

## **Course Outcomes of M.Phil. Biochemistry**

### **CBC 1: RESEARCH METHODOLOGY**

CO 1: By studying this paper students will able to define research, explain and apply research terms, describe the research process and the principle activities, skills and ethics associated with the research process.

CO 2: Students can explain the relationship between theory and research, describe and compare the major quantitative and qualitative research methods.

CO 3: Construct an effective research proposal that will serve as the launching point for the research project, understand the importance of research ethics and integrate research ethics into the research process.

CO 4: Students will easily use the statistical tool and computer software for organization and analysis of data.

### **EBC 1: CONCEPTS IN BIOCHEMISTRY**

CO 1: Students will acquire knowledge of different metabolic pathways and their integration.

CO 2: Understanding of properties of enzyme along with concept of enzymes-substrate kinetics and its importance in biological reactions.

CO 3: Appreciate the cellular components and will choose appropriate experimental strategy for research in basic and molecular biology.

CO 4: Understand immunology at basic level as well as its biochemical importance.

### **EBC 2: HUMAN PHYSIOLOGY & CLINICAL BIOCHEMISTRY**

CO 1: This course will provide a sound basis in human physiology and clinical biochemistry to support in-depth understanding of physiological processes of all body systems in detail and on an appropriate level.

CO 2: Students will able to explain how the activities of organs are integrated for maximum efficiency.

CO 3: Students will be prepared to identify how changes in normal physiology lead to disease and it will support further study in health and medical sciences or related fields.

CO 4: This paper will also provide understanding of hormonal action in human body to regulate normal physiological activity of different organ system as well as metabolic process.

## Course Outcomes of M.Sc. Biochemistry

### **CBC 1: FUNDAMENTALS OF BIOCHEMISTRY**

**CO1:**To understand the concepts of preparation of buffers, molarity, normality, ionization, molality.

**CO2:**The understanding of different types of chemical bonding, molecular machinery of living cells, principles that govern the structures of macromolecules and their participation in living system.

**CO3:**To identify with the classification and structural properties of carbohydrates, proteins, nucleic acids and lipids, glycoproteins and glycolipids and their significance in biological systems.

**CO4 :**By the end of the course, the students will be able to demonstrate advanced knowledge and understanding of aspects of physical and chemical properties of aqueous solutions, concepts of free energy

### **CBC 2: METABOLISM**

**CO1:**Metabolism refers to all biochemical reactions which occur in the living organisms.

**CO2:**By studying this paper students will able to differentiate the anabolic and catabolic pathways and their important enzymatic steps, understand how glycolysis produces metabolic energy as well as producing intermediates for further metabolic reactions.

**CO3 :**To acquire knowledge related to the principles and basic mechanisms of metabolic control and how regulation of biochemical pathways leads to normal integrated metabolism, understand the organization of a typical mitochondrion, locating membranes, enzymes, respiratory complexes, the  $F_0-F_1$  complex, important transporter proteins and how it functions to synthesize ATP

**CO4:**To understand the importance of Integration of Metabolism, degradation, catabolism, hormonal regulation of metabolism etc will be exposed with the fact that perturbations in the bimoleculas lead to various diseases. To open new way into metabolic engineering for the production of useful compounds.

### **CBC 3: ENZYMOLOGY**

**CO1:**Students will be prepared for theoretically & practically to understand properties of enzyme.

**CO2 :**Enzymes are functional and its role in living system is unique. To understand ability to difference between a chemical catalyst and biocatalyst along with concept of enzymes-substrate kinetics and its importance in biological reactions.

**CO3 :**Enzymology paper is core Biochemistry subject, detailed understating of enzymology will help students to prepare their mind for interdisciplinary functional properties of protein.

**CO4 :**This paper gives platform to develop vast range of application of industrially valuable enzymes.

## **IBC 1: ANALYTICAL TECHNIQUES**

**CO1:**Analytical science is the study of the determination of the chemical composition of natural and artificial materials using both classical and modern instrumental techniques.

**CO2:**From this paper students will gain a deep understanding of chemical principles, especially those relevant to the chemistry of chemical analysis.

**CO3 :**Students will gain theoretical and practical knowledge of experimental methods and analytical instrumentation.

**CO4 :**Students will be able to safely and efficiently select and apply appropriate analytical methods to the analysis of real problems; able to interpret data from analytical methods, and will understand approaches for the validation of these analytical methods.

## **CBC 4: CELL BIOLOGY AND GENETICS**

**CO1:**Students will understand the structures and purposes of basic components of cell, especially membranes and organelles.

**CO2:**Appreciate the cellular components underlying cell division along with a deep insight to cell division, cell death and uncontrolled cell division.

**CO3 :**Students will learn the basic principles of inheritance and patterns of heredity.

**CO4:**Students will test and deepen their mastery of genetics by applying this knowledge in a variety of problem-solving situations.

## **CBC 5: HUMAN PHYSIOLOGY AND ENDOCRINOLOGY**

### **Course Outcome:**

**CO1:**This course will provide a sound basis in human physiology to support in-depth understanding of physiological processes of all body systems in detail and on an appropriate level.

**CO2:**Students will be able to explain how the activities of organs are integrated for maximum efficiency.

**CO3 :**Students will be prepared to identify how changes in normal physiology lead to disease and it will support further study in health and medical sciences or related fields.

**CO4:**This paper will also provide understanding of hormonal action in human body to regulate normal physiological activity of different organ system as well as metabolic process.

## **CBC 6: MOLECULAR BIOLOGY**

### **Course Outcome:**

**CO1:**Students will choose appropriate experimental strategy for research in basic and molecular biology.

**CO2:**To perform laboratory techniques in basic biology, molecular biology, and advanced techniques. Explanation and integration of biological principles, as applied to basic and molecular biology.

**CO3 :**Development of strong diversified background in modern biology, appropriate to the individual student goals. Develop critical-thinking, and problem based learning skills.

**CO4:**This paper will open an understanding of current trends in molecular and genetic research, and critically appraise published work. Students will be prepared to demonstrate an ability to design, undertake, and interpret, a research project, presented in the form of a dissertation.

## **IBC 2: BIOINFORMATICS AND BIostatISTICS**

**CO1:**Students will choose appropriate experimental strategy for research in basic and applied biology.

**CO2:**Explanation and integration of bioinformatics principles and its applications to basic and applied biology.

**CO3:**Students will gain *in silico* training on data mining, database searching, software application, quantitative analysis and interpretation, molecular modeling, QSAR and various DNA, RNA and Protein analytical tools.

**CO4:**Moreover, this paper enables students to acquire the knowledge of statistical analysis and its principles.

## **CBC 7: IMMUNOLOGY**

**CO 1:**To attain a working knowledge of current immunological principles as they relate to the cells and molecules of the immune system.

**CO 2:** Understanding of mechanism of interaction in defending the body against invading microorganisms.

**CO 3:** Students will get knowledge of development and acquisition of ability to recognize antigens and finally how they malfunction in autoimmune diseases.

**CO 4:** Students will extend and solidify their understanding of the presented principles through critical readings from the primary research literature.

Properties and Overview of Immune Response, Innate Immunity, Cells and Tissues of The Adaptive Immune System, Cytokines, Effect or Mechanism of Cell Mediated Immunity, Effect or Mechanism of Humeral Immunity

## **CBC 8: CLINICAL AND NUTRITIONAL BIOCHEMISTRY**

**CO 1:** Advanced understanding and knowledge of theoretical and practical aspects of blood biochemistry and its components.

**CO 2:** Connection of blood to entire organ system of body in single circulatory channel and consequences of environmental and genetic factors of blood disorders.

