SREE NARAYANA COLLEGE

PUNALUR

Program outcomes, Program specific outcomes and Course outcomes

for

First Degree programs

INTERNAL QUALITY ASSURANCE CELL

SNC, PUNALUR

Sree Narayana College, Punalur offers a total of 8 graduate programs viz Bachelor of Arts in Communicative English, Economics, and History, Bachelor of Science in Mathematics, Physics, Chemistry, and Zoology and a Bachelor of Commerce. The departments of Mathematics, Physics and Chemistry also offer Post Graduate courses The College also has a department of Oriental languages which focuses on additional language courses for undergraduate students and a department of Physical Education which offer daily coaching for selected students in various athletic and team sports. The Physical Education Department also offers an Open Course which is an elective course for fifth semester students. The college follows the curriculum prescribed by University of Kerala and has clearly stated graduate attributes, qualification descriptors and program learning outcomes. Learning Outcome-based Course Framework (LOCF) emphasizes that all programs are outcome-oriented at Program, Program-Specific and Course levels, all in sync so that the graduates demonstratively possess the requisite knowledge and exhibit skills-attitude for a productive life.

Program Outcomes (POs): It represent the knowledge, skills and attitudes the students should have at the end of a course completion of their respective degree program.

Course Outcomes (COs): It gives the resultant knowledge and skills the student acquires at the end of each course. It defines the cognitive processes a course provides.

Program Specific Outcomes (PSOs): These are statements that define outcomes of a program which make students realize the fact that the knowledge and techniques learnt in this course has direct implication for the betterment of society and its sustainability.

Mechanism of Communication: The College has clearly stated learning outcomes of the Programs and Courses. The following mechanism is followed by the institution to communicate the learning outcomes to the teachers and students.

- Hard Copy of syllabi and Learning Outcomes are available in the departments for ready reference to the teachers and students
- Learning Outcomes of the Programs and Courses are displayed on the walls outside each department
- Soft Copy of Curriculum and Learning Outcomes of Programs and Courses are also uploaded to the Institution website for reference
- The importance of the learning outcomes has been communicated to the teachers in every IQAC Meeting and College Committee Meeting.
- The students are also made aware of the same through Tutorial Meetings.

B.A. ENGLISH AND COMMUNICATIVE ENGLISH

LANGUAGE COURSES
I Semester-Course Outcome
(Listening, Speaking and Reading)
EN1111.1 (B.A/ B.Sc) / EN1111.2 B.Com &EN111.3 (English & Communicative English)

1. Make students excellent communicators in English
2. Understand the nuances of listening, speaking and reading
3. Preparing the learners to face situations with confidence and to seek employment in the modern globalized world

Writings on Contemporary Issues (Foundation Course1)
EN1121 (B.A/ B.Sc) &CG 1121.3 (English & Communicative English)

1. Sensitise students on various contemporary issues
2. Encourage the students to read literary pieces critically.

II Semester-Course Outcome
Modern English Grammar and Usage
EN1212.1 (B.A/ B.Sc) / EN1212.2 B.Com) &EN1211.3 (English & Communicative English)

1. Enable them to construct grammatically and structurally correct sentences
2. Help the students minimise their mother tongue influence and improve communication skills

EN1211.1 /Environmental studies (B.A/ B.Sc) & CG1271Environmental studies (English & Communicative English)

1. Make the students aware of the threats faced by environment
2. To sensitise the students about the methods by which we can preserve environment

III Semester-Course Outcome
EN1311.1 (B.A./B.Sc)/EN1311.2(B.Com)/EN 1311.3 English & Communicative English Writing and Presentation Skills

1. Familiarise the students with different modes of writing
2. Mastering writing techniques to meet academic and professional needs.
3. Sharpen their accuracy in writing

IV Semester-Course Outcome
EN1411.1B.A/ B.Sc / EN1411.2 B.Com /EN1411.3 English & Communicative English

Readings in Literature

1. Help students understand and appreciate literary texts.
2. Sensitise students to the aesthetic, cultural and social aspects of literature.
3. Aware of the best pieces of literary writing
4. Critical analysis of literature as a cultural and interactive phenomenon.

LANGUAGE/FOUNDATION COURSES-PROGRAMME OUTCOME (B.A/ B.Sc/B.Com/B.A. English & Communicative English

1. Identify the difference between academic and informal writing.
2. Realize the importance of exposure to English language and how it is necessary for progression in their career
3. Understand the significant impact of grammatical skills in writing.
4. Understand various dimensions of English language and literature.
5. Develop a proper understanding of the environmental, contemporary issues.
6. Apply correct usage based on Standard English and not conceptual excellence.
7. Gets a proper understanding of the environmental issues, its intensity and anticipates precautions for preventing it in future.
8. Understand and judge the problems prevalent in the contemporary world

CORE COURSES for B.A. English & Communicative English
I Semester
CG 1141 Reading Poetry

1. Enhances the reading and critical skill.
2. Sensitize students to the language, forms and types of poetry.
3. Make them aware of the diverse poetic devices and strategies.
4. Read, analyze and appreciate poetry.
5. Enhance the level of literary and aesthetic experience and to help them respond creatively.

II Semester
CG1241 Reading Drama

1. Familiarise students with various forms and schools of drama
2. Sensitize them to the verbal and visual language of drama
3. Help the students watch, write and perform plays

III Semester
CG 1341 Reading Fiction

1. Enable them to analyse and appreciate various fictional modes
2. Make them aware of various fictional modes
3. Give them insight into other cultures

CG1342 20th century Malayalam literature in English Translation

1. Introduce the students to wide range of Malayalam writings
2. Identify the vast body of 20th century Malayalam literature.
3. Read and analyse some of the major Malayalam writers and their works

CG 1321 Informatics (FOUNDATION COURSE)

1. Update and expand basic informatics skill and attitudes relevant to the emerging knowledge society.
2. Equip students to utilise the digital knowledge resources effectively
3. Understand the nature of the emerging digital knowledge society.

IV Semester

CG 1441 Reading Prose

1. Help them understand and appreciate different prose writing
2. Acquaint them with cultural diversity and divergence in perspectives.
3. Introduce basic concepts of style and literary devices in prose

CG 1442- World Classics

1. Introduce the students to the world of classical literature
2. Read and analyse various classical texts
3. Evaluate classical texts critically and assess their own culture and classics.

V Semester

CG 1541 Literary criticism

1. Give students an overview of various critical practices over the ages
2. Develop in them critical perspective.
3. Read and analyse literary texts from different perspectives.

EN1543 Indian Writing in English

1. Understand and appreciate the richness of Indian writing.
2. Trace the development of Indian writing in English.
3. Acquaint themselves with a wide range and variety of Indian writers

CG 1542 Film Studies

1. Give students basic knowledge in the history, art and culture of films
2. Introduce to them key concepts in film

3. Enable them to appreciate classic movies
4. Ability to pursue higher studies and careers in film.

VI Semester
CG 1641 Travel Literature

1. Help students read and appreciate different kinds of travel literature
2. Introduce to them basic concepts in travel writing
3. Facilitate and promote curiosity in travel writing
4. Understand the themes of self, culture, writing and travel

CG1642 Women's Writing

1. Introduce students to the development of women's writing in various countries
2. Familiar with the diverse concerns addressed by feminism
3. Acquire the skill to understand feminism as a social movement and a critical tool.

CG1643 Methodology and Perspectives of Humanities

1. Introduce students to the methodological issues specific to the humanities
2. Develop in them a critical perspective in pursuing literary studies
3. Make sense of literature and read literature critically from a theoretical perspective.

CG 1661.1 American Literature (Elective Course)

1. Introduce students to American literature, life and culture
2. Broaden their aesthetic and intellectual abilities

Programme Outcome (Core Course)

1. Enable them to understand the various literary genres in English literature.
2. Read, analyse and appreciate poetry, drama and fiction critically.
3. Respond critically and .creatively to the world
4. Discern the richness and distinctiveness of twentieth century Malayalam writing.
5. Understand and appreciate different types of prose writing.
6. Use digital knowledge resources effectively for their studies.
7. Develop a critical perspective and capacity to relate and compare various critical practices and schools.
8. Trace the development of Indian writing in English.
9. Acquire familiarity with both the Western and the Indian theatre.10.
10. Read and appreciate classical works.
11. Develop critical perspective in pursuing literary studies.
12. Read and appreciate American literature
13. Analyse, understand and appreciate travel writings

COMPLEMENTARY COURSES

Courses Offered

SEMESTERI-CG1131 History of English Literature 1(COMPLEMENTARY COURSE)

SEMESTERII- CG1231History of English Literature 2 (COMPLEMENTARY COURSE)

SEMESTERIII-CG1331 History of English Literature 3 (COMPLEMENTARY COURSE)

SEMESTERIV-CG 1431 History of English language & Phonetics

(COMPLEMENTARY COURSE)
SEMESTERVI-CG 1645 PROJECT

COURSE OUTCOME

1. Students gain a wholesome understanding of British History
2. Understand the socio-political situation in England
3. Introduction of various genres of literature emerged during that period
4. How the culture of Britain evolved
5. Understand and appreciate individual works from various ages
6. Help them gain knowledge about the origin of language, semantics etc.

PROGRAMME OUTCOME

1. Understanding and appreciation of the complexities involved in the production and reception of British language
2. Better understanding of the works of different ages
3. An insight into how people lived during various ages in Britain, their culture etc
4. Identify the various language families
5. A new literary perspective
6. Knowledge of how language evolved, formation of words, meanings, suprasegmentals etc

SEMESTERV-CG 1551.1 Creative Writing (OPEN COURSE)
Course Outcome

1. Make the students aware of the various aspects of creative writing
2. Equip students to attempt at practical creative writing
3. Strength their talents in creative writing
4. Familiarise students to various English writers and their works

Programme Outcome

1. Identify different poetic forms
2. Write book and film reviews
3. Read and appreciate poems and stories
4. Ability to think and write creatively
5. Write poems and short stories based on various themes from everyday life and situations

CG1644 PROJECT/DISSERTATION

Course Outcome

1. To give an insight into the area of research and analysis
2. To inculcate research aptitude in students so as to conduct researches in future

Programme Outcome

1. Equip them to carry out research works in future

VOCATIONAL COURSES

CG1171 Basics of Communication (Sem 1)

Course Outcome

1. To build and enrich their communication skills
2. Familiarise with different modes of communication
3. Understand the barriers of communication
4. Engage students in meaningful communication

Programme Outcome

1. Analyse and identify various types of communication
2. Make use of essential principles of communication
3. Identify prominent methods and models of communication

CG1371 Copy Editing (Sem 3)

Course Outcome

1. Familiarise students with the concepts of copy editing
2. Impart basic copy-editing skills
3. Help them find employment in the publishing fields

Programme Outcome

1. Ability to copy edit materials
2. Produce well organised written discourse
3. Find employment in the field of copy editing

