMING

Learning Objective:

Introduction of a portable and secure programming language.

Course is helpful to learn the implementation of object-oriented concepts.

Learning Outcome:

Know the structure and model of the Java programming language

Use the Java programming language for various programming technologies

Develop software using the Java programming language

Choose an engineering approach to solving problems, starting from the acquired knowledge of programming and knowledge of operating systems.

III SEMESTER: G 602.3: WEB DESIGNING

Learning Objective:

Understand the principles of creating an effective and interactive web page.

Recognize the elements of HTML and CSS.

Learning Outcome:

At the end of the course the students will be able to

Understand features of Internet and email

Develop Simple web pages using HTML & Style Sheets

Develop interactive web page using scripting language.

III SEMESTER: G 603.3: OPERATING SYSTEMS

Learning Objectives:

To understand what a process is and how processes are synchronized and scheduled.

To understand different approaches to memory management.

Subject Demonstrates a knowledge of process control, threads, concurrency.

Learning Outcome:

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.

Learn Windows Operating system basics

III SEMESTER CBCS : G604.3E Elective Paper 1(Skill based) GRAPHIC DESIGN

Learning Objective : To learn about various technologies in computer graphics, animation and virtual reality system.

Learning Outcome: Students are able to draw primitive graphical shapes and perform transformation techniques. They are also learning about various new technologies developed and their applications.

G605.3E Elective -II:INTERNET OF THINGS

Learning Objectives:

To learn Basic concepts behind IoT and to study design principles for Connected devices, IoT communication protocols , internet based connectivity , Sensor technologies and Sensor data Communication protocols

Learning Outcome :

Students will be fully aware of Technology behind IoT , Design Principles for Connected devices , IoT communication protocols and internet based communication.

G 601.4: DATA STRUCTURES USING C

Learning Objectives:

Helps to learn how the choice of data structures and algorithm design methods impacts the performance of programs.

Helps in understanding abstract data types like stack, queue and list.

Microprocessor

Learning Outcome:

To describe the usage of various data structures

To choose the appropriate data structure to solve a programming problem

To demonstrate various methods of organizing large amounts of data.

IV SEMESTER: G 602.4: WEB PROGRAMMING USING PHP

Learning Objective:

Understand the usage of PHP and MySQL in dynamic web development.

Understand PHP language data types, logic controls, built-in and user-defined functions.

Learning Outcome:

Be able to setup and configure MySQL, PHP, Apache web server development environment.

Understand Object oriented programming paradigm in PHP. And build a simple, functional web application using PHP/My

IV SEMESTER: G 603.4: DATA MINING

Learning Objective:

To introduce students to the basic concepts and techniques of Data Mining

To study the methodology of engineering legacy databases for data warehousing and data mining to derive business rules for decision support systems

Develop and apply critical thinking, problem-solving, and decision-making skills

Learning Outcomes

Students will be able to categorize and carefully differentiate between situations for applying different data-mining techniques: frequent pattern mining, association, correlation, classification.

design and implement systems for data mining.

IV SEMESTER: G604.4E Elective -I: HARDWARE AND PC MAINTENANCE**Learning Objectives:**

To build and maintain computer systems, desktops, and peripherals.

To learn installing, diagnosing, repairing, maintaining, and upgrading Softwares

Learning Outcomes:

At the end of the course students will fully aware of

Assembling Computer Systems

Installing Various Operating Systems and other softwares

Trouble suiting Computer Systems

IV SEMESTER: G605.4E Elective -II: Fundamentals of ICT**Learning Objectives:**

To make the students understand and learn the basics of computer for its effective use in day to day life.

Learning Outcomes:

Be able to apply knowledge of computing analyze a problem, and identify and define the computing requirements appropriate to its solution

Be able to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

V SEMESTER: G 601.5: JAVA 2 ENTERPRISE EDITION

Learning Objectives:

Introduction to JSP processing, JSP application design and Sharing Session and Application data.
To familiarize with concepts of Servlet, JDBC, Java Beans.