**CO 3:** Rationale and theoretical basis for methods and tools used in the diagnosis of common biochemical disorders.

**CO 4:** Distinguish between fat-soluble vitamins and water-soluble vitamins, biochemical functions and synthesis for these vitamins.

## **EBC 1: MICROBIAL BIOCHEMISTRY**

**CO 1:** Students will be able to appreciate the entire spectrum of microscopic life forms - from relatively simple, small but unique viruses to bacteria.

**CO 2:** Enable the students to understand the fine mechanism of regulation of gene expression. Awareness will be created on different types of viruses and diseases caused by them.

**CO 3:** Appreciate the crucial role played by bacteria in nitrogen metabolism.

**CO 4:** Students will get deep insight to antimicrobials.

## **EBC 2: PHARMACEUTICAL BIOCHEMISTRY AND REGULATORY AFFAIRS**

**CO 1:** Gain detail understanding of how drug act inside the body after absorption from intestine in to blood.

**CO 2:** Understanding of factors that affect drug absorption, interaction with target receptors and inhibition of enzymes.

**CO 3:** Understanding of process of product registration and different guidelines which control the manufacturer to follow correct strategy for manufacturing of drug.

**CO 4:** Learn how to write and file the patent; how to document clinical data of the concern drug research.

### **EBC 3: PLANT BIOCHEMISTRY**

**CO 1:** Understanding of the constituents of the plant cell and appreciate the role of each of the components.

**CO 2:** Appreciate the biological significance of photosynthesis in plants and human environment.

**CO 3:** Appreciate the modes and pathways involved in the biosynthesis of plant hormones and highlight their roles in the cell.

**CO 4:** As secondary metabolites relate to therapeutic and nutritional uses, their multidimensional aspect will be highlighted.

### **EBC 4: RESEARCH METHODOLOGY**

**CO 1:** Gain the ability to define research, explain and apply research terms, describe the research process and the principle activities, skills and ethics associated with the research process;

**CO 2:** Students will be able to explain the relationship between theory and research, describe and compare the major quantitative and qualitative research methods.

**CO 3:** Students will be able to construct an effective research proposal that will serve as the launching point for the research project, understand the importance of research ethics and integrate research ethics into the research process.

**CO 4:** Students will easily use the statistical tool and computer software for organization and analysis of data.

### **EBC 5: ANIMAL CELL TISSUE CULTURE**

**CO 1:** To attain a working knowledge of discrimination between the different types of cell culture technologies.

**CO 2:**Detailed criteria for consideration for scale up of cell culture and media composition.

**CO 3:**Students will gain knowledge in identifying the appropriate cell model for a large scale process.

**CO 4:** Gain knowledge of recent developments in cell and tissue engineering.

## **Course Outcomes of M. Phil. Botany**

In the first semester, according to the UGC Ordinance 2016, they have to complete a 8-Credit Course work.

**CO 1:** It focuses on the research methodology, data analysis, statistical methods, literature survey, presentations and computer applications.

**CO 2:** By studying this paper students will be able to understand research terms, the research process and develop skills and ethics associated with the research process.

**CO 3:** Students will learn statistical tools and software for data analysis.

### **M. Phil Paper – 1. General Botany (Core)**

CO 1: Students will get exposure on the plant taxonomy

CO 2: Students will gain knowledge on plant physiological processes significant for plant growth and development

CO 3: Different aspects on plant propagation, genetics and molecular biology can be known.

### **Micro-202: Desert Ecology**

CO 1: In this paper, the students are acquainted with the soil science and growth of plants in different habitats.

CO 2: Different aspects of soil properties and its influence on growth of plants are studied. The students gain broader spectrum on the abilities of plants to grow in stress environments.

CO 3: Another part of the syllabus relates to the increase in desert areas due to soil erosion, degradation of land, destruction of forests etc. Students develop awareness regarding the problems and develop insight on solving it.

CO 4: Since these problems are major in arid, semi-arid and desert regions, research is carried out and stress resistant plants are developed, their study becomes very interesting and significant.

### **BOT-203: Advances in Plant Biology**

CO1: In this paper, Students gain knowledge on plant growth physiology, genetics and molecular biology

CO2: Students get hands on training on plant propagation techniques which is helpful to get jobs and develop business in agriculture and horticulture sector

CO3: Students get hands on training on plant molecular biology and genetics which helps in getting jobs at teaching and research institutes

### **BOT-203: Herbal Medicine**

CO1: In this paper, Students gain knowledge on ethanobotanical use of plant resources

CO2: Students get hands on training on development of herbal drugs which is helpful to get jobs and develop business in pharmaceutical and biotechnological sector

CO3: Students get hands on training on drugs development which helps in getting jobs at teaching and research institutes

## **Course Outcomes of M. Sc. Botany**

### **BOT 101: CELL BIOLOGY**

**CO1:** These fundamental courses develops knowledge of students in plants cell biology.

**CO2:** This helps students in getting job at teaching and research institutes.

### **BOT 102: MOLECULAR BIOLOGY, GENETICS & EVOLUTION**

**CO1:** These fundamental courses develops knowledge of students in plants molecular biology, genetics, adaptation and evolution.

**CO2:** This helps students in getting job at teaching and research institutes.

### **BOT 103: BIODIVERSITY & BIOSYSTEMATICS**

**CO1:** These course trains students in identification and classification of plant species.

**CO2:** This helps them to get job in forest, seed banks, botanical gardens, biotechnological, pharmaceutical and other research institutes as plant taxonomist.

### **BOT 104: BIOSTATISTICS AND BIOINFORMATICS**

**CO1:** In bioinformatics they will gain deep understanding of using computer tool to visualize, explore and model sequence analysis using different software.

**CO2:** Students will able to recognize the importance of statistical analysis, and approach to problem solving, in various disciplines.

### **BOT 207: BIOCHEMISTRY**

**CO1:** These course develops knowledge of students on biomolecules of plants such as primary and secondary metabolites.

**CO2:** This helps students to develop their understanding on use of plants material in development of pharmaceutical, medicinal and biotechnological products.

### **BOT 208: BIOTECHNOLOGY & IMMUNOLOGY**

**CO1:** The students will get the experimental knowledge of genetic engineering and immunological fields.

**CO2:** Students will able to gain hands-on experience on plant tissue culture and immunological qualitative and quantitative techniques.



### **BOT 209: ENVIRONMENTAL SCIENCE**

**CO1:** This course creates awareness among students on conservation and judicious use of plant species.

**CO2:** It helps students to understand the significance of each plant species available in specific geographical region.

**CO3:** This helps students to get job in plant conservation centers, seed banks, botanical gardens etc.

### **BOT 210: ANALYTICAL TECHNIQUES**

**CO1:** This course trains students in handling sophisticated instruments such as HPLC, LCMS, GCMS, Sequencer, PCR etc.

**CO2:** This helps them to get job opportunities in research, biotechnological and pharmaceutical institutes.

### **BOT 319: PLANT ANATOMY, MORPHOGENESIS AND EMBRYOLOGY**

**CO1:** The students will gain ability to apply the acquired knowledge and skills in the field of plant morphology, anatomy and embryology

**CO2:** The students are enabled to understand the morphogenesis and embryology mechanisms of plant growth and development.

### **BOT 314: PLANT ECOLOGY**

**CO1:** The students get to understand the basic concepts of geology, ecology, autecology, population dynamics and advanced ecology.

**CO2:** Students will learn to process of the establishment of ecosystem, vegetation, plant succession and adaptations.

**CO3:** Gain the knowledge related to plant diversity and its adaptation in India.

### **BOT 315: PLANT PROPAGATION TECHNIQUES**

**CO1:** Students will learn the basic principles of in vitro and in vivo propagation techniques.

**CO2:** This paper will introduce the horticulture industrial skills of plant propagation, such as grafting, budding, layering, cutting and tissue culture.

