



# Women's Christian College

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An Autonomous Institution affiliated to the University of Madras

Re-accredited by NAAC in 2019 with Grade A+

College with Potential for Excellence

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## PROGRAMME OUTCOMES (UG)

On successful completion of the Programme the students will be able to:

- P01** Demonstrate knowledge of concepts in their respective disciplines
- P02** Communicate effectively in both written and spoken English besides possessing knowledge of another language
- P03** Practice ethical values in personal, professional and social spheres
- P04** Integrate skills of analysis, critiquing, application and creativity in intellectual and social pursuits
- P05** Employ appropriate digital tools and techniques necessary in analyzing data and creative design
- P06** Gain competence to pursue higher education, research or career.
- P07** Interact meaningfully with others displaying leadership and coordination skills in executing projects
- P08** Exhibit potential for innovation, entrepreneurship and research
- P09** Demonstrate responsibility as citizens committed to national development through community outreach
- P010** Be spiritually inspired towards responsible stewardship, wellness of self and a sustainable environment.

## **DEPARTMENT OF HISTORY**

### **Programme Specific Outcomes**

**On successful completion of Bachelor of History programme, the student should be able to**

**PSO1:** Apply the knowledge of history as major and economics as an allied in society, culture, polity and economy.

**PSO2:** Acquire competency and skills to write and speak about the concepts, principles, theories in history and economics through discussion, presentation, projects and reports.

**PSO3:** Identify the ethical, political ideologies and economic structures which influenced the key historical events and issues.

**PSO4:** Analyze social and economic factors such as race, ethnicity, gender, class, religion and region which influenced historical narratives.

**PSO5:** Apply computer skills to analyze data and for learning courses through digital platforms.

**PSO6:** Attain competence for competitive exams and to pursue higher studies and careers.

**PSO7:** Demonstrate knowledge in their interdisciplinary majors to carry out research projects.

**PSO8:** Develop fundamental knowledge and skills required for organizing and carrying out entrepreneurial activities.

**PSO9:** Investigate the various experiences of diversity, cultures to be meaningful citizens and exhibit responsibility towards national development.

**PSO10:** Integrate knowledge and adequate skills to be socially relevant for their sustainability.

## HISTORY OF INDIA UPTO 1526 C.E

**Code: UHS/CO/55**

**Hours: 75**

**Semester: I**

**Credits: 4**

### **Learning Objective:**

- Students will acquire knowledge on the rich and diverse history of India.
- Students will be able to interpret primary sources and secondary sources in order to evaluate historical events.

### **Course Outcomes:**

**On Successful completion of the course, the learners will be able to:**

**CO 1: [K2]** Discuss the different cultures, urbanized societies and birth of polity in India.

**CO 2: [K2]** Explain the administrative structures adopted by various dynasties.

**CO 3: [K3]** Develop a model of modern society based on the characteristics of Ancient and Medieval India.

**CO4: [K4]** Compare and contrast the political narrative of transition of Ancient kingdoms and medieval kingdoms.

**CO 5: [K4]** Investigate the socio-economic and cultural facets of India from the Ancient period to the early Medieval period in a historical perspective.

## WOMEN'S STUDIES

**Code: UHS/CO/56M**

**Hours: 60**

**Semester: I**

**Credits: 4**

### **Learning Objective:**

- To enable the students to understand the feminist theories and various problems of women.
- To assist the students in developing working knowledge of the connections between women's studies and social change.

### **Course Outcomes:**

**On Successful completion of the course, the learners will be able to:**

**CO1: [K1]** Recognize the women's studies as an academic discipline, with an understanding of major theories and issues, policies related to the development of women.

**CO2: [K2]** Describe the phases of feminism, problems of women, approaches and theories for development of women.

**CO3: [K2]** Summarize the Indian Feminism, empowerment indices and national policy for women.

**CO4: [K3]** Apply the concepts to the current issues related to women development.

**CO5: [K4]** Analyze the issues related to gender equity and empowerment of women.

## HISTORY OF MEDIEVAL INDIA (UPTO 1707 C.E)

**Code: UHS/CO/57M**

**Hours: 90**

**Semester: II**

**Credits: 4**

### **Learning Objective:**

Acquire a multifaceted understanding of the factors that shaped state and society in Medieval India.

### **Course Outcomes:**

**On Successful completion of the course, the learners will be able to:**

**CO1: [K2]** Summarize and articulate the contribution of the political factors which led to the formation of kingdoms in the North and South.

**CO2: [K2]** Identify and differentiate the characteristics features of the society, economy and culture of the Medieval period.

**CO3: [K3]** Construct an administrative model based on the medieval kingdoms.

**CO4: [K4]** Compare and contrast the foreign policies of the Medieval kingdoms.

**CO5: [K4]** Appraise the domestic policies and administration of the Medieval kingdoms.

## HISTORY OF MADRAS

**Code: UHS/CO/58**

**Hours:**

**75**

**Semester: II**

**Credits: 4**

### **Learning Objective:**

- Develop an informed familiarity with glorious past of Madras city.
- Appreciate and understand the multicultural, multi-faceted and dynamic nature of Madras.

### **Course Outcomes:**

**On Successful completion of the course, the learners will be able to:**

**CO 1: [K2]** Examine the antiquity and historicity of Madras from the prehistoric times to the present

**CO 2: [K2]** Discuss the role of internal and external factors in the facilitating the growth of Madras

**CO 3: [K3]** Prepare a city plan based on the growth of Madras in various fields

**CO 4: [K4]** Illustrate the socio-cultural essence and personality of Madras

**CO 5: [K4]** Analyze the developmental narrative of the city from “Madras” to a “Metropolitan City”

## COLONIALISM TO INDEPENDENCE

**Code: UHS/CO/69**

**Hours: 75**

**Semester: III**

**Credits: 4**

### **Learning Objective:**

- Understand on the establishment of the British Rule in India.
- Study on the emergence of the nationalist feelings in India which finally ended with India's Independence.

### **Course Outcomes:**

**On Successful completion of the course, the learners will be able to:**

**CO1: [K2]** Describe the nature, rise, spread and decline of colonialism in India

**CO2: [K2]** Explain the political conflict between the Indian rulers and the British

**CO3:[K3]** Create a model of Modern India using the essence, features and impact of British administration

**CO4:[K4]** Scrutinize the direct and indirect impact of Colonialism on India polity, economy and society.

**CO5:[K4]** Critique the role of people, events, organizations, legislations and movements that transported the nation from colonialism to independence

## HUMAN RIGHTS IN INDIA

**Code: UHS/CO/73M**

**Hours: 60**

**Semester: III**

**Credits: 4**

### **Learning Objectives:**

- Familiarize with the idea of human rights in India.
- Explore issues, relating to rights of women and children in India.

### **Course Outcomes:**

On successful completion of the course, the learners will be able to

**CO1: [K2]** Summarise the nature, features and scope of Human Rights Laws in India.

**CO2: [K2]** Identify the evolution of Human Rights in India and its violation and describe significance of human rights in future based on the past concerns.

**CO3: [K3]** Articulate the role to be played by the stakeholders in the promotion and implementation of human rights.

**CO4: [K4]** Analyse the gap between human rights and grass root realities in the National context.

**CO5: [K5]** Explain and educate the underprivileged about human rights and train them to use the knowledge during the times of need.

## HISTORY OF INDIA FROM 1947 TO PRESENT TIMES

**Code: UHS/CO/70M**

**Hours: 60**

**Semester: IV**

**Credits: 4**

### **Learning Objective:**

- Acquire knowledge of political developments after Independence of India
- Understand the significance of the domestic and foreign policies under different Governments in the rise of India as a Democratic power

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to**

**CO1: [K2]** Describe the historical development of India since 1947.

**CO2: [K2]** Identify the major political, economic and social issues concerning India and the response of the various Governments.

**CO3: [K3]** Sketch an operative domestic and foreign policy for future India.

**CO4: [K4]** Appraise the nature of Indian Foreign policy since 1947.

**CO5: [K4]** Elaborate on the major domestic policies from 1947 to present times.

## BASICS OF ANTHROPOLOGY

**Course Code: UHS/CO/63**

**Hours: 60**

**Semester: IV**

**Credits: 4**

### **Learning Objectives:**

- Understand and appreciate human biological, linguistic, and cultural diversity, especially those features that separate humans from other species.
- Awareness of the origin of both cultural and human biological diversity through time.

### **Course Outcomes**

**On Successful completion of the course, the learners will be able to:**

**CO1: [K2]** Explain the basic concepts, theories of anthropology and the key developments in human evolution

**CO2: [K2]** Analyze the Morphology of Primates and Human Evolution.

**CO3: [K3]** Apply the past and present cultural stages and issues to develop holistic societal and cultural processes for the present and future.

**CO4: [K4]** Assess and implement ethical practices in anthropological research

**CO5: [K4]** Inspect the human biological, linguistic, and cultural diversity, especially those features that separate humans from other species.

## **ART HISTORY OF INDIA AND THE WEST**

**Course Code: UHS/CO/46M**

**Hours: 75**

**Semester: V**

**Credits: 4**

### **Learning Objective:**

- Achieve a general overview of the history and development of Indian and western art and architecture, its major periods, concepts and artists, and its historical, social, cultural, religious and political contexts.

### **Course Outcomes:**

**On Successful completion of the course, the learners will be able to:**

**CO1: [K2]** Identify significant architectural and artistic monuments from India and the West

**CO2: [K2]** Interpret the influence of philosophical, historical, and/or artistic phenomena of Ancient India in relation to contemporary Western culture

**CO3: [K3]** Apply specific art historical vocabulary to the analysis of Ancient India and the West

**CO4: [K4]** Analyse aspects of Indian and Western culture in relation to broader cultural, scientific, or social processes

**CO5: [K5]** Appraise literary and artistic forms/styles and the cultural/historical contexts in which they evolve

## **EUROPEAN HISTORY (1900 A.D- TO PRESENT TIMES)**

**Course Code: UHS/CO/47M**

**Hours: 75**

**Semester: V**

**Credits: 4**

### **Learning Objective:**

This course will enrich the knowledge of the students to not only know about the Europe of the past but of Europe today and its major role in world affairs.

### **Course Outcomes**

On Successful completion of the course, the learners will be able to:

**CO1: [K2]** - Identify prominent ideologies and concepts that shaped European history

**CO2: [K2]** - Estimate the political development of the European continent from the nineteenth century to the present times

**CO3: [K3]** – Develop analytical and strategic policies by exploring historical events in the context of 20th century European history.

**CO4: [K4]** - Analyse the reasons why national experiences in Europe have left an impact on the world

**CO5: [K5]** – Critique the ways in which European nations developed diverse economic, political, and social structures.

## **POLITICAL REFORMS IN CHINA (FROM 1949 –TILL PRESENT)**

**Course Code: UHS/CO/54**

**Hours: 75**

**Semester: V**

**Credits: 4**

### **Learning Objectives:**

- To trace the trends and the process of economic development in India.
- To analyze the challenges and understand the strategies of economic development.

### **Course Outcomes:**

**On Successful completion of the course, the learners will be able to:**

**CO1: [K2]** Discuss the nature and principles underlying the evolution of Chinese politics, economy and society in the People's Republic.

**CO2: [K2]** Explain the economic reforms and trend in the development of China.

**CO3: [K3]** Apply the principles and concepts to understand the development changes in China.

**CO4: [K4]** Analyse the key issues and problems arising from the success of China's development strategies.

**CO5: [K5]** Evaluate the historical events, economic policies and development of China.

## **HISTORY OF USA SINCE 1945**

**Course Code: UHS/CO/64**

**Hours: 60**

**Semester: V**

**Credits: 3**

### **Learning Objective:**

- Students will be able to summarize the significant landmarks of American History
- Students will be able to critically examine the different facets of American society and polity

### **Course Outcomes:**

**On Successful completion of the course, the learners will be able to:**

**CO1: [K2]** Express the significance of the key developments in the history of the United States since 1945

**CO2: [K2]** Review the historical context and develop critical interpretations of its significance

**CO3: [K3]** Employ the pattern of political changes and social movements to construct new socio-political structures

**CO4: [K4]** Compare and contrast the features of US Domestic and Foreign policy since 1945 and its impact on Home and World affairs

**CO5: [K5]** Criticize the political, social and economic history of USA in a more diagnostic approach



## CONTEMPORARY HISTORY OF JAPAN

**Code: UHS/CO/62M**

**Hours: 75**

**Semester: VI**

**Credits: 4**

### **Learning Objective:**

- Highlight the developments in Japan from an insular Nation to a developed nation after its brutal downfall during the Second World War.

### **Course Outcomes:**

On Successful completion of the course, the learners will be able to:

**CO1: [K2]** Describe the post-war political, socio-economic transformation of Japan

**CO2: [K2]** Illustrate the political, economic, social and environmental issues in Japan since 1945

**CO3: [K3]** Develop new policies based on the characteristic features of Japan's domestic and foreign policies.

**CO4: [K4]** Analyze the stumble, emergence and transformation of Japan from an occupied territory into a Global power.

**CO5: [K5]** Appraise the role of various governments and leaders in the political and socio-economic developments in Japan from 1945

## PRINCIPLES OF ARCHAEOLOGY

**Code: UHS/CO/66**

**Hours: 90**

**Semester: VI**

**Credits: 4**

### **Learning Objective:**

- Students will be able to understand importance of Archaeology to the study of history
- Students will be able to collect, analyze, and interpret archaeological data in a way that adds to the understanding of cultural heritage in proper context

### **Course Outcomes:**

On Successful completion of the course, the learners will be able to:

**CO1: [K2]** Identify and understand the core knowledge, concepts and components of the archaeology.

**CO2: [K2]** Illustrate the major developments in human history with the help of various archaeological sources.

**CO3: [K3]** Apply the concept of archaeology to record, investigate, analyze and interpret archaeological derived remains.

**CO4: [K4]** Evaluate the strategies involved in the investigation of archaeological remains and validate how it can further the aim of historical research.

**CO5: [K4]** Appraise the role of archaeology and archaeologists in reconstructing and preserving the past.

## INTERNATIONAL RELATIONS

**Course Code: UHS/CO/67**

**Semester: VI**

**Hours: 75**

**Credits: 4**

### **Learning Objective:**

- Acquire a critical, well-grounded understanding of multiple worldviews, experiences, powerstructures, ethical and cultural positions in relation to contemporary global problems
- Recognize multiple historical and contemporary narratives in and about the world.

### **Course Outcomes:**

On successful completion of the course, the learners will be able to

**CO1: [K2]** Explain key concepts, ideologies and concerns in international relations.

**CO2: [K2]** Identify the major conflicts and issues in the world and its impact.

**CO3: [K3]** Sketch responsible action plan to address political, ethical, social and environmental changes

**CO4: [K4]** Compare and contrast the relationship between states and non-state actors and its international outcomes

**CO5: [K5]** Critique the historic and contemporary role and effects of international organizations and actions on global scenario.

## HISTORY BY NUMBERS I

**Course Code: UHS/CE/17**

**Semester: V**

**Hours: 75**

**Credits: 5**

### **Learning Objective:**

- To understand and analyse the history effectively using statistical methods and tools.
- To quantify the information and present in diagrams and graphs using Microsoft Excel.

### **Course Outcomes:**

**On Successful completion of the course, the learners will be able to:**

**CO1: [K2]** Describe the basic concepts of data, sampling methods, arranging and tabulations, presentation and summarizing data and its usefulness in understanding the history.

**CO2: [K2]** Illustrate different types of diagrams, charts and formulas in the statistical analysis of data and apply in MS Excel.

**CO3: [K3]** Apply statistical techniques in real data sets of history and research to derive results.

**CO4: [K4]** Analyse the results and propose recommendations to the decision-making process.

**CO5: [K5]** Estimate various statistical functions and interpret the values.

## **GEOGRAPHY OF TOURISM AND TRAVEL**

**Code: UHS/CE/ 20**

**Hours: 75**

**Semester: V**

**Credits: 5**

### **Learning Objective:**

- Acquire knowledge of world geography and the concept of Tourism geography
- Understand the importance of geography in travel industry

### **Course Outcomes:**

On Successful completion of the course, the learners will be able to:

**CO1: [K2]** Recall the tourism concepts, geographical features and elements of tourism and travel

**CO2: [K2]** Describe the importance of geography in tourism and tourism potential in the various tourism generating regions of the world

**CO3: [K3]** Develop innovative tourism policies and framework based on the knowledge acquired on tourism, transport and travel geography.

**CO4: [K4]** Analyse how geographical components have helped in the development of tourism and travel industry.

**CO5: [K5]** Appraise the inter-relation of geography, tourism and travel patterns around the globe.

## **HISTORY BY NUMBERS II**

**Course Code: UHS/CE/18**

**Hours: 75**

**Semester: VI**

**Credits: 5**

### **Learning Objective:**

- To understand the importance of statistical techniques and its relevance in history.
- To measure the trends and quantify the relationships using Ms. Excel.

### **Course Outcomes:**

**On Successful completion of the course, the learners will be able to:**

**CO1: [K2]** Discuss the basic concepts in statistical methods and estimation and its usefulness in understanding the history.

**CO2: [K2]** Illustrate different types of equations, measure trends and estimate relationship in the historical data and apply in MS Excel.

**CO3: [K3]** Apply statistical techniques in real data sets of history and research to derive results.

**CO4: [K4]** Analyse the results and propose recommendations to the decision-making process.

**CO5: [K5]** Estimate various statistical functions and interpret the values.

## **ENTREPRENEURSHIP DEVELOPMENT**

**Code: UHS/CE/23**  
**Semester: VI**

**Hours: 75**  
**Credits: 5**

### **Learning Objectives:**

- To enable the students understand the basic concepts and process of entrepreneurship and its contribution to the development of individual and nation.
- To provide the students with the knowledge on setting up of enterprise and financial sources.

### **Course Outcomes:**

On Successful completion of the course, the learners will be able to:

**CO1: [K2]** Describe the concepts of entrepreneurship, functions, process and various models.

**CO2: [K2]** Summarize the various aspects of entrepreneurship and institutions assisting entrepreneurship.

**CO3: [K3]** Apply the concepts in the current business situations to plan entrepreneurial activities.

**CO4: [K4]** Analyse the role and process of entrepreneurship, effectiveness of financial institutions facilitating entrepreneurship.

**CO5: [K5]** Explain and familiarize the various concepts of entrepreneurship and impart entrepreneurial skills to the underprivileged.

## **TOURISM AND TRAVEL MANAGEMENT**

**Code: UHS/CE/24**  
**Semester: VI**

**Hours: 75**  
**Credits: 5**

### **Learning Objective:**

- To acquaint the students with concepts and basic principles of tourism and travel management
- To enable the students to understand the various aspects of tourism and travel industries.

### **Course Outcomes:**

On Successful completion of the course, the learners will be able to:

**CO1: [K2]** Describe the fundamental concepts, ideas and components of tourism and travel.

**CO2:[K2]** Explain the principles of tourism and travel management and tourism development.

**CO3: [K3]** Apply the understanding of Tourism and Travel in current scenarios.

**CO4: [K4]** Analyse the various aspects of tourism, travel management.

**CO5: [K5]** Critique how various types, components, stakeholders and impact of tourism and travel will help in policy making

## **HISTORY OF ANCIENT CIVILIZATIONS (EXCLUDING INDIA)**

**Code: UHS/SU/16**  
**Semester: I**

**Hours: 75**  
**Credits: 5**

### **Learning Objective:**

Gain a better understanding of ancient civilizations and how they have established important foundations for our world today

### **Course Outcomes:**

**On Successful completion of the course, the learners will be able to:**

**CO1: [K2]** Describe the development of human society through cultures and civilizations.

**CO2: [K2]** Illustrate and compare the evolution of ancient civilizations in the world.

**CO3: [K3]** Identify and explain the nature of socio-cultural features of the civilizations in the historical context.

**CO4: [K4]** Devise strategies for societal development based on the knowledge of the achievements of the ancient civilizations.

**CO5: [K4]** Appraise the various factors which influenced the development of Ancient cultures across the globe.

## **CONSTITUTIONAL HISTORY OF INDIA**

**Code: UHS/SU/12**

**Hours: 75**

**Semester: II**

**Credits: 5**

**Learning Objective:**

- To understand their rights and duties as citizen of India.

**Courses Outcomes:**

**On Successful completion of the course, the learners will be able to:**

**CO1: [K2]** Explain about the salient features and philosophy of the Indian Constitution and its significance

**CO2: [K2]** Examine the knowledge of the principles and ethos of the Constitution in sustaining democracy.

**CO3: [K3]** Apply the knowledge of Indian Constitution in present and future issues and challenges.

**CO4: [K4]** Analyse the theoretical knowledge into practical utility in day-to-day life as an ideal citizen of the nation.

**CO5: [K4]** Appraise the role of the Indian Constitution in individual and nation building.

## **MONEY AND BANKING**

**Code: UHS/SU/15**

**Hours: 75**

**Semester: III**

**Credits: 5**

**Learning Objective:**

- To enable the students to understand the working of monetary and banking system in India
- To assist the students in developing knowledge on instruments of credit control and the monetary policy in regulating money supply in the economy

**Course Outcomes:**

**On Successful completion of the course, the learners will be able to:**

**CO1: [K1]** Describe the various concepts of monetary economics and banking theory.

**CO2: [K2]** Explain the functions and theories of money, banking and financial market and the underlying economic principles.

**CO3: [K3]** Apply the concepts and theories of money and banking to the current events in the economy.

**CO4: [K4]** Analyse the role of money, financial markets and institutions in the growth of the economy.

**CO5: [K4]** Evaluate the monetary functions and policies for the development of the economy.

## **INDIAN ECONOMIC DEVELOPMENT**

**Code: UHS/SU/14**

**Hours: 90**

**Semester: IV**

**Credits: 5**

### **Learning Objectives:**

- To trace the trends and the process of economic development in India.
- To analyze the challenges and understand the strategies of economic development.

### **Course Outcomes:**

**On Successful completion of the course, the learners will be able to:**

**CO1: [K1]** Describe the basic concepts and characteristics of the Indian economy since independence.

**CO2: [K2]** Explain the economic planning, reforms and issues affecting the development of the economy.

**CO3: [K3]** Apply the concepts of Indian economy to the current events appropriately to provide solution.

**CO4: [K4]** Analyse the growth and challenges in the key sectors and remedial measures of the government.

**CO5: [K4]** Evaluate the various policies and programmes of the government for the development of the economy.

## **TOURISM AND HOTEL MANAGEMENT**

**Course Code: UHS/NM/ 05**

**Hours: 30**

**Semester: III**

**Credits: 2**

### **Learning Objectives:**

- To introduce students to balanced knowledge, skills and industry exposure in tourism, travel and hotel management
- To enable students to acquire the requisite skills for competent service of tourism and hotel industry

### **Course Outcomes**

On Successful completion of the course, the learners will be able to:

**CO1: [K2]** Explain the basic concepts, theories of tourism and hospitality industry

**CO2: [K2]** Analyze the function and organization of hotels

**CO3: [K3]** Apply the knowledge of tourism and hotel management in handling real life situations

**CO4: [K4]** Assess the role of management in tourism and hospitality industry

**CO5: [K4]** Evaluate the current trends in tourism and hotel management.

## **TOURISM GEOGRAPHY**

**Code: UHS/SK/08**  
**Semester: V**

**Hours: 45**  
**Credits: 3**

**Learning Objectives:**

- To introduce students to the various geographical locations of tourist places, weather climate and distances, the different routes between them and the different characteristics of places which are important for tourism.
- Understand the importance of geography in travel industry

**Course Outcomes:**

On Successful completion of the course, the learners will be able to:

**CO1: [K2]** Discuss the tourism concepts, geographical features and elements of tourism and travel

**CO2: [K2]** Describe the tourism potential in the various tourism generating regions of the world

**CO3: [K3]** Develop innovative tourism policies and framework based on the knowledge acquired on tourism, transport and travel geography

**CO4: [K4]** Analyse how geographical components have helped in the development of tourism and travel industry.

**CO5: [K5]** Appraise the inter-relation of geography, tourism and travel patterns around the globe.

## **DEPARTMENT OF ENGLISH**

### **Programme Specific Outcomes**

**On successful completion of the BA English programme, the students will be able to**

**PSO1:** demonstrate knowledge of the literary canon, newer literatures, and aspects of language, linguistics, media, performance and research.

**PSO2:** utilise the four skills of language learning in social and professional spheres, for effective research, documentation and presentation.

**PSO3:** practise ethical values gained from their exposure to literature and critical thought in personal, professional and social engagements.

**PSO4:** analyse and critique texts and ideologies, demonstrate independent thinking, design and carry out projects and ethical research that are relevant to the community.

**PSO5:** use creative and digital skills in the transcreation of literature, in creative writing, advertisements, film scripts and designing graphic layouts.

**PSO6:** exhibit competence in the discipline to pursue higher education, research or career from practical courses that equip them for independent thinking and innovation.

**PSO7:** interact meaningfully as leaders/team players, plan and coordinate academic and cultural events, innovative projects and service-learning initiatives.

**PSO8:** utilise hands-on experience from practical courses and professional training from internships to equip themselves for innovation and independent thinking.

**PSO9:** demonstrate ethical and sensitive involvement with the community through internships/collaboration with NGOs, teaching initiatives, journalistic efforts, and performance for social action.

**PSO10:** appreciate the need for individual well-being, exhibit an understanding of human impact on the environment and promote a sustainable relationship with it.



## APPROACHING LITERATURE

Code: UEN/CO/36M  
Semester: 1

Hours: 60  
Credits: 4

### Learning Objectives

- To enable students to understand and appreciate literature
- To familiarise them with the various genres of literature
- To enable them to understand the importance of context in the production of literature
- To introduce students to new perspectives and approaches in literature
- To equip students with academic writing skills

### Course Outcomes

**On successful completion of the course, the learners will be able to**

**CO1: [K1]** find and describe poetic devices and literary forms

**CO2: [K2]** examine and discuss poetic devices and their functions, and literary texts from different genres.

**CO3: [K3]** examine unfamiliar literary texts and illustrate their knowledge of the elements of technique and style.

**CO4: [K4]** analyse the significance of social and historical contexts in the production of literature.

**CO5: [K4]** analyse the significance of new perspectives in the understanding of literature, and critique established ideologies through re-visioned reading of literary texts.

## BRITISH LITERATURE 1550-1750

Code: UEN/CO/46M  
Semester: 1

Hours: 60  
Credits: 4

### Learning Objectives

- To introduce the students to the literature of the period
- To highlight the close link between the literature and the social background

### Course Outcomes

**On successful completion of the course, the learners will be able to**

**CO1: [K1]** define and describe the British political, social and cultural histories from the early origins of the British society to the early eighteenth century.

**CO2: [K2]** outline the oral traditions of communal literature and the written traditions of literature by classifying texts from prose, poetry, drama and fiction influenced by the social and literary contexts.

**CO3: [K3]** demonstrate meanings of the texts prescribed for study by deducing the social and literary contexts.

**CO4: [K4]** analyse the texts by applying a formalist approach to the reading of texts in order to arrive at a critical appreciation.

**CO5: [K4]** independently compare unfamiliar texts written in the same time-frame of the texts reflected in the course material.

## **FEMINIST PERSPECTIVES: AN INTRODUCTION**

**Code: UEN/CO/61M**  
**Semester: II**

**Hours: 75**  
**Credits: 4**

### **Learning Objectives**

- To make the students familiar with the basic concepts and landmark texts of feminist thought
- To enable the students, see these perspectives in a selection of literary texts
- To encourage discussion on and sensitise students to current issues among women
- To engage in service and learning opportunities while working with NGOs

### **Course Outcomes**

**On successful completion of the course, the learners will be able to**

**CO1: [K1]** describe the history and evolution of feminist thought.

**CO2: [K2]** explain important literary content on feminist thought.

**CO3: [K3]** use concepts of feminism and examine elements of popular culture.

**CO4: [K4]** investigate women's issues in society, collaborating/volunteering with NGOs working for women's rights and support.

**CO5: [K4]** examine literary texts from a feminist perspective.

## **BRITISH LITERATURE 1750-1900**

**Code: UEN/CO/62M**  
**Semester: II**

**Hours: 75**  
**Credits: 4**

### **Learning Objectives**

- To introduce students to the literature of the Romantic Age and the Victorian Age
- To highlight the close link between literature and the society in which writers live, by examining the historical, political, economic, social and cultural realities of the time
- To introduce students to the various literary forms in poetry, prose and the novel through representative texts of the period prescribed for study

### **Course Outcomes**

**On successful completion of the course, the learners will be able to**

**CO1: [K1]** relate to and describe the political, social and cultural histories of the period under discussion

**CO2: [K2]** compare the literary trends of the period and discuss the outcomes.

**CO3: [K3]** examine texts from poetry and prose in order to deduce meanings.

**CO4: [K4]** analyse the texts prescribed for study, and examine style and content

**CO5: [K4]** analyse the texts to understand the significant issues pertaining to the time-frame under study.

## CONTEMPORARY AMERICAN LITERATURE 1960 ONWARDS

**Code: UEN/CO/29M**  
**Semester: III**

**Hours: 60**  
**Credits: 4**

### Learning Objectives

- To introduce students to the key concepts in contemporary American literature.
- To create a sensitivity and appreciation for American poetry, drama, prose, and fiction.

### Course Outcomes

**On successful completion of the course, the learner will be able to**

**CO1: [K1]** list significant literary figures and movements in American literature from 1960 to the present.

**CO2: [K2]** identify the role of race and other forms of discrimination in the creation of contemporary American Literature.

**CO3: [K3]** demonstrate knowledge of key intellectual and aesthetic trends guiding the production of literature in America from 1960 to the present.

**CO4: [K4]** appreciate and critically analyse American texts of various genres – poetry, drama, prose, and fiction.

**CO5: [K5]** assess literary texts from the period and examine their historical and cultural contexts.

## READINGS IN LITERATURE

**Code: UEN/CO/37M**  
**Semester: III**

**Hours: 60**  
**Credits: 4**

### Learning Objectives

- To develop reading and reviewing skills in students
- To introduce students to mythology, folktales and fiction
- To familiarise students with literary allusions that may occur in the curriculum

### Course Outcomes

**On successful completion of the course, the student is able to**

**CO1: [K2]** discuss the complexity of morality and symbolic thought in works of literature, and their cultural implications.

**CO2: [K3]** critically examine and make connections with texts from significant world literature.

**CO3: [K4]** identify and analyse mythological allusions and their relevance to modern times

**CO4: [K5]** interpret works of popular fiction, affirming or contradicting the ideas expressed in such texts.

**CO5: [K6]** compose retellings of folktales and fables.

## 20<sup>th</sup> CENTURY BRITISH LITERATURE

**Code: UEN/CO/48M**  
**Semester: IV**

**Hours: 60**  
**Credits: 4**

### Learning Objectives

- To introduce the students to the literature of the period
- To highlight the close link between the literature and the social background

### Course Outcomes

**On successful completion of the course, the learners will be able to**

**CO1: [K1]** relate to the British political, social, and cultural histories of the twentieth century

**CO2: [K2]** compare literary trends in British Literature from 1900 onwards.

**CO3: [K3]** examine texts in order to deduce meanings.

**CO4: [K3]** apply theories of formalism to the texts in order to arrive at the contextualised readings of texts.

**CO5: [K4]** analyse texts and examine style and content.

## LIFE NARRATIVES

**Code: UEN/CO/63M**

**Semester: IV**

**Hours: 60**

**Credits: 4**

### Learning Objectives

- To introduce the students to a recording of memories, experiences, insights of leaders from various walks of life.
- To highlight the close link between life writings, narratives, and biopic to social issues and human capital.
- To enable a multidisciplinary perspective to life and society

### Course Outcomes

On successful completion of the course, the learners will be able to

**CO1: [K2]** review the political, social, and cultural realities across the globe

**CO2: [K3]** interpret the relevance of individual texts in terms of the contexts and the issues they address

**CO3: [K4]** analyse texts from a holistic perspective

**CO4: [K5]** assess the literary merit of the genres of the life narratives

**CO5: [K6]** compile ideas based on personal experiences and create a narrative of their own

## INDIAN LITERATURES – PAPER I

**Code: UEN/CO/52**

**Semester: V**

**Hours: 75**

**Credits: 4**

### Learning Objectives

- To introduce the students to literary pieces in English and in translation, by Indian authors.
- To make them aware of the social, cultural, political, economic changes that took place in post-Independence India.
- To sensitise the students to the realities of the marginalised in contemporary Indian society.
- To expose students to the concerns of urbanized and globalised Indians.

### Course Outcomes

**On successful completion of the course, the learners will be able to**

**CO1: [K1]** describe the complex historical trajectory of India's colonial and postcolonial status.

**CO2: [K2]** explain the concerns of Indian writers in the context of various issues in post-independence India.

**CO3: [K3]** examine texts by Indian writers and interpret them within the relevant historical, political and cultural contexts.

**CO4: [K4]** analyse texts by Indian writers to sensitively respond to the concerns of the marginalised.

**CO5: [K5]** evaluate critically literary texts within the context of the contemporary Indian society.

## POSTCOLONIAL LITERATURE

**CODE: UEN/CO/58M**  
**Semester: V**

**Hours: 75**  
**Credits: 4**

### **Learning Objectives:**

- To introduce students to literatures from different postcolonial cultures
- To sensitise them to problems addressed by writers trying to capture specific indigenous traditions and customs in their writing
- To revisit the established notions of the literary canon

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to**

**CO1: [K1]** recall the social, cultural and historical contexts pertaining to postcolonialism.

**CO2: [K2]** discuss the colonial enterprise and its agenda.

**CO3: [K3]** apply key theoretical concepts in examining differing postcolonial realities.

**CO4: [K4]** analyse postcolonial issues and concerns across cultures/nations.

**CO5: [K5]** assess problems to understand agendas and recommend solutions.

## ASIAN LITERATURE I

**Code: UEN/CO/50M**  
**Semester: V**

**Hours: 75**  
**Credits: 4**

### **Learning Objectives:**

- To introduce students to literary texts of West Asian countries.
- To create interest, sensitivity and appreciation for literature and literary traditions.
- To expose students to the socio-political background of the nations. included for study.
- To introduce students to the cultural nuances of these nations.

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to**

**CO1: [K1]** recognize the differences in culture from texts and writers from West Asian countries

**CO2: [K2]** explain the West Asian cultures and literature from a historical perspective

**CO3: [K3]** identify the growing appreciation of West Asian cultures and identities

**CO4: [K4]** analyse literary concepts and genres

**CO5: [K5]** evaluate West Asian literature and its place in the global literary scene

## FOOD WRITING

**Code: UEN/CO/59**  
**Semester: V**

**Hours: 75**  
**Credits: 3**

### **Learning Objectives**

- To introduce students to the genre of food writing
- To create a cultural sensitivity and appreciation for food writing
- To critique texts on food writing and examine the contexts they originate from

### Course Outcomes

**On successful completion of the course, the learners will be able to**

**CO1: [K1]** identify and examine the social, cultural and historical contexts pertaining to food writing

**CO2: [K2]** discuss issues related to food, across cultures, as reflected in the texts

**CO3: [K3]** examine the texts from the perspective of selected literary and social theories

**CO4: [K4]** analyse issues and concerns across cultures/nations/ethnicities

**CO5: [K5]** assess the problems studied to understand agendas, and recommend solutions

## INTERNSHIP

**Code: UEN/CO/60**

**Semester: V**

**Time span: 2-4 weeks**

**Credits: 1**

### Learning Objectives:

- To train the students in real life application of skills acquired from the courses offered in the curriculum.
- To give students the opportunity to understand the practical work environment they are trained for
- To give them a competitive edge in selecting careers after the undergraduate programme

### Course Outcomes

**On successful completion of the course, the learners will be able to**

**CO1: [K2]** show skills demonstrating an understanding of the specific professional contexts they are trained for.

**CO2: [K3]** employ theory and application in the workplace.

**CO3: [K4]** illustrate professional skills through exposure to the workplace.

**CO4: [K5]** appraise skills, requirements and developments in the job market.

**CO5: [K6]** adapt to requirements of the workplace at various organisational levels.

## INDIAN LITERATURES- PAPER II

**Code : UEN/CO/53M**

**Semester: VI**

**Hours : 75**

**Credits: 4**

### Learning Objectives

- To introduce the students to literary pieces in English and in translation, by Indian authors
- To make them aware of the social, cultural, political, economic changes that took place in Post-Independence India
- To sensitise the students to the realities of the marginalised in contemporary Indian society
- To expose students to the concerns of urbanized and globalised Indians

### Course Outcomes

**On successful completion of the course, the learners will be able to**

**CO1: [K1]** describe and trace the poetic tradition in Indian Literatures.

**CO2: [K2]** explain different ideas and articulate viewpoints in relation to regional voices and ideas.

**CO3: [K3]** examine texts by Indian writers and interpret them within the relevant historical, political and cultural contexts.

**CO4: [K4]** analyse texts by Indian writers to sensitively respond to the concerns of the marginalised.

**CO5: [K5]** assess literary texts with a critical insight within the context of contemporary Indian society.

## ECOLITERATURE

Code: UEN/CO/55M  
Semester: VI

Hours: 75  
Credits: 4

### Learning Objectives

- To provide a critical tool to students and help apply ecological concepts to cultural texts
- To sensitize students to the relation between literature and environment

### Course Outcomes

**On successful completion of the course, the learner will be able to**

CO1: [K1] define the basic principles of Ecoliterature

CO2: [K2] explain the importance and relevance of the ecological perspective in literary studies

CO3: [K3] identify the complexities in environment and the relation between literature and environment

CO4: [K4] analyse texts that illustrate environmental concerns

CO5: [K5] explain the need for ethical stand and commitment to the natural world

## ASIAN LITERATURE II

Code: UEN/CO/51  
Semester: VI

Hours: 75  
Credits: 4

### Learning Objectives

- To introduce students to literary texts from South Eastern parts of Asian countries.
- To create interest, sensitivity and appreciation for literature and literary traditions.
- To expose students to the socio-political background of the nations included for study.
- To introduce students to the cultural nuances of these nations.

### Course Outcomes

**On successful completion of the course, the learners will be able to**

CO1: [K2] explain the historical, literary and socio-political backgrounds of the texts.

CO2: [K3] apply the historical and socio-political contexts to the texts.

CO3: [K4] analyse the texts from different critical perspectives.

CO4: [K5] justify the study of cultures and identities represented in East Asian literatures.

CO5: [K5] critique relevant political, social and cultural aspects (issues/practices) reflected in the texts.

*Note: The socio-political background is to be discussed along with each country's literature as found relevant. This background should also be assessed.*

## JOURNALISM

Code: UEN/CE/05  
Semester: V

Hours : 75  
Credits: 5

### Learning Objectives:

- To introduce students to the world of journalism and to sensitise them to the role media plays in society
- To train them in reporting, writing and editing skills
- To increase their awareness of current issues
- To train them to organise material for the campus newspaper/blog, "Rivett"

**Course Outcomes:**

**On successful completion of the course, the learners will be able to**

**CO1: [K2]** identify the principal functions of the various departments of a news organization.

**CO2: [K3]** develop skills in news reporting, feature writing and interviewing.

**CO3: [K4]** analyse current affairs in India and the world.

**CO4 : [K5]** find errors and edit news stories.

**CO5: [K6]** collaborate to create a campus newspaper/blog.

## **ENGLISH LANGUAGE TEACHING**

**Code : UEN/CE/13**

**Hours : 75**

**Semester: V**

**Credits: 5**

**Learning Objectives:**

- To equip students with the theoretical basis in methodology to plan a lesson, select, adapt materials to teach different items, work out varied and interesting methods of teaching
- To make students aware of and enable them to gain an understanding of the four language skills in order to work out carefully planned and graded activities which will aid the development of language in a classroom environment
- To enable students to go through the experience of teaching selected items through peer group and practice teaching sessions

**Course Outcomes:**

**On successful completion of the course, the learners will be able to**

**CO1: [K2]** explain the principles of English language pedagogy.

**CO2: [K3]** apply different methods and approaches from theories in English Language Teaching to facilitate effective teaching and learning strategies.

**CO3: [K4]** analyse the pedagogical needs for English language teaching and learning in classroom contexts.

**CO4: [K5]** evaluate the requirements of heterogeneous and homogenous learner groups.

**CO5: [K6]** create exercises, generate course materials and execute practical teaching sessions for mixed ability learner groups.

## **ENGLISH FOR EFFECTIVE COMMUNICATION**

**Code: UEN/CE/06**

**Hours: 75**

**Semester: V**

**Credits: 5**

**Learning Objectives**

- To enable students to understand and apply the steps of the writing process
- To enable students to make verbal presentations on a given topic to a group
- To enable students to comprehend listening and reading passages and express opinions on the material
- To enable students to demonstrate an application of correct language structures

**Course Outcomes**

On successful completion of the course, the learner will be able to:

**CO1: [K2]** illustrate the correct language structures in contextual speaking & writing

**CO2: [K3]** apply LSRW skills of language learning for oral & written presentations

**CO3: [K4]** organize opinions, views, perspectives to arrive at inferences

**CO4: [K5]** evaluate judgments made about information presented by providing supporting evidence

**CO5: [K6]** plan presentations to effectively communicate and express points of view and perspectives



## THEATRE IN CONTEXT

**Code: UEN/CE/18**  
**Semester: VI**

**Hours: 75**  
**Credits: 5**

### Learning Objectives

- To enable students to research, analyse, interpret and create theatrical scripts underpinned by theoretical and practical study
- To provide students with a hands-on training experience in effective theatrical productions
- To enable students to adapt theatrical genres and styles to work within contemporary contexts

### Course Outcomes

On successful completion of the course, the learners will be able to

**CO1: [K1]** examine various theatrical styles and genres, in order to become skilled, well-informed and reflective theatrical practitioners.

**CO2: [K2]** illustrate their ability to communicate with an audience through practical and creative work.

**CO3: [K3]** determine the theatrical approaches best suited for communicating effectively with a target audience.

**CO4: [K4]** devise the most suitable way to interpret and create/ recreate a text for staging before an audience.

**CO5: [K5]** assess the context and perform as individuals or in groups to convey the intent/message with clarity.

## SHORT FILM PRODUCTION

**Code: UEN/CE/14**  
**Semester: VI**

**Hours: 75**  
**Credits: 5**

### Learning Objectives

- To introduce students to the world of communication through the language of film
- To create awareness of effective visual language
- To develop the skills of script writing
- To inculcate a sense of social commitment and responsibility in using video

*This course provides theoretical and practical knowledge in visual grammar, script writing, short film production and post-production. Students, in small groups, will be involved in the production of short video presentations for end-semester assessment.*

### Course Outcomes

**On successful completion of the course, the learners will be able to**

**CO1: [K2]** review films from a cinematographic and socially relevant perspective.

**CO2: [K3]** apply significant theories and critical approaches to the study of films.

**CO3: [K4]** appraise the significance of the short film/documentary for social change and development.

**CO4: [K5]** interpret the technical language of film, use of camera distances, movements, angles and viewpoints.

**CO5: [K6]** produce a concept, AV script and short film as a team.

## UNDERSTANDING DISABILITY

**: UEN/CE/16**  
**Semester: VI**

**Hours: 75**  
**Credits: 5**

### Learning Objectives

- To introduce students to disability as something that goes beyond a medically circumscribed concept of impairment
- To sensitise them to the fact that it is also a sociocultural construct within enforced systems of exclusion
- To develop an understanding of multiple perspectives and representations of disability

### Course Outcomes

**On successful completion of the course, the learners will be able to**

**CO1: [K1]** identify and describe the core concepts and issues pertaining to disability as a field of study.

**CO2: [K2]** examine critical perspectives on disability and discuss their relevance in contemporary contexts.

**CO3: [K3]** apply such perspectives to examine representations of disability in multiple fields/ disciplines.

**CO4: [K4]** identify contexts to demonstrate their ability to engage in critical questions/ discussion/ advocacy.

**CO5: [K5]** evaluate representation in multiple forms, assess/ critique their collective impact, and recommend solutions for an altered perspective in engaging with disability.

## INTRODUCTION TO TRAVEL NARRATIVES

**Code: UEN/CE/17**  
**Semester: VI**

**Hours: 75**  
**Credits: 5**

### Learning Objectives

- To introduce students to travel narratives through critical readings of travel works from diverse cultures and of various narrative styles.
- To develop an understanding of the impact of the processes of colonialism and post- colonialism on the development of travel literature.
- To locate travel narratives in the context of globalisation.

### Course Outcomes

**On successful completion of the course, the learners will be able to**

**CO1: [K1]** recognise the aesthetics of the genre and its traditions.

**CO2: [K2]** understand innovations in travel narrative forms.

**CO3: [K3]** examine travel narratives in the context of globalisation.

**CO4: [K4]** analyse concerns of identity in travel narratives.

**CO5: [K5]** evaluate writers' perspectives on travel.

## **BUILDING MOTIVATION THROUGH LANGUAGE AND LITERATURE**

**Code: UEN/SU/17**  
**Semester: I**

**Hours : 90**  
**Credits: 5**

### **Learning Objectives**

- help students acquire confidence and to enhance their potential and performance
- To improve their ability to appreciate and study literature

### **Course Outcomes**

**On successful completion of the course, the learners will be able to**

**CO1: [K1]** recognise and describe different perspectives by examining literary texts.

**CO2: [K2]** outline a plan of action to achieve clearly identified goals.

**CO3: [K3]** demonstrate the ability to work constructively in a team in achieving a common goal.

**CO4: [K4]** explain issues that impact society and thus establish a sense of community.

**CO5: [K4]** analyse statements, examine and present evidences of alternative arguments.

## **CONTEMPORARY TAMIL LITERATURE IN TRANSLATION**

**Code: UEN/SU/19**  
**Semester: II**

**Hours: 90**  
**Credits: 5**

### **Learning Objectives**

- To introduce the students to the wealth of literary output in contemporary Tamil language.
- To expose the students to various socio-political realities that exist in the State
- To experience the richness of Tamil culture and ethos through Tamil thought present in the writings.

### **Course Outcomes**

**On successful completion of the course, the learners will be able to**

**CO1: [K1]** examine political, social, and cultural histories of 20<sup>th</sup> century Tamil literature.

**CO2: [K2]** compare literary trends in Tamil Literature from 1900 onwards.

**CO3: [K3]** interpret texts in order to deduce meanings.

**CO4: [K4]** analyse translated works of Tamil writers from literary and social perspectives.

**CO5: [K4]** appraise translated texts as a means of highlighting the role played by Tamil voices.

## **INTRODUCTION TO LINGUISTICS**

**Code: UEN/SU/15**  
**Semester III**

**Hours: 90**  
**Credits: 5**

### **Learning Objectives**

- To introduce students to the fundamental principles of Linguistics
- To provide a brief introduction to schools of grammar
- To expose students to the dynamic function of language and its variations in a society
- To introduce students to the basic tenets of language acquisition
- To provide a foundation for students who wish to pursue further studies in this field

### Course Outcomes

**On successful completion of the course, the learners will be able to**

**CO1 [K1]:** describe the features of language development in individuals and communities.

**CO2 [K2]:** identify the basic units of language and how they operate in English.

**CO3 [K3]:** identify and examine structures of linguistic utterances.

**CO4 [K4]:** explain basic concepts in different branches of linguistics.

**CO5 [K4]:** analyse evolution of language in society from historical, geographical, and political perspectives.

## ADVERTISING & PUBLIC RELATIONS

**Code: UEN/SU/20**

**Semester: IV**

**Hours: 90**

**Credits: 5**

### Learning Objectives

- To make students aware of the impact advertising has on society
- To give them a basic understanding of the advertising process involving concepts such as market, sales, creative ideas, mass media, IPR and entrepreneurship
- To provide training in copywriting and scriptwriting for print and audio-visual media
- To introduce them to the importance of public relations and its functions
- To teach them the use of various tools and media for organizing PR campaigns

### Course Outcomes

**On successful completion of the course, the learners will be able to**

**CO1: [K2]** examine advertising and PR from social, psychological, economic, and ethical perspectives.

**CO2: [K3]** develop a better understanding of advertising in the context of marketing, IPR and entrepreneurship

**CO3: [K4]** write sample copy, press releases, AV scripts and blueprints to advertise products, services and ideas.

**CO4: [K5]** appraise multimedia ads technically and strategically.

**CO5: [K6]** plan events for a simple PR campaign using various tools and media.

## ENGLISH FOR COMMUNICATION SKILLS- PAPER I ADVANCED LEVEL

**Code: UEN/EA/12**

**Semester: 1**

**Hours: 90**

**Credits: 3**

### Learning Objectives

- To enable the student to use the stylistic features of the language appropriately and creatively
- To enable comprehension of passages such as literary texts
- To enhance the student's grasp and use of language for effective and ethical creative writing

### Course Outcomes

**On successful completion of the course, the learners will be able to**

**CO1: [K2]** interpret ideas and paraphrase them while engaging with literary extracts/ texts.

**CO2: [K3]** examine any text critically and articulate their opinions on the same.

**CO3: [K4]** plan and organise information in brief narratives.

**CO4: [K5]** evaluate and choose ideas to incorporate in descriptive passages.

**CO5: [K6]** create complete fictional narratives.

## ENGLISH FOR COMMUNICATION SKILLS – PAPER I INTERMEDIATE LEVEL

Code: UEN/EI/13  
Semester: I

Hours: 90  
Credits: 3

### Learning Objectives

To enable comprehension of passages that develop inferential and analytical thinking  
To enable students to write grammatically accurate and contextually appropriate language

### Course Outcomes

**On successful completion of the course, the learners will be able to**

**CO1: [K1]** find the key points from the given texts.

**CO2: [K2]** explain ideas and opinions from texts given to them.

**CO3: [K3]** demonstrate confidence in reading and writing through exposure to new ideas from texts/personal interviews/discussions held in class.

**CO4: [K3]** organize information and communicate using official drafts.

**CO5: [K4]** distinguish the main idea(s) from supporting details, and fact from opinion.

## ENGLISH FOR COMMUNICATION SKILLS – PAPER I BASIC LEVEL

Code: UEN/ EB/14  
Semester: I

Hours: 90  
Credits: 3

### Learning Objectives

- To facilitate independent and critical thinking in students and enable them to communicate effectively
- To enable comprehension of short passages
- To help students organise ideas and write short paragraphs

### Course Outcomes

**On successful completion of the course, the learners will be able to**

**CO1: [K1]** identify the contextual meanings of words, using them in everyday conversations.

**CO2: [K2]** arrange ideas to form well-structured paragraphs.

**CO3: [K3]** write different kinds of letters and identify important information from conversations.

**CO4: [K4]** analyse any given text and respond to questions based on it.

**CO5: [K4]** deduce information from visual representations like charts, tables, graphs etc.

## ENGLISH FOR COMMUNICATION SKILLS – PAPER I FUNDAMENTAL LEVEL

Code: UEN/EF/09  
Semester: I

Hours: 90  
Credits:3

### Learning Objectives

- To enable comprehension of simple factual passages
- To help students identify and rectify basic errors in the language
- To help students use the language intelligibly in simple sentences

### Course Outcomes

**On successful completion of the course the learners will be able to:**

**CO1: [K1]** describe a context in complete sentences using relevant content words.

**CO2: [K2]** restate information from various sources in the form of instructions.

**CO3: [K3]** illustrate ability to speak and write about themselves.

**CO4: [K4]** infer meaning from texts and identify the right words and expressions to be used in the relevant contexts.

**CO5: [K4]** analyse a text and explain its content in continuous writing / transfer it into worksheets.

## ENGLISH FOR COMMUNICATION SKILLS – PAPER II ADVANCED LEVEL

**Code: UEN/EA/13M**  
**Semester II**

**Hours: 60**  
**Credits:3**

### Learning Objectives

- To enable the student to acquire a knowledge of the formal structures of journalistic writing
- To enable the student to deduce the accurate and effective use of language in print media through pieces of journalistic writing

### Course Outcomes

**On successful completion of the course, the learners will be able to**

**CO1: [K2]** interpret and paraphrase information from different written sources.

**CO2: [K3]** examine and articulate ideas effectively in a structured manner.

**CO3: [K4]** analyse and organise ideas to reconstruct arguments and accounts in a coherent presentation.

**CO4: [K5]** evaluate multiple points of view in order to cogently report facts and formulate independent perspectives.

**CO5: [K6]** compile and create written pieces which integrate descriptive writing with factual information.

## ENGLISH FOR COMMUNICATION SKILLS –PAPER II INTERMEDIATE LEVEL

**Code: UEN/EI/14M**  
**Semester: II**

**Hours: 60**  
**Credits: 3**

### Learning Objectives

- To enable students to organise and present ideas in continuous writing.
- To train students to respond to books by writing reviews.
- To equip students to distinguish between relevant and irrelevant facts and apply strategies for summarizing.

### Course Outcomes

**On successful completion of the course, the learners will be able to:**

**CO1: [K2]** demonstrate their acquired vocabulary through continuous writing.

**CO2: [K3]** make use of a plan to write paragraphs.

**CO3: [K3]** identify main ideas from a text, summarise and present information in a condensed form.

**CO4: [K4]** analyse relationships between ideas/words in a text.

**CO5: [K4]** analyse and evaluate any given text.

## **ENGLISH FOR COMMUNICATION SKILLS – PAPER II BASIC LEVEL**

**Code : UEN/EB/15M**  
**Semester: II**

**Hours : 60**  
**Credits: 3**

### **Learning Objectives**

- To facilitate independent and critical thinking in students and enable them to communicate effectively
- To enable comprehension of descriptive passages
- To train students in the skills of summarising and reporting

### **Course Outcomes**

**On successful completion of the course, the learners will be able to**

**CO1: [K1]** examine and rectify language errors in their own writing.

**CO2: [K2]** identify and use unfamiliar words in contextualised speech and writing.

**CO3: [K3]** develop the skills to write a passage on any given topic.

**CO4: [K4]** analyse any given form of text to briefly respond to questions based on it and acquire the ability to arrange well-structured notes.

**CO5: [K4]** differentiate between various real-life contexts and engage in meaningful conversations.

## **ENGLISH FOR COMMUNICATION SKILLS – PAPER II FUNDAMENTAL LEVEL**

**Code: UEN/EF/10M**  
**Semester: II**

**Hours: 60**  
**Credits:3**

### **Learning Objectives**

- To enable comprehension of simple, descriptive passages
- To express ideas in simple sentences and arrange them logically and coherently
- To help students write a short, structured paragraph

### **Course Outcomes**

**On successful completion of the course the learners will be able to:**

**CO1: [K1]** write short coherent conversational exchanges and messages.

**CO2: [K2]** interpret information presented in short passages/pictorial format and restate it in short answers.

**CO3: [K3]** illustrate understanding of and use words, expressions and phrases in relevant contexts through vocabulary exercises and short answers.

**CO4: [K4]** organise information from peers into a cogent, verbal presentation.

**CO5: [K4]** analyse ideas and categorise them to prepare a framework, culminating in coherent, structured writing.

## **ESSENTIALS OF ENGLISH USAGE – ADVANCED LEVEL**

**Code: UEN/SK/11**  
**Semester: II**

**Hours: 45**  
**Credits: 3**

### **Learning Objectives**

- To enable the student to write with clarity
- To enable the student to acquire a knowledge of complex sentence structures and figurative language

### Course Outcomes

**On successful completion of the course, the learners will be able to**

- CO1: [K2]** identify and classify problems in usage, syntax and vocabulary that hamper effective communication.
- CO2: [K3]** illustrate their ability to communicate with clarity.
- CO3: [K4]** analyse contextual clues in order to infer meaning.
- CO4: [K5]** recommend the use of appropriate expressions in order to create meaning in a given context.
- CO5: [K6]** modify badly written passages, by identifying errors and editing complex sentence structures.

## ESSENTIALS OF ENGLISH USAGE - INTERMEDIATE LEVEL

**Code: UEN/SK/12**

**Semester: II**

**Hours: 45**

**Credits: 3**

### Learning Objectives

- To enable students to use grammar appropriately in simple and complex sentence structures
- To strengthen their grammatical base

### Course Outcomes

**On successful completion of the course, the learners will be able to**

- CO1: [K1]** find and correct common grammatical errors in sentence.
- CO2: [K2]** arrange and rephrase information using various sentence structures
- CO3: [K3]** use grammatically correct sentences in continuous writing.
- CO4: [K3]** identify and incorporate grammar rules.
- CO5: [K4]** distinguish between various types of sentences

## ESSENTIALS OF ENGLISH USAGE – BASIC LEVEL

**Code : UEN/SK/19**

**Semester: II**

**Hours : 45**

**Credits: 3**

### Learning Objectives

- To promote knowledge of the structure and function of the English language
- To equip students to use different tenses and various parts of speech in contextualised speech and writing
- To introduce students to use appropriate register for different situations and function

### Course Outcomes

**On successful completion of the course, the learners will be able to**

- CO1: [K1]** examine nuances of forms and usage of the language, recognising parts of simple sentences, and write well-structured paragraphs.
- CO2: [K2]** predict the correct verbs and tenses and use that skill to frame questions.
- CO3: [K3]** examine and rectify errors while using grammatical structures and engage in active self-correction.
- CO4: [K4]** evaluate everyday scenes to build vocabulary, demonstrating the same through registers in speech and continuous writing.
- CO5: [K4]** categorise various grammatical concepts such as articles, prepositions, conjunctions, tenses, verbs etc. and implement them in a given text, using them correctly in different modes of discourse.