Learning Outcomes:

At the end of the course students will be able to Design/Develop Program
Develop appropriate data model and database scheme
Create and test prototypes

V SEMESTER: G 602 .5: COMPUTER GRAPHICS AND MULTIMEDIA

Learning Objectives:

To introduce the use of the components of a graphics system and become familiar with the building approach of graphics system components and algorithms related to them.

Learning Outcomes:

Students will able to:
To list the basic concepts used in computer graphics.
To implement various algorithms to scan, convert the basic geometrical primitives, transformations, Area filling, clipping.

V SEMESTER: G 603.5: OBJECT ORIENTED ANALYSIS & DESIGN

Learning Objectives:

Explain the principles and requirements of OOA and Design

Describe the object-oriented approach to system development, modeling objects, relationships and interactions.

Learning Outcomes:

Analyze Objects and Classes of the software system.

Construct object model using object types, attributes, structures and associations.

Analyze Functional and Dynamic Modeling

V SEMESTER: G 604 .5: SOFTWARE ENGINEERING**Learning Objectives:**

Helps in developing the ability to design a system, component or process.

Better and in-depth understanding about how to develop and create a piece of software.

Learning Outcome:

Be successful professionals in the field with fundamental knowledge of software engineering. Analyze and resolve information technology problems through the application of systematic approaches and diagnostic tools

V SEMESTER: G 605 .5: PYTHON PROGRAMMING**Learning Objectives:**

To Study Python Fundamentals to advanced concepts like OOPS, Exception handling, multi-threading, Networking, Database Connectivity and Graphical User Interface

Learning outcomes:

Be skilled at creating, debugging and testing a software application using the Python programming language.

V SEMESTER: G 606.5: DESIGN AND ANALYSIS OF ALGORITHMS

Learning Objectives:

Upon completion of this course, students will be able to do the following:

Analyze the asymptotic performance of algorithms.

Demonstrate a familiarity with major algorithms and data structures.

Learning outcomes:

Ability to analyze the performance of algorithms.

Ability to choose appropriate algorithm design techniques for solving problems

VI SEMESTER: G 601.6: LINUX AND SHELL PROGRAMMING

Learning Objectives:

To understand and make effective use of Linux utilities and shell scripting language to solve problems.

To run various UNIX commands on a standard UNIX/LINUX Operating system

Learning Outcome:

On completion of this course the student will be able to:

Identify and use UNIX/Linux utilities to create and manage simple file processing operations, organize directory structures with appropriate security.

VI SEMESTER: G 602. 6: MOBILE COMMUNICATION

Learning Objectives:

To make students familiar with fundamentals of mobile communication systems

To choose system (TDMA/FDMA/CDMA) according to the complexity, installation cost, speed of transmission, channel properties etc.

To identify the requirements of mobile communication as compared to static communication

Learning Outcome:

To make students familiar with various generations of mobile communications

To understand the concept of cellular communication

To understand the basics of wireless communication

Knowledge of GSM mobile communication standard, its architecture, logical channels, advantages and limitations

VI SEMESTER: G 603.6: CLOUD COMPUTING

Learning Objectives:

A clear definition of what Cloud Computing is

A comprehensive understanding of Cloud Computing

An understanding of Cloud Computing benefits and key concepts

Learning Outcome:

Understand the concepts, characteristics, delivery models and benefits of cloud computing

Understand the key security and compliance challenges of cloud computing

BV 110

B.Voc. (Retail Management)

B.VOC-RETAIL MANAGEMENT

B Voc in Retail Management Retail Sector has been at the helm of India's growth story. The Retail industry in India is vibrant and one of the fastest growing markets in the world especially in the sectors such as modern retail, traditional retail, e-commerce, direct selling, direct marketing etc.

The B.Voc. in Retail Management is a specialized undergraduate bachelor's degree Programme which prepares the graduate to acquire such skills so that they become trained skilled manpower in the Retail sector.