**CO3:** Students will understand factors that affect plant propagation techniques.

**CO4 :** Students will also learn research for the development of agribusiness.

### **BOT 316: HERBAL TECHNOLOGY**

**CO1:** Studies on uses of plant species on development of herbal, pharmaceutical and biotechnological products.

**CO2:** This provides opportunity to students to get job on research and teaching institutes.

### **BOT 317: DIVERSITY OF PLANT LIFE**

**CO1:** Studies on plant diversity and ecology will improve knowledge of students on plant identification and classification

**CO2:** It provides hands on training on floral identification, calculation of ecological diversity, conservation of rare and economically important plant species.

**CO3:** This helps students in getting jobs at research institutes such as Gujarat biodiversity board, Botanical survey of India etc.

### **BOT 419: PLANT RESOURCE UTILIZATION AND CONSERVATION**

**CO1:** This course provides information to students on ethanobotanical use of plant materials.

**CO2:** It creates awareness among students on conservation and judicious use of plant resources.

**CO3:** It provides hands on training to students on conservation of seeds and plant germplasm which helps in getting job at teaching and research institutions.

### **BOT 420: PLANT PHYSIOLOGY AND METABOLISM**

**CO1:** Students will learn the basic principles and mechanisms of plant growth development.

**CO2:** This paper will also provide understanding of hormonal action in plant to regulate normal physiological activity of different organ as well as metabolic process.

### **BOT 421: PLANT BIOTECHNOLOGY AND GENETIC ENGINEERING**

**CO1:** The students will have knowledge of tools and strategies used in genetic engineering.

**CO2:** Gain an in-depth understanding of the basic and recent development in the field of biotechnology.

### **BOT 422: HERBAL TECHNOLOGY II**

**CO1:** Hands on training to students in development of herbal and pharmaceutical drugs from plant resources.

**CO2:** It increases chances of students to get job in pharmaceutical and biotechnological industries.

### **BOT 423: WATER, SOIL AND DESERTIFICATION**

**CO1:** Studies to create awareness among students on destruction of plant species due to degradation of land, forest and habitat.

**CO2:** Studies on adaptation of plants in harsh environmental conditions. Hands on training to students on propagation of plants in harsh environments and develop stress resistant plant varieties. This helps students to get job in research institutes.

## **Course Outcomes of M. Phil. Microbiology**

In the first semester, according to the UGC Ordinance 2016, they have to complete a 8-Credit Course work.

**CO 1:** It focuses on the research methodology, data analysis, statistical methods, literature survey, presentations and computer applications.

**CO 2:** By studying this paper students will be able to understand research terms, the research process and develop skills and ethics associated with the research process.

**CO 3:** Students will learn statistical tools and software for data analysis.

### **M. Phil. Paper – 1. Microbial Technology**

CO 1: Students will get exposure on the broader area of the applications of microorganisms.

CO 2: Applications of microorganisms in different areas are discussed and students get broader spectrum of the usefulness of the microorganisms.

CO 3: Different aspects undertaken include protein engineering, enzyme based applications and use of the microorganisms in monitoring and restoration of the environment.

### **Micro-102: EXTREMOPHILES AND METAGENOMICS**

CO 1: In this paper, the students are acquainted with the microorganisms from highly extreme habitats.

CO 2: Various aspects of these specific organisms are dealt and students get broader spectrum of the abilities of these microorganisms.

CO 3: Another part of the syllabus relates to the microorganisms which are not cultivatable in the lab and hence they remain unknown for the world.

CO 4: Since these microorganisms account for the maximum, their study becomes very very interesting and significant.

### **Micro-103: BIODEGRADATION OF XENOBIOTIC COMPOUNDS**

CO 1: In this paper, emphasis is laid on environmental aspects of the microbiology.

CO 2: The potential of microorganisms in bioremediation is an important aspect which is discussed in this paper.

CO 3: Various kinds of pollutants exist and constantly being added into the environment. The students will get enough exposure on the potential of the microbial world in reducing and removing these pollutants.

### **Micro-104: FOOD & DAIRY MICROBIOLOGY**

CO 1: In this paper, emphasis is laid on environmental aspects of the microbiology.

CO 2: The potential of microorganisms in bioremediation is an important aspect which is discussed in this paper.

CO 3: Various kinds of pollutants exist and constantly being added into the environment. The students will get enough exposure on the potential of the microbial world in reducing and removing these pollutants.

## **Course Outcomes of M. Sc. Microbiology**

### **MICRO. 101: CELL BIOLOGY**

CO 1: Students learn in details about comparative account of plant, animal and microbial cells, the similarities and differences and specialities of different types of cells

CO 2: Students learn in detail about organelles present in plant, animal and microbial cells, their structure and function and their importance to cells they are present in

CO 3: Students learn in details new developments about cytoskeleton, its organization and functions; an important structural part of cell important in cell division

CO 4: Students learn in details new developments about signalling and its importance in modulating cellular behaviour during development and diseased condition

### **MICRO. 102: MOLECULAR BIOLOGY, GENETICS & EVOLUTION**

CO 1: Students learn in details about classical Mendelian genetics, natural selection, how the field of genetics evolved, speciation and the evolution of diverse life in general

CO 2: Students learn in details about the various structure forms of DNA, organization of DNA in prokaryotes & Eukaryotes, synthesis of DNA in prokaryotes & Eukaryotes, and linkage and genemapping

CO 3: Students learn in details new developments about structure of gene and variant structures of genes in viruses, prokaryotes & Eukaryotes and their implications in the biology of these organisms, salient features of genetic code and the comparative account of synthesis of RNA and protein in prokaryotes & Eukaryotes

CO 4: Students learn in details new developments about the dynamic nature of DNA and the changes that can take in the hereditary material DNA, how cell responds to these changes and their implications and the organelles responsible for extrachromosomal inheritance

### **MICRO. 103: BIODIVERSITY & BIOSYSTEMATICS**

CO 1: Students learn in details about basic concept of biodiversity, environmental changes in the form of pollution and its implications on biodiversity at various levels

CO 2: Students learn in details about the phylogenetic and phenetic classification and taxonomy of prokaryotes & Eukaryotes

### **MICRO. 104: BIOSTATISTICS AND BIOINFORMATICS**

CO 1: Students learn in details about basic statistics and application of statistical tools to study biological phenomenon, biodiversity, population biology and genetics

CO 2: Students learn in details about the field of bioinformatics and its applications in diverse fields such as basic biology and applied chemical and biological sciences

CO 3: Applications of bioinformatic tools in understanding the genetics of biological cell forms, their evolution and the classification and taxonomy of diverse life

### **MICRO. 207: BIOCHEMISTRY**

CO 1: Students learn in details about fundamental chemical components of cell, their structure and function

CO 2: Students learn in details about enzymes and their nomenclature, classification, chemistry and biology,

CO 3: General concept of bioenergetics, energy-generating biochemical reactions and how cell uses this energy for the synthesis of new cell

### **MICRO. 208: BIOTECHNOLOGY & IMMUNOLOGY**

CO 1: Students learn in details about the causes of pollution, priority environmental pollutants and their behaviour in Nature and how biological principles can be exploited especially microbes to develop technologies for pollution abatement, development of enzyme formulations that improve the value of biocatalysts, and techniques to cultivate animal and plant cells in vitro and its varied applications

CO 2: basic information and tools required to gene manipulation and immunological principles

### **MICRO. 209: ENVIRONMENTAL SCIENCE**

General well-being of the life on the surface of the planet

CO 2: Students learn how pollution is generated by anthropogenic activities and how it can damage globally and locally our environment, food web and life in general

CO 3: methods to evaluate the damage caused to environment and its probable short term and long term implications

### **MICRO. 210: ANALYTICAL TECHNIQUES**

CO 1: Students learn in details about different techniques useful in the study and research of biological sciences, various microscopic techniques, sample preparation and staining, various spectroscopic techniques like UV-Vis, IR and MS, chromatographic techniques for the separation and identification of metabolites

CO 2: Students learn about techniques for the physical separation of cells and cellular metabolites by centrifugation, and electrophoretic separation of protein and nucleic acids

### **MICRO-313: GENOME ORGANIZATION AND REGULATION OF GENE EXPRESSION (CORE PAPER I)**

CO 1: In this paper, students will learn new advances in genome organization in various prokaryotic systems.