CG 1471 Print and Online (Sem IV)

Course Outcome

1. Introduction to print media and its history

2. Familiarising news, its value and reporting
3. Introduction to online and journalistic writing

Programme Outcome

1. Able to do news reporting , online and journalistic writing
2. Knowledge of media ethics
3. Create blogs, wikis, etc.

CG 1472 Theatre Studies (Sem-IV)

Course Outcome

1. Introduction to theatre studies
2. Familiarise the students to Western and Indian theatre
3. Awareness about the fundamental theories on theatre

Programme Outcome

1. Help students appreciate theatre
2. Develop listening and writing skill of students
3. Respond creatively to world around

CG1571 English Language Teaching (Sem 5)

Course Outcome

1. Introduce to students teaching of English as a second language
2. Aid them in understanding learning from a teacher's perspective

Programme Outcome

1. Comprehend the concepts in language teaching
2. Understand psychological principles behind language acquisition
3. Understand different methods and approaches of language learning
4. Effective planning of lessons

CG 1572 The Language of Advertising (Sem 5)

Course Outcome

1. Provide students with an ability to enrich creative skills
2. Understand the term advertising and its role in society
3. Comprehend the different types of advertising

Programme Outcome

1. Identify the different types of advertising
2. Aware of the present status of advertising
3. Identify the impact of advertising in society

CG 1573 Audiovisual Writing (Sem V)

Course Outcome

1. Introduce students to the history of television and radio communication
2. Make them aware of the different types of radio and television programme
3. Identify the role of audio and visual communications

Programme Outcome

1. Identify and analyse various types of television programmes
2. Identify impact and influence of television channels

CG 1671 Technical English (Sem VI)

Course Outcome

1. Introduce students to language skills in technical writing
2. Develop verbal and non verbal skills in technical English

Programme Outcome

1. Enable them to meet professional needs
2. Develop strategies and tactics that scientists, engineers and others will need in order to communicate successfully
3. Develop technical writing skills

CG 1672 Business Communication in English (Sem VI)

Course Outcome

1. Introduce learners to business communication skills
2. Competence in verbal and non verbal business communication skills
3. Develop inter-personal skills

Programme Outcome

1. Equip learners with high professional expertise in business communication
2. Enable them to use business in real life situations
3. Effective business correspondence

B.A. HISTORY

Programme Outcomes

1. Understanding Polity, Society and Economy of the people.
2. Understanding various social institutions.
3. Analyzing our culture in comparison with others.
4. Understanding our values and traditions
5. Inculcating civic sense and patriotism in the minds of students.
6. Developing interest in the study of history

Programme Specific Outcomes

1. Create critical thinking on the present issues in the light of past and experiences.
2. Make students aware about the professional values of History as a discipline.
3. Generate interest in local historical studies.
4. Create skills related historical studies.

B.A. HISTORY COURSE OUTCOME

HY 1141 METHODOLOGY AND PERSPECTIVES OF SOCIAL SCIENCES

1. Familiar with the broad contours of Social Sciences and its methodology.
2. Familiar with the main concerns of Social Science disciplines.
3. Articulation the basic terminologies and theories prevalent in concerned disciplines.
4. Analysis and critical reading of popular and periodical literature from a Social Science perspective.

HY 1241 CULTURAL FORMATION OF THE PRE-MODERN WORLD

1. Able to engage with conceptual and general issues regarding culture and civilization of the ancient period.
2. Aware about among the students about the cultural heritage of mankind.
3. Knowledge about changes that took place among the major cultures of
4. World civilizations.
5. Aware about harmonious existence of the different sections of the people.

HY 1321 INFORMATICS

1. Skills in informatics relevant to the emerging knowledge society and also to equip the students effectively to utilize the digital knowledge for their course.

2. Analyze basic concepts and functional knowledge in the field of informatics.

3. Functional knowledge in a standard office package and popular utility

4. Aware about social issues and concerns in the use of digital technology.

5. Skills to use digital knowledge resources in learning.

HY 1341 EVOLUTION OF EARLY INDIAN SOCIETY AND CULTURE

1. Analyze the salient Features of Prehistoric and Proto Historic Culture in India.
2. Analyze the evolution of India Culture with special reference to the society and polity of Ancient period.
3. Familiar with the heritage of India.

HY 1441 MEDIEVAL INDIA: SOCIO- CULTURAL PROCESSES

1. Knowledge on the Social Cultural and Administrative Features during the Medieval Period.
2. Familiar with the processes that made the socio-cultural specificities possible.
3. Aware about the linkage effect of this period in subsequent centuries.

HY 1442 HISTORY OF MODERN WORLD – PART I

1. Familiar with the changes in the history of the modern world.
2. Analyze the agenda of the imperialistic powers in Latin America and Africa.
3. Understand about the liberal ideas and freedom struggles.

HY 1541 MAJOR TRENDS IN HISTORICAL THOUGHT AND WRITINGS

1. Understand the history of historical writings.
2. Evaluate the works in the light of new theories and concept.

HY 1542 COLONIALISM AND RESISTANCE MOVEMENTS IN INDIA

1. Review the circumstances that led to the establishment of colonialism in India.
2. Describe the impact of colonial rule in India with particular reference to socio-religious political and economic fields.
3. Analyze the genesis and progress of the resistance Movements against the British.

HY 1543 HISTORY OF MODERN WORLD – PART II

1. Analyze the significance of the unification movements in Italy and Germany that paved the way for the beginning of a new epoch.
2. Understand the First and Second World Wars.
3. Evaluate the achievements and failures of the International Organizations.

HISTORICAL METHOD

Mechanics of Project writing

1. Enable the students to understand the method of writing history.
2. Make aware of the various tools pertaining to the writing of history.

3. Familiar with the new theories and concepts in historical method.

HY 1642 MAJOR TRENDS IN INDIAN HISTORICAL THOUGHT AND WRITINGS

1. Understand the origin and development of historical writings in India.
2. Identify major historical works in Indian history.
3. Aware about the influence of ideas and theories, trends and concepts in Indian historical writings.

HY 1643 CONTEMPORARY INDIA

1. Understand the circumstances that led to the formation of India Union.
2. Understand the challenges faced by independent India and the bold measures initiated after independence.
3. Evaluate the achievements of contemporary India with special reference to Science, Information Technology.

HY 1644 THE TWENTIETH CENTURY REVOLUTIONS

1. Understand four major revolutions of the 20th century, *i.e.* Russian, Chinese, Vietnamese and Cuban.
2. Aware about the legacy of the above revolutions.
3. Familiar with the nature, scope and significance of the revolutions in the present context.

HY 1651.5 ELECTIVE COURSE INTRODUCTION TO ARCHAEOLOGY

1. Insight into the discipline of Archaeology.
2. Analyze the evolution of Archaeology as a subject
3. Understand various periods & concepts in Archaeology.
4. Describe archaeological methods

COMPLEMENTARY COURSES

HY 1131.2 HISTORY OF MODERN WORLD (1789-1900)

1. Understand the importance of French Revolution this marked the beginning of far-reaching changes in the history of mankind.
2. Interpret the significance of the unification movements in Italy and Germany that paved the way for the beginning of a new epoch.
3. Aware aboutthe genesis and growth of liberal idea.

HY 1131.1 HISTORY OF MODERN INDIA (1857-1900)

1. Analyze the circumstances that led to the establishment of colonialism in India.
2. Judge impact of colonial rule in India with particular reference to socio-religious political and economic fields.
3. Analyze the genesis and progress of the resistance Movements against the British.

HY 1231.4 HISTORY OF MODERN WORLD (1901-1920)

1. Familiar with the hidden agenda of the imperialistic powers in Asia and Africa.
2. Review that led to the confrontation among European powers.
3. Appreciate the triumph of the working class movements.

4. Assess the merits and demerits of the League of Nations as the First International Organization.

HY 1331.6 HISTORY OF MODERN WORLD (1921-1955)

1. Familiar with the history of modern world from 1921 to 1955.
2. Analyze causes that led to the rise of dictatorship during the inter-war period.
3. Review the causes, course and results of the Second World War.
4. Assess the cold war alliances and developments.

HY 1431.8 HISTORY OF MODERN WORLD (AFTER-1955)

1. Knowledge of the nature, scope and relevance of NAM.

2. Assess the current problems of the world with special reference to the unipolar and bipolar coupled with the emerging nations.

3. Analyze the nature and circumstances that led to the rise of regional and international alliances.

OPEN COURSE HY 1551. 2 INTRODUCTION TO ARCHAEOLOGY

1. Insight into the discipline of archaeology
2. Understand the evolution of archaeology as a subject

3. Understand various periods & concepts in archaeology.
4. Understand archaeological methods

B. A. ECONOMICS

Programme Outcomes

This programme provides students a well-founded education in Economics and has adapted curricula that prepares graduates for employment and further study as economists.

Programme Specific Outcomes

1. To provide the students with the opportunity to pursue courses that emphasizes quantitative
    a. and theoretical aspects of Economics.

2. To provide students with the opportunity to focus on applied and policy issues in Economics.

3. The ability to analyze historical and current events from an economic perspective.

4. To create students ability to suggest of the various economic problems.

COURSE OUTCOMES

Core Courses

Core I EC 1141 Introductory Microeconomics

Course objectives: To develop a conceptual foundation and analytical methods used in Microeconomics

Core II EC 1241 Intermediate Microeconomics

Course Objectives: The course intends to give basic understanding of Micro Economics

Core III Foundation Course EC 1321 Informatics for Applied Econometrics

Course Objectives: This course introduces a plethora of online resources which will help students improve their teaching-learning experience. The students will also be able to utilize these web resources to enhance their career and academics. The course also provides an exposition to econometric concepts and techniques. This is to enable the students to conduct and criticize empirical studies in economics and related fields. It covers estimation and diagnostic testing of simple regression .models using computer software

Core IV EC 1341 Introductory Macroeconomics

Course Objectives: This course offers a short introduction to Macroeconomics. After introducing the multiplier and the Keynesian theory of income determination, the course further introduces the student to ISLM analysis

Core V EC 1441 Mathematical Methods for Economics

Corse Objectives: The key objective of this paper is to provide the students an insight into the importance of mathematical methods in Economics and also to familiarize them with the basic mathematical techniques used in economic analysis

Core VI EC 1442 Intermediate Macroeconomics

Corse Objectives: To introduce students to the micro foundations of macroeconomics, inflation and unemployment, economic growth and fiscal and monetary policies in an open economy

Core VII .EC 1541 Methodology and Perspectives of Social Science

Course Objectives: The course intends to familiarize the students with the broad contours of Social Sciences, specifically Economics and its methodologies, tools and analysis procedures. The course also aims to create an enthusiasm among students, incorporating various concepts .and issues in economics

Core VIII EC 1542 Statistical Methods for Economics

Course Objectives: The course is intended to familiarize the students with statistical tools and techniques and enable them to apply these tools in Economics

Core IX EC 1543 Readings in Political Economy

Corse Objectives: It helps the students to familarise economists and their contributions.