PROGRAMME OUTCOMES (PO's)

P01	To make students capable of the applicable National Occupational Standards (NOS) in the Retail Management industry in the national and global context
P02	Students will be able to apply techniques, frameworks and tools to arrive at informed decisions in profession and practice.

PO3	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.
PO4	Graduates with a flair of self-employment will be able to initiate and build upon entrepreneurial ventures or demonstrate entrepreneurship for their employer organizations.

P05

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.

P06	To provide students with a comprehensive understanding of the theoretical and applied aspects of retail management.
P07	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.

PO8	To equip students with skills required to bring the customers into the store and respond to their buying needs
PSO's (Programme Specific Outcome)	
PSO 1	Develop the knowledge, skill and attitude to creatively and systematically apply in the Retail Management field

PSO 2

Develop fundamental in-depth knowledge and understanding of the techniques, principles, concepts, values, substantive rules and development of the core areas of Retail Management.

Exhibit self-confidence and awareness of general issues prevailing in the technological field and in the society and communicate effectively with the other departments, professional fraternity and with society at large through digital and non-digital mediums and using a variety of modes such as effective reports & documentation, effective presentations, and give and

PSO 4	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 5	Explain theoretical framework of Retail Management Demonstrate the job role of Sales Associate

PSO 6	Demonstrate the job role of Team leader in retailing sector Demonstrate the job role of Departmental Manager in an organised retail sector
PSO 7	Demonstrate the job role of Store Manager in any retail organisation
PSO 8	Effectively use Point Of Sale software • Appraise and interpret various acts and laws related to retail sector

CO's (Course Outcome)	
BV 114.1	INTRODUCTION TO RETAILING Establish and satisfy customer needs Monitor and manage store performance Provide leadership for your tea

BV 115.1

ELEMENTS OF SALESMANSHIP

This paper provides comprehensive knowledge of Store Location, layout and operations

PRINCIPLES OF MANAGEMENT

Describe what management is.

Explain the primary functions of management

<p>BV 117.1</p>	<p>FUNDAMENTALS OF CUSTOMER SERVICE</p> <p>1.To help students understand the critical need for service orientation in the current business scenario.</p> <p>To help customers choose right products</p> <p>3.To create a positive image of self and organization in the customers mind</p> <p>To resolve customer concerns To improve customer relationship To work effectively in your team</p>
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BV 118.1	<p>STORE OPERATIONS-I PRACTICAL TRAINING 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.</p>
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BV 114.2	STORES LAYOUT AND DESIGN It provides comprehensive knowledge of Store Location, layout and operations
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BUSINESS ORGANIZATION AND ENVIRONMENT

**Understanding the different environment in the business climate
Understanding the minor and major factors affecting the business
in various streams**

**3. Understanding the different environment like, political,
technological and economic environment in the business**

BV115.2

4. Acquiring in-depth knowledge about legal environment etc.

BV116.2	BRAND MANAGEMENT AND CONSUMER MARKETING Understanding key principles of branding Explaining branding concepts and ideas in their own words Understanding and conduct the measurement of brand equity and brand performance Practically developing a brand, including positioning and communication
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BV114.3	<p>RETAIL MANAGEMENT- FUNCTIONAL PRINCIPLES AND PRACTICES</p> <ul style="list-style-type: none">Establish and satisfy customer needsMonitor and manage store performanceProvide leadership for your teamTo maintain the availability of goods for sale to customersTo help customers choose right productsTo provide specialist support to customers facilitating purchases
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BV 115.3	ADVERTISING AND SALES PROMOTION- To make the students understand the importance of advertising and medias' role in advertising and Brand management. Establish and satisfy customer needs To process the sale of products
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BV116.3

VISUAL MERCHANDISING

This module aims at learning basic visual merchandising concepts and theories essential in the store image, its merchandise, and displays.