CO 2: The students will gain the knowledge of various gene regulation and expression systems in prokaryotic and eukaryotic microbes.

CO 3: The studied related to genetic exchange in prokaryotes including mechanisms of transformation, transduction, conjugation and plasmid biology are very significant.

CO 4: The students will learn the viral systems and its genetic regulations.

### **MICRO-314: FERMENTATION TECHNOLOGY-I (CORE PAPER II)**

CO 1: Since the microorganisms have various industrial applications new screening methods and preservation of industrial microorganisms is introduced.

CO 2: The students will learn the basic and advanced concepts of fermentation including the design of bioreactor for genetically modified organisms and kinetics of fermentation process CO 3: The studied related scale up of sterilization, viral safety for biotech productions and production of protein by heterologous expression system are very significant.

CO 4: The aspect related to automated fermentation process including biosensor technology and its applications are introduced that will raise the knowledge about recent developments in the field.

### **MICRO-315: ENVIRONMENTAL BIOTECHNOLOGY- I (ELECTIVE PAPER-I)**

CO 1: In this paper, the importance of microbial ecology and the significant role of microorganisms in biogeochemical cycles are highlighted.

CO 2: The emphasis is laid on various interactions within and between microbial populations. The students will get the knowledge about how constant microbial interactions made in natural environments.

CO 3: The students will get through various methods of biodegradation using microorganisms

CO 4: The students will learn principle and applications of various biodeterioration process made by microorganisms.

### **MICRO-316: FOOD BIOTECHNOLOGY (ELECTIVE PAPER II)**

CO 1: The microorganisms have various applications in food technology. So, the students will learn various processes carried out in food industries to produce fermented food.

CO 2: The role of genetically modified microorganisms and production of genetically modified foods and crops are significant aspects of food industries. The students will learn these aspects in detail

CO 3: The studied related scale up of sterilization, viral safety for biotech productions and production of protein by heterologous expression system are very significant.

CO 4: The aspect related to automated fermentation process including biosensor technology and its applications are introduced that will raise the knowledge among the students about the recent developments in the field.

### **MICRO-317: MOLECULAR BIOTECHNOLOGY (ELECTIVE PAPER III)**

CO 1: A range of proteomics techniques are introduced that are significant to study.

CO 2: The emphasis is laid on DNA-protein interactions studies using various molecular methods that would develop the knowledge among the students related to molecular biology.

CO 3: The students will get through recent advancements in various reporter gene systems that are very significance in molecular biology studies.

CO 4: Various vector systems and their relevant host systems will develop the knowledge about molecular cloning and expression analysis among the students.

### **MICRO-419: MOLECULAR PHYLOGENY AND DIVERSITY (CORE PAPER-I)**

CO 1: The new bacterial strains identified based on 16S rDNA gene sequencing and other molecular techniques are introduced.

CO 2: The metagenomics approach and new techniques used to identify non-cultivable microbes are introduced.

CO 3: The students will learn unique features of various Gram-negative bacteria and their applications.

CO 4: Various Gram-positive bacteria and its ecological and industrial significance will develop the knowledge about characteristics and applications of these microorganisms among the students.

### **MICRO-420: EXTREMOPHILES (CORE PAPER-II)**

CO 1: Recent advancements in the field of extremophiles are introduced.

CO 2: The students will learn one of the important groups of extremophilic microorganisms known as Archaea and its potential biotechnological applications

CO 3: Various extremophilic microorganism including thermophiles, psychrophiles acidophiles and their adaptive mechanisms are introduced.

CO 4: The students will get through extremophilic microbes including halophiles, alkaliphiles barophiles and methanogens, their adaptive mechanisms and industrial significance.

#### **MICRO-421: BIMOLECULAR ENGINEERING (ELECTIVE PAPER-I)**

CO 1: The proteomics studies are introduced that are significant to study.

CO 2: The emphasis is laid on molecular chaperons and their role in folding of extremophilic microorganisms.

CO 3: The students will get through recent advancements in various methods of protein engineering and its significance.

CO 4: Various PCR techniques used to amplify a gene of interest, molecular cloning, and next generation sequencing will develop the knowledge about recent developments in the field of molecular biology.

#### **MICRO-422: FERMENTATION TECHNOLOGY II (ELECTIVE PAPER II)**

CO 1: Ranges of downstream processes are introduced that are significant in fermentation industries.

CO 2: The emphasis is laid on production processes and the concept of immobilization to increase production of desired product in fermentation industries.

CO 3: The students will get through recent advancements in microbial production of organic acids, amino acids, antibiotics and vitamins that are very significance in fermentation industries.

CO 4: The applications of various enzymes and polysaccharides produced by microbes in fermentation industries will develop the knowledge among the students.

#### **MICRO-423: ENVIRONMENTAL BIOTECHNOLOGY II (ELECTIVE PAPER-**

CO 1: It relates to the microorganisms which are involved in biodegradation process and its applications.

CO 2: Since microorganisms account for their biodegradation process, students will learn various biodegradations process including biodegradation of pesticides and other harmful compounds by microorganisms and their ecological significance.

CO 3: Various microbial processes used to remove inorganic pollutants from soil/other natural environments are introduced.

CO 4: The recent bioremediation strategies involving prokaryotic and eukaryotic microbes will improve the knowledge among the students.

## **Course Outcomes of M. Sc. Zoology**

**ZOOL.**

**101:**

### **CELL BIOLOGY**

- CO-1:** Understand the Scope of cell biology, because cell is the basic unit of life.
- CO-2:** Understand the Main distinguishing characters between plant cell and animal cell.
- CO-3:** To study and understand the whole cell organelles with their structure and function.
- CO-4:** Understand the cell cycle and know the importance of various cells in body of organisms.
- CO-5:** Understand the various applications of cells by using cell biology like study of various types of tumour.
- CO-6:** Understand the Animal cells and various cell organelles by using microphotographs.

### **ZOOL. 102: MOLECULAR BIOLOGY, GENETICS & EVOLUTION**

- CO-1:** Understand how DNA encodes genetic information and the function of mRNA and tRNA
- CO-2:** Understand the process of DNA replication, transcription and translation.
- CO-3:** Apply the principles of Mendelian inheritance.
- CO-4:** Understand the cause and effect of alterations in chromosome number and structure.
- CO-5:** Relate the conventional and molecular methods for gene manipulation in other biological systems.
- CO-6:** Discuss and analyse the epigenetic modifications and imprinting and its role in diseases.
- CO-7:** Get new avenues of joining research in related areas such as genetic engineering of cells, cloning, genetic disorders, human fertility programme, genotoxicity, etc

### **ZOOL. 103: BIODIVERSITY & BIOSYSTEMATICS**

- CO-1:** Understand the evolution, history of phylum.
- CO-2:** Understand about the Non Chordate animals.
- CO-3:** To study the external as well as internal characters of non-chordates.
- CO-4:** To study the distinguishing characters of non-chordates.
- CO-5:** Understand the economic importance of Molluscs
- CO-6:** Understand the various internal systems like Digestive system, nervous system with the help of charts.
- CO-7:** Understand the functions of Gemmules and spicules.