Core X EC1544 Economic Growth and Development

Course Objectives: To ensure that students begin to understand basic concepts of Economic Growth and Development and thereby enable them to acquire multi dimensional aspects of developmental issues To convey knowledge about theoretical framework of Growth and Development under different Schools of economic thought .To impart knowledge about Political institutions, the role of the state in Economic Development and problems that affect state Governance

Core XI EC1545 International Economics

Corse Objectives: To understand the basic concepts and theories of international trade and enable students to have a basic understanding of the emerging trends, issues and policies in the field of international economic system

<u>Open Course</u> EC1551.2 Human Resource Management

Corse Objectives: Keeping in view the broad objective of an open course in providing the basis for life enrichment and career orientation, a course in Human Resource Management is offered.. The course is aimed at providing basis for understanding the significance of human resource in the growth of our economy and society and to learn the ways for integrating H . RM strategies in organizations

Core Course XII EC1641 Indian Economy

Corse Objectives: The course intends to provide an understanding about growth process in Indian economy, sectoral aspects of the economy by focusing agriculture, industry and service sectors, relations of .India with external sector and economic reforms

Core Course XIII EC1642 Banking and Finance

Corse Objectives: The course intends to familiarize the students with the basic concepts in Banking and Financeand develop a comprehensive knowledge on the role of banks in the operation of an economy. It also enables them to know the operation of the Indian Financial System and activities in the .financial markets

Core Course XIV EC1643 Public Economics

Corse Objectives : The course is aimed at
(a). Introducing the subject matter and scope of public economics, role of government, types of ;market failures and the concept of public good .
(b). Providing a general understanding on the basic fiscal policy instruments.
(c). Generating awareness on public economics in India, with special focus on budgetary system .and fiscal federalism

Learning outcomes It is expected that this course would connect students to the basic concepts, components and processes of public economics .This would impart the skills essential for understanding and analysing the fiscal policy instruments and budgetary process in India. Students would develop an interest in unraveling the fiscal issues of India. The basic orientation would mould public .policy makers and analysts of the future

Core Course XV EC 1644 Environmental Economics and Disaster Management

Corse Objectives: The course intends to create environmental awareness among students and .provide exposure to disaster management

ELECTIVE COURSE EC1661.1 KERALA ECONOMY

Corse Objectives: To understand the structural changes, Sector-wise contribution and features of the Kerala Economy since the formation of the state and enable the students to have a basic understanding of the emerging trends and issues of Kerala Economy

EC 1645 Project

As part of the requirements for BA Programme , every student must do a project either individually or as a group under the supervision of a teacher. The project is expected to equip the student to identify an issue or topic and conduct the study in a systematic and scientific way. Students will get the opportunity to apply various tools they have learned and present the report in a structured manner

Complementary Courses

Complementary I

EC 1131 FOUNDATIONS OF ECONOMIC THEORY

Course Objective The main objective is to provide a basic understanding of economic concepts and theories

Complementary III

EC 1231 MONEY AND BANKING

Course Objective The course intends to provide a basic understanding about the nature and significance of money and banking in the functioning of an economy

Complementary V

EC 1331 INTRODUCTION TO INTERNATIONAL TRADE AND PUBLIC ECONOMICS

Course Objective The course inculcates the students about the significance of public finance in the context of increasing role of Government. It also provides the basic theoretical framework of budgetary mechanism in India, State activities and various aspects of International Trade

Complementary VII

EC 1431 INDIAN ECONOMY SINCE INDEPENDENCE

Course Objective The general objective of the course is to provide basic understanding of the Indian economy and it will familiarises the students about the various concepts of National

Income and create awareness about the significance of agriculture, industry and service sector in the Economics

B.Com

Learning Outcome

Commerce education is intended to achieve skills to manage business enterprises generally and acquaint knowledge to perform management of personnel, accounting activities, assess performance of employees, management of various resources so as to minimize the cost and improve effectiveness of enterprises, etc.

General outcome achieved by our students through learning the programme are given below.

1. Achieved a basic awareness regarding the national and international business environment.
2. Inculcated basic business laws while dealing contracts with different parties while performing business activities.
3. Learned methods and procedure and practice of accounting followed by various organizations.
4. Achieved talents to manage business enterprises by learning general management principles
5. Learned to assess and evaluate total cost of the firm, apportionment and control of cost

Specific Outcome

1. Created qualities to develop new enterprises by inculcating Entrepreneurial qualities
2. Created ability to audit business accounts and prepare reports
3. Inculcated the research ability among students

Outcome of different courses

FOUNDATION COURSE I: CO 1121

METHODOLOGY AND PERSPECTIVES OF BUSINESS EDUCATION

1. Created a basic awareness about the business environment and the role of business in economic development.
2. Provided a holistic, comprehensive and integrated perspective to business education
3. Gave a fundamental understanding about ethical practices in business.

CORE COURSE I: CO 1141 – ENVIRONMENTAL STUDIES

1. Enabled the students to acquire basic ideas about environment and emerging issues about environmental problems.
2. Provide an awareness about the need and importance of environmental protection

CORE COURSE II: CO 1142 MANAGEMENT CONCEPTS AND THOUGHT

1) Equipped the learners with knowledge of management concepts and their application in contemporary organizations
2) Provided overall understanding of the different dimensions of the management process.

COMPLEMENTARY COURSE I: CO 1131 – MANAGERIAL ECONOMICS

1. Familiarized the students with the economic principles and theories underlying various business decisions.
2. Equipped the students to apply the economic theories in different business situations.

FOUNDATION COURSE II: CO 1221-INFORMATICS AND CYBER LAWS

1. Review the basic concepts and fundamental knowledge in the field of informatics and to create an awareness about the nature of the emerging digital knowledge society and the impact of informatics on business decisions.
2. Created an awareness about the cyber world and cyber regulations.

CORE COURSE III: CO 1241 - FINANCIAL ACCOUNTING

1. Familiarized the students with different methods of depreciation.
2. Equipped the students to prepare the accounts of specialized business enterprises.

CORE COURSE IV: CO1242- BUSINESS REGULATORY FRAMEWORK

1. Provided a brief idea about the framework of Indian business Laws
2. Enabled the students to apply the provisions of business laws in business activities

COMPLEMENTARY COURSE II: CO 1231 - BUSINESS MATHEMATICS

1. Familiarized the students with the basic mathematical tools.
2. Impart skills in applying mathematical tools in business practice

CORE COURSE V: CO 1341-ENTREPRENEURSHIP DEVELOPMENT

1. Familiarized the students with the latest programmes of Government in promoting small and medium industries.
2. Impart knowledge regarding starting of new ventures.

CORE COURSE VI: CO 1342 - ADVANCED FINANCIAL ACCOUNTING

1. Create awareness of accounts related to dissolution of partnership firms.
2. Acquainted the students with the system of accounting for different branches and departments.
3. Enabled the students to prepare accounts of consignments.

CORE COURSE VII: CO 1343: COMPANY ADMINISTRATION

1. Familiarized the students about the salient provisions of Indian Companies Act 2013.
2. Acquainted the students with Management and Administration of Companies, Compliance requirements, investigation into the affairs of the company and Winding up procedure

CO 1361.2 - PRINCIPLES OF CO-OPERATION

1. Inculcated the principles of co-operation among the students.
2. Acquainted the students with the management and working of co-operatives.

COMPLEMENTARY COURSE III: CO 1331 - E-BUSINESS

1. Provided the students a clear-cut idea of e-commerce and e-business and their types and models.
2. Acquainted the students with some innovative e-business systems.
3. Imparted knowledge on the basics of starting online business.

CORE COURSE VIII CO 1441 - INDIAN FINANCIAL MARKET

1. Provided a clear-cut idea about the functioning of Indian Financial Market in general and Capital market operations in particular.

CORE COURSE IX:CO1442 BANKING AND INSURANCE

1. Provided a basic knowledge about the theory and practice of banking
2. Provided a basic understanding of Insurance business.
3. Familiarized the students with the changing scenario of Indian Banking and Insurance

CORE COURSE X: CO 1443 - CORPORATE ACCOUNTING

1) Created awareness about corporate accounting in conformity with the provisions of Companies Act, IAS and IFRS.

2) Helped the students in preparation of accounts of banking and insurance companies.

3) Enabled the students to prepare and interpret financial statements of joint stock companies.

CO 1461.2 - CO-OPERATIVE MANAGEMENT AND ADMINISTRATION

1) Familiarised the students with the principles and practice of co-operative management and administration.

2) Enabled the students to identify the issues in the process of management and administration of co-operatives.

COMPLEMENTARY COURSE IV: CO 1431 - BUSINESS STATISTICS

1. Enabled the students to gain understanding of statistical techniques those are applicable to business.
2. Enabled the students to apply statistical techniques in business.

CORE COURSE XI: CO – 1541: FUNDAMENTALS OF INCOME TAX

1) Familiarized the students about the fundamental concepts of Income Tax.
2) Enabled the students to acquire the basic skills required to compute the tax liability of individual assessee with more emphasis on Income from Salaries and Income from House property.

CORE COURSE XII: CO 1542 - COST ACCOUNTING

1. Familiarized the students with cost and cost accounting concepts
2. Prepsred the students to learn cost accounting as a distinct stream of accounting

CORE COURSE XIII CO 1543: MARKETING MANAGEMENT

1) Provided an understanding of the contemporary marketing process in the emerging business scenario.
2) Studied various aspects of application of modern marketing techniques for obtaining a competitive advantage in business organizations

Open Courses *(For students from Disciplines other than Commerce)*

Open Course I: CO 1551.1- FUNDAMENTALS OF FINANCIAL ACCOUNTING

1. Enabled the students to acquire knowledge in the basic principles and practices of financial accounting.
2. Equipped the students to maintain various types of ledgers and to prepare final accounts

ELECTIVE COURSE III: STREAM 2 - CO-OPERATION

CO 1561.2 - CO-OPERATIVE LEGAL SYSTEM

1. Gave an insight into the prevailing co-operative legal system.
2. Enabled the students to understand the legal framework of co-operation

CORE COURSE XIV: CO 1641 AUDITING

1. Provided the students the knowledge of auditing principles, procedures and techniques in accordance with current legal requirements and professional standards.
2. Familiarized the students with the audit of Companies and the liabilities of the auditor

CORE COURSE XV: CO 1642: APPLIED COSTING

1. Acquainted the students with different methods and techniques of costing.
2. Enabled the students to apply the costing methods and techniques in different types of industries

CORE COURSE XVI: CO 1643 - MANAGEMENT ACCOUNTING

1. Enabled the students to acquire sound knowledge of concepts, methods and techniques of management accounting

2. Made the students develop competence with management accounting usage in managerial decision making and control.

ELECTIVE COURSE IV: STREAM 2 -CO-OPERATION

CO 1661.2 - CO-OPERATIVE ACCOUNTING

1. Familiarized the students with the special features of accounting and audit in co-operatives.
2. Enabled the students to understand the procedures of co-operative audit

B.Sc. CHEMISTRY

CORE COURSE

SEMESTER – I

Course Code– CH1141- Inorganic ChemistryI

Course Outcome:

- Understand the atomic structure, periodicity and non-aqueous solvents.
- Appreciate how the inner structure of elements dictates the chemical properties of elements
- Understand how the elements are arranged in the periodic table and the characteristics and application of s -block elements, hydrogen and their compounds.
- Study the various environmental pollutions and measures to control it.