## **ESSENTIALS OF ENGLISH USAGE – FUNDAMENTAL LEVEL**

**Code: UEN/SK/20**  
**Semester: II**

**Hours: 45**  
**Credits:3**

### **Learning Objectives**

- To enable the student to understand parts of speech and use them correctly in a context
- To enable the student to use the various parts of speech together in continuous writing

### **Course Outcomes**

**On successful completion of the course the learners will be able to**

**CO1: [K1]** find parts of speech with their inflections and employ them in suitable contexts.

**CO2: [K2]** interpret basic grammar rules in order to form sentences.

**CO3: [K3]** use appropriate descriptive and adjoining words/phrases in continuous writing.

**CO4: [K4]** identify and rectify grammatical errors in sentences.

**CO5: [K4]** analyse sentence structures and frame simple sentences.

## **ENGLISH FOR COMMUNICATION SKILLS- PAPER III ADVANCED LEVEL**

**Code: UEN/EA/14**  
**Semester III**

**Hours: 60**  
**Credits: 3**

### **Learning Objectives**

- To equip the student with language skills for social, academic and professional purposes
- To train the student to negotiate with challenging reading comprehension passages

### **Course Outcomes:**

**On successful completion of the course, the student is able to**

**CO1: [K2]** demonstrate academic writing skills.

**CO2: [K3]** use effective vocabulary for social, academic and professional purposes.

**CO3: [K4]** analyze complex texts.

**CO4: [K5]** justify arguments with appropriate reasons and evidence.

**CO5: [K6]** construct an effective Statement of Purpose.

## **ENGLISH FOR COMMUNICATION SKILLS -PAPER III INTERMEDIATE LEVEL**

**Code: UEN/EI/15**  
**Semester III**

**Hours: 60**  
**Credits: 3**

### **Learning Objectives**

- To enable students to comprehend texts ranging from print to visual media
- To equip students to be proficient in various writing styles such as expository, narrative, descriptive and persuasive
- To train students in creative/review writing through an understanding, appreciation and critical perception of visual arts/media

### **Course Outcomes**

**On successful completion of the course, the learners will be able to**

**CO1: [K1]** write their perspectives after examining a given text

**CO2: [K2]** comprehend a given text and respond coherently with details

**CO3: [K3]** develop a plan into organized writing

- CO4: [K4] critically analyse media texts  
CO5: [K5] interpret pictorial representations in continuous writing

### **ENGLISH FOR COMMUNICATION SKILLS – PAPER III BASIC LEVEL**

**Code: UEN/EB/16**  
**Semester: III**

**Hours: 60**  
**Credits: 3**

#### **Learning Objectives**

- To facilitate independent and critical thinking in students and enable them to communicate effectively
- To enable students to be prepared for job interviews
- To enable students to write effective and coherent content

#### **Course Outcomes**

**On successful completion of the course, the learners will be able to**

**CO1: [K1]** list personal and professional details in forms and CVs.

**CO2: [K2]** identify the contextual meanings of words and use appropriate words to fill in the blanks.

**CO3: [K3]** develop their ideas and present them in written and spoken pieces.

**CO4: [K3]** examine and rectify language errors in their own writing.

**CO5: [K4]** analyse texts taken from newspapers or magazines that are socially relevant.

### **ENGLISH FOR COMMUNICATION SKILLS – PAPER III FUNDAMENTAL LEVEL**

**Code: UEN/EF/11**  
**Semester: III**

**Hours: 60**  
**Credits:3**

#### **Learning Objectives**

To enable comprehension of short passages based on issues relating to human interest  
To enable students to write essays with the help of an outline

#### **Course Outcomes**

**On successful completion of the course the learners will be able to**

**CO1: [K1]** find and recall the appropriate expressions to be written in specific contexts.

**CO2: [K2]** interpret and discuss ideas from simple texts.

**CO3: [K3]** illustrate understanding of a given text by classifying the information therein

**CO4: [K4]** explain their potential for employability in writing

**CO5: [K4]** analyse contexts, categorise information and coherently sequence their ideas in continuous writing.

### **SPOKEN AND PRESENTATION SKILLS – ADVANCED LEVEL**

**Code: UEN/SK/23**  
**Semester: III**

**Hours: 45**  
**Credits:3**

#### **Learning Objectives**

- To train the student to make formal oral presentations
- To enable the student to speak fluently and spontaneously and handle hostile questioning

### Course Outcomes

**On successful completion of the course, the learners will be able to**

**CO1: [K1]** recall the knowledge of the format and presentation of the content required for oral presentations.

**CO2: [K2]** discuss the particular perspective on a researched topic quoting adequate evidence.

**CO3: [K3]** demonstrate the skill to present efficient profiles for job interviews.

**CO4: [K4]** examine and present arguments and counter arguments.

**CO5: [K5]** justify ideas/opinion/answers to responses.

## **SPOKEN AND PRESENTATION SKILLS - INTERMEDIATE LEVEL**

**Code: UEN/SK/16**

**Semester: III**

**Hours: 45**

**Credits: 3**

### Learning Objectives

- To develop the competency of students in spoken and presentation skills
- To sharpen listening skills

### Course Outcomes

**On successful completion of the course, the learner would be able to**

**CO1: [K1]** write a standardized curriculum vitae and is prepared for a job interview

**CO2: [K2]** discuss a topic in a group, introducing new/different ideas.

**CO3: [K3]** demonstrate her ability for effective public speaking.

**CO4: [K3]** display her competence to answer questions raised by the audience

**CO5: [K4]** interpret information delivered through audio-visual media.

## **SPOKEN AND PRESENTATION SKILLS – BASIC LEVEL**

**Code: UEN/SK/21**

**Semester: III**

**Hours : 45**

**Credits: 3**

### Learning Objectives

- To help students improve their listening skills and language competence
- To enable students to participate in group and class discussions.
- To prepare students for an interview for further studies or employment
- To build self-confidence in students and train them for effective presentations

### Course Outcomes

**On successful completion of the course, the learners will be able to**

**CO1: [K1]** list their achievements and skills effectively in interviews.

**CO2: [K2]** restate information from an audio text by responding to specific questions.

**CO3: [K3]** demonstrate the ability to participate in discussions based on an audio text.

**CO4: [K3]** organise ideas pertaining to a topic and deliver a talk on the same.

**CO5: [K4]** distinguish main ideas from supporting ideas and articulate their thoughts on the given topic in a formal manner.

## **SPOKEN AND PRESENTATION SKILLS – FUNDAMENTAL LEVEL**

**Code: UEN/SK/22**  
**Semester: III**

**Hours: 45**  
**Credits:3**

### **Learning Objectives**

- To train students in the skills needed to use English for speaking in groups and individually
- To train students in the skills needed to make presentations
- To train the students to use the listening skills of the language in real life situations

### **Course Outcomes**

**On successful completion of the course the learners will be able to**

**CO1: [K1]** recall information from audio messages and write out the details

**CO2: [K2]** restate the information gathered from different sources and discuss it with a peer group.

**CO3: [K3]** illustrate their potential for employability in spoken form

**CO4: [K4]** explain their skill sets for employability in writing.

**CO5: [K4]** analyse issues, compare and contrast opposing perspectives and coherently make an oral presentation to an audience.

## **ENGLISH FOR COMMUNICATION SKILLS – PAPER IV** **SPOKEN ENGLISH**

**Code: UEN/EO/01M**  
**Semester: IV**

**Hours: 60**  
**Credits: 3**

### **Learning Objectives**

- To enhance pronunciation and intonation patterns in spoken communication
- To expand vocabulary and improve fluency
- To make a formal presentation about a topic in front of an audience
- To participate in group discussions

### **Course Outcomes**

**On successful completion of the course the learners will be able to**

**CO1: [K1]** recall phonetic elements to enhance vocabulary in different activities for practice in spoken skills

**CO2: [K2]** outline and formulate ideas to be presented in a formal speech.

**CO3: [K3]** display their competence to answer questions raised by an audience.

**CO4: [K4]** analyse a formal talk /lecture and present a summary/report on the same

**CO5: [K4]** compare and contrast opposing perspectives and coherently make an oral presentation to an audience.

## **ENGLISH FOR COMMUNICATION SKILLS – PAPER IV** **ENGLISH SKILLS FOR THE WORKPLACE**

**Code: UEN/EO/02M**  
**Semester: 1V**

**Hours: 60**  
**Credits:3**

### **Learning Objectives**

- To prepare students for a job interview.
- To introduce students to the workplace contexts and different industries.
- To introduce English phrases and vocabulary designed to meet company's specific language needs.
- To develop English language skills for employability and for career advancement.

### Course Outcomes

**On successful completion of the course, the learners will be able to**

- CO1: [K2] examine the context and write different kinds of official communication in workplace
- CO2: [K3] use context-specific terminology and expression in workplace
- CO3: [K4] categorize information and communicate using official drafts
- CO4: [K5] evaluate a given situation and demonstrate her skill of making informed decisions
- CO5: [K6] design and create official documents for the workplace

## **ENGLISH FOR COMMUNICATION SKILLS – PAPER IV ENGLISH FOR COMPETITIVE EXAMS**

**Code: UEN/EO/03M**  
**Semester: 1V**

**Hours :60**  
**Credits:3**

### Learning Objectives:

- To enable students to comprehend and infer passages or specific information given.
- To develop vocabulary through exercises in the competitive examination model.
- To facilitate students to develop their language skills for competitive examinations.

### Course Outcomes:

**On successful completion of the course, the learners will be able to:**

- CO1: [K2] demonstrate language skills to answer inferential questions
- CO2: [K3] apply knowledge of grammar to answer various exercises for Competitive examinations.
- CO3: [K4] infer meanings of unfamiliar words using contextual clues and solve exercises in the competitive exam model.
- CO4: [K5] evaluate the most suitable answer with regard to MCQs.
- CO5: [K5] interpret passages or specific information given.

## **ENGLISH FOR COMMUNICATION SKILLS – PAPER IV WRITING FOR PUBLIC RELATIONS AND FOR FILM**

**Course Code: UEN/EO/05M**  
**Semester: IV**

**Hours: 60**  
**Credits: 3**

### Learning Objectives:

- To understand the role of PR in an organisation
- To learn the dimensions of writing in terms of content, formats and styles required for PR and to develop the required writing skills
- To understand the process of creating film stories from idea to script and storylines
- To develop concepts, understanding the visual nature of the medium
- To learn the art of building character, dialogue and plot into the structure of the script

### Course Outcomes:

**On successful completion of the course, the learners will be able to**

- CO1:[K2] discuss communication strategies for PR and film
- CO2:[K3] illustrate ideas through visuals and scripts using the medium of film to communicate to an audience
- CO3:[K4] differentiate film structures and genres
- CO4:[K5] appraise films with appropriate pitch, treatment and storyboard
- CO5:[K6] plan and create content for PR communications

## **ENGLISH FOR COMMUNICATION SKILLS – PAPER IV ENGLISH FOR PUBLIC SPEAKING**

**Code: UEN/EO/06M**  
**Semester: IV**

**Hours: 60**  
**Credits: 3**

### **Learning Objectives:**

- To train students in assimilating, analysing and synthesising their reading in order to prepare them to deliver effective speeches
- To help them gain a hands-on experience of communicating in English and critically using English language
- To empower students to gain ownership of their learning

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to**

**CO1: [K2]** infer relevant inputs on basic principles in Public Speaking to enhance oral communication in formal contexts.

**CO2: [K3]** classify ideas and demonstrate the ability to participate in discussions based on a given topic.

**CO3: [K4]** analyse the given audio text and explain relevant content therein by answering specific questions.

**CO4: [K5]** assess situations and determine appropriate frameworks to deliver speeches in different occasions.

**CO5: [K6]** develop ideas to form a well-structured formal speech.

## **ENGLISH FOR COMMUNICATION SKILLS – PAPER IV CREATIVE WRITING**

**Code: UEN/EO/07M**  
**Semester: IV**

**Hours: 60**  
**Credits: 3**

### **Learning Objectives**

- To guide and train students to write creatively in various genres
- To provide an environment of guidance and support from peers thereby nurturing creativity
- To help students view their work critically and produce socially sensitive writing

### **Course Outcomes**

**On successful completion of the course, the learners will be able to**

**CO1: [K2]** examine ideas and outline components that constitute a well-constructed fictional narrative.

**CO2: [K3]** examine images and ideas in order to use them suitably in verse or prose.

**CO3: [K4]** explain content in appropriate language to age-based target groups.

**CO4: [K5]** analyse a plot/context and prioritise the details that are significant to a narrative, and critique/edit their work and that of their peers.

**CO5: [K6]** create a brief script for the stage/ synopsis/ fictional narrative/ poem.

## UNDERSTANDING CINEMA

**Code: UEN/NM/03**  
**Semester: IV**

**Hours: 30**  
**Credits: 2**

### Learning Objectives

- To introduce students to the fascinating world of cinema
- To hone their skills to become discerning and critical viewers of the medium
- To create awareness about the social impact of films
- To enhance their enjoyment of cinema through a deeper understanding of this powerful audio-visual medium

### Course Outcomes

**On successful completion of the course, the learners will be able to**

**CO1: [K2]** review film genres and movies.

**CO2: [K3]** develop a well-informed and critical perspective on cinema.

**CO3: [K3]** apply genre criticism to movies.

**CO4 : [K4]** analyse movies in terms of structure, content, cinematography and ideology.

**CO5: [K5]** critique the nuances and social impact of cinema.

## PERSONALITY ENRICHMENT – A LITERARY HUMANISTIC APPROACH

**Code: UEN/SK/09**  
**Semester: IV**

**Hours: 45**  
**Credits: 3**

### Learning Objectives:

To introduce students to literary texts in order to

- highlight the values they expound
- fine-tune their personalities in areas such as living in harmony, respecting differences, feeling proud of their heritage and heightening a sense of responsibility as educated citizens of our country

### Course Outcomes

**On successful completion of the course, the learner will be able to**

**CO1: [K1]** show informed perspectives of the self and an integrated sense of personal and cultural identity.

**CO2: [K2]** discover and explain her role in nation building.

**CO3: [K3]** develop respect towards other cultures to value diversity.

**CO4: [K4]** inspect and resolve personal and interpersonal conflicts detrimental to communal harmony.

**CO5: [K5]** evaluate and respond to larger social issues by being the voice of the underprivileged and serve the marginalized.

## GRAPHIC DESIGN AND LAYOUT

**Code: UEN/SK/18**  
**Semester: V**

**Hours: 45**  
**Credits: 3**

### Learning Objectives

- To train students in the integration of image, type, colour into layouts for media
- To help students use design tools to enhance their creative representation of reports and other materials

### Course Outcomes

**On successful completion of the course, the learners will be able to**

**CO1: [K1]** show their understanding of the tools of Photoshop and InDesign.

**CO2: [K2]** illustrate their knowledge of the techniques used to correct/ create composite images.

**CO3: [K3]** employ the softwares to design various layouts.

**CO4: [K4]** analyse the design tools and their suitability for completing different assignments.

**CO5: [K5]** determine the appropriate tools required and use them to complete the various projects assigned to them.

## WRITING SKILLS FOR OFFICIAL COMMUNICATION AND RESEARCH

**Code: PEN/SK/02**

**Semester: I & II**

**Hours: 30**

**Credits: 2**

### Learning Objectives

- To sharpen the writing skills required for academic/formal writing
- To learn the technique of writing reports/ dissertation / official letters.

### Course Outcomes

**On successful completion of the course, the learners will be able to**

**CO1: [K2]** outline the argument, reasons, evidences and delimitation for research

**CO2: [K3]** use the outline to structure an academic essay

**CO3: [K4]** examine the various writing approaches for research in social sciences

**CO4: [K5]** assess appropriate language skills/stylistic features for academic writing

**CO5: [K6]** construct a project proposal and synthesise recommendations into a report

## ADVERTISING & PUBLIC RELATIONS

**Code: UEN/SU/20**

**Semester: IV**

**Hours: 90**

**Credits: 5**

### Learning Objectives

- To make students aware of the impact advertising has on society
- To give them a basic understanding of the advertising process involving concepts such as market, sales, creative ideas, mass media, IPR and entrepreneurship
- To provide training in copywriting and scriptwriting for print and audio visual media
- To introduce them to the importance of public relations and its functions
- To teach them the use of various tools and media for organizing PR campaigns

### Course Outcomes

**On successful completion of the course, the learners will be able to**

**CO1: [K2]** examine advertising and PR from social, psychological, economic, and ethical perspectives.

**CO2: [K3]** develop a better understanding of advertising in the context of marketing, IPR and entrepreneurship.

**CO3: [K4]** write sample copy, press releases, AV scripts and blueprints to advertise products, services and ideas.

**CO4: [K5]** appraise multimedia ads technically and strategically.

**CO5: [K6]** plan events for a simple PR campaign using various tools and media.



## INDIAN LITERATURES – PAPER I

**Code: UEN/CO/52**

**Semester: V**

**Hours: 75**

**Credits: 4**

### Learning Objectives

- To introduce the students to literary pieces in English and in translation, by Indian authors.
- To make them aware of the social, cultural, political, economic changes that took place in Post-Independence India.
- To sensitise the students to the realities of the marginalised in contemporary Indian society.
- To expose students to the concerns of urbanized and globalised Indians.

### Course Outcomes

**On successful completion of the course, the learners will be able to**

**CO1: [K1]** describe the complex historical trajectory of India's colonial and postcolonial status.

**CO2: [K2]** explain the concerns of Indian writers in the context of various issues in post-independence India.

**CO3: [K3]** examine texts by Indian writers and interpret them within the relevant historical, political and cultural contexts.

**CO4: [K4]** analyse texts by Indian writers to sensitively respond to the concerns of the marginalised.

**CO5: [K5]** evaluate critically literary texts within the context of the contemporary Indian society.

## INDIAN LITERATURES – PAPER II

**Code: UEN/CO/53M**

**Semester: VI**

**Hours: 75**

**Credits: 4**

### Learning Objectives

- To introduce the students to literary pieces in English and in translation, by Indian authors
- To make them aware of the social, cultural, political, economic changes that took place in Post-Independence India
- To sensitise the students to the realities of the marginalised in contemporary Indian society
- To expose students to the concerns of urbanized and globalised Indians

### Course Outcomes

**On successful completion of the course, the learners will be able to**

**CO1: [K1]** describe and trace the poetic tradition in Indian Literatures.

**CO2: [K2]** explain different ideas and articulate viewpoints in relation to regional voices and ideas.

**CO3: [K3]** examine texts by Indian writers and interpret them within the relevant historical, political and cultural contexts.

**CO4: [K4]** analyse texts by Indian writers to sensitively respond to the concerns of the marginalised.

**CO5: [K5]** assess literary texts with a critical insight within the context of contemporary Indian society.

## POSTCOLONIAL LITERATURE

**CODE: UEN/CO/58M**  
**Semester: V**

**Hours: 75**  
**Credits: 4**

### Learning Objectives

- To introduce students to literatures from different postcolonial cultures
- To sensitise them to problems addressed by writers trying to capture specific indigenous traditions and customs in their writing
- To revisit the established notions of the literary canon

### Course Outcomes

**On successful completion of the course, the learners will be able to**

**CO1: [K1]** recall the social, cultural and historical contexts pertaining to postcolonialism.

**CO2: [K2]** discuss the colonial enterprise and its agenda.

**CO3: [K3]** apply key theoretical concepts in examining differing postcolonial realities.

**CO4: [K4]** analyse postcolonial issues and concerns across cultures/nations.

**CO5: [K5]** assess problems to understand agendas and recommend solutions.

## FOOD WRITING

**Code: UEN/CO/59**  
**Semester: V**

**Hours: 75**  
**Credits: 3**

### Learning Objectives

- To introduce students to the genre of food writing
- To create a cultural sensitivity and appreciation for food writing
- To critique texts on food writing and examine the contexts they originate from

### Course Outcomes

**On successful completion of the course, the learners will be able to**

**CO1: [K1]** identify and examine the social, cultural and historical contexts pertaining to food writing

**CO2: [K2]** discuss issues related to food, across cultures, as reflected in the texts

**CO3: [K3]** examine the texts from the perspective of selected literary and social theories

**CO4: [K4]** analyse issues and concerns across cultures/nations/ethnicities

**CO5: [K5]** assess the problems studied to understand agendas, and recommend solutions

## UNDERSTANDING DISABILITY

**Code: UEN/CE/16**  
**Semester: VI**

**Hours: 75**  
**Credits: 5**

### Learning Objectives

- To introduce students to disability as something that goes beyond a medically circumscribed concept of impairment
- To sensitise them to the fact that it is also a sociocultural construct within enforced systems of exclusion
- To develop an understanding of multiple perspectives and representations of disability

### **Course Outcomes**

**On successful completion of the course, the learners will be able to**

**CO1: [K1]** identify and describe the core concepts and issues pertaining to disability as a field of study.

**CO2: [K2]** examine critical perspectives on disability and discuss their relevance in contemporary contexts.

**CO3: [K3]** apply such perspectives to examine representations of disability in multiple fields/ disciplines.

**CO4: [K4]** identify contexts to demonstrate their ability to engage in critical questions/ discussion/ advocacy.

**CO5: [K5]** evaluate representation in multiple forms, assess/ critique their collective impact, and recommend solutions for an altered perspective in engaging with disability.

## **INTRODUCTION TO TRAVEL NARRATIVES**

**Code: UEN/CE/17**

**Hours: 75**

**Semester: VI**

**Credits: 5**

### **Learning Objectives**

- To introduce students to travel narratives through critical readings of travel works from diverse cultures and of various narrative styles.
- To develop an understanding of the impact of the processes of colonialism and post-colonialism on the development of travel literature.
- To locate travel narratives in the context of globalisation.

### **Course Outcomes**

**On successful completion of the course, the learners will be able to**

**CO1: [K1]** recognise the aesthetics of the genre and its traditions.

**CO2: [K2]** understand innovations in travel narrative forms.

**CO3: [K3]** examine travel narratives in the context of globalisation.

**CO4: [K4]** analyse concerns of identity in travel narratives.

**CO5: [K5]** evaluate writers' perspectives on travel.

## **THEATRE IN CONTEXT**

**Code: UEN/CE/18**

**Hours: 75**

**Semester: VI**

**Credits: 5**

### **Learning Objectives**

- To enable students to research, analyse, interpret and create theatrical scripts underpinned by theoretical and practical study
- To provide students with a hands-on training experience in effective theatrical productions
- To enable students to adapt theatrical genres and styles to work within contemporary contexts

### **Course Outcomes**

**On successful completion of the course, the learners will be able to**

**CO1: [K1]** examine various theatrical styles and genres, in order to become skilled, well-informed and reflective theatrical practitioners.

**CO2: [K2]** illustrate their ability to communicate with an audience through practical and creative work.

**CO3: [K3]** determine the theatrical approaches best suited for communicating effectively with a target audience.

**CO4: [K4]** devise the most suitable way to interpret and create/ recreate a text for staging before an audience.

**CO5: [K5]** assess the context and perform as individuals or in groups to convey the intent/message with clarity.

## **INTERNSHIP**

**Code: UEN/CO/60**

**Semester: V**

**Time Span: 2-4 weeks**

**Credits: 1**

### **Learning Objectives:**

- To train the students in real life application of skills acquired from the courses offered in the curriculum.
- To give students the opportunity to understand the practical work environment they are trained for.
- To give them a competitive edge in selecting careers after the undergraduate programme.

### **Course Outcomes**

**On successful completion of the course, the learners will be able to**

**CO1: [K2]** show skills demonstrating an understanding of the specific professional contexts they are trained for.

**CO2: [K3]** employ theory and application in the workplace.

**CO3: [K4]** illustrate professional skills through exposure to the workplace.

**CO4: [K5]** appraise skills, requirements and developments in the job market.

**CO5: [K6]** adapt to requirements of the workplace at various organisational levels

## **DEPARTMENT OF MATHEMATICS PROGRAMME SPECIFIC OUTCOMES**

**On successful completion of Bachelor of Science in Mathematics, the student should be able to**

**PSO1:** Develop the skill to think critically on concepts of Mathematics

**PSO2:** Apply the knowledge of Mathematics in presentation of results and reports

**PSO3:** Understand and analyse problems in Mathematics within the quantified constraints

**PSO4:** Acquire knowledge and skills through logical reasoning to solve real time problems

**PSO5:** Examine and utilize appropriate techniques to solve problems in Mathematics

**PSO6:** Acquire teaching skills and subject knowledge in the course of their study which will help them to shine in various fields including Education, IT, Statistics, etc

**PSO7:** Interact with the team , manage the project, communicate with external stake holders for gathering requirements and implementation

**PSO8:** Develop the ability to think independently paving way for self learning , innovation, entrepreneurship and research

**PSO9:** Provide new solutions using the domain knowledge of Mathematics acquired during the programme to reach out to the user community

**PSO10:** Acquire arithmetic skills, aptitude skills, communication skills to fulfill the employment requirements and enhance personality.



## DIFFERENTIAL CALCULUS

**Code: UMA/CO/57**  
**Semester: I**

**Hours: 60**  
**Credits: 3**

### **Learning Objective:**

- To review and extend the knowledge of differential calculus with an introduction to applications of differentiation.
- To develop problem solving skills.

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to :**

**CO1: [K2]** Explain the concepts of differentiation and its applications

**CO2: [K3]** Apply various techniques to solve problems in differentiation

**CO3: [K3]** Demonstrate the utilization of formulae, results to compute problems in differentiation and its applications

**CO4: [K4]** Identify methods to solve different problems involving differentiation

**CO5: [K4]** Analyse problems in differentiation and its applications to obtain solutions

## CLASSICAL ALGEBRA

**Code: UMA/CO/50 M**  
**Semester: I**

**Hours:60**  
**Credits: 4**

### **Learning Objective:**

- To study the relation between roots and equations and finding the sum of infinite series using binomial, exponential and logarithmic series.
- To lay a strong foundation in Pure Mathematics.

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to :**

**CO1: [K2]** Explain the basic concepts and results of Theory of Equations and Series

**CO2: [K3]** Apply different techniques to solve equations, determine the convergence/divergence/ sum of series

**CO3: [K3]** Demonstrate the utilization of formulae, theorems in finding solutions to problems

**CO4: [K4]** Analyse problems in Theory of Equations, Series and obtain their solution

**CO5: [K4]** Examine and identify methods to solve problems in Theory of equations and Series

## INTEGRAL CALCULUS

**Code: UMA/CO/ 51**  
**Credits: 4**

**Hours: 60 Semester: II**

### **Learning Objective:**

- To explain the different methods of Integration, evaluation of multiple Integrals.
- To introduce the fundamental concepts of Beta and Gamma functions.

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to :**

**CO1: [K2]** Explain the fundamental concepts and results of Integral Calculus

**CO2: [K3]** Apply different methods to compute definite, improper and multiple integrals

**CO3: [K3]** Demonstrate the utilization of formulae,properties of integrals to evaluate them

**CO4: [K4]** Analyse problems in integration and obtain the solution

**CO5: [K4]** Examine different types of integrals and identify methods to compute them

## ORDINARY DIFFERENTIAL EQUATIONS AND TRIGONOMETRY

Code: UMA/CO/ 52M  
Semester: II

Hours: 75  
Credits: 4

### Learning Objectives:

- To present methods of solving Ordinary Differential Equations of first order and of higher degree and to introduce Laplace transforms with its application in solving differential equations.
- To review and extend the knowledge of trigonometry.

### Course Outcomes:

**On successful completion of the course, the learners will be able to:**

- CO1: [K2]** Explain the fundamental concepts of ordinary differential equations, trigonometric functions and hyperbolic functions.
- CO2: [K3]** Apply various techniques to solve ordinary differential equations, determine trigonometric expansions, relations between circular and hyperbolic functions.
- CO3: [K3]** Demonstrate the utilization of trigonometric, hyperbolic expansions / properties of ordinary differential equations to evaluate problems.
- CO4: [K4]** Analyze the different types of ordinary differential equations, trigonometric functions, hyperbolic functions and obtain solutions to problems involving them.
- CO5: [K4]** Examine ordinary differential equations, trigonometric/ hyperbolic functions and identify methods to compute problems involving them.

## PARTIAL DIFFERENTIAL EQUATIONS AND ANALYTICAL GEOMETRY (3D)

Code: UMA/CO/20M  
Semester: III

Hours: 60  
Credits: 4

### Learning Objective:

- To present methods of solving Partial Differential Equations.
- To study planes, straight lines, spheres using their equations, to introduce equations of cone, cylinder and conicoids.

### Course Outcomes:

**On successful completion of the course, the learners will be able to:**

- CO1: [K2]** Explain the fundamental concepts of partial differential equations and three-dimensional coordinate geometry
- CO2: [K3]** Apply suitable techniques to solve, form partial differential equations and determine properties of three - dimensional coordinate geometry
- CO3: [K3]** Demonstrate the utilization of methods to solve partial differential equations and problems in three-dimensional coordinate geometry
- CO4: [K4]** Analyze the different types of partial differential equations and properties of planes, lines, spheres, cone, cylinder to obtain solutions to problems involving them.
- CO5: [K4]** Inspect partial differential equations, problems in three dimensional coordinate geometry and evaluate them.

## ALGEBRAIC STRUCTURES I

Code: UMA/CO/53M  
Semester: III

Hours: 60  
Credits:4



**Learning Objectives:**

- To introduce the basic concepts and results of Group Theory and Ring Theory.
- To develop logical thinking.

**Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

**CO 1: [K2]** Describe basic concepts and properties of Groups and Rings.

**CO 2: [K3]** Apply the results from elementary group and ring theory to prove theorems and solve contemporary problems.

**CO 3: [K4]** Analyse mathematical proofs of basic results in Groups and Rings.

**CO 4: [K4]** Illustrate the efficient use of algebraic techniques to concepts in groups and rings.

**CO 5: [K5]** Explain algebraic features of mathematical systems using Groups and Rings.

## **VECTOR CALCULUS AND FOURIER SERIES**

**Code: UMA/CO/22M**

**Hours: 60**

**Semester: IV**

**Credits: 4**

**Learning Objective:**

- To introduce vector differentiation, integration and some integral theorems.
- To study Fourier series.

**Course Outcomes:**

**On successful completion of the course, the learners will be able to :**

**CO 1: [K2]** Explain the fundamental concepts of Vector differentiation, Integration and Fourier Series.

**CO2: [K3]** Apply the acquired knowledge to solve problems in vector differentiation, integration and to determine the Fourier series of a function.

**CO3: [K3]** Demonstrate the utilization of results in solving problems in Vector differentiation, Integration and Fourier series.

**CO4: [K4]** Analyze Problems in Vector differentiation, Integration and Fourier series and solve them.

**CO5: [K4]** Examine the relations between line integrals, surface integrals and Volume integrals and evaluate them.

## ALGEBRAIC STRUCTURES II

**Code: UMA/CO/54M**

**Hours: 60**

**Semester: IV**

**Credits:4**

### **Learning Objectives:**

- To introduce the concepts and properties of vector spaces and applications of matrices.
- To develop independent thinking.

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

**CO 1: [K2]** Demonstrate basic concepts and properties of Euclidean rings, Vector Spaces, Linear Transformation and application of matrices.

**CO 2: [K3]** Apply the results from Euclidean rings, Vector Spaces, Linear Transformation to prove theorems

**CO 3: [K3]** Examine and solve problems in Rings, Vector Spaces and linear system of equations.

**CO 4: [K4]** Analyse standard theorems regarding Euclidean rings, vector spaces and Linear Transformation.

**CO 5: [K5]** Explain relations between algebraic structures like rings, vector spaces and Linear Transformation

## REAL ANALYSIS I

**Code: UMA/CO/41M**

**Hours: 60**

**Semester: V**

**Credits: 4**

### **Learning Objective:**

- To introduce the concepts of sequences, series, metric spaces and their properties.
- To learn the behavior of sequences, series and functions on metric spaces.

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to :**

**CO1: [K2]** Describe the basic concepts and properties of the real number system, metric spaces, sequences, series and functions

**CO2: [K3]** Apply concepts and results of the real number system and metric spaces to solve problems involving them

**CO3: [K4]** Analyze proofs of basic results relating to the real number system, metric spaces, sequences, series and functions

**CO4: [K4]** Examine and illustrate the use of different techniques to concepts in introductory Real Analysis

**CO5: [K5]** Explain the relation between the real number system and metric spaces with respect to sequences, series and functions

## MECHANICS

**Code: UMA/CO/43**

**Hours: 75**

**Semester: V**

**Credits: 4**

### **Learning Objective:**

- To familiarize the students with the laws and principles of mechanics
- To understand and solve physical problems.

**Course Outcomes:****On successful completion of the course, the learners will be able to:**

- CO1: [K2]** Demonstrate the fundamentals and principle of Kinematics, forces, equilibrium of a uniform homogeneous string, projectiles and Central orbits.
- CO2: [K3]** Apply the concepts of basic mechanics in proving results and solving problems.
- CO3: [K4]** Analyse problems in Kinematics, forces, equilibrium of a uniform homogeneous string, projectiles and Central orbits and solve them.
- CO4: [K4]** Examine and utilize the results in Kinematics, forces, equilibrium of a uniform homogeneous string, projectiles and Central orbits.
- CO5: [K5]** Explain the theory of mechanics and utilize them to solve related problems.

## **ELEMENTS OF OPERATIONS RESEARCH**

**Code: UMA/CO/55M****Hours : 75 Semester:V****Credits : 4****(Proofs of theorems and derivations not included unless specified)****Learning Objective:**

- To introduce Operations Research and its applications and Entrepreneurship.
- To present methods of solving Linear Programming problems, Transportation problems, Assignment problems and Entrepreneurship.

**Course Outcomes:****On successful completion of the course, the learners will be able to:**

- CO1: [K2]** Describe the origin and basic concepts of Operations Research and Entrepreneurship.
- CO2: [K3]** Illustrate the application of optimization techniques to solve LPP and its related forms.
- CO3: [K4]** Identify and explain the features in Entrepreneurship, methods of optimization of LPP .
- CO4: [K4]** Analyze the algorithms to solve linear programming problems ,transportation problem and assignment problem.
- CO5: [K5]** Inspect the optimal solution of LPP and its related problems.

## **NUMBER THEORY AND CRYPTOGRAPHY**

**Code: UMA/CO/56****Hours: 60****Semester: V****Credits: 4****Learning Objective:**

- To develop an appreciation for some interesting properties of numbers that developed from ancient times.
- To understand the basic process of coding theory with special reference to crypto systems.

**Course Outcomes:****On successful completion of the course, the learners will be able to:**

- CO1:[K2]** Describe the basic concepts and properties of numbers, encryption and decryption.
- CO2:[K3]** Apply the results of number theory and its concepts in cryptography.
- CO3:[K4]** Examine the proofs of theorems based on the results of number theory.
- CO4:[K4]** Analyse the operations of numbers to solve the problems
- CO5:[K5]** Interpretation of the results of number theory , encryption and decryption of messages.

## **REAL ANALYSIS II**

**Code: UMA/CO/46M****Hours: 75**

**Semester: VI**

**Credits: 4**

**Learning objective:**

- To provide study on continuity, Riemann Stieltjes integral.
- To develop a foundation for higher studies in mathematics.

**Course Outcomes:**

**On successful completion of the course, the learners will be able to :**

- CO1: [K2]** Describe the basic concepts and properties of metric spaces, the Riemann integral and derivatives
- CO2: [K3]** Apply concepts and results to obtain solutions to problems involving properties of metric spaces, integration and differentiation of functions
- CO3: [K4]** Examine proofs of basic results related to Calculus and metric spaces
- CO4: [K4]** Analyze and illustrate the different techniques utilized to concepts in Advanced Real Analysis
- CO5: [K5]** Explain the relation between metric spaces, integration and differentiation of functions

## **COMPLEX ANALYSIS**

**UMA/CO/48M**

**Semester: VI**

**Hours: 90**

**Credits: 4**

**Learning Objective:**

- To introduce the basic principles of differentiable functions of a single complex variable, analytic functions.
- To study Bilinear Transformation, Taylor's series, Laurent's series and residues.

**Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

- CO1: [K2]** Explain the concepts of differentiation and integration of complex functions, analytic functions, power series and transformations.
- CO2: [K3]** Apply various techniques to solve problems on calculus of complex functions, power series and mappings by transformations.
- CO3: [K4]** Examine the proofs of theorems related to complex functions, series and transformations.
- CO4: [K4]** Analyze the concepts of continuity, differentiability, analyticity, Taylor's and Laurent's series and obtain solutions to problems involving them.
- CO5: [K5]** Evaluate derivatives and integrals of complex functions, series expansion of functions and transformations.

## MATHEMATICAL STATISTICS

**Code: UMA/CO/59**

**Semester: VI**

**Hours: 75**

**Credits: 4**

### **Learning Objective:**

- To introduce some important probability distributions with their properties and applications in service learning
- To study the relationship between sampling variables.

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

**CO1: [K2]** Describe the basic concepts of random variables and theory of sampling

**CO2: [K3]** Classify discrete distributions, continuous distributions and utilize statistical techniques in problem solving and service learning to obtain different parameters of sampling distributions.

**CO3: [K3]** Apply different characteristics of random variables and use hypothesis testing to solve problems.

**CO4: [K4]** Examine the concepts of random variables and probability distributions, analyze testing of hypothesis of large, small sample problems and service learning.

**CO5: [K5]** Evaluate the various parameters of probability distributions and justify the results of sampling theory, interpret the results from service learning.

## NUMERICAL ANALYSIS

**Code: UMA/CE /20**

**Semester: V**

**Hours: 75**

**Credits: 5**

### **Learning Objective:**

- To introduce various numerical techniques that are used for interpolation.
- To find approximate numerical solutions for equations and problems in calculus.

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

**CO1: [K2]** Explain the fundamental concepts of interpolation, numerical differentiation and integration.

**CO2: [K3]** Apply various numerical methods to obtain approximate solutions to calculus of finite differences.

**CO3: [K3]** Establish the results on calculus of finite differences and predict solutions using them.

**CO4: [K4]** Analyze and solve problems in calculus of finite differences.

**CO5: [K5]** Interpret and use appropriate method to solve numerical method problems.

## FUZZY MATHEMATICS

**Code:UMA/CE/16**  
**Semester: V**

**Hours:75**  
**Credits:5**

### **Learning Objective:**

To introduce Fuzzy Logic.  
To educate on application of Fuzzy Logic.

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

**CO1:[K2]** Explain the concepts and results of Fuzzy sets, relations, rules and defuzzification.

**CO2:[K3]** Apply different techniques to solve problems on Fuzzy logic.

**CO3:[K4]** Analyze statistical data by using fuzzy logic methods to get inferences.

**CO4:[K4]** Examine the process of fuzzification and defuzzification.

**CO5:[K5]** Evaluate the applications of Fuzzy logic.

## ASTRONOMY

**Code : UMA/CE/17**  
**Semester : V**

**Hours : 75**  
**Credits : 5**

### **Learning objective:**

- To understand the mathematical principles for astronomical phenomena such as seasons, phases of the moon, eclipses using spherical trigonometry.
- To provide a practical experience by viewing celestial objects through telescopes.

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

**CO1: [K2]** Outline the wide variety of objects contained in the Universe, the astronomical phenomena, the effects of refraction and parallax on the coordinates of a celestial body.

**CO2: [K3]** Use spherical trigonometry to define astronomical coordinate systems and study the effects of refraction and parallax on the coordinates of a celestial body and the astronomical phenomena.

**CO3: [K4]** Analyze the basic properties of celestial bodies, and explain the astronomical phenomena.

**CO4: [K4]** Compare the characteristics of objects contained in the Universe to examine the astronomical phenomena.

**CO5: [K5]** Justify the facts about the Universe.

## DISCRETE MATHEMATICS

**Code: UMA/CE/03**  
**Semester: VI**

**Hours: 75**  
**Credits: 5**

### **Learning Objective:**

- To introduce some aspects of Discrete Mathematics such as Logic; Boolean Algebra and its application to Switching Networks.
- To introduce Graph Theory which finds its applications in Computer Science.

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

- CO 1: [K2]** Describe basic concepts and properties of symbolic logics, Boolean algebra, Switching networks, Graph theory.
- CO 2: [K3]** Apply the concepts of discrete mathematics to interpret problems.
- CO 3: [K4]** Analyze propositions, networks and graphs to prove results.
- CO 4: [K4]** Examine problems in mathematical logic, Boolean algebra, Switching circuits, Graph theory and obtain inferences.
- CO 5: [K5]** Justify mathematical structures in symbolic logic, Boolean algebra, Switching Networks, Graph theory.

## **ADVANCED OPERATIONS RESEARCH**

**Code: UMA/CE/18**

**Hours: 75**

**Semester: VI**

**Credits: 5**

**(Proofs of theorems and derivations not included unless specified)**

### **Learning Objective:**

- To introduce queuing system, replacement problem, inventory control, project scheduling, theory of games and sequencing problem.
- To study different techniques of solving problems in network scheduling and game theory.

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

- CO1: [K2]** Explain fundamental concepts of queuing system, replacement problem, inventory control, network scheduling, game theory and sequencing problem.
- CO2: [K3]** Apply the different results for solving optimization problems.
- CO3: [K4]** Identify suitable methods to find solutions to problems in queuing system, inventory models, replacement models, network analysis, game theory and sequencing problem.
- CO4: [K4]** Analyze solutions to problems in queueing system, inventory models, replacement models, sequencing problem and inspect network analysis ,game theory with a probabilistic approach.
- CO5: [K5]** Recommend the best solution for the different optimization models.

## **TOPICS IN MECHANICS**

**Code: UMA/CE/13**

**Hours: 75**

**Semester: VI**

**Credits: 5**

### **Learning Objective:**

- To provide an in depth study in Forces on a rigid body, Centre of mass, Simple Harmonic Motion, Impact.
- An emphasis on problem solving techniques.

### **Course Outcomes:**

**On successful completion of the course, the learners will be able:**

- CO1: [K2]** Illustrate the basics concepts in forces on a rigid body, center of mass, simple harmonic motion and impact.
- CO2: [K3]** Identify the various techniques in forces on a rigid body, center of mass, simple harmonic motion and impact for proving results and solving problems.
- CO3: [K3]** Make use of the different properties in forces on a rigid body, center of mass, simple harmonic motion and impact as a systematic tool for problem solving.
- CO4: [K4]** Analyze the theorems in forces on a rigid body, center of mass, simple harmonic motion and impact.

**CO5: [K5]** Evaluate problems using the results in forces on a rigid body, center of mass, Simple harmonic motion and impact.

## **GRAPH THEORY**

**Code: UMA/CE/ 06**  
**Semester: VI**

**Hours: 75**  
**Credits: 5**

### **Learning Objective:**

- To introduce and use basic concepts and methods from the theory of graphs.
- To study some properties of graphs such as planarity and colourability.

### **Course Outcomes:**

**On successful completion of the course, the learners will be able:**

- CO1: [K2]** Summarize the basic concepts, properties of graphs, Eulerian, Hamiltonian and Trees.
- CO2: [K3]** Identify the various proof techniques in proving theorems in graph theory.
- CO3: [K3]** Apply the basic concept of graph theory and algorithms to solve problems.
- CO4: [K4]** Inspect the efficient use of properties of graphs, planarity and colourability.
- CO5: [K5]** Evaluate some real-time problems using concepts of graph theory.

## **PROGRAMMING IN C**

**Code: UMA/CE/19**  
**Semester: VI**

**Hours:75**  
**Credits:5**

### **Learning Objective:**

- To Introduce C language.
- To develop the programming skills in C.

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

- CO1: [K2]** Describe the built-in functions and operators.
- CO2: [K3]** Apply the concepts of data types and operators that formulates C programming.
- CO3: [K4]** Examine the usage of built - in and user defined functions in solving different problems.
- CO4: [K4]** Analyze the loops, decision making statements and iterative statements to solve the problems.
- CO5: [K5]** Construct programs to solve problems using C programming.

## **SERVICE LEARNING**

**Code: UMA/SL/01**  
**Semester: V**

**Hours: 15**  
**Credit: 1**

### **Learning Objective:**

- To give an opportunity to teach Mathematics creatively.
- To give an experience of the workplace.

### **Course Outcomes:**

- Skills in effective teaching and communication.
- Motivation to reach out to the society.

## **PROJECT**

**Code :UMA/EL/12**

**Hours: 30**



**Semester: V/VI**

**Credits:2**

**Learning Objective:**

- To explore the applications of Mathematical concepts studied in the Core/ Core Elective papers.
- To practically use these applications and present a report of the findings.

**Course Outcomes:**

- Skill to apply different mathematical techniques to find solutions to problems.
- Ability to learn and work independently and creatively.

## **FORMAL LANGUAGES AND AUTOMATA**

**Code: UMA/SS/02**

**Hours: 30**

**Semester: V**

**Credits: 2**

**Learning Objective:**

- To introduce an important area of study in Computer Mathematics.
- To explore new concepts.

**Course Outcomes:**

- Ability to learn independently.
- Understand the basic concepts of Formal Languages and Automata

## **NUMERICAL METHODS I ( for Mathematics major)**

**Code: UMA/SE/13**

**Hours: 90**

**Semester: I**

**Credits:5**

**(Derivations and proofs of theorems not required)**

**Learning Objectives :**

- To understand and demonstrate numerical techniques to obtain solutions of various mathematical problems.
- To develop the ability to problem solving skills in analysing and evaluating the accuracy of numerical methods.

**Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

**CO1: [K2]** Explain the concepts of solutions of equations, difference operators and interpolation.

**CO2: [K3]** Apply various techniques to solve algebraic and transcendental equations , finite difference equation and problems in interpolation.

**CO3: [K3]** Demonstrate the utilization of formulae, results to compute solutions of algebraic and transcendental equations , finite difference equation and problems in interpolation .

**CO4: [K4]** Identify methods to solve problems in algebraic and transcendental equations, finite difference equation and interpolation.

**CO5: [K4]** Analyse problems to solve algebraic and transcendental equations , finite difference equation and interpolation.

## **NUMERICAL METHODS II ( for Mathematics major)**

**Code: UMA/SE/14**

**Hours: 105**

**Semester: II**

**Credits:5**

**(Derivations and proofs of theorems not required)**

**Learning Objectives :**

- To understand and demonstrate numerical techniques in calculus of finite differences
- To develop the ability to problem solving skills in analysing and evaluating the accuracy of numerical methods.

**Course Outcomes:**

**On successful completion of the course, the learners will be able to :**

- CO1: [K2]** Explain the fundamental concepts of numerical differentiation , integration , difference equations and differential equations
- CO2: [K3]** Apply various techniques to solve numerical differentiation , integration , difference equations and differential equations problems
- CO3: [K3]** Demonstrate the utilization of formulae and methods to compute solutions of numerical differentiation , integration , difference equations and differential equations problems
- CO4: [K4]** Identify methods to solve problems in numerical differentiation , integration, difference equations and differential equations
- CO5: [K4]** Analyse problems in numerical differentiation , integration and differential equations and obtain the solution.

**GENERAL MATHEMATICS I  
(for Chemistry & Computer Science major)**

**Code: UMA/SE/11**

**Hours: 90**

**Semester: I**

**Credits: 5**

**(No derivations are required)**

**Learning Objective:**

- To present the different methods in solving problems in Calculus.
- To introduce the fundamental concepts of Theory of equations ,Matrices and Summation of Series.

**Course Outcomes:**

**On successful completion of the course, the learners will be able to :**

- CO1: [K2]** Explain the fundamental concepts of Calculus and Algebra
- CO2: [K3]** Apply various techniques to obtain solutions to problems in differentiation, integration, theory of equations, matrices, special series
- CO3: [K3]** Demonstrate the utilization of results in evaluating problems
- CO4: [K4]** Examine and identify methods to compute solutions to problems
- CO5: [K4]** Analyse problems in differentiation, integration, algebra and solve them

**GENERAL MATHEMATICS II  
(For Chemistry and Computer Science majors)**

**Code: UMA/SE/12**

**Hours: 105**

**Semester: II**

**Credits: 5**

**(Proofs of the theorems are not required unless otherwise specified)**

**Learning objective:**

- To apply the integral methods in Fourier series and to extend the knowledge of integrals by introducing improper integrals.
- To present different methods of solving problems in Differential equations.
- To introduce the fundamental concepts of Laplace transforms, Expansions of Trigonometric Functions and Linear Transformations.

**Course Outcomes:****On successful completion of this course, the learners will be able to**

- CO1: [K2]** Discuss the fundamental concepts of Calculus in solving differential equations, Laplace Transforms, Fourier Series and Algebra in evaluating improper integrals, Matrices in linear transformation and Trigonometry in the expansions of trigonometric functions
- CO2: [K3]** Solve the differential equations, classify the linear transformation, express function as series, use Beta and Gamma functions in the evaluation of improper integrals and determine the expansions for trigonometric functions.
- CO3: [K3]** Apply the various mathematical techniques in solving problems.
- CO4: [K4]** Examine the methods in solving differential equations and improper integrals, in finding transformations, and expanding functions (fourier series and trigonometric functions)
- CO5: [K4]** Analyse problems solving in calculus, Matrices and Trigonometry.

**APPLIED MATHEMATICS - I****(for Physics major)****Code: UMA/SU/15M****Semester: III****Hours: 90****Credits: 5****(No proofs are required)****Learning Objective:**

- To introduce successive differentiation, integration of rational and irrational functions.
- To study the concepts of Vector Calculus, Matrices and their applications.

**Course Outcomes:****On successful completion of the course, the learners will be able to:**

- CO1: [K2]** Explain the fundamental concepts of Calculus, Matrices, Series and Vectors.
- CO2: [K3]** Apply various techniques to obtain solutions to problems in Calculus, Vectors, Matrices and Series.
- CO3: [K3]** Examine the utilization of results in evaluating problems.
- CO4: [K4]** Analyse and solve problems in Calculus, Vectors, Matrices and Series.
- CO5: [K5]** Determine the methods to solve different problems involving Calculus, Matrices, Series and Vectors.

**APPLIED MATHEMATICS - II****(for Physics major)****Code: UMA/SU/16****Semester: IV****Hours: 90****Credits: 5****(No proofs are required)****Learning Objective:**

- To introduce fundamental concepts of differential equations, Laplace transforms and complex variables.
- To develop problem solving skills.

**Course Outcomes:****On successful completion of the course, the learners will be able to:**

- CO1: [K2]** Describe fundamental concepts of Differential equations, Laplace transforms and Complex analysis.
- CO2: [K3]** Apply different methods in Differential Equations, Laplace transforms and Complex integration to compute solutions to problems.
- CO3: [K3]** Examine the utilization of results in evaluating problems.
- CO4: [K4]** Evaluate problems in Differential Equations, Laplace transforms and Complex integration to obtain their solution.

**CO5: [K5]** Determine methods to solve different problems involving Differential Equations, Laplace transforms and Complex integration

## **LINEAR PROGRAMMING**

**Code: UMA/NM/03**

**Semester: III**

**Hours: 30**

**Credits: 2**

**(Derivations and proof of theorems are not included)**

**Learning Objective:**

- To present the formulation and solution of LPP using graphical method.
- To introduce methods to solve Transportation and Assignment Problems.

**Course Outcomes:**

**On successful completion of this course, the learners will be able to:**

**CO1: [K2]** Describe the basic concepts of linear programming.

**CO2: [K3]** Apply Mathematical methods in solving Linear Programming Problem.

**CO3: [K3]** Identify and solve the problems using optimization techniques

**CO4:[K4]** Analyze the verbal description of the real system to a linear programming Problem

**CO5: [K4]** Examine the optimal solution obtained from graphical method, transportation and assignment problems.

## **POPULAR ASTRONOMY**

**Code:UMA/NM/04**

**Semester: IV**

**Hours:30**

**Credits: 2**

**(As this course is offered to students of any major subject, spherical trigonometry, derivations of results and formulae are not included)**

**Learning objective:**

- To provide the knowledge about celestial objects like sun, moons, planets, stars and explain the occurrence of eclipses and seasons.
- To provide a practical experience by viewing celestial bodies through telescopes.

**Course Outcomes:**

**On successful completion of this course, the learners will be able to:**

**CO1: [K2]** List the basic coordinates of celestial objects and Identify major constellations

**CO2: [K2]** Summarize the overall properties of the celestial objects and appreciate the wide variety of objects contained in the Universe.

**CO3: [K3]** Classify the occurrences of the celestial phenomena

**CO4: [K3]** Examine the facts about the Universe .

**CO5: [K4]** Compare the characteristics of celestial bodies, and explain the astronomical phenomena.

## **STATISTICS USING R**

**Code: UMA/NM/05**

**Semester: III**

**Hours: 30**

**Credits: 2**

**Learning Objective:**

- To introduce elementary methods of representing data, simple measures such as averages and dispersion and correlation to find the relationship between two variables.
- To create skills in analyzing the data using an open - source software R.

**Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

**CO1: [K2]** Explain the command and functions of R programming for basic parameters in Statistics.

**CO2: [K3]** Demonstrate the utilization of R – commands to evaluate problems and to plot

statistical graphs.

**CO3: [K3]** Construct R – commands to find measures of central tendency, dispersions and correlation analysis.

**CO4: [K4]** Analyse problems and infer solutions using R – programming.

**CO5: [K5]** Evaluate statistical problems to obtain solutions using R – programming.

## **MATH SKILLS IN EVERYDAY LIFE**

**Code: UMA/NM/06**

**Hours: 30**

**Semester: IV**

**Credits: 2**

### **Learning Objective:**

- To build critical thinking, problem-solving ability, reasoning
- To understand the significant role of Maths in every aspect of life

**Course Outcomes:****On successful completion of this course, the learners will be able to:****CO1: [K2]** understand the concepts of numbers, percentage, average and interpretation of data**CO2: [K3]** Use the formulae and data to find the solution**CO3: [K3]** Identify the problem and discovering the answer**CO4:[K4]** Categorize numbers, simplification, percentage, average and data interpretation and working out properly.**CO5: [K4]** Examine and evaluate the problems on numbers, simplification, percentage, average and data interpretation

## QUANTITATIVE REASONING

**Code: UMA/SK/01****Hours: 45****Semester: IV****Credits: 3****Learning objective:**

- To develop the skill of reasoning applied to numerical problems.
- To enable students to prepare for competitive examinations.

**Course Outcomes:****On successful completion of the course, the learners will be able to :****CO1: [K2]** Explain the fundamental concepts of solving problems involving Basic Mathematics**CO2: [K3]** Apply various techniques to obtain solutions to numerical problems**CO3: [K3]** Illustrate the utilization of results in solving problems**CO4: [K4]** Analyze and obtain inferences from problems**CO5: [K4]** Examine and identify methods to solve problems in Quantitative Aptitude.

## QUANTITATIVE AND LOGICAL REASONING

**Code: UMA/SK/03****Hours: 45****Semester: IV****Credits: 3****Learning Objective:**

- To present the different skills to solve problems on Numbers, Ages, Time and Distance , Trains, Coding and Decoding tests, Analytical Reasoning tests.
- To enable students to prepare for competitive examinations.

**Course Outcomes:****On successful completion of the course, the learners will be able to :****CO1: [K2]** Explain the fundamental concepts of solving problems involving Basic Mathematics and Logical Reasoning**CO2: [K3]** Apply various techniques to obtain solutions to numerical problems, Coding and decoding tests, Analytical Reasoning Tests**CO3: [K3]** Illustrate the utilization of results in solving mathematical and reasoning problems**CO4: [K4]** Examine and identify methods to solve problems in Quantitative Aptitude and logical Reasoning**CO5: [K4]** Analyse problems mathematically and logically to obtain inferences from them

## MATHEMATICAL OPEN SOURCE SOFTWARE AND INFORMATION SECURITY

**Code: UMA/SK/ 04****Hours: 45****Semester: V****Credits:3**

**Learning Objective:**

- To enable students to use their skills in the application of software in solving Mathematical problems.
- To provide an opportunity to acquire hands-on-training in the application of software for research using Statistics.

**Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

- CO1: [K2]** Describe the basic commands and functions of maxima, R programming and fundamental concepts of information security.
- CO2: [K3]** Demonstrate the utilization of maxima and R programming to evaluate problems and to plot graphs.
- CO3: [K3]** Construct maxima and R – commands to find solutions to numerical and statistical problems, identify problems related to information security.
- CO4: [K4]** Analyse problems and infer solutions using maxima and R – programming, deduce solutions to cyber threats.
- CO5: [K4]** Examine numerical and statistical problems using maxima and R – programming.

## **LOGICAL REASONING AND INFORMATION SECURITY**

**Code: UMA/SK/06**

**Hours: 45**

**Semester: V**

**Credits: 3**

**Learning Objective:**

- To develop the skill of reasoning applied to simple logical and non-verbal problems and to enable students to prepare for competitive examinations.
- To create awareness of the threats faced and to highlight the importance of information security.

**Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

- CO1: [K2]** Explain the fundamental concepts of solving problems involving verbal and non-verbal reasoning and information security.
- CO2: [K3]** Apply different techniques to obtain solutions to verbal and non-verbal reasoning.
- CO3: [K3]** Identify the relations, patterns in verbal and non-verbal reasoning problems and security related to information technology.
- CO4: [K4]** Inspect problems and infer solutions to verbal, non-verbal reasoning, and cyber threats
- CO5: [K4]** Estimate solutions for problems in logical reasoning

## DEPARTMENT OF PHYSICS PROGRAM SPECIFIC OUTCOMES

**On successful completion of Bachelor of Science in Physics, the student will be able to:**

- PSO1:** Demonstrate knowledge of the theoretical physics concepts and exhibit proficiency in performing experiments in the laboratory.
- PSO2:** Communicate scientific information and innovative ideas in oral, written and graphical forms.
- PSO3:** Exhibit moral, ethical and social values in all walks of life, and avoid unethical behaviour in assessments, laboratory work, research activities, reports and internships.
- PSO4:** Employ theoretical concepts and critical reasoning ability with physical, mathematical and technical skills to solve problems, acquire data, analyse their physical significance and explore new design possibilities.
- PSO5:** Utilize a wide range of electronic resources and digital tools and techniques to interpret various theories and present their findings.
- PSO6:** Demonstrate aptitude skills and deep understanding of recent developments in physics acquired through curriculum, LDC, MOOC learning, internships, field visits, field projects and co-curricular activities to qualify for higher education, research and career in reputed organizations at national and international level.
- PSO7:** Excel in skills with competence required for leadership and working collaboratively in a multidisciplinary environment.
- PSO8:** Evince technological and entrepreneurial skills that are relevant to Physics-related job trades and employment opportunities.
- PSO9:** Demonstrate social empathy and act with an informed awareness of issues using concepts of applied physics and principles of service-learning for the betterment of community.
- PSO10:** Be spiritually inclined and become responsible citizens and sensible stewards.