### **ZOOL. 104: BIOSTATISTICS AND BIOINFORMATICS**

- CO-1:** Know the theory behind fundamental bioinformatics analysis methods.
- CO-2:** Be familiar with widely used bioinformatics databases.
- CO-3:** Know basic concepts of probability and statistics.
- CO-4:** Describe statistical methods and probability distributions relevant for molecular biology data.
- CO-5:** Know the applications and limitations of different bioinformatics and statistical methods.
- CO-6:** Perform and interpret bioinformatics and statistical analyses with real molecular biology data.
- CO-7:** Acquire knowledge of various databases of proteins, nucleic acids. Primary, secondary and composite databases. BLAST, FASTA, DOT PLOT
- CO-8:** Make phylogenetic predictions or prediction of structure of proteins and nucleic acids
- CO-9:** Develop understanding in Primer designing
- CO-10:** Understand data mining tool and its practical application in a case study
- CO-11:** Apply the knowledge in future course of their career development in higher education and research.



### **ZOOL. 207: BIOCHEMISTRY**

**CO-1:** Understand the concept of enzyme, its mechanism of action and regulation.

**CO-2:** Learn the preparation of models of peptides and nucleotides.

**CO-3:** Learn biochemical tests for amino acids, carbohydrates, proteins and nucleic acids.

**CO-4:** Learn measurement of enzyme activity and its kinetics.

### **ZOOL. 208: BIOTECHNOLOGY & IMMUNOLOGY**

**CO-1:** Develop an understanding of the fundamental molecular tools and their applications of DNA modification and cloning.

**CO-2:** Appreciate shifting their orientation of learning from a descriptive explanation of biology to a unique style of learning through graphic designs and quantitative parameters to realize how such research and innovations have made science interdisciplinary and applied.

**CO-3:** Develop future course of their career development in higher education and research with a sound base.

**CO-4:** Apply their knowledge with problem solving approach to recommend strategies of genetic engineering for possible applications in Biotechnology and allied industry.

**CO-5:** Understand the structure and function of immunoglobulins.

**CO-6:** Understand the technique of cell and tissue culture. Learn the preparation of solution of given percentage and molarity.

### **ZOOL. 209: ENVIRONMENTAL SCIENCE**

**CO-1:** Develop understanding on the concept and issues of global environmental change.

**CO-2:** Analyse the causes and effects of depletion of stratospheric ozone layer.

**CO-3:** Examine the climate change and its effect on living beings.

**CO-4:** Understand the physical basis of natural greenhouse effect on man and materials.

**CO-5:** Evaluate human influenced driver of our climate system and its applications.

**CO-6:** Know the biotic and abiotic components of ecosystem.

**CO-7:** Food chain & food web in ecosystem.

**CO-8:** Understand diversity among various groups of animal kingdom.

**CO-9:** Understand Animal community & ecological adaptation in animals.

**CO-10:** Scope, importance and management of biodiversity

### **ZOOL. 210: ANALYTICAL TECHNIQUES**

**CO-1:** Understand the purpose of the technique, its proper use and possible modifications/ improvement.

**CO-2:** Learn the theoretical basis of technique, its principle of working and its correct application.

**CO-3:** Learn the construction repair and adjustment of any equipment required for a technique.

**CO-4:** Learn the accuracy of technique.

**CO-5:** Learn the maintenance laboratory equipments/ tools, safety hazards and precautions.

**CO-6:** Understand the technique of cell and tissue culture. Learn the preparation of solution of given percentage and molarity.

**CO-7:** Understand the process of preparation of buffer. Learn the techniques of separation of amino acids, proteins and nucleic acids.

### **Zool. – 313: STRUCTURE & FUNCTIONS OF INVERTEBRATES (CORE)**

**CO-1:** Develop an understanding of the characters used to classify besides being able to differentiate the organisms belonging to different taxa.

**CO-2:** Have hands on experience of materials demonstrating the diversity of protists and non-chordates.

**CO-3:** Understand the relative position of individual organs and associated structures through dissection of the invertebrate representatives.

**CO-4:** Realize that very similar physiological mechanisms are used in very diverse organisms.

**CO-5:** Get a flavor of research by working on project besides improving their writing skills. It will further enable the students to think and interpret individually.

**CO-6:** Undertake research in any aspect of animal physiology in future.

#### **Zool - 314: MAMMALIAN PHYSIOLOGY (CORE)**

**CO-1:** Understand the Importance of physiology and branches of it.

**CO-2:** Understand the terms-Osmosis, diffusion, pH and Buffer.

**CO-3:** Understand the Digestion and Excretion process, by studying the organs of it.

**CO-4:** Understand the process of Metabolism.

**CO-5:** Understand the term Detoxification.

**CO-6:** Understand the Circulatory system and Lymphatic system.

**CO-7:** Study the nervous system.

**CO-8:** Understand the process of vision and hearing.

**CO-9:** Understand the process of muscle contraction.

#### **Zool – 315: HUMAN PARASITOLOGY (ELECTIVE)**

**CO-1:** To study and understand the scope and branches of Medical Zoology.

**CO-2:** To aware the students for various parasites and diseases which spreads in human with the help of study of host-parasite relationship.

**CO-3:** To increase awareness for the health in students.

**CO-4:** Understand the various disease causing vectors like Mosquitoes.

**CO-5:** To aware about the typhoid, cholera likes disease.

#### **Zool – 316: DEVELOPMENTAL BIOLOGY & ADAPTATION (ELECTIVE)**

**CO-1:** To understands Pregnancy: conception and blastocyst formation, implantation and delayed implantation, placenta: formation, types and functions, hormones in pregnancy.

**CO-2:** Explain and contrast the processes of spermatogenesis, oogenesis.

**CO-3:** Demonstrate an understanding of the hormonal control of reproduction in males and how this is regulated.

**CO-4:** Distinguish between the main stages of embryonic, foetal and neonatal development

#### **Zool. – 317 : ANIMAL ECOLOGY (ELECTIVE)**

**CO-1:** Engage in field-based research activities to understand well the theoretical aspects taught besides learning techniques for gathering data in the field.

**CO-2:** Analyse a biological problem, derive testable hypotheses and then design experiments and put the tests into practice.

**CO-3:** Solve the environmental problems involving interaction of humans and natural systems at local or global level.

#### **Zool. – 419: AQUACULTURE & FISHERIES TECHNOLOGY (CORE)**

**CO-1:** To understand the Aquaculture concept, Culture systems: Freshwater aquaculture systems: Freshwater prawn culture, fish culture in paddy fields, Brackish water culture, Mariculture: Oyster culture, Crab culture, Lobster culture, mussel culture, culture of Eels, Culture of aquatic weeds.

**CO-2:** To understand the Composite fish culture and Preparation and management of fish culture ponds.

**CO-3:** Transport of fish seed and Brood fish and Harvesting: Fishing techniques, preservation & processing of fish and Fish pathology.

**CO-4:** To understand Fresh water prawn culture and Pearl culture, Pearl producing mollusks, pearl formation, collection of oysters, rearing of oysters, insertion of nucleus, harvesting of pearls, composition & quality of pearl.

**CO-5:** To understand the Technologies in Fisheries development: Recirculation technology, Geographic Information System (GIS) technology, passive Acoustics in fisheries, Use of Information Communication Technology (ICT) in fishes: production aspects, marketing aspects.

### **Zool. – 420: NEUROBIOLOGY (CORE)**

**CO-1:** Understand the structure of brain and improved methods to study it.

**CO-2:** Develop treatments for neurodegenerative diseases (such as Alzheimer's and Parkinson's diseases) and mental illnesses.