SEMESTER- II

Foundation Course II

Course Code-CH1221- Methodology and Perspectives of Sciences and General Informatics

Course Outcome:

- Understand how Science or in special Chemistry works.
- Get a basic understanding to do self-directed experimentation work and research in chemistry under the guidance and supervision of a mentor.
- Analytical chemistry helps to understand about the experimental parts of the theory and the safety measures which could follow when doing experiments using chemicals.

SEMESTER- III

Course Code – CH1341 Inorganic Chemistry- II

Course Outcome:

- Provide a necessary foundation for inorganic chemistry.
- Build a thorough knowledge in chemical bonding and compounds of non-transition elements

- Gives an elementary idea about nanomaterials and gives a strong foundation in the area of nuclear chemistry.

SEMESTER – IV

Course Code – CH1441 Organic Chemistry– I

Course Outcome:

- It imparts the Chemistry of aliphatic and aromatic substituted compounds
- Introduces and explains the concept of reaction mechanism.
- Understand the concept of stereo chemistry, photochemistry and aromaticity

SEMESTER – V

Course Code – CH1541 Physical Chemistry – I

Course Outcome:

- Gain exposure and practice in the areas of physical chemistry which include gas and liquid properties, thermodynamics, and group theory.
- Understand the chemistry of bulk systems.

Course Code –CH1542 Inorganic Chemistry – III

Course Outcome:

- Gain exposure and practice in the areas of inorganic chemistry which include coordination chemistry, transition and inner transition elements.
- Idea about the classification of several organometallic reactions and can identify the role of organometallic compounds in organic synthesis.
- Knowledge about the Instrumental methods of analysis
- Understand the methods of isolation of elements from their ores

Course Code- CH1543 Organic Chemistry- II

Course Outcome:

- Idea about the preparation and properties, mechanism of reactions of many organic conversions and of organic compounds.
- Knowledge to interpret spectrum of organic compounds
- Understand the new frontiers in chemistry- the supramolecular and the green chemistry

OPEN COURSE FOR OTHER MAJORS

Course Code -CH1551.1 Essentials of Chemistry

Course Outcome:

- Understand atomic structure and periodicity.
- Idea about chemistry in day to day life
- Knowledge about polymers and their importance
- Understand various pollutant and the measures to control it

SEMESTER – VI

Course Code- CH1641 Physical Chemistry–II

Course Outcome:

- Understand the concepts of thermodynamics, quantum mechanics, and spectroscopy to chemical, physical, and biochemical systems.
- Perceive the essential mathematical relationships in thermodynamics, quantum mechanics, and spectroscopy.
- Evaluate physical and chemical systems by non spectroscopic techniques

Course Code- CH1642 Organic Chemistry–III

Course Outcome:

- Idea about the preparations and properties oforganic compounds and mechanism of reactions of many organic conversions
- Understand the various heterocyclic compounds- synthesis and structure elucidation and introduction to drugs

Course Code- CH1643 Physical Chemistry- III

Course Outcome:

- Study the basics of electrochemistry and its importance to modern industry and technology.
- Idea about the kinetics of a reaction
- Introduces Phase equilibria and gives an elementary idea of photochemistry

ELECTIVE-COURSE

Course Code - CH1651.3 Polymer Chemistry

Course Outcome:

- Introduces and explains polymers, preparation techniques and their processing methods
- Study on various elastomers and their applications
- Understand the experimental methods for determining the molecular weight and the study on various properties exhibited by the polymers

LABORATORY COURSES

SEMESTER II

Computer Laboratory

Course Outcome:

- Perceives knowledge about computer and internet in learning, the use of educational softwares, information mining from internet and using INFLIBNET/NICNET, NPTEL and VIRTUAL LABS OF MHRD.
- Use of Spread sheets in Data handling and presentation.
- Aware about chemistry softwares- Introduction to chemical structure drawing and visualization of molecules

SEMESTER I, III & IV

Lab Course I
Course Code CH1442
Qualitative Analysis (Micro Analysis) and Inorganic Preparations

Course Outcome:

- Develop skills in analysing anions and cations in a mixture using microscale qualitative analysis
- Understand the methods for preparing some inorganic compounds

SEMESTER V

Lab Course II
Course Code CH1544- Inorganic Volumetric Analysis
Course Outcome:

Develop skills in performing volumetric titrations- acidimetry, alkalimetry, permanganometry, dichrometry and iodometry

- Idea about preparing solutions of different concentrations
- Understand the theory behind various titrations

Lab Course III

Course code CH1545- Physical Chemistry Experiments

Course Outcome:

- Understand and develop skills in performing physical experiments
- Familiarise with conductometric titrations and potentiometric titrations

SEMESTER VI

Lab Course IV

Course Code CHI644- Organic Chemistry Experiments

Course Outcome:

- Familiarise with the procedure of organic analysis
- Understand the organic estimation method for molar mass by acid and base titration and determination of Phenol and Aniline volumetrically
- Discuss about chromatographic techniques on separation of dyes and amino acid mixtures

Lab Course V

Course Code- CHI645 Gravimetry

Course Outcome:

1. Idea about the theory of gravimetric analysis
2. Perform the gravimetry and analysis of various metals

SEMESTER V AND VI

Course Code-CH1646 Chemistry Project and Factory visit

Course Outcome:

- Inculcate proficiency to identify appropriate research topic and presentation
- Understand the methods of project preparation and presentation
- Awareness about various chemical reactions
- Understand the working of various sophisticated instruments

COMPLEMENTARY COURSE - PHYSICS

SEMESTER I

Course Code- CH1131 .1 Theoretical Chemistry

Course Outcome:

- Understand the structure of atom
- Idea about chemical bonding- hybridisation and structure of molecules
- Study on the nucleus and nuclear properties
- Study on the theories and principles of analytical techniques

SEMESTER II

Course Code – CH1231.1 Physical Chemistry- I

Course Outcome:

- Knowledge on the laws of thermodynamics
- Idea about thermochemistry
- Understand the effect of temperature and pressure on various chemical reactions
- Understand the ionic equilibrium- acids and bases

SEMESTER III

Course Code – CH1331.1 Physical Chemistry- II

Course Outcome:

- Understand the gaseous state and crystalline state
- Idea about various electrochemical reactions and electrodes
- Knowledge on the characteristics of catalysis and the concept of photochemistry
- Study on the rate of different chemical reactions
- Idea about the elements of symmetry and point groups of some molecules

SEMESTER IV

Course Code – CH1431 .1 Spectroscopy And Material Chemistry

Course Outcome:

1. Idea about various spectroscopic techniques used in the study of the structure of molecules
2. Study on the coordination complexes and their properties
3. Study of the different techniques used in metallurgical processes
4. Idea about the introduction to nanoscience, the method of preparation of nanomaterialsand the tools for measuring nanostructures
5. Idea about smart materials- conducting polymers and liquid crystals

LABORATORY COURSES

Course Code CH1432 .1

Course Outcome:

1. Develop skills on analysing cations in a mixture
2. Idea about the theories of volumetric titrations- acidimetry, alkalimetry, permanganometry and iodometry and develop experimental skills

COMPLEMENTARY COURSE- ZOOLOGY

SEMESTER II

Course Code-CH1131.4 Theoretical Chemistry

Course Outcome:

1. Understand the structure of atom
2. Idea about chemical bonding- hybridisation and structure of molecules
3. Study on various environmental pollution
4. Study on the theories and principles of analytical techniques

SEMESTER II

Course Code-CH1231.4 Inorganic and Bioinorganic Chemistry

Course Outcome:

- Study on the classification on organometallic compounds, their environmental and biological aspects
- Idea on the nuclear properties and application of radioactivity
- Understand coordination chemistry and bioinorganic chemistry

SEMESTER III

Course Code -CH1331.4 Mechanisms in Organic Substitution Reactions

Course Outcome:

1. Knowledge on the different electron displacement effects and substitution reactions
2. Idea about the stereochemistry of organic compounds
3. Knowledge on carbohydrates- their classification, properties and structure
4. Understand aminoacids, proteins, lipids and nucleic acids
5. Knowledge on the polymers and their applications

SEMESTER IV

Course Code CH1431.4 Physical Chemistry

Course Outcome:

- Knowledge on the rate of the chemical reactions and catalysis
- Idea about the concept of acids and bases
- Knowledge on the preparation, properties and applications of colloids
- Understand the principle of various spectroscopic techniques
- Knowledge on different instrumental methods of chemical analysis
- Study on different liquid systems

LABORATORY COURSE

Course Code CH1432 .4

Course Outcome:

- Develop skills on analysing organic compounds and the preparation methods of some organic compounds
- Idea about the theories of volumetric titrations- acidimetry, alkalimetry, permanganometry and iodometry and develop experimental skills

B.Sc. MATHEMATICS

Course Outcome

SEMESTER I

Course Code: MM 1141
Course Name: Methods of Mathematics

1. Familiar with the fundamental methods solving problems.
2. Finding the rate of changes through differentiation method
3. Finding the area under a curve through the integration method.

Course Code: MM 1131.1
Course Name: Calculus with applications in Physics – I

1. Understand Differentiation and Integration with application to Physics
2. Aware of infinite series and its convergence.
3. Familiar with Basic Vector Algebra.

Course Code: MM 1131.2
Course Name: Calculus with applications in Chemistry– I

1. Understand Differentiation and Integration with application to Chemistry
2. Familiar with basics in Complex numbers and Hyperbolic functions
3. Familiar with Basic Vector Algebra.

SEMESTER II

Course Code: MM 1221
Course Name: Foundations of Mathematics

1. Understanding the concepts of sets and functions.
2. Understand the way in which a mathematician formally makes statements and proves or disproves it.