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TAXATION LAW & PRACTICE IN BUSINESS

Compute the assessable value of transactions related to goods and services for levy and determination of duty liability.

Identify and analyze the procedural aspects under different applicable statutes related to indirect taxation

BV114.4	ACCOUNTING FUNDAMENTALS This paper is aimed at providing comprehensive knowledge of maintenance of accounts under different agreements. Manage a budget to maintain the availability of goods for sale to customers
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BV115.4	<p>RETAIL CONSUMER BEHAVIOUR Measure, critique and interpret consumer behavior. Infer research data to create marketing strategies as a means of increasing consumer sales. Analyze trends in consumer marketing that impact corporate planning. Compare and contrast the purchase decision process in consumer and organizational markets.</p>
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BV 116.4	RETAIL SUPPLY CHAIN MANAGEMENT- To create awareness about the supply chain activities taken in order to deliver the goods To organize the delivery of reliable service To maintain the availability of goods for sale to customers
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BV112.5	LEGAL AND ETHICAL ASPECTS OF BUSINESS Explain fundamental aspects of laws relevant for a business entity Understand the principles of corporate governance and ability to implement and report compliance Create awareness and understanding of the ethical values
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BV113.5

ENTREPRENEURSHIP

Understand the concept of Entrepreneurship

Explain the competencies of an Entrepreneur

Explain the concept of types of feasibility study

Explain the concept, importance and application of social entrepreneurship

BV 114.5	<p>GENERAL ECONOMICS</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> <p>To maintain the availability of goods for sale to customers</p> <p>To maximize sales of goods and services</p>
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BV 115.5	<p>MARKETING MANAGEMENT</p> <p>Critically evaluate the key analytical frameworks and tools used in marketing.</p> <p>Apply key marketing theories, frameworks and tools to solve Marketing problems.</p> <p>Utilise information of a firm's external and internal marketing environment to identify and prioritise appropriate marketing strategies</p>
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BV 116.5

CUSTOMER RELATIONSHIP MANAGEMENT-

This course will enable the students to learn the basics of Customer Relationship Management.

Understood Relationship Marketing Learnt Sales Force Automation

Learnt Database Marketing

BV 117.5	E-COMMERCE- Analyze the impact of E-commerce on business models and strategy. Describe the major types of E-commerce. Explain the process that should be followed in building an E-commerce presence. Identify the key security threats in the E-commerce environment
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BV111.6	<p>GENERAL PROJECT MANAGEMENT</p> <p>The students will able to explain complex management situations based on knowledge and facts and respect for different</p> <p>The students hold develop critical attitudes, which are necessary for “life-long learning” and an attitude of open-mindedness and selfcritical reflection with a view to self-improvement</p>
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INVENTORY MANAGEMENT

Understand terms that are frequently used in warehouse management

Identify the goals and objectives of inventory management and measure your process against these goals

Calculate safety stock, reorder points, and order quantities

Evaluate inventory management systems

Identify the parts of the inventory cycle Better maintain inventory accuracy

BV 113.6

.INDUSTRIAL AND RURAL MARKETING

Categorize issues in rural & Industrial markets an

Analyse marketing environment, consumer behaviour, distribution channels, marketing strategies, etc. in the context of rural and Industrial markets in India

distribution channels, marketing strategies, etc. in the context of ruraland Industrial markets in India

<p>. BV 114.6</p>	<p>RETAIL LOGISTICS MANAGEMENT] 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>
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	<p data-bbox="389 1680 828 1722">. IT AND ADMINISTRATION</p> <p data-bbox="389 1732 1429 1827">Explain how electronic data transmission is used for product and financial management.</p> <p data-bbox="389 1837 1510 1932">Evaluate the application of electronic data transmission for marketing, data management, loyalty and customer tracking.</p> <p data-bbox="389 1942 1429 2026">Explain the strategic implications of IT development in relation to investment decision-making and cost of implementation</p>
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BV 115.6