**CO-3:** Understand the structure of different lobes of the brain and their corresponding functions.

**CO-4:** Understand intricacies of nerve impulse conduction.

### **Zool. – 421 : MARINE BIOLOGY (Elective)**

**CO-1:** A student will collaboratively and independently.

**CO-2:** Use basic ecosystem principles, identify and understand the biology of various marine phyla to characterize marine habitats.

**CO-3:** Use scientific techniques to quantitatively describe parameters of marine habitats and understand the relationship of physical parameters to distribution of biota.

**CO-4:** Use an understanding of research, laboratory and/or field experiences to organize data to illustrate and articulate basic ecological principles.

**CO-5:** Use critical thinking to evaluate human impacts on marine ecosystems and consider how local consumer and policy decisions can be informed by an understanding of the interconnectedness of marine habitats and the critical relationship of the sea to human cultures.

### **Zool. – 422 : WILDLIFE BIOLOGY & ANIMAL BEHAVIOUR (Elective)**

**CO-1:** Develop an understanding of how animals interact with each other and their natural environment

**CO-2:** Develop the ability to use the fundamental principles of wildlife ecology to solve local, regional and national conservation and management issues

**CO-3:** Develop the ability to work collaboratively on team-based projects

**CO-4:** Demonstrate proficiency in the writing, speaking, and critical thinking skills needed to become a wildlife technician

**CO-5:** Gain an appreciation for the modern scope of scientific inquiry in the field of wildlife conservation management

**CO-6:** Develop an ability to analyze, present and interpret wildlife conservation management information.

**Zool – 423: ENDOCRINOLOGY & REPRODUCTIVE PHYSIOLOGY (Elective)**

**CO-1:** Learn about hypothalamo and hypophysial axis.

**CO-2:** Understand about different endocrine glands and their disorders.

**CO-3:** Understand the mechanism of hormone action.

**CO-4:** To understand Reproductive organ: male and female gonads, duct systems and sex accessories, external sexual dimorphisms

**CO-5:** Understand the Reproductive patterns: Environmental factors and breeding, continuous and seasonal breeders.

**CO-6:** Understand the Sexual cycles: puberty, oestrous and menstrual cycles. Ovarian event: follicular phase, cycling of non-pregnant uterus and vagina.

**CO-7:** Know how sexually transmitted diseases may contribute to altered neonatal or reproductive function.

**CO-8:** Critically assess relevant scientific literature in Human Reproductive Biology and present their argument in oral and written work.

## **Course Outcomes of M. Phil. Zoology**

**101:**

**Zool-**

### **METHODS IN ECOLOGY & ENVIRONMENT (Core)**

- CO-1:** Develop understanding on the concept and issues of global environmental change.
- CO-2:** Analyse the causes and effects of depletion of stratospheric ozone layer.
- CO-3:** Examine the climate change and its effect on living beings.
- CO-4:** Understand the physical basis of natural green gashouse effect on man and materials.
- CO-5:** Evaluate human influenced driver of our climate system and its applications.
- CO-6:** Know the biotic and abiotic components of ecosystem.
- CO-7:** Food chain & food web in ecosystem.
- CO-8:** Understand diversity among various groups of animal kingdom.
- CO-9:** Understand Animal community & ecological adaptation in animals.
- CO-10:** Scope, importance and management of biodiversity.
- CO-11:** Engage in field-based research activities to understand well the theoretical aspects taught besides learning techniques for gathering data in the field.
- CO-12:** Analyse a biological problem, derive testable hypotheses and then design experiments and put the tests into practice.
- CO-13:** Solve the environmental problems involving interaction of humans and natural systems at local or global level.

### **Zool-202 : PHYSIOLOGY**

- CO-1:** Understand the Importance of physiology and branches of it.
- CO-2:** Understand the terms-Osmosis, diffusion, pH and Buffer.
- CO-3:** Understand the Digestion and Excretion process, by studying the organs of it.
- CO-4:** Understand the process of Metabolism.
- CO-5:** Understand the term Detoxification.
- CO-6:** Understand the Circulatory system and Lymphatic system.
- CO-7:** Study the nervous system.
- CO-8:** Understand the process of vision and hearing.
- CO-9:** Understand the process of muscle contraction.

### **Zool - 203: WILDLIFE & CONSERVATION (Elective)**

- CO-1:** Develop an understanding of how animals interact with each other and their natural environment
- CO-2:** Develop the ability to use the fundamental principles of wildlife ecology to solve local, regional and national conservation and management issues
- CO-3:** Develop the ability to work collaboratively on team-based projects
- CO-4:** Demonstrate proficiency in the writing, speaking, and critical thinking skills needed to become a wildlife technician
- CO-5:** Gain an appreciation for the modern scope of scientific inquiry in the field of wildlife conservation management
- CO-6:** Develop an ability to analyze, present and interpret wildlife conservation management information.

## **Course Outcomes of M. Sc. Biotechnology**

**BT**

**101:**

### **MICROBIOLOGY [CORE]**

**CO1:** To learn different microbial staining techniques, growth curve of bacteria and understand common nutrient requirement and media for growth of microorganisms.

**CO2:** To understand pathogenicity, virulence factors of microorganisms get knowledge of medical microbiology

**CO3:** To learn about recombination gene technology, gene targeting techniques and basic knowledge of different type of mutation

**CO4:** To identify with classification virus and understand general features of plant and animal virus as well as lytic and lysogeny cycle of virus

**CO5:** To understand types of antimicrobial agent and classes of antibiotic, antifungal, antiprotozoans antibiotics

### **BT 102: ENZYME TECHNOLOGY**

**CO1:** Introduction, nomenclature and classification of enzymes

**CO2:** Enzyme kinetics and mechanism of action of enzymes

**CO3:** Enzyme technology: immobilization of enzymes, commercial production of enzymes, enzyme engineering, design and construction of novel enzymes.

**CO4:** Application of enzymes in medicine (therapeutic enzymes, enzymes as analytical reagents), drug synthesis and biosensors.

### **BT 103: MOLECULAR BIOLOGY**

After successful completion of the course student will be able to understand

**CO1:** Central dogma of biology, C-value paradox, multigene families and genomic organization in prokaryotes eukaryotes and Archeobacteria

**CO2:** Mechanism of replication (synthesis of DNA), Causes and consequences of DNA damage and Mechanism and significance of DNA damage repair

**CO3:** Mechanism of transcription (synthesis of RNA) ,Control and regulation of gene expression at transcription level

**CO4:** Mechanism of translation (synthesis of proteins), post translational modifications

**CO5:** learn about Regulations and gene expression in prokaryotes and eukaryotes using operon concept.

### **BT 104: BIOCHEMISTRY [MULTI / INTER-DISCIPLINARY]**

After successful completion of the course student will be able to understand

**CO1:** Classification and structural properties of carbohydrates and lipids, glycoproteins and glycolipids and proteoglycans their significance in biological systems.

**CO2:** Structure and Classifications of amino acids and protein based on different criteria, Ramachandran plot and fibrous and globular protein.

**CO3:** Structure and conformations of nucleic acids, Physical property of DNA, Genomic and organellar DNA in eukaryotes

**CO4:** Nitrogen acquisition and assimilation, photosynthesis and respiration and electron transport chain .

**CO5:** Glycolytic pathways, Citric acid cycle, HMP Shunt, glyoxylate pathway, Oxidative deamination, Urea cycle and Oxidation of fatty acids.

### **BT 206: MOLECULAR CELL BIOLOGY**

After successful completion of the course student will be able to understand.....

**CO1:** Overview of cell cycle, its components, control, check points, also learn about cell signaling and molecular basis of signal transduction.