Course Code: MM 1231.1
Course Name: Calculus with applications in Physics – II

1. Familiar with basics in Complex numbers and Hyperbolic functions.
2. Got an idea about Partial Differentiation and evaluate multiple integral.
3. Understand Vector Differentiation

Course Code: MM 1231.1

Course Name: Calculus with applications in Physics – II

1. Aware of infinite series and its convergence.
2. Got an idea about Partial Differentiation and evaluate multiple integral.
3. Understand Vector Differentiation

SEMESTER III

Course Code: MM 1341
Course Name: Elementary Number Theory and Calculus – I

1. Understand Abstract Algebraic structure.
2. Understand the fundamental facts in Elementary Number Theory.
3. Familiar with the basics of calculus of vector valued functions and multiple integrals.

Course Code: MM 1331.1
Course Name: Calculus and Linear Algebra

1. Got a concrete idea about ordinary differential equations and how to solve it.
2. Understand Vector Integration and Fourier Series
3. Familiar with Basic Linear Algebra

Course Code: MM 1331.2
Course Name: Linear Algebra, Probability Theory & Numerical Methods

1. Understand Numerical methods
2. Understand Probability and Statistics
3. Familiar with Basic Linear Algebra

SEMESTER IV

Course Code: MM 1441
Course Name: Elementary Number Theory and Calculus – II

1. Understand the fundamental facts in Elementary Number Theory.
2. Familiar with the basics of calculus of vector valued functions and multiple integrals.

Course Code: MM 1431.1
Course Name: Complex Analysis, Special Functions, and Probability Theory

1. Concrete idea on Complex Analysis

2. Familiar with some special functions such as The Factorial Function, Gamma Function.
3. Understand Probability and Statistics

Course Code: MM 1431.2
Course Name: Differential Equations, Vector Calculus, and Abstract Algebra

1. Got a concrete idea about ordinary differential equations and how to solve it.
2. Understand Vector Integration and Abstract Algebra.

SEMESTER V

Course Code: MM 1541
Course Name: Real Analysis – I

1. Understand the ideas of sequence of real numbers and the concept of infinite summation in a formal manner.
2. A minimal idea to the metric space structure of R and a step-ping stone into the idea of abstract topological spaces

Course Code: MM 1542
Course Name: Complex Analysis – I

1. Understand basic complex function theory.
2. Familiar with Complex Integration

Course Code: MM 1543
Course Name: Abstract Algebra – Group Theory

1. A very strong foundation in the theory of groups.
2. Understand the concept of Classifying groups based on the fundamental theorem

Course Code: MM 1544
Course Name: Differential Equations

1. Got an idea about how differential equations arise in various physical problems
2. Solve first order differential equations and second order linear equations.

Course Code: MM 1551.1
Course Name: Operations Research (Open Course)

1. Understand the idea behind Formulation of Linear Programming models.

2. Understand Transportation problems and Project Management.

SEMESTER VI

Course Code: MM 1641
Course Name: Real Analysis – II

1. Understand the concept of continuity, existence of derivatives, and integrability.

Course Code: MM 1642
Course Name: Complex Analysis – II

1. Familiar with Power Series Representation of Analytic Functions such as Taylor Series, Laurent series.
2. Understand Residue Theorem and how it is used to solve real Improper Integrals
3. Got an idea about Conformal mapping and Mobius Transformations.

Course Code: MM 1643
Course Name: Abstract Algebra – Ring Theory

1. Familiar with higher algebraic structure rings.
2. By numerous examples got a strong foundation on Rings and Fields.

Course Code: MM 1644
Course Name: Linear Algebra

1. Understand how to solve system of linear equations.
2. Familiar with Vector spaces and how Matrix related to Vector algebra.

Course Code: MM 166.1
Course Name: Graph Theory

1. Aware of some of the fundamental concepts in Graph Theory
2. Develop better understanding of the subject so as to use these ideas skilfully in solving real world problems.

Course Code: MM 1541
Course Name: Computer Programming

1. Familiar with document preparation using LATEX
2. Understand the basics of computer Programming using Python

Course Code: MM 1646
Course Name: Project

1. Comprehensive Viva
2. Recognize the importance of planning and preparing required to undertake a research project
3. Develop a thorough understanding of the chosen subject area
4. Demonstrate the ability to collate and critically interpret and assess data

B.Sc. PHYSICS

1. **Program - Science-Physics**
2. **Specific Program- B.Sc.Physics**
3. **Courses - Core Course, Open Course, Complementary Course Programme**

Specific Outcomes (PSOs) and Course Outcomes (COs) for all courses Program Outcome (PO)

1. Generate graduates of the calibre sought by industries and public service as well as academic teachers and researchers of the future.
2. Attract outstanding students from all backgrounds.
3. Develop skills required to gather information from resources and use them.
4. Acquire skills in methodology related to physics.

Program Specific Outcome(PSO)

1. A broad knowledge of fundamental physical laws applying to the world at scales ranging from the nuclear to the cosmological.

2. Demonstrate a rigorous understanding of the core theories & principles of physics, which includes mechanics, electromagnetism, thermodynamics, and quantum mechanics.

3. Knowledge about material properties and its application for developing technology to ease the problems related to the society.

4. Understand the set of physical laws, describing the motion of bodies, under the influence of system of forces.

5. Understand the relationship between particles and atom, as well as their creation and decay.

6. Relate the structure of atoms and subatomic particles to their properties.

7. Analyze the applications of mathematics to the problems in physics and develop suitable mathematical method for such application and for formulation of physical theories.

8. Understand the structure of solid materials and their different physical properties along with electronics, and material science.

9. Skill to use Information Communication Technology to gather knowledge at will.

10. Read, understand and interpret physical information – verbal, mathematical and graphical ability to tackle a wide range of topics in thermodynamics,Statistical Mechanics, Electricity, Electrodynamics and Electronics.
11. Skill to unravel the secrets of the universe and understand the physical laws governing themotion of planets and astronomical objects in the solar system.
12. Skill use appropriate software such as programming languages and packages in a physics investigation.
13. Ability to carry out an independent investigation using textbooks and other available literature, searching databases and interacting with colleagues and staff to extract important information.
1. Understand component symbol, working principle, classification and specification of electrical components.
2. Trained in skills related to electronics industry and market.
3. Scientific aptitude and temperament- perspective on superstitions prevailing in the society will be changed by developing a scientific aptitude.
4. Develop an aptitude for research in Physics

COURSE OUTCOMES (Cos)

Core Course I PY1141:Basic Mechanics and Properties of Matter

1. Understand the elastic behaviour and working of torsional pendulum
2. Analyse bending behaviour beams and analyse the expression for young's modulus
3. Acquire basic knowledge of elasticity, Surface tension and fluid dynamics
4. Analyse waves and oscillations

Core Course II PY1241:Heat and Thermodynamics

1. Analysis of laws of thermodynamics and its applications to real world.
2. Understand the working principle of diesel engine and petrol engine
3. Understand the heat transfer mechanism

Core course III PY1341:Electrodynamics

1. Knowledge of Electrostatics, Magnetostatics and Electromagnetic induction
2. Understand Maxwell's equations and electromagnetic waves
3. Knowledge of transient currents, alternating current and circuit theory

Core Course IV PY1441:Classical and Relativistic Mechanics

1. Understand Newton's laws.
2. Understand the dynamics and gravitation
3. Understand behaviour of rigid body dynamics
4. Explain Lagrangian formulation and its application
5. Describe how the symmetries of space and time lead to conservation laws
6. Preliminary understanding of Hamiltonian dynamics.
7. Understand of Frames of reference, Galilean invariance, and Special Theory of Relativity and its consequences

Core Course V Practical I - Mechanics, Properties of Matter, Heat and Acoustic

a. Familiar with simple experiments on the elastic behaviour of materials
b. Familiar with simple experiments on the heat transfer mechanism in various type of materials
c. Analysis of experimental data with error calculations

Core course VI PY1541: Quantum Mechanics

1. Understand the failure of classical mechanics in explaining various physical phenomena.
2. Statistical interpretation of wave function
3. Understand mathematical formulation of quantum mechanics

4. Understand Development of time dependent and time independent Schrodinger equation

Core Course VII PY1542: Statistical Physics, Research Methodology and Disaster Management

1. Understand the concept of phase space, ensemble
2. Knowledge of research-methodology, experimentation and error analysis.
3. Analysis of error in measurements and estimation and reporting of errors
4. Knowledge on global natural disasters and their management

Core Course VIII PY1543:Electronics

1. Understand the principle of diodes, transistors, field effect transistors
2. Study the construction and working of signal amplifiers and oscillators
3. Learn the principle of operation amplifiers and simple circuits using op-amps.

Core Course VIII PY1544:Atomic and Molecular Physics

1. Analysis of atom models.
2. Understand and analyse atomic and molecular spectra.
3. Apply knowledge of resonance spectra in various fields.

Open Course PY1551.3: Applied Physics

1. General awareness on commonly used electrical and electronics equipments
2. Basic ideas on various scientific, medical and optical instruments
3. Understand the principle of common mechanical devices

Core Course IX PY1641:Solid State Physics

1. Understand crystal structure and interatomic forces
2. Describe the properties of X-rays and its application in crystallography
3. Analyse the optical, dielectric and magnetic properties of materials.
4. Understand the basics of superconductivity

Core Course X PY1642:Nuclear and Particle Physics

a. Understand the nuclear structure and various models
b. Understand the principle of radioactivity and carbon dating
c. Gain detailed knowledge on elemental particles
d. Understand the principle of nuclear fission and nuclear fusion

Core course XI PY1643:Classical and Modern Optics

1. Detailed knowledge of Interference and Diffraction, Polarization and Dispersion
2. Understand preliminaries of Fiber optics and Lasers
3. Understand the basics of Holography

Core Course XII PY1644:Digital Electronics and Computer Science

1. Distinguish and apply number systems, Boolean algebra and logic gates.
2. Understand the basics of computers and memory systems.
3. Understand C programming and computer oriented numerical methods.

Core Course XIII Elective – PY1661.4:Nano science and Technology

1. Understand the large-scale structure of Universe
2. Classify and catalogue of various astronomical bodies
3. Understand the dynamic activity of Sun
4. Understand the structure and composition of Earth's magnetosphere

Core Course XIV Practical II- Optics, Electricity and Magnetism

1. Understand various phenomena of optics with the help of simple experiments
2. Familiar with some simple experiments in electricity and magnetism

Core Course XV Practical III- Electronics and Computer Science

1. Knowledge in Construction of rectifiers, amplifiers and oscillators
2. Solving some simple problems in physics using numerical methods by implementing them in C programming language

Core Course XVI Project

1. Develop research culture
2. Understand the research methodology
3. Interpretation of data and improved scientific writing

B.SC. PHYSICS COMPLEMENTARY COURSE - CHEMISTRY

Complementary Course I PY1131.2- Rotational Dynamics and Properties of Matter

1. Understand the basic concepts related to modulus of elasticity
2. Understand molecular theory of surface tension
3. Understand rotational dynamics of rigid bodies

Complementary Course II PY1231.2- Thermal Physics

1. Analysis of laws of thermodynamics and its applications to real world.
2. Understand the working principle of diesel engine and petrol engine
3. Understand the heat transfer mechanism

Complementary Course III PY1331.2-Optics, Magnetism and Electricity

1. Detailed knowledge of Interference and Diffraction, Polarization and Dispersion
2. Understand preliminaries of Fiber optics and Lasers

Complementary Course IV PY1431.2- Atomic physics, Quantum mechanics and Electronics

1. Knowledge of various atom models.
2. Understand and analyse atomic and molecular spectra.
3. Understand the principle of diodes, transistors, field effect transistors.