### Mapping of Program Specific Outcomes (PSOs) with Program Outcomes (POs)

PSOs										
POs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10





**PROPERTIES OF MATTER AND SOUND**  
**(2018-2021 Batch onwards)**

**Code: UPH/CO/41M**  
**Semester: I**

**Hours: 60**  
**Credit: 4**

**Learning objectives:**

This course intends to

- provide an in-depth understanding of properties of materials, namely elasticity and viscosity, gravitation and also the properties of oscillations and waves
- introduce the study of free, damped and forced oscillations and their applications to waves in fluids, solids, air columns and strings, acoustics of buildings and Doppler effect

**Course outcomes:**

On successful completion of this course, the learners will be able to

**CO1: [K1]** explain basic concepts related to properties of matter, gravitation, waves, sound and acoustics

**CO2: [K2]** discuss the theories and illustrate various methods and experiments used for the study of materials, wave properties, propagation of sound and acoustics

**CO3: [K3]** solve problems related to these topics in properties of matter, gravitation and sound using the theoretical knowledge acquired

**CO4: [K4]** analyse the behaviour of materials, fluids, waves and gravitational effects under various conditions

**CO5: [K5]** assess and compare material properties and acoustics in buildings

**INSTRUMENTATION AND PRACTICAL PHYSICS – I**  
**(2022-2025 Batch onwards)**

**Theory cum Practical**

**Code : UPH/CO/50**  
**Semester: I & II**

**Theory: 30 + 30 = 60 Hours**  
**Practical: 30+45 = 75 Hours**  
**Credits : 3+3**

**Learning Objectives:**

This course aims to

- introduce various basic experimental techniques to acquire physical data systematically, use the data to determine experimental results, and interpret the findings using relevant scientific framework
- enable students to acquire theoretical knowledge and practical skills in the use of workshop machines and laboratory instrumentation
- introduce the real time data collection and its analysis using sensors
- provide theoretical knowledge of the working and application of various instrumentation devices for measurements of physical entities involved

**Course Outcomes:**

On successful completion of this course, the learners will be able to:

**CO1: [K2]** explain the construction, working of measuring instruments and transducers along with their applications

**CO2: [K3]** apply the theoretical and practical knowledge of workshop machines and laboratory instruments to perform experiments skilfully and acquire data

**CO3: [K4]** analyze the data acquired, present them graphically and compare the results obtained with the results from calculations

**CO4: [K5]** validate experimental results based on the accepted standard values and deduce meaningful conclusions from the laboratory findings

**CO5: [K6]** design and construct different objects and models from the theoretical and practical knowledge of various carpentry tools and machineries

**MECHANICS AND FUNDAMENTALS OF CLASSICAL PHYSICS**

(2018 – 2021 Batch onwards)

**Code: UPH/CO/42M**

**Hours: 60**

**Semester: II**

**Credits: 4**

**Learning Objectives:**

This course intends to

- train the students to apply the laws of motion to straight line and curvilinear motions of particles as well as to extended objects and their interactions
- equip students to analyze mechanical systems and solve numerical problems in dynamics
- give an insight into the fundamentals of Classical Mechanics

**Course Outcomes:**

On successful completion of the course, the learners will be able to

**CO1: [K1]** describe the fundamental principles, laws and concepts of mechanics such as vector quantities, projectile motion, impulse and impact, kinematics, rigid dynamics, moment of inertia and classical mechanics

**CO2: [K2]** discuss the principles, concepts and theories in mechanics and classical physics

**CO3: [K3]** apply the concepts learnt in mechanics and classical physics to real-life situations and use mathematical knowledge to effectively solve problems

**CO4: [K4]** analyze a variety of physical phenomena with laws of mechanics and classical physics to lay the foundations for engineering applications

**CO5: [K5]** justify the observations and interpretations in topics related to mechanics and classical physics

## ATOMIC PHYSICS AND LASERS

(2018 – 2021 Batch onwards)

**Code: UPH/CO/34M**

**Semester: III**

**Hours: 60**

**Credits: 4**

### Learning Objectives:

This course aims to

- provide a framework for understanding the physics of atoms, molecules and their structures
- introduce various types of lasers and their applications in different fields including holography

### Course Outcomes:

On successful completion of the course, the learners will be able to:

**CO1: [K1]** describe effectively the basic theory and concepts of atomic physics and lasers

**CO2: [K2]** discuss the experimental methods with relevant theory and interpret their results to study the particle properties of waves, atomic structure, spectra and laser production techniques

**CO3: [K3]** apply the concepts learnt in atomic physics and lasers to real-life situations and use mathematical knowledge to effectively solve problems

**CO4: [K4]** appraise and compare the theoretical models and working principles used in atomic physics and lasers

**CO5: [K5]** justify the observations and interpretations in topics related to atomic physics and lasers

## THEORY OF ERRORS AND PRACTICAL PHYSICS – II

(2019-2022 Batch onwards)

(Theory cum Practical)

**Code : UPH/CO/47**

**Theory: Semester III**

**Practical: Semesters III & IV**

**Theory: 15 Hours**

**Practical: 90 Hours**

**Credits: 1+3**

### Learning Objectives:

This course aims to

- introduce the concepts of theory of errors and probability distributions with an emphasis on application in physics experiments
- provide the students an opportunity to further develop their practical skills in the use of workshop machines and sensors
- train students to use various experimental techniques and skills to acquire physical data accurately, determine experimental results
- enable them to interpret the experimental findings and correlate them with the relevant theory
- carry out service-learning project by identifying the community needs, and applying the in-depth knowledge of physics curriculum.

### Course Outcomes:

On successful completion of the course, the learners will be able to

**CO1: [K2]** explain the theory of error analysis and probability distributions and demonstrate the use of mechanical, electrical, optical and electronic instruments required for performing experiments in this course

**CO2: [K3]** apply the theoretical and practical knowledge of laboratory instruments and workshop machines to perform experiments skilfully and acquire data compute the results and represent them graphically

**CO3: [K4]** analyze the data acquired, present them graphically and compare the graphical results with the results

from

calculations

**CO4: [K5]** estimate the percentage of errors in the experimental values applying the theory of error analysis

**CO5: [K5]** develop physics resources for the community and evaluate the impact of community service in their learning process

## **OPTICS AND SPECTROSCOPY**

**(2018-2021 Batch onwards)**

**Code: UPH/CO/43M**

**Hours: 75**

**Semester: IV**

**Credits: 4**

### **Learning Objective:**

This course aims to

- provide students with a thorough knowledge of propagation and interaction of light with matter, and geometrical and physical optics
- impart an in-depth understanding of various spectroscopic techniques, instrumentation and interpretation of spectroscopic data that serve as an important tool in the analysis of atoms, molecules and compounds

### **Course Outcomes:**

On successful completion of the course, learners will be able to

**CO1: [K1]** relate the fundamental concepts of geometrical and physical optics and the interaction between electromagnetic radiation and matter

**CO2: [K2]** discuss the theories, demonstrate various methods, experiments and instrumentation in optics and spectroscopy

**CO3: [K3]** apply problem-solving skills in optics and spectroscopy by selecting appropriate equations and performing numerical calculations

**CO4: [K4]** analyse the different kinds of atomic and molecular spectra and the effect of various phenomena of light such as polarization, interference diffraction and optics

**CO5: [K5]** assess and compare the behaviour of light in optics and in spectroscopic studies.

## **ELECTRICITY AND MAGNETISM**

**(2017-2020 Batch onwards)**

**Code: UPH/CO/44**

**Hours: 60**

**Semester: V**

**Credits: 4**

### **Learning Objective:**

This course aims to describe the fundamental processes of Electricity and Magnetism and relate them to the development of Electromagnetic wave theory, solve numerical problems related to these theories and apply these concepts to understand the working of electrical instruments.

### **Course Outcomes:**

On successful completion of this course, the student will be able to

**CO1: [K1]** describe effectively the fundamental laws, theorems and concepts of electricity and magnetism

**CO2: [K2]** discuss the principles, theories and applications in electricity and magnetism

**CO3: [K3]** formulate and solve problems in electricity, magnetism and electronics based on the concepts learnt from this course

**CO4: [K4]** analyse the concepts of electricity with real life situations and magnetic materials used in daily life

**CO5: [K5]** justify the observations and interpretations in topics related to electricity and magnetism

# **GENERAL ELECTRONICS**

**(2005-2008 Batch onwards)**

**Code: UPH/CO/19M**

**Hours: 60**

**Semester: V**

**Credits: 4**

## **Learning Objective:**

This course aims to provide adequate knowledge of the principles of electronics, constructional features and characteristics of various semiconducting devices and their applications.

## **Course Outcomes:**

On successful completion of this course, the learners will be able to

**CO1: [K1]** explain the fundamental concepts and principles of semiconductor devices

**CO2: [K2]** illustrate the principles, characteristics and working of semiconductor devices and their applications

**CO3: [K3]** apply theoretical knowledge to solve problems related to semiconductor devices.

**CO4: [K4]** analyse various semiconductor electronic circuits and determine the outputs

**CO5: [K5]** assess various electronic circuits to suit specific applications.

## DIGITAL ELECTRONICS

(2005-2008 Batch onwards)

**Code: UPH/CO/20M**

**Hours: 60**

**Semester: V**

**Credits: 4**

### Learning Objectives:

This course aims to

- introduce to students the laws and theorems of Boolean algebra, K-map simplification and flip flops and applications
- enable them to design logic circuits based on the given truth tables and simplified expressions
- train them to analyse digital and analog data processing circuits

### Course Outcomes:

On successful completion of this course, the student will be able to

**CO1: [K2]** outline the fundamental concepts and principles of digital electronics and operational amplifiers and explain the operations of combinational and sequential logic circuits, registers, counters, operational amplifier circuits and D/A and A/D converters

**CO2: [K3]** solve problems associated with codes and number systems, binary arithmetic, Boolean algebra and operational amplifiers

**CO3: [K4]** analyze digital circuits using the laws and mapping tools, and examine the functions of op-amp data conversion circuits

**CO4: [K5]** determine the outputs of given logic and op-amp circuits based on concepts learnt in this course

**CO5: [K6]** design digital electronic and op-amp circuits for various operations using concepts learnt in this course.

## THERMODYNAMICS AND STATISTICAL PHYSICS

(2012-2015 Batch onwards)

**Code: UPH/CO/29**

**Hours: 60**

**Semester: V**

**Credits: 4**

### Learning objectives:

This course aims to

- provide an exposure to the laws of thermodynamics, thermodynamical quantities and their applications
- enable students understand the properties of macroscopic systems using the knowledge of properties of individual particles through the statistical distribution laws

### Course outcomes:

On successful completion of this course, the learners will be able to

**CO1: [K1]** outline the physical laws and principles in thermal and statistical Physics

**CO2: [K2]** explain the theories and experiments in statistical physics and thermodynamical applications

**CO3: [K3]** solve problems using the laws of thermodynamics, classical, quantum and statistical physics

**CO4: [K4]** analyse the theories and laws of thermodynamics and statistical physics and their application in diverse areas of physics

**CO5: [K4]** compare the outcomes of relevant theories applied to various particles and systems.

## PRACTICAL PHYSICS –III

(For 2019-2022 Batch onwards)

**Code : UPH/CO/48**

**Hours: 60**

**Semester: V**

**Credits: 2**

**Learning Objectives:**

This course aims to

- enable students gain hands-on experience in experimental physics and correlate findings with the theoretical concepts learnt during their undergraduate degree programme
- provide students opportunity to perform experiments at an advanced level and prepare them for higher studies and quality research work

**Course Outcomes:**

On successful completion of this course, the learners will be able to

**CO1: [K2]** associate the instructions specified in the lab manual with the experimental set up provided to them to perform experiments in optics, sound, electricity, magnetism and electronics

**CO2: [K3]** make use of the required laboratory instruments skilfully to achieve the aim of the experiments through individual hands-on experience

**CO3: [K3]** apply the theoretical and practical knowledge to carry out general and electronics experiments, and real time experiments using sensors to acquire necessary data

**CO4: [K4]** analyse and report the results accurately by performing necessary calculations with the recorded data and representing them graphically

**CO5: [K5]** verify the experimental results with the theoretical predictions and draw meaningful conclusions to the laboratory findings.



## **Quantum Mechanics** **(2005-2008 Batch onwards)**

**Code: UPH/CO/21**  
**Semester: VI**

**Hours: 60**  
**Credits: 4**

### **Learning objectives:**

This course aims to

- introduce the concepts of wave mechanics, dual nature of matter, operator formalism, the uncertainty relations, Schrödinger equation and its application to one and three dimensional systems
- help students understand various observed phenomena in the atomic and subatomic regions, and their explanations based on quantum mechanics

### **Course outcomes:**

On successful completion of this course, the learners will be able to

**CO1: [K1]** recall the inadequacy of classical mechanics, development of wave mechanics and concepts of dual nature of matter, its consequences, uncertainty principle, operators and Schrodinger's equation

**CO2: [K2]** discuss the theories based on matter waves, wave mechanics, uncertainty principle, operator formalism and Schrodinger's equation and applications and also illustrate various methods and experiments for study of matter waves

**CO3: [K3]** apply the concepts and principles of quantum mechanics learnt in all the topics of this course to solve problems and calculate observables

**CO4: [K3]** solve Schrodinger's equation for one dimensional and spherical potential systems

**CO5: [K4]** analyse certain behaviour and natural phenomena observed at the subatomic level using the quantum theoretical background

## **NUCLEAR AND PARTICLE PHYSICS** **(2017-2020 Batch onwards)**

**Code: UPH/CO/45M**  
**Semester: VI**

**Hours: 60**  
**Credits: 4**

### **Learning Objectives:**

This course aims to

- introduce the students to the subatomic world of particles and their interactions
- give an understanding about the four forces, nuclear fusion and nuclear fission and their applications

### **Course Outcomes:**

On successful completion of the course, the learners will be able to

**CO1: [K2]** outline the fundamental concepts of nuclear physics and elementary particles and their interactions in an analytical and quantitative way

**CO2: [K2]** explain the laws, concepts, models and theories related to various physical phenomena in nuclear and particle physics

**CO3: [K3]** formulate and solve mathematical problems regarding the nuclear and particle Physics and identify their limitations in nature

**CO4: [K4]** analyse the theories of nuclear physics which are transferable to wider applications in areas including medicine, power production and security and also compare the elementary particles

**CO5: [K5]** justify the observations and interpretations in topics related to nuclear and particle Physics

## **RELATIVITY AND MATHEMATICAL PHYSICS**

**(2004-2007 Batch onwards)**

**Code: UPH/CO/14M**

**Hours: 60**

**Semester: V1**

**Credits: 4**

### **Learning Objectives:**

This course aims to

- enable students gain an understanding of special theory of relativity using Cartesian coordinates and geometric space-time and apply it to relativistic dynamics, kinematics and electromagnetic wave theory
- provide a basic understanding of the postulates and fundamental concepts of general theory of relativity
- introduce the essential special functions of mathematical physics represented as specified solutions of differential equations, series, recurrence relations and generating functions

### **Course Outcomes:**

On successful completion of this course, the learners will be able to

**CO1: [K1]** recognize and recall the principles of general and special relativity and to special functions such as Bessel, Hermite, Laguerre and Legendre polynomial

**CO2: [K2]** explain the essential theories, experiments and phenomena related to relativity and special functions in mathematical physics

**CO3: [K3]** apply problem-solving skills in relativity and mathematical physics

**CO4: [K4]** analyze the causes and outcomes of various concepts of relativity and special mathematical functions learnt in this course.

**CO5: [K5]** compare and justify the outcomes and applications of various principles in relativity and mathematical physics

## **PRACTICAL PHYSICS - IV**

**(For 2019-2022 Batch onwards)**

**Code : UPH/CO/49**

**Semester: VI**

**Hours: 90**

**Credits: 3**

### **Learning Objectives:**

This course aims to

- enable students gain hands-on experience in experimental physics and correlate findings with the theoretical concepts learnt during their undergraduate degree programme
- provide students opportunity to perform experiments at an advanced level and prepare them for higher studies and quality research work

### **Course Outcomes:**

On successful completion of this course, the learners will be able to

**CO1: [K2]** associate the instructions specified in the lab manual with the experimental set up provided to them to perform experiments in optics, sound, electricity, magnetism and electronics

**CO2: [K3]** make use of the required laboratory instruments skilfully to achieve the aim of the experiments through individual hands-on experience

**CO3: [K3]** apply the theoretical and practical knowledge to carry out general and electronics experiments and acquire necessary data

**CO4: [K4]** analyse and report the results accurately by performing necessary calculations with the recorded data and representing them graphically

**CO5: [K5]** verify the experimental results with the theoretical predictions and draw meaningful conclusions to the laboratory findings.

## **MICROPROCESSOR 8085 AND MICROCONTROLLER**

**(2017-2020 Batch onwards)**

**(Theory cum Practical)**

**Code: UPH/CE/26**

**Semester: V/VI**

**Theory cum practical: 75 Hours**

**Credits: 5**

### **Learning Objectives:**

This course aims to

- impart an in-depth understanding of architecture of microprocessor 8085, memory and interfacing devices
- enable students to apply programming techniques with the knowledge of the instruction set, memory system and various interfacing devices, and develop assembly language programs
- provide knowledge on 8051 microcontroller, ATmega328, LDR, LM35, LED and their applications

**Course Outcomes:**

On successful completion of the course, the learners will be able to:

**CO1: [K2]** explain in detail the software and hardware of 8085 Microprocessor, hardware of 8051 microcontroller and AT-Mega 328

**CO2: [K2]** illustrate the interfacing of peripheral devices with 8085 microprocessors

**CO3: [K3]** apply the software instructions to write efficient programs

**CO4: [K4]** distinguish and analyse the features of 8085 microprocessor and 8051 microcontroller.

**CO5: [K4]** compare and contrast the various operations of 8085 microprocessor and 8051 microcontroller.

## **MEDICAL AND RADIATION PHYSICS**

**(2017-2020 Batch onwards)**

**Code: UPH/CE/29**

**Semester: V/VI**

**Hours:75**

**Credits: 5**

**Learning Objectives:**

This course aims to

- provide a solid background of the physics principles underlying imaging technologies used in radiology and medical instrumentation
- create awareness on radiation safety practices and procedures associated with hospital environment and patient safety
- provide field exposure to students through project work which is designed to enable practical application of their theoretical knowledge of the concepts
- impart students with skills necessary to find higher educational or career opportunities in academic institutions, laboratories and industry related to medical physics

**Course Outcomes:**

On successful completion of this course, the learners will be able to:

**CO1: [K1]** relate the fundamental knowledge of mathematics, physics, chemistry and biology to the various medical instruments, medical imaging and radiography techniques.

**CO2: [K2]** explain the functioning of transducers, electrodes, and various medical instrumentations and concepts in biometrics, patient safety, bioelectric potentials, radiation, nuclear medicine.

**CO3: [K3]** apply the knowledge of physical laws to a variety of medical systems and human physiology.

**CO4: [K4]** analyse the behaviour and causes of various physiological entities, and use of instruments in the field of medicine.

**CO5: [K5]** justify ethical, social and safety issues concerning medical and radiation physics.

## **SOLID STATE PHYSICS**

**(2017-2020 Batch onwards)**

**Code: UPH/CE/27**

**Semester: VI**

**Hours:75**

**Credits : 5**

### **Learning Objectives:**

This course aims to

- provide introduction to basic concepts in Solid State Physics
- give an in-depth description of crystal, electronic structure and lattice dynamics of materials based on the theories of classical and quantum physics

### **Course Outcomes:**

On successful completion of this course, the learners will be able to

**CO1: [K1]** outline the fundamental concepts related to crystalline structures, their imperfections, lattice dynamics and metals

**CO2: [K2]** explain the theories relevant to crystalline structures, lattice dynamics and metals

**CO3: [K3]** solve problems pertinent to the topics studied in this course

**CO4: [K4]** analyse the properties of various crystal structures and metals

**CO5: [K4]** compare the structural properties of crystals and electronic properties of metals.

## **NANOSCIENCE AND NANOTECHNOLOGY**

**(2017 – 2020 Batch onwards)**

**Code: UPH/CE/28**

**Semester: V/VI**

**Hours: 75**

**Credits: 5**

### **Learning Objectives:**

This course intends to

- offer an overall understanding of Nanoscience and Nanotechnology, starting from the basics
- introduce different types of nanomaterials, their properties, various fabrication methods, characterization techniques and a wide range of applications in the current scenario

### **Course Outcomes:**

On successful completion of the course, the learners will be able to:

**CO1: [K1]** describe the fundamental principles of nanoscience, nanotechnology and quantum mechanical concepts governing the behaviour of nanomaterials

**CO2: [K2]** explain the fabrication techniques and characterization techniques used for nanomaterials, properties of nanomaterials and their usefulness

**CO3: [K3]** apply their knowledge of nanostructures to choose the right method to synthesize, characterize and study the properties of nanomaterials

**CO4: [K4]** classify and distinguish nanomaterials based on their properties and applications

**CO5: [K5]** appraise the fascinating properties of nanomaterials that are superior to their bulk counterparts and their applications in different fields such as medicine, energy, sensors and nanoelectronics.

## **ASTROPHYSICS AND ASTRONOMY**

**(2017-2020 Batch onwards)**

**Code: UPH/CE/30**

**Hours: 75**

**Semester: V/VI**

**Credits: 5**

### **Learning Objectives:**

This course intends to

- impart in-depth knowledge within the defined areas of astrophysics, astronomy and astrophysical processes related to various celestial phenomena
- familiarize students with telescopes and auxiliary instruments used for astronomical observations or detections within the electromagnetic spectrum
- expose students to necessary developments on present-day astrophysics in order to stimulate scientific interest
- train students to establish competence in taking up possible career paths in astronomy and astrophysics

### **Course Outcomes:**

On successful completion of the course, learners will be able to

**CO1: [K1]** outline the basic concepts of astrophysics and astronomy

**CO2: [K2]** explain the theory of telescopes, sun, moon, stars, solar system, asteroids, comets, meteors, meteorites, galaxies and cosmology

**CO3: [K3]** apply the physics concepts related to telescopes and celestial bodies

**CO4: [K4]** compare and contrast the various astronomical phenomena and the tools of astronomers

**CO5: [K5]** justify the various astronomical occurrences and selection of suitable telescopes for optical astronomy

## **MATHEMATICAL PHYSICS**

**(Learner Designed Course)**

**Course code: UPH/LD/47**

**Hours: 45**

**Semester:**

**III/V**

**Credits: 3**

### **Learning Objectives:**

This course aims to familiarize one with certain mathematical methods that are essential for solving problems in theoretical physics.

**Course Outcomes:**

On successful completion of the course, the learners will be able to

**CO1: [K1]** recall the principles of Beta, Gamma function, Fourier Transform, Tensor analysis and linear vector spaces

**CO2: [K2]** explain the essential theories of the topics studied in mathematical physics

**CO3: [K3]** apply integral transformation to solve domain problems in frequency domain.

**CO4: [K3]** apply problem-solving skills to problems which are subjected to boundary conditions, tensors, and vector spaces.

**CO5: [K4]** analyse the outcome of the physical problems solved and discuss its physical significance.

**FLUID MECHANICS**

(Learner Designed Course)

**Code: UPH/LD/48**

**Hours: 45**

**Semester: III**

**Credits: 3**

**Learning Outcomes:**

This course intends to give knowledge about the basics of fluid mechanics, the properties of fluid, fluid statics, in-viscid and compressible flows.

**Course outcomes:**

On successful completion of the course, the learners will be able to

**CO1: [K1]** describe the fundamental principles, laws and concepts of fluid mechanics.

**CO2: [K2]** discuss the principles, concepts and theories of fluid mechanics, fluid statics, in-viscid and compressible flows.

**CO3: [K2]** illustrate the concepts and theories specified in this course.

**CO4: [K3]** apply the knowledge of physical laws to fluid mechanics and human physiology.

**CO5: [K4]** analyze the properties and behaviour of various types of flows specified in the course.

**ROCKETS AND MISSILES**

(Learner Designed Course)

**Code: UPH/LD/49**

**Hours:45**

**Semester: III**

**Credits: 3**

**Learning objectives:**

This course aims to give an understanding about the basics and theories of rocket dynamics, solid and liquid propulsion rockets, control systems and testing of rockets.

**Course outcomes:**

On successful completion of this course, the learners will be able to

CO1: [K1] outline the basic concepts of rockets and missiles

CO2: [K2] explain the theories related to solid propulsion, liquid propulsion and control systems and rocket propulsion

CO3: [K2] illustrate the various methodologies and theories specified in this course

CO4: [K3] apply the physics concepts to the theoretical basis of rockets and missiles

CO5: [K4] analyze the various features and theories relevant to the topics studied

**COMPUTATIONAL PHYSICS**

(Theory cum practical)

(2009-2012 Batch onwards)

Code: UPH/SE/07

Theory Hours: 60 Semester: II

Practical Hours:45

Credits: 5

**Learning Objectives:**

This course aims to

- provide knowledge on computational methods and training to solve problems in physics and mathematics
- enable students to learn the algorithmic approach of the numerical methods and codify using FORTRAN

**Course Outcomes:**

On successful completion of the course, the learners will be able to:

**CO1: [K2]** explain effectively the consequences of finite precision and the inherent limits of the various numerical methods and demonstrate knowledge of FORTRAN language and exhibit proficiency in coding using it

**CO2: [K3]** apply numerical methods and interpolation techniques to solve algebraic and transcendental equations, numerical integrals and differential equations and also use concepts of FORTRAN programming language for performing various operations

**CO3: [K4]** analyse the solutions of algebraic, transcendental equations and numerical integrals and differential equations

**CO4: [K5]** compare the order of accuracy of the solutions obtained using various numerical methods

**CO5: [K6]** develop efficient, well-documented FORTRAN programs to implement numerical methods and present the results



**APPLIED PHYSICS FOR MATHEMATICS AND CHEMISTRY**  
**(Mathematics 2019-2022 Batches onwards)**

**Code: UPH/SE/16**

**Hours: 60**

**Semester: I**

**Credits: 4**

**Learning objectives:**

This course aims to

- introduce students to certain university level physics concepts and their applications
- help them to gain insights into the interrelation between physics and their core subjects

**Course outcomes:**

On successful completion of the course, the learners will be able to

**CO1: [K2]** explain the essential concepts in mechanics, wave physics, electricity, electromagnetism, nuclear physics and digital electronics

**CO2: [K3]** apply knowledge of physical laws to solve problems on topics under study

**CO3: [K4]** analyse various theories and methods used in different areas such as mechanics, wave physics, electromagnetism, nuclear physics and digital electronics

**CO4: [K5]** elucidate suitable applications related to concepts studied in this course

**CO5: [K6]** design logic circuits on simplification of Boolean expressions

**PRACTICAL PHYSICS FOR MATHEMATICS AND CHEMISTRY**  
**(Mathematics 2013 - 16 Batches onwards)**

**Code: UPH/SE/11**

**Hours: 3 x 15 = 45**

**Semester: I**

**Credits: 1**

**Learning Objectives:**

This course aims to

- provide students with hands-on experience in experimental techniques to develop competence in instrumentation
- enable them to correlate the results obtained with the standard data

**Course Outcomes:**

On successful completion of the course, the learners will be able to:

**CO1: [K3]** practice the experimental procedures on their own by following the lab manual provided to them

**CO2: [K3]** employ their practical skills such as observation, interpretation, reasoning, predicting and questioning to acquire data with good precision

**CO3: [K4]** analyze the results obtained from the experiments and represent them graphically.

**CO4: [K5]** justify the experimental results with relevant theoretical concepts

**CO5: [K6]** design and implement logic circuits by applying the knowledge acquired from digital electronics theory component

## **ADVANCED PHYSICS FOR MATHEMATICS AND CHEMISTRY** (Mathematics 2013 - 2016 & Chemistry 2012 - 2015 Batch onwards)

**Code: UPH/SE/12**  
**Semester: IV**

**Hours: 60**  
**Credits: 4**

### **Learning objective:**

This course aims to provide knowledge on concepts of semiconductor and digital electronics, quantum mechanics, optical communication and their applications.

### **Course Outcomes:**

On successful completion of this course, the learners will be able to

**CO1: [K1]** recognize and recall the basic physics principles and concepts in wave physics, electromagnetism, modern physics and electronics.

**CO2: [K2]** explain the essential theories, experimental procedures and illustrations learnt in this course.

**CO3: [K3]** employ analytical and problem-solving skills to solve numerical problems associated with the principles and phenomena learnt in this course.

**CO4: [K4]** analyze the behaviour, causes and outcomes of various physical phenomena and circuits.

**CO5: [K5]** evaluate the construction and working of devices and circuits based on topics learnt in this course.

## **ADVANCED PRACTICAL PHYSICS FOR MATHEMATICS** (Mathematics 2019-2022 Batches onwards)

**Code: UPH/SE/17**  
**Semester: II**

**Hours: 30**  
**Credits: 1**

### **Learning Objectives:**

This course aims to

- provide students with hands-on experience in experimental techniques to develop competence in instrumentation enable them to correlate the results obtained with the standard data

### **Course Outcomes:**

On successful completion of the course, the learners will be able to

**CO1: [K3]** practice the experimental procedures and make observations on their own by following the lab manual provided to them

**CO2: [K3]** illustrate the characteristics and applications of semiconductor devices

**CO3: [K4]** analyze and interpret the results of the experiments and represent them graphically

**CO4: [K5]** justify the experimental results with relevant theoretical concepts

**CO5: [K6]** design and implement logic circuits applying the theoretical knowledge acquired from Digital Electronics theory component

## **APPLIED PHYSICS FOR MATHEMATICS AND CHEMISTRY** (Chemistry 2019-2022 Batches onwards)

**Code: UPH/SE/16M**  
**Semester: III**

**Hours: 60**  
**Credits: 4**

### **Learning objectives:**

This course aims to

- introduce students to certain university level physics concepts and their applications
- help them to gain insights into the interrelation between physics and their core subjects

**Course outcomes:**

On successful completion of the course, the learners will be able to

**CO1: [K2]** explain the essential concepts in mechanics, wave physics, electricity, electromagnetism, nuclear physics and digital electronics

**CO2: [K3]** apply knowledge of physical laws to solve problems on topics under study

**CO3: [K4]** analyse various theories and methods used in different areas such as mechanics, wave physics, electromagnetism, nuclear physics and digital electronics

**CO4: [K5]** elucidate suitable applications related to concepts studied in this course

**CO5: [K6]** design logic circuits on simplification of Boolean expressions

**PHYSICS FOR COMPUTER SCIENCE  
(2012-2015 Batch onwards)**

**Code: UPH/SE/14M**  
**Semester: III**

**Hours: 60**  
**Credits: 4**

**Learning objectives:**

This course aims to

- introduce students to certain university level physics concepts and their applications
- help them to gain insights into the interrelation between physics and their core subjects

**Course outcomes:**

On successful completion of this course, the learners will be able to

**CO1: [K1]** recognize and recall the basic physics principles and concepts in wave physics, electromagnetism, modern physics and electronics.

**CO2: [K2]** explain the essential theories, experimental procedures and illustrations learnt in this course.

**CO3: [K3]** employ analytical and problem-solving skills to solve numerical problems associated with the principles and phenomena learnt in this course.

**CO4: [K4]** analyze the behaviour, causes and outcomes of various physical phenomena and circuits.

**CO5: [K5]** evaluate the construction and working of devices and circuits based on topics learnt in this course.

**PRACTICAL PHYSICS FOR COMPUTER SCIENCE  
(2012-2015 Batch onwards)**

**Code: UPH/SE/15**  
**Semester: III**

**Hours: 45**  
**Credits: 1**

**Learning Objectives:**

This course aims to

- provide students with hands-on experience in experimental techniques to develop competence in instrumentation
- enable them to correlate the results obtained with the standard data

**Course Outcomes:**

On successful completion of the course, the learners will be able to

**CO1: [K3]** practice the experimental procedures on their own by following the lab manual provided to them

**CO2: [K3]** employ their practical skills such as observation, interpretation, reasoning, predicting and questioning by acquiring data with good precision

- CO3: [K4]** analyze the results obtained from the experiments and represent them graphically  
**CO4: [K5]** justify the experimental results with relevant theoretical concepts theory component  
**CO5: [K6]** design and implement logic circuits by applying the knowledge acquired from theory component

**ADVANCED PRACTICAL PHYSICS FOR CHEMISTRY**  
(Mathematics 2019-2022 Batches onwards)

**Code: UPH/SE/18**

**Hours: 30**

**Semester: IV**

**Credits: 1**

**Learning Objectives:**

This course aims to

- provide students with hands-on experience in experimental techniques to develop competence in instrumentation enable them to correlate the results obtained with the standard data

**Course Outcomes:**

On successful completion of the course, the learners will be able to

- CO1: [K3]** practice the experimental procedures and make observations on their own by following the lab manual provided to them  
**CO2: [K3]** illustrate the characteristics and applications of semiconductor devices  
**CO3: [K4]** analyze and interpret the results of the experiments and represent them graphically  
**CO4: [K5]** justify the experimental results with relevant theoretical concepts  
**CO5: [K6]** design and implement logic circuits applying the theoretical knowledge acquired from Digital Electronics theory component

**NON-CONVENTIONAL ENERGY SOURCES**

(Non-Major Elective)

(2008-2011 Batch onwards)

**Code: UPH/NM/04**

**Hours: 30**

**Semester: III/IV**

**Credits: 2**

**Learning objectives:**

This course intends to

- provide information on different alternative sources of energy, their availability and process of power extraction
- sensitize students on the national and global energy requirements and help them realize the importance of sustainable development in the energy sector

**Course outcomes:**

On successful completion of the course, the learners will be able to

- CO1: [K1]** explain the need of energy conversion and various methods of energy storage systems  
**CO2: [K2]** illustrate different sources of renewable energy, innovative technologies involved in harnessing the energy and discuss the advantages and limitations of different renewable energy sources  
**CO3: [K2]** demonstrate the various energy conversion system  
**CO4: [K3]** identify wide variety of applications of renewable energy sources  
**CO5: [K4]** compare and contrast the different forms of energy conversion systems and the output energy obtained from them.

**WORKSHOP TECHNOLOGY**

(Non-Major Elective)

(2017-2020 batch onwards)

**Code: UPH/NM/06**

**Theory: 15 Hours**

**Semester: III/IV**

**Practical: 15 Hours**

**Credits: 2**

**Learning objectives:**

This course aims to

- enable the students to acquire practical skills in the use of workshop machines such as wood lathe, drilling machine, band saw, shearing machine and grinding machine
- empower them to make utility and decorative articles in wood and metal

**Course outcomes:**

On successful completion of this course, the learners will be able to:

**CO1: [K2]** describe the construction and working of measuring instruments and workshop machinery, and explain the concepts of cost estimation and engineering drawing

**CO2: [K3]** solve numerical problems and sketch the isometric and orthographic views of various objects

**CO3: [K4]** categorize all the basic tools and equipment used in fitting, carpentry, sheet cutting, drilling and wood lathe

**CO4: [K5]** choose appropriate measuring instruments and workshop machinery needed, employ them to make measurements and assess the outcome

**CO5: [K6]** design and construct any utility item of their choice using the theoretical and practical knowledge gained in this course

## **ASTROPHYSICS**

**(Non-Major Elective)**

**(2017-2020 batch onwards)**

**Code: UPH/NM/07**

**Hours: 30**

**Semester: III/IV**

**Credits: 2**

**Learning objectives:**

This course intends to

- introduce principles of astrophysics describing the science of formation and evolution of stars, and interpretation of various heavenly phenomena
- provide an understanding of the physical nature of bodies in space along with the instrumentation and techniques used in astronomical research

**Course outcomes:**

On successful completion of this course, the learners will be able to

**CO1: [K1]** recall the basic concepts related to telescopes, sun, stars, solar system and galaxies.

**CO2: [K2]** explain the theories and phenomena learnt in this course.

**CO3: [K2]** outline the various discoveries and recent advancements of astrophysics and cosmology.

**CO4: [K3]** apply the principles in physics to astronomical situations.

**CO5: [K4]** differentiate the various astrophysical phenomena observed in celestial bodies.

## **COMPUTING AND ENTREPRENEURIAL SKILLS**

**(Soft Skills)**

**(2020-23 Batch onwards)**

**Code: UPH/SK/03**

**Theory: 30 Hours**

**Semester: IV/V**

**Practical: 15 Hours**

**Credits: 3**

**Learning objectives:**

This course aims to

- impart knowledge of basic computing concepts and develop ability to use common software applications such as word processing, spreadsheet and presentation software and to use the internet in a secure manner
- introduce the fundamental aspects of intellectual property rights and entrepreneurship

**Course outcomes:**

On successful completion of the course, the learners will be able to:

**CO1: [K2]** explain the hardware, system and application software of computers and concepts of information security awareness, intellectual property rights and entrepreneurship

**CO2: [K3]** utilize various application software to represent data in different forms and communicate information and innovative ideas

**CO3: [K3]** identify malware attacks/threats on a computer or network

**CO4: [K3]** apply knowledge gained to develop their novel ideas and innovations

**CO5: [K4]** plan business ideas for start-ups and assess opportunities for it

**INTRODUCTION TO RESEARCH IN PHYSICS**

(Skilled Based Course)

(2022-2025 Batch onwards)

**Code: UPH/SK/ 04**

**Hours: 45**

**Semester: IV/V**

**Credit: 3**

**Learning objectives:**

This course intends to

- introduce skills required for effective research and scientific communication
- equip students to make informed choices with respect to research design
- enable students to practice scientific writing and present their projects
- encourage students to pursue higher studies and research in physics

**Course outcomes:**

On successful completion of this course, the learners will be able to

**CO1: [K2]** describe various concepts related to research methods and methodology in physics, research ethics, technical writing and the communication skills involved for scientific problem.

**CO2: [K3]** apply the knowledge, understanding and theoretical and laboratory skills required for identifying problems relating to physics research

**CO3: [K3]** develop communication skills involving the ability to read texts and research papers analytically and present these results in technical as well as popular science meetings to different groups/audiences

**CO4: [K4]** categorize, analyze and represent the ideas/concepts in the organization of any written scientific communication

**CO5: [K5]** defend the project work executed in the written report and oral presentation

**DEPARTMENT OF CHEMISTRY**  
**PROGRAMME SPECIFIC OUTCOMES**

**On successful completion of the programme the students will be able to**

**PSO1:** Acquire in-depth knowledge of the fundamental concepts in all disciplines of chemistry.

**PSO2:** Disseminate the basics of chemistry and advanced topics and analytical skills in organic, inorganic and physical chemistry.

**PSO3:** Uphold ethical values in personal life, research and career.

**PSO4:** Demonstrate laboratory skills, analytical acumen, creatively in academics and research.

**PSO5:** Apply digital tools to collect, analyze and interpret data and present scientific findings.

**PSO6:** Gain competence to pursue higher education and career opportunities in chemistry and allied fields.

**PSO7:** Exhibit leadership qualities to work individually and within a team in organizing curricular, co-curricular and extracurricular activities.

**PSO8:** Apply the concepts of chemistry to solve problems in the community, entrepreneurial and research pursuits.

**PSO9:** Exhibit competence in educational, industrial and research pursuits that contribute towards the holistic development of self and community.

**PSO10:** Display proactive approach towards sustainable environment through green laboratory practices.





## CHEMISTRY PAPER – I

UCH/CO/53M  
Semester: I

Hours: 75  
Credits: 4

### Learning Objectives

The course aims at giving an overall view of the

- Atomic structure, wave particle duality of matter and nature of chemical bonding.
- Periodic table, periodicity in properties of elements
- Fundamental concepts of organic chemistry and functional group analysis.

### Course Outcomes

On completion of the course the students should be able to

**CO1: [K1]** Discuss the concept of wave particle duality of matter, periodic table, periodic properties, laws of gaseous state, aromaticity, types of bonding, functional groups and laboratory hygiene and safety. Write IUPAC names of organic compounds.

**CO2: [K2]** Compare the various models of atom, the trends in the periodic properties of elements, real and ideal gases. Explain the laws of gaseous state and distinguish between types of bonds, weak chemical forces, aliphatic, aromatic compounds and functional groups.

**CO3: [K3]** Apply the theories of atomic structure, bonding, molecular velocities and Huckel's rule to do calculations involved in the core concepts. Classify conductors and semiconductors and their mechanism of conduction.

**CO4: [K4]** Construct MO diagrams, P-V isotherms, calculate critical constants, predict trends in periodic properties, hybridization, geometry, bond order, and magnetic behaviour of simple molecules.

**CO5: [K5]** Analyse Periodic properties, Fajan's rules, and bond energy to predict the properties of compounds. Assess the stability of benzene, deviation from ideal behaviour and critical phenomena in real gases.

## ORGANIC CHEMISTRY PRACTICAL – I

Code: UCH/CO/54  
Semester: I

Hours: 45  
Credits: 2

### Learning Objectives

The course on organic analysis is designed to provide

- hands-on experience to analyse organic compounds systematically.
- thorough understanding on the chemistry behind organic reactions.

### Course Outcomes

On successful completion of the course, the learners will be able to

**CO1: [K1]** Observe the physical state, odour, colour and solubility of the given organic compound.

**CO2: [K2]** Identify the presence of special elements and functional group in an unknown organic compound performing a systematic analysis.

**CO3: [K3]** Compare mono and dicarboxylic acids, primary, secondary and tertiary amines, mono and diamides, mono and polyhydric phenols, aldehyde and ketone, reducing and non-reducing sugars and explain the reactions behind it.

**CO4: [K4]** Exhibit a solid derivative with respect to the identified functional group.

## CHEMISTRY PAPER - II

UCH/CO/55M  
Semester: II

Hours: 75  
Credits: 4

### Learning Objectives

This course aims at giving an overview of

- Quantum mechanical treatment of atom and wave equation
- Concepts, laws and properties of solids and liquids
- Trends in properties and salient features of s-block elements (groups 1&2)
- The principles of organic reaction mechanism, electronic effects and stereochemistry

### Course Outcomes

On successful completion of the course the learners should be able to

**CO1: [K1]** Discuss the principles and fundamental concepts of quantum mechanics, atom model, wave equation, orbitals, solid state, liquid crystals, elements of groups 1 and 2, mechanism of organic reactions, electronic effects and stereochemistry.

**CO2: [K2]** Explain the postulates of quantum mechanics, different crystal structures, defects in solids, properties of solid and liquid state, liquid crystals, periodicity in properties of alkali and alkaline earth metals, parameters of organic reaction mechanisms, electronic effects and stereochemical parameters.

**CO3: [K3]** Calculate parameters pertaining to quantum mechanics and crystalline solids; Classify and compare relationships and periodic trend in group 1 and group 2 elements, reaction mechanisms, electronic effects and stereochemistry of organic compounds.

**CO4: [K4]** Examine the significance of  $\Psi$  and  $\Psi^2$ , properties of solid state and liquid crystals, reactivity of compounds of alkali and alkaline earth metals, organic reagents, reaction intermediates, electronic effects, stereoisomers.

**CO5: [K5]** Evaluate the application of quantum mechanical concepts in atom model and orbitals, solid state and liquid crystals, compounds of elements of groups 1 and 2, electronic effects on reactivity of organic compounds and stereoisomerism.

## **VOLUMETRIC ANALYSIS & PREPARATION OF INORGANIC COMPOUNDS**

Code: UCH/CO/56

Hours:60 Semester: II

Credits: 3

### **Learning Objective:**

**This course aims to train the students**

- to acquire skills necessary for volumetric estimations and inorganic preparation
- to understand the principles involved in these estimations.

### **Course outcomes :**

**On successful completion of the course the students should be able to**

**CO1: [K1]** Explain the basic principles involved in titrimetric analysis and inorganic preparations.

**CO2 : [K2]** Compare the methodologies of different titrimetric analysis.

**CO3 : [K3]** Calculate the concentrations of unknown solutions applying the concept of normality, molarity, molality, percentage concentration, etc. and develop the skill to estimate the amount of a substance present in a given solution.

**CO4 : [K4]** Assess the yield of different inorganic preparations and identify the end point of various titrations.

## **CHEMISTRY PAPER III**

UCH/CO/57M

Semester: III

Hours: 75

Credits: 4

### **Learning Objectives**

**The course aims at giving an overall view of the**

- Chemistry of acids and bases and ionic equilibrium
- Trends of properties and salient features of p-block elements belonging to boron and carbon family
- Principles of radioactivity, nuclear chemistry and qualitative inorganic analysis
- The stability & reactions of hydrocarbons and the principles of quantitative analysis

### **Course outcomes**

**On successful completion of the course the learners should be able to**

**CO1:[K1]** Describe the theories and principles involved in acids, bases, ionic equilibrium, nuclear chemistry and inorganic qualitative analysis; write the reactions of elements of group 13 and 14, aliphatic and aromatic hydrocarbons.

**CO2:[K2]** Distinguish between acids and bases, fission and fusion, properties of compounds of group 13 & 14 and the mechanisms involved in the reactions of aliphatic and aromatic hydrocarbons.

**CO3:[K3]** Apply core concepts to calculate pH, solubility product, binding energy, and half life period. Analyze the role of buffers, indicators, nuclear energy and compare the compounds of boron and carbon. Predict reaction products in aliphatic and aromatic hydrocarbons.

**CO4:[K4]** Analyze the mechanism of buffer action, compounds of boron and carbon family. Interpret the mechanism and reactions involved in aliphatic and aromatic hydrocarbons.

**CO5:[K5]** Deduce the mechanisms pertaining to aliphatic and aromatic hydrocarbons; assess the concepts of acids, bases, ionic equilibrium, nuclear chemistry, inorganic qualitative analysis.

## SEMI-MICRO INORGANIC QUALITATIVE ANALYSIS

**Code: UCH/CO/40**  
**Semester: III**

**Hours: 45**  
**Credits: 2**

### Learning Objectives

The objective of the qualitative inorganic analysis is to have hands on experience for analyzing systematic group separation and identification of cations in inorganic salt and mixture.

### Course outcomes

**On successful completion of the course the learners will be able to**

**CO1: [K2]** Explain the principles of  $k_{sp}$  and common ion effect involved in precipitation, performing dry and wet tests to detect anions and cations in a simple salt and mixture with special reference to interfering anions

**CO2: [K3]** Applying the underlying principles and skills for doing systematic analysis

**CO3: [K4]** Identify the cause of interference and the method to eliminate the same

**CO4: [K4]** Analyse systematically and report a mixture containing two cations and anions

## CHEMISTRY PAPER – IV

**Code: UCH/CO/58M**  
**Semester: IV**

**Hours: 75**  
**Credits: 4**

### Learning Objectives

**The course aims at giving an overall view of the**

- Laws and applications of thermodynamics and thermochemistry
- Chemistry of group 15-18 elements, their compounds and applications
- Reactions and mechanisms of halogen derivatives, alcohols, phenols, ethers, epoxides, thiols, thioesters and their significance in chemical synthesis.

## Course Outcomes

**On successful completion of the course the learners will be able to**

**CO1: [K1]** Discuss the laws and fundamental concepts of thermodynamics and thermochemistry; general properties of elements and compounds of group 15-18; nomenclature, preparation and properties of alkyl and aryl halides, alcohols, phenols, ethers, epoxides, thiols and thioethers.

**CO2: [K2]** Classify thermodynamic systems, processes, calculate thermodynamic parameters, heats of reactions and bond energy, discuss the reactions of alkyl and aryl halides, alcohols, phenols, ethers, epoxides, thiols, thioethers and compounds of group 15-18.

**CO3: [K3]** Apply the thermodynamic concepts to various types of systems, to calculate the state functions of the systems, compare the types of nucleophilic substitution, elimination reactions, factors influencing them. Identify reactions and applications of halogen derivatives, alcohols, phenols, ethers, epoxides, thiols, thioethers, and compounds of group 15-18.

**CO4: [K4]** Predict the changes accompanying thermodynamic process in ideal and real gases, thermochemical reactions, reaction mechanisms of halogen derivatives, alcohols, phenols, ethers, epoxides, thiols and thioethers; explain the preparation, properties, structure and uses of compounds of group 15 to 18.

**CO5: [K5]** Evaluate the application of the laws and concepts of thermodynamics and thermochemistry, the properties of compounds of group 15-18 elements; interpret the reaction mechanisms and products of aliphatic and aromatic alcohols, thiols, phenols, ethers, epoxides, thioethers and halogen derivatives.

## ORGANIC CHEMISTRY PRACTICAL – II

**Code: UCH/CO/46**

**Hours: 45**

**Semester: IV**

**Credits: 2**

### Learning Objectives

The practical course on organic preparations aims to provide hands on experience to prepare organic compounds, determine the physical properties, purify and isolate organic compounds applying different techniques.

### Course Outcomes

**On successful completion of the course the learners will be able to**

**CO1: [K2]** Explain the principles of preparation of organic compounds, determination of melting, boiling point and separation techniques.

**CO2: [K2]** Identify the type of reactions involved in the preparations and describe the various separation procedures.

**CO3: [K3]** Apply the principles and skills underlying the synthesis and purification of organic compounds.

**CO4: [K4]** Examine the yield and melting point of the compounds synthesized.

## ORGANIC CHEMISTRY I

Code: UCH/CO/59M  
Semester: V

Hours: 60  
Credits: 4

### Learning Objectives

**This course aims to give an understanding of**

- Structure and properties of carbonyl compounds and their derivatives, active methylene compounds, heterocyclic and organometallic compounds.
- Reactions and synthetic applications of carbonyl compounds and their derivatives, active methylene compounds, heterocyclic and organometallic compounds.

### Course Outcomes

**On successful completion of the course, the learner should be able to**

**CO1 [K1]:** Describe the preparation and properties of active methylene compounds, heterocyclic and organometallic compounds, carbonyl compounds and their derivatives, stereochemistry of organic molecules and their stereospecific reactions.

**CO2 [K2]:** Explain reaction mechanisms of active methylene compounds, heterocyclic, organometallic and carbonyl compounds and their derivatives.

**CO3 [K3]:** Identify name reactions of carbonyl, heterocyclic and organometallic and active methylene compounds.

**CO4 [K4]:** Compare and contrast reactions of carbonyl compounds and their derivatives, heterocyclic compounds, organometallic compounds and active methylene compounds.

**CO5 [K5]:** Predict methods of synthesis and applications of carbonyl, heterocyclic, organometallic and active methylene compounds.

## INORGANIC CHEMISTRY - I

Code: UCH/CO/60M  
Semester: V

Hours: 60  
Credits: 4

### Learning objectives

**This course aims at giving an overall view of**

- Properties of transition elements, inner transition elements and organometallic compounds.
- Theories of bonding in coordination chemistry and its varied applications.

### Course Outcomes

**On successful completion of this course, the learners should be able to**

**CO1: [K1]** Describe the general characteristics of transition elements, inner transition elements, methods of preparation of metal carbonyls and IUPAC nomenclature.

**CO2: [K2]** Compare properties of transition elements and non-transition elements, chelate forming ligands, lanthanoides, actinoides and their extraction, transition metals groups .

**CO3: [K3]** Illustrate the applications of transition elements, lanthanoides, actinoides and their compounds, discuss the stability of chelates, hybridization and magnetic characteristics of complexes.

**CO4: [K4]** Analyze the validity of EAN rule in metal carbonyls, causes and consequences of lanthanide contraction, origin of colour in transition metal complexes, lanthanoides and actinoids.

**CO5: [K5]** Predict the hybridization, geometry and magnetic properties of coordination compounds, assess the nature of bonding in carbonyl compounds, ferrocene and hardness of water.

## PHYSICAL CHEMISTRY – I

Code: UCH/CO/61M  
Semester: V

Hours: 60  
Credits: 4

### **Learning Objectives This course aims to introduce**

- The laws and applications of thermodynamics.
- The concepts of free energy functions and related equations in thermodynamics and chemical and physical equilibria.
- Applications of chemical equilibrium, kinetics and catalysis.

### **Course Outcomes**

**On successful completion of the course the learners should be able to**

**CO1: [K1]** Discuss the laws, principles and fundamental concepts of thermodynamics, free energy, partial molar properties, physical and chemical equilibrium, Kinetics and Catalysis.

**CO2: [K2]** Explain thermodynamic functions, reaction rates, theories of reaction rates and derive relation between various TD functions and kinetic parameters.

**CO3: [K3]** Classify and differentiate between types of systems, thermodynamic processes, reactions, equilibrium processes and catalysis; Calculate  $q$ ,  $w$ ,  $\Delta E$ ,  $\Delta H$ ,  $\Delta S$  and  $\Delta G$ .

**CO4: [K4]** Analyze the causes and effects of thermodynamic processes in ideal and real gases, different types of reactions, equilibrium processes and mechanism of catalysis.

**CO5: [K5]** Predict feasibility of a reaction, correlate thermodynamic functions and apply theories of reaction rates and parameters affecting physical and chemical equilibrium.

## **SPECTROSCOPY**

**Code: UCH/CO/ 45M**

**Semester: V**

**Hours: 75**

**Credits: 4**

### **Learning Objectives**

**This paper is designed to introduce the final year students to**

- Principles, instrumentation and applications of microwave, infrared, Raman, NMR, UV spectroscopy and mass spectrometry.
- group theory, electrical and magnetic properties of molecules.

### **Course Outcomes**

**On successful completion of the course the learners should be able to**

**CO1: [K1]** Describe symmetry elements, point groups, principles of spectroscopy and spectrometry.

**CO2: [K2]** Outline the various spectroscopic principles, instrumentation, construct group multiplication table for simple molecules.

**CO3: [K3]** Apply selection rules to understand spectral transitions. Predict point groups of molecules, IR, mass nmr spectra of organic compounds, electrical and magnetic properties and relate it to structural characteristics.

**CO4: [K4]** Analyse and distinguish organic molecules based on spectral data. Elucidate the structure of molecules using dipole moment and Woodward – Fieser rules.

**CO5: [K5]** Interpret spectral data and predict molecular structure.

## **PHYSICAL CHEMISTRY PRACTICAL – I**

**Code: UCH/CO/47**

**Semester: V**

**Hours: 45**

**Credits: 2**

### **Learning Objectives**

**This course aims to**

- give hands on experience to students in verifying theoretical concepts taught in the classroom through experiments.
- evaluate the students understanding of the theory behind experimental work.

**Course Outcomes:**

**On successful completion of the course the learners should be able to**

**CO1: [K1]** Describe the principles and methodology for the practical work

**CO2: [K2]** Explain the procedure, data and methodology for the practical work.

**CO3: [K3]** Apply the principles of electrochemistry, kinetics for carrying out the practical work

**CO4: [K4]** Demonstrate laboratory skills for safe handling of the equipment and chemicals

## **INTERNSHIP**

**Code: UCH/CO/65**

**Credit : 1**

**Semester: V**

Internship offers on-the-job training and preliminary research experience for the students. They are expected to work in research/ training institutions or companies and would gain experiential knowledge during the stipulated time period. The students are required to submit a report at the end of the internship and are evaluated by an oral presentation and viva-voce by an internal examiner. Internship is offered for extra credit.

## **ORGANIC CHEMISTRY – II**

**Code: UCH/CO/62M**

**Hours: 60**

**Semester: VI**

**Credits: 4**

**Learning Objectives**

**This course aims to give an understanding of**

- Nomenclature, reactions and significance of nitro compounds, amines, heterocyclics, condensed ring systems and dyes.
- Classification, isolation and structure elucidation of natural products.
- Molecular rearrangements in organic chemistry.

**Course Outcomes**

**On successful completion of the course the learners should be able to**

**CO1: [K1]** Explain the preparation, properties, classification and nomenclature of nitro compounds, amines, heterocyclics, dyes and natural products and importance of molecular rearrangements.

**CO2: [K2]** Discuss the name reactions in nitrogen compounds, heterocyclics and recognize the structure of dyes and natural products and rearrangement reactions.

**CO3: [K3]** Illustrate suitable methods to synthesize dyes, nitro compounds, amines, heterocyclic compounds, alkaloids and terpenoids and for molecular rearrangement reactions.

**CO4: [K4]** Analyze the properties, and reactions of dyes, nitrogen compounds, heterocyclics and elucidate the structure alkaloids and terpenoids

**CO5: [K5]** Predict the possible mechanism of the chemical reactions involving dyes, nitro compounds, amines, heterocyclics and natural products and for molecular rearrangements.

## **INORGANIC CHEMISTRY-II**

**Code: UCH/CO/63M**

**Hours: 60**

**Semester: VI**

**Credits: 4**

**Learning Objectives**



**This course aims at giving the overall view of the**

- the dietary requirement and the biological role of essential and trace elements.
- structure, properties and applications of transport and storage of metal ions, metalloenzymes, silicates and inorganic polymers.
- valence bond and crystal field theory and its varied applications.

**Course outcomes**

**On successful completion of the course the learners should be able to**

**CO1: [K1]** Describe the role of essential, non-essential, trace elements and metalloenzymes, electron transfer reactions, silicates and inorganic polymers. Discuss the bonding on the basis of crystal field theory (CFT), Jahn-Teller effect, silicates and inorganic polymers.

**CO2: [K2]** Distinguish among the types of silicates, inorganic polymers, electron transfer reactions (ETR), metalloenzymes. Explain the biological role of metalloenzymes, essential, non-essential and trace elements in biological system, magnetic properties, stabilities and colour of complexes.

**CO3: [K3]** Classify and discuss the functions and applications of essential, non essential and trace elements, metalloenzymes, silicates, inorganic polymers, coordination complexes, apply the concept of CFT to predict the bonding and properties of complexes.