BV 116.6	OPERATIONS MANAGEMENT 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 environment
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	<p data-bbox="389 1606 893 1648">FRANCHISING MANAGEMENT</p> <p data-bbox="389 1654 1502 1848">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> <p data-bbox="191 1854 349 1896">BV 117.6</p> <p data-bbox="389 1854 1477 1896">Describe and understand the reasons for franchising a business</p>
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PROJECT WORK

- 1. To learn students the practical tactics of retail business**
- 2. to process credit applications for purchases**
- 3. to keep store secure**
- 4. to help maintain healthy and safety**
- 5. to provide specialist support to customers facilitating purchases**
- 6. to maximize sales of goods & services**
- 7. to organize the delivery of reliable service**

BV 130	B.Voc. (Food Processing & Engineering)

PROGRAMME OUTCOMES (PO)

Develop skill and expertise in post graduate scholars to work on projects for value addition of various food products

Generate adequate trained man power to work in food processing industries.

Develop cadre of scholars for achieving entrepreneurial skills and self-employment opportunities in food processing sector.

PROGRAMME SPECIFIC OUTCOMES (PSO)

To relate the chemical composition of foods to their functional properties.

To understand, plan, perform and analyse a range of chemical investigations with an emphasis on food analysis.

To give a molecular rationalization for the observed physical properties and reactivity of major food component.

COURSE OUTCOME:

BV-134.1 BASICS OF FOOD PROCESSING

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

BV-135.1 FUNDAMENTALS OF FOOD & NUTRITION

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 and understand the 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

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

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

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

BV-136.2: INTRODUCTION TO FRUIT AND VEGETABLE PROCESSING

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

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

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

How to do sampling of milk and milk products.

Physical, Chemical & Microbial analysis of milk and milk products.

Development of different milk products.

BV 134.4- INTRODUCTION TO MEAT, FISH AND POULTRY

PROCESSING

Student shall know about the significance & necessity of organized animal product sector.

Students shall acquire the ability of value- addition to Meat, Poultry, Egg & Fish.

Student shall be well versed with processing, preservation & quality control of Meat, Egg & Fish in Food Industry

BV 135.4- BASICS OF FOOD PACKAGING

The different types of materials and media used for packaging foods.

Manufacturing processes for different packaging materials.

Quality testing techniques for different packaging materials.

BV 135.4-FOOD ADDITIVES AND PRESERVATIVES

Student shall gain a thorough knowledge of Chemical Nature, Analysis, Risk & Benefits of Food Additives.

Student shall gain a thorough knowledge of Antimicrobial Agents, Antioxidants & Anti Browning Agents.

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.

Analyze 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

BV 120	B.Voc. (Pharmaceutical Chemistry) (No Students)

BV 150	B.Voc. (Animation and Multimedia)
<u>B.VOC. IN ANIMATION & MULTIMEDIA</u>	
PROGRAMME OUTCOMES	
P01	Animation Technology. To develop competencies and skills needed for becoming an effective Animator
P02	Mastering traditional & digital tools to produce stills and moving images. Exploring different approaches in computer animation
P03	To enable students to manage Animation Projects from its Conceptual Stage to the final Product creation
PROGRAMME SPECIFIC OUTCOMES	

<p>PSO</p>	<p>Understand the basic elements of art and/or design through art analysis</p>
<p>PSO</p>	<p>Learn how to use materials, tools and processes, effectively and safely to create original works of art.</p>
<p>PSO</p>	<p>Develop creative problem-solving strategies as a means to create strong artwork. Identify Western art in detail</p>

COURSE OUTCOME

COMPUTER FUNDAMENTALS

Introduction to computer hardware.

Presentation with PowerPoint& understanding its application, working on templates, slideshow, custom animation and transition

FOUNDATION ARTS

Understand the basic elements of art and/or design through art analysis.

Learn how to use materials, tools and processes, effectively and safely to create original works of art.