**CO2:** Mechanisms of apoptosis and necrosis and regulating factors

**CO3:** Structure of microtubules, cilia, flagella and intermediate filaments, also learn about cell behavior.

**CO4:** Fertilization, Post fertilization, In vitro fertilization and role of different protein in fertilization.

**CO5:** Genetic basis of cancer, Oncogene , Viral oncogene , techniques used in cancer research and cancer treatment.

### **BT 207: IMMUNOLOGY**

After successful completion of the course student will be able to understand.....

**CO1:** Introduction, history and scope of Immunology ,Cells, organs and molecules of immune system

**CO2:** Nature and biology of antigens. Structure and function of antibodies. Kinetics of antigen and antibody interaction and immunological techniques.

**CO3:** B lymphocyte AND T lymphocyte development and activation , also learn about generation of immunological diversity.

**CO4:** MHC molecules its gene and organization , MHC restriction and tolerance.

**CO5:** Immunity to infectious agents, autoimmunity, hypersensitivity, transplantation, tumor immunology, vaccination ,Hybridoma technology and production of monoclonal antibody

### **BT 208: MOLECULAR BIOTECHNOLOGY-I**

After successful completion of the course student will be able to understand.....

**CO1:** recombinant DNA technology, Dna modifying enzyme and restriction mapping

**CO2:** Various gene cloning vectors like plasmid,cosmid,BAC, YAC,Shuttle vector, Expression vector

**CO3:** Genomic libraries preparations, probe preparations , in vitro phage packaging, positional cloning and chromosomal walking.

**CO4:** Various screening techniques to analyzed recombinant and also learn about Microarray techniques

**CO5:** Nucleic acid synthesis and sequencing, methods of gene regulations, DNA markers and applications of genetic engineering.

### **BT 209: BIOSTATISTICS & ANALYTICAL TECHNIQUES**

After successful completion of the course student will be able to understand.....

**CO1:** Diagrammatic, graphical and tabular representations of data ,Measures of central tendency, dispersion, Regression and correlation ,Basic concepts of hypothesis testing, Level of significance

**CO2:** Radio isotops, it's properties and applications, also learn about light and electron microscopy.

**CO3:** Various types of spectroscopy and its applications

**CO4:** Various types of chromatography, centrifugation, Gel electrophoresis .

### **BT 311: FERMENTATION TECHNOLOGY [CORE-I]**

**CO1:** Students will get knowledge of basic techniques like media formulation, sterilization, strain isolation and improvement, which are mandates of development of any fermentation process.

**CO2:** Students will gain knowledge of parameters related to fermenter designs, and the accessories used in the design of a fermenter, to troubleshoot problems associated with various fermentation processes.

**CO3:** students will get acquainted to the fermentation economics and how to design processes accordingly.

**CO4:** students will attain information on already well-established fermentation processes in the industry and the current approaches for the improvisation in them.

**CO5:** students will also have insight in the fundamentals of food processing and the advancements in that industry. In addition to that they too have been exposed to the modern approaches of the food and nutraceuticals.

### **BT 312: MOLECULAR BIOTECHNOLOGY-II [CORE-II]**

**CO1:** Students will get information regarding the methods used in gene detection and detection of expressed gene products; as well as they will get knowledge of protein sequencing approaches.

**CO2:** Students will attain the knowledge of modern approaches used to study DNA-Protein interactions and Protein-Protein interactions and the advancements in them.

**CO3:** Students will gain knowledge about various Reporter/Marker genes and their use in expression studies of gene of interest.



CO4: Students will be familiarized to the protein folding strategies used to get the information on the correct protein folding in Vivo. And the approaches used to attain the same in Vitro.

CO5: exposure to the strategies and concepts of protein engineering, Drug targeting and Drug designing using various case studies.

### **BT 313: BIOINFORMATICS [CORE-III]**

CO1: Students will be exposed to the fundamentals to make them used to with the terms of computer science and to develop computational approach in them. Further leading them to the emergence of the Bioinformatics and the recent status of the same.

CO2: students will get used to with the biological databases, types of databases, organization, Data retrieval systems used by various databases and searching the correct database to obtain the desired results. Students will also learn about the tools and algorithms used to furnish the retrieved data to extract the useful information from them and to interpret.

CO3: Students will be exposed to the modern day “Omics” approaches and the relevant terminologies

### **BT 314: ENVIRONMENTAL BIOTECHNOLOGY [ELECTIVE I]**

CO1: Students will learn to count on the biological/ renewable resources and sustainable approaches in various fields like agriculture, energy production and recycling of the waste material.

CO2: Approach will be developed to conserve the non-renewable resources and the environment, and to think about more and more use of biological/renewable, non-hazardous resources.

CO3: Students will be exposed to the approaches of the production and post-production processing using the biological material so as to lessen the burden of the pollutants generated by the industrial processes.

### **BT 315: CELL CULTURE [ELECTIVE II]**

CO1: students will learn about plant and animal cell culturing methods, and the techniques to get improvised cell lines of the eukaryotes and their maintenance.

CO2: Students will have insight in the field of modern therapeutics using the stem cell lines in treatment of various diseases, and the potential of stem cells and gene therapy

CO3: Students will have the knowledge regarding the recombinant products produced by the genetically manipulated eukaryotic organisms to benefit the human health

### **BT 316: FOOD BIOTECHNOLOGY [Elective-III]**

The student will have knowledge on the role of various microorganisms associated with different foods.

The student will have knowledge on the presence of pathogenic and spoilage microorganisms associated with different foods.

The student will have specific knowledge on microorganisms in different raw materials and the health risk of food borne infections and intoxications.

The student will understand how microorganisms grow, and can be used in a positive manner and also controlled in foods.

The student will understand how to use qualitative and quantitative analysis of microorganisms based on theory as well as practical work. The student will have knowledge on physical, chemical and microbiological methods to control both quality and health risks in foods.

### **BT 418: MOLECULAR PHYLOGENY AND EXTREMOPHILES [CORE]**

describe evolutionary process at the molecular level, apply molecular methods to study genetic variation within and between species, and explain and justify different models of sequence evolution

discriminate between Pros and Cons of the cultivable and non-cultivable approaches to study the microorganisms and establishment of the concept of actual evolutionary relationship of the microbes

understanding the extreme environments and the adaptations in the organisms and the usefulness of such products in day to day human life.

### **BT – 419: SOCIO-ECONOMIC ASPECTS & IPR [ELECTIVE-1]**

Awareness about conservation of the biological diversity and the global efforts made for the same

Impact of genetically engineered products on biodiversity, ecosystems and on human life

Social concern about the use of GMOs and awareness towards the biosafety laws.

Awareness toward the IPR laws

Awareness about Rights of patenting the biological material.

### **BT 420: PHARMACEUTICAL BIOTECHNOLOGY [Elective II]**

Students will understand the various techniques used in modern biotechnology.

Students can able to provide examples of current applications of biotechnology and advances in the different areas like medical science

Students can explain the concept and application of monoclonal antibody technology

Students can demonstrate and Provide examples on how to use microbes and mammalian cells for the production of pharmaceutical products

### **BT – 421: AGRICULTURE BIOTECHNOLOGY [Elective – III]**

Recall the basic concepts of Biotechnology and explain fundamental cellular events during the process of plant cell culture development

Determine the factors influencing plant cell differentiation and thereby execute proper techniques/ procedures for the maintenance of sterile condition and proper plant growth

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

describe methods for obtaining and application of genetically modified plants

explain the application of plants as bioreactors for the production of vaccines and therapeutic proteins

demonstrate critical knowledge in problem solving within an interdisciplinary context of biotechnological production of secondary metabolites and recombinant proteins using plant cell technology

## **Course Outcomes of M.Phil. Management**

### **Paper No. 12101: Research Methodology**

To equip the students with the basic understanding of the research methodology and to provide an insight into the application of modern analytical tools and techniques for the purpose of management decision making.