**CO4: [K4]** Explain the postulates of CFT to predict the bonding in coordination complexes. compare the mechanisms of ETRs, structures and functions of metalloenzymes, inorganic polymers, silicates, essential, non-essential and trace elements.

**CO5: [K5]** Assess the structure, properties and functions of silicates, inorganic polymers, metalloenzymes, biological role of essential, non-essential and trace elements, compare the VBT and CFT and their limitations.

## PHYSICAL CHEMISTRY II

**Code: UCH/CO/64M**  
**Semester : VI**

**Hours: 60**  
**Credits:4**

### Learning Objectives

This course aims to introduce

- Topics on phase rule, binary liquids.
- Theory and application of electrolytic conductance and transference and ionic equilibria.
- Working of Galvanic cells and fuel cells.

### Course Outcomes

**On successful completion of the course, the learners should be able to**

**CO1: [K1]** explain the terminology and principles involved in photochemistry, phase rule, binary solutions, electrolytic conductance, electrochemical cells, fuel cells and corrosion.

**CO2: [K2]** distinguish between types of photochemical processes, phase diagrams of different systems, liquid mixtures, types electrolytic conductance, electrochemical cells and energy storage devices.

**CO3:[K3]** apply the principles of – photochemistry to photochemical processes, binary solutions and Nernst distribution law to purification and separation; to construct of phase diagram, electrochemical cells and to measure of conductance and EMF.

**CO4: [K4]** correlate - laws of photochemistry to photochemical processes; percentage composition-temperature, vapour pressure - temperature relationships in binary solutions; illustrate the applications of phase rule; electrochemistry and energy storage devices.

**CO5: [K5]** predict – efficiency of photochemical processes; parameters governing phase changes; suitable separation technique for different binary solutions; distribution between immiscible liquids; feasibility of cell reactions; methods of preventing corrosion.

## GRAVIMETRIC ANALYSIS

**Code: UCH/CO/51**  
**VI**

**Hours: 15 + 45 = 60**  
**Credits: 2**

**Semester:**

### **Learning Objectives**

**The course aims at giving the overall view of the**

- Principles and theoretical aspects of gravimetric analysis
- Hands on experience on the techniques such as precipitation, filtration, washing and drying.
- Estimating the amount of the inorganic compound present in the solution.

### **Course outcomes**

**On successful completion of the course the learner should be able to**

**CO1:[K1]** Explain the principles involved in precipitation, filtration, washing and drying of precipitate.

**CO2:[K2]** Distinguish between the types of precipitation and examine the factors governing precipitation, volatilization and gravimetric analysis.

**CO3:[K3]** Applying the principles of precipitation, washing, drying and weighing for systematic gravimetric analysis.

**CO4:[K4]** Estimate the inorganic compound present in solution and compare the result with the theoretical and skilled values obtained.

## **PHYSICAL CHEMISTRY PRACTICAL – II**

**Code: UCH/CO/52**  
**Semester: VI**

**Hours: 45**  
**Credits: 2**

### **Learning Objectives**

**This course aims to**

- give hands on experience to students in verifying theoretical concepts taught in the classroom through experiments.
- evaluate the students understanding of the theory behind experimental work.

### **Course Outcomes:**

**On successful completion of the course the learners should be able to**

**CO1: [K1]** Describe the principles and methodology for the practical work.

**CO2: [K2]** Explain the procedure, data and methodology for the practical work

**CO3: [K3]** Apply the principles of phase rule and electrochemistry for carrying out the practical work

**CO4: [K4]** Demonstrate laboratory skills for safe handling of the equipment and chemicals

## **INDUSTRIAL CHEMISTRY**

**Code: UCH/CE/12**  
**Semester: V**

**Hours : 75**  
**Credits : 5**

### **Learning Objectives**

**This course aims to give an overview on**

- Principles of chemistry as applied to various industrial processes and fundamental concepts of IPR and patents.
- Formulation of certain cosmetics products, food preservation and processing, classification and characteristics of fuels, abrasives and lubricants; manufacture of leather, paper, paints and varnishes.
- Implications of industrial processes and products on the environment and biosphere.

### Course Outcomes

**On successful completion of the course the learners should be able to**

**CO1: [K1]** List down the ingredients in cosmetics, food preservatives, lubricants, paints, varnishes and abrasives; industries in Tamil Nadu; India, types of IPR and trademarks. Discuss the characteristics and manufacturing process of soaps, fuels, cement, leather, paper and sugar.

**CO2: [K2]** Classify and compare different types of fuels, soaps, detergents, skin and hair care products, perfumes, methods of food preservation, food standards, lubricants, abrasives and trademarks.

**CO3: [K3]** Enumerate advantages of different types of fuels, soaps, detergents, cosmetic products, lubricants, sugar, cement, food preservation and standards, abrasives, patentability factors, paints and varnishes. Explain the cleansing action and biodegradability of soaps and detergents.

**CO4: [K4]** Summarize the properties of fuels, soaps, detergents, lubricants, food additives, abrasives, paper, paints and sugar.

**CO5: [K5]** Plan and execute project work to evaluate any one implication of an industrial process / product on the environment and biosphere.

## PHARMACEUTICAL CHEMISTRY

**Code: UCH/CE/13**

**Semester: V**

**Hours: 75**

**Credits: 5**

### Learning Objectives

**This elective course covers**

- Terminology used in pharmaceutical chemistry, common and major diseases and their treatment.
- Structure relationship to pharmacological activity, introduction to drug development, types of drugs and selected topics in clinical chemistry.
- A topic on intellectual property rights that introduces the learners to IPR , patents and service learning project

### Course Outcomes

**On successful completion of the course the learners should be able to**

**CO1:[K1]** Define the pharmaceutical terminologies; describe the principles in pharmacological activity, drug development, clinical chemistry, hematology, therapeutic drugs and treatment of diseases; list the types of IPR and trademarks.

**CO2: [K2]** Discuss the development of drugs, structural activity, disease types, physio- chemical properties of therapeutic agents, significance of medicinal plants, clinical tests and factors for patentability.

**CO3: [K3]** Apply the principles involved in structural activity, drug designing, service learning, functions of haematological agents; estimation of clinical parameters and therapeutic application of drugs for diseases.

**CO4:[K4]** Analyze the type of diseases and treatment, pharmacological activity, Drug development and metabolism, mode of action of therapeutic agents and clinical parameters.

**CO5: [K5]** Examine the methods involved in drug designing, routes of administration, causes and treatment of diseases, significance of therapeutic agents, blood and urine analysis.

## POLYMER SCIENCE

**Code: UCH/CE/03**  
**Semester: VI**

**Hours: 75**  
**Credits: 5**

### Learning Objectives

**This course aims at giving an overall view of the**

- Various types of polymers and their characterization
- Kinetics and techniques of polymerization
- Determination of molecular weight, polymer technology and special polymers

### Course Outcomes

**On successful completion of the course, the learners should be able to**

**CO1: [K1]** classify different types of polymers, techniques of polymerization and define the terms associated with polymers.

**CO2: [K2]** explain the principles of different polymerization techniques, methods of molecular weight determination, processing of polymers, properties of special polymers and difference between polymer and macromolecule.

**CO3: [K3]** compare different polymerization techniques, methods of processing polymer fibres and properties of different types of polymers.

**CO4: [K4]** assess the mechanical and thermal properties of polymers and inspect the reaction mechanism and kinetics of condensation and addition polymerization.

**CO5: [K5]** summarize the parameters concerning different methods of molecular weight determination and processing of polymers.

## NANOSCIENCE

**Code: UCH/CE/10**  
**Semester: VI**

**Hours: 75**  
**Credits: 5**

### Learning Objectives

**This course aims to provide**

- Basic understanding of matter at nanoscale, Terminologies in nanoscience
- Methods of preparation of nanomaterials
- Optical, magnetic, electronic and chemical properties
- Special nanomaterials
- Characterization techniques and applications

### Course outcomes

**On successful completion of the course the students will be able to**

**CO1:[K1]** Explain the general concepts and physical phenomena of relevance within the field of nanoscience.

**CO2:[K2]** Describe the properties, synthesis, characteristics of nanomaterials, special nanomaterials and applications.

**CO3:[K3]** Examine the structure, properties, applicability and characterization of nanomaterials.

**CO4:[K4]** Analyze various synthesis procedures, characterizations and uses of nanomaterials.

**CO5: [K5]** Predict the stabilization of nanomaterials, properties and spectral patterns.

## BIOCHEMISTRY

Code: UCH/CE/11M

Hours: 75

Semester: VI

Credits: 5

### Learning Objectives

This course provides an overview of

- macromolecules such as carbohydrates, proteins, enzymes, hormones, lipids and nucleic acids in the biological system
- structure and functions and mode of action of biomolecules in human biology and metabolism.

### Course Outcomes

On successful completion of the course the learner should be able to,

CO1:[K1] Describe the occurrence, classifications, properties and importance of biomolecules.

CO2: [K2] Explain the structure, functions and metabolism of biomolecules.

CO3: [K3] Classify biomolecules based on their structure, properties, reactions and uses.

CO4: [K4] Recognize the relationship and interconnections between the biomolecules, reaction mechanism and mode of action.

CO5: [K5] Assess the importance of biomolecules in all metabolic pathways.

## SELECTED ANALYTICAL TECHNIQUES IN CHEMISTRY

Code: UCH/SE/22

Hours: 60+30

Semester: IV

Credits: 5

### Learning Objectives

This course aims to provide

- Basic knowledge required for chemists working in research laboratories and industries
- Knowledge on errors in analysis
- Hands on experience in handling a few instruments
- Awareness on adulterants and their detection

### Course Outcomes

On successful completion of the course the learners should be able to

CO1 : [K1] Relate the principles and procedures involved in various purification, separation and analytical instrumentation methods and define terms in data analysis.

CO2:[K2] Explain the principle of thermoanalytical, electrogravimetry, polarography, thermal, electrochemical methods of analysis, solvent extraction, distillation, various chromatographic techniques and statistical treatment of analytical data.

CO3 : [K2] Distinguish between different types of error and error minimization processes. Discuss about data in chemical analysis, adulterants and their detection in common food items, flame photometry and UV-Visible spectrophotometry.

CO4 : [K3] Correlate and calculate  $R_f$  values and their applications, classify separation techniques and purification procedures and analyze various analytical techniques and experimental data.

CO5 : [K4] Analyse UV-Visible spectral data, interpret thermograms, DTA plot and polarogram

## **CHEMISTRY FOR HOME SCIENCE (VOCATIONAL & GENERAL STREAM)**

**Code: UCH/SU/03M**

**Hours: 60**

**Semester: I /II**

**Credits:4**

### **Learning Objective**

**This course aims at giving an overall view of the**

- Introduction to the concepts of chemical bonding and fundamentals of organic reactions
- Overview of the chemistry of carbohydrates and proteins
- Introduction to food additives and certain separation techniques relevant to biomolecules

### **Course Outcomes**

**On successful completion of the course, the learners should be able to**

**CO1: [K1]** Identify the shapes of orbitals, aromaticity of compounds, types of reagents, intermediates and bonding in inorganic molecules; describe the principles of chromatographic and separation techniques, reactions of organic compounds, carbohydrates, proteins and characteristics of food additives and preservatives.

**CO2: [K2]** Write the concepts of VSEPR theory, Chemical bonding; list out the types of reactions; discuss the properties, reactions, structure and tests to identify carbohydrates and proteins.

**CO3: [K2]** Discuss the principles, techniques, applications, advantages and disadvantages of separation methods; Compare the characteristics, safety, hazards of food additives and preservatives, evaluation of safety and hazards of food additives by toxicity tests

**CO4: [K3]** Classify organic compounds, reaction intermediates, types of organic reactions, carbohydrates, proteins and amino acids; Write the characteristics and applications of food additives & preservatives.

**CO5: [K4]** Compare the types of chemical bonds, hybridisation, organic reactions and reagents; Examine the principles and applications of separation methods; Identify the reactions pertaining to carbohydrates, amino acids and proteins; evaluate the properties, safety and hazardous effects of food additives and preservatives .

## **CHEMISTRY FOR PHYSICAL SCIENCES - I**

**Code: UCH/SE/16M**

**Hours: 60**

**Semester I/II/III**

**Credits: 4**

### **Learning Objectives**

**The course aims to give an overview of**

- Types of chemical bonding
- Fundamentals of kinetics and catalysis
- The basic concepts of solid state and electrochemistry
- Principles of titrimetric analysis.

### **Course Outcomes**

**On completion of the course the students will be able to**

**CO1: [K1]** Recognize different types of chemical bonding, catalysis, stereoisomerisms, packing in a crystal lattice, types of ligands, electrochemical cells and titrations.

**CO2: [K2]** Explain the basic concepts of chemical bonding, solid state chemistry, coordination chemistry and optical activity.

**CO3: [K2]** Discuss the fundamental concepts of chemical kinetics, catalysis, electrochemistry, volumetric analysis, biological functions of haemoglobin and chlorophyll.

**CO4: [K3]** Apply the concepts of chemical bonding to predict the shapes of molecules, solid state chemistry to determine radius ratio, electrochemistry to predict the reactivity of the elements, chemical kinetics to derive the rates of reactions, volumetric analysis to determine the concentrations of different solutions and to prepare standard solutions.

**CO5: [K4]** Analyze stereoisomers, order and molecularity of a reaction, defects in crystals, hardness of water.

## APPLIED CHEMISTRY

Code: UCH/SE/02M

Semester: III

Hours 60

Credits: 4

### Learning Objectives

**This course is designed to provide**

- the chemistry behind materials and compounds they come across in their everyday life like soaps, detergents, cosmetics and ceramics.
- the chemistry of drugs, chemistry of energy, chemistry of vision.
- an awareness on harmful adulteration in foods and simple tests to identify the adulterants

### Course Outcomes

**On successful completion of the course the learners will be able to**

**CO1: [K1]** Explain the terminologies and principles of various energy sources, personal care products, refractory materials, dyes, pharmaceutical chemistry, food additives and adulterants.

**CO2: [K2]** Explain the characteristics, reactions, types of energy sources, fuels, radio isotopes, dyes, drugs, ceramic materials, food additives, soaps & detergents.

**CO3: [K2]** Describe the biological role of elements and trace elements in living systems; theories of colour and constitution, role and formulation of personal care products.

**CO3: [K3]** Identify the role of electrochemistry, nuclear chemistry in the energy sector, Compare the properties of essential, non-essential, trace elements and drugs. Discuss the characteristics of colour, adulterants, food additives, ceramic materials, personal care products, soaps and detergents.

**CO4: [K4]** Assess and compare types and applications of fuels, energy sources, drugs, food additives, adulterants, dyes, personal care products, soaps and detergents, essential, non-essential and trace elements.

## PRACTICAL CHEMISTRY I QUALITATIVE ORGANIC SEMI MICRO ANALYSIS

Code: UCH/SE/20

Semester: I/III

Hours: 30

Credits: 1

### Learning Objective:

This course aims to provide the theory of qualitative analysis with reference to qualitative semi micro analysis of organic compounds.



**Course Outcomes:**

**On successful completion of the course, the learners should be able to**

**CO1: [K2]** describe the concepts and principles of quantitative analysis

**CO2: [K2]** enumerate the procedure, data, methodology for organic analysis.

**CO3: [K3]** apply concepts and principles to carryout organic analysis by following green laboratory practices

**CO4 : [K4]** demonstrate laboratory skills for safe handling of chemicals to conserve environment at semi-micro level

**CO5 : [K5]** interpret the functional group by systematic analysis and confirming the results by confirmatory analysis.

## **CHEMISTRY FOR PHYSICAL SCIENCES -II**

**Code:UCH/SE/17M**  
**Semester IV**

**Hours: 60**  
**Credits:4**

**Learning Objectives**

**This course aims at giving an overall view of**

- The basic principles, laws and applications of phase rule, photochemistry, surface chemistry and material science
- The basic concepts, reactions and stability of organic compounds
- separation and purification techniques

**Course Outcomes**

**On successful completion of the course, the learners should be able to**

**CO1:[K1]** Explain laws and principles of photochemistry, adsorption isotherms, electromeric effect in organic compounds; Classify alloys and materials

**CO2:[K2]** Discuss phase diagrams, adsorption isotherms, composition of alloys and characteristics of materials.

**CO3:[K2]** Compare photochemical processes, types of chromatography, properties of organic compounds based on electronic effects, composition and applications of alloys.

**CO4:[K3]** Apply principles of photo chemistry, phase rule, chromatographic techniques, concepts of electronic and electrometric effects.

**CO5:[K4]** Analyze the significance of photochemical phenomena, influence of electronic effects on reactivity of organic compounds and application of various materials in everyday life.

## **PRACTICAL CHEMISTRY II**

**Code:UCH/SE/21**  
**Semester: II/IV**

**Hours:45**  
**Credits:1**

**Learning Objective:**

The objective of the course is to

- make the students understand the principles involved in these estimations
- train the students to acquire skills necessary for volumetric estimations
- Provide a thorough knowledge on the chemistry behind volumetric analysis
- Provide a hands on experience on quantitative estimations

**Course Outcomes:**

**On successful completion of the course the learners should be able to**

**CO1: [K2]** Describe the concepts and principles of volumetric analysis

**CO2: [K2]** Classify the different types of quantitative estimations

**CO3: [K3]** Apply concepts and principles to carryout estimations by following green laboratory practices

CO4 : [K4] Demonstrate laboratory skills for safe handling of chemicals to conserve environment

### **PRACTICAL CHEMISTRY III**

**Code: UCH/SE/07**

**Semester: II / IV**

**Hours: 45**

**Credits: 1**

#### **Learning Objectives**

**This course aims to**

- give hands on experience to students in verifying theoretical concepts taught in the classroom through experiments.
- evaluate the students understanding of the theory behind experimental work.

#### **Course Outcomes:**

**On successful completion of the course the learners should be able to**

**CO1: [K1]** Describe the principles and methodology for the practical work.

**CO2: [K2]** Explain the procedure, data and methodology for the practical work

**CO3: [K3]** Apply the principles of phase rule, electrochemistry and colorimetry for carrying out the practical work

**CO4: [K4]** Demonstrate laboratory skills for safe handling of the equipment and chemicals

### **CHEMISTRY FOR BIOLOGICAL SCIENCES-I**

**Code: UCH/SE/18M**

**Semester: III**

**Hours: 60**

**Credits: 4**

#### **Learning Objectives**

**This course aims to provide an understanding of**

- basic organic chemistry, atomic structure and chemical bonding.
- fundamentals of electrochemistry, role of metal ions in biological system, analytical chemistry and basic principles of laboratory techniques

#### **Course Outcomes**

**On successful completion of the course the learner should be able to**

**CO1: [K1]** Describe concepts of atomic structure, chemical bonding, organic reactions, stereochemistry, electrochemistry and chemical analysis.

**CO2: [K2]** Discuss the types of chemical bonds, shapes of molecules, organic reactions, reaction intermediates, essential and non-essential elements; methods of chemical analysis.

**CO3: [K2]** Explain the types of reactions, stereoisomerism in organic compounds, role & toxic effects of metal ions in biological systems, electrochemical principles, pH, buffers and batteries.

**CO4: [K3]** Apply the concepts of bonding to predict shapes of molecules and stereochemistry of organic molecules. Examine the role of metal ions and their toxic effects in biological systems. Apply standard electrode potential to electrochemical reactions and pH in living systems.

**CO5: [K4]** Summarize the applications of bonding, reaction intermediates, chemical reactions and stereochemistry in organic molecules, qualitative and quantitative measurements in laboratory.

### **CHEMISTRY FOR BIOLOGICAL SCIENCES II**

**Code: UCH/SE/19M**  
**Semester: IV**

**Hours: 60**  
**Credits: 4**

**Learning Objective:**

The objective of this course is to provide the students of biological sciences,

- basic understanding of pharmaceutical chemistry, separation techniques, kinetics and catalysis.
- knowledge on basics and applications of radioactivity and polymers.

**Course Outcomes:**

**On successful completion of the course, the learners should be able to**

**CO1[K1]** Define various terms used in pharmaceutical chemistry, separation techniques, polymer science, catalysis and kinetics

**CO2[K2]** Identify the types and principles of pharmaceutical chemistry, separation techniques, kinetics and catalysis. Discuss radioactivity and polymers.

**CO3[K3]** Classify separation technique, catalysis, kinetics, radioactivity and different types of polymerization reactions

**CO4[K4]** Explain the terminologies, structure and therapeutic uses of drugs, chromatographic and electrophoretic techniques, radioactivity, catalysis, kinetics and polymers

**CO5[K4]** Interpret rate equations, role of binding energy and packing fraction, magic numbers in nuclear reactions.

## PHARMACEUTICAL CHEMISTRY

**Code: UCH/SE/12**

**Semester: IV**

**Hours: 60**

**Credits: 4**

### Learning Objectives

**This course aims to give an understanding of**

- The terminology used in pharmaceutical chemistry, drug development., treatment of common and major diseases
- Chemical compounds used as different therapeutic agents and clinical testing in laboratories.

### Course Outcomes:

**On successful completion of the course the student will be able to**

**CO1 [K1]** Define the pharmaceutical terminologies; describe the principles in drug development, clinical chemistry, hematology, therapeutic drugs and treatment of diseases.

**CO2 [K2]** Discuss the development of drugs, disease types, physio-chemical properties of therapeutic agents, significance of medicinal plants, and clinical tests.

**CO3 [K2]** Explain the principles and functions of haematological agents, estimations of clinical parameters, therapeutic application of drugs for diseases.

**CO4[K3]** Classify the types of diseases and treatment; examine the steps in drug development and metabolism, mode of action of therapeutic agents and clinical parameters.

**CO5 [K4]** Analyse the methods involved in drug designing, routes of administration, causes and treatment of diseases, significance of therapeutic agents, blood and urine analysis.

## DYEING AND PRINTING OF TEXTILES

**Code: UCH/NM/01**

**Semester: III / IV**

**Hours : 30**

**Credits : 2**

### Learning objective:

This course consists of both theoretical and practical components.

- the theoretical chapters give a brief overview on different types of textile fibres, fabrics and dyes.
- The practical portion is designed to develop the skills and techniques of different types of dyeing & printing.

### Course Outcomes:

**On successful completion of the course, the learners should be able to**

**CO1: [K1]** Describe different types of textile fibres, synthetic dyes and basic weaves

**CO2 : [K2]** Compare various printing techniques

**CO3 : [K3]** Apply different methods of dyeing and printing on different types of fabric

**CO4 :[K3]** Examine the applicability of various dyes based on the nature of the fibre

**CO4 : [K4]** Identify the types of dyeing and printing present in a particular fabric

## COSMETICS AND PERSONAL GROOMING

**Code: UCH/NM/03**

**Semester: III/IV**

**Hours: 30**

**Credits: 2**

### Learning Objective:

This course aims at familiarizing the students with

- different aspects of cosmetics and personal grooming.
- Topics on hair, skin and dental care products along with makeup preparations.

**Course Outcomes:**

**On successful completion of the course, the learners should be able to**

**CO1[K1]**Name the ingredients of various skin, hair and dental care, make up preparations and perfumes

**CO2[K2]**Discuss various types of beauty treatments in personal grooming

**CO3[K3]**Explain the different beauty treatments, ingredients in skin, hair and dental care, make up and perfumes.

**CO4[K3]**Classify skin, hair and dental care and perfume products

**CO5[K4]**Assess the various beauty treatments, skin, hair and dental care products

## **FORENSIC SCIENCE**

**Code: UCH/NM/02**

**Hours: 30**

**Semester: IV**

**Credits: 2**

**Learning Objective:**

This paper aims to give a brief overview on forensic science covering topics like physical evidence, toxicology, fire, arson and forgery.

**Course Outcomes:**

**On successful completion of the course the learners should be able to**

**CO1: [K2]** Describe the - functions of a forensic science laboratory; method of processing of crime scene;

**CO2: [K2]**Classify physical evidence; poisons; disputed documents; explosives

**CO3: [K3]**Choose the method of collecting various physical evidence; antidotes for certain poisons; detecting counterfeit currency

**CO4: [K3]**Examine - the evidence from crime scene to detect the cause and disputed documents

**CO5:[K4]**Correlate - the significance of various physical evidence in crime scene investigation; disputed documents for forgery;

## COMPUTER APPLICATIONS IN CHEMISTRY

**Code: UCH/SK/06**

**Hours: 45**

**Semester: IV**

**Credits: 3**

### Learning Objective:

- To introduce simple problem-solving applications using flow charts.
- To learn a language C++ and to execute its applications in chemical calculations.
- To enable the student to learn application software and apply it to solve problems in quantitative chemical analysis.
- To generate business ideas for start-up and assess the opportunity for it.

### Course Outcomes

On successful completion of the course, the learners should be able to

**CO1[K2]** Describe the principles and importance of MS office, machine language, chemistry software, cyber security, entrepreneurship, business plan and computer-based careers options for chemists.

**CO2[K3]** Illustrate programs, spreadsheet, plots, charts, and calculations using computer for interpretation of chemical data and molecular structures.

**CO3[K4]** Identify possible cyber threats, free chemistry software, programming language and business models.

**CO4[K4]** Analyse content and carryout functions pertaining to MS office tools and other chemistry software and cyber security tools.

**CO5[K5]** Evaluate complex calculations, application software, programming language, cyber security.

## COSMETICS AND FORMULATION OF BEAUTY CARE PRODUCTS

**Course Code: UCH/SK/04**

**Hours: 45**

**Semester: V**

**Credits: 3**

### Learning objectives:

This course aims at giving an overall view of

- A broad based chemistry knowledge on personal care products, raw materials
- Principles of formulations, quality control through lectures and practical workshops.
- The basics in formulating cosmetic products in a laboratory environment.

### Course outcomes

On successful completion of the course the learner should be able to

**CO1:[K2]** Explain the chemistry of cosmetics and functions of skin

**CO2:[K2]** Discuss safety principles and testing for allergy of cosmetics

**CO3:[K3]** Use the principles of formulation to prepare creams, shampoos etc.

**CO4:[K4]** Examine and evaluate the building blocks of skin, hair and dental care products

**CO5:[K4]** Compare and contrast the properties of different creams and shampoos

## ESSENTIALS OF FOOD CHEMISTRY AND FOOD TECHNOLOGY

**Code: UCH/SK/05**

**Hours: 45**

**Semester: V**

**Credits: 3**

**Learning objectives:**

This course would provide the students

- a. An overview on the functional aspects of food and its processing.
- b. An insight into the packaging requirements of food categories.
- c. A hands-on experience on identifying and analysing the components of food.

**Course outcomes:**

On successful completion of the course the learner should be able to

CO1:[K2] Explain the chemistry underlying the properties and reactions of various food components

CO2:[K2] Discuss the scientific methods to preserve and pack foods. CO3:[K3] Examine the role of micro and macro nutrients in biological system

CO4:[K4] Identify and evaluate the components of food.

CO5:[K4] Compare and contrast the different methods of food preservation

**Elective Course offered to PG Department of Home Science****FOOD PACKAGING, CONTAMINANTS AND FOOD ANALYSIS**

**Code: PCH/EL/01**

**Hours: 60**

**Semester: III**

**Credits: 3**

**Learning Objectives****The objective of this course is to provide**

- Knowledge on the role and significance of packaging in food industry.
- Understanding of packaging materials, testing and regulatory aspects of packaging requirements
- Overview of contaminants due to packaging materials and their effects on human health.
- Application of UV and fluorescence spectroscopy in food analysis

## **Course Outcomes**

**On successful completion of the course the student will be able to**

**CO1: [K2]** Describe the requirements of packaging materials in food packaging, the testing methods used for packaged food and packaging materials, the contaminants and methods of food analysis.

**CO2: [K3]** Classify the types of packaging materials and testing methods, explain the consequences of contaminants and strategy of food analysis using spectral technique.

**CO3: [K3]** Explain the significance of utility of different packaging materials, testing protocols, identification of contaminants and food analysis methods.

**CO4: [K4]** Evaluate the use of different packaging materials for different food stuff. Investigate the applications of testing methods in food analysis and packaging in identifying contaminants and maintaining the requirements of packaging materials.

**CO5: [K4]** Assess the role of food packaging in maintaining the quality of food, in preventing contaminants, also to apply the role of testing protocols in ensuring standards of packaging materials and to assess the utility of spectral techniques in maintenance of food safety.



## **B.Sc. PLANT BIOLOGY AND PLANT BIOTECHNOLOGY**

### **Programme Specific Outcomes**

On successful completion of Bachelor of Science in Plant Biology and Plant Biotechnology, the student should be able to

- PSO 1:** Demonstrate knowledge of fundamental concepts in classical and modern Botany.
- PSO 2:** Transfer scientific knowledge through effective communication.
- PSO 3:** Exhibit integrity and upholding ethical values through professional and social consciousness.
- PSO 4:** Gain experiential and computational skills by exercises through practical classes, study trips and workshops.
- PSO 5:** Develop scientific thinking and digital skills using modern technology.
- PSO 6:** Exhibit competencies to take up careers in Botany and allied fields.
- PSO 7:** Utilize contextual knowledge effectively to function in multidisciplinary areas of research and development.
- PSO 8:** Exhibit potential for innovation and entrepreneurship in interdisciplinary areas.
- PSO 9:** Demonstrate responsibility by knowledge transfer from laboratory through community outreach.
- PSO 10:** Inculcate moral values towards professional standards and be responsible stewards of the environment encouraging sustainable practices.



## ALGAE, FUNGI & PLANT PATHOLOGY

**Code: UPB/CO/69**

**Semester: I**

**Hours: 75**

**Credits: 4**

### **Learning Objectives:**

- To classify primitive forms of plants.
- To understand diversity among lower plants.
- To focus on concepts in plant pathology.

### **Course Outcomes:**

On successful completion of this course, the learners will be able to

- CO1: [K1]** recognise the morphology of algae, fungi, lichens and basic concepts of plant pathology.
- CO2: [K2]** describe the general characteristics of algae, fungi, lichens and plant diseases.
- CO3: [K2]** elaborate the economic importance of algae, fungi, lichens and disease management.
- CO4: [K3]** explain concepts of biotic interactions, parasexuality and heterothallism.
- CO5: [K4]** compare the life cycle patterns of algae, fungi and plant defense mechanism.

## ALGAE, FUNGI & PLANT PATHOLOGY - PRACTICAL

**Code: UPB/CO/52**

**Semester: I**

**Hours: 45**

**Credits: 2**

### **Learning Objectives:**

- To study the morphological features of various algae and fungi.
- To identify plant diseases mentioned in the syllabus based on the symptoms.
- To identify the type of lichen thallus based on morphology.

### **Course Outcomes:**

On successful completion of the course the learners will be able to

- CO1: [K1]** recognize the morphology of algae, fungi and lichen forms prescribed in the syllabus.
- CO2: [K2]** isolate algal forms and plant pathogens.
- CO3: [K2]** explain symptoms of plant diseases and plant-microbe interactions.
- CO4: [K3]** illustrate algae, fungi and plant diseases through field trips.
- CO5: [K4]** prepare algal herbarium and fungal spore prints.

## **CYTOLOGY, ANATOMY & EMBRYOLOGY**

**Code: UPB/CO/53M**

**Hours: 90**

**Semester: II**

**Credits: 5**

### **Learning Objectives:**

- To enable the students understand the elementary structure and functions of eukaryotic cell organelles.
- To give an insight into the different anatomical structures in plants.
- To provide an understanding of embryology of angiosperms.

### **Course Outcomes:**

On successful completion of this course, the learners will be able to

- CO1: [K1]** recognize the various structures in cellular and tissue organization of plants along with ecological adaptation of plants.
- CO2: [K2]** discuss about the ultra-structure of cells, cell division, theories of crossing over and non-disjunction.
- CO3: [K2]** summarize the shoot and root apex organization, theories, anatomical features and embryology.
- CO4: [K3]** elucidate the overview of cell structure, cell cycle, tissue type and internal organization.
- CO5: [K4]** compare the ecological anatomy, structure and development of microsporangium and megasporangium, fertilization, development of embryo and endosperm and polyembryony.

## **CYTOLOGY, ANATOMY & EMBRYOLOGY - PRACTICAL**

**Code: UPB/CO/54**

**Hours: 45**

**Semester: II**

**Credits: 2**

### **Learning Objectives:**

- To enable students identify different stages in cell division.
- To enable students acquire the necessary skills in taking and observing free hand sections of plant materials collected from various habitats.

### **Course Outcome:**

On successful completion of the course the learners will be able to

- CO1: [K1]** identify the structure of cell organelles and stages of cell division.
- CO2: [K2]** classify the types of stomata and ovules.
- CO3: [K3]** differentiate various ergastic substances present in plant tissues.
- CO4: [K4]** analyze the anatomical features of dicots and monocots.
- CO5: [K4]** perform hand sectioning technique of plant materials.

## **BRYOPHYTES, PTERIDOPHYTES & GYMNOSPERMS**

**Code: UPB/CO/55M**

**Hours: 75**

**Semester: III**

**Credits: 5**

### **Learning Objectives:**

- To enable the students to have an overview of Non-vascular and Vascular cryptogams.
- To understand the chronological events that has taken place in the history of earth while studying Paleobotany (fossil studies).

**Course Outcomes:**

On successful completion of this course, the learners will be able to

- CO1: [K1]** define the concepts of geological time scale, heterospory, apogamy and apospory.
- CO2: [K2]** describe the structure and reproduction of thalloid to higher plant forms.
- CO3: [K2]** discuss the different methods of fossilization, sporangial organization & stellar evolution in Pteridophytes.
- CO4: [K3]** explain the rise of vascular plants through learning their classification and their salient features.
- CO5: [K3]** compare the life cycle patterns in Bryophytes, Pteridophytes and Gymnosperms (prescribed in the syllabus) and the structure of selected fossil forms.

## **BRYOPHYTES, PTERIDOPHYTES & GYMNOSPERMS - PRACTICAL**

**Code: UPB/CO/56**

**Semester: III**

**Hours: 45**

**Credits: 2**

**Learning Objectives:**

- To enable students gain expertise in hand sectioning technique.
- To enable students observe and record the characteristic features of selected species of Bryophytes, Pteridophytes and Gymnosperms and their fossil forms.

**Course Outcomes:**

On successful completion of this course, the learners will be able to

- CO1: [K1]** recognize the major groups of vascular plants.
- CO2: [K2]** describe the structure of fossil forms prescribed in the syllabus.
- CO3: [K2]** illustrate the morphological and anatomical features of vascular plants.
- CO4: [K3]** develop comprehensive skills in sectioning and micro preparation.
- CO5: [K4]** distinguish the primitive /extinct life forms based on their characteristics.

## TAXONOMY OF ANGIOSPERMS & PLANT BREEDING

**Code: UPB/CO/57**  
**Semester: IV**

**Hours: 75**  
**Credits: 5**

### Learning Objectives:

- To provide an understanding and appreciation of flowering plants.
- To encourage careful observation to identify the taxa.
- Allows comparative analysis of the major plant families.
- Students are given an insight into the basic Plant Breeding techniques.

### Course Outcomes:

On successful completion of this course, the learners will be able to

- CO1: [K1]** define the concepts in plant morphology and plant breeding.
- CO2: [K2]** explain the systems of plant classification, Botanical Nomenclature, cultivation and processing techniques of paddy, sugarcane, cotton, coffee and groundnut and different plant breeding methods.
- CO3: [K2]** describe the vegetative/floral characters of plants, construct floral diagram and floral formula.
- CO4: [K3]** explain the protocol for herbarium preparation, features of selected plant families, their economic importance and hybridization techniques.
- CO5: [K4]** compare the diagnostic characters of different plant families and plant breeding techniques.

## TAXONOMY OF ANGIOSPERMS & PLANT BREEDING - PRACTICAL

**Code: UPB/CO/58**  
**Semester: IV**

**Hours: 45**  
**Credits: 2**

### Learning objectives:

- To enable the students understand the terminologies in plant morphology and taxonomy and write botanical description for taxa.
- To develop familiarity with scientific names and the rules governing their application.
- To equip them with field identification skills and familiarize with the local flora and their economic importance.

### Course Outcomes:

On successful completion of the course, the learners will be able to

- CO1: [K2]** identify locally available plants to their respective families highlighting the family characters.
- CO2: [K2]** identify plants of economic importance and their useful parts.
- CO3: [K3]** develop comprehensive skills in field identification, collection of specimens, writing technical description and botanical drawings.
- CO4: [K3]** construct floral diagram and write floral formula for a given flower.
- CO5: [K4]** dissect and display the floral parts; analyze the vegetative and floral characters.

## PHYSIOLOGY & BIOCHEMISTRY OF PLANTS

**Code: UPB/CO/59M**  
**Semester: V**

**Hours: 75**  
**Credits: 5**

**Learning Objectives:**

- To understand the plant functions, growth and development and the physiology of flowering.
- To correlate the knowledge gained to appreciate the overall interrelations between physiology, morphology, anatomy and nature.

**Course Outcomes:**

On successful completion of this course, the learners will be able to

- CO1: [K1]** relate to various physiological and biochemical processes in plants.  
**CO2: [K2]** outline the absorption, growth and responses in plants.  
**CO3: [K2]** discuss the role of biochemicals in plant metabolism.  
**CO4: [K3]** elucidate various metabolic processes in plants.  
**CO5: [K4]** deduce the factors influencing physiological processes in plants.

## **PHYSIOLOGY & BIOCHEMISTRY OF PLANTS - PRACTICAL**

**Code: UPB/CO/67**

**Semester: V**

**Hours: 45**

**Credits: 2**

**Learning Objectives:**

- Students can comprehend basic physiological mechanisms in plants.
- Students can observe and appreciate transpiration, photosynthesis and respiration in plants.

**Course Outcomes:**

On successful completion of this course, the learners will be able to

- CO1: [K1]** recall the principles and basic mechanisms in plant physiology experiments.  
**CO2: [K2]** infer the principle behind the experimental set-up in relation to plant physiology.  
**CO3: [K3]** acquire essential practical skills to obtain accurate results based on theoretical concepts.  
**CO4: [K3]** perform experiments in context to physiological functions of plants.  
**CO5: [K4]** interpret the quantitative and qualitative data from the experiments.

## **ECOLOGY, PHYTOGEOGRAPHY & REMOTE SENSING**

**Code: UPB/CO/70**

**Semester: V**

**Hours: 60**

**Credits: 4**

### **Learning Objectives:**

- To appreciate the aesthetics and functions of biodiversity.
- To understand the importance of conservation and resource management.
- To document ecosystem services and biodiversity through field ecology.
- To engage students in the practical application of knowledge and skills acquired, towards an identified community need pertaining to environmental issues through Service Learning.

### **Course Outcomes:**

On successful completion of this course, the learners will be able to

- CO1: [K1]** write the basics of ecology, conservation biology, remote sensing and environmental ethics.
- CO2: [K2]** explain the concepts pertaining to functional and behavioural ecology in forests and urban areas, phytogeography, resource management, conservation, remote sensing, environmental ethics and policies.
- CO3: [K3]** examine the applications of various dimensions in ecology, remote sensing, environmental ethics and governance.
- CO4: [K4]** analyze the implications of functional and behavioral ecology in natural and man-made areas, biodiversity, conservation, GIS tools, environmental ethics, policies and natural disasters.
- CO5: [K5]** evaluate selected environmental issues in a community by correlating with the knowledge gained through Service Learning.

## **ECOLOGY, PHYTOGEOGRAPHY & REMOTE SENSING - PRACTICAL**

**Code: UPB/CO/62**

**Semester: V**

**Hours: 30**

**Credit: 1**

### **Learning Objectives:**

- To facilitate the physical, chemical and microbial analysis of water.
- To familiarize with GIS applications.
- To study the biological interactions.

### **Course Outcomes:**

On successful completion of this course, the learners will be able to

- CO1: [K1]** list the phytoplanktons and the role of other producers in productivity and biological oxygen demand in water bodies.
- CO2: [K2]** design a building/outdoor space with concepts pertaining to biodiversity, conservation and ecology.
- CO3: [K3]** examine the participation and outcomes of various species in biotic interactions.
- CO4: [K3]** solve the numerical data to calculate the frequency, density and abundance of plant species in a quadrat.
- CO5: [K4]** analyze the microbial and chemical quality of water samples.



## GENETICS & MOLECULAR BIOLOGY

**Code: UPB/VT/20M**

**Semester: V**

**Hours: 90**

**Credits: 5**

### **Learning Objectives:**

- To understand the basic principles of inheritance and to develop their ability to relate in real life situation.
- This course also deepens their knowledge by solving a variety of problems in Genetics.
- To introduce the key concepts in molecular basis of heredity.
- To understand gene organization, regulation and mutation.

### **Course Outcomes:**

On successful completion of this course, the learners will be able to

- CO1: [K1]** write the basic concepts in classical and molecular basis of heredity.
- CO2: [K2]** summarise the chromosome theory of linkage, characteristics of multiple alleles, factors affecting Hardy-Weinberg Equilibrium and crossing over, significance of crossing over.
- CO3: [K2]** explain the gene organization, molecular mechanism of gene expression, chromosomal and gene mutation and DNA repair.
- CO4: [K3]** elucidate the genetic mechanisms in various inheritance patterns and sex determination.
- CO5: [K4]** apply the principles in Mendelian inheritance, gene interaction, Genetic map and population Genetics and draw conclusions on the genetic data provided.

## PLANT BIOTECHNOLOGY

**Code: UPB/CO/63M**

**Semester: VI**

**Hours: 75**

**Credits: 5**

### **Learning Objectives:**

- This course aims at providing basic knowledge on the techniques and applications of the rapidly developing and revolutionary branch of science.
- The course helps students to widen their knowledge base and pursue higher studies

### **Course Outcomes:**

On successful completion of this course, the learners will be able to

- CO1: [K1]** enumerate the concepts and scope of biotechnology.
- CO2: [K2]** explain the various techniques used in plant micropropagation and rDNA technology.
- CO3: [K2]** elaborate the role of biotechnology in plant tissue culture, agriculture, medicine, environment and industry.
- CO4: [K3]** discuss the recent developments in genetic engineering with awareness on ethical, legal and safety regulations.
- CO5: [K4]** analyse the applications of biotechnology in agriculture, medicine, industry and environment.

## PLANT BIOTECHNOLOGY - PRACTICAL

**Code: UPB/CO/64**

**Semester: VI**

**Hours: 45**

**Credits: 2**

**Learning Objectives:**

- To isolate and observe various biofertilizers from soil and plant sample.
- To culture plant tissue and to develop callus.
- To prepare synthetic seeds using somatic embryos.

**Course Outcomes:**

On successful completion of this course, the learners will be able to

- CO1: [K1]** recognize the working principle of various equipments in biotechnology.  
**CO2: [K2]** demonstrate practical skills to perform experiments and obtain accurate results.  
**CO3: [K3]** analyse the results critically based on theory.  
**CO4: [K3]** identify the appropriate biotechnological application in crop improvement.  
**CO5: [K4]** interpret the techniques in rDNA technology.

## **FUNDAMENTALS OF GARDENING**

**Code: UPB/CO/65**

**Semester: VI**

**Hours: 60**

**Credits: 4**

**Learning Objectives:**

- To recognize the importance of growing plants and practice the knowledge gained by developing kitchen garden and ornamental garden.
- To be able to design gardens and become entrepreneur in Horticulture.

**Course Outcomes:**

On successful completion of this course, the learners will be able to

- CO1: [K1]** define the concepts in horticulture and seed technology.  
**CO2: [K2]** demonstrate a working knowledge on biology of soil, compost making, designing and planning of garden, pest, diseases and nutrient management practices.  
**CO3: [K3]** apply horticultural skills acquired to design various styles of garden, terrarium preparation, flower arrangement and plant propagation techniques.  
**CO4: [K3]** explain the importance of horticultural plants, principles and practices of seed health testing, seed production and the maintenance of plants in different environmental conditions.  
**CO5: [K4]** analyse the theoretical concepts of seed germination, seed processing, plant propagation methods, seed testing and the principles involved in landscaping for horticultural crops.

## **FUNDAMENTALS OF GARDENING - PRACTICAL**

**Code: UPB/CO/66**

**Semester: VI**

**Hours: 30**

**Credit: 1**

**Learning Objectives:**

- To enable the students apply horticulture techniques learnt in classroom in an outdoor setting.
- To recognize and identify common ornamental and foliage plants.

**Course Outcomes:**

On successful completion of this course, the learners will be able to

- CO1: [K1]** identify locally available horticulture plants, common vegetable seeds and

- suggest suitable propagation techniques.
- CO2: [K2]** explain the horticultural importance of garden components and garden tools.
- CO3: [K3]** establish the identity of the given garden pest/disease and comment on its symptoms in the host plant and control measures.
- CO4: [K3]** apply landscape gardening concepts, principles and design a suitable garden in a given area.
- CO5: [K4]** critically comment on the various horticultural practices and equipment used in seed testing.

## **BIOPROCESS TECHNOLOGY**

**Code: UPB/VT/21M**  
**Semester: VI**

**Hours: 60**  
**Credits: 3**

### **Learning Objectives:**

- To introduce the basics of industrial fermentation processes.
- To highlight the diverse applications of microbes.
- To provide basic information on safety and quality control in microbial production.

### **Course Outcomes:**

On successful completion of this course, the learners will be able to

- CO1: [K1]** recall the regulations on safety and applications of microbes.
- CO2: [K2]** explain the design and operation of industrial practices in mass production of microbial products.
- CO3: [K2]** describe the fermentation processes in industrial production.
- CO4: [K3]** elaborate the protocols, challenges and quality control in bioprocess technology.
- CO5: [K4]** evaluate the nutritional and environmental factors in cell culture.

## **FUNDAMENTALS OF FOOD MICROBIOLOGY**

**Code: UPB/CE/31**  
**Semester: V**

**Hours: 75**  
**Credits: 5**

### **Learning Objectives:**

- To introduce the students to the importance of microbes in food industry.
- To appreciate the role of microbes in fermentation.
- To provide basic information on food processing and food borne disease.
- To introduce the basic techniques in food analysis.

### **Course Outcomes:**

On successful completion of this course, the learners will be able to

- CO1: [K1]** define the basic concepts in food microbiology.
- CO2: [K2]** explain the preparation and benefits of fermented foods and the factors that affect microbial growth.
- CO3: [K2]** discuss the methods used to control food spoilage and food preservation.
- CO4: [K3]** develop entrepreneurial skills in the preparation of fermented foods and measures to control food-borne pathogens.
- CO5: [K4]** compare the role of microorganisms in fermentation and food spoilage.

## MUSHROOM CULTIVATION

Code: UPB/CE/32  
Semester: V

Hours: 75  
Credits: 5

### Learning Objectives:

- To understand classification of mushrooms and mushroom biology.
- To learn mushroom cultivation techniques.
- Brings an insight on the nutritive value and value addition of mushrooms.
- To understand and appreciate the role of mushrooms in Nutrition, Medicine, Health and Environment.

### Course Outcomes:

On successful completion of this course, the learners will be able to

- CO1: [K1] describe the basic concepts in mushroom biology, classification, cultivation, post-harvest technologies and diseases.
- CO2: [K2] explain the economic importance, nutritive value and medicinal value of mushrooms.
- CO3: [K2] discuss the methodologies in the cultivation of mushrooms and factors affecting the production of basidiocarps.
- CO4: [K3] develop entrepreneurship skills in mushroom cultivation and value added products of mushrooms.
- CO5: [K4] compare the techniques used to isolate pure culture, spawn preparation and in mushroom cultivation.

## BIOSTATISTICS AND BIOINFORMATICS

Code: UPB/CE/21  
Semester: VI

Hours: 75  
Credits: 5

### Learning Objectives:

- To initiate data collection, tabulation and analysis of experimental data.
- To understand different types of statistical analysis, probability and significance.
- To introduce the basic concepts in bioinformatics – scope and applications.

### Course Outcomes:

On successful completion of this course, the learners will be able to

- CO1: [K1] relate the fundamentals of data collection and bioinformatics.
- CO2: [K2] elucidate the use of statistical and *in silico* tools.
- CO3: [K2] describe the fundamental concepts in biological databases.
- CO4: [K3] construct tables for numerical data presentation.
- CO5: [K3] solve statistical problems, probability and significance.

## BASICS IN NANOTECHNOLOGY

Code: UPB/CE/24  
Semester: VI

Hours: 75  
Credits: 5

### Learning Objectives:

- Aims to provide comprehensive knowledge of basics in nanotechnology.

- Helps the students understand the various applications of nanoparticles.

**Course Outcomes:**

On successful completion of this course, the learners will be able to

- CO1: [K1]** relate the basic concepts in nanoscience and nanotechnology.  
**CO2: [K2]** explain properties and characterization of nanoparticles.  
**CO3: [K2]** describe the novel methods of synthesis and the interaction of the nanostructures with the cell, nucleic acids, proteins and environment.  
**CO4: [K3]** elucidate the applications of nanoparticles in textile, food, health and medicine.  
**CO5: [K4]** compare the advantages and disadvantages of nanoparticles in health, medicine and environment.

## **MEDICINAL PLANTS & ETHNOBOTANY**

**Code: UPB/CE/25**  
**Semester VI**

**Hours: 75**  
**Credits: 5**

**Learning Objectives**

- To understand the nuances of medicinal plants and their phytoconstituents
- To explore the perspectives in ethnobotanical research

**Course Outcomes:**

On successful completion of the course the learners will be able to

- CO1: [K1]** recognize plants and their uses in relation to social, culture and medicinal purposes.  
**CO2: [K2]** explain the background of traditional systems of medicines, cultivation, management, ethnobotanical knowledge, ethics and legal awareness about medicinal plants.  
**CO3: [K2]** elucidate the phytochemistry, pharmacognosy, biopharmacology and bioprospecting of medicinal plant extracts.  
**CO4: [K3]** elaborate the techniques in the phytochemical analysis of medicinal plants.  
**CO5: [K4]** analyse various phytoconstituents, formulations, adulteration and quality of herbal drugs.

## **FORESTRY**

**Code: UPB/CE/33**  
**Semester: VI**

**Hours: 75**  
**Credits: 5**

**Learning Objectives:**

- To study the distribution pattern, composition and diversity of forest ecosystem
- To understand the method of forest management principles and conservation
- To get familiarized with the forest products, wood technology, tribology and IPR

**Course Outcomes:**

On successful completion of this course, the learners will be able to

- CO1: [K1]** relate the basic concepts of forestry, tribe and tribal communities and forest policies  
**CO2: [K2]** describe the forest types in India, silviculture and agroforestry practices, forest degradation, regeneration, management practices and forest resource

- CO3: [K2]** illustrate the biodiversity of forest, natural and artificial regeneration, timber processing, forest issues, forest organisations, IPR and its types
- CO4: [K3]** elucidate sustainable utilization of forest resources, forest based industries, forest conservation & protection, classification of wood, sustainable development strategies, problems in tribal development and biopiracy.
- CO5: [K4]** analyse the distribution of forests in India, major and minor forest produce, and their role in India economy, significance of ethnic community in forest conservation.

## **GENERAL MICROBIOLOGY**

**Code: UPB/SE/25M**  
**Semester: I**

**Hours: 60**  
**Credits: 4**

### **Learning Objectives:**

- To provide comprehensive knowledge about microbes and its effect on man and environment.
- To provide comparative analysis of major groups of microbes.
- To appreciate the role of microbes in fermentation.

### **Course Outcomes:**

On successful completion of this course, the learners will be able to

- CO1: [K1]** relate to the fundamentals and applications of microbiology.
- CO2: [K2]** explain the historical background, factors influencing growth and control of microbes.
- CO3: [K2]** describe the significance of pathogenic and beneficial role of microorganisms.
- CO4: [K3]** elaborate basic microbiological techniques.
- CO5: [K4]** discuss the general characteristics of microbes and antibiotics.

## **GENERAL MICROBIOLOGY - PRACTICAL**

**Code: UPB/SE/26**  
**Semester: I**

**Hours: 30**  
**Credit: 1**

### **Learning Objectives:**

- To comprehend the role of microbes in nature.
- To enable students to develop their skills in techniques in microbiology.

### **Course Outcomes:**

On successful completion of this course, the learners will be able to

- CO1: [K1]** identify the tools, glassware and equipment used in microbiology.
- CO2: [K2]** prepare different culture media for microbial growth.
- CO3: [K3]** demonstrate isolation of pure microbial cultures.
- CO4: [K4]** analyze the characteristics of microbes.
- CO5: [K4]** perform basic microbiological techniques.

## BIOINSTRUMENTATION

**Code: UPB/SU/05M**

**Semester: IV**

**Hours: 60**

**Credits: 4**

### **Learning Objectives:**

- To understand the principle, operation and maintenance of various tools/equipment in the laboratory.
- Perform experiments using the laboratory instruments and formulate experiments for project work.

### **Course Outcomes:**

On successful completion of this course, the learners will be able to

- CO1:[K1]** recognize the principle and use of various instruments for biological experiments.  
**CO2:[K2]** describe techniques used in separation and analysis of biomolecules.  
**CO3:[K2]** explain the quantitative analysis of molecules using various equipment.  
**CO4:[K3]** discuss the application of instruments used for the microscopic, physical and analytical studies of biological samples.  
**CO5:[K4]** evaluate the principle, construction, operation and applications of various separation techniques and instruments.

## TECHNIQUES IN BIOINSTRUMENTATION - PRACTICAL

**Code: UPB/SU/08**

**Semester: IV**

**Hours: 30**

**Credit: 1**

### **Learning Objectives:**

- To find out pH of different samples.
- To use various chromatographic and electrophoretic techniques for separation of various biomolecules.
- To study and number of cells in given biological samples.
- To draw microscopic biological samples using camera lucida.

### **Course Outcomes:**

On successful completion of this course, the learners will be able to

- CO1: [K2]** explain the principle and applications of instruments used in biological studies.  
**CO2: [K3]** estimate the concentration of bio-molecules.  
**CO3: [K3]** calculate the cell count and dimensions of microscopic objects.  
**CO4: [K4]** analyze the separation of molecules using chromatographic and centrifugation techniques.  
**CO5: [K4]** correlate the use of different microscopes for observation of microscopic details.

## IT SKILLS FOR BIOLOGISTS

**Code: UPB/SK/03**

**Hours: 45**

**Semester: IV**

**Credits: 3**

### **Learning Objectives:**

- To familiarize the student with the preparation of scientific documents in MS Word, MS Excel and MS PowerPoint
- To design and develop reports and videos using multimedia

### **Course outcome:**

On successful completion of this course, the learners will be able to

- CO1: [K2]** describe the functional components of computer.  
**CO2: [K2]** compare and use tools for creating a document.  
**CO3: [K3]** identify the vulnerability of internet systems and defend the mechanisms of attacks.  
**CO4: [K3]** develop knowledge on computational skills in biology.  
**CO5: [K4]** analyze the use of computer for various application.

## ESSENTIALS OF MICROBIOLOGY

**Code: UPB/SU/29**

**Hours: 60**

**Semester: I**

**Credits: 4**

### **Learning Objectives:**

- To understand the functional paradigm of microbes in diverse fields.
- To contemplate the growth and control of microorganisms.

### **Course Outcome:**

On successful completion of this course, the learners will be able to

- CO1: [K1]** recollect the background, characteristics and significance of microbes.  
**CO2: [K2]** explain the factors, processes, media involved in microbial culture.  
**CO3: [K2]** deduce the pathogenic and beneficial role of microbes in food, medicine and environment.  
**CO4: [K3]** describe the contributions of microbiologists, fermentation methods, interaction of microbes with respect to biotic and abiotic components.  
**CO5: [K4]** analyse the significance of microbes in industrial preparation of fermented foods, wastewater treatment and environment sustainability.



## ESSENTIALS OF MICROBIOLOGY - PRACTICAL

**Code: UPB/SU/14**  
**Semester: I**

**Hours: 30**  
**Credit: 1**

### Learning Objectives:

- To provide a basic knowledge on the main microbiological technique.
- To enable the students learn the working principle and construction of equipment used in Microbiology.
- To impart practical skills to isolate microbes from different sources.
- To demonstrate the motility of bacteria.

### Course outcome:

On successful completion of this course, the learners will be able to

- CO1: [K1]** recognize various tools, glassware, equipment and microbes used in microbiology.  
**CO2: [K2]** isolate microbes under axenic condition.  
**CO3: [K3]** characterize microorganisms from different sources.  
**CO4: [K3]** prepare fermented foods.  
**CO5: [K4]** assess quality of water and milk.

## FUNDAMENTALS OF BOTANY

**Code: UPB/SE/27**  
**Semester: II**

**Hours: 60**  
**Credits: 4**

### Learning Objectives:

- To provide a comprehensive knowledge in the broad areas of Plant Diversity.
- To understand the various technical terminologies used in plant description.
- To give an insight into the different anatomical structures in plants.
- To appreciate interactions between various biotic communities.
- To introduce students to the basic concepts of horticulture.

### Course outcome:

On successful completion of this course, the learners will be able to

- CO1: [K2]** describe the concepts in co-evolution of plants and animals, plant propagation pollination biology and the floral and vegetative morphology.  
**CO2: [K3]** explain the life cycle in lower plant forms, the structure of male and female gametophyte and the process of fertilization.  
**CO3: [K3]** identify the diagnostic characters of plant families and their economic importance.  
**CO4: [K4]** classify the flowering plants by investigating the floral and vegetative structures.  
**CO5: [K4]** discuss the different types of biotic interactions existing in nature, stomata, endosperms and plant propagation techniques.

## FUNDAMENTALS OF BOTANY - PRACTICAL

**Code: UPB/SE/28**  
**Semester: II**

**Hours: 45**  
**Credits: 1**

### Learning Objectives:

- To study the morphological features of various algae and fungi.
- To enable students acquire the necessary skills in taking and observing free hand sections of plant materials.
- To train students in plant propagation techniques.