Develop creative problem-solving strategies as a means to create strong artwork.

COMPUTER GRAPHICS

Understanding resolutions, file types.

Understanding work area.

Understanding color correction.

STOP MOTION AND CUTOOUT ANIMATION

To understand the concept of stop motion.

Understanding Frame rate and frame by frame animation

Storyboard development ideas

COMPUTER FUNDAMENTALS LAB

introduced to computer hardware and its various components.

Understanding different hardware devices and their applications.

Get the knowledge of MS Office, its options, features.

COMPUTER GRAPHICS LAB -

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

STOP MOTION LAB

To understand the concept of stop motion.

Understanding Frame rate and frame by frame animation.

Storyboard development ideas.

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.

2D CHARACTER AND ENVIRONMENT SKETCHING

Understanding character sketching and anatomy study.

Studying Matte paintings and different shapes and forms.

Creating landscapes, colouring and creating patterns.

4. Creating walk cycle and gesture drawing.

3D MODELLING

To understand the interface and customizing it.

To understand the tools and different parameters.

To create different types of 3D related objects with proper anatomies.

Understand how proportions are at work.

COMIC ART AND DESIGN

Getting the knowledge about basics of comics and understanding visual story telling.

Focussing on different comic cultures.

Experimenting with different types of tools, stylings and construction of sequences.

Introducing the main and coming forms of publishing and distribution that is important for comic culture.

3D MODELLING LAB

To understand the interface and customizing it.

To understand the tools and different parameters.

To create different types of 3D related objects with proper anatomies.

Able to understand how proportions are at work.

ANIMATION PRODUCTION LAB

Understanding editing concepts and different video editing programs and parameters.

Understanding different resolutions, presets and frame rates.

Creating different styles of animated story telling.

Exporting and rendering in desired file formats.

COMIC ART AND DESIGN LAB

Getting the knowledge about basics of comics and understanding visual story telling.

Focusing on different comic cultures.

Experimenting with different types of tools, stylings and construction of sequences.

Introducing the main and coming forms of publishing and distribution that is important for comic culture.

PRODUCTION TECHNIQUES

Understanding the process of voice tracking.

Implementing the concepts of transitions, layering, Video capture.

Learning different types of audio/ video formats.

2D ANIMATION

Understanding the process of 2D animation.

Understanding different tool bars.

Creating different tweening effect.

Importing and placing sound within the software.

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.

PRODUCTION TECHNIQUES LAB

To understand voice tracking.

To understand the concept of transitions, layering.

Understanding different audio/ video formats.

Understanding the concept of video capture.

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.

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

Understanding the specifics of the camera.

Understanding different setups and alignment of cameras.

Understanding different types of lights.

MULTIMEDIA TECHNIQUES

Understanding VFX workflow.

Learning camera techniques.

Getting understanding of compositing procedure.

Understanding different procedural matting.

Understanding different types of keying.

WEB TECHNOLOGY LAB

To learn basic principles of developing a website.

Getting introduced to web technologies.

Understanding different domains and hosting.

Understanding the way to publishing sites and promoting websites.

Understanding client server scripting language.

3D TEXTURING & LIGHTING LAB

Understanding the specifics of the camera.

Understanding different setups and alignment of cameras.

Understanding different types of lights.

INTERACTIVE ANIMATION

Understanding Flash animation and its applications.

Navigating through different buttons.

Understanding action scripts.

Getting into different sounds, tracks and sliders.

POST PRODUCTION

To understand Post Production process.

Applying script onto the screen.

Understanding film making techniques.

Understanding sound, color grading techniques, pitch correction etc. to give more uniqueness to the project.

ADVANCED CHARACTER DESIGN

To understand different types of characters used for animation.

Identifying textures and UW maps and Unwrapping.

To understand lighting.

Learning basics of perspective, environment modelling.

3D RIGGING & ANIMATION-

Develop skills in creating objects and character animation.