Complementary Course V Practicals

1. Understand various phenomena of optics with the help of simple experiments.
2. Familiar with some simple experiments in electricity and magnetism. ·
3. Apply the knowledge of diodes in various circuits

B.SC. PHYSICS COMPLEMENTARY COURSE - MATHEMATICS

Complementary Course I PY1131.1 Mechanics and Properties of Matter

1. Understand the basic concepts related to modulus of elasticity
2. Learn the molecular theory of surface tension 3. Understand rotational dynamics of rigid bodies

Complementary Course II PY1231.1Thermal physics and statistical mechanics

1. Analysis of laws of thermodynamics and its applications to real world.
2. Understand the working principle of diesel engine and petrol engine
3. Understand the heat transfer mechanism

Complementary Course III PY1331.1 Optics, Magnetism and Electricity

1. knowledge of Interference and Diffraction, Polarization and Dispersion
2. Understand preliminaries of Fiber optics and Lasers

Complementary Course IVPY1431.1 Modern Physics and Electronics

1. Study various atom models.

2. Understand and analyse atomic and molecular spectra.
3. Understand the principle of diodes, transistors, field effect transistors.

Complementary Course V Practicals

1. Understand various phenomena of optics with the help of simple experiments.
2. Familiar with of some simple experiments in electricity and magnetism.
3. Application of diodes in various circuits

B. Sc. ZOOLOGY

Program - Science-Zoology
Specific Program- B.Sc. Zoology
Courses - Core Course
Open Course
Programme Specific Outcomes (PSOs) and Course Outcomes (COs) for all courses
Program Outcome (PO)

1. Apply the knowledge in basic Zoology in various fields of science for the development in Life Science .
2. Develop ecological awareness in students and the need for sustainable development in the present scenario of environmental disruption and climate change.
3. Understand the diversity of animals and their ecological significance.
4. Create awareness of the ecological significance and evolutionary status of each organism.
5. Acquire basic scientific skills like observation and experimentation

Program Specific Outcome (PSO)

1. Acquire a detailed knowledge on invertebrate and vertebrate animal diversity, its form structure, habit and evolutionary relations between them.
2. Apply knowledge through understanding the methodologies and perspectives of Zoological Sciences.
3. Understand the concepts in cell biology, the basic components of the cell and its method of functioning.
4. Get skilled in animal dissections and understand the basic anatomy of living organisms.
5. Understand and analyze the pattern of inheritance in organisms through the study of Genetic principles.
6. Get introduced to recent developmental fields of Biology like Biotechnology and Bioinformatics and understands the scope of the subject.
7. Get an awareness about the immune defence mechanisms and gets an overview on the applications in the field of microbiology.
8. To study in detail on human physiology and thus would be capable to relate their knowledge on the basic body functions to maintain a healthy life.
9. Be equipped to understand the importance of digital databases to effectively contribute to new advancements in the field of medicine, taxonomy, developmental biology, biotechnology and bioinformatics.
10. Learn the basic mechanism of embryonic development in living organisms and gets introduced to its advanced technologies in the field of medicinal research.
11. Gain insight on the role played by evolution in nature and the inevitable change brought about in ecological systems through evolutionary forces.
12. Acquire basic knowledge and awareness on the need for public health and hygiene in irradiating diseases and to maintain a healthy public life on a whole.
13. Get practical experience in cytological, physiological, microbiological and hematological principles.
14. Communicate the information that they have acquired by systematic theoretical and practical learning.

15. Apply their knowledge to find solutions to existing social situations, through reflective thinking and coordinated study with a scientific outlook.

B.Sc. ZOOLOGY COURSE OUTCOMES (COs)

Core Course I Animal Diversity I - ZO1141

1. Learn the different classes under phylum Chordata and their common characteristics.
2. Get a wide knowledge on the pattern of evolution of different complex life forms on earth.
3. Relate their theoretical knowledge in development of applied fields like taxonomical identification and for creating public awareness on the need for conserving animal diversity.

Core Course II Animal Diversity II- ZO1241

1. Learn the different classes under phylum Chordata and their common characteristics.
2. Get a wide knowledge on the pattern of evolution of different complex life forms on earth.
3. Relate their theoretical knowledge in development of applied fields like taxonomical identification and for creating public awareness on the need for conserving animal diversity.
4. Understand the comparative anatomy of vertebrates in detail.

Core Course III Methodology and Perspectives of Zoology ZO1341

1. Learn fundamental characteristics of science as a human enterprise and they are able to do data collection can present data in a well established manner.
2. Understand the methodology of scientific research.
3. Understand the importance of statistical analysis in the field of biological research.
4. Get an idea about the scope of biological research through gaining knowledge on the instrumental techniques in biology.

Core course IV Cell BiologyZO1441

1. Learn about in detail about a single cell, its organelles, structure and function.
2. Understand the evolution of multicellular complexity in eukaryotes compared to that in prokaryotes.
3. Get an idea about cell division, cell communication like cell signaling and signal transduction.
4. To be able to relate their knowledge on the process of ageing and the condition leading to development of cancerous cells.

Core Course V Practical I - Methodology and Perspectives of Zoology, Animal Diversity I

and II -ZO1442

1. Get an idea about the plan of conventional organ system in common, easily available animals.
2. The proverb 'seeing is believing' is proved by the students because they learn the features of typical examples and economically important specimens via direct observation of preserved specimens.

Core Course VI Genetics and Biotechnology ZO1541

1. Get an idea of the mechanism of crossing over and inheritance patterns in man and an overview of human genetics.

2. To learn the principles and techniques involved in DNA technology and get an overview of modern techniques like PCR, human genome project, Hybridoma technology, gene therapy human cloning and practical application of biotechnology.
3. To understand sex determining mechanism, cytoplasmic inheritance and mutation.

Core course VII Immunology and Microbiology-ZO1542

1. Learn the principles and mechanisms of immunology
2. To enhance their knowledge on the malfunctioning and disorders of the immune system
3. Have an idea of microbes in detail and their economic importance with special reference to pathogenic forms and applied micro biology.

Core Course VIII Physiology and Biological Chemistry -ZO1543

1. Get an overview on different systems and the inherent disorders/ deficiencies involved therein.
2. Learn hormone action and enzyme action in detail.
3. Get an idea on the structure and functions of bio-molecules and their role in metabolism.

Foundation course II General Informatics, Bioinformatics and Molecular Biology ZO1621

1. Understand the basic concepts and functional knowledge in the field of informatics.
2. Get awareness about nature of the emerging digital knowledge society.
3. To be able to aware about social issues and concerns in the use of digital technology.
4. Understand the nature, application and scope of Bioinformatics.
5. Get an idea about knowledge on skills for higher education.
6. Understand gene expression, genetic code, post transcriptional modifications, bacterial recombination and gene regulation in prokaryotes.

Core Course IX Developmental Biology and Experimental Embryology ZO1641

1. Get in depth knowledge on various stages involved in the developing embryo.
2. Gain an idea on initial developmental procedures involved in Amphioxus, Frog and chick.
3. Enhance knowledge with information on state- of- the art experimental procedures in embryology.

Core Course X Ecology, Ethology, Evolution and Zoogeography ZO1642

1. Get an overview on the principles, applications and management of environmental science.
2. Learn the inherent morphological and physiological bases of behavioral pattern exhibited by vertebrates.
3. Enhance the overall knowledge of organic evolution with special reference to man.
4. Get an idea on geological time scale, animal distribution, zoogeography, dating and significance of fossils.

Core course XI Practical II - Cell Biology, Genetics, Biotechnology, Immunology and Microbiology-ZO1643

1. To be able to prepare and observe chromosomal arrangements during cell division.
2. Identify and distinguish chromosomal aberrations in man.
3. To attain broad knowledge of conventional biotechnological procedures.

Core Course XII Practical III - Physiology and Biological Chemistry, Molecular Biology and Bioinformatics. Course Code - ZO1644

1. Learn to apply basic principles in physiology.
2. Acquire skills to perform routine blood analysis and clinical procedures for blood & urine analysis.
3. Develop skill in simple biochemical laboratory procedures.

Core Course XIII Practical IV - Developmental Biology, Ecology, Ethology, Evolution and
Zoogeography-ZO1644

1. Attain detailed knowledge in practical skills in the concerned subject
2. Become an expert to relate the scientific knowledge with life.
3. Get an application level knowledge of procedural practices.

OPEN COURSE I Public Health and Hygiene ZO1551.1

1. Get an overview on the importance of good health and personal hygiene.
2. Become aware of clean sexual habits thereby warding off sexually transmitted diseases.
3. Get health education and learn ill effects of smoking, alcoholism and drug abuse.
4. Get an idea about sex education and contraceptive methods.
5. Understand the benefit of Yoga and mental health education.

OPEN COURSE II Economic Zoology - Vermiculture and Apiculture Course Code – ZO1651.1

1. Get an idea about the importance of self employment and self reliance.
2. Study the basic procedure and methodology of vermiculture.
3. Learn the scope and methodology of apiculture.

Zoology Project and Field study ZOI646

1. They attain an overall idea in identifying appropriate research topic, observation, experimentation and analyzing result.
2. Understand how to write a project.

COMPLEMENTARY COURSE: BOTANY

Course Outcomes (Cos)

Complementary Course I BO1131: Microtechnique, Angiospem Anatomy and Reproductive Botany

1. Develop an idea on the preservation of plant specimens.
2. Understand different microtechniques like staining and mounting.
3. Develop an idea about the internal structure and reproduction in Angiosperms.
4. Understand the structure function and significance of different cells and tissues.
5. Understand the morphology and anatomy of reproductive parts of plants and their development.

Complementary Course II BO1231: Phycology, Mycology, Lichenology, Bryology, Pteridology, Gymnosperms and Plant Pathology

1. To understand the internal structure of Algae, Fungi, Bryophytes, Pteridophytes and Gymnosperms.
2. Get an insight of the evolutionary development of plants from Algae to Gymnosperms.
3. Understand the internal structure and reproduction in diverse plants.
4. Equip students to identify and understand the major characteristics of Algae, Fungi, Bryophytes, Pteridophytes and Gymnosperms.
5. Create an awareness on the significance of lower plants in the ecosystem.