**Course outcome:**

On successful completion of this course, the learners will be able to

- CO1: [K2]** describe plant taxa and identify based on the family diagnostic characters.  
**CO2: [K2]** observe the various biological interactions through field study.  
**CO3: [K3]** develop skills and ability to take thin sections in various plant forms.  
**CO4: [K3]** apply the horticulture techniques learnt in classroom in both outdoor and indoor setting.  
**CO5: [K4]** analyze the different organs of plant and secondary growth.

## **BASICS IN FOOD AND ENVIRONMENTAL MICROBIOLOGY**

**Code: UPB/SU/30**

**Hours: 60**

**Semester: III**

**Credits: 4**

**Learning Objectives:**

- To introduce the students to the fascinating world of microorganisms.
- To understand and appreciate their role in nutrition, medicine, health and environment.

**Course Outcomes:**

On successful completion of this course, the learners will be able to

- CO1: [K1]** recall the fundamental concepts of microbiology.  
**CO2: [K2]** explain the characteristics of microbes, contributions of pioneers in microbiology.  
**CO3: [K2]** describe the beneficial and harmful role of microbes in food and environment.  
**CO4: [K3]** elaborate the processes involved in microbial growth, fermentation of food, microbial analysis of water, food spoilage and control of microorganisms.  
**CO5: [K4]** elucidate the role of microbes in wastewater treatment, solid waste management and environmental sustainability.

## **BASICS IN FOOD AND ENVIRONMENTAL MICROBIOLOGY- PRACTICAL**

**Code: UPB/SU/31**

**Semester: III**

**Hours: 30**

**Credit: 1**

### **Learning Objectives:**

- To help students develop skills in microbiology techniques.
- To enable students acquire skills in preparation of various probiotic products.

### **Course Outcomes:**

On successful completion of this course, the learners will be able to

- CO1: [K2]** recognize the tools, glassware, equipment and microbes used in microbiology.  
**CO2: [K2]** differentiate microbes based on cultural characters.  
**CO3: [K3]** prepare culture media and fermented foods.  
**CO4: [K4]** analyze the quality of food, milk and potable water.  
**CO5: [K4]** perform microbiological techniques.

## **BASICS IN VEGETABLE GARDENING**

**Code: UPB/NM/04**

**Semester: III**

**Hours: 30**

**Credits: 2**

### **Learning Objectives:**

- To impart practical skills of vegetable gardening to grow organically in home gardens.
- To introduce the concept of organic farming.

### **Course outcome:**

On successful completion of this course, the learners will be able to

- CO1: [K2]** describe the concepts in organic gardening.  
**CO2: [K2]** identify common garden implements and seeds of locally available vegetables.  
**CO3: [K2]** demonstrate garden operation procedures and cultivation techniques of selected vegetable crops.  
**CO4: [K4]** design the layout for a kitchen garden and choose vegetable crops for a geographic region.  
**CO5: [K4]** analyse the common pests and diseases in a vegetable garden and suggest suitable control measures.

## FLORICULTURE AND LANDSCAPING

**Code: UPB/NM/06**  
**Semester: III**

**Hours: 30**  
**Credits: 2**

### **Learning Objectives:**

- To provide an overview of Floriculture and its importance
- Understand different garden styles
- To introduce various techniques in raising a nursery
- Familiarize with principles and practices of landscaping and ornamental gardening.

### **Course outcome:**

On successful completion of this course, the learners will be able to

- CO1: [K1]** define the various concepts in Floriculture, nursery techniques and landscaping.
- CO2:[K2]** identify regional ornamental plants, common garden implements, pests and diseases, media used for propagating nursery plants, various garden styles and garden components.
- CO3: [K3]** apply the principles of landscaping and garden maintenance practices and use it productively.
- CO4: [K3]** prepare nursery beds, potting mixture and organic fertilizers.
- CO5: [K4]** explain cultivation practices of selected cut flowers, plant propagation methods and structures.

## FOOD MICROBIOLOGY

**Code: UPB/NM/05**  
**Semester: IV**

**Hours: 30**  
**Credits: 2**

### **Learning Objectives:**

- To comprehend the role of microbes in food.
- To prepare and analyze fermented foods.

### **Course outcome:**

On successful completion of this course, the learners will be able to

- CO1: [K1]** explain the protocol for preparation of fermented foods and their health benefits.
- CO2: [K2]** describe the role of microbes in food industry.
- CO3: [K3]** prepare culture media and isolate microbes aseptically.
- CO4: [K4]** assess the quality of food, milk and potable water.
- CO5: [K4]** enumerate the factors causing food spoilage and food-borne infections.

## HYDROPONICS

**Code: UPB/NM/07**  
**Semester: IV**

**Hours: 30**  
**Credits: 2**

### **Learning Objectives:**

- To acquaint with different types of hydroponic system.
- To provide a comprehensive knowledge on plant propagation through hydroponics.
- To initiate entrepreneurial skills and encourage them to become women entrepreneurs.

### **Course outcome:**

On successful completion of this course, the learners will be able to

- CO1: [K2]** describe the components and advantages of hydroponic systems.  
**CO2: [K3]** identify suitable plants that can be grown using hydroponics system.  
**CO3: [K3]** analyze nutrient requirement and deficiency symptoms for plants growing in soilless culture.  
**CO4: [K4]** design a simple hydroponics unit.  
**CO5: [K4]** exhibit entrepreneurial skills by using managing and marketing strategies.

## MUSHROOM CULTIVATION

**Code: UPB/NM/08**  
**Semester: II**

**Hours: 30**  
**Credits: 2**

### **Learning Objectives:**

- To learn the techniques of mushroom cultivation.
- It brings an insight on the nutritive value and recipes prepared using mushrooms.

### **Course outcome:**

On successful completion of this course, the learners will be able to

- CO1: [K1]** define technical terminologies related to mushroom biology.  
**CO2: [K2]** describe techniques used in cultivation of edible mushrooms.  
**CO3: [K3]** choose and schedule mushroom production.  
**CO4: [K4]** acquire entrepreneurship skills for edible mushroom cultivation.  
**CO5: [K5]** design infrastructure for mushroom production.

## ADVANCES IN FOOD MICROBIOLOGY

**Code: PPB/EL/08**  
**Semester: I**

**Hours: 60**  
**Credits: 3**

### Learning Objectives:

- To introduce various techniques employed for the study of microbes associated with foods.
- To study the role of microbes in food preparation, spoilage and preservation.
- To provide an overview of food borne diseases and microbial toxins.

### Course Outcome:

On successful completion of this course, the learners will be able to

- CO1: [K1]** enumerate upon microbial growth, control, fermentation and GM foods.  
**CO2: [K2]** describe the microorganisms based on their colony characteristics and their significance in fermented foods.  
**CO3: [K3]** explain the role of microbes in fermentation, GM foods, food industry and toxin production.  
**CO4: [K4]** deduce the fermentation process and the protocol for the preparation of selected fermented food products.  
**CO5: [K5]** elaborate on sterilization principles, mechanism of fermentation, food estimation, preparation of fermented foods and industrial applications.

## LABORATORY TECHNIQUES IN FOOD MICROBIOLOGY

**Code: PPB/EL/09**  
**Semester: II**

**Hours: 90**  
**Credits: 3**

### Learning Objectives:

- To introduce various techniques employed for the study of microbes associated with foods.
- To study the role of microbes in food fermentation and spoilage.

### Course Outcome:

On successful completion of this course, the learners will be able to

- CO1: [K1]** identify microbes based on their morphological and biochemical characteristics.  
**CO2: [K2]** demonstrate isolation of pure microbial culture.  
**CO3: [K3]** experiment with the principles of fermentation using different foods.  
**CO4: [K4]** perform bacteriological analysis of water, milk and other foods.  
**CO5: [K5]** develop competency in microbiological laboratory skills and in the preparation of fermented foods.

## DEPARTMENT OF ADVANCED ZOOLOGY & BIOTECHNOLOGY

### PROGRAMME SPECIFIC OUTCOMES

On successful completion of the Bachelor of Science in Advanced Zoology and Biotechnology Programme, the student should be able to:

- PSO1:** Explain concepts and principles in zoological sciences.
- PSO2:** Communicate effectively ideas and concepts in oral and written forms.
- PSO3:** Endorse ethical values in personal and professional life and research.
- PSO4:** Collect, categorize, analyze and interpret biological data by employing appropriate tools.
- PSO5:** Use digital tools and adaptive technology to conduct investigations of higher order to mitigate problems in society and environment.
- PSO6:** Be proficient in basic laboratory techniques, effectively use modern equipments and gain competence to pursue higher studies and research.
- PSO7:** Engage in digital documentation of fauna both individually and as a team.
- PSO8:** Employ skills in entrepreneurial endeavour.
- PSO9:** Demonstrate responsibility to society through community outreach.
- PSO10:** Display environmental stewardship through conservation and sustainable practices.

Mapping of Programme Specific Outcomes (PSOs) with POs.

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
<b>PO1</b>	<b>X</b>									
<b>PO2</b>		<b>X</b>								
<b>PO3</b>			<b>X</b>							
<b>PO4</b>				<b>X</b>						
<b>PO5</b>					<b>X</b>					
<b>PO6</b>						<b>X</b>				
<b>PO7</b>							<b>X</b>			
<b>PO8</b>								<b>X</b>		
<b>PO9</b>									<b>X</b>	
<b>PO10</b>										<b>X</b>

## BIOLOGY OF ANIMALS I

**Code: UZB/CO/57M**  
**Semester: I**

**Hours: 60**  
**Credits: 4**

### Learning Objective:

- This course is designed to introduce the undergraduate students to a wide array of invertebrates so that they may integrate the structural and functional facts of every group and follow their phylogeny systematically.
- The course is also intended to give students a preliminary perspective on the diversity of fauna that would kindle their interest in animal life and increase their understanding of the morphological and anatomical organisation of animals.

### Course Outcomes:

**On successful completion of the course, the learners will be able to:**

- CO1: [K2]** Compare the different levels of organization in the animal kingdom. Explain the general characteristic features of the Invertebrate group from Protozoa to Annelida.
- CO2: [K2]** Outline the external and internal organization and function of the Invertebrate Phyla from Protozoa to Annelida. Explain the life cycle of protozoan and helminth parasites.
- CO3: [K3]** Classify the representative phyla upto the class level. Categorize the canal system in sponges, types of coral reefs.
- CO4: [K4]** Compare the complexity of the canal system in sponges, explain the basic biological processes of coral reef formation, identify polymorphism in coelenterates and adaptive radiation in polychaetes.
- CO5: [K4]** Elucidate the life cycle and prophylaxis of protozoan and helminth parasites.

## BIOLOGY OF ANIMALS PRACTICAL

**Code: UZB/CO/54**  
**Semester: I**

**Hours: 60**  
**Credit : 1**

### Learning Objective:

- The course is designed to give the students a broad perspective of common invertebrates and chordates in terms of their taxonomy, symmetry, exoskeletal structures, adaptations and habitat.

### Course Outcomes:

**On successful completion of the course the learners will be able to:**

- CO1: [K2]** Illustrate and outline the description of organisms from Protozoa to Mammalia.
- CO2: [K3]** Classify arthropods, molluscs, fishes and reptiles using dichotomous key.
- CO3: [K4]** Identify freshwater invertebrates after collection.
- CO4: [K4]** Compare and contrast beak, feet and feathers of birds, scales of fishes and dentition in mammals.
- CO5: [K5]** Assess biodiversity of insects.

## BIOLOGY OF ANIMALS II

**Code: UZB/CO/18**  
**Semester: II**

**Hours: 60**  
**Credits: 4**



**Learning Objective:**

- This course is designed to introduce the undergraduate students to a wide array of invertebrates and primitive chordates so that they may integrate the structural and functional facts of every group and follow their phylogeny systematically.
- The course is also intended to give students a preliminary perspective on the diversity of fauna that would kindle their interest in animal life and increase their understanding of the morphological and anatomical organisation of animals.

**Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

- CO1: [K2]** Explain the general characteristic features body plan and functions of the representative phyla (Arthropoda, Mollusca, Echinodermata, Prochordata). Describe the appendages of prawns, mouthparts of insects.
- CO2: [K2]** Describe the formation of foot and shell in molluscs and trace the phenomenon of Torsion in Gastropoda. Explain the ciliary mode of feeding in Prochordates. Explain Retrogressive metamorphosis in Urochordates.
- CO3: [K3]** Classify the representative Phyla upto the class level. Identify the larval forms of Crustacea and Echinodermata.
- CO4: [K4]** Distinguish between the various larval forms of Crustaceans and Echinoderms. Compare mouth parts of insects in relation to the feeding habits. Explain Torsion in Gastropods
- CO5: [K4]** Explicate the phylogenetic significance of *Peripatus* and the systematic position of Prochordates. Compare the mouth parts of insects in relation to their feeding habits.

## **BIOLOGY OF ANIMALS III**

**Code: UZB/CO/52M**

**Semester: II**

**Hours: 75**

**Credits: 4**

**Learning Objective:**

- This course is designed to introduce the undergraduate students to a wide array of vertebrates so that they may integrate the structural and functional facets of every group and follow their phylogeny systematically.
- The course is also intended to give students a preliminary perspective of the diversity of fauna that would kindle their interest in animal life and increase their understanding of the morphological and anatomical organization of animals.

**Course Outcomes:**

**On successful completion of the course the learners will be able to:**

- CO1: [K2]** Describe the general characters, external and internal organization and characters of vertebrate groups.
- CO2: [K3]** Identify and classify common vertebrates, poisonous and non-poisonous snakes
- CO3: [K3]** Explore terrestrial invasion and neoteny in amphibians, biological status of *Sphenodon*, origin, adaptive radiation, external and internal organization of vertebrate groups and demonstrate the ecology, geology and extinction of Mesozoic era.
- CO4: [K4]** Compare and describe types of placenta & dentition in mammals; parental care in fishes and amphibians; migration in fishes and birds. Categorize adaptations in birds for an aerial and terrestrial mode of life and reproductive systems in mammals.
- CO5: [K4]** Investigate the biological status of *Sphenodon*. Outline the concepts of Neoteny, terrestrial invasion in amphibians, adaptive radiation in reptiles and Mesozoic era and extinction.

## CELL BIOLOGY

**Code: UZB/CO/21M**  
**Semester: III**

**Hours: 60**  
**Credits: 4**

### **Learning Objective:**

- This course provides an opportunity for the students to understand the unity and diversity of cells and presents strategies for studying their molecular organization in detail.
- The paper also highlights the study of cancer in the context of Cell Biology and novel cancer therapies.

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

- CO1: [K2]** Describe the structure of the major cellular organelles and the types of interactions between cells. Explain the chemical composition of cells and use of different microscopic techniques in evaluating cell organization.
- CO2: [K3]** Apply the principle of centrifugation for subcellular fractionation. Illustrate the models proposed to explain the organization of the plasma membrane, nuclear envelope and polymorphism in lysosomes. Identify the structure and functions of microtubules, actin filaments and illustrate their role in cell mobility.
- CO3: [K4]** Explicate the functions of the plasma membrane, major cellular organelles and the mechanism of signal transduction. Illustrate and explain the phases of Cell cycle.
- CO4: [K4]** Sequence the events associated with protein synthesis, organization of the microtubules and microfilaments, cell senescence and apoptosis.
- CO5: [K5]** Explain the mechanism of signal hypothesis, vesicular transport and compaction of the DNA in the nucleus. Justify the characteristics of cancer cells and substantiate therapeutic measures to treat cancer.

## BIOCHEMISTRY

**Code: UZB/CO/22M**  
**Semester: III**

**Hours: 60**  
**Credits: 4**

### **Learning Objective:**

- This course deals with concepts in Biochemistry to highlight the fitness of biomolecules in terms of their 3-D structure and their roles in specific cellular and metabolic functions.
- The course provides an understanding of the chemical and biological content in which each biomolecule, reaction or pathway operates.

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

- CO1: [K2]** Explain the chemical unity of diverse living organisms and the qualities of water. Elaborate on the biomolecules based on the structure.
- CO2: [K3]** Classify Proteins, Lipids, Carbohydrates, Nucleic acids and enzymes based on their structure.
- CO3: [K4]** Explicate the metabolic pathways in the context of Glycolysis, TCA cycle, Fatty acid oxidation and Fatty acid synthesis.
- CO4: [K4]** Examine the weak interactions in aqueous systems, the ionization of water, weak acids and weak bases, intercellular signaling, enzyme-substrate reaction and application of enzymes.
- CO5: [K5]** Elucidate Michaelis-Menten equation. Validate metabolic cycles.

## CLASSICAL & MOLECULAR GENETICS

**Code: UZB/CO/50M**  
**Semester: IV**

**Hours: 60**  
**Credits: 4**

**Learning Objective:**

- This course enables students to understand the process by which genetic information is transmitted from one generation to another in predictable ways, as proposed initially by Mendel and later by other geneticists.
- The Course facilitates appreciation of DNA at the molecular level that facilitates one to comprehend how DNA function affects an individual at the cellular and molecular level.

**Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

- CO1: [K2]** Explain the various patterns of inheritance, chromosomal basis of inheritance, linkage and crossing over. gene function and regulation.
- CO2: [K3]** Classify the various prenatal diagnostic tests. Examine the steps involved in Genetic Counselling. Express sex determination, sex-linked, sex-limited and sex-influenced traits.
- CO3: [K3]** Illustrate the different types of intragenic and intergenic interactions. Investigate karyotype, numerical and structural changes in chromosomes and special types of chromosomes.
- CO4: [K4]** Explore the structure and function of DNA in the context of replication, transcription, translation, regulation and mutation. Outline transformation and conjugation in the context of Bacterial Genetics.
- CO5: [K4]** Examine the pathways associated with Inherited Metabolic Disorders. Solve problems applying genetic principles in population studies.

## **CYTOGENETICS & BIOCHEMISTRY PRACTICAL**

**Code: UZB/CO/40**  
**Semester: IV**

**Hours: 60**  
**Credits: 2**

**Learning Objective:**

- The course gives hands-on training in cytogenetic techniques - micrometry, smear preparation (Buccal Epithelium and Blood), squash preparation (Onion root tip, Grasshopper Testis and salivary gland of *Chironomus* Larva).
- Biochemical techniques-extraction and estimation of total sugars, proteins, lipids, RNA and DNA, Chromatographic separation.

**Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

- CO1:[K3]** Compute measurements of cells using micrometry. Identify *Bonelia* and explain its genetic significance.
- CO2:[K4]** Examine chromosomes to identify stages of mitosis in onion root tip; meiosis in grasshopper testis; Identify giant chromosomes in salivary gland of *Chironomous* larvae
- CO3:[K4]** Analyze buccal epithelial cells and observe Barr body; Compare fingerprint patterns and explain its application; Qualitatively analyze samples to detect the presence of carbohydrates, proteins and lipids
- CO4:[K5]** Estimate the amount of sugar, protein, lipid, DNA and RNA after its extraction from appropriate biological samples
- CO5:[K4]** List the amino acids and lipid fractions based on  $R_f$  values following chromatographic separation

## ANIMAL PHYSIOLOGY

Code: UZB/CO/51M  
Semester: V

Hours: 60  
Credits: 4

### Learning Objective:

- Physiology termed as the “Queen of Biological Sciences” deals with the analysis of structure and function in living organisms.
- This enables the student to understand the entire gamut of the physiological processes.

### Course Outcomes:

**On successful completion of the course, the learners will be able to:**

- CO1:[K2]** Explain the mechanism of osmotic and ionic regulation, organs of excretion, respiration, circulation, movement, nervous and chemical coordination and Bioluminescence.
- CO2:[K3]** Categorize strategies of osmotic and ionic regulation, organs of excretion, excretory products, respiratory pigments in different phyla, vascular pumps, pathways in blood clotting, components of the nervous system, receptors and placental hormones.
- CO3:[K3]** Illustrate regulation of osmotic and ionic balance, excretion, respiration, circulation, endocrine regulation in insects and mammals, and the functional significance of Bioluminescence.
- CO4:[K4]** Examine the physiology of excretion, respiration, circulation, nervous coordination, reflex action, muscle contraction and sensory reception.
- CO5:[K5]** Justify the nature of excretory product with habitat, adaptations to high altitudes and diving. Construct the events associated with reproductive physiology.

## ANIMAL PHYSIOLOGY PRACTICAL

Code: UZB/CO/44  
Semester: V

Hours: 45  
Credits: 2

### Learning Objectives:

- The course enables the students to have a basic understanding of the fundamental processes and physiological mechanism that serves to control the various functions of both animals and human beings.

### Course Outcomes:

**On successful completion of the course, the learners will be able to:**

- CO1:[K1]** Identify and observe the histology from prepared slides (striated, unstriated, cardiac muscle, kidney, nerve cell, spinal cord) and identify haemin crystals.
- CO2:[K2]** Demonstrate the principles of  $Q_{10}$  by salivary digestion in relation to temperature and pH and ciliary activity of Fresh Water Mussel.
- CO3:[K3]** Ascertain the nature of excretory products.
- CO4:[K4]** Investigate RBC and WBC count using Haemocytometer.
- CO5:[K5]** Estimate the rate of oxygen uptake, salt loss and salt gain in *Tilapia*.

## DEVELOPMENTAL BIOLOGY & EVOLUTION

Code: UZB/CO/45  
Semester: V

Hours: 60  
Credits: 4

### Learning Objective:

- This course focuses on the gradual emergence of embryonic form and structure from

what appears to be a very modest beginning.

- The essence of the course is change - transition from one stage to another. Also highlights the modern concepts of manipulating human fertility and associated legal and ethical implications.
- Evolution revolves around basic principles of speciation and significance of fossils.

**Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

**CO1:[K2]** Explain ontogenetic development, stages in gametogenesis and fertilization; cleavage and embryonic reorganization.

**CO2:[K2]** Describe early embryonic development, embryonic induction and speciation.

**CO3:[K3]** Determine the phases of ontogeny, explain the events in fertilization, Patterns of cleavage, and mechanism of neural induction. Explore the extra embryonic development in chick and man. Analyze the different methods of fossilization.

**CO4:[K4]** Compare Spermatogenesis and Oogenesis. Examine the role of fate maps and investigate the ethical/legal implications of manipulating human fertility. Illustrate the development of eye and heart and placenta in vertebrates. Explore the concept of species and subspecies; types of isolating mechanisms involved in speciation; the fossil record of Man.

**CO5:[K5]** Summarize *in vitro* fertilization techniques, Justify the prevention of multiple births; Compare and determine the role of isolating mechanisms involved in speciation.

Verify the role of inducers in organ development and validate the techniques involved in the dating of fossils.

## **.DEVELOPMENTAL BIOLOGY & EVOLUTION PRACTICAL**

**Code: UZB/CO/46**

**Semester: V**

**Hours: 30**

**Credit: 1**

**Learning Objectives:**

- Students gain an insight into the developmental stages of representative organisms, placenta of mammals, fossils and living fossils through slides and specimen.
- They also observe the motility of sperms in rat, and prepare temporary mounts of chick blastoderm.

**Course Outcomes:**

**On completion of the course, the learners will be able to:**

**CO1:[K2]** Describe the developmental stages of *Amphioxus*, Frog and Chick.

**CO2:[K2]** Discuss placenta of sheep, man and rat.

**CO3:[K3]** Examine fossils and living fossils. Prepare a squash of rat testis and observe live sperms.

**CO4:[K4]** Compare and contrast mammalian testis and ovary.

**CO5:[K5]** Distinguish developmental stages of *Amphioxus*, frog and chick.

## ENVIRONMENTAL BIOLOGY

**Code: UZB/CO/58**  
**Semester: VI**

**Hours: 60**  
**Credits: 4**

### **Learning Objective:**

- This course is concerned with the interrelationships of living organisms and their environments and is studied with a view to discover the principles which govern the relationships.
- The students are made conscious of their surroundings by instilling in their minds the growing concern for conservation and analyse ecological issues through Service Learning Project.

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

**CO1:[K2]** Explain the scope of Ecology, detail the interaction of physico- chemical parameters in various habitats. Associate the impacts of global climate change with alterations in habitat.

**CO2:[K2]** Interpret ecosystem functioning through abiotic and biotic factors. Describe the faunal diversity in the different habitats. Summarize the studies and theories in Exobiology.

**CO3:[K3]** Discuss interplay of environmental factors in macro habitats, microhabitats, ecological niches and organisms, differentiate the biota of various habitats and their adaptations to their environment.

**CO4:[K4]** Classify the branches of Ecology. Illustrate the Biogeochemical cycles. Compare the types of life support systems employed for survival in space. Deliberate on the complexities of issues that lead to global climate change.

**CO5:[K5]** Justify the animal population interactions and adaptations in the different habitats. Justify carbon sequestration, carbon trading and GHG audit. Critically analyze the steps involved in various ecological issues by correlating with knowledge gained through Service Learning.

## ENVIRONMENTAL BIOLOGY PRACTICAL

**Code: UZB/CO/48**  
**Semester: VI**

**Hours: 45**  
**Credits: 2**

### **Learning Objective:**

- Students estimate abiotic parameters of water samples from different sources through titrimetric and colorimetric methods.
- Observe representative samples from rocky and sandy shore, marine plankton and animal associations to understand their adaptations/ relationships and record noise levels in different areas of the campus.

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

**CO1:[K2]** Differentiate rocky shore fauna from sandy shore fauna and highlight their adaptations.

**CO2:[K3]** Discuss animal associations; ascertain noise levels and determine its implications.

**CO3:[K4]** Analyze common marine plankton in a sample and document primary productivity.

**CO4:[K5]** Estimate different abiotic parameters such as Dissolved oxygen, Salinity, Free Carbon-di-oxide, Carbonates and bicarbonates, Phosphates, and Calcium in water samples.

**CO5:[K6]** Conduct morphometry of a pond ecosystem and construct a food web.

## PLANT AND ANIMAL CELL BIOTECHNOLOGY

**Code: UZB/VT/21M**

**Semester: V**

**Hours: 60**

**Credits: 4**

### **Learning Objective:**

- The course aims to expose the students to the science of Plant and Animal cell Biotechnology which has an enormous thrust in the field of research and health care.
- The paper deals with basic principles and the applications of latest techniques in Genetic Engineering, for the production of transgenic plants and seedless varieties of fruits.
- The course highlights the techniques and applications of animal cell culture for the production of proteins for diagnostics and treatment of diseases.

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

- CO1: [K1]** Recall the fundamental concepts in Genetic Engineering, plant cell and tissue culture, Agricultural Biotechnology, animal cell and organ culture and Health Care Biotechnology.
- CO2: [K2]** Discuss the techniques involved in preparation of culture media and production of plant and animal cell cultures, callus culture and organ culture. Review the importance of bioreactors for large scale culture of cells.
- CO3: [K3]** Demonstrate the production of hybrid plants through somaclonal variation & somatic hybridization techniques and methods of transferring genes into animal cells. Predict the safety measures and regulations for rDNA work.
- CO4: [K4]** Examine the techniques in the production of transgenic plants, transfection and transplantation of cultured cells and downstream processing of proteins.
- CO5: [K5]** Explain the production and purification of interferons, insulin, vaccines, monoclonal antibodies in the context of Health Care Biotechnology.

## CULTURE TECHNIQUES

**Code: UZB/VT/22**  
**Semester: V**

**Hours: 30**  
**Credit: 1**

### Learning Objectives:

- This course enables students to gain knowledge about the laboratory organization and various techniques employed for plant tissue culture
- To understand the importance of aseptic condition

### Course Outcomes:

**On successful completion of the course learners will be able to:**

**CO1:[K2]** Explain the working principle and application of Laminar air flow, Incubator, CO<sub>2</sub> Incubator, Cryostorage, Inverted microscope.

**CO2:[K2]** Outline the application of culture vessels used in culture techniques.

**CO3:[K3]** Demonstrate the preparation of MS media and explants to analyze the dedifferentiation of explants to form callus.

**CO4:[K4]** Explore initiation of root and shoot culture through hormonal modulation in MS Medium.

**CO5:[K4]** Examine anchorage dependence, suspension culture and culture of cell lines at the Department of Human Genetics, Sri Ramachandra Institute of Higher Education & Research University.

## ENVIRONMENTAL BIOTECHNOLOGY

**Code: UZB/VT/27M**  
**Semester: VI**

**Hours: 60**  
**Credits: 4**

### Learning Objective:

- The course explores avenues for the wise management, preservation and restoration of the environment, by the use of microorganisms, other living systems, and genetically engineered system to create new ecological niches that can bring about large scale transfer in the structure and functions of the ecosystem.
- Introduces the learners to Entrepreneurship, Intellectual Property Rights and Patenting.

### Course Outcomes:

**On successful completion of the course, the learners will be able to:**

**CO1:[K2]** Describe the concept of grey water recycling, solid waste treatment, immobilization technique, patents, IPR and functions and characteristics of entrepreneurship.

**CO2:[K2]** Discuss the scope, application of Environmental Biotechnology, and the feasibility of biofuels such as Biogas, microbial hydrogen production, ethanol production and the gasohol experiment.

**CO3:[K3]** Identify biotechnological solutions to address environmental issues like pesticide pollution, fuel pollution, biodegradation of explosives, oil spills, plastics, metal pollution remediation, biosorption of heavy metals, biosensors in environmental analysis.

**CO4:[K4]** Analyze the pros and cons of different methods of composting in order to develop skills to start vermicomposting on a small scale, waste treatment, biofuels, GMO and its environmental impact and explain the methodology behind IPR and patenting.

**CO5:[K4]** Examine the role of microorganisms and plants as biopesticides and biofertilizers. Explicate the challenges, opportunities and applications of Environmental Biotechnology.

## IMMUNOLOGY



**Code: UZB/VT/23M**  
**Semester: VI**

**Hours: 60**  
**Credits: 4**

**Learning Objective:**

- This course gives an insight into the natural defense mechanisms of the body to combat infections.
- It gives an account of the body's immunological systems, principal mechanisms of immune response and applications.

**Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

- CO1:[K2]** Explain the various components of the immune system, aspects of Molecular Immunology, mechanism of immune responses, immunization, immune therapy and abnormalities associated with immune function.
- CO2:[K3]** Identify the cells and organs of the immune system, categorize the different classes of antigens and antibodies and their interactions, classify types of immunity and the abnormalities associated with immune functions.
- CO3:[K4]** Compare the various cells and organs of the immune system, differentiate types of antigens and antibodies and their interactions, mechanisms of immune response and pathways of Complement activation.
- CO4:[K4]** Analyse the pathways of maturation of B and T lymphocytes, explicate Immunization and immunotherapy, examine the abnormalities associated with immune functions.
- CO5:[K5]** Predict the abnormalities associated with immune functions based on symptoms. Defend the mechanisms of immune responses to infections.

## **IMMUNOLOGICAL TECHNIQUES**

**Code: UZB/VT/26**  
**Semester: VI**

**Hours: 45**  
**Credit: 2**

**Learning Objective:**

- Students are trained in isolation of lymphocytes and hepatocytes, locating lymphoid organs, Double Immunodiffusion, Rocket Immunoelectrophoresis, ELISA, Staining and documentation of Agarose immunoslides.

**Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

- CO1:[K2]** Identify and describe the various immune cells in the peripheral blood smear.  
Illustrate lymphoid organs in fish.
- CO2:[K3]** Predict the interaction between antigens based on the pattern of precipitation.  
Establish blood types on the basis of agglutination reaction.
- CO3:[K3]** Examine the antigen fractions using Rocket Immunoelectrophoresis. Demonstrate fractions of antigens through staining and documentation of agarose immunoslide.
- CO4:[K4]** Outline the steps in the isolation of Hepatocytes and Lymphocytes.
- CO5:[K5]** Validate the concentration of antigens using ELISA.

## **BIOPHYSICS & BIOSTATISTICS**

**Code: UZB/CE/02**

**Semester: V**

**Hours: 75**

**Credits: 5**

**Learning Objective:**

- Biophysics, an interdisciplinary subject unravels the underlying physical principles of biological phenomenon.
- The course enhances the understanding of bimolecular structures through diverse techniques available to study their properties.
- It also provides interesting information on diagnostic tools and their applications.
- Biostatistics progresses in a conventional fashion from descriptive statistics to statistical analysis of the data to draw valid inferences.

**Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

- CO1:[K2]** Explain the concepts of thermodynamics, spectroscopy and separation techniques, diagnostic radiology and medical imaging techniques, Neurobiophysics and Biostatistics.
- CO2:[K3]** Illustrate the principle and working of UV/VIS, IR, Raman and NMR Spectroscopy.
- CO3:[K3]** Examine vision and hearing defects associated in the context of Neurobiophysics.
- CO4:[K4]** Explore the use of appropriate separation techniques, medical imaging techniques and diagnostic radiology.
- CO5:[K5]** Determine Probability, measure of central tendencies and deviations, compare methods of sampling and predict Test of significance.

## **ECONOMIC ZOOLOGY**

**Code: UZB/CE/12**

**Semester: V**

**Hours: 75**

**Credits: 5**

**Learning Objective:**

- This course analyses the biological aspects of organisms that are beneficial and harmful.
- It highlights the pest of agricultural crops, pearl culture, Prawn culture, Poultry and Sericulture.
- The course has the potential of encouraging students towards entrepreneurship.

**Course outcomes:**

**On successful completion of the course, the learners will be able to:**

- CO1:[K2]** Classify insect pests, describe the types of damage caused by insects to plants and discuss the reasons for insects to assume pest status.

- CO2:[K2]** Describe the fundamentals in poultry farming and elaborate on pearl culture.
- CO3:[K3]** Identify the nature of damage caused by common pests of paddy, coconut, cotton, vegetables and fruits and explore their control measures. Examine the strategies of IPM.
- CO4:[K4]** Explain the techniques and application in sericulture, apiculture and lac culture.
- CO5:[K4]** Explicate Carp and Pearl culture.

## **WILDLIFE BIOLOGY**

**Code: UZB/CE/13**  
**Semester: VI**

**Hours: 75**  
**Credits: 5**

### **Learning Objective:**

- To enable students to acquire knowledge on various aspects of wildlife biology and habitat ecology
- To sensitize the students to the need for conservation of wildlife
- To enable students to understand the treats faced by wildlife and use of tools and techniques used in Wildlife Biology
- To familiarize students with a variety of laws and regulations that influence conservation and management of wildlife.

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

- CO1:[K2]** Explain the fundamental concepts of Wildlife Management and Wildlife Habitat Ecology.
- CO2:[K2]** Discuss the categorisation of threatened wildlife.
- CO3:[K3]** Identify the wildlife wealth of India, threats to wildlife and capture methods.
- CO4:[K4]** Analyse the various strategies of wildlife conservation, tools, techniques and legislations in Wildlife Management.
- CO5:[K5]** Assess the cause and effects of man-animal conflict, Modes of conservation; validate the prospects and problems of biosphere reserves, corridors, captive breeding, ecotourism and eco-restoration.

## ANIMAL BEHAVIOUR

**Code: UZB/CE/09**

**Semester: VI**

**Hours: 75**

**Credits: 5**

### **Learning Objective:**

- The course aims to provide a balanced, comprehensive and integrated approach to the fascinating world of Animal Behaviour- a popular & flourishing discipline.
- It introduces the basic ideas and trends of Ethology with carefully selected examples.

### **Course outcomes:**

**On successful completion of the course, the learners will be able to:**

**CO1: [K2]** Outline the basic concepts in Ethology, feeding and reproductive behaviour.

**CO2: [K3]** Identify Key stimulus, FAP, IRM, and ASE.

**CO3: [K3]** Apply the methods to study and record animal behaviour.

**CO4: [K4]** Examine social organization in honey bees and primates.

**CO5: [K5]** Elucidate strategies of predation and escape mechanisms. Interpret neural control of behavior.

## FIELD ZOOLOGY

**Code: UZB/CE/11**

**Semester: VI**

**Hours: 75**

**Credits: 5**

### **Learning Objective:**

- This course provides direct experience with a variety of organisms in the field.
- This course aims at the identification of various species of birds, crustaceans, butterflies, moths and other invertebrates and their key features.
- The physical features of the habitat and ecological communities will also be considered.

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

**CO1:[K2]** Elaborate the code of conduct and equipments used in Field Zoology. Explain the concepts in terrestrial and aquatic communities.

**CO2:[K2]** Observe butterflies, moths, birds and other macrofauna on campus. Describe and draw a bird in the field.

**CO3:[K3]** Examine species diversity and species abundance in terrestrial and aquatic habitats. Classify butterflies and moths based on their morphology.

**CO4:[K4]** Correlate bills and feet in birds with their habit and habitat. Identify birds based on their wing type and tail.

**CO5:[K4]** Identify birds by sight, sound and silhouette. Examine vocalization in birds.

## MICROBIOLOGY

**UZH/SE/15**  
**Semester: I**

**Hours: 60**  
**Credits: 4**

### **Learning Objective:**

- This course is designed to help students appreciate the natural roles, structure, and functions of microorganisms.
- It also emphasizes the importance of microorganisms not only as causative agents of disease but also as important contributors to food production, antibiotic manufacture, vaccine development and environmental management.
- This course also makes the students understand and employ the principles of microbiology and the molecular mechanisms of pathogenesis.

### **Course Outcomes:**

**On successful completion of the course, the learners will be able:**

**CO1:[K2]** Outline the structure of bacteria and viruses and identify the industrial use of bacteria, yeast and moulds.

**CO2:[K3]** Interpret the pathology of common airborne, water borne, sexually transmitted diseases and food poisoning; classify food preservation techniques and explain preparation of culture media, preparation of bacteria.

**CO3:[K4]** Compare the various methods employed in sterilization and disinfection and analyze the microbial growth

**CO4:[K4]** Distinguish the lytic and lysogenic phase in viral multiplication, differentiate the different staining techniques; compare techniques in microbial examination of food.

**CO5:[K5]** Explicate the role of microbes in the context of producing cheese, butter, probiotics and single cell proteins; in the industrial production of penicillin, lactic acid and vinegar.

## MICROBIAL TECHNIQUES

**UZH/SE/16**  
**Semester: I**

**Hours: 30**  
**Credit: 1**

### **Learning Objective:**

- Students perform different staining techniques, culture micro-organisms, plot microbial growth and test the purity of drinking water samples.

### **Course Outcomes:**

**On successful completion of the course the learners will be able to:**

**CO1:[K2]** Explain the working principle and functions of tools and equipments used in Microbiology.

**CO2:[K3]** Demonstrate bacterial motility through hanging drop method and measure growth of bacteria and yeast.

**CO3:[K4]** Observe bacteria through the different staining techniques.

**CO4:[K4]** Inspect bacterial contamination of milk using Methylene blue reduction test. Infer on antibiotic sensitivity of microbes using antibiotic discs.

**CO5:[K5]** Assess the purity of potable water.

## COMMUNITY HEALTH AND HYGIENE

**Code: UZH/SE/27**

**Hours: 60**

**Semester: IV**

**Credits: 4**

**Learning Objective:**

- This course emphasizes the fundamental tenets of the occurrence and prevention of diseases, promotion of health and improvement of the quality of life individuals and communities.

**Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

- CO1:[K2]** Compare the nutritional profiles of principal foods and nutritional problems in public health.
- CO2:[K2]** Discuss the importance of food hygiene and illustrate the significance of food toxicants.
- CO3:[K3]** Classify mental illness; examine the harmful effects of tobacco, alcohol and drugs.
- CO4:[K4]** Explicate the epidemiology and control of communicable and non – communicable diseases.
- CO5:[K4]** Identify the common complications during pregnancy, antenatal, intranatal and postnatal care, causes of Maternal and infant mortality, the importance of breast feeding for infants and blood borne diseases.

## **COMMUNITY HEALTH AND HYGIENE PRACTICAL**

**Code: UZB/SE/19**

**Hours: 30**

**Semester: IV**

**Credit: 1**

**Learning Objective:**

- The students are able to perform qualitative tests
- They also gain knowledge on detecting adulterants, assessing nutritional status, premenstrual syndrome, osteoporosis and the ill effects of smoking and drinking.

**Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

- CO1:[K2]** Draw from observation of slides and describe the characters of *Pediculus* and *Candida albicans*.
- CO2:[K2]** Explain the complications of malnutrition and Liver cirrhosis and smoker's lung.
- CO3:[K3]** Demonstrate qualitative tests to detect carbohydrates, proteins and fats in cooked foods and to test bone strength and resilience to illustrate osteoporosis.
- CO4:[K4]** Detect food adulterants among common food samples.
- CO5:[K5]** Assess nutritional status and premenstrual symptoms among college girls, purity of potable water by MPN and identify bacterial contamination among fresh fruits and vegetables.

## **BEHAVIOURAL GENETICS AND FUNDAMENTAL CONCEPTS OF INHERITANCE**

**Code: UZB/SE/28**

**Hours: 60**

**Semester: I**

**Credits: 4**

**Learning Objective:**

- The course aims to understand the genetic mechanisms that enable the nervous system to direct appropriate interactions between organisms and their physical and social environments.
- A chapter on Genetic Counseling gives a practical approach to genetic problems. Genetics of cancer paves the way to explore the facets of cancer research.

- Neural mechanisms and genetic factors that predispose to addictive behaviour help to throw light on alcohol and drugs.

**Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

- CO1:[K2]** Explain the concepts in behavioural genetics and transmission genetics, mechanism of neural communication and elements of complex behaviour.
- CO2:[K2]** Discuss genetic basis of sex, chromosomal anomalies and genetic diseases, genetics of behaviour, intelligence and cancer.
- CO3:[K3]** Compare various prenatal diagnostic techniques, numerical changes in chromosomes. Classify inherited metabolic disorders and those associated with Hemoglobin. Outline the steps involved in genetic counseling.
- CO4:[K4]** Outline the mechanism of sex determination. Analyse the functions of different parts of the brain, neurotransmitters and neurodegeneration. Identify the hereditary and environmental factors in cancer and explore recent trends in cancer therapy.
- CO5:[K4]** Examine the mechanisms of the biological clock. Justify the genetics of behaviour and intelligence in the context of sleep cycles and addiction.

## **BEHAVIOURAL GENETICS AND FUNDAMENTAL CONCEPTS OF INHERITANCE PRACTICAL**

**Code: UZB/SE/29**  
**Semester: I**

**Hours: 30**  
**Credit: 1**

**Learning Objective:**

- Students verify Mendel's laws using beads
- Study the inheritance of sex influenced traits
- Prepare buccal smear to observe Barr body, observe nerve cell and pathology of lungs and liver in the context of smoking and alcoholism.

**Course Outcomes:**

**On successful completion of the course the learners will be able to:**

- CO1: [K2]** Identify a nerve cell. Interpret inheritance of sex influenced trait with reference to length of index finger.
- CO2: [K3]** List the clinical features of neurodegenerative diseases and the pathological effects of smoking and alcohol.
- CO3: [K4]** Analyse and arrange human chromosomes to construct an ideogram.
- CO4: [K4]** Verify Mendel's Monohybrid and Dihybrid ratio using beads and observe simple mendelian traits
- CO5: [K4]** Examine buccal epithelial cells to observe Barr body

## **GENERAL ZOOLOGY**

**Code: UZB/SE/25**  
**Semester II**

**Hours: 60**  
**Credits: 4**

**Learning Objective:**

- This course is designed to give the students an insight into the body plan and functions of animals.
- It exposes students to the general principles of Genetics, Cell Biology, Physiology, Developmental Biology and Economic Zoology.

**Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

**CO1:[K2]** Explain the structural and functional organization of Scorpion and Rabbit

**CO2:[K2]** Describe the concept of human reproduction and development

**CO3:[K3]** Illustrate the role of harmful and beneficial insects and parasites of medical importance

**CO4:[K4]** Compare and contrast the basic concepts of ABO blood groups and types of syndromes. Explain sex determination, autosomal & allosomal syndromes and Cancer Biology

**CO5:[K4]** Analyse the physiology of thermoregulation and excretion

## **GENERAL ZOOLOGY PRACTICAL**

**Code: UZB/SE/30**

**Semester: II**

**Hours: 45**

**Credit : 1**

**Learning Objective:**

- The course lays a strong foundation of important concepts learnt theoretically with practical application by teaching them to perform blood typing; prepare buccal smear.
- The course enables the learnt to test the nature of excretory products and observe human placenta and insects of economic importance.



**Course Outcomes:****On successful completion of the course, the learners will be able to:****CO1: [K2]** Arrange the ideogram of autosomal and allosomal syndromes.**CO2: [K3]** Classify and describe productive helpful and harmful insects; protozoan and helminth parasites.**CO3: [K4]** Examine buccal epithelial cells to observe Barr body.**CO4: [K4]** Analyze the nature of excretory products.**CO5: [K5]** Interpret presence or absence of agglutination in the context of blood groups.

## **BASICS OF BIRD WATCHING**

**Code: UZB/NM/06****Semester: III****Hours: 30****Credits: 2****Learning Objective:**

- The course aims at introducing students to a fulfilling and rewarding connection with birds through Bird watching.
- Through the course they would develop and hone skill set-observation, listening, note-taking - and above all learn to appreciate birds in their locale and contribute towards their conservation.

**Course Outcomes:****On successful completion of the course, the learners will be able to:****CO1: [K1]** List the equipments required and the code of conduct to be followed while birding.**CO2: [K2]** Record bird calls and visualize them using appropriate software.**CO3: [K3]** Identify the parts of a bird and draw a bird in the field**CO4: [K3]** Examine the silhouette, colour, and behaviour to identify and document birds; Collect and classify feathers.**CO5: [K4]** Compare beak and feet in birds and infer on their habit and habitat.

## **AQUARIUM KEEPING**

**Code: UZB/NM/07****Semester: III****Hours: 30****Credits: 2****Learning Objective:**

- Aquarium keeping is a promising enterprise of economic, aesthetic and recreational value.
- The course introduces students to the fascinating and colourful world of aquarium fishes and helps them to successfully set up and maintain a freshwater aquarium.

**Course Outcomes:****On successful completion of the course, the learners will be able to:****CO1: [K2]** Explain fish biology and concept of breeding among aquarium fishes**CO2: [K2]** Identify the ornamental fishes**CO3: [K3]** Demonstrate the basic skills of setting up and maintenance of aquarium**CO4: [K4]** Differentiate the types of feed and feeding procedures**CO5: [K4]** Identify diseases among aquarium fishes

## **BASICS OF BIOINFORMATICS**

**Code: UZB/NM/08****Hours: 30**

**Semester: III**

**Credits: 2**

**Learning Objective:**

- This course exposes students from various science disciplines to the rapidly growing field of Bioinformatics.
- It challenges them to use the available online tools and analyze the biological data, thus developing their entrepreneurial skills.

**Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

**CO1: [K2]** Explain the basic structure of DNA and levels of organization of proteins

**CO2: [K2]** Predict the secondary structures of proteins and visualize their three-dimensional structures.

**CO3: [K3]** Compare the advanced search options using different Boolean operators

**CO4: [K3]** Use the online tools for analysis of sequences and sequence comparison.

**CO5: [K4]** Assess the information available online and investigate the biological data using tools in Bioinformatics

## **HUMAN GENETICS**

**Code: UZB/NM/02**

**Hours: 30**

**Semester: IV**

**Credits: 2**

**Learning Objective:**

- This course is offered to non-biology students to acquire a strong foothold in the fundamentals of human genetics and gene-based knowledge of inherited disorders.

**Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

**CO1: [K2]** Describe the sex limited and sex influenced traits

**CO2: [K3]** Explain the genetic basis of inheritance, sex determination and sex-linked inheritance in inherited genetic disorders such as Hemophilia, Colour blindness and Hypertrichosis

**CO3: [K3]** Compare blood groups in man and determine the significance of blood transfusion and Rh factor in pregnancy

**CO4: [K4]** Analyze some common syndromes which arise due to chromosomal anomalies

**CO5: [K4]** Explicate the metabolic pathway involved in common metabolic disorders in man

## WOMEN AND WELLNESS

**Code: UZB/NM/09**

**Semester: IV**

**Hours: 30**

**Credits: 2**

### **Learning Objective:**

- The course is designed as a topical approach to women's wellbeing covering ontogenic periods.
- It focuses on issues like nutritional status, changes during adolescence and common disorders highlighting ways of coping with them.

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

**CO1: [K2]** Explain the phases in womanhood, nutrition status and barriers to health care.

**CO2: [K2]** Describe complications in pregnancy and common cancers in women.

**CO3: [K3]** Outline the physical and reproductive changes during adolescence.

**CO4: [K4]** Analyze changes in the post-reproductive phases.

**CO5: [K5]** Evaluate the menstrual cycle and associated disorders.

## PEACE EDUCATION IN SCIENCE AND BIOLOGICAL WARFARE

**Course Code : UZB/NM/10**

**Semester : IV**

**Hours : 30 Hours**

**Credit : 2**

### **Learning Objectives:**

- To bring awareness about Peace Education in Science and Biological Warfare among students.
- To educate them on the impact of Bioweapons and the Biodefense strategies adopted
- To highlight the detrimental effects of Bioweapons on the Environment using Case Studies
- To inculcate a sense of social responsibility towards maintaining Peace in campus and in the community.
- To empower them as potential agents of Peace in our society.

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

**CO1: [K2]** Understand the history and impact of Biological Warfare.

**CO2: [K2]** Extrapolate the cause, effect of Bioweapons and Biodefense strategies implemented.

**CO3: [K3]** Discover the impact of Biological Warfare on Environmental Health.

**CO4: [K3]** Explore the role, contribution and impact of Science towards Peace.

**CO5: [K4]** Outline the purpose, benefits and challenges in Peace Education.

## BIOINFORMATICS AND NUTRIGENOMICS

Code: PZB/EL/03  
Semester: III

Hours: 60  
Credits: 3

### Learning Objective:

- The course introduces students to the current exciting field of Nutritional genomics and the role of nutrients and biologically active food components on gene expression.
- It also helps them to retrieve and analyze data from existing genomic and proteomic databases.

### Course Outcomes:

**On successful completion of the course, the learners will be able to:**

**CO1: [K4]** Explain the structure and replication of DNA and Eukaryotic genomes.

**CO2: [K4]** Compare and contrast the structural, expressional and functional proteomics.

**CO3: [K4]** Categorize dietary patterns using metabolomics and browse enzyme and pathway databases.

**CO4: [K5]** Assess the effects of nutrients on gene expression and correlate genes with the diseases using various databases.

**CO5: [K6]** Construct a primer pair using the sequences retrieved and design *in silico* drug using online tools.

## IT TOOLS FOR BIOLOGISTS AND BIOINFORMATICS

Code: UZB/SK/03  
Semester: IV

Hours: 45  
Credits: 3

### Learning Objective:

- This course provides students with the knowledge, competence and skills in the use of Microsoft Office applications
- To Create documents through the new, easy-to-use interface of Word
- Work with formulae and prepare professional charts with Excel
- Create presentations with pictures, shapes and animation in PowerPoint
- The course also trains students to use bioinformatics tools and exposes them to cyber security.

### Course Outcomes:

**On successful completion of the course, the learners will be able to:**

**CO1:[K2]** Discuss the protocols involved in creating, editing and formatting documents/worksheets using MS office.

**CO2: [K3]** Demonstrate animations using MS PowerPoint Presentation

**CO3: [K3]** Apply track changes and mail merge options in MS word and solve numerical problems using MS Excel

**CO4: [K4]** Analyze the concepts, challenges and examine the online tools in Bioinformatics

**CO5: [K5]** Assess computer ethics and security systems in a PC

## BIOCHEMISTRY

**Code: UZB/CO/22M**  
**Semester: III**

**Hours: 60**  
**Credits: 4**

### Learning Objective:

- This course deals with concepts in Biochemistry to highlight the fitness of biomolecules in terms of their 3-D structure and their roles in specific cellular and metabolic functions.
- The course provides an understanding of the chemical and biological content in which each biomolecule, reaction or pathway operates.

### Course Outcomes:

**On successful completion of the course, the learners will be able to:**

**CO1: [K2]** Explain the chemical unity of diverse living organisms and the qualities of water. Elaborate on the biomolecules based on the structure.

**CO2: [K3]** Classify Proteins, Lipids, Carbohydrates, Nucleic acids and enzymes based on their structure.

**CO3: [K4]** Explicate the metabolic pathways in the context of Glycolysis, TCA cycle, Fatty acid oxidation and Fatty acid synthesis.

**CO4: [K4]** Examine the weak interactions in aqueous systems, the ionization of water, weak acids and weak bases, intercellular signaling, enzyme-substrate reaction and application of enzymes.

**CO5: [K5]** Elucidate Michaelis-Menten equation. Validate metabolic cycles.

## DEVELOPMENTAL BIOLOGY & EVOLUTION

**Code: UZB/CO/45**  
**Semester: V**

**Hours: 60**  
**Credits: 4**

### Learning Objective:

- This course focuses on the gradual emergence of embryonic form and structure from what appears to be a very modest beginning.
- The essence of the course is change - transition from one stage to another. Also highlights the modern concepts of manipulating human fertility and associated legal and ethical implications.
- Evolution revolves around basic principles of speciation and significance of fossils.

### Course Outcomes:

**On successful completion of the course, the learners will be able to:**

**CO1: [K2]** Explain ontogenetic development, stages in gametogenesis and fertilization; cleavage and embryonic reorganization.

**CO2: [K2]** Describe early embryonic development, embryonic induction and speciation.

**CO3: [K3]** Determine the phases of ontogeny, explain the events in fertilization, Patterns of cleavage, and mechanism of neural induction. Explore the extra embryonic development in chick and man. Analyze the different methods of fossilization.

**CO4: [K4]** Compare Spermatogenesis and Oogenesis. Examine the role of fate maps and investigate the ethical/legal implications of manipulating human fertility. Illustrate the development of eye and heart and placenta in vertebrates. Explore the concept of species and subspecies; types of isolating mechanisms involved in speciation; the fossil record of Man.

**CO5: [K5]** Summarize *in vitro* fertilization techniques, Justify the prevention of multiple births; Compare and determine the role of isolating mechanisms involved in speciation.

Verify the role of inducers in organ development and validate the techniques

involved in the dating of fossils.

## **BIOLOGY OF MAN**

**Code: UZB/CE/10**

**Semester: VI**

**Hours: 75**

**Credits: 5**

### **Learning Objective:**

- This course focuses on human structure and function, health and wellness.
- It fulfills the natural curiosity of students in understanding the functioning of the human body, its disorders

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

**CO1: [K2]** Outline the structure of the organs of digestive, respiratory, circulatory, reproductive and nervous system.

**CO2: [K2]** Explain the normal and the physiological modifications in organ systems and discuss the technique and application of CPR and EEG.

**CO3: [K3]** Identify the components in the secretions of the liver and pancreas and demonstrate the effects of smoking and hypertension.

**CO4: [K4]** Infer the pathogenesis of diseases, hormonal changes associated with menstruation and menopause. Compare and contrast abnormalities of gonadal function.

**CO5: [K4]** Diagnose pathological conditions in the liver, pancreas, lung, heart, brain and ovary based on specific clinical features.

## **REGENERATIVE BIOLOGY**

**Code: UZB/LD/40**

**Semester: IV**

**Hours: 60**

**Credits: 3**

### **Learning Objectives:**

- The course explores the origin and evolutionary significance of regeneration and the different types of interactions. It will enable the students to examine the pivotal role of aging in regeneration.
- Recent medical interventions and Regenerative Therapy are the highlights of this course. The course will also discuss the major issues and challenges of research in the field of Regenerative Medicine.

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

**CO1: [K2]** Understand the origin, types, modes, ethics and evolutionary significance of regeneration in Invertebrates and Chordates.

**CO2: [K2]** Characterize and discuss the role of tissue and nerve interactions and major issues of Aging in Regeneration.

**CO3: [K3]** Examine the characteristics and role of aging in Regeneration of organ systems.

**CO4: [K3]** Explore the recent medical interventions in inducing artificial regeneration.

**CO5: [K4]** Analyze the Regenerative therapy of Human systems and their challenges in Research.











## **M.Phil**

### **Programme Outcomes**

On successful completion of the programme the learner will

- PO1:** Have a sound understanding of theory and able to apply it to research.
- PO2:** Develop a critical approach to the evaluation of their own and others' research work.
- PO3:** Learn the importance of intellectual integrity, professional code of conduct and ethics in research.
- PO4:** Be able to pursue Ph.D program for personal and professional development.
- PO5:** Opt for careers requiring writing and communicative skills.
- PO6:** Develop, design and implement research projects competently.
- PO7:** Be well equipped in the basic and advanced techniques in their field of study.
- PO8:** Have a comprehensive understanding of statistical techniques in research and be able to select suitable methods of analysis of data.





## B.Sc. Nutrition, FSM & Dietetics-Vocational Stream (2023-2026)

### FOOD SCIENCE

<b>Code:</b>			<b>UVD/CO/12M</b>
<b>Hours: 60</b>			<b>Ho</b>
<b>Semester:</b>	<b>I</b>	<b>/</b>	<b>II</b>
<b>Credits: 4</b>			<b>Cr</b>

#### Learning Objectives:

- To help learners study the different methods of cooking and their advantages and disadvantages.
- To help them understand the scientific principles governing the acceptability of food preparations.

#### Course Outcomes:

On successful completion of the course, the learners will be able to:

- CO1: [K1] list nutrients in different food groups and describe the preliminary methods of food preparation and cooking.
- CO2: [K2] describe the structure, composition, nutritive value, selection and storage of different foods and their role in cookery.
- CO3: [K3] explain the scientific principles underlying the changes/reactions that occur during food preparation and processing.
- CO4: [K4] analyze the benefits and drawbacks of food processing and identify adulterants in food.
- CO5: [K5] justify the best cooking method focusing on maximizing nutrient retention with desirable physical and sensory attributes

### BASIC COOKERY

**Code: UVD/CO/13**

**Hours: 60**

**Semesters: I/II**

**Credits: 2**

**Cr**

#### Learning Objectives

- To learn simple and scientific methods of cooking.
- To apply the knowledge gained in the preparation of various food items.