Understanding the fundamental features of different controllers, wraps and modifiers, poses and postures. Work with bone parameters and IK Solvers.

VISUAL EFFECTS

Getting to know about VFX technique.

Usage of cameras, editing concepts.

Understanding lights and cameras, exporting composition.

Understand the concept of Motion Tracking.

3D ANIMATION LAB

Creating character animation.

Understanding and working on facial expressions.

Understanding text animation.

Creating dynamic effects.

VIDEO COMPOSITING LAB

Creating visual effects and special effects as required by the industry.

Understanding various image processing techniques including Chroma keying.

Understanding compositing process & getting to know different techniques.

Understanding Motion Tracking techniques.

ADVANCED 3D GRAPHICS

Understanding workspace, buttons, palettes of digital sculpting software like ZBrush.

Understanding Topology.

Understanding different UV textures, Polypaint materials.

DYNAMICS & EFFECTS

Create dynamic particle effects using particle systems.

Gain knowledge about 2D and 3D Fluid systems.

To Understand Active Passive Colliders.

DYNAMICS LAB

Creating dynamic particle effects using particle simulations, particle systems.

Understanding time control.

Understanding frame rate/ Key modes.

Usage of Array particle systems.

SCRIPT WRITING LAB

Creating basic elements of story and analysing different plot structure.

Understanding the theme and emotions of the character.

Understanding plot, progressiveness, complications involved in it, climax etc.

Understanding screen writing structure, narratives and dialogues.

STORYBOARDING LAB

Creating a series of animated storyboards from the script.

Applying basic drawing techniques and creating the storyboard as required by the script.

Understanding Pre- Production workflow.

BV 160	B.Voc. (Renewable Energy Management)
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BV 170	B.Voc. (Software Development)
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BVoc Software Development

Program Outcome(PO)

PO1:	Understand, Analyze and Develop computer programs in the areas related to Object-oriented concepts, Web designing and Algorithms.
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PO2:	Develops the necessary skills to make a career in the field of computers.
PO3:	Building ability to work as a member or leader of a team in multidisciplinary environment.
PO4:	Develops the ability to select modern computing tools, skills and technique necessary for innovative software solutions.
Program Specific Outcome(PSO)	
PSO1:	Producing knowledgeable and skilled human resources to be employable in IT Industry.

PSO2:	Exploring the skills of students to become entrepreneurs who can develop customized solutions for small and medium enterprises.
Course Code: BV 170 2.1	Course Title: Information Technology Tools

Course Outcomes (COs):
After completing this course satisfactorily, a student will be able to:
Understand the fundamentals of computer system
Identify different components within the computer system
Understand different types of input and output devices
Demonstrate the working concepts of different devices connected to computer
Explain different generations of programming languages and their significance
Understand the use of Word processing, Spreadsheet, Presentation and DBMS applications
Understand Digital computer and digital systems functioning

Course Code: BV 170 1.1	Course Title: Programming in C
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Course Outcomes (COs):

After completing this course satisfactorily, a student will be able to:

Confidently operate Desktop Computers to carry out computational tasks

Understand working of Hardware and Software and the importance of operating systems

Understand programming languages, number systems, peripheral devices, networking, multimedia and internet concepts

Read, understand and trace the execution of programs written in C language

Write the C code for a given problem

Perform input and output operations using programs in C

Write programs that perform operations on arrays

II SEMESTER: BV 170 1.2: WEB DESIGNING

Learning Objective:

Understand the principles of creating an effective and interactive web page.

Recognize the elements of HTM and CSS.

Learning Outcome:

At the end of the course the students will be able to

Understand features of Internet and email

Develop Simple web pages using HTML & Style Sheets

Develop interactive web page using scripting language.

II SEMESTER: BV 170 1.2: Relational Database Management System

Course Outcome:

Understand the basic concepts and the applications of database systems.

Master the basics of SQL and construct queries using SQL.

Understand the relational database design principles.