6. Understand the economic importance of Algae, Fungi, Bryophytes and Pteridophytes.
7. Apply knowledge in plant pathology in daily life by understanding pathogens, spread of diseases in plants and preventive measures.

Complementary Course III BO1331: Systematic Botany, Economic Botany, Ethno Botanyand Plant Breeding

1. Understand the diversity of Angiosperms by naming and classification.
2. Acquaint with aims, objectives and significance of Taxonomy.
3. Develop an idea about Angiosperm classification and preservation of plant parts.
4. Understand the basic techniques in preparation of herbarium.
5. To give an idea about plants of economic and medicial importance.
6. Understand methods to collect and use tribal knowledge in medicinal plants.

Complementary Course IV BO1431: Plant Physiology, Plant Ecology, Horticulture andPlant Biotechnology

5. Acquire basic knowledge needed for proper understanding of plant functioning including water transport, photosynthesis, respiration and translocation of solutes.
6. Familiarize with the basic skills and techniques related to plant physiology.
7. Understand the morphological, physiological and anatomical adaptations of plants growing in different environments.
8. Get an insight about the significance of different ecosystems and need for environmental protection
9. Help the student to design novel mechanisms for the sustainable utilization of naturalresources.
10. Enable the students to understand the structure and function of the ecosystems
11. Acquire awareness on environmental pollution and its effect in climate and living organisms.
12. Emphasize the need for protection of nature and natural resources.
13. Understand different horticultural techniques like budding, layering and grafting and apply in daily life.
14. Develop an idea on the modern techniques in horticulture
15. Understand the current developments in the field of Biotechnology.
16. Give an idea on plant tissue culture techniques.
17. Understand methods and application of biotechnology.

Complementary Course V BO1432: Practical (BO1131, BO1231, BO1331 and BO1431)

1. Identify the anatomy of root, stem and leaf.
2. Understandstomatal structure.
3. Familiarize the structure of Anther and Embryo.
4. Identify algae, fungi, lichen, bryophyte, pteridophyte and gymnosperms.
5. Study the internal structure of Algae, Fungi, Lichen, Bryophyte, Pteridophyte and Gymnosperms.
6. Identify systematic position of angiosperm members.
7. Identify economically important plants.
8. Understand the aim and working in different physiological experiments.
9. Study of ecological adaptations in plants.

10. Identify different horticultural tools.
11. Familiarize vegetative propagation methods.

DEPARTMENT OF ORIENTAL LANGUAGES - HINDI

HN 1111.1- Prose and One Act Plays

1. Understand the cultural, social and moral values of modern Hindi prose.
2. Understand the One Act Plays.

HN1211.1- Fiction, Short
Story & Novel

1. Appreciate the world of fiction.
2. Developed creative process and communication skills.

HN 1311.1 - Poetry and Grammar

1. Knowledge of Hindi Poetry.
2. Understand the Grammar of Hindi

HN 1411.1- Drama, Translation and Correspondence

1. Appreciate and analyse the dramatic elements in Literature
2. Understand the process of translation.
3. Familiar with official correspondence in Hindi.

DEPARTMENT OF ORIENTAL LANGUAGES - MALAYALAM

ML 1111.1 Malayalakavitha, Lang. Course II (Addl. Lang. I)

1. Understand the cultural, social and moral values of ancient and modern poetry.
2. Knowledge of Malayalam Poetry.

ML 1211.1 Gadyasahityam Lang. Course V (Addl. lang. II)

1. Understand social and moral values of modern prose.

ML 1311.1 Drisyakalasahityam Lang. Course VII (Addl. Lang. III)

1. Understand the cultural values of Drisyakala, i.e., Kadhakali, Thullal, Drama etc.

ML 1411.1 Asayavinimayam, Sargathmaka Rachana, Bhashavabodham Lang. Course IX (Addl. Lang. IV)

1. Understand the process of translation.

DEPARTMENT OF PHYSICAL EDUCATION

SEMESTER V

PE 1551.1 HEALTH & FITNESS EDUCATION [OPEN COURSE]

1. To introduce the fundamentals of Health and Physical fitness.
2. To provide information about the scientific basis and benefits of Physical Activity.
3. To enable the students to lead a healthy lifestyle.
4. To impart knowledge regarding health, nutrition and first aid measures
5. To give a brief awareness about sports & games and their influence in the society.

M.Sc. CHEMISTRY

SEMESTER – I

CH 211- Inorganic Chemistry –I

Course Outcome:

- Develop deep knowledge on the theories of metal complexes
- Idea about the various elements of symmetry and symmetry operations
- Understand data analysis methods and attaining deep knowledge on the theories of volumetric titrations
- Discuss about isopoly and heteropoly acids
- Know the various types of pollution and to discuss the methods to control it

CH 212- Organic Chemistry – I

Course Outcome:

- Obtain idea about the stereochemistry of organic compounds and chirality of drugs
- Understand the organic intermediates, their stability and their reactivity
- Knowledge about the various substitution reactions
- Deep knowledge on the elimination and addition reactions of organic compounds
- Familiarise with the reagents used in organic synthesis

CH 213-Physical Chemistry-I

Course Outcome:

- Obtain idea about the foundation and postulates of quantum mechanics and its application to simple systems
- Idea about different adsorption techniques and also the theories of catalysis
- Knowledge about the thermodynamics of reactions and the partial molar quantities
- Understand the kinetics and theories of chemical reactions and idea about the effect of radiation on the rate of the reactions
- Deep knowledge on the properties of gases and liquids and the methods to determine these properties

CH 214- Inorganic Chemistry Practicals -I

Course Outcome:

- Awareness about the separation and identification of rare cations
- Understand the volumetric estimation of cations
- Skills on colorimetric and spectrophotometric estimations of metal ions
- Idea about the preparation of metal complexes

CH 215- Organic Practicals -I

Course Outcome:

- Deep knowledge on identification and separation of organic compounds
- Familiarise the method of separation of mixtures by chromatographic techniques
- Develop skills ontwo stagespreparation of organic compounds

CH 216- Physical Practicals –I

Course Outcome:

- Develop idea and skills in performing various physical experiments
- Understand the theory and performing the experiments

SEMESTER – II

CH 221- Inorganic Chemistry –II

Course Outcome:

- Knowledge about sulphur, phosphorus and boron containing inorganic compounds
- Understand the spectral and magnetic properties of coordination complexes
- Deep knowledge on crystals and their different structures
- Idea about the properties of inner transition elements and their separation techniques
- Knowledge about the electronic structure of solids, conductivity and their dielectric properties

CH 222- Organic Chemistry- II

Course Outcome:

- Knowledge on physical organic chemistry
- Deep knowledge on the various organic molecular rearrangements and transformation reactions
- Idea about aromaticity and pericyclic reactions

- Understand the photochemical processes and the applications of photochemistry
- Familiarise with the chemistry of natural products and biomolecules

CH 223- Physical Chemistry -II

Course Outcome:

- Thorough knowledge on quantum chemistry
- Idea about various spectroscopic techniques and their instrumentation
- Understand the thermodynamics of irreversible processes and their applications
- Knowledge on the concepts of statistical thermodynamics
- Familiarise with electrochemistry, various electrodes and the electrokinetic phenomena

SEMESTER – III

CH 231- Inorganic Chemistry- III

Course Outcome:

- Idea about the introduction of organometallic compounds and their catalytic properties
- Deep knowledge on the reactions of metal complexes
- Elaborate idea about bioinorganic chemistry and role of elements in biological systems
- Develop the idea on the various spectroscopic techniques used in the characterisation of inorganic complexes
- Deep knowledge on the nuclear properties and the various nuclear reactions

CH 232- Organic Chemistry-III

Course Outcome:

- Deep knowledge on the structural elucidation of organic compounds using the spectroscopic techniques
- Understand the mechanism and methods in organic synthesis
- Familiarise the different chromatographic techniques used in the separation of organic compounds

CH 233- Physical Chemistry –III

Course Outcome:

- Understand chemical bonding and application of different methods to study the nature of bonding in molecules
- Introduction to computational chemistry and the various methods

- Discussed on the physical aspects of different spectroscopic techniques
- Thorough knowledge on statistical thermodynamics
- Application of electro analytical and spectrophotometric methods in chemistry

CH 234- Inorganic Chemistry Practicals –II

Course Outcome:

- Develop skills on estimation of mixture of ions by volumetric and gravimetric methods
- Idea about how to interpret metal complexes using IR, UV- Vis spectral data
- Detailed knowledge on the interpretation of TG and DTA curves of metal oxalate hydrates

CH 235- Organic Practicals-II

Course Outcome:

- Understand the methods of estimation of organic compounds by volumetric and colorimetric methods and to develop experimental skills
- Idea on the paper chromatographic technique of organic mixture separation
- Detailed idea of green chemistry and the single stage preparation of compounds using green chemistry protocols

CH 236- Physical Practicals- II

Course Outcome:

- Deep knowledge on different physical experiments and develop experimental and observational skills

SEMESTER – IV

CH 241- Chemistry of Advanced Materials

Course Outcome:

1. Understand nanomaterials, their synthesis and role of metal nanoparticle in catalysis
- Idea on the basic tools and applications of nanotechnology
- Detailed knowledge about the polymerisation process
- Industrially important polymers- conducting polymers, polymers used in drug delivery, crystalline polymers, polymer based nanoparticles and polymer based LEDs
- Idea about smart materials

CH 242 (a) Inorganic Chemistry-IV

Course Outcome:

- Detailed idea on the application of group theory
- Understand the new frontier in chemistry- Supramolecular chemistry
- Deep knowledge about metal- metal bond formation and their characteristics
- Idea about some selected topics in bioinorganic chemistry
- Detailed understanding of acids, bases and non-aqueous solvents

CH 243 (a) Dissertation

Course Outcome:

- Develop the research aptitude of students
- Detailed knowledge about the instrumentation analysis and experimental knowledge
- Understand the method of preparation and presentation of thesis

CH 243 (b) Visit to R & D Centre

Course Outcome:

- Awareness of various R& D Centres
- To understand and familiarise with the working of various sophisticated instruments

M.Sc MATHEMATICS

Course Outcome

SEMESTER : I

Paper Code: MM 211
Paper Name: Linear Algebra

1. To understand about vector spaces , subspaces ,bases and dimensions , Linear transformation, their algebras and their representation by matrices.
2. Characteristics values of linear transformation.
3. Analysis of characteristic (Eigen) values , triangulable and diagonalizable Transformations and primary decomposition theorem.

Paper Code : MM 212
Paper Name : Real Analysis I

1. Functions of bounded variation expressed as the difference of increasing,
2. Continuous functions.
3. Definition and properties of Riemann stieltjes Integral.
4. Point wise and uniform convergence in the sequence of functions.
5. Properties of functions in multivariate calculus.