**Course Outcomes:**

On successful completion of the course, the learners will be able to:

**CO1: [K1]** select appropriate methods for weighing dry and wet food ingredients.

**CO2: [K2]** explain different methods for cooking cereals, pulses, vegetables, meat, fish and poultry

**CO3: [K3]** prepare food items from the given recipes.

**CO4: [K4]** explain the reasons behind the changes that occur during food preparation.

**CO5: [K5]** justify the best cooking methods for retention of nutrients and parameters related to acceptability

## PHYSIOLOGY

**Code: UVD/CO/17M**

**Hours: 60**

**Semesters: I/II**

**Credits: 4**

**Prerequisites: 4**

**Learning Objectives:**

- To enable learners understand the structure and physiology of various organs in the body.
- To apply the knowledge of physiology in understanding the pathophysiology of diseases and providing medical nutrition therapy

**Course Outcomes:**

On successful completion of the course, the learners will be able to:

**CO1: [K1]** describe the structure and functions of cellular organelles and define fundamental physiological terms from cells to organ systems

**CO2: [K2]** discuss the different types and functions of cells and tissues  
**CO3: [K3]** illustrate the structure of various organs in the human

**CO4: [K4]** explain the basic physiological functioning of organ systems  
**CO5: [K5]** summarize the

hormonal regulation of physiological processes pertaining to the endocrine and reproductive systems.

## PHYSIOLOGY PRACTICAL

**Code: UVD/CO/15**

**Hours:**

**60**

**Semesters: I/II**

**Credits:**

**2**

### **Learning Objectives**

- To acquire background knowledge in histology and to understand the role of cells as components of tissues and organs.
- To acquire hands-on experience in a few hematological procedures and dissection of specimens.

### **Course Outcomes**

On successful completion of the course, the learners will be able to

- CO1: [K1]** Describe the histology of tissues
- CO2: [K2]** Identify different types of blood cells and blood groups
- CO3: [K3]** Interpret hemoglobin levels, white blood cell count, blood pressure, respiratory rate and pulse rate.
- CO4: [K4]** Dissect specimens of sheep's heart, brain and kidney
- CO5: [K5]** Differentiate the microscopic structure of various organ systems



## PRINCIPLES OF NUTRITION

**Code: UNV/CO/42M**

**Hours: 60**

**Semester: III**

**Credits: 4**

### Learning Objectives

- To understand the importance of nutrition in maintaining good health.
- To study the functions, sources and effects of deficiencies of macronutrients and water.

### Course Outcomes

**On successful completion of the course, the learners will be able to:**

**CO 1: [K1]** define nutrients and terms related to nutrition.

**CO 2: [K2]** classify nutrients and describe their sources and recommended allowances.

**CO 3: [K3]** examine the role of nutrients and interpret their significance for maintenance of good health.

**CO 4: [K4]** explain the absorption, transport and bioavailability of nutrients and conditions arising out of deficiency and excess.

**CO 5: [K4]** summarize the metabolism of different nutrients in relation to health and dietary intake and suggest preventive measures to overcome nutrient deficiencies.

## LIFESPAN DEVELOPMENT

**Code:UNV/CO/43M**

**Hours: 60**

**Semester:III**

**Credits:4**

### Learning Objectives:

- Learners will be able to explain the concept of lifespan development which en

compasses growth and learning in humans from conception to end of life

- Learners will be able to relate and apply these scientific concepts to what they observe and experience in their own lives.

**Course Outcomes:**

On successful completion of the course, learners will be able to:

**CO1: [K1]** Understand and define basic concepts associated with lifespan development.

**CO2: [K2]** Demonstrate an understanding of the biological, psychological, social and cultural influences through the lifespan.

**CO3: [K3]** Develop basic skills in observing and interpreting human behavior.

**CO4: [K4]** Analyze problems arising at various stages during the lifespan and examine solutions for the same.

**CO5: [K5]** Evaluate societal and cultural practices that are followed at various stages and apply the concepts and principles of life span development to personal experience.

## **FUNDAMENTALS OF BIOCHEMISTRY**

**Code: UNV/CO/44M**

**Hours: 60**

**Semester: IV**

**Credits:4**

**Learning Objectives:**

- To understand the classification, functions and properties of carbohydrates, proteins and fats and also the role of enzymes in biological reactions.
- To gain an understanding of the major metabolic pathways involved in the metabolism of nutrients in the human body.

**Course Outcomes:**

On successful completion of the course, the learners will be able to

**CO1: [K1]** define basic terms and concepts related to metabolism of nutrients.

- CO2: [K2]** discuss the structure and classification of macronutrients, enzymes, Coenzymes and nucleic acids.
- CO3: [K3]** explain the properties and functions of macronutrients and enzymes.
- CO4: [K4]** explain major metabolic pathways involving carbohydrates, proteins and fats.
- CO5: [K5]** summarize the integration of metabolic pathways and the role of enzymes and coenzymes in metabolism.

## **SPORTS NUTRITION**

**Code: UVD/CO/16M**

**Hours: 60**

**Semesters: IV/V**

**Credits: 4**

### **Learning Objectives**

- To understand the basic concepts of nutrition for physical fitness and sports.
- To understand the special nutritional requirements for athletes

### **Course Outcomes**

**On successful completion of the course, the learners will be able to:**

- CO 1:[K1]** define terms related to nutrients, supplements, fitness, and body composition parameters physical related to sports nutrition.
- CO 2:[K2]** discuss the benefits of aerobic and anaerobic exercises, fuel systems, nutrients and ergogenic aids needed for enhancing performance.

**CO 3:[K 3]** explain the significance of fuel systems, conditioning, nutrients, ergogenic aids and energy pathways involved in aerobic and anaerobic exercises.

**CO 4:[K 4]** analyze the role of macro and micronutrients, fluids, supplements and ergogenic aids for performance.

**CO 5:[K 5]** assess the importance of macro and micronutrients, fluids, and supplements in planning pre- or post-game meals for athletes of all ages involved in aerobic and anaerobic sports.

## **NUTRITION ACROSS LIFE STAGES**

**Code: UNV/CO/45**

**Hours: 60**

**Semester: V**

**Credits: 4**

### **Learning Objectives**

- To enable the students to acquire a knowledge of the principles of planning diets for various stages of the life cycle.
- To develop an ability to plan balanced diets for individuals of diverse physical activity levels and for various socio - economic strata.

### **Course Outcomes**

On successful completion of the course, the learners will be able to

**CO1: [K1]** describe the concepts of meal management and principles of menu planning.

**CO2: [K2]** identify eating disorders, nutritional problems and make use of dietary goals and guidelines to plan diets.

**CO3: [K3]** determine the importance and advantages of breast milk, advantages and disadvantages of bottle milk and supplementary foods, explain growth and development during various stages.

**CO4: [K4]** analyze the physiological changes that take place during pregnancy and old age and explain the importance of diet for different age groups and special children.

**CO5: [K5]** summarize the nutritional requirements, nutritional problems and dietary guidelines for various stages.

## **CLINICAL NUTRITION**

**Code: UNV/CO/46M**

**Hours: 60+30**

**Semester: V**

**Credits: 5**

### **Learning Objectives**

- To understand the various metabolic and pathophysiological alterations of the major systems of the body
- To understand the nutritional implications of systemic disorders

### **Course Outcomes**

On successful completion of the course, the learners will be able to

- CO 1:** [K1] define terminology associated with nutrition, health and disease
- CO2:** [K2] explain the diagnostic methods and interpret lab reports in monitoring various disease conditions
- CO3:** [K3] examine the metabolism of nutrients in relation to health and disease
- CO4:** [K4] explain the causes, symptoms and diagnosis of disorders due to nutritional imbalances
- CO5:** [K5] summarize the causes, types, clinical signs and symptoms and complications in various disease conditions

## **COMMUNITY NUTRITION**

**Code: UNV/CO/47M**

**Hours: 60**

**H**

**Semester: V**

**Credits: 4**

### **Learning Objectives**

- To enable students to understand the importance of nutrition in the nation's progress and means to overcome problems of malnutrition and other nutritional disorders in the community.
- To understand and practice assessment of nutritional status and to study the role of national and international organizations in improving community health.

### **Course Outcomes**

On successful completion of the course, the learners will be able to:

**CO1: [K1]** define simple terms pertaining to community nutrition and indices of nutritional status.

**CO2: [K2]** summarize common nutritional problems, causes, assessments and intervention strategies that can be adopted in a community to promote health.

**CO3: [K3]** explain the significance and implication of nutritional assessments, nutrition surveillance and monitoring provided by various programs and organizations to ensure food accessibility and security.

**CO4: [K4]** compare methods of nutritional assessment, and outline the objectives and functions of national and international agencies in enhancing community health.

**CO5: [K5]** choose appropriate strategies for assessing nutritional status, and plan a nutrition education program for vulnerable groups to actively engage students in acquiring a service learning experience.

## **OOD SERVICE MANAGEMENT**

**Code: UNV/CO/51**

**Hours: 60 + 30**

**H**

**Semester: V**

**Credits: 5**

**Learning Objectives**

- To understand the various aspects involved in the functioning of a Food Service Institution
- To develop a working knowledge and basic skills in the management of a Food Service Institution

**Course Outcomes**

On successful completion of the course, the learners will be able to:

**CO 1: [K1]** Describe development of Food Service, types of account, books of account, advantages of double entry book keeping, waste management and causes and prevention of accidents in a food service

**CO2: [K2]** Classify types of organization, food services, food service systems, food service styles, types of equipment, types of waste, types of pest, types of pricing and elements of cost

**CO 3: [K3]** Apply the principles, functions and tools of management, hygiene in personnel, food handling, plant, equipment and methods of work; waste management, safety and work simplification in a food service setting

**CO 4: [K4]** Explain application of work simplification principles, factors affecting pricing, cost control and books of account and records for control in a food service

**CO 5: [K5]** Evaluate the layout of different work units of a Food Service, types of equipment used and factors contributing to hygiene, sanitation and safety

**THERAPEUTIC DIETETICS**

**Code: UNV/CO/49M**

**Hours: 60+30**

**Semester: VI**

**Credits: 5**

**Learning Objectives**

- To understand the role of a dietician and gain knowledge in diet counselling and educating patients.
- To develop skills and techniques in the planning and preparation of diets for therapeutic conditions

## Course Outcomes

**On successful completion of the course, the learners will be able to:**

**CO1: [K2]** explain the concepts of diet therapy, responsibilities of a Dietitian in the health Care process and the need for special feeding methods in specific conditions

**CO2: [K3]** apply the principles of diet therapy and plan diets for different therapeutic conditions

**CO3: [K4]** differentiate the pathogenesis, clinical signs, consequences and treatment of acute and chronic conditions/diseases

**CO4 : [K5]** appraise the role of specific foods in the management of metabolic disorders and identify common food allergens

**CO5: [K6]** elaborate the significance of dietary intervention in the treatment and prevention of diabetes mellitus, CHD and hypertension

## PERSONNEL MANAGEMENT

**Code: UNV/CO/50M**  
**60**

**Hours:**

**Semester: VI**  
**4**

**Credits:**

### Learning Objectives

- To understand the functions of personnel management within an organization.
- To develop leadership qualities and management skills in students and train students for management roles in Food Service establishments.

### Course Outcomes:

**On successful completion of the course, the learners will be able to:**

**CO 1: [K1]** Describe functions and roles of personnel manager, personnel policies, procedures and programs, personnel records, staff selection, factors influencing wage administration and barriers to communication



**CO2: [K2]** Explain transactional analysis, need for incentives, disciplinary action and grievance procedure, legal aspects of personnel management

**CO 3: [K3]** Illustrate the role of personnel audit, induction, training, employee benefits, motivation and grievance mechanism in personnel development

**CO 4: [K4]** Analyse the various laws, personnel functions and practices that promote employee welfare and development

**CO 5: [K5]** Evaluate leadership styles, motivation methods, methods of recruitment, induction training, performance appraisal and employee benefits in food service institutions

## **QUANTITY FOOD PRODUCTION AND SERVICE**

**Code: UNV/CO/52  
30)**

**Hours: (60+**

**Semester:VI**

**Credits: 4**

### **Learning Objectives**

- To understand the application of basic principles in bulk production of the food.
- To gain knowledge regarding selection and purchase of food and to develop skills in menu planning for quantity food production

### **Course Outcomes**

**CO1: [K2]** Explain menu, types of menu, standardized recipes, recipe format, stepping up recipes

**CO2: [K3]** Identify the quality factors, methods of purchase, holding and storage techniques in Food service unit, construct a menu

**CO3: [K4]** Classify beverages and point out its uses and explain the service techniques for food and beverage

**CO4: [K5]** Justify the importance of maintaining food quality and summarize the production scheduling and production control

**CO5: [K6]** Compile the quality factors to be considered in food selection, storage, production, cleaning and design a HACCP plan for recipes using the principles of HACCP

## **FUNDAMENTALS OF TAILORING**

**Code: UNV/CE/05**  
**75**

**Hours:**

**Semester: V**

**Credits: 5**

### **Learning Objectives**

- To acquire knowledge on the basic construction techniques
- To develop patterns for selected garments by the drafting procedure.

### **Course Outcomes**

**On successful completion of the course, the learners will be able to**

**CO1: [K1]** identify the right choice of sewing tools, hand stitches, fullness and basic construction techniques used in clothing construction

**CO2: [K2]** describe the concepts of hand stitches, fullness and basic construction techniques relating to garment construction

**CO3: [K3]** demonstrate the methodology to be followed in designing and in assembling a garment considering the fit and overall appearance of the garment

**CO4: [K4]** identify suitable patterns, basic construction techniques and drafting procedure

for selected ladies' garments

**CO5: [K5]** decide on the suitable hand stitches, fullness and all other factors while

constructing women's garments from the knowledge gained

## **BASICS IN RESEARCH METHODOLOGY AND STATISTICS**

**(FOR STUDENTS DOING PROJECT IN SEMESTER V)**

**Code: UVD/CE/01**  
**75**

**Hours:**

**Semester: V**  
**Credits: 5**

### **Learning Objectives**

- To understand research methodology.
- To use simple statistical methods for analysis of data.

### **Course Outcomes**

**On successful completion of the course the learners will be able to:**

**CO1: [K1]** Define research and terms associated with research process

**CO2:[K2]** Explain research design, methods of research, collection, tabulation and presentation of data.

**CO3: [K3]** Choose a sampling method and identify the appropriate statistical methods

**CO4: [K4]** Analyze the data and draw conclusions

**CO5: [K5]** Critically evaluate, draw inferences and construct a report with references

## **CONSUMER ECONOMICS**

**Code: UNV/CE/06**  
**75**

**Hours:**

**Semester: VI**  
**Credits: 5**

### **Learning Objectives**

- To be aware of rights and responsibilities as family purchase agents
- To understand consumer behaviour, product market relationship and its application in economics

### **Course Outcomes**

**On successful completion of the course, the learners will be able to:**

**CO1: [K1]** describe consumer rights and responsibilities, laws governing consumer behaviour, types of markets, channels of distribution and elements of good buymanship

**CO2: [K2]** identify common business malpractices and laws for consumer protection

**CO 3: [K3]** explain market mechanism, pricing, role of agencies for standardization and grading of consumer goods.

**CO 4: [K4]** illustrate effect of consumer education, consumer protection organisations and current trends on consumer behaviour

**CO 5: [K5]** Evaluate the importance of quality standards, Branding, packaging, labeling and advertisement on purchase behaviour.

## **FOOD PRESERVATION**

**Code: UNV/CE/07**  
**75**

**Hours:**

**Semester: VI**  
**Credits:5**

### **Learning Objectives**

- To understand the scientific principles underlying food preservation
- To study the different methods used in food preservation

### **Course Outcomes**

**On successful completion of the course, the learners will be able to:**

**CO1:[K2]** describe the terms related to food preservation and classify foods based on the shelf life

**CO2:[K3]** explain the causes of food spoilage and identify the need and principles of food preservation

**CO3:[K4]** compare the principles and techniques of various food preservation methods

and explain the role of packaging in food processing.

**CO4:[K5]** justify the use of various preservation techniques, packaging materials and sensory evaluation in product development

**CO5:[K6]** elaborate the steps involved in product development and formulate simple preserved foods and evaluate the sensory quality of the newly developed product

## **PRINCIPLES OF ART AND INTERIOR DECORATION**

**Code: UVD/SU/02M  
(60+30)**

**Semester: II / III**

**5**

**Hours:**

**Credits:**

### **Learning Objectives:**

- To help learners understand the elements and principles of design
- To understand the factors in the selection of right materials for decoration and creating suitable interiors.

Course Outcomes:

On successful completion of the course, the learners will be able to

**CO1: [K1]** define the functional aspects of interior materials and describe the elements and principles of design.

**CO2: [K2]** explain the use of elements and principles of design and demonstrate different types of interior materials and finishes

**CO3: [K3]** identify and evaluate the art principles and their applications and illustrate the interior space scene with the different interior materials

**CO4: [K4]** examine the use of elements and principles of design, color theories, psychological and emotional responses to color and different types of interior materials and finishes in creating different moods in interiors

**CO5: [K5]** evaluate the styles of furniture, lighting, window treatment, wall and floor finishes, accessories and flower arrangement most appropriate for different interiors

## **FUNDAMENTALS OF TEXTILES**

**Code: UVD/SU/03M**

**Hours:60 + 30**

**Semester: IV**

**5**

**Credits:**

### **Learning Objectives:**

- Understand the concepts of textiles, use appropriate textile terminology, predict the product performance and Interpret labels on textiles
- Create awareness on the diverse textile products, make wise selection of textiles and its contribution to clothing and interiors

### **Course Outcomes:**

**On successful completion of the course, the learners should be able to**

**CO1: [K1]** describe the essential properties of textile fibres, yarns and the basic fabric construction techniques

**CO2: [K2]** explain the manufacturing process of man-made fibres, yarn construction, weaving, finishes done on textiles, printing and dyeing methods

**CO3: [K3]** classify textile fibres, yarns, woven fabrics, finishes, printing and dyeing process

**CO4: [K4]** categorize the fibres, yarns, fabrics and finishes for its appropriate end use and the printing and dyeing techniques followed

**CO5: [K5]** assess the suitable finishes, printing and dyeing techniques followed based on the fibre, and identify the fibre, yarn and fabric.

**B.Sc. Nutrition, FSM & Dietetics-  
Vocational Stream(Offered to 2021  
Batch)**

**FOOD SERVICE MANAGEMENT**

**Code:**

**UNV/CO/51  
Hours**

**: 60 +30**

**Semester: VI**

**Credits: 5**

**Learning Objectives**

- To understand the various aspects involved in the functioning of a Food Service Institution
- To develop a working knowledge and basic skills in the management of a Food Service Institution

**Course Outcomes**

On successful completion of the course, the learners will be able to:

- CO 1: [K1]** Describe development of Food Service, types of account, books of account, advantages of double entry book keeping, waste management and causes and prevention of accidents in a food service
- CO2: [K2]** Classify types of organization, food services, food service systems, food service styles, types of equipment, types of waste, types of pest, types of pricing and elements of cost
- CO 3: [K3]** Apply the principles, functions and tools of management, hygiene in personnel, food handling, plant, equipment and methods of work; waste management, safety and work simplification in a food service setting
- CO 4: [K4]** Explain application of work simplification principles, factors affecting pricing, cost control and books of account and records for control in a food service
- CO 5: [K5]** Evaluate the layout of different work units of a Food Service, types of equipment used and factors contributing to hygiene, sanitation and safety

**B.Sc. Nutrition, FSM & Dietetics- General  
Stream (2023-2026)PHYSIOLOGY**



**Code: UVD/CO/17M**

**H**

**Hours: 60 Semesters: I/II**

**Credits: 4**

**Learning Objectives:**

- To enable learners understand the structure and physiology of various organs in the body.
- To apply the knowledge of physiology in understanding the pathophysiology of diseases and providing medical nutrition therapy

**Course Outcomes:**

On successful completion of the course, the learners will be able to :

- CO1: [K1]** describe the structure and functions of cellular organelles and define fundamental physiological terms from cells to organ systems
- CO2: [K2]** discuss the different types and functions of cells and tissues
- CO3: [K3]** illustrate the structure of various organs in the human body
- CO4: [K4]** explain the basic physiological functioning of organ systems
- CO5: [K5]** summarize the hormonal regulation of physiological processes pertaining to the endocrine and reproductive systems.

## **PHYSIOLOGY PRACTICAL**

**Code: UVD/CO/15**

**Hour**

**Hours: 60**

**Semesters: I/II**

**Credits**

**Credits: 2**

**Learning Objectives:**

- To acquire background knowledge in histology and to understand the role of cells as components of tissues and organs.
- To acquire hands-on experience in a few hematological procedures and dissection of specimens.

**Course Outcomes:**

**On successful completion of the course, the**

**learners will be able to** **CO1: [K1]** Describe the histology of tissues

- CO2: [K2]** Identify different types of blood cells and blood groups
- CO3: [K3]** Interpret hemoglobin levels, white blood cell count, blood pressure, respiratory rate and pulse rate.
- CO4: [K4]** Dissect specimens of sheep's heart, brain and kidney
- CO5: [K5]** Differentiate the microscopic structure of various organ systems

## **FOOD SCIENCE**

**Code:UVD/CO/12M**

**Hours: 60**

**Semester:I/II**

**Credits: 4**

**Learning Objectives:**

- To help learners study the different methods of cooking and their advantages and disadvantages.
- To help them understand the scientific principles governing the acceptability of food preparations.

**Course Outcomes:**

On successful completion of the course, the learners will be able to:

- CO1: [K1]** list nutrients in different food groups and describe the preliminary methods of food preparation and cooking.
- CO2: [K2]** describe the structure, composition, nutritive value, selection and storage of different foods and their role in cookery.
- CO3: [K3]** explain the scientific principles underlying the changes/reactions that occur during food preparation and processing.
- CO4: [K4]** analyse the benefits and drawbacks of food processing and identify adulterants in food.
- CO5: [K5]** justify the best cooking method focusing on

maximizing nutrient retention with  
desirable physical and sensory attributes

## BASIC COOKERY

**Code: UVD/CO/13**  
**Semesters: I/II**

**Hours: 60**  
**Credits: 2**

### Learning Objectives

- To learn simple and scientific methods of cooking.
- To apply the knowledge gained in the preparation of various food items.

### Course Outcomes

**On successful completion of the course, the learners will be able to:** **CO1:[K1]** select appropriate methods for weighing dry and wet food ingredients.

**CO2:[K2]** explain different methods for cooking cereals, pulses, vegetables, meat, fish and poultry

**CO3: [K3]** prepare food items from the given recipes.

**CO4:[K4]** explain the reasons behind the changes that occur during food preparation.

**CO5:[K5]** justify the best cooking methods for retention of nutrients and parameters related to acceptability

## PRINCIPLES AND TECHNIQUES OF FOOD PRESERVATION

**Code: UND/CO/43M**

**Hours: 60**

**Semester: III**

**Credits:4**

### Learning Objective:

- To enable learners to understand the scientific principles underlying food preservation
- To apply the principles of food preservation in formulating simple preserved products and sharing the knowledge with the community thereby enhancing interpersonal skills and forging fruitful service-learning partnerships with the community

### Course Outcomes:

On successful completion of the course, learners will be able to:

**CO1: [K1]** recall the terms in food preservation, explain the concept of shelf life of food and understand the need for/role of food preservation

**CO2: [K2]** identify the causes of food spoilage and describe their control by various methods of preservation.

**CO3: [K3]** analyse the role, principles and methods of various food preservation methods

**CO4: [K4]** critically evaluate the advantages and disadvantages of the different methods of food preservation

**CO5: [K5]** demonstrate an understanding of the principles and applications of food preservation by organizing a food preservation workshop for the community with a service-learning perspective.

## **HUMAN NUTRITION I**

**Code: UND/CO/33 M**

**Hours: 60**

**Semester: III**

**Credits: 4**

### **Learning Objectives**

- To understand the importance of nutrition in maintaining good health.
- To study the functions, sources and effects of deficiencies of macronutrients and water.

### **Course Outcomes**

**On successful completion of the course, the learners will be able to:**

**CO1: [K1]** define nutrients and terms related to nutrition.

**CO2: [K2]** describe the sources, recommended allowances of macronutrients, water and electrolytes.

**CO3: [K 3]** interpret the significance of macronutrients based on classification, and water for maintenance of good health.

**CO4: [K 4]** explain the functions of carbohydrates, fats, proteins, water and electrolytes.

**CO5: [K 5]** assess the role of macronutrients, water and electrolytes in health and disease.

## HUMAN NUTRITION II

Code: UND/CO/34 M

Hours: 60

Semester: IV

Credits: 4

### Learning Objectives

- To understand the importance of energy balance and body composition parameters in maintaining good health.
- To study the functions, sources and effects of deficiencies of micronutrients.

### Course Outcomes:

**On successful completion of the course, learners will be able to:**

**CO1: [K1]** define terms related to energy, body composition, micronutrients, phytonutrients, nutrigenomics and nutraceuticals.

**CO2: [K2]** describe the sources, recommended allowances of vitamins, minerals and requirements of energy

**CO3: [K3]** explain the significance of nutritional assessment, body composition parameters and factors affecting micronutrients and energy requirements

**CO4: [K4]** analyze the role of micronutrients and factors affecting utilization of energy.

**CO5: [K5]** assess the factors that lead to deficiency and excess of micronutrients, and energy requirements in health and disease.

## LIFE CYCLE NUTRITION

Code:UND/CO/35M

Hours:60

Semester:IV

Credits:4

Learning Objective:

- To enable the learners to acquire knowledge on the principles of planning balanced diets.
- To discuss, contrast and evaluate the roles of nutrition and wellness within the complex processes of pregnancy, lactation, child development, growth and aging.

#### **Course Outcomes:**

On successful completion of the course, the learners will be able to:

- CO1:[K1]** relate the knowledge of the science of nutrition to human health across the lifespan
- CO2:[K2]** examine the physiological basis for nutritional needs of normal, healthy humans as they move through lifecycle stages: pregnancy, lactation, infancy, pre-school and school child, adolescent, adult, and elderly.
- CO3:[K3]** discuss foods and nutrients with regard to the biological requirements of humans at different stages of the lifecycle
- CO4:[K4]** analyse the conditions that substantially alter/impact nutrition at each stage of the lifecycle and Identify nutrition related problems and disorders
- CO5:[K5]** recommend diets for the various age groups to meet their nutritional needs and implement appropriate dietary guidelines to promote health and prevent diseases.

## **NUTRITIONAL BIOCHEMISTRY**

**Code: UND/CO/36**

**Hours: 45+60**

**Semester: V**

**Credits: 5**

#### **Learning Objectives**

- To understand the structure and functions of the major biomolecules
- To study the metabolic pathways involved in the metabolism of nutrients

#### **Course Outcomes**



**On successful completion of the course, the learners will be able to**

**CO1: [K1]** describe, enzymes, co-enzymes, vitamins, nucleic acids and macronutrients based

on its classification

**CO2: [K2]** illustrate the structure of macronutrients, purine and pyrimidine bases, nucleotides

and nucleic acids.

**CO3: [K3]** examine the properties and functions of macronutrients, enzymes and vitamins.

**CO4: [K4]** explain major metabolic pathways involving carbohydrates, proteins and fats

and estimate ATP production through biological oxidation.

**CO5: [K5]** summarize the integration of metabolic pathways and the role of enzymes

and coenzymes in metabolism.

## **ADVANCED COOKERY**

**Code: UND/CO/37  
+30**

**Hours: 45**

**Semester: V**

**Credits: 4**

### **Learning Objectives**

- To understand about various cuisines and develop cultural competency
- To learn kitchen management

### **Course Outcomes**

**On successful completion of the course, the learners will be able to:**

**CO1: [K1]** Describe cooking methods, cooking terminology, food adjuncts, standardized recipes, recipe file, recipe formats factors affecting food selection, rules for service of food and beverages and factors affecting menu planning

**CO2: [K2]** Discuss the cuts of meat, fish, poultry and vegetables, types of beverage and its uses in cookery; the unique characteristics and special foods of different cuisines

**CO3: [K3]** Apply principles of rechauffé cookery, menu planning, stepping up recipes and recipe writing in preparing rechauffé dishes, writing menus and recipes

**CO4: [K4]** Critically analyze the factors affecting food selection, methods of purchase, holding and storage in Food service units

**CO5: [K5]** Justify choice of dishes, accompaniments, food adjuncts, beverages and the use of special ingredients and cooking methods when planning specialty dishes and menus for different cuisines

## **PUBLIC HEALTH NUTRITION**

**Code: UND/CO/38M**

**Hours: 60**

**Semester: V**

**Credits: 4**

### **Learning Objectives**

- To understand the importance of nutrition and hygiene in promoting public health.
- To acquire knowledge on public health diseases and prevention strategies at the community level.

### **Course Outcomes**

**On successful completion of the course, the learners will be able to:**

**CO1: [K2]** relate the concept of public health approach and role of health care systems in India to promote health and prevent diseases

**CO2: [K3]** identify the epidemiological agents in disease causation and public health measures to combat them

- CO3: [K4]** critically analyze food and nutrition security at the individual and community levels and the measures adopted at the National level to improve them
- CO4: [K5]** appraise the significance of nutrition education programs in combating public health nutritional problems and creating awareness on good health and hygiene in the community
- CO5: [K6]** integrate the role of national and International organizations as significant contributors to promote public health and nutrition

# SPORTS NUTRITION

Code: UVD/CO/16 M

Hours: 60

Semesters: IV/V

Credits: 4

## Learning Objectives

- To understand the basic concepts of nutrition for physical fitness and sports.
- To understand the special nutritional requirements for athletes

## Course Outcomes

**On successful completion of the course, the learners will be able to:**

- CO 1: [K1]** define terms related to nutrients, supplements, fitness, and body composition parameters physical related to sports nutrition.
- CO 2: [K2]** discuss the benefits of aerobic and anaerobic exercises, fuel systems, nutrients and ergogenic aids needed for enhancing performance.
- CO 3: [K 3]** explain the significance of fuel systems, conditioning, nutrients, ergogenic aids and energy pathways involved in aerobic and anaerobic exercises.
- CO 4: [K 4]** analyze the role of macro and micronutrients, fluids, supplements and ergogenic aids for performance.
- CO 5: [K 5]** assess the importance of macro and micronutrients, fluids, and supplements in  
planning pre- or post-game meals for athletes of all ages involved in aerobic and anaerobic sports.

# DIETETICS

**Code: UND/CO/39M**

**Hours: 60+30**

**Semester: VI**

**Credits: 5**

## **Learning Objectives**

- To understand the importance of diet and dietary modification in disease conditions.
- To plan and calculate the nutrient content for different disease/disorders

## **Course Outcomes**

**CO1: [K2]** Explain RDA, Food groups, Portion Size, Food exchange list, glycemic

index, concepts of diet therapy and special feeding methods and food allergy

**CO2: [K3]** Identify the etiology symptoms of diseases, diagnostic methods and

the complications in various diseases

**CO3: [K4]** Compare the various diseases/ disorders and apply the concepts of nutritional

management in diet planning

**CO4: [K5]** Examine the condition of the individual and explain the role of foods and diets

in treating diseases

**CO5: [K6]** Elaborate on the causes, symptoms of a disease/ disorder, design a suitable

diet plan using principles of nutritional management and recommend dietary

adjustments leading to better health outcomes and improved quality of life.

## HUMAN GROWTH AND DEVELOPMENT

**Code: UND/CO/42M  
(60+30)**

**Hours:**

**Semester: VI  
Credits: 4**

### Learning Objectives

- To enable students to develop an understanding of an individual from infancy to adulthood so that they can be guided effectively.
- To develop a scientific attitude towards behaviour patterns in the individual.

### Course Outcomes

**CO1: [K1]** Understand and define basic concepts associated with human growth and development.

**CO2: [K2]** Demonstrate an understanding of the biological, psychological, social and cultural influences through the lifespan.

**CO3: [K3]** Develop basic skills in observing and interpreting human behavior.

**CO4: [K4]** Analyze problems arising at various stages during the lifespan and examine solutions for the same.

**CO5: [K5]** Evaluate societal and cultural practices that are followed at various stages and apply the concepts and principles of human growth and development to personal experience.

## MANAGEMENT OF FOOD SERVICES

**Code: UND/CO/41  
+30)**

**Hours: (60**

**Semester: VI**

**Credits: 5**

### Learning Objectives

- To understand the basic principles of management in Food Service units.
- To develop a working knowledge and basic skills in the management of a FoodService Institution.

## **Course Outcomes**

On successful completion of the course, the learners will be able to:

- CO1:[K1]:** Describe development of Food Service, types of budget, steps in preparing a budget, books of account, inventories and records for control ;care and maintenance of equipment and food adulteration
- CO2 :[K2]:**Classify food services, food service systems, food service styles ,equipment components of cost used explain the adulterants present in food.
- CO3 [K3]:** Apply the principles, functions and tools of management, work simplification hygiene in personnel, food handling, plant, equipment and methods of work; labour laws and welfare measures in a food service setting
- CO 4: [K4]** Explain application of personnel management functions, sanitation and hygiene, principles of HACCP in the food service setting
- CO 5: [K5]** Evaluate the layout of different work units of a Food Service, types of equipment used and factors contributing to hygiene, sanitation and determine the selection process of Food Service Personnel

## **FOOD PRODUCT DEVELOPMENT**

**Code: UND/CE/09**

**Hours: 75**

**Semester: V**

**Credits: 5**

### **Learning Objectives**

- To understand and apply various aspects of food product development
- To enable students to understand concepts about subjective and objective evaluation of new product

### **Course Outcomes**

**On successful completion of the course, the learners will be able to**

- CO1:[K1]** define the basic concepts in food product development, packaging and quality.
- CO2:[K2]** identify the need, characteristics, factors influencing the new product and

explain the requirements of test marketing, packaging and quality attributes

**CO3: [K3]** apply the basic principles, types and steps involved in new product development

and choose appropriate packaging materials and marketing tools

**CO4: [K4]** analyse the significance and types of packaging, labelling, advertising, costing

and quality concepts for the new food product

**CO5: [K5]** evaluate new food product quality

## **BASICS IN RESEARCH METHODOLOGY AND STATISTICS**

**(FOR STUDENTS DOING PROJECT IN SEMESTER V)**

**Code: UVD/CE/01**

**Hours:**

**75**

**Semester: V**

**Credits: 5**

### **Learning Objectives**

- To understand research methodology.
- To use simple statistical methods for analysis of data.

### **Course Outcomes**

**On successful completion of the course the learners will be able to:**

**CO1: [K1]** Define research and terms associated with research process

**CO2: [K2]** Explain research design, methods of research, collection, tabulation and presentation of data.

**CO3: [K3]** Choose a sampling method and identify the appropriate statistical methods

**CO4: [K4]** Analyze the data and draw conclusions

**CO5: [K5]** Critically evaluate, draw inferences and construct a report with references



## COMMUNICATION AND DIET COUNSELING

Code: UND/CE/10

Hours: 75

Semester: VI

Credits: 5

### Learning Objectives

- To learn effective communication and counseling skills.
- To identify and explain tips for improving presentation skills during group and individual counselling

### Course Outcomes

**On successful completion of the course, the learners will be able to**

**CO1: [K1]** describe the categories, process and media of communication and counseling, use

of computers, teaching methods and the types of dietitians

**CO2: [K2]** discuss the importance of communication and counseling, responsibilities

of various dietitians and the application of computers in communication and

diet counseling

**CO3: [K3]** explain the use of audio visual aids in teaching and counseling and in

other communication types

**CO4: [K4]** compare the various types of communication and counseling and

distinguish the types of dietitians based on their responsibilities.

**CO5: [K5]** select the various communication and counseling skills and apply it

in diet counseling

## WOMEN AND FAMILY DYNAMICS

**Code: UND/CE/11**

**Hours:**

**75**

**Semester: VI**

**Credits: 5**

### **Learning Objectives**

- To become acquainted with the dynamics of family life
- To understand reproductive health, programmes and legislations for women.

### **Course Outcomes**

**CO1: [K1]** Examine and become acquainted with the dynamics of family life with its multifaceted functions in society.

**CO2: [K2]** Demonstrate an understanding of reproductive health issues in women.

**CO3: [K3]** Employ effective stress management techniques to overcome domestic and workplace challenges.

**CO4: [K4]** Analyse critical situations that can affect family life and examine solutions for the same.

**CO5: [K5]** Consider the various family welfare measures and legislations and assess their effectiveness in the protection of the rights of women.

## **PRINCIPLES OF ART AND INTERIOR DECORATION**

**Code: UVD/SU/02M  
(60+30)**

**Hours:**

**Semester: II / III**

**Credits:**

**5**

### **Learning Objectives:**

- To help learners understand the elements and principles of design
- To understand the factors in the selection of right materials for decoration and creating suitable interiors.

### **Course Outcomes:**

On successful completion of the course, the learners will be able to

**CO1: [K1]** define the functional aspects of interior materials and describe the elements and principles of design.

**CO2: [K2]** explain the use of elements and principles of design and demonstrate different types of interior materials and finishes

**CO3: [K3]** identify and evaluate the art principles and their applications and illustrate the interior space scene with the different interior materials

**CO4: [K4]** examine the use of elements and principles of design, color theories, psychological and emotional responses to color and different types of interior materials and finishes in creating different moods in interiors

**CO5: [K5]** evaluate the styles of furniture, lighting, window treatment, wall and floor finishes, accessories and flower arrangement most appropriate for different interiors

## **FUNDAMENTALS OF TEXTILES**

**Code: UVD/SU/03M**

**Hours:**

60 + 30

**Semester: IV**

**Credits:**

5

### **Learning Objectives:**

- Understand the concepts of textiles, use appropriate textile terminology, predict the product performance and Interpret labels on textiles
- Create awareness on the diverse textile products, make wise selection of textiles and its contribution to clothing and interiors

### **Course Outcomes:**

**On successful completion of the course, the learners should be able to**

**CO1: [K1]** describe the essential properties of textile fibres, yarns and the basic fabric construction techniques

**CO2: [K2]** explain the manufacturing process of man-made fibres, yarn construction, weaving, finishes done on textiles, printing and dyeing methods

**CO3: [K3]** classify textile fibres, yarns, woven fabrics, finishes, printing and dyeing process

**CO4: [K4]** categorize the fibres, yarns, fabrics and finishes for its appropriate end use and the printing and dyeing techniques followed

**CO5: [K5]** assess the suitable finishes, printing and dyeing techniques followed based on the fibre, and identify the fibre, yarn and fabric.

Unit I

## **NME/SKB Courses offered by the Department**

### **HAND EMBROIDERY**

**Code: UND/NM/01**

**Hours: 30**

**Semester: III**

**Credits: 2**

#### **Learning Objectives**

- Develop personal artistic and creative language and Integrate ideas, materials, designs and colors in suitable embroidery to meet the current fashion demand.
- Apply knowledge to blend traditional embroidery to suit the current demand.

#### **Course Outcomes**

**On successful completion of the course, the learners will be able to**

**CO1: [K1]** recognize the various types of hand embroidery.

**CO2: [K2]** identify various types of hand embroidery and its applications.

**CO3: [K3]** apply suitable colour schemes on the embroidery designs.

**CO4: [K4]** design various styles of hand embroidery.

**CO5: [K5]** decide suitable hand stitches on patterns to create value added products and demonstrate skills suitable for entrepreneurship.

## **MANAGEMENT OF A PRE-SCHOOL**

**Code: UND/SK/04**

**Hours: 45**

**Semester: V**

**Credits: 3**

### **Learning Objectives**

- To know the physical structure and facilities of a preschool.
- To become aware of various aspects such as admission procedures, curriculum development, record maintenance, home school relationships and nutrition programs in a preschool.

### **Course Outcomes**

**CO1: [K2]** Demonstrate an understanding of the modalities involved in setting up a preschool.

**CO2: [K3]** Administer a preschool program with respect to setting duties for personnel, admission procedures and maintaining records.

**CO3: [K4]** Select appropriate indoor and outdoor equipment for a preschool.

**CO4: [K5]** Choose programs and activities for a curriculum that caters to the holistic development of preschoolers.

**CO5: [K6]** Develop skills in various teaching methods.

## **ENTREPRENEURSHIP FOR WOMEN**

**Code: UNV/SK/03**

**Hours: 45**

**Semester: IV**

**Credits: 3**

### **Learning Objectives**

- To create awareness about Entrepreneurship as an effective alternative to a 'White collar Job'.

- To enable learners to acquire knowledge required to meet various requirements of an entrepreneurial venture.

## **Course Outcomes**

**On successful completion of the course, the learners will be able to:**

**CO1: [K2]** explain the various concepts of entrepreneurship and classify the types of enterprise, ownership, and enterprise networking.

**CO2: [K3]** discuss the role of women entrepreneurs and enumerate the various developmental programme and supporting institutions for women entrepreneurship.

**CO3: [K4]** analyse the concepts of an Entrepreneurship Development Programme and various institution support to start an enterprise.

**CO4: [K5]** summarize the systematic process in project identification, selection, formulation, and execution for starting a business venture

**CO5: [K6]** design a project proposal for a small enterprise with the skills and

knowledge gained and formulate/develop a product as part of an entrepreneurial venture.

## **CONCEPTS IN FASHION DESIGNING AND GARMENT CONSTRUCTION**

**Code: UND/SK/02**

**Hours:45**

**Semester: IV**

**Credits: 3**

### **Learning Objectives**

- Develop personal, artistic and creative skills and Integrate ideas, materials, designs and colors in dress designing to meet the current fashion demand.
- Create designer products utilizing the knowledge in fashion designing

### **Course Outcomes**

**On successful completion of the course, the learners will be able to**

**CO1: [K1]** identify the right choice of sewing tools, colour, design used in clothing construction

**CO2: [K2]** describe the concepts related to the basic construction techniques for garment construction

**CO3: [K3]** demonstrate the methodology to be followed in designing and in assembling a garment considering the fit and overall appearance of the garment

**CO4: [K4]** Identify suitable designs according to the figure of the wearer and drafting procedure for selected ladies garments

**CO5: [K6]** construct Women's garments in various styles from the knowledge

## **BASICS IN CULINARY SKILLS**

**Course Code: UND/SK/03**

**Hours: 45**

**Semester: V**

**Credits: 3**

### **Learning Objectives**

- Understand basics in culinary nutrition
- Introduce basic cooking and presentation skills.

### **Course Outcomes**

**CO1: [K1]** define balanced diet, standardized recipe and identify different ingredients, equipments for food preparation

**CO2: [K2]** describe the objectives, principles of cooking and the changes in cooked foods

**CO3: [K3]** explain food groups, food additives and prepare a food item

**CO4: [K4]** compare the different methods of cooking

**CO5: [K5]** create and evaluate a dish based on quality, safety and presentation skills

## **FOOD DEMONSTRATION AND PRESENTATION SKILLS**



**Code: UND/SK/05**

**Hours:45**

**Semester: V**

**Credits:3**

### **Learning Objectives**

- To develop food and equipment demonstration skills
- To acquire skills necessary for attractive display of foods, reviewing foods and presenting food blogs and vlogs

### **Course Outcomes**

**On successful completion of the course, the learners will be able to:**

**CO 1: [K2]** Describe the qualities of a lecture demonstrator, steps in conducting a recipe demonstration, factors influencing viewership, rules for writing food reviews and blogs

**CO 2: [K3]** choose cutlery, tableware, napkin folds, table décor and table appointments and prepare table setting for different menus

**CO 3: [K4]** explain the steps involved in creating a food vlog food blog and recipe demonstration on YouTube

**CO 4: [K5]** evaluate recipe demonstration, food display prepared following food styling principles, food blog

**CO 5: [K6]** create a recipe demonstration, blog or food review using skills learnt

## **M.Sc. Food Service Management and Dietetics (2023-2025)**

### **APPLIED PHYSIOLOGY**

**Code: PMN/CO/23**

**Hours: 60+30**

**Semester: I**

**Credits: 5**

### **Learning Objectives**

- To do a detailed study of specialized cells to integrate structure with functions.
- To learn the current concepts in the digestion and absorption mechanisms of macronutrients and to study the hormonal control of body functions.

## **Course Outcomes**

**On successful completion of the course, the learners will be able to :**

- CO1: [K2]** explain the role of water, electrolytes and acid-base balance in maintaining homeostasis and the hypothalamic control of body temperature
- CO2: [K3]** illustrate the sequence of events in different phases of the cardiac cycle and menstrual cycle.
- CO3: [K4]** differentiate the structure and functions of specialized cells in the body.
- CO4: [K5]** interpret the effects of circulatory failure on other organs and systems in the body
- CO5: [K6]** integrate the hormonal control of body functions and the effects of hyposecretion and hypersecretion.

## FINANCIAL AND MARKETING MANAGEMENT IN FOOD SERVICES

Code: PFM/CO/19M  
60+30

Hours:

Semester: I  
5

Credits:

### Learning Objectives:

- To understand various issues involved in financial management of a firm and equip them with advanced analytical tools and techniques that are used for making sound financial decisions and policies.
- To build marketing abilities with the emphasis on studying the conceptual framework of marketing

### Course Outcomes:

On successful completion of the course the learners should be able to

**CO1:[K2]** explain the concepts of finance, financial accounting, banking, taxation, marketing , advertisement and pricing policies for starting a food service unit

**CO2: [K3]** identify the factors responsible for controlling food cost, compute food and beverage costs and choose the appropriate methods of marketing and advertisement and pricing methods

**CO3: [K4]** compare taxes, and explain financial accounting, the role of banks in promoting

business in food services, accounting practices and pricing policies

**CO4: [K5]** justify the selection of an advertisement media to promote small enterprise using an appropriate marketing strategy and pricing policy and summarise the concepts of financing of business

**CO5: [K6]** conceive and visualise a food service unit, identify the source of finance, appropriate marketing strategy, media of advertising, and relevant pricing policy for the food service unit and also elaborate on the importance of banking and taxation in Food business

## FOOD THEORY AND APPLICATIONS

Code: PMN/CO/24  
Semester: I

Hours: 60  
Credits: 4

### **Learning Objectives**

- To be familiar with the composition of foods and their influences on functionality
- understand the chemical and physical basis for interactions taking place between food components and how these influence the properties of foods systems (including gels, dispersions, foams and emulsions)

### **Course Outcomes**

**On successful completion of the course, the learners will be able to**

**CO1: [K2]** Explain the physical and chemical properties of various foods and their uses

**CO2: [K3]** Identify suitable methods of food processing and preservation

**CO3: [K4]** Explain food dispersions with respect to structure, properties, formation, stability and uses

**CO4: [K5]** Select food properties that can be used in food preparations

**CO5: [K6]** Compile and critically discuss the role and function of food additives in the food industry

## **SELECTED TOPICS IN FOOD SERVICE MANAGEMENT**

**Code: PFM/CO/24M**

**Hours: 60**

**Semester: I**

**Credits: 4**

**Hour**

**Credits**

### **Learning Objectives**

- To develop skills in food selection purchase, storage, and service of food.
- To enable learners to become conscientious caterers and Food Service Managers

### **Course Outcomes**

**On successful completion of the course, the learners should be able to**

**CO1: [K2]** Explain the concepts of good operation management, styles of service, food service system, hygiene and sanitation and quality management of food services.

**CO2: [K3]** Identify the food service systems, styles, purchase and storage methods, types of menu, methods of sanitation and hygiene and management of

environment and wastes.

**CO3: [K4]** Compare and appraise food production systems, kitchen organization, purchase and storage methods, hygiene and environmental management.

**CO4: [K5]** Explain history and classification of food service industry, food operation, production and service and quality management.

**CO5: [K6]** Elaborate on the food service industry, food production to service, hygiene and quality management.

# ADVANCED FOOD SCIENCE

Code: PMN/CO/25

H

Hours: 60

Semester: II

Credit

Units: 4

## Learning Objectives

- To learn the different aspects of advanced food science with specific reference to food processing and post-harvest technology.
- Understand the principles and current practices of processing techniques and the effects of processing parameters on product quality.

## Course Outcomes

On successful completion of the course, the learners

will be able to: **CO1: [K2]** describe the terms and principles of food processing.

**CO2: [K3]** explain the causes of food spoilage and its impact on food quality and their control.

**CO3: [K4]** examine the different methods of food processing, preservation and packaging techniques on food quality and shelf life of foods.

**CO4: [K5]** critically analyze the advantages and disadvantages of different food processing, preservation and packaging techniques.

**CO5: [K6]** develop food products and design food labels in accordance with food safety laws and regulations.

# CULINARY ART MANAGEMENT

Code: PFM/CO/23

Hours

:60+30

Semester: II

Credit

Units: 5

## Learning Objectives

- Learn about the importance and the cultural influence

- of Indian and international food cuisine
- Learn the etymology of foods from other regions

### Course Outcomes

On successful completion of the course the learners should be able to

- CO1: [K2]** explain the food culture, characteristics and culinary influences of Indian, Oriental, European Mediterranean cuisine and Mesoamerican cuisine
- CO2: [K3]** identify the spices, herbs and sauces, and classify the equipment and tools used and the specialty foods in various cuisines and disseminate the information through oral and poster presentations.
- CO3: [K4]** compare the methods of cooking and the styles of service, menu and Special foods used in Indian, Oriental, European, Mediterranean and Mesoamerican cuisine and demonstrate them to the peer group
- CO4: [K5]** design a menu, draw the table setting and specify the specialty foods for Indian, Oriental, European Mediterranean cuisine, Mesoamerican cuisine and discuss the equipments, spices and seasonings and communicate to the peer through presentations and demonstrations.
- CO5: [K6]** conceive and visualize a food service outlet, interact with the peer group discuss and decide on specific cuisine, the ingredients, the spices and herbs required, the equipment needed and the type of menu, the style of service and specialty foods

## PHYSICAL FACILITIES FOR FOOD SERVICES

**Code: PFM/CO/25**  
**Semester: II**

**Hours: 60**  
**Credits: 4**

### Learning Objectives

- To have a basic understanding of the physical facilities used in a food service
- To understand the design, selection, care and operation of equipment used in a food service.

Course Outcomes:

**On successful completion of the course, the learners should be able to** **CO1: [K2]** discuss the concepts of layout design, good lighting, construction

materials, finishes and equipments.

**CO2: [K3]** determine the trends affecting food service design, water supply and plumbing system, base materials, selection and purchase of equipment.

**CO3: [K4]** classify equipments, appraise the recent trends in equipments used in food service institution, their cost of installation, maintenance and care.

**CO4: [K5]** explain equipment used in different areas and their financial investment on purchase and repair and justify the use of these materials and energy resources.

**CO5: [K6]** summarise the types of food services, building materials, equipment construction and finishes, selection and financial investments.

### **COMMUNITY NUTRITION**

**Code: PMN/CO/26M**

**Hours: 60**

**Semester: III**

**Credits: 4**

#### **Learning Objectives**

- To enable the student to understand the nutritional problems in our country
- To understand the role of governmental and non-governmental agencies in overcoming these problems.
- 

#### **Course Outcomes**

**On successful completion of the course, the learners will be able to:**

**CO1: [K2]** explain the nutritional problems in India, their causes, consequences and prevention

**CO2: [K3]** illustrate the role of state, national and international agencies in ensuring food security and combating malnutrition

**CO 3: [K4]** Assess and select the determinants of health related behaviour, methods of assessment of nutritional status and indicators of food and nutrition security



of different population groups

**CO 4: [K5]** evaluate the role of secondary data, national policies and community based strategies in preventing disease and malnutrition

**CO 5: [K6]** critically analyse the programs to combat food insecurity and promote health

### **COMMUNITY NUTRITION PROJECT- SERVICE LEARNING**

**Code: PMN/CO/29 SL**

**Hours: 60**

**Semester: III**

**Credits: 2**

#### **.Learning Objectives:**

- To plan, design and execute Nutrition Education Programs with a service-learning perspective, evaluate its impact, discuss and reflect on the outcome at every stage of the project
- To develop audiovisual aids and choose suitable methodology to educate the community on good nutrition in promoting good health and well-being.

#### **Course Outcomes**

On successful completion of the course, the learners will be able to:

- CO1:[K3]** identify the nutritional needs of the society and apply personal and interpersonal skills to offer solutions and services for nutrition problems in the community
- CO2:[K4]** analyze and understand the needs and the nutritional problems of the community, and develop and disseminate information through nutrition education program for the target population.
- CO3:[K5]** design a service learning project and determine appropriate strategies for nutrition interventions, develop audio visual aids and evaluate the process and impact of a nutrition intervention.

**CO4:[K6]** formulate a service learning program and deliver information to the community and foster leadership skills, promote personal growth, and critical thinking

**CO 5:[K6]** journalize the events of the service learning program, reflect on the process and make a written and oral presentation and prepare them for community work and action research.

## **APPLIED STATISTICS AND RESEARCH METHODOLOGY**

**Code: PMN/CO/ 27M**

**Hours: (60+45)**

**Semester: III**

**Credits: 5**

### **Learning Objectives**

- To understand the principles of data collection, analysis and proper interpretation of data.
- To know the importance and technique of classification and tabulation of data.

### **Course Outcomes**

**On successful completion of the course, the learners will be able to**

**CO1: [K2]** define concepts of research and statistics, types and significance of research, meaning and scope of statistics. Identify a research problem, choose an appropriate research design, plan a suitable tool for data collection and solve simple statistical problems.

**CO2: [K3]** choose a research problem, appropriate research and sampling design, research tools and calculate measures of central tendency.

**CO3: [K4]** explain the research process, concept of skewness, kurtosis, probability theorem, measurement and scaling techniques, sampling design, ethics of research, theoretical distribution and calculate measures of variation.

**CO4: [K5]** compare the tools for data collection, compute appropriate statistical test and use a suitable method for presentation of data and explain presentation of data and report writing

**CO5: [K6]** plan a research proposal, organize data, infer results using parametric and non parametric methods and compile report.

## ADVANCED PAPER IN DIETETICS

**Code: PMN/CO/28M**  
**Semester: III**

**Hours:75**  
**Credits:5**

### **Learning Objectives**

- To give an in-depth view of recent trends in the dietary management of various conditions.
- To prepare learners for research or clinical practice in the field of dietetics based on evidence nutrition.

### **Course Outcomes:**

**On successful completion of the course, the learners should be able to**

**CO1: [K2]** Explain the concept of nutrition care process and modifications to normal diets.

**CO2: [K3]** Identify and apply the principles of diet therapy in health care setting.

**CO3: [K4]** Compare and appraise diet therapy for gastro intestinal disorders.

**CO4: [K5]** Explain and recommend appropriate medical nutrition therapy for the treatment

Of non-communicable diseases based on current guidelines.

**CO5: [K6]** Plan diets for weight management, degenerative diseases and justify the

significance of special feeding methods in therapeutic conditions.

## INTERNSHIP

**Code:PMN/CO/21**

**1Month**

**Semester:III**

**Credits:2**

### Learning Objectives:

- To enable students to acquire practical training in a clinical setup and understand the functioning of a dietary department.
- To understand the basis for medical nutrition therapy and its application in treating various disease conditions.

### Course Outcomes:

On successful completion of the course, the learners will be able to

**CO1: [K3]** apply concepts learnt in managing diet kitchens, implement diet plans and document the nutrition care process

**CO2:[K5]** assess nutritional status, interpret lab results, plan preventive and therapeutic diets, and provide appropriate nutritional counseling to the clients

**CO3: [K6]** develop professional skills to enhance their employability in the field of dietetics and food service management

## HUMAN RESOURCE MANAGEMENT

**Code: PFM/CO/26M**

**Hours:**

**60+30**

**Semester: IV**

**Credits: 5**

### Learning Objectives

1. To provide a sound understanding of the functions of Human Resource Managers and prepare students for managerial roles in the food service industry
2. To develop leadership, communication and problem solving skills in the students.

### Course Outcomes

**On successful completion of the course, the learners will be able to:**

**CO1: [K2]** Explain the principles and functions of management and contemporary HR practices

**CO2: [K3]** Illustrate the role of a HR manager in creating a work environment that promotes productivity and managing conflict, change and attrition.

**CO3: [K4]** Compare the organisational set up in different catering establishments, labour laws, leadership and motivational theories and explain their suitability

**CO4: [K5]** Assess personnel functions, labour legislations and tools of management to

evaluate their uses

**CO 5: [K6]** Plan and organise a food sale/group project applying the principles, functions and tools of management and choose appropriate tools and

practices to promote a productive and healthy work environment

## **THESIS**

**Code:PFM/CO/22**  
**Week**

**Hours: 16 Hrs /**

**Semester:IV**

**Credits:8**

### **Learning Objectives:**

- Review related literature and gain in-depth knowledge on the topic of research.
- Interpret findings, draw conclusions and acquire skills for scientific writing.

### **Course Outcomes:**

On successful completion of the course, the learners should be able to

**CO1:[K3]** choose a relevant research problem, conduct literature review and develop research proposals adhering to ethical guidelines

- CO2:[K4]** select appropriate tools and methodologies to collect data, analyze, tabulate, interpret and present data using suitable statistical methods
- CO3:[K5]** critically analyze the results and summarize the findings
- CO4:[K6]** compile and write a report applying principles of scientific writing giving recommendations and referencing
- CO5:[K6]** develop a suitable research design, construct tools for data collection, analyze, interpret and infer results, report writing and present the findings

## **ENTREPRENEURSHIP**

**Code: PFM/EL/01**

**Ho**

**urs: 60**

**Semester: I**

**Cre**

**redits: 3**

### **Learning Objectives**

- Prepares students to develop the insight to discover and create entrepreneurial opportunities and the expertise to successfully launch, manage, and grow their own venture.
- Exhibit financial and management skills necessary to succeed in increasingly challenging academic environments of further higher education.
- Develop analytical and critical thinking skills necessary to make sound financial decisions in business and personal arenas.

### **Course Outcomes**

- On successful completion of the course, the learners should be able to
- CO1: [K2]** explain the concept, role and importance of entrepreneur and entrepreneurship and relate it to business start-ups for the economic development of an individual and Nation.
- CO2: [K3]** classify the different types of entrepreneurs and business to avail suitable financial assistance.
- CO3: [K4]** examine the business opportunities and constraints and apply it while starting a new business or in the expansion of an existing business.
- CO4: [K5]** evaluate the reasons for success or failure of a Business.
- CO5: [K6]** identify a target group, plan a project and implement it based

on the concepts learnt and demonstrate entrepreneurial skills.

## **FUNCTIONAL FOODS AND NUTRACEUTICALS**

**Code: PMN/EL/12M**

**H**

**ours: 60**

**Semester: II**

**Cred**

**its: 3**

### **Learning Objectives**

- To gain knowledge on functional foods and nutraceuticals and their safety.
- To understand the role of functional food and Nutraceuticals in health and disease.

### **Course Outcomes**

**On successful completion of the course, the learners should be able to**

- CO1: [K2]** Explain the concept and identify functional foods, phytochemicals and antioxidants and explain its potential application in the food industry.
- CO2: [K3]** Identify nutraceuticals and outline the mechanism of action and their role of probiotics and prebiotics in the food industry.
- CO3: [K4]** Compare the characteristics, sources and mechanism of action of prebiotics and probiotics and recommend its use in human health.
- CO4: [K5]** Explain and elucidate the therapeutic role of functional foods and nutraceuticals, their safety and its use in the prevention treatment of disease.
- CO5: [K6]** Elaborate and discuss the safety of nutraceuticals, laws governing their use and elaborate on the systematic reviews of nutraceuticals in clinical trials.

## **DRUG -NUTRIENT INTERACTIONS**

**Code: PMN/EL/13**

**Hours: 60**

**Semester: II**

**Credits: 3**

### **Learning Objectives**

- To enable learners understand the significance of food and drug interactions in the present clinical scenario.

- To help learners apply this knowledge in prescribing individualized dietary regimen for various therapeutic conditions in order to optimize drug efficacy.

### **Course Outcomes**

**On successful completion of the course, the learners will be able to:**

- CO1: [K1]** Describe basic concepts pertaining to drug and nutrient interactions.
- CO2: [K2]** Discuss the influence of nutritional status on drug utilization across age groups and clinical conditions.
- CO3: [K3]** Examine the role of nutrients on drug metabolism in normal and therapeutic conditions.
- CO4: [K4]** Explain clinically possible drug-nutrient interactions that may enhance or depress drug efficacy during different stages of life and specific medical conditions.
- CO5: [K5]** Recommend appropriate nutritional strategies based on drug-nutrient interactions in order to optimize drug efficacy.

## **SPORTS AND EXERCISE NUTRITION**

**Code: PMN/EL/ 08**  
**60**

**Hours:**

**Semester: III**

**Credits: 3**

### **Learning Objectives**

- To understand the use of key nutrients as fuels to enhance goals related to health, fitness and performance.
- To understand the scientific basis for sports nutrition in order to avoid unsafe practices for enhancing performance.

### **Course Outcomes:**

**On successful completion of the course, the learners should be able to**

**CO1: [K2]** describe fitness and its components, types of exercise, body composition,

ergogenic aids, problems related to sports and athletes, explain the role of



various macro and micronutrients, sports foods, and the energy systems involved in different types of exercise.

**CO2: [K3]** explain the functions and metabolism of macronutrients in different activities and examine the use of ergogenic aids, assessment of body composition, role of micronutrients, and water for exercise.

**CO3: [K4]** explain the energy yield upon the oxidation of macronutrients, and focus on the use of sports foods, macronutrient, micronutrient and hydration guidelines, pertaining to pre-event, during event and post-event

**CO4: [K5]** justify the nutrient requirement of athletes for different types of activities and for those with special considerations, assess body composition parameters of athletes, and select various sports supplements and ergogenic aids used to enhance performance.

**CO5: [K6]** develop a nutrition plan for athletes involved in aerobic and anaerobic activities

## **BASICS IN GUIDANCE AND COUNSELLING**

**Code:PMN/EL/10M**

**Hours: 60**

**Semester:IV**

**Cre**

**redits:3**

### **Learning Objectives:**

- Enable learners to understand various concepts and principles of guidance and counselling.
- Helps them to know about various areas of counselling and acquire skills in the use of different approaches and techniques in guidance and counselling for the benefit of society.

**Course Outcomes:**

On successful completion of the course, the learners will be able to:

- CO1: [K2]** demonstrate an understanding of interplay between biological, psychological and social forces affecting mental health and psychological well-being of individuals.
- CO2: [K3]** develop the skill of using various approaches and methods of counselling.
- CO3: [K4]** differentiate between the importance of educational, vocational and work education counselling services.
- CO4: [K5]** distinguish between normal and deviated behaviours and be sensitised to the special needs of guidance services to the exceptional and their families.
- CO5: [K6]** adapt from the range of counselling techniques to meet societal needs.

**SCIENTIFIC WRITING**

**Code: PMN/SK/03**

**Hours: 30**

**Semester: III**

**Credits:2**

**Learning Objective:**

- To enable learners to understand and apply scientific writing skills in drafting project proposals, thesis and journal articles.
- To enable learners to critically analyze data from research and incorporate it into a concise and logical sequence with proper citation.

**Course Outcomes:**

On successful completion of this course the learners will be able to

- CO1: [K2]** explain the importance, concepts, ethical values and method of scientific writing.
- CO2: [K3]** write proposals for projects and funding and also write different chapters of a thesis.

- CO3: [K4]** analyze, plan and device appropriate research and sample design and research tools.
- CO4: [K5]** choose appropriate sampling design, method of editing, coding, suitable statistical tests and data presentation.
- CO5: [K6]** prepare tools for data collection, abstracts and manuscripts for publication and summarize and compile contents for oral and poster presentation.

## **NUTRITION COUNSELLING**

**Code: PMN/SK/05**

**Hours: 30**

**Semester: IV**

**Credits: 2**

### **Learning Objectives**

- To learn the counselling skills and techniques
- To get hands on experience in mock counselling and use the principles in the community for health promotion and disease prevention

### **Course Outcomes:**

**On successful completion of the course, the learners should be able to**

**CO1: [K2]** explain the various types of communication and counselling.

**CO2 : [K3]** examine the steps involved in nutrition counselling and understand its significance for behaviour modification in different disease conditions through case studies

**CO3: [K4]** categorize the various types of dieticians by their roles and responsibilities

**CO4: [K5]** compare and contrast individual counselling from group counselling

**CO5: [K6]** develop audio visual aids for any normal or therapeutic conditions and use it during counselling



**MSc. Foods and Nutrition (2023-2025)**

**APPLIED PHYSIOLOGY**

**Code: PMN/CO/23**  
**Semester: I**

**Hours: 60+30**  
**Credits: 5**

**Learning Objectives**

- To do a detailed study of specialized cells to integrate structure with functions.
- To learn the current concepts in the digestion and absorption mechanisms of macronutrients and to study the hormonal control of body functions.

**Course Outcomes**

**On successful completion of the course, the learners will be able to:**

**CO1: [K2]** explain the role of water, electrolytes and acid-base balance in maintaining homeostasis and the hypothalamic control of body temperature

**CO2: [K3]** illustrate the sequence of events in different phases of the cardiac cycle and menstrual cycle.

**CO3: [K4]** differentiate the structure and functions of specialized cells in the body.

**CO4: [K5]** interpret the effects of circulatory failure on other organs and systems in the body  
**CO5: [K6]** integrate the hormonal control of body functions and the effects of hyposecretion and hypersecretion.

**ADVANCED PAPER IN CARBOHYDRATES AND LIPIDS**

**Code: PFN/CO/24**  
**Semester: I**

**Hours: 75**  
**Credits: 5**

**Learning Objectives:**

- To understand the functional, therapeutic and toxic role of carbohydrates and lipids.
- To learn the dietary implications of different types of carbohydrates and lipids.

**Course Outcomes**

**On successful completion of the course, the learners will be able to:**

**CO1: [K1]** describe the classification, digestion, absorption metabolism and transport of carbohydrates and lipids and

- its relationship with other nutrients
- CO2: [K2]** discuss the storage of carbohydrate and lipids in the body and its associated diseases
- CO3: [K3]** examine the functions of the different types of carbohydrates and lipids and its role in gene expression
- CO4: [K4]** analyze the dietary implications of the different types of carbohydrates and lipids and the carbohydrate and lipid-based food substitutes used.
- CO5: [K5]** substantiate the importance of the therapeutic and toxic effects of carbohydrates and lipids in health and disease.

## **FOOD THEORY AND APPLICATIONS**

**Code: PMN/CO/24**

**H**

**Hours: 60**

**Semester: I**

**Credits: 4**

**Hours: 4**

### **Learning Objectives:**

- To be familiar with the composition of foods and their influences on functionality
- understand the chemical and physical basis for interactions taking place between food components and how these influence the properties of food systems (including gels, dispersions, foams and emulsions)

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to**

- CO1: [K2]** Explain the physical and chemical properties of various foods and their uses
- CO2: [K3]** Identify suitable methods of food processing and preservation
- CO3: [K4]** Explain food dispersions with respect to structure, properties, formation, stability and uses
- CO4: [K5]** Select food properties that can be used in food preparations
- CO5: [K6]** Compile and critically discuss the role and function of food additives in the food industry

## **BIOCHEMISTRY- PAPER I**

**Code: PFN/CO/23M**

**Hours: 60**

**Semester: I**

**Credits: 4**

### **Learning Objectives**

- To provide a sound understanding of the structure and functions of Carbohydrates and Lipids.
- To understand the major metabolic pathways and their regulation.

### **Course Outcomes**

**On successful completion of the course, the learners will be able to:**

**CO1: [K1]** describe enzyme and co enzyme function, structure of carbohydrates and lipids.

**CO2: [K2]** explain the physiological significance and functions of carbohydrate and lipids.

**CO3: [K3]** examine the pathways involved in the metabolism of carbohydrate and lipids.

**CO4: [K4]** explain the pathways involved in the production of energy via metabolism of carbohydrate and lipids.

**CO5: [K5]** summarize the significance of the various metabolic pathways involved in carbohydrate and lipid metabolism

## **BIOCHEMISTRY- PAPER II**

**Code: PFN/CO/25 M**  
**Semester: II**

**Hours: 60**  
**Credits: 4**

### **Learning Objectives**

- To provide a sound understanding of structure and function of Proteins.
- To understand the transmission of genetic information from DNA to Proteins, Metabolism of Detoxification and action of Free Radicals.

### **Course Outcomes**

**On successful completion of the course, the learners will be able to:**

**CO1: [K1]** describe the structure and functions of amino acids, proteins, nucleic acids and antioxidants.

**CO2: [K2]** explain the physiological significance of amino acids, Proteins, nucleic acids and Free Radicals.

**CO3: [K3]** examine the pathways involved in the metabolism of amino acids, protein, xenobiotics.

**CO4: [K4]** explain and interpret the significance of the metabolic pathways involved in the anabolism and catabolism of

protein, nucleic acids and xenobiotics.

**CO5: [K5]** summarize the integration of the different metabolic pathways.

### **ADVANCED PAPER IN ENERGY AND PROTEINS**

**Code: PFN/CO/26**

**Hours:75**

**Semester: II**

**Credits: 5**

#### **Learning Objectives**

- To acquire an in-depth knowledge of the role of energy and protein in the human body and to understand concepts of energy requirements, energy balance and the health effects of obesity and starvation
- To understand the nutritional aspects of proteins and amino acids with emphasis on metabolism, protein and amino acid requirements, assessment of protein quality, effects of deficiencies, toxicities and techniques for improving protein nutrition.

#### **Course Outcomes:**

On successful completion of the course, the learners will be able to:

- CO1: [K2]** describe the functions pertaining to energy and protein metabolism.
- CO2: [K3]** explain the methods to measure energy and protein requirements and factors influencing it.
- CO3: [K4]** analyse the concept of energy and nitrogen balance and to understand the consequences of energy and protein imbalances
- CO4: [K5]** assess energy and protein functions, requirements and quality to develop strategies to improve nutritional status.
- CO5: [K6]** justify the energy and protein requirements for different age groups in normal and therapeutic conditions

### **COMMUNITY NUTRITION**

**Code: PMN/CO/26M**

**Hours: 60**

**Semester: III**

**Credits: 4**

#### **Learning Objectives**



- To enable the student to understand the nutritional problems in our country
- To understand the role of governmental and non-governmental agencies in overcoming these problems.

### **Course Outcomes**

**On successful completion of the course, the learners will be able to:**

**CO1: [K2]** explain the nutritional problems in India, their causes, consequences and prevention

**CO2: [K3]** illustrate the role of state, national and international agencies in ensuring food security and combating malnutrition

**CO 3: [K4]** Assess and select the determinants of health related behaviour, methods of assessment of nutritional status and indicators of food and nutrition security of different population groups

**CO 4: [K5]** evaluate the role of secondary data, national policies and community based strategies in preventing disease and malnutrition

**CO 5: [K6]** critically analyse the programs to combat food insecurity and promote health

### **COMMUNITY NUTRITION PROJECT- SERVICE LEARNING**

**Code: PMN/CO/29 SL**

**Hours:60**

**Semester: III**

**Credits:2**

#### **Learning Objectives:**

- To plan, design and execute Nutrition Education Programs with a service-learning perspective, evaluate its impact, discuss and reflect on the outcome at every stage of the project
- To develop audiovisual aids and choose suitable methodology to educate the community on good nutrition in promoting good health and well-being.

### **Course Outcomes**

On successful completion of the course, the learners will be able to:

**CO1:[K3]** identify the nutritional needs of the society and apply personal and interpersonal skills to offer solutions and services for nutrition problems in the community

- CO2:[K4]** analyze and understand the needs and the nutritional problems of the community, and develop and disseminate information through nutrition education program for the target population.
- CO3:[K5]** design a service learning project and determine appropriate strategies for nutrition interventions, develop audio visual aids and evaluate the process and impact of a nutrition intervention.
- CO4:[K6]** formulate a service learning program and deliver information to the community and foster leadership skills, promote personal growth, and critical thinking
- CO 5:[K6]** journalize the events of the service learning program, reflect on the process and make a written and oral presentation and prepare them for community work and action research.

## APPLIED STATISTICS AND RESEARCH METHODOLOGY

**Code: PMN/CO/ 27M**

**Hours: (60+45)**

**Semester: III**

**Credits: 5**

### Learning Objectives

- To understand the principles of data collection, analysis and proper interpretation of data.
- To know the importance and technique of classification and tabulation of data.

### Course Outcomes

**On successful completion of the course, the learners will be able to**

**CO1: [K2]** define concepts of research and statistics, types and significance of research, meaning and scope of statistics. Identify a research problem, choose an appropriate research design, plan a suitable tool for data collection and solve simple statistical problems.

**CO2: [K3]** choose a research problem, appropriate research and sampling design, research tools and calculate measures of central tendency.

**CO3: [K4]** explain the research process, concept of skewness, kurtosis, probability theorem, measurement and scaling techniques, sampling design, ethics of research, theoretical distribution and calculate measures of variation.

**CO4: [K5]** compare the tools for data collection, compute appropriate statistical test and use a suitable method for presentation of data and explain presentation of data and report writing

**CO5: [K6]** plan a research proposal, organize data, infer results using parametric and non parametric methods and compile report.

## ADVANCED PAPER IN DIETETICS

**Code:PMN/CO/28M**

**Hours:75**

**Semester:III**

**Credits:5**

### Learning Objectives

- To give an in-depth view of recent trends in the dietary management of various conditions.

- To prepare learners for research or clinical practice in the field of dietetics based on evidence nutrition.

**Course Outcomes:**

**On successful completion of the course, the learners should be able to**

**CO1: [K2]** Explain the concept of nutrition care process and modifications to normal diets.

**CO2: [K3]** Identify and apply the principles of diet therapy in health care setting.

**CO3: [K4]** Compare and appraise diet therapy for gastro intestinal disorders.

**CO4: [K5]** Explain and recommend appropriate medical nutrition therapy for the treatment

Of non-communicable diseases based on current guidelines.

**CO5: [K6]** Plan diets for weight management, degenerative diseases and justify the

significance of special feeding methods in therapeutic conditions.

## **INTERNSHIP**

**Code:PMN/CO/21**

**Semester:III**

**1Month**

**Credits:2**

**Learning Objectives:**

- To enable students to acquire practical training in a clinical setup and understand the functioning of a dietary department.
- To understand the basis for medical nutrition therapy and its application in treating various disease conditions.

**Course Outcomes:**

On successful completion of the course, the learners will be able to

**CO1: [K3]** apply concepts learnt in managing diet kitchens, implement diet plans and document the nutrition care process

**CO2:[K5]** assess nutritional status, interpret lab results, plan preventive and therapeutic diets, and provide appropriate nutritional counseling to the clients

**CO3: [K6]** develop professional skills to enhance their employability in the field of dietetics and food service management

## **ADVANCED PAPER IN MINERALS AND VITAMINS**

**Code: PFN/CO/27M**

**Hours: 75**

**Semester: IV**

**Credits: 5**

### **Learning Objectives**

- To comprehend the physiological and biochemical roles played by minerals and vitamins in human nutrition and the impact of its deficiency and excess in the body
- To emphasize on the current nutritional implications of micronutrients.

### **Course Outcomes**

**On successful completion of the course, the learners will be able to:**

**CO1: [K2]** explain the hormonal control of water and electrolyte balance and the role of macrominerals in human nutrition

**CO2: [K3]** illustrate the significance of microminerals in human nutrition

**CO3: [K4]** distinguish the metabolic and physiological functions of fat and water soluble vitamins

**CO4: [K5]** interpret the effects of hypo and hypervitaminosis

**CO5: [K6]** integrate the relationship between minerals, vitamins and other nutrients and the role of mineral and vitamin supplements in health promotion.

## **THESIS**

**Code: PFN/CO/22**

**Hours:16Hrs/Week**

**Semester: IV**

**Credits:8**

### **Learning Objectives:**

- Review related literature and gain in-depth knowledge on the topic of research.

- Interpret findings, draw conclusions and acquire skills for scientific writing.

**Course Outcomes:**

On successful completion of the course, the learners will be able to

- CO1:[K3]** choose a relevant research problem, conduct literature review and develop research proposals adhering to ethical guidelines
- CO2:[K4]** plan a suitable research design, and select appropriate tools and methodologies to conduct the study.
- CO3:[K5]** critically analyze the data using suitable statistical methods, interpret and infer results.
- CO4:[K5]** summarize and present the findings.
- CO5:[K6]** compile and write a report applying principles of scientific writing giving recommendations and referencing.

## **FUNCTIONAL FOODS AND NUTRACEUTICALS**

**Code: PMN/EL/12M**

**H**

**ours: 60**

**Semester: II**

**Cred**

**its: 3**

**Learning Objectives:**

- To gain knowledge on functional foods and nutraceuticals and their safety.
- To understand the role of functional food and Nutraceuticals in health and disease.

**Course Outcomes:**

**On successful completion of the course, the learners should be able to**

- CO1: [K2]** Explain the concept and identify functional foods, phytochemicals and antioxidants and explain its potential application in the food industry.
- CO2: [K3]** Identify nutraceuticals and outline the mechanism of action and their role of probiotics and prebiotics

in the food industry.

- CO3: [K4]** Compare the characteristics, sources and mechanism of action of prebiotics and probiotics and recommend its use in human health.
- CO4: [K5]** Explain and elucidate the therapeutic role of functional foods and nutraceuticals, their safety and its use in the prevention treatment of disease.
- CO5: [K6]** Elaborate and discuss the safety of nutraceuticals, laws governing Their use and elaborate on the systematic reviews of nutraceuticals in clinical trials.



## DRUG -NUTRIENT INTERACTIONS

**Code: PMN/EL/13**  
**Semester: II**

**Hours: 60**  
**Credits: 3**

### Learning Objectives

- To understand the significance of food and drug interactions in the present clinical scenario.
- To apply this knowledge in prescribing individualized dietary regimen for various therapeutic conditions in order to optimize drug efficacy.

### Course Outcomes

**On successful completion of the course, the learners will be able to:**

- CO1: [K1]** describe basic concepts pertaining to drug and nutrient interaction
- CO2: [K2]** discuss the influence of nutritional status on drug utilization across age groups and clinical conditions.
- CO3: [K3]** examine the role of nutrients on drug metabolism in normal and therapeutic conditions.
- CO4: [K4]** Explain clinically possible drug-nutrient interactions that may enhance or depress drug efficacy during different stages of life and specific medical conditions.
- CO5: [K5]** recommend appropriate nutritional strategies based on drug-nutrient interactions in order to optimize drug efficacy.

## TECHNIQUES IN NUTRITIONAL BIOCHEMISTRY (PRACTICAL COURSE)

**Code: PFN/EL/04**

**Hours: 90**

**Semester: II**

**Credit**

**s: 3**

### Learning Objective:

- To enable the learners to understand the techniques and principles involved in different laboratory investigations.
- To impart analytical skills through food analysis and biochemical techniques.

### Course Outcomes:

On successful completion of the course, the learners should be able to

- CO1: [K2]** identify and select appropriate techniques in the preparation and standardization of solutions
- CO2:[K3]** apply the skills learnt in titrimetric analysis to estimate vitamin C content in foods, iodine and acid number of oils
- CO3:[K4]** analyze the moisture, protein, fat and mineral content of food items
- CO4:[K5]** estimate the glucose and hemoglobin content of blood using photoelectric colorimeter
- CO5:[K6]** develop analytical skills and apply it in biochemical estimations

## **SPORTS AND EXERCISE NUTRITION**

**Code: PMN/EL/ 08**  
**60**

**Hours:**

**Semester: III**

**Credits: 3**

### **Learning Objectives**

- To understand the use of key nutrients as fuels to enhance goals related to health, fitness and performance.
- To understand the scientific basis for sports nutrition in order to avoid unsafe practices for enhancing performance.

### **Course Outcomes:**

**On successful completion of the course, the learners should be able to**

**CO1: [K2]** describe fitness and its components, types of exercise, body composition,

ergogenic aids, problems related to sports and athletes, explain the role of

various macro and micronutrients, sports foods, and the energy systems involved in different types of exercise.

**CO2: [K3]** explain the functions and metabolism of macronutrients in different activities and examine the use of ergogenic aids, assessment of body composition, role of micronutrients, and water for exercise.

**CO3: [K4]** explain the energy yield upon the oxidation of macronutrients, and focus on

the use of sports foods, macronutrient, micronutrient and hydration guidelines, pertaining to pre-event, during event and post-event

**CO4: [K5]** justify the nutrient requirement of athletes for different types of activities

and for those with special considerations, assess body composition parameters

of athletes, and select various sports supplements and ergogenic aids used to enhance performance.

**CO5: [K6]** develop a nutrition plan for athletes involved in aerobic and anaerobic activities

## **BASICS IN GUIDANCE AND COUNSELLING**

**Code: PMN/EL/10M**

**Hours: 60**

**Semester: IV**

**Cre**

**redits:3**

### **Learning Objectives:**

- Enable learners to understand various concepts and principles of guidance and counselling.
- Helps them to know about various areas of counselling and acquire skills in the use of different approaches and techniques in guidance and counselling for the benefit of society.

### **Course Outcomes:**

On successful completion of the course, the learners will be able to:

**CO1: [K2]** demonstrate an understanding of interplay between biological, psychological and social forces affecting mental health and psychological well-being of individuals.

**CO2: [K3]** develop the skill of using various approaches and methods of counselling.

- CO3: [K4]** differentiate between the importance of educational, vocational and work education counselling services.
- CO4: [K5]** distinguish between normal and deviated behaviours and be sensitised to the special needs of guidance services to the exceptional and their families.
- CO5:[K6]** adapt from the range of counselling techniques to meet societal needs.

## **SCIENTIFIC WRITING**

**Code:PMN/SK/03**

**Hours: 30**

**Semester:III**

**Credits:2**

### **Learning Objective:**

- To enable learners to understand and apply scientific writing skills in drafting project proposals, thesis and journal articles.
- To enable learners to critically analyze data from research and incorporate it into a concise and logical sequence with proper citation.

### **Course Outcomes:**

On successful completion of this course the learners will be able to

- CO1: [K2]** explain the importance, concepts, ethical values and method of scientific writing.
- CO2: [K3]** write proposals for projects and funding and also write different chapters of a thesis.
- CO3: [K4]** analyze, plan and device appropriate research and sample design and research tools.
- CO4: [K5]** choose appropriate sampling design, method of editing, coding, suitable statistical tests and data presentation.
- CO5: [K6]** prepare tools for data collection, abstracts and manuscripts for publication and summarize and compile contents for oral and poster presentation

## **NUTRITION COUNSELLING**

**Code: PMN/SK/05**

**Hours: 30**

**Semester: IV**

**Credits: 2**

### **Learning Objectives**

- To learn the counselling skills and techniques
- To get hands on experience in mock counselling and use the principles in the community for health promotion and disease prevention

### **Course Outcomes:**

**On successful completion of the course, the learners should be able to**

**CO1: [K2]** explain the various types of communication and counselling.

**CO2 : [K3]** examine the steps involved in nutrition counselling and understand its significance for behaviour modification in different disease conditions through case studies

**CO3: [K4]** categorize the various types of dieticians by their roles and responsibilities

**CO4: [K5]** compare and contrast individual counselling from group counselling

**CO5: [K6]** develop audio visual aids for any normal or therapeutic conditions and use it during counselling

## **NUTRITION IN MENTAL HEALTH (Offered to students of Psychology)**

**Code: PHS/EL/04**

**Hours: 60**

**Semester: I**

**Credits: 3**

### **Learning Objectives**

- To gain knowledge about the nutrients necessary for the functioning of the human body
- To understand the role of nutrition in certain conditions of Mental Health

### **Course Outcomes**

**On successful completion of the course, the learners will be able to**

- CO1: [K1]** explain balanced diet, menu planning and healthy food choices through the lifecycle
- CO2: [K2]** outline the nutritional needs across age groups and specific psychological disorders
- CO3: [K3]** identify signs and symptoms related to nutritional deficiencies from infancy to old age
- CO4: [K4]** explain the functions of nutrients in normal growth and development and in certain psychological disorders
- CO5: [K5]** justify the role of nutrients in normal and specific mental health conditions

## **MPHIL COURSE FOOD SERVICE MANAGEMENT AND DIETETICS**

### **PAPER I RESEARCH METHODOLOGY AND INTRODUCTION TO TEACHING/LEARNING PROCESS**

**Code: MMN/01**

**Hours: 60**

**Credits: 5**

#### **Learning Objectives**

- Enable students to formulate research problems and use appropriate sampling methods
- Identify tools for data collection, process and analyse data
- Gain knowledge on the different teaching and learning methods

#### **Course outcomes**

**On successful completion of the course the learners should be able to**

- CO1: [K3]** Apply appropriate test of significance in the field of food service management, dietetics and foods and nutrition.
- CO2: [K4.]** Compare the different tools of data collection and design a suitable tool for research
- CO3: [K5]** To determine the different teaching and learning methods in formal and non-formal education and the methods of evaluation in higher education
- CO4: [K6]** Elaborate on the different sampling designs used in

**CO5: [K6]** research and explain the process in delivering food  
Plan a research proposal, organize data, infer results and compile report.

**PAPER II ADVANCED PAPER  
IN  
FOOD SERVICE MANAGEMENT AND DIETETICS**

**Code: MFM/02**

**Hours:60**

**Credits :5**

**Learning objectives**

- To prepare students for managerial roles in the food service industry
- To understand current concepts on diet therapy and drug-nutrient interactions

**Course outcomes**

**On successful completion of the course, the learners should be able to**

- CO1: [K3]** Explain and apply the principles of human resource management in food service.
- CO2: [K4]** Compare and evaluate communication strategies in nutrition education and develop an appropriate education program for the target population.
- CO3: [K3]** Plan and Implement Knowledge of dietetics and healthy eating for health promotion and disease prevention.
- CO4: [K5]** Assess nutrition related problems, conduct and evaluate nutrition intervention.
- CO5: [K6]** Formulate a research proposal, conduct research, interpret and report results.

**MPHIL  
COURSE  
FOODS AND  
NUTRITION**

**PAPER I RESEARCH METHODOLOGY AND  
INTRODUCTION TO TEACHING/LEARNING  
PROCESS**

**Code: MMN/01**

**Hours: 60**

**Credits: 5**

**Learning Objectives**

- Enable students to formulate research problems and use appropriate sampling methods
- Identify tools for data collection, process and analyse data
- Gain knowledge on the different teaching and learning methods

**Course outcomes**

**On successful completion of the course the learners should be able to**

- CO1: [K3]** Apply appropriate test of significance in the field of food service management, dietetics and foods and nutrition.
- CO2: [K4.]** Compare the different tools of data collection and design a suitable tool for research
- CO3: [K5]** To determine the different teaching and learning methods in formal and non-formal education and the methods of evaluation in higher education
- CO4: [K6]** Elaborate on the different sampling designs used in research and explain the process in delivering food
- CO5: [K6]** Plan a research proposal, organize data, infer results and compile report.



## **PAPER II -ADVANCED PAPER IN FOODS AND NUTRITION**

**Code: MFN/05**

**Hours : 60**

**Credits : 5**

### **Learning Objective**

1. To gain perspectives on current concepts and research in the field of food science and nutrition.
2. To understand the importance of macro and micronutrients, non-nutritional factors, genetically modified foods and its relationship with metabolic disorders and non- communicable diseases.

Course Outcomes:

**On successful completion of the course, the learners will be able to:**

- CO1: [K2]** describe the functions and metabolism of nutrients, phytochemicals, non- nutritional food components, and technological advances in the field of foodscience.
- CO2: [K3]** explain the methods involved in assessment of nutritional status of individuals and the community at large, and techniques involved in the fields of food science and nutrition based on current research.
- CO3: [K4]** analyse the role and interrelationship of nutrients, genetically modified foods, phytochemicals with respect to health, drug interactions, and behaviour.
- CO4: [K5]** critically analyse the role of macro and micronutrients, genetically modified foods, foods developed through various technologies.
- CO5: [K6]** develop intervention plans and research activities for improving and managing the nutritional status of individuals and the community, and design strategies to promote good health and prevent diseases.

## **PAPER III ELECTIVE COURSE ON SPECIALIZATION**

**Code: MFM/05 and MFN/06**

**Hours: 60**

**Credits:5**

### **Learning objectives:**

- Gain a thorough understanding of their area of research
- Understand the basis for the tools and techniques used in the research study

### **Course outcomes:**

On successful completion of the course the learners will be able to:

- CO1:[K2]** identify research problems in the fields of food science, nutrition, foodservice management and dietetics
- CO2:[K3]** demonstrate scientific writing skills
- CO3:[K4]** critically analyse and interpret the related review of literature
- CO4 :[K5]** evaluate research findings and draw suitable inferences of the study
- CO5:[K6]** design a proposal for specific field of study justifying the choice of Experimental tools used and its interpretation

The content of the paper has to be drawn by the student in consultation with the staff supervisor.

## PAPER IV DISSERTATION

**Code: MFM/06 and MFN/07**

**Hours: 10 hrs/week**

**Credits: 21**

### **Learning objectives:**

- Review related literature and gain in depth knowledge of the topic of research
- Interpret findings, draw conclusions and acquire skills for scientific writing

### **Course outcomes:**

On successful completion of the course, the learners will be able to:

- CO1:[K3]** applying the principles of research, justify, organize and explain the objectives for research based on ethical considerations
- CO2:[K4]** compare and evaluate literature in the related area of study
- CO3: [K5]** determine and apply the appropriate statistical tests to interpret data
- CO4:[K6]** formulate appropriate research design, sampling design and suitable tools for  
Data collection and execute research applying scientific knowledge and Statistical principles
- CO5: [K6]** compile research findings to arrive at suitable conclusions and defend the findings of the study

## DEPARTMENT OF COMPUTER SCIENCE

### Program Specific Outcomes

Upon Completion of the B. Sc. Computer Science Degree Program, the student would be able to:

- PSO1** Demonstrate the knowledge of core concepts in Computer Science
- PSO2** Ability to communicate effectively with stakeholders, comprehend their needs and design user-friendly applications
- PSO3** Use ethical computing principles to create sustainable and secure solutions
- PSO4** Integrate skills of analysis, application and creativity to respond effectively to intellectual, professional and social challenges.
- PSO5** Employ appropriate Computing techniques and Mathematical tools to design multi-disciplinary solutions
- PSO6** Develop competence to pursue higher education, research and career in the context of rapid technology change
- PSO7** Plan and implement projects exhibiting teamwork and progressive leadership in diverse teams
- PSO8** Foster creativity, innovation and entrepreneurship in developing Information Technology products and solutions
- PSO9** Assess the local and global impact of technology on the community and engage in building innovative knowledge society
- PSO10** Be spiritually inspired towards responsible stewardship, defuse conflict and engage positively in difficult social situations.



## PROGRAMMING TECHNIQUES USING PYTHON

**Code: UCS/CO/81M**

**Hours: 60**

**Semester: I**

**Credits: 4**

### Learning Objectives:

- To understand the algorithmic techniques and programming constructs in Python
- To study and implement the sort and search algorithms using Python
- To use Python data structures – lists, tuples and dictionaries to represent complex data and solve problems

### Course Outcomes:

**On successful completion of the course, the learners will be able to:**

**CO1: [K1]** Define the solution to a problem in algorithmic steps and programming constructs

**CO2: [K2]** Explain the algorithms and choose the right data structure

**CO3: [K3]** Apply suitable algorithm and programming technique to solve the problem

**CO4: [K4]** Compare the performance of different algorithms / techniques for a given problem

**CO5: [K4]** Devise new ways to solve complex problems

## PROGRAMMING IN PYTHON

**Code: UCS/CO/82**

**Hours: 60**

**Semester: I**

**Credits: 2**

### Learning Objectives:

- To use the basic programming constructs in Python to solve problems
- To use simple and compound data types and use modular approach to write python programs
- To acquire skills to become a Python Developer

### Course Outcomes:

**On successful completion of the course, the learners will be able to:**

**CO1: [K1]** List the programming constructs used to solve problems

**CO2: [K2]** Demonstrate the use of various data types in Python

**CO3: [K3]** Choose the appropriate data type, related functions and methods

**CO4: [K3]** Implement the program and produce the require output

**CO5: [K4]** Analyse the output for its correctness and efficiency

## DATA STRUCTURES

**Code: UCS/CO/83M**

**Semester: II**

**Hours: 60**

**Credits: 4**

### **Learning Objectives:**

- To explain the role of data structures and algorithms to solve the problem
- To identify the data structures and the algorithms used to solve a given problem
- To develop real-time applications using suitable data structure

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

**CO1: [K1]** Define the basics of object-oriented principles, data structures and algorithms

**CO2: [K2]** Explain the representation, operations and algorithms for the data structures

**CO3: [K3]** Select the appropriate data structure and algorithm design method

**CO4: [K4]** Compare the performance of data structures and the algorithms used

**CO5: [K4]** Devise new applications using the data structures

## DATA STRUCTURES LAB

**Code: UCS/CO/84**

**Semester: II**

**Hours: 45**

**Credits: 2**

### **Learning Objectives:**

- To understand the various data structures and write programs in Python
- To write python programs to solve problems
- To acquire skills to become a software developer

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

**CO1: [K1]** List the data structure and the algorithms used to solve the problem

**CO2: [K2]** Explain the operations of the data structure and the algorithm used

**CO3: [K3]** Choose the appropriate programming constructs

**CO4: [K3]** Implement the program and produce the required output

**CO5: [K4]** Analyze the output for its correctness and efficiency.

## **BASICS OF INFORMATION TECHNOLOGY**

**Code: UCS/CO/64**

**Semester: II**

**Hours: 15+15**

**Credits: 1**

### **Learning Objectives:**

- To provide knowledge on the basic principles of Windows Operating Systems
- To develop the necessary skills needed for document preparation
- To analyze, visualize data and create Presentations

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

**CO1: [K1]** Define the components of Computer, Internet, Documents, Spreadsheets and Presentation

**CO2: [K2]** Discuss the features of Internet, Documents, Spreadsheets and Presentations

**CO3: [K3]** Choose appropriate features to create, edit and format Documents, Spreadsheets  
and Presentations

**CO4: [K3]** Apply the various design, layouts and other advanced features to present and  
visualize the results

**CO5: [K4]** Organize the output document presentation

## **DATABASE MANAGEMENT SYSTEMS**

**Code: UCS/CO/85M**

**Semester: III**

**Hours: 75**

**Credits: 4**

### **Learning Objectives:**

- To comprehend the role of database management system in an organization and to demonstrate an understanding of Relational Database model
- To formulate solutions to a range of query and data update problems using SQL
- To familiarize with various storage structures, transaction processing and data warehousing concepts

### **Course Outcomes:**

**On successful completion of this course, the learners will be able to:**

**CO1: [K1]** Define basic database management concepts, Relational database design,  
languages, storage and implementation.

**CO2: [K2]** Explain Relational Data Model elements and Decision Support Systems (DSS)

**CO3: [K3]** Apply RDBMS data model concepts to design, query and Normalize relations



- CO4: [K3]** Determine suitable database Storage techniques, Transaction Model and DSS  
**CO5: [K4]** Analyze the implementation of Database design for Transaction processing and Decision Support Applications

## **DBMS LAB**

**Code: UCS/CO/86**  
**Semester: III**

**Hours: 45**  
**Credits: 2**

### **Learning Objectives:**

- To design a RDBMS database schema for a given problem-domain
- To manipulate data, write procedures and functions using SQL commands
- To acquire skills to become a SQL Developer

### **Course Outcomes:**

**On successful completion of this course, the learners will be able to:**

- CO1: [K1]** Identify suitable DDL and DML commands to create and process a Database  
**CO2: [K2]** Experiment query execution to manipulate a database  
**CO3: [K3]** Determine functions and procedures for specific database operations  
**CO4: [K4]** Analyze and determine the commands, procedures, functions and indexes to process the database  
**CO5: [K4]** Justify the use of appropriate constraints, queries, functions and procedures for any database application

## **OPERATING SYSTEMS**

**Code: UCS/CO/87M**  
**Semester: IV**

**Hours: 60**  
**Credits: 3**

### **Learning Objectives:**

- To understand the components, structure and functions of Operating System
- To describe the management of various resources by the Operating System
- To exhibit proficiency in using the Linux operating system.

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

- CO1: [K1]** Define the operating system components, structure and resources  
**CO2: [K2]** Explain the services, resource scheduling and allocation methods  
**CO3: [K3]** Apply the Techniques and Tools to solve problems in Operating system  
**CO4: [K4]** Compare the various algorithms according to their function  
**CO5: [K4]** Examine the issues to be considered in the design of an Operating System

## WEB TECHNOLOGIES

**Code: UCS/CO/88**

**Semester: IV**

**Hours: 30+45**

**Credits: 3**

### Learning Objectives:

- To understand the basics of World Wide Web and design a website using HTML and CSS
- To perform client-side scripting using JavaScript and provide server-side connectivity through PHP with database support
- To acquire skills to become a web developer

### Course Outcomes:

**On successful completion of the course, the learners will be able to:**

**CO1: [K1]** Define the basic elements in web pages

**CO2: [K2]** Demonstrate the usage of components in designing web pages

**CO3: [K3]** Develop modern Web applications using the client and server-side technologies

**CO4: [K4]** Examine and apply advanced features to enhance the design of websites

**CO5: [K5]** Recommend design solutions for interactive website development

## INTERNSHIP

**Code: UCS/CO/98**

**Semester: V**

**Credits: 1**

Internship is conducted at the end of IV semester during the summer vacation. This is a compulsory academic requirement for the completion of the degree. In order to facilitate Industry – Institution interaction, students are deputed in groups of two or three or individually to reputed companies for a period of 2 – 4 weeks. At the end of the training period they are required to bring an attendance certificate, submit a report and present the work for assessment by the faculty members.

## DIGITAL SYSTEMS AND MICROCONTROLLERS

**Code: UCS/CO/89M**

**Semester: V**

**Hours: 60**

**Credits: 4**

### Learning Objectives:

- To understand the basic functionality of digital circuits
- To study the architecture of microprocessor 8085 and microcontroller 8051
- To design advanced circuits and interface with external devices

**Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

**CO1: [K1]** Define the digital principles, microprocessor and micro controller fundamentals

**CO2: [K2]** Explain the procedure involved in the design of digital systems by a circuit and block diagram

**CO3: [K3]** Construct a digital system with the selected components

**CO4: [K4]** Connect the digital systems using interfaces

**CO5: [K4]** Organize the knowledge in designing new applications

## **DIGITAL SYSTEMS LAB**

**Code: UCS/CO/90**

**Hours: 45**

**Semester: V**

**Credits: 2**

**Learning Objectives:**

- To design digital systems using the combinational and sequential logic
- To write assembly language programs using 8085 instructions set
- To acquire skills to become a digital system engineer

**Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

**CO1: [K1]** List the components and principles used to design the digital system

**CO2: [K2]** Express the steps or logic involved in the design

**CO3: [K3]** Construct the digital system and write program using assembly language

**CO4: [K3]** Record the inputs and the outputs of the system

**CO5: [K4]** Examine the outputs for correctness and efficiency

## **MULTIMEDIA APPLICATIONS**

**Code: UCS/CO/91**

**Hours: 30+45**

**Semester: V**

**Credits: 4**

**Learning Objectives:**

- To understand the concepts of digital media and digitization process
- To create and edit textual and non-textual media and design a contextual multimedia presentation
- To become a Multimedia Specialist

**Course Outcomes:**

**On successful completion of this course, the learners will be able to:**

**CO1: [K1]** Define basic concepts in all Multimedia elements

**CO2: [K2]** Demonstrate knowledge on display systems and all the Multimedia elements

**CO3: [K3]** Choose suitable data representation, file formats, Compression techniques

CO4: [K4] Analyze the usage of appropriate features of various media  
CO5: [K5] Evaluate the media elements in terms of storage and delivery platform

## SOFTWARE ENGINEERING

Code: UCS/CO/92M

Hours: 60

Semester: V

Credits: 4

### Learning Objectives:

- To understand the concepts and methods required for the construction of large software systems
- To develop a broad understanding of software engineering
- To know the basics of Intellectual Property Rights(IPR)

### Course Outcomes:

**On successful completion of the course, the learners will be able to:**

CO1: [K1] Enumerate the activities in various phases of the project life cycle

CO2: [K2] Demonstrate the understanding of different process models

CO3: [K3] Implement various life cycle activities

CO4: [K3] Utilize the techniques and tools necessary for engineering practice to develop the Software

CO5: [K4] Appraise the engineering nature of software development process

## COMPUTER NETWORKS

Code: UCS/CO/93

Hours: 60

Semester: V

Credits: 4

### Learning Objectives:

- To describe the functionality of Layered Network Architecture.
- To assign logical addresses to devices connected in a Network
- To analyze the performance of the various communication protocols.

### Course Outcomes:

**On successful completion of this course, the learners will be able to:**

CO1: [K1] Define the basic principles of communication and networking

CO2: [K2] Explain the various layers, their design issues, protocols and algorithms

CO3: [K3] Apply the techniques and algorithms to solve problems in networks

CO4: [K3] Employ appropriate Addressing schemes and security measures for networking

CO5: [K4] Analyze the performance of various network elements

## DATA SCIENCE USING PYTHON

**Code: UCS/CO/94**

**Semester: VI**

**Hours: 60**

**Credits: 4**

### **Learning Objectives:**

- To understand the basics of Data Science and its associated Python libraries
- To transform raw data for processing using Python libraries
- To analyze, interpret and visualize data for solving real world problems

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

**CO1: [K1]** Define the basics concepts and algorithms of Data Science

**CO2: [K2]** Select, upload and transform data into a form suitable for data analysis

**CO3: [K3]** Apply Data Manipulation techniques and algorithms to develop a model

**CO4: [K4]** Analyse the data using visual representation and machine learning algorithms

**CO5: [K5]** Construct and assess the models using different measures

## DATA SCIENCE LAB

**Code: UCS/CO/95**

**Semester: VI**

**Hours: 45**

**Credits: 2**

### **Learning Objectives:**

- To transform raw data for processing using Python libraries
- To analyze, interpret and visualize data using the algorithms
- To acquire skills to become a data scientist

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

**CO1: [K1]** Choose the right representation of data

**CO2: [K2]** Translate data by applying pre-processing and transformation techniques

**CO3: [K3]** Apply python libraries for data manipulation

**CO4: [K4]** Analyze and visualize data using data science algorithms

**CO5: [K5]** Build models to solve real-world problems

## COMPUTER ALGORITHMS

**Code: UCS/CO/96M**

**Hours: 60**

**Semester: VI**

**Credits: 4**

### **Learning Objectives:**

- To analyze time complexity of algorithms
- To understand different design strategies to provide algorithmic solution
- To synthesize efficient algorithms in solving complex problems in software design

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

**CO1: [K1]** Define the basic concepts in design and analysis of algorithms

**CO2: [K2]** Explain different standard algorithm design techniques

**CO3: [K3]** Identify and report various algorithmic solutions for the given problem

**CO4: [K4]** Compare and select algorithm design approaches for a specific problem

**CO5: [K5]** Design algorithms for a given problem using standard algorithmic techniques

## CLOUD COMPUTING

**Code: UCS/CO/97M**

**Hours: 45**

**Semester: VI**

**Credits: 3**

### **Learning Objectives:**

- To understand the technologies and principles used in Cloud Computing
- To study and use the various cloud services and resource management using Virtualization
- To appreciate the emergence of cloud as the latest computing paradigm.

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to**

**CO1: [K1]** Define the characteristics and principles in cloud computing

**CO2: [K2]** Explain the models and technologies used in Cloud Computing

**CO3: [K3]** Apply the Cloud computing principles in various domains

**CO4: [K4]** Analyze the functioning of cloud technologies

**CO5: [K5]** Appraise the recent developments in Cloud Computing

## **IT PRODUCT DEVELOPMENT LAB**

**Code: UCS/CO/80**

**Semester: VI**

**Hours: 15+45**

**Credits: 3**

### **Learning Objectives:**

- To apply information technology principles and practices to real-world solutions
- To develop skills as a team player and a professional software developer
- To demonstrate employability skills and professionalism

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to**

**CO1: [K1]** Enumerate the steps involved in developing IT product solution

**CO2: [K2]** Demonstrate effective use of written, verbal, and non-verbal communication

**CO3: [K3]** Employ relevant knowledge, skills, and judgment to provide IT solutions

**CO4: [K4]** Plan the project execution phases, staffing and timeline

**CO5: [K5]** Present and defend the developed product solution

## **DATA WAREHOUSING AND DATA MINING**

**Code: UCS/CE/18**

**Semester: V**

**Hours: 75**

**Credits: 5**

### **Learning Objectives:**

- To understand the principles, architecture, design and implementation of data warehousing and data mining
- To apply knowledge of data and perform data mining
- To analyze the real-life problem using data mining tools and techniques

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

**CO1: [K1]** Define the principles of data mining and data warehousing

**CO2: [K2]** Explain the methods and algorithms in data mining and data warehousing

**CO3: [K3]** Apply different techniques for mining the data

**CO4: [K3]** Experiment with data mining tools to identify relevant patterns

**CO5: [K4]** Analyze the patterns and recommend optimal solutions

## NUMERICAL METHODS

**Code: UCS/CE/19**

**Semester: V**

**Hours: 75**

**Credits: 5**

### Learning Objectives:

- To enhance the problem solving skills using namely numerical methods
- To understand the basic elements of numerical methods and error analysis
- To find numerical solution of algebraic equation, systems of linear equations, integration and differentiation, differential equation

### Course Outcomes:

**On successful completion of the course, the learners will be able to:**

**CO1: [K1]** Relate to common numerical methods to obtain approximate solutions

**CO2: [K2]** Describe numerical methods for various mathematical operations and tasks.

**CO3: [K3]** Apply numerical methods to obtain solutions for mathematical problems

**CO4: [K3]** Choose appropriate algorithms to solve problems

**CO5: [K4]** Analyze and evaluate the accuracy of common numerical methods

## INTERNET OF THINGS

**Code: UCS/CE/20**

**Semester: V**

**Hours: 75**

**Credits: 5**

### Learning Objectives:

- To understand the basics of Internet of Things, its architecture and associated protocols along with the necessary physical components
- To implement simple IoT applications using Raspberry Pi and Python
- To acquire knowledge to build simple real-time applications of IoT for the society

### Course Outcomes:

**On successful completion of the course, the learners will be able to:**

**CO1: [K1]** Define the basic concepts of Internet of Things and its associated components

**CO2: [K2]** Classify physical devices and protocols

**CO3: [K3]** Apply the concepts and components to build simple IoT Solutions

**CO4: [K4]** Analyze applications and protocols for real-time scenario

**CO5: [K5]** Design new applications using sensors and Raspberry Pi



## ARTIFICIAL INTELLIGENCE AND APPLICATIONS

**Code: UCS/CE/21**

**Semester: V**

**Hours: 75**

**Credits: 5**

### **Learning Objectives:**

- To learn the foundations and principles of Artificial Intelligence
- To apply the various problem solving and knowledge representation techniques
- To understand the applications of Artificial Intelligence in various domains

### **Course Outcomes:**

**On successful completion of the course, the Learners will be able to**

**CO1: [K1]** Define the various agents used in Artificial Intelligence

**CO2: [K2]** Describe the working of algorithms used in Artificial Intelligence

**CO3: [K3]** Apply the Artificial Intelligence principles in real life applications

**CO4: [K4]** Analyze the impact of Artificial Intelligence in various domains

**CO5: [K5]** Summarize the issues and challenges in Artificial Intelligence

## CYBER SECURITY

**Code: UCS/CE/22**

**Semester: VI**

**Hours: 75**

**Credits: 5**

### **Learning Objectives:**

- To understand the key issues related to cyber security
- To create awareness in the society on cyber security
- To emphasize the need for security in an organization and to pursue career in Cyber Security

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

**CO1: [K1]** Define the basic issues in the cyber world and its legal perspective

**CO2: [K2]** Describe the principles of Cyber security and Cyber forensics tool

**CO3: [K3]** Apply the legal and technical competence for Cyber safety

**CO4: [K3]** Make use of methodologies to combat Cyber crimes

**CO5: [K4]** Analyze the crime involved and devise the course of action

## COMPUTER VISION

**Code: UCS/CE/23**  
**Semester: VI**

**Hours: 75**  
**Credits: 5**

### Learning Objectives:

- To understand the basics of image processing techniques for Computer Vision
- To apply algorithms for segmentation, classification and transformation of images
- To build basic applications in Computer Vision

### Course Outcomes:

**On successful Completion of the course, the learners will be able to:**

**CO1: [K1]** Define the basic concepts of image processing techniques for Computer Vision

**CO2: [K2]** Explain the algorithms and techniques for image processing and Computer Vision

**CO3: [K3]** Apply image processing techniques to detect shapes and features

**CO4: [K4]** Compare and choose the right vision technique to classify and detect objects

**CO5: [K5]** Design Computer Vision applications for real world problems

## BLOCKCHAIN TECHNOLOGY

**Code: UCS/CE/24**  
**Semester: VI**

**Hours: 75**  
**Credits: 5**

### Learning Objectives:

- To learn the basics of blockchain technology
- To Understand the methods involved in developing a decentralized application
- To apply and analyze the knowledge of blockchain and its impact on the society

### Course Outcomes:

**On successful completion of the course, the learners will be able to**

**CO1: [K1]** Define the various elements and types of Blockchain

**CO2: [K2]** Describe the process involved in creating a blockchain network

**CO3: [K3]** Apply the concepts to develop a decentralized application

**CO4: [K4]** Analyze the impact of Blockchain Technology in various domains

**CO5: [K5]** Summarize the issues and challenges in blockchain technology

## **BIG DATA ANALYTICS**

**Code: UCS/CE/25**

**Semester: VI**

**Hours: 75**

**Credits: 5**

### **Learning Objectives:**

- To understand the basic elements and technologies for handling Big Data
- To demonstrate knowledge on Hadoop Ecosystem
- To manage, analyze and visualize Big Data

### **Course Outcomes:**

**CO1: [K1]** Define the basic elements and technologies for managing Big data

**CO2: [K2]** Explain the technologies used to process and visualize Big data

**CO3: [K3]** Employ Tools to manage Big data

**CO4: [K3]** Determine the efficacy of data storage and techniques used

**CO5: [K4]** Analyze and interpret Big data

## **HUMAN COMPUTER INTERACTION**

**Code: UCS/CE/26**

**Semester: VI**

**Hours: 75**

**Credits: 5**

### **Learning Objectives:**

- To learn the foundations of Human Computer Interaction
- To become familiar with the design technologies for individuals and persons with disabilities
- o design user friendly mobile and Web applications

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

**CO1: [K1]** Recognize the different aspects of HCI

**CO2: [K2]** Explain the HCI implications for designing Web and Mobile applications

**CO3: [K3]** Construct meaningful user interface.

**CO4: [K3]** Apply the rules and practices to design user dialog.

**CO5: [K4]** Evaluate the user comfort of any applications

## STATISTICAL METHODS

**Code: UCS/SU/13M**  
**Semester: IV**

**Hours: 75**  
**Credits: 5**

### Learning Objectives:

- Gain a thorough understanding of applied principles of statistics
- Demonstrate competency in handling data for statistical design and analysis
- Analyze data sets using statistical tools

### Course Outcomes:

**On successful completion of the course, the learners will be able to:**

**CO1: [K1]** State basic theoretical and applied principles of statistics needed to enter the job force

**CO2: [K2]** Interpret key statistical concepts to non-statisticians

**CO3: [K3]** Apply suitable statistical measures to solve the given problem

**CO4: [K3]** Articulate the results of analysis done using descriptive statistical measures

**CO5: [K4]** Compute solutions based on statistical data for real world problems

## ESSENTIAL EMPLOYABILITY SKILLS

**Code: UCS/SK/05**  
**Semester: V**

**Hours: 30+15**  
**Credits: 3**

### Learning Objective:

- To enhance problem solving skills using mathematical concepts
- To qualify in competitive examinations
- To develop creative, innovative and feasible solutions as a team

### Course Outcomes:

**On successful completion of the course, the learners will be able to:**

**CO1: [K1]** Show procedural fluency with arithmetic operations

**CO2: [K2]** Demonstrate uses of arithmetic operations to represent real-world scenarios

**CO3: [K3]** Select approximation or exact calculations as needed

**CO4: [K3]** Choose appropriate representation among the oral, written, and graphical forms

**CO5: [K4]** Appraise authentic print media containing quantitative information

## **PYTHON PROGRAMMING**

**Code: UCS/SE/07**  
**Semester: I**

**Hours: 60+30**  
**Credits: 5**

### **Learning Objectives:**

- To study the fundamentals of Python programming
- To understand and apply various data structures and programming constructs
- To get an insight into the large standard libraries, which supports many common programming tasks

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

**CO1: [K1]** Define the basic concepts in Python Programming

**CO2: [K2]** Demonstrate proficiency in writing Python programs

**CO3: [K3]** Apply various complex data types in solving diverse problems

**CO4: [K3]** Construct modules to solve problems using programming constructs

**CO5: [K4]** Examine complex problems and use appropriate problem-solving techniques

## **PROBLEM SOLVING USING PYTHON**

**Code : UCS/ SE/08**  
**Semester : III**

**Hours : 60+30**  
**Credits : 5**

### **Learning Objectives:**

- To solve problems using fundamental problem solving techniques
- To use appropriate data structures to represent data
- To develop solutions for real-life problems using standard programming constructs

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

**CO1: [K1]** Define solution to a problem in simple algorithmic steps and programming constructs

**CO2: [K2]** Describe appropriate programming constructs, problem solving techniques and data structures to solve problems

**CO3: [K3]** Apply suitable algorithms and programming techniques using Python

**CO4: [K3]** Build solutions for real-life problems using modular approach

**CO5: [K4]** Compare and use appropriate algorithms to solve complex problems

## DATA STRUCTURES USING PYTHON

**Code : UCS/SE/09**

**Semester : IV**

**Hours : 60+30**

**Credits : 5**

### **Learning Objectives:**

- To familiarize with the basic data structures and define them using Abstract Data Type
- To write programs using Object oriented principles in Python
- To critically analyze and choose suitable data structures for a problem

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

**CO1: [K1]** Define and describe the abstract data types stack, queue, trees and Graphs

**CO2: [K2]** Illustrate the working of various data structures and algorithms

**CO3: [K3]** Apply various operations on data structures and implement them using Python

**CO4: [K4]** Compare the performance of data structure and algorithms

**CO5: [K5]** Recommend solutions to solve real-life problems

## WEB COMMERCE

**Code: UCS/NM/03**

**Semester: III**

**Hours: 30**

**Credits: 2**

### **Learning Objectives:**

- To describe the key features of network technology and infrastructure that supports E- Commerce.
- To demonstrate understanding of e-commerce categories and types of electronic payment systems.
- To explore the features of various e-commerce and e-governance websites

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

**CO1: [K1]** Define the basic elements, technology and infrastructure that supports E- Commerce

**CO2: [K2]** Discuss the technology resources and E-commerce functions

**CO3: [K3]** Identify various e-commerce trading relationships and payment options

**CO4: [K3]** Examine the features and options available in e-commerce and e-governance websites

**CO5: [K4]** Evaluate an E-Commerce website

## INTERNET BASICS

**Code: UCS/NM/04**  
**Semester: IV**

**Hours: 30**  
**Credits: 2**

### Learning Objectives:

- To introduce the key features of networking and communication that support internet and WWW
- To demonstrate the usage of e-mail, social networks, video conferencing for better communication
- To explore the features of various online shopping websites

### Course Outcomes:

**On successful completion of the course, the learners will be able to:**

**CO1: [K1]** Define the basic elements of networking and communication

**CO2: [K2]** Discuss the functionality of internet communications and security measures

**CO3: [K3]** Identify various ways of online communication

**CO4: [K3]** Examine the functionality and features of social networking and online chatting

**CO5: [K4]** Evaluate an E-Commerce website

## IT Tools

**Code: UCS/SK/01**  
**Semester: IV**

**Hours: 15 + 30**  
**Credits: 3**

### Learning Objectives:

To provide knowledge on Software Microsoft office

- To develop the necessary skills needed for document preparation
- To analyze, visualize data and create Presentations

### Course Outcomes:

**On successful completion of the course, the learners will be able to:**

**CO1: [K1]** Define the components of Documents, Spread Sheets Presentations and Mail

**CO2: [K2]** Discuss the features of Documents, Spread Sheets Presentation and email

**CO3: [K3]** Apply appropriate features to create edit and format data

**CO4: [K4]** Analyze data and present the results as a report

**CO5:[K5]** Choose features to customize the report and presentation and communicate efficiently through mail

## WEB DESIGN

**Code: UCS/SK/02**  
**Semester: V**

**Hours: 15+30**  
**Credits: 3**

### **Learning Objectives:**

- To describe the key features of a computer, Internet and E-mail Services
- To explore the progression in Internet and E-mail technology and its ethical stance
- To demonstrate the purpose of different elements and attributes in designing a web page

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

**CO1: [K1]** Define the basic purpose of a Computer, Internet and E-mail technology

**CO2: [K2]** Outline the features used in designing a simple web page

**CO3: [K2]** Demonstrate the evolution in the field of Internet and E-mail services

**CO4: [K3]** Examine the features available in designing websites with media source

**CO5: [K3]** Develop a website with elements and navigation

## MULTIMEDIA SOFTWARE TOOLS

**Code: UCS/SK/04**  
**Semester: IV**

**Hours: 15+30**  
**Credits: 3**

### **Learning Objectives:**

- To enable students to become aware of multiple modes of media.
- To demonstrate collaboration and technical facility at a professional entry level in media design and production.
- To have good knowledge of the technologies behind multimedia applications and the skills for developing simple projects

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

**CO1: [K1]** Define the characteristics of each media type and describe their applications.

**CO2: [K2]** Describe the features of various elements of multimedia systems

**CO3: [K3]** Employ appropriate tools for developing multimedia applications

**CO4: [K4]** Evaluate the usage of techniques and features for building applications

**CO5: [K5]** Develop applications that incorporate a variety of digital media such as graphics, voice, animation and video



## **INFORMATION MANAGEMENT USING COMPUTERS**

**Code: PCS/SK/03**

**Hours: 15+15**

**Semester: II/III**

**Credits: 2**

### **Learning Objectives:**

- To develop the necessary skills needed for document preparation
- To master the skills of creating and analyzing data and to present a graphical representation of data
- To educate the necessity to understand the impact of cybercrimes and threats with solutions in a global and societal context.