Paper Code: MM 213
Paper Name: Differential Equations

1. Various methods for computing solutions of second order linier equations
2. Series solution of first order equations - ordinary point, regular singular point.
3. Determine types of Differential Equations which can be solved by the applications of Special Functions
4. Properties of Special functions
5. Understand Differential Equations of first order, Genesis of First Order PDE
6. Classifications of Integrals - Linear equation of first order.

7. Various methods for computing solutions of first order PDE
8. Understand the formation and solution of some significant PDE like wave equation, heat Equation and Laplace equation
9. Maximum and Minimum Principles

Paper Code : MM 214
Paper Name : Topology I

1. Understand to construct topological spaces from metric spaces and properties of neighbourhoods, open sets , close sets, basis and sub-basis.
2. Apply the properties of open sets , closed sets, interior points accumulation points and derived sets in deriving the proofs of various theorems.
3. To understand the concepts of countable spaces and separable spaces.
4. Understand the concepts and properties of the compact and connected topological spaces.

SEMESTER : II

Paper Code : MM 221
Paper Name : Abstract Algebra

1. Basic ideas of Abstract Algebra.
2. Properties of cyclic and permutation Groups and its applications
3. Sylows theorem and its applications.
4. Definition and examples of Homomorphism and its properties.
5. Factorization of polynomial and and Reducibility Tests.
6. Fundamental theorem of field theory and its applications.

Paper Code : MM 222
Paper Name : Real Analysis II

1. Basic concepts of measurable function and Lebesgue measure
2. Lebesgue's differentiation theorem and its verification.
3. Abstract measures and its use in Differentiation and Integration.
4. Verification of completeness in $L^p(\mu)$.
5. Jordan Decomposition and applications of Radon - Nikodym Theorem.

Paper Code : MM 223
Paper Name : Topology II

1. Concept of product and Quotient Space, Finite and arbitrary products, Quotient Space
2. Concepts of Separation Axioms, Normal Spaces, Separation by continuous functions
3. Understand Convergence, Tychnoff 's Theorem
4. Fundamental Concepts of Algebraic Topology
5. Concept of Brouwer Fixed Point Theorem

Paper Code : MM 224
Paper Name : Scientific Programming With Python

1. Describe the core syntax of Python Programming Language
2. Discover the need for working with the strings and functions
3. Illustrate the process of structuring the data using lists, dictionaries, tuples and sets
4. Indicate the use of regular expressions and built -in functions to navigate the file system
5. Infer the Object - Oriented Programming concepts in Python
6. Graphing using Python.

SEMESTER : III

Paper Code : MM 231
Paper Name : Complex Analysis-I

1. Familiar with Power Series Representation of Analytic Functions such as Taylor Series, Laurent series.
2. Understand Residue Theorem and how it is used to solve real Improper Integrals
3. Got an idea about Conformal mapping and Mobius Transformations.

Paper Code : MM 232
Paper Name : Functional Analysis - I

1. Explain the fundamental concepts of fundamental analysis
2. Continuous application of Normal Space
3. Understand and apply fundamental theorems from the theory of Normed and
4. Banach Spaces, including the Hahn Banach theorem, the open mapping theorem ,the closed graph theorem
5. Application of uniform boundedness principle and closed graph , open
6. mapping theorem
7. Understand the fundamentals of Spectrum of bounded operatives

Paper Code : MM 233
Paper Name : Operations Research (Elective)

1. Formulate some real life problems into linear programming problem.
2. Use the simplex method to find an optimal vector for the standard linear programming problem and the corresponding dual problem.
3. Prove the optimality condition for feasible vectors for linear programming and Dual linear programming problem.
4. Find optimal solution of transportation problem and assignment problem.
5. Learn the constructions of networks of a project and optimal scheduling using CPM and PERT .

6. Formulate and solutions of linear programming model of two person zero sum game.

Paper Code : MM 234

Paper Name : Graph Theory (Elective)

1. Basic concepts of graphs.
2. Definition of Isomorphism and blocks and its verification.
3. Solve problems using Basic graph theory , cliques, matching and tournaments.
4. Understand Eulerian and Hamiltonian graphs and its properties and determine whether graphs are Hamiltonian and /or Eulerian.
5. Solve problems involving vertex and edge connectivity.
6. Solve problems involving Vertex coloring and edge coloring of graphs.
7. Understanding Centre of graphs and detour distances.

SEMESTER : IV

Paper Code : MM 241

Paper Name : Complex Analysis-II

1. Understand Compactness and convergence in the space of Analytic functions.
2. Familiar in the Reimann Zeta function Runge's Theorem.
3. Understand Analytic continuation along a path and Riemann surface.

Paper Code : MM 242

Paper Name : Functional Analysis - II

1. Spectrum of Compact operators
2. Inner Product Spaces, Orthogonal Sets and it's verifications, Orthonormalization in some problems
3. Approximation and optimization Projection and Riesz representation theorem

Paper Code : MM 243

Paper Name : Coding Theory (Elective)

1. Learn about basic techniques of algebraic coding theory like matrix encoding, polynomial encoding and decoding by coset, leaders etc.
2. Different types of codes like linear , BCH , cyclic and MDS codes.
3. Learn how algebraic coding theory is applicable in real world problems.
4. The student is able to apply linear block codes for error detection and correction.
5. Apply BCH and Reed Muller codes for channel performance improvement against burst errors.

Paper Code : MM 244

Paper Name : Analytic Number Theory (Elective)

1. Expected to get interested to solve challenging problems in Number Theory.
2. Understand the properties of divisibility and prime numbers , compute the greatest
3. common divisor and least common multiple and handle linear Diophantine equations.
4. Understand the operations with congruence , linear and non - linear congruence equations.
5. Understand and use the theorems: Chinese Remainder Theorem , Lagrange theorem,
6. Fermat's theorem, Wilson's theorem.
7. Use arithmetic functions in areas of mathematics.

Paper Code : MM 245
Paper Name : Dissertation / Project

1. Comprehensive Viva
2. Recognize the importance of planning and preparing required to undertake a research project
3. Develop a thorough understanding of the chosen subject area
4. Demonstrate the ability to collate and critically interpret and assess data

M.Sc. PHYSICS

Program Outcomes

1. To develop strong student competencies in Physics and its applications in a technology-rich, interactive environment.
2. The student understands the historical development of physics, its possibilities and limitations, and understands the value of lifelong learning.
3. The students will become effective researcher who will be able to provide lucid summation of the scientific literature on a given topic of study.
4. Enable the students to avail career opportunities in teaching, industry and research

Program Specific Outcomes

1. Understanding the basic concepts of physics particularly concepts in classical mechanics, quantum mechanics, statistical mechanics and electricity and magnetism to appreciatehow diverse phenomena observed in nature follow from a small set of fundamental laws through logical and mathematical reasoning.
2. Students will be able to describe and critically evaluate the current state-of-the-art in selected areas of physics.
3. Students will earn to carry out experiments in basic as well as certain advanced areas of physics such as condensed matter physics, nanoscience, lasers and electronics.

Course Outcomes

FIRST SEMESTER

PH211Classical Mechanics:

1. Application of Newton's laws of motion to solve advanced problems involving the dynamic motion of classical mechanical systems.

2. Use differential equations and other advanced mathematics in the solution of the problems.

3. represent the equations of motion for complicated mechanical systems using the Lagrangian and Hamiltonian formulations of classical mechanics.
4. get familiarized with Poisson brackets and Hamilton -Jacobi equation and classical background of Quantum mechanics

5. Understand Kinematics and Dynamics of rigid body in detail and ideas regarding Euler's equations of motion.

6. Understand theory of small oscillations in detail along with basis of Free vibrations.

7. Gain basic ideas about Non linear equations and chaos.

PH 212: Mathematical Physics

1. Develop detailed knowledge of Linear algebra, Complex analysis, Fourier Series and Tensor analysis
2. Knowledge in Probability theory, Group Theory and Special Functions
3. Develop in-depth knowledge of Differential equations and solution methods.

PH213:Basic Electronics

1. Know common electronic circuits using Diodes, BJTs, FETs, OPAMPs and 555 timer ICs.
2. Familiar with solid-state devices
3. Familiar with preliminaries of Digital Electronics and Optical Electronics
4. Knowledge of electronic instrumentation.

SECOND SEMESTER

PH221:Modern Optics and Electromagnetic Theory

1. Knowledge of common topics in modern optics and preliminaries of nonlinear optics
2. Knowledge of Electromagnetic waves and Relativistic electrodynamics
3. Knowledge of Radio wave propagation, Transmission lines, waveguides and antennas

PH222: Thermodynamics, Statistical Mechanics and Basic Quantum Mechanics:

1. Familiar with Thermodynamic relations and Classical and Quantum statistics
2. Understand Phase transitions
3. Understand Foundations of quantum mechanics, the paradoxes and some exactly solvable problems in quantum mechanics

PH223:Computer Science and Numerical Techniques

1. Familiar with basic computer architecture and microprocessors
2. Understand Python and C++ programming languages
3. Understand some of the important numerical methods in problem solving in physics

PH251:Practical I General Physics

1. Develop observational, analytical and evaluation skills in mechanical and optical properties of materials.

PH252:Practical IIElectronics and Computer Science

1. Develop observational, analytical and evaluation skills in electronics

THIRD SEMESTER

PH231:Quantum Mechanics

1. Understand approximation methods in quantum mechanics
2. Analyse the connection between symmetry and conserved quantities, the angular momentum, and the properties of systems of identical particles.
3. Understand the theory of quantum scattering
4. Understand topics in relativistic quantum mechanics and preliminaries of quantum field theory

PH232:Advanced Spectroscopy

1. Understand general tools of spectroscopy
2. Detailed understanding of Molecular, rotational, IR, Electronic, Raman,
3. Distinguish ESR, NMR, Mossbauer, Photo electron and Photo acoustic spectroscopy

PH233:Advanced Electronics

1. Understand Radio and microwave communications and Pulse modulation
2. Understand digital communications, optical fiber communication and mobile cellular communications
3. Understand Digital signal processing

Fourth Semester

PH241:Condensed Matter Physics

1. Learn crystal structure, lattice vibrations and free electron and band theories
2. Learn semiconductors, Dielectric and Magnetic properties of matter and Superconductivity
3. Preliminaries of nanoscience

PH242:Nuclear and Particle Physics

1. Learn Nuclear forces, nuclear models and nuclear reactions
2. Details of Nuclear fission and fusion
3. Nuclear detectors, particle accelerator and Elementary particle physics

PH243:Advanced Electronics

1. Knowlege of Microprocessors, interfacing and embedded systems
2. Preliminaries of artificial intelligence
3. Knowledge of Television, Radar and satellite communications

PH261:Practical III Advanced Physics Practicals

1. Develop observational, analytical and evaluation skills in electrical and magnetic properties of materials.

PH262:Practical IVAdvanced Electronics Practicals

1. Skill in performing advanced experiments using op-amps, ICs and microprocessors