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to:**

**CO1: [K1]** Define the features for document preparation, organizing data in spreadsheets and concepts related to Cyber Security and Digital Marketing

**CO2: [K2]** Explain the tools for documentation, analyzing data, Cyber security and Digital Marketing

**CO3: [K3]** Choose and apply appropriate features to create Documents, Spreadsheets, contents and blogs for specific applications.

**CO4: [K4]** Analyze data to present the results in graphical format

**CO5: [K5]** Build customized Documents, Spreadsheets and blogs

## **Mobile Application Development - App Inventor**

**Hours: 30**

### **Learning objectives:**

To learn computational thinking concepts which allows even novices, to build fully functional mobile apps for Android devices.

### **Course Outcomes:**

- To design and create Android mobile apps using App Inventor
- To Understand the basic programming concepts and the underlying logic
- To Acquire modular visual programming skills
- To develop apps for Games, Location Tracker, and social cause

# **Business Intelligence Tool – Tableau**

**Hours: 30**

## **Learning Objectives:**

To use Business Intelligence tool in decision making for anyone who wants to make use technology.

## **Course Outcome:**

- Use the Tableau workspace to create visualizations
- Represent data pictorially and analyse data.
- Reveal data insights using dashboard.
- Earn certification as Tableau Certified Data Analyst



## BASIC PSYCHOLOGY I

Code: UPS/CO/45M  
Semester: I

Hours: 60  
Credits: 4

### Learning objectives:

**This course enables the students to**

- Develop a knowledge base about human behavior in broad areas of psychology
- Understand the research methods of psychology

### Course outcomes:

**On successful completion of the course, the learners will be able to**

**CO1: [K1]** Define basic psychological concepts of sensation, attention, states of consciousness, perception, learning, schools of psychology and research methods in the field

**CO2: [K2]** Describe concepts related to sensation, attention, states of consciousness, perception, learning, schools of psychology and research methods in the field

**CO3: [K3]** Apply basic psychological processes in daily life situations

**CO4: [K4]** Examine multiple determinants of various basic psychological processes

**CO5: [K4]** Compare and contrast approaches, sub-fields and concepts related to basic psychological processes

## DEVELOPMENTAL PSYCHOLOGY I

Code: UPS/CO/35M  
Semester: I

Hours: 60  
Credits: 4

### Learning objectives:

**This course enables the student to**

- Understand human growth and development from conception to early childhood
- Appreciate the determinants of human growth and development.

### Course outcomes:

**On successful completion of the course, the learners will be able to**

**CO1: [K 2]** Identify the key factors that shape human development from conception to early childhood.

**CO2: [K 2]** Describe physical, cognitive, language and psychosocial development from conception to early childhood.

**CO3: [K3].** Apply the knowledge acquired about human development from conception to early childhood to specific circumstances

**CO4: [K4]** Analyze information about human development from conception to early childhood considering key factors.

**CO5: [K4]** Evaluate ideas about human development from conception to early childhood using empirical facts, figures or illustrations.

## BASIC PSYCHOLOGY II

**Code: UPS/CO/46M**  
**Semester: II**

**Hours: 60**  
**Credit: 4**

### **Learning objectives:**

**This course enables the students to**

- Learn basic psychological processes
- Appreciate different approaches to psychological processes

### **Course outcomes:**

**On successful completion of the course, the learners will be able to**

**CO1: [K1]** Define basic psychological concepts of memory, thinking, intelligence, motivation, emotion and personality

**CO2: [K2]** Describe the concepts and theories related to memory, thinking, intelligence, motivation, emotion and personality

**CO3: [K3]** Apply basic psychological processes of memory, thinking, intelligence, motivation, emotion and personality in daily life situations

**CO4: [K4]** Examine multiple determinants of various basic psychological processes

**CO5: [K4]** Analyze concepts and theories related to basic psychological processes

## DEVELOPMENTAL PSYCHOLOGY II

**Code: UPS/CO/36M**  
**Semester: II**

**Hours: 60**  
**Credit: 4**

### **Learning objectives:**

**This course enables the students to**

- Understand the process of human growth and development during middle childhood and adolescence.
- Appreciate the factors influencing growth and development during these stages.

### **Course outcomes:**

**On successful completion of the course, the learners will be able to**

**CO1: [K2]** Describe the physical, cognitive and psychosocial development that takes place in middle childhood and adolescence

**CO2: [K3].** Apply the knowledge acquired about human development during middle childhood and adolescence to specific circumstances.

**CO3: [K4].** Analyze information about human development during middle childhood and adolescence

**CO4: [K5]** Justify ideas about human development during middle childhood and adolescence using empirical facts, figures or illustrations.

**CO5: [K6]** Propose practical tips or guidelines for common developmental tasks/challenges relating to middle childhood and adolescence.

## SERVICE-LEARNING IN PSYCHOLOGY

**Course Code: UPS/CO/44 SL**  
**Semester: III**

**Credits: 4**  
**Hours: 60**

### **Learning Objectives:**

**This course will enable the students to**

- Understand the need and nature of community engagement
- Acquire skills of planning, formulating and executing a service-learning project in psychology

### **Course outcomes:**

**On successful completion of the course, the students will be able to:**

**CO1: [K2]** Describe the components and relevance of service-learning programs in psychology

**CO2: [K3]** Apply personal and interpersonal skills to develop and execute a community-based project

**CO3: [K4]** Analyze the needs and the problems of the society in order to develop modules, assessment tools and tests for the target population

**CO4: [K5]** Evaluate the process and impact of the psychological intervention program

**CO5: [K6]** Design a project proposal and execute the project to the community

## DEVELOPMENTAL PSYCHOLOGY III

**Code: UPS/CO/37M**  
**Semester: III**

**Hours: 60**  
**Credit: 4**

### **Learning objectives:**

**This course enables the students to**

- Understand human growth and development during adulthood and old age.
- Appreciate the factors influencing growth and development during these stages.

### **Course outcomes:**

**On successful completion of the course, the learners will be able to**

**CO1: [K2]** Describe the physical, cognitive and psychosocial development that takes place in early, middle and late adulthood.

**CO2: [K3]** Apply the knowledge acquired about early, middle and late adulthood to specific situations.

**CO3: [K4]** Analyze information relating to human development in early, middle and late adulthood.

**CO4: [K5]** Justify ideas about early, middle and late adulthood based on facts figures and illustrations.

**CO5: [K6]** Propose practical tips or guidelines for common developmental tasks / challenges relating to early, middle and late adulthood.

## SOCIAL PSYCHOLOGY I

Code: UPS/CO/38M

Hours: 60

Semester: IV

Credits: 4

### Learning Objectives:

**This course enables the students to**

- Understand individuals in a social context.
- Understand how people perceive and think about one another and factors that influence these social thought processes.

### Course Outcomes:

**On successful completion of the course, the learners will be able to**

**CO1: [K2]** Describe the fundamentals principles of social psychology.

**CO2: [K2]** Discuss influence of social factors on **human behaviour**

**CO3: [K3]** Examine the operation of self in the social context.

**CO4: [K4]** Analyse **various social situations through application of social psychology principles**

**CO5: [K4]** Infer social psychological principles to real-world issues

## ABNORMAL PSYCHOLOGY I

Code: UPS/CO/32M

Hours: 60

Semester: IV

Credits: 4

### Learning objectives:

**This course enables the students to**

- Gain an understanding of the clinical picture of various psychological disorders
- Understand the causes and management of various psychological disorders.

### Course outcomes:

**On successful completion of the course, the learners will be able to**

**CO1:[K2]** Discuss the symptoms of major categories of psychopathology in childhood and adolescence and their typical developmental course.

**CO2:[K3]** Examine the prominent biological, psychological, and sociocultural etiological/risk factors for mental health difficulties in childhood and adolescence and how they interact with one another.

**CO3:[K4]** Compare and contrast the neuro-developmental disorders of childhood and the neuro cognitive disorders presenting later in life based on symptoms.

**CO4:[K4]** Differentiate the psychosocial and biological treatment procedures for the childhood and adolescent disorders.

**CO5:[K4]** Analyse the role of factors such as gender, culture, and typical development in framing issues in developmental psychopathology.

## **SOCIAL PSYCHOLOGY II**

**Code: UPS/CO/39M**  
**Semester: V**

**Hours: 60**  
**Credits: 4**

### **Learning objectives:**

**This course enables the students to**

- Understand the dynamics of social influence, its application in everyday life.
- Appreciate the ability of individuals to resist social influence

### **Course outcomes:**

**On successful completion of the course, the learners will be able to**

**CO1: [K2]** Describe the dynamics of human behavior in areas of social influence

**CO2: [K3]** Apply social psychology concepts to everyday life situations

**CO3: [K4]** Analyze concepts, theories and research findings related to various forms of social influence

**CO4: [K5]** Compare concepts and theories related to various forms of social influence

**CO5: [K6]** Plan interventions to address real-world problems using social influence principles

## **ABNORMAL PSYCHOLOGY II**

**Code: UPS/CO/33M**  
**Semester: V**

**Hours: 60**  
**Credits: 4**

### **Learning objectives:**

**This course enables the students to**

- Gain an understanding of the clinical picture, causes and management of various psychological disorders

### **Course outcomes:**

**On successful completion of the course, the learners should be able to**

**CO1: [K1]** Describe the symptoms of the major categories of adult psychopathology.

**CO2: [K2]** Identify factors related to the onset, course, specifiers, and duration of mental disorders.

**CO3: [K3]** Determine the role of factors such as gender, age, and culture, that contribute to the prevalence of mental disorders in adulthood.

**CO4: [K4]** Differentiate the prominent biological, psychological, and sociocultural etiological/risk factors for mental disorders.

**CO5: [K5]** Evaluate the biological and psychosocial treatment procedures for the treatment of mental disorders.



## COUNSELLING PSYCHOLOGY

Code: UPS/CO/42M  
Semester: V

Hours: 60  
Credits: 3

### Learning objectives

This course enables the students to

- Understand the basic processes and skills in counselling
- Gain knowledge about the various theoretical approaches and the contexts in which counseling can be carried out.

### Course outcomes:

On successful completion of the course, the learners will be able to

CO1:[K1] Examine the differences in guidance, counselling and psychotherapy.

CO2:[ K2] Explain the application of the skills, process and theoretical approaches in counselling

CO3:[K3] Examine the scope of counseling in various contexts..

CO4:[ K4] Analyze the principles, techniques and skills in school, career, marriage and crisis counselling.

CO5:[K4] Analyze the various approaches to Counselling.

## PRACTICAL I - EXPERIMENTAL PSYCHOLOGY

Code: UPS/CO/30  
Semester: V

Hours: 30+90  
Credits: 4

### Learning Objectives:

This course enables the student to

- Understand the theory and procedures of experimentation
- Acquire skills of observation in lab settings
- Conduct experiments in psychology, systematic recording of data and presentation of results

### Course Outcomes:

On successful completion of the course, the learners will be able to

CO1: [K2] Describe the concepts related to psychological experimentation

CO2: [K2] Explain concepts related to experimental method and data analysis

CO3: [K3] Administer the experiments under guidance and supervision

CO4: [K4] Analyze experimental data using various psychological concepts

CO5: [K5] Score the experimental data using procedures appropriate to the experiment

## INTERNSHIP

**Code: UPS/CO/43**  
**Semester: V**

**Duration: 2-4 weeks**  
**Credit: 1**

### **Learning objectives:**

**This course enables the students to**

- Observe the work of qualified personnel in their work settings.
- Acquire work related skills.

### **Course outcomes:**

**On successful completion of the course the learners will be able to**

**CO1: [K4]** Analyze the skills required for working in a given setting.

**CO2: [K5]** Evaluate learning outcomes based on their internship experience.

**CO3: [K6]** Develop some basic/ specific skills during the period of their internship.

The internship will be done for a duration of 2 -4 weeks (not less than 40 hrs) in the following settings: NGOs/Schools/Hospitals/Special schools/Clinics/Day care centers /Old Age Home/Corporate Sector/Media.

The internship will be completed during the summer vacation following semester IV.

A written report will be submitted and a presentation will be made. (35 marks+15 marks respectively=50 marks). Students will undergo a short bridge course on basic listening skills and on how to conduct themselves in the workplace, before the internship.

## SOCIAL PSYCHOLOGY III

**Code: UPS/CO/40M**  
**Semester: VI**

**Hours: 60**  
**Credits: 4**

### **Learning objectives:**

**This course enables the students to**

- Learn how individuals relate to one another.
- Understand the applications of social psychology principles in creating a sustainable future.

### **Course outcomes:**

**On successful completion of the course, the learners will be able to**

**CO1: [K2]** Describe the theories, principles and concepts of social relations and sustainable living.

**CO2: [K3]** Apply the social psychological principles of social relations and sustainable living to real-world issues.

**CO3: [K4]** Analyse the concepts and research in social relations and sustainable living.

**CO4: [K5]** Critically evaluate theories and applications of social relations and sustainable living.

**CO5: [K6]** Plan interventions using social psychology principles to promote positive social change.

## ABNORMAL PSYCHOLOGY III

**Code: UPS/CO/34M**  
**Semester: VI**

**Hours: 60**  
**Credits: 4**

### **Learning objectives:**

**This course enables the students to**

- Gain an understanding of the clinical picture, causes and management of the various psychological disorders

### **Course outcomes:**

**On successful completion of the course, the learners will be able to**

**CO1: [K1]** Describe the symptoms of the major categories of adult psychopathology.

**CO2: [K2]** Identify factors related to the onset, course, specifiers, and duration of mental disorders.

**CO3: [K3]** Determine the role of factors such as gender, age, and culture, that contribute to the prevalence of mental disorders in adulthood.

**CO4: [K4]** Differentiate the prominent biological, psychological, and sociocultural etiological/risk factors for mental disorders.

**CO5: [K5]** Evaluate the biological and psychosocial treatment procedures for the treatment of mental disorders.

## PRACTICAL II - PSYCHOLOGICAL TESTING

**Code: UPS/CO/41M**  
**Semester: VI**

**Hours: 120**  
**Credits: 4**

### **Learning Objectives:**

**The course enables students to**

- Understand the nature, interpretation and application of psychological tests.
- Provide training in test administration, under guidance and supervision.
- Help students acquire the skills of recording and analysis of data.

### **Course Outcomes:**

**On Successful completion of the course, the learners will be able to:**

**CO1: [K2]** Describe the concepts related to psychological assessment

**CO2: [K2]** Demonstrate an understanding of each assessment in terms of its development, standardization, norms, reliability, validity and applications

**CO3: [K3]** Administer test under guidance and supervision

**CO4: [K5]** Score test data using test manuals

**CO5: [K6]** Write discussion based on test results

## INTRODUCTION TO CYBERPSYCHOLOGY

**Code: UPS/SK/04M**  
**Semester: V**

**Hours: 45**  
**Credits: 3**

### **Learning objectives:**

**This course enables the students to**

- Broaden knowledge and understanding of the issues of cybercrime, online communities, internet addiction, online therapies
- Empower students to manage their online social activity, identity and privacy

### **Course outcomes:**

**On successful completion of the course, the learners will be able to**

**CO1: [K2]** Describe the characteristics of the internet that influence online behaviours

**CO2: [K3]** Apply concepts from Cyberpsychology to real-life situations

**CO3: [K4]** Analyze the positive and negative influences that different online activities have on behaviour and emotional states

**CO4: [K5]** Evaluate how psychological methods, concepts and theories are applied to understand online behaviour

**CO5: [K6]** Develop strategies to manage online social activity, identity and privacy concerns

## PROJECT

**Code: UPS/CE/01**  
**Semesters: V, VI**

**Hours: 225**  
**Credits: 15**

### **Learning objectives:**

**This course enables the students to**

- Carry out community service, internships, Case-studies/survey.
- Observe work place requirements and ethical practices in hospitals / organizations / educational settings.
- Gain an exposure to the structure and functioning of institutions and acquire skills in reporting.

### **Course outcomes:**

**On successful completion of the course, the learners will be able to**

**CO1: [K2]** Explain the need and importance of community service and internships.

**CO2: [K3]** Use appropriate interview skills to gather necessary information about the structure and functioning of organizations.

**CO3: [K4]** Apply suitable research methodology to address research questions/apply knowledge gained to conduct case history taking, case assessment and analysis.

**CO4: [K5]** Evaluate learning outcomes based on work experiences in organizations.

**CO5: [K6]** Recommend suitable steps for the organization keeping in mind their vision and mission.

## BEHAVIOR IN ORGANIZATIONS

**Code: UPS/CE/08M**  
**Semester: VI**

**Hours: 75**  
**Credits: 5**

### Learning Objectives

This course provides the students

1. An introductory approach to understand the behavior of individuals working in organizations
2. Information about the field of organizational behavior to enable them to make an informed decision about opting for this field as a specialization on the Masters level

### Course Outcomes

**On successful completion of the course the learners will be able to:**

**CO1: [K2]** Describe the different perspectives and concepts related to organizational behavior

**CO2: [K3]** Illustrate the role of teams in organizational behavior, and the concepts of work-life balance, happiness, spirituality and soft skills at the workplace

**CO3: [K4]** Examine the determinants of personality, attitudes, emotional intelligence and psychological contract in organizational behavior

**CO4: [K4]** Analyze the theories of leadership and motivation

**CO5: [K5]** Evaluate the emerging issues impacting organizational behavior

## INTRODUCTION TO COGNITIVE PSYCHOLOGY

**Code: UPS/CE/09M**  
**Semester: VI**

**Hours: 75**  
**Credits: 5**

### Learning objectives:

**This course enables the students to**

- Understand the ways in which humans engage in processing of information
- Acquire basic knowledge of core concepts in human cognition (e.g. attention, perception, memory, problem solving, creativity and decision making)

### Course outcomes:

**On successful completion of the course, the learners will be able to**

**CO1: [K1]** Define the basic concepts in cognitive psychology

**CO2: [K2]** Explain the various theories of cognitive processes

**CO3: [K2]** Summarize the process involved in various higher mental processes such as attention, perception, memory, problem solving, creativity and decision making

**CO4: [K3]** Apply the various higher mental processes in everyday life situations

**CO5: [K4]** Analyse the various theories, assumptions and concepts of various cognitive processes

## INTRODUCTION TO BIOLOGICAL PSYCHOLOGY

**Code: UPS/SU/04**  
**Semester: II**

**Hours: 90**  
**Credits: 5**

### **Course Objectives**

**The course enables the student to**

- Understand important concepts in biological psychology
- Understand the role of the nervous system in behaviour
- Understand the connections between biological systems and psychological processes

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to**

**CO1: [K2]** Differentiate the structures of the nervous system, their functional specialization and the impact of impairment on behaviour

**CO2 [K2]** Summarize the guiding assumptions of the brain's neural communication network and its influence on behaviour

**CO3: [K3]** Examine the Research Methods used in studying brain anatomy and activity with behavior

**CO4: [K3]** Explain the importance of Biological Psychology and its contribution to the field of Psychology

**CO5 : [K4]** Illustrate the biological basis of cognitive, emotional and behavioural phenomena

## **DESCRIPTIVE STATISTICS**

**Code: UPS/SU/05**  
**Semester: III**

**Hours: 90 hours**  
**Credits: 5**

### **Learning Objectives:**

**The course enables students to**

- Understand the fundamental concepts in descriptive statistics.
- Acquire skills of statistical computation.

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to**

**CO1: [K2]** Explain the basic concepts in Statistics for the behavioral sciences.

**CO2: [K3]** Illustrate and organize data through tables, figures and graphical representations.

**CO3: [K4]** Analyze the data using descriptive statistics methods

**CO4: [K5]** Explain the findings based on statistical computations.

**CO5: [K6]** Discuss the applications of statistical techniques.

## **BASIC RESEARCH METHODS AND STATISTICAL TECHNIQUES**

**Code: UPS/SE/08**  
**Semester: IV**

**Hours: 90**  
**Credits: 5**

### **Learning Objectives:**

**This course enables the student to**

- Understand the research processes
- use hypothesis testing by employing suitable statistical tests
- Draw inferences by generalizing results to the population

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to**

**CO1: [K2]** Explain the basic steps in the research process.

**CO2: [K3]** Identify research hypotheses and illustrate the steps in hypothesis testing.

**CO3: [K4]** Distinguish between parametric and non-parametric tests and carry out hypothesis testing applying these techniques.

**CO4: [K5]** Explain the application of different statistical techniques.

**CO5: [K6]** Formulate and implement a survey-based research project (Formulate a research proposal for the online medium of instruction).

## **INTRODUCTION TO HUMAN SERVICES**

**Code: UPS/SE/07**  
**Semester: IV**

**Hours: 90**  
**Credits: 5**

### **Learning objectives:**

**This course enables the students to**

- Understand the approach of meeting human needs through an interdisciplinary knowledge base
- Learn about the different models of service delivery
- Perceive the nature and roles of clients and human service professionals.

### **Course outcomes:**

**On successful completion of the course, learners will be able to:**

**CO1: [K2]** Describe concepts related to the field of Human Services.

**CO2: [K3]** Apply the knowledge gained about human services to specific situations.

**CO3: [K4]** Analyze information relating to human services.

**CO4: [K5]** Evaluate ideas pertaining to human services based on facts, figures and illustrations.

**CO5: [K6]** Combine the concepts learnt with social realities of Indian society.

## RELATIONSHIP BUILDING SKILLS

**Code: UPS/NM/01**

**Hours: 30**

**Semester: III**

**Credits: 2**

### **Learning Objectives:**

**The course enables students to**

- Understand the factors that enhance relationships.
- Develop relationship building skills

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to**

**CO1: [K1]** Describe the nature and development of relationships and Interpersonal skills.

**CO2: [K2]** Explain the communication model, communication skills, verbal and non-verbal skills.

**CO3: [K3]** Analyse the barriers to Interpersonal effectiveness and examine the value-added qualities required at work place settings.

**CO4: [K4]** Assess and evaluate the level of self-awareness, self-disclosure, trust and assertiveness.

**CO5: [K4]** Examine ways to resolve conflicts, anxiety, fear and shyness effectively

## ENHANCING PERSONALITY

**Code: UID/SK/01**

**Hours: 45**

**Semester: IV**

**Credits: 3**

### **Learning objectives:**

**The course enables students to**

- Understand personality and personality development
- Improve personal and interpersonal skills

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to**

**CO1: [K2]** Describe personality and the various aspects of personality development.

**CO2: [K3]** Examine the techniques to enhance personality

**CO3: [K3]** Apply conflict resolution strategies, healthy communication skills and time management in daily settings.

**CO4: [K4]** Analyse healthy ways to express feelings and build self-discipline.

**CO5: [K5]** Recommend ways to manage stress effectively.



## INTRODUCTION TO PSYCHOLOGICAL DISORDERS

**Code: UPS/NM/02**  
**Semester: IV**

**Hours: 30**  
**Credits: 2**

### **Learning Objectives:**

**This course enables the students to**

- Bring about awareness on the different types of psychological disorders
- Create a positive attitude towards people with psychological disorders

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to**

**CO1: [K1]** Define abnormal behaviour

**CO2: [K1]** Describe the basic features of classification of mental disorders.

**CO3: [K2]** Discuss the various perceptives in understanding abnormal behaviour.

**CO4: [K3]** Classify signs and symptoms under various developmental and psychological disorders

**CO5: [K4]** Identify various self-enhancing strategies for self-improvement.

## INTRODUCTION TO DYSLEXIA AND REMEDIAL TEACHING METHODS

**Code: UPS/EL/01**  
**Semester: I/II**

**Hours: 45**  
**Credits: 2**

### **Learning objectives:**

**This course enables the students to**

- To identify children with learning difficulties in the normal classroom.
- To understand teaching methods to overcome learning problems.
- To help the parent to move in the positive direction.

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to**

**CO1: [K2]** Explain disorders related to learning difficulties

**CO2: [K3]** Apply various teaching methods to help children with learning difficulties

**CO3: [K4]** Identify children with learning difficulties in the normal classroom

**CO4: [K5]** Evaluate the various teaching methods to overcome learning problems

**CO5: [K6]** Diagnose various problems faced by children using psychological tests.

## **M.Sc. APPLIED PSYCHOLOGY PG PROGRAM OUTCOMES**

**On successful completion of the program the students will be able to:**

- PO1: Demonstrate an in-depth understanding of concepts and knowledge in the core and related field of study
- PO2: Use communication skills effectively in different professional and academic fields
- PO3: Skillfully identify problems; critically analyze data information to formulate appropriate problem management strategies
- PO4: Carry out independent and team research, interpret data using digital media, and demonstrate the ability to report the research findings in a prescribed scientific format.
- PO5: Integrate values with ethical practices in work and research environments, and become responsible citizens and leaders.
- PO6: Foster self-awareness and reflective thinking to facilitate personal and professional growth
- PO7: Exhibit awareness of social/ environmental needs and develop sustainable strategies to resolve issues
- PO8: Succeed as entrepreneurs/ obtain sustainable employment through professional experience gained from internships/ training programs and placement opportunities



## COUNSELLING

**Code: PPS/CO/50M**

**Hours: 60**

**Semester: 1**

**Credits: 4**

### **Learning Objectives:**

**This course enables students to**

- Understand the principles of counselling
- Gain knowledge of the different approaches to counselling and psychotherapy
- Understand the application of counselling in certain contexts.
- Gain knowledge of ethical principles in counselling

### **Course Outcomes:**

**On successful completion of the course the students will be able to**

**CO1: [K2]** Demonstrate an understanding of ethical professional counselling relationship.

**CO2: [K3]** Explain the application of counselling and psychotherapy in various contexts

**CO3: [K4]** Analyze the concepts/ principles and theories of Counselling and Psychotherapy.

**CO4: [K5]** Summarize the art and science of counselling.

**CO5: [K5]** Critically evaluate the applicability of various counseling concepts and theories.

## BEHAVIOR MODIFICATION

**Code: PPS/CO/46M**

**Hours: 60**

**Semester: I**

**Credits: 4**

### **Learning objectives:**

**This course enables the students to**

- Learn the terminology, procedures, and techniques of Behavior Modification
- Equip students to apply these principles within the real-world environment.

### **Course outcomes:**

**On successful completion of the course the learners will be able to**

**CO1: [K2]** Demonstrate knowledge of the basic principles and techniques in operant and classical conditioning.

**CO2: [K3]** Apply the behavioral model to the procedure and practical applications of various techniques to establish new behaviours

**CO3: [K4]** Distinguish between behavior modification techniques to increase desirable behavior and decrease undesirable behaviour, and their practical applications

**CO4: [K4]** Distinguish between behavior modification techniques for anxiety induction and anxiety reduction, and their practical applications

**CO5: [K5]** Recommend individualized behavior modification plans based on the various techniques learnt

## **RESEARCH METHODOLOGY**

**Code: PPS/CO/52M**

**Semester: I**

**Hours: 60**

**Credits: 4**

### **Learning Objectives:**

**This course enables the students to**

- Orient students toward research in the field of Psychology.
- Familiarize students with the style of writing journal articles.

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to**

**CO1: [K2]** Describe the fundamental concepts of research methodology and intellectual property rights

**CO2: [K3]** Explain the various methods of research design

**CO3: [K4]** Analyze the steps involved in the process of research

**CO4: [K5]** Select appropriate topics to conduct research

**CO5: [K6]** Develop a research proposal based on APA format

## **PERSONAL EFFECTIVENESS**

**Code: PPS/CO/49M**

**Semester: I**

**Hours: 75**

**Credits: 4**

### **Learning objectives:**

**This course enables the students to**

- Understand the theoretical approaches to personal effectiveness
- Acquire the necessary personal and interpersonal skills.

### **Course outcomes:**

**On successful completion of the course, the learners will be able to**

**CO1: [K2]** Describe personality and personality development.

**CO2: [K3]** Examine techniques to enhance personality

**CO3: [K4]** Analyze healthy ways to enhance oneself.

**CO4: [K5]** Recommend motivational, communication and conflict management strategies in everyday life.

**CO5: [K6]** Design a life plan in accordance with principles of personality development

## TEST CONSTRUCTION AND STANDARDIZATION

**Code: PPS/CO/48**

**Hours: 60**

**Semester: II**

**Credits: 4**

### **Learning objectives:**

**This course enables the students to**

- Understand the steps in construction of psychological tests
- Gain knowledge of the procedures in standardization and development of norms

### **Course Outcomes:**

**On successful completion of the course the learners will be able to**

**CO1: [K2]** Describe the steps in test construction and standardization

**CO2: [K3]** Explain the requirements of item writing and methods in item analysis

**CO3: [K4]** Analyze test construction principles for different types of tests.

**CO4 :[K5]** Summarize test standardization procedures such as reliability, validity and development of norms.

**CO5: [K6]** Plan test construction and/or standardization procedures for hypothetical tests

## PSYCHOLOGICAL THERAPIES

**Code: PPS/CO/51M**

**Hours: 60**

**Semester: II**

**Credits: 4**

### **Learning objectives:**

**This course enables the students to**

- Develop an understanding of the different types of psychological therapies
- Inculcate an understanding of the application of psychological therapies with specific groups/areas

### **Course outcomes:**

**On successful completion of the course, the students will be able to**

**CO1: [K2]** Describe the basic concepts of different psychological therapies.

**CO2: [K3]** Examine how counselling can be applied to certain problems and special areas

**CO3: [K4]** Analyze basic skills and techniques used in specific groups/ problems/alternative approaches.

**CO4: [K5]** Critically evaluate psychological therapies for specific groups/ problems/alternative approaches.

**CO5: [K5]** Recommend suitable strategies to be used in hypothetical cases.

## ORGANIZATIONAL BEHAVIOUR

**Code: PPS/CO/37M**  
**Semester: II**

**Hours: 60**  
**Credits: 4**

### **Learning objectives:**

**This course enables the students to**

- Study the behavior of people in organizations at three levels-individual, group and organizational systems
- Appreciate the significance and process of organizational change

### **Course outcomes:**

**On successful completion of the course, the learners will be able to**

- CO1: [K2]** Summarize the various psychological concepts in the field of organizational behavior
- CO2: [K3]** Analyze the concepts and theories of organizational behavior
- CO3: [K4]** Evaluate the concepts and theories related to organizational behavior
- CO4: [K5]** Inspect the concepts and theories related to organizational behavior
- CO5: [K6]** Design interventions to address workplace problems

## HEALTH PSYCHOLOGY

**Code: PPS/CO/45M**  
**Semester: II**

**Hours: 60**  
**Credits: 4**

### **Learning objectives:**

**This course enables the students to**

- Understand the psychological principles that underlie coping with health issues.
- Understand the various ways for managing illness

### **Course outcomes:**

**On successful completion of the course, the learners will be able to**

- CO1: [K1]** Describe the basic concepts in health psychology
- CO2: [K2]** Explain various theories in health psychology
- CO3: [K3]** Apply concepts of health psychology in health and community settings
- CO4: [K4]** Compare and contrast various theories and concepts in health psychology
- CO5: [K5]** Evaluate various theories and programs in health psychology.

## HUMAN RESOURCE MANAGEMENT – I

**Code: PPS/CO/53M**  
**Semester: II**

**Hours: 60**  
**Credits: 4**

### **Learning objectives:**

**This course enables the students to**

- Understand the contemporary issues of human resource management in organizations.

- Appreciate the importance of human resource management in the functioning and growth of organizations.
- Learn about the methods and techniques involved in human resource management.

**Course outcomes:**

**On successful completion of the course, the learners will be able to**

**CO1: [K2]** Describe human resource management concepts related to the field, Job analysis, recruitment, training, coaching and managing talent.

**CO2: [K3]** Illustrate human resource management concepts pertaining to the field, Job analysis, recruitment, training, coaching and managing talent.

**CO3: [K4]** Analyze information regarding human resource management with reference to the field, Job analysis, recruitment, training, coaching and managing talent.

**CO4: [K5]** Evaluate human resource management concepts and practices connected to the field, Job analysis, recruitment, training, coaching and managing talent.

**CO5: [K6]** Compile strategies that can be employed in organizations with reference to the field, Job analysis, recruitment, training, coaching and managing talent.

## **PSYCHOLOGICAL TESTING – I**

**Code: PPS/CO/44**

**Hours: 105**

**Semester: II**

**Credits: 4**

**Learning objectives:**

**This course enables the students to**

- Gain knowledge about the characteristics and uses of psychological tests.
- Acquire training in test administration and assessment of intelligence, personality, aptitude, interest, and development.

**Course outcomes:**

**On successful completion of the course, the learners will be able to**

**CO1: [K2]** Review historical perspectives concerning the nature and meaning of assessment.

**CO2: [K3]** Identify ethical and legal considerations in testing.

**CO3: [K4]** Illustrate the principles of assessment, including concepts of psychometric properties, and interpretation of test scores.

**CO4: [K5]** Select appropriate psychological assessments based on the given information and observations of the client.

**CO5: [K6]** Formulate a comprehensive report for each client based on test scores.



## SUMMER PLACEMENT

Code PPS/CO/39

Semester: II

Duration : 1 month

Credits: 2

### Learning objectives:

**This course enables the students to**

- Work in an organization of their choice where they acquire hands-on training in the areas of counselling / organizational behaviour / human resource management.
- Observe experts / professionals, interact with them and learn the required skills.

### Course outcomes:

**On Successful completion of the course, the learners will be able to:**

**CO1: [K2]** List the opportunities involved in the field of Psychology.

**CO2: [K3]** Apply the concepts of organizational behavior/counseling/human resource management in workplace/community/hospital settings

**CO3: [K4]** Appraise the functioning of various departments/services offered in an organization/institution.

**CO4: [K5]** Acquire professional skills through observation& work experience provided under supervision.

**CO5: [K6]** Recommend required changes in the organization

## PSYCHOLOGICAL INTERVENTION IN EDUCATIONAL SETTINGS

Code: PPS/CO/41M

Semester: III

Hours: 75

Credits: 4

### Learning objectives:

**This course enables the students to**

- recognize the specific psychological needs arising in educational contexts.
- acquire theoretical concepts and practical strategies to help students facing developmental challenges in schools and colleges.

### Course outcomes:

**On successful completion of the course, learners will be able to**

**CO1: [K2]** Describe the need for and provision of psychological interventions in educational contexts.

**CO2: [K3]** Apply the knowledge acquired about psychological needs and services to specific situations in educational settings.

**CO3: [K4]** Analyze information relating to psychological services in educational settings.

**CO4: [K5]** Justify ideas relating to the psychological services for children, adolescents and adults in educational settings.

**CO5: [K6]** Propose interventions for use in educational settings.

## MARKETING PSYCHOLOGY

**Code: PPS/CO/47M**

**Hours: 75**

**Semester: III**

**Credits: 4**

**Learning Objectives:**

**The course enables students to**

- Develop an understanding of various concepts and strategies of marketing
- Have an orientation about the trends in marketing, in the Indian context

**Course Outcomes:**

**On successful completion of the course, the learner will be able to**

**CO1: [K2]** Summarize basic concepts related to marketing

**CO2: [K3]** Apply marketing strategies

**CO3: [K4]** Appraise the role of marketing in business and society

**CO4: [K5]** Evaluate the role of market segmentation, marketing models and branding

**CO5: [K6]** Formulate marketing strategies that incorporate psychological and sociological factors

## SELECTED READINGS

**Code: PPS/CO/35**

**Hours: 75**

**Semester: II**

**Credits: 4**

**Learning Objectives:**

**This course enables the students to**

1. Develop skills of team work, decision making and collaborative learning through the exercise of syllabus formulation.
  2. Keep abreast of recent developments in the field of counselling and psychotherapy.
- Course outcomes may be framed every year depending on the nature of the course.

## HUMAN RESOURCE MANAGEMENT - II

**Code: PPS/CO/54M**

**Hours: 75**

**Semester: III**

**Credits: 4**

**Learning objectives:**

**This course enables the students to**

- Understand the contemporary issues of human resource management in organizations.
- Appreciate the importance of human resource management in the functioning and growth of organizations.
- Learn about the methods and techniques involved in human resource management.

**Course outcomes:**

**On successful completion of the course, learners will be able to**

**CO 1: [K2]** Describe human resource management concepts related to performance appraisal and management, strategic pay plans, benefits and services, employee relations, safety, collective bargaining and workplace counselling.

**CO2: [K3]** Illustrate human resource management concepts pertaining to performance appraisal and management, strategic pay plans, benefits and services, employee relations, safety, collective bargaining and workplace counselling.

**CO3: [K4]** Analyze information regarding human resource management with reference to performance appraisal and management, strategic pay plans, benefits and services, employee relations, safety, collective bargaining and workplace counselling.

**CO4: [K5]** Evaluate human resource management concepts and practices connected to performance appraisal and management, strategic pay plans, benefits and services, employee relations, safety, collective bargaining and workplace counselling.

**CO5: [K6]** Compile strategies that can be employed in organizations with reference to performance appraisal and management, strategic pay plans, benefits and services, employee relations, safety, collective bargaining and workplace counselling.

## **PSYCHOLOGICAL TESTING II (COUNSELLING & PSYCHOTHERAPY)**

**Code: PPS/CO/42**

**Semester: III**

**Hours: 120**

**Credits: 4**

**Learning objectives:**

**This course enables the students to**

- Train students in test administration and assessments related to the counselling setting,
- Enable students to acquire report writing skills.

**Course outcomes:**

**On successful completion of the course, the learners will be able to**

**CO1:[K4]** Illustrate the principles of assessment, including concepts of psychometric properties, and interpretation of test scores.

**CO2:[K5]** Evaluate a client based on structured clinical interview and mental status examination.

**CO3:[K5]** Select appropriate psychological assessments based on the given information and observations of the client.

**CO4:[K6]** Formulate a comprehensive integrated report for each client based on test scores.

**CO5:[K6]** Formulate an intervention plan detailing further assessment and counselling goals for each client based on test results.

## PSYCHOLOGICAL TESTING II (ORGANISATIONAL BEHAVIOR)

**Code: PPS/CO/16**

**Semester: III**

**Hours: 120**

**Credits: 4**

### **Learning objectives:**

**This course enables the students to**

- Train in test administration and assessments related to organizational settings
- Acquire report writing skills

### **Course outcomes:**

**On successful completion of the course, the learners will be able to:**

**CO1: [K2]** Demonstrate an understanding of each assessment in terms of its development, standardization, norms, reliability, validity and applications

**CO2: [K3]** Develop competence in the selection, administration and scoring of psychological assessments in organizational settings

**CO3: [K4]** Analyze test results using the concepts of organizational behaviour

**CO4: [K5]** Predict future outcomes in organizational settings based on test results

**CO5: [K6]** Formulate recommendations for further assessment or intervention based on clients' test results

## INTERNSHIP

**Code: PPS/CO/55**

**Semester:IV**

**Hours: 150**

**Credits: 4**

### **Learning objectives:**

**This course enables the students to**

- To provide the students with opportunities for field observation and work experience in the area of educational and hospital settings / organizational settings
- To enable an understanding of the structure and functioning of the institution.

### **Course Outcomes**

**On successful completion of the course, the students will be able to**

**CO1: [K2]** Describe the organizational history, structure, staffing, funding and infrastructure

**CO2: [K3]** Relate the theoretical knowledge and skills they have acquired in the MSc course to the practical applications of these concepts and skills in the organization

**CO3: [K4]** Analyze the functions carried out by the various teams/departments within the organization.

**CO4: [K5]** Compare and contrast the effective practices in the organizations with those that can be improved

**CO5:[K6]** Plan suggestions and recommendations to challenges observed in the organization

## CASE STUDIES IN HEALTH AND SCHOOL SETTINGS

**Code: PPS/CO/18**

**Hours: 150**

**Semester: IV**

**Credits: 4**

### **Learning objectives:**

**This course enables the students to**

- Effectively interview clients seeking professional help and obtain case histories
- Plan and conduct relevant assessments to develop a further understanding of the case.
- Develop skills to set therapeutic goals and carry out relevant interventions.

### **Course outcomes:**

**On successful completion of the course, the learners will be able to**

- **CO1: [K2]** Explain the requirements of case study in health, clinical and educational settings.
- **CO2: [K3]** Apply appropriate interview techniques and assessment tools to gather information in the chosen setting
- **CO3: [K4]** Analyze the treatment goals based on data gathered from client interviews and assessments.
- **CO4: [K5]** Implement an intervention program with client in Health, Clinical or Educational setting
- **CO5: [K6]** Develop an integrated case report for each client with follow up plans.

## PROJECT IN ORGANISATIONS

**Code: PPS/CO/19**

**Hours: 150**

**Semester: IV**

**Credits: 4**

### **Learning objectives:**

**This course enables students to**

- Understand the different principles of organizational behavior and human resource management.
- Understand the characteristics of the work force studied.

### **Course outcomes:**

**On successful completion of the course, the learners will be able to:**

**CO1: [K4]** Appraise needs in the organization in which the project is being carried out.

**CO2: [K4]** Devise a suitable plan of action to address identified needs.

**CO3: [K5]** Assess selected aspects according to need-based plan.

**CO4: [K5]** Evaluate results of assessment conducted / the implementation of the action planned.

**CO5: [K6]** Synthesize procedures, learnings and observations in the form of a report.

## STATISTICS

**Code: PPS/CE/18**

**Semester: I**

**Hours: 45**

**Credits: 3**

### **Learning objectives:**

**This course enables the students to**

- Review the essential concepts of descriptive statistics.
- Develop an understanding of inferential statistics in behavioural research.

### **Course outcomes:**

**On successful completion of the course, the learners will be able to**

**CO1: [K2]** Demonstrate the implications of statistics in understanding quantitative data.

**CO2: [K3]** Relate the statistical concepts and theories with its application in behavioral research.

**CO3: [K4]** Examine the use of various descriptive and inferential statistics in behavioral research.

**CO4: [K5]** Assess the elements of hypothesis testing and its application in behavioral research.

**CO5: [K5]** Summarize the assumptions and application of parametric and nonparametric tests.

## BASIC TRAINING FOR TRAINERS

**Code: PPS/CE/21M**

**Semester: II**

**Hours: 45**

**Credits: 3**

### **Learning Objectives:**

**This course enables the students to**

- Understand the processes and procedures involved in training.
- Acquire skills of planning and presenting training sessions, developing suitable audio-visual aids, props, games and activities and evaluating a training program.

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to**

**CO1: [K1]** Describe the basic concepts in training

**CO2: [K2]** Explain various theories, assessments and needs in training

**CO3: [K3]** Apply concepts of training in different settings

**CO4: [K4]** Compare and contrast various training methods, assessments.

**CO5: [K5]** Evaluate a training program

## CONSUMER BEHAVIOUR

**Code: PPS/CE/23M**

**Hours: 45**

**Semester: II**

**Credits: 3**

### **Learning objectives:**

**This course enables the students to**

- Analyze the reasons and motives for consumer buying behavior
- Understand how consumer behavior can be affected by different marketing strategies

### **Course outcomes:**

**On successful completion of the course, the learners will be able to**

**CO1: [K2]** Describe fundamental concepts of consumer behaviour

**CO2: [K3]** Apply consumer behaviour concepts to real world marketing problems

**CO3: [K4]** Analyze the role of psychological and social factors in consumer decision making

**CO4: [K5]** Appraise psychological, social and ethical implications of marketing actions on consumer behaviour

**CO5: [K6]** Develop marketing and promotional strategies centring around consumer psychology

## SERVICE-LEARNING IN COMMUNITY PSYCHOLOGY

**Code: PPS/CE/28 SL**

**Hours: 45**

**Semester: II**

**Credits:3**

### **Learning Objectives:**

**This course enables the students to**

- Understand the nature, concepts and interventions in community psychology.
- Acquire skills in formulating and executing a service-learning project in community psychology.

### **Course outcomes:**

**On successful completion of the course, the learners will be able to**

**CO1: [K2]** Describe important concepts, fields, preventive and supportive measures in community psychology.

**CO2: [K3]** Apply theory and personal, interpersonal skills to develop and execute a community-based project.

**CO3: [K4]** Analyze the needs and the problems of the society in order to develop an appropriate psychological intervention program for the target population.

**CO4: [K5]** Evaluate the process and impact of the psychological intervention program.

**CO5: [K6]** Develop effective presentations of modules to the community in order to foster leadership skills, promote personal growth, and critical thinking.

## POSITIVE PSYCHOLOGY

**Code: PPS/CE/27M**

**Hours: 45**

**Semester: III**

**Credits: 3**

### **Learning objectives:**

**This course enables the students to**

- Understand psychological strengths of people and discuss strategies to promote positive mental health
- Focus on the prevention of mental health disorders

### **Course outcomes:**

**On successful completion of the course, the learners will be able to**

**CO1: [K2]** Summarize the ideas and perspectives in positive psychology

**CO2: [K3]** Use the theories and concepts of psychology to promote positive outcomes

**CO3: [K4]** Analyse the nature and implications of positive mental health

**CO4: [K5]** Critically evaluate the theories and concepts of positive psychology

**CO5: [K6]** Plan intervention programs to build character strengths in individuals

## CRIMINAL AND FORENSIC PSYCHOLOGY

**Code: PPS/CE/24M**

**Hours: 45**

**Semester: III**

**Credit: 3**

### **Learning objectives:**

**This course enables the students to**

- Develop knowledge about criminal behaviors
- Understand the application of Criminal and Forensic Psychology.

### **Course outcomes:**

**On successful completion of the course, the learners will be able to**

**CO1: [K1]** Define the various behaviors of criminals and reproduce the Indian laws related to forensic psychology

**CO2: [K2]** Recognize the reasons for the Criminal Behavior, distinguish between psychological theories related to forensic psychology and summarize the attitudes and beliefs of punishment and prison management

**CO3: [K3]** Application of Psychology in Forensics

**CO4: [K4]** Analyze the role of a Psychologist in the Criminal Justice System

**CO5: [K5]** Evaluate the prison programs from a Psychological perspective



## THESIS

**Code: PPS/CE/08**  
**Semester: IV**

**Hours: 150**  
**Credits: 8**

### **Learning Objectives:**

**This course aims to help students to**

- Apply the principles of research methodology in formulating hypotheses, developing research plan and
- Carry out the research plan using statistical techniques and report writing.

### **Course Outcomes:**

**On successful completion of the course, the learners will be able to**

**CO1: [K3]** Examine independent research reading and arrive at researchable topics

**CO2: [K3]** Use APA guidelines in scientific writing.

**CO3: [K3]** Complete data collection, analysing data and drawing suitable conclusions

**CO4: [K4]** Identify suitable research methodology, applicable to research questions

**CO5: [K6]** Develop appropriate hypotheses to address research questions

## NATURE, CAUSES AND REMEDIATION OF LEARNING DISABILITIES

**Code: PPS/CE/09M**  
**Semester: IV**

**Hours: 150**  
**Credits: 8**

### **Learning objectives:**

**This course enables the students to**

- Understand learning disabilities, the assessment procedures and remedial methods
- Provide an opportunity to observe remedial instruction in special schools and acquire skills to help students with learning disabilities.

### **Course outcomes:**

**On successful completion of the course, the learners will be able to**

**CO1: [K2]** Explain the nature, causes, diagnosis, types and remediation of learning disabilities

**CO2: [K3]** Apply procedures in assessment, diagnosis and remediation of learning disabilities in practical settings.

**CO3: [K4]** Analyze the different types of learning disabilities and diagnostic methods.

**CO4: [K5]** Assess the diagnosis and remedial methods to deal with different types of learning disabilities.

**CO5: [K6]** Design intervention methods and prepare modules for remedial work for the learning disabled.

## TRAINING IN ORGANISATIONS

**Code: PPS/CE/26M**

**Hours: 150**

**Semester: IV**

**Credits: 8**

### **Learning Objectives:**

**The course enables the student to:**

- Provide conceptual knowledge about the process of training in organizations
- Provide an opportunity to observe different aspects of training in organizations

### **Course Outcomes:**

**On successful completion of the course the learners will be able to**

**CO1: [K2]** Describe the concepts related to training as a human resource development activity

**CO2: [K3]** Examine competency mapping process and apply solutions to various training related problems.

**CO3: [K4]** Investigate the steps and structure of training needs analysis, training design and evaluation models

**CO4: [K5]** Evaluate various training related models, training needs and training transferability

**CO5: [K6]** Develop a competency model, and design a training program with a training plan for effective evaluation

## PRACTICE OF BASIC COUNSELLING SKILLS

**Code: PPS/SK/01**

**Hours: 15 + 30**

**Semester: 1**

**Credits: 2**

### **Learning Objectives:**

**This course is designed to enable students to**

- Acquire knowledge about skill-based models of counseling.
- Practice the skills of attending, listening and responding with empathy using classroom activities and exercises.
- Learn how to design and execute a need-based workshop in the community.

### **Course Outcomes:**

**On successful completion of the course the students will be able to**

**CO1: [K2]** Discuss the process of Counselling

**CO2: [K3]** Explain the basic counselling skills of listening, responding, challenging and formulating action plan

**CO3: [K4]** Estimate their assets and limitations as counsellor trainees

**CO4: [K5]** Evaluate the skills of counselling through classroom activities and practicum.

**CO5: [K6]** Design and conduct a need-based workshop in the community

## APPLICATION OF BEHAVIOR MODIFICATION TECHNIQUES

**Code: PPS/SK/04**

**Semester: I**

**Hours: 45 (20 + 25)**

**Credits: 2**

**Learning objectives:**

**This course enables the students to**

- Acquaint students with various techniques of conducting behavioural assessments, developing therapy goals and strategies.
- Help students analyze, assess and develop treatment plans for various behaviour problems
- Carry out relaxation techniques.

**Course outcomes:**

**On completion of the course the learners will be able to**

**CO1: [K4]** Distinguish between various core cognitive techniques

**CO2: [K5]** Evaluate a case and write a cognitive-behavioral case conceptualization

**CO3: [K6]** Plan and implement various behavioral strategies as appropriate

**CO4: [K6]** Apply the basic cognitive-behavioural model to a case, and formulate a functional behavioural analysis using the basic behavioural principles of the A-B-C contingency

**CO5: [K6]** Design and implement a cognitive behavioural intervention plan with clear timelines and goals for a client

## **CURRENT TRENDS IN DEVELOPMENTAL DISABILITIES**

**Code: PPS/EL/14**

**Semester: II**

**Hours: 60**

**Credits: 4**

**Learning objectives:**

**This course enables the students to**

- Gain an overview of the current trends in developmental disabilities in the areas of early intervention, education and social inclusion.
- Identify key concerns and perspectives to consider for Inclusion and Special Education programs

**Course outcomes:**

**On successful completion of the course, the learners will be able to**

**CO1: [K2]** Describe the different developmental disabilities across the life span, early intervention, education and social inclusion.

**CO2: [K3]** Examine the areas of rehabilitation viz Early Intervention, Education, Work and Access, that require collaboration with Persons with Disabilities (PWDs) and their families

**CO3: [K4]** Analyze the psychosocial and human rights problems encountered by PWDs across childhood, adolescence and adulthood.

**CO4: [K5]** Evaluate the challenges in implementing early intervention and inclusion of PWDs

**CO5: [K6]** Design programs for inclusion of PWDs in different environmental settings across the life span.

## **INTRODUCTION TO DIAGNOSTIC CLASSIFICATION**

**Code: PPS/EL/17**  
**Semester: III**

**Hours: 60**  
**Credits: 4**

### **Learning objectives:**

**This course enables the students to**

- To introduce students to a broad framework of the DSM 5, its use as a manual and its classification system.
- To provide an overview of the diagnostic features of the mental disorders listed in the DSM 5.
- To provide students with a structured way to understand and apply diagnostic criteria to mental disorders and evaluate clinical symptom manifestations in a variety of contexts (primary care, educational, corporate, clinical and counselling).

### **Course outcomes:**

**After successful completion of the course the students will be able to**

**CO1: [K2]** Demonstrate an understanding of the use of diagnostic classification systems for mental disorders, and the ethical issues in diagnosis.

**CO2: [K3]** Apply the DSM criteria to understand the clinical presentation of various psychological disorders.

**CO3: [K3]** Examine the factors related to the onset, course, specifiers, and duration of psychological disorders.

**CO4: [K4]** Analyze differential diagnoses and comorbidities based on a cross-sectional comprehensive understanding of symptoms.

**CO5: [K5]** Evaluate hypothetical case studies and arrive at a provisional diagnosis by applying the DSM 5 diagnostic criteria of clinical symptoms.

## **LIFE SKILLS FOR PERSONAL GROWTH**

**Code: PPS/EL/16**  
**Semester: III**

**Hours:60**  
**Credits:3**

### **Course Objectives:**

**This course enables the students to**

- Describe the development of self-image and various theories of personality development.
- Describe the various types of communication.
- Describe effective life planning
- Describe the different ways of dealing with emotions.

### **Learning outcomes:**

**On successful completion of the course, the learners will be able to**

**CO1: [K2]** Describe self-image, human relations, emotions and various theories of personality development.

**CO2: [K3]** Analyse self-awareness levels, communication barriers, relationship patterns of the individual and examine ways to develop new relationships

**CO3: [K4]** Examine one's emotions and ways to express emotions constructively, ways to take risks and examine contributors to success

**CO4: [K5]** Assess and evaluate the communication skills of the self.

**CO5: [K6]** Formulate a life plan using life planning strategies

## **M.PHIL IN PSYCHOLOGY PROGRAM OUTCOMES**

On successful completion of the program the students will be able to:

**PO1** Have a sound understanding of theory and be able to apply it to research.

**PO2** Develop a critical evaluation of their own and others research work.

**PO3** Learn the importance of intellectual integrity, professional code of conduct and ethics in research.

**PO4** Be able to pursue Ph.D. programs for personal and professional development.

**PO5** Opt for careers requiring writing and communicative skills.

**PO6** Develop, design and implement projects competently.

**PO7** Be well equipped in basic and advanced techniques in their field of study.

**PO8** Have a comprehensive understanding of statistical techniques in research and be able to select suitable methods of analysis of data skills.

## PROGRAM SPECIFIC OUTCOMES

On successful completion of the program the students will be able to:

**PSO1** Demonstrate an in-depth understanding of advanced concepts in research methodology and select Personality theories.

**PSO2** Develop their research topic based on critical evaluation of research done in the field and be able to review the research work of others.

**PSO3** Adopt an appropriate research framework in terms of scientific methodology, fulfilling ethical guidelines and requirements.

**PSO4** Possess the necessary research skills and the spirit of scientific enquiry to enable them to pursue their doctoral studies.

**PSO 5** Demonstrate the skill set required for scientific writing, to review research writing and make lucid and coherent research presentations.

**PSO 6** Develop suitable research plan/projects in their area of study.

**PSO 7** Demonstrate a sound understanding of basic and advanced concepts in research methodology and statistical techniques.

**PSO 8** Carry out research, apply qualitative and quantitative methods of data analysis and interpret the results

	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>
<b>PSO1</b>	X							
<b>PSO2</b>		X						
<b>PSO3</b>			X					
<b>PSO4</b>				X				
<b>PSO5</b>					X			
<b>PSO6</b>						X		
<b>PSO7</b>							X	
<b>PSO8</b>								X