The Course also helps to instill discrimination in using research appropriately and effectively.

### **Paper No. 12102: Strategic Management**

The objective of this course is to give an understanding about importance of strategic management in a dynamic environment for business.

It helps students to learn about different strategy options, appropriate selection and effective implementation and control.

### **Paper No. 12103: Advances in Management**

The objectives of this course to provide contemporary knowledge in the functional area of management.

After learning of this course student can develop their research aptitude in contemporary areas of management.

## **Course Outcomes of M.Phil. Management**

### **PRINCIPLES OF MANAGEMENT**

#### **COURSE OUTCOMES**

- The objectives of this paper are to familiarize the student with basic management concepts and processes in the organization.

### **ACCOUNTING FOR MANAGERS**

#### **COURSE OUTCOMES**

- The basic purpose of this course is to develop an insight of postulates, principles and techniques of accounting and utilization of financial and accounting information for planning decision-making and control.

### **MANAGEMENT INFORMATION SYSTEMS**

#### **COURSE OUTCOMES**

- To develop basic understanding about Information Systems, its development and role in Organization at various levels and gain insight into e-commerce.

### **FUNDAMENTALS OF BANKING & INSURANCE**

#### **COURSE OUTCOMES**

- The objective of the course is to familiarize the students with the basic practices of banks, methods of mobilization of resources in banks and also initiate to principles of insurance.

### **MANAGERIAL COMMUNICATION – SEMINAR COURSE**

#### **COURSE OUTCOMES**

- The course is aimed at equipping the students with the necessary Skills and Techniques of Communication that are useful in developing skills of communicating effectively.

### **MARKETING MANAGEMENT**

#### **COURSE OUTCOMES**

- The purpose of this course is to develop an understanding of the underlying concepts, strategies and issues involved in the marketing of products and services.

### **FINANCIAL MANAGEMENT**

#### **COURSE OUTCOMES**

- The purpose of this course is to acquaint the students with the broad framework of financial decision-making in a business unit.

### **ECONOMICS AND ENVIRONMENT FOR BUSINESS**

#### **COURSE OUTCOMES**

- To acquaint the participants with concepts and techniques used in Micro-Economic theory and to enable them to apply this knowledge in business decision making and to create understanding about environment of business and to acquaint the students with emerging trends in business environment.

### **BANKING OPERATIONS MANAGEMENT**

#### **COURSE OUTCOMES**

- To familiarize students about banking operations relating to allowing loans & advances as also investment of surplus funds.

### **HUMAN RESOURCE MANAGEMENT –SEMINAR COURSE**

#### **COURSE OUTCOMES**

- The Objective of this course is to sensitize students to the various facets of managing people and to create an understanding of the various policies and practices of human resource management.

#### **COURSE OUTCOMES**

## **ORGANISATION BEHAVIOUR**

- To familiarize the students with basic organisation process to bring about organisational behaviour. Develop ability to observe, understand and analyse the behaviour within the organisation.
- Helpful in developing basic skills to deal with the ongoing behavioural dynamics and contribute to organisational effectiveness.

## **OPERATIONS MANAGEMENT**

### **OUTCOMES**

- The Course is designed to acquaint the students with decision making in: Planning, schedule and control of Production and Operation functions in both manufacturing and service organization.

## **BASICS OF QUANTITATIVE TECHNIQUES & OPERATION RESEARCH**

### **COURSE OUTCOMES**

- The objective of the course is to make the students familiar with basic Knowledge of QT & OR. The main focus is on its application in business decision-making.

## **LEGAL & REGULATORY ASPECTS OF BANKING AND MICROFINANCE**

### **COURSE OUTCOMES**

- To provide the students basic understanding of legal framework that is formulated for regulation as well as proper functioning of banks – Important role of banks contains endeavouring for financing small entrepreneurs and generate employment in the Country – Study of activities relating to microfinance will make the students understand how banks are doing this type of business.

## **CONSUMER BEHAVIOUR Seminar Course**

### **COURSE OUTCOMES**

- The basic objective of this course is to develop and understanding about the Decision-making process and its applications in marketing function of firms.

## **INDIAN FINANCIAL SYSTEM**

### **COURSE OUTCOMES**

- The main objectives of this course are to help to learn the various financial services and their role in the overall financial system.

## **BUSINESS RESEARCH**

### **COURSE OUTCOMES**

- To equip the students with the basic understanding of the research methodology and to provide an insight into the application of modern analytical tools and techniques for the purpose of management decision making.
- The Course also helps to instill discrimination in using research appropriately and effectively.

## **STRATEGIC MANAGEMENT**

### **COURSE OUTCOMES**

- The objective of this course is to give an understanding about importance of strategic management in a dynamic environment for business.
- It helps students to learn about different strategy options, appropriate selection and effective implementation and control.

## **LEVERAGING TECHNOLOGY & BASICS OF INTERNATIONAL BANKING**

### **COURSE OUTCOMES**

- Students will learn how the banking services are provided with the help of modern technology – Students will also understand basics of international banking and financing of foreign trade.

## **RISK MANAGEMENT**

### **COURSE OUTCOMES**

- The objective of this course is to provide in depth knowledge about the Risk management in financial matters and develop hedging skill among the students.

## **CUSTOMER RELATIONSHIP MANAGEMENT IN BANKING & INSURANCE**



### **COURSE OUTCOMES**

- To help students understand the concept and practice of CRM and applications across Businesses and to give students ability to develop and manage CRM projects.

## **COMPREHENSIVE PROJECT REPORT**

### **COURSE OUTCOMES**

- The objective of this course is to prepare the student to conduct a research study on Banking Industry or the industry where the candidate is working using the tools and techniques learned in the two years of study.
- The focus of study could be in depth analysis of an industry or a diagnostic problem solving exercise of an organization.
- The student is expected to conduct a detailed survey of literature. In case of a status report of an industry, it is expected that the student collects all aspects related to a particular industry analyze data and present the findings.

## **Course Outcomes of M.B.A. Management**

### **PRINCIPLES OF MANAGEMENT**

- The objectives of this paper are to familiarize the student with basic management concepts and processes in the organization.

### **QUANTITATIVE TECHNIQUES IN MANAGEMENT**

#### **COURSE OUTCOMES**

- The objective of the course is to make the students familiar with few basic mathematical and linear programming techniques. The main focus is on its application in business decision-making.

### **ECONOMICS AND ENVIRONMENT FOR BUSINESS**

#### **COURSE OUTCOMES**

- To acquaint the participants with concepts and techniques used in Micro-Economic theory and to enable them to apply this knowledge in business decision making and to create understanding about environment of business and to acquaint the students with emerging trends in business environment.

### **MANAGEMENT INFORMATION SYSTEMS**

#### **COURSE OUTCOMES**

- To develop basic understanding about Information Systems, its development and role in Organization at various levels and gain insight into e-commerce.

### **ACCOUNTING FOR MANAGERS**

#### **COURSE OUTCOMES**

- The basic purpose of this course is to develop an insight of postulates, principles and techniques of accounting and utilization of financial and accounting information for planning decision-making and control.

### **MANAGERIAL COMMUNICATION**

#### **COURSE OUTCOMES**

- The course is aimed at equipping the students with the necessary Skills and Techniques of Communication that are useful in developing skills of communicating effectively.

### **CASE PEDAGOGY IN MANAGEMENT**

#### **COURSE OUTCOMES**

- The basic objective of this course is to provide the knowledge of case and its importance in management education.

### **CONTEMPORARY ISSUES IN MANAGEMENT - I**

#### **COURSE OUTCOMES**

- The objective of the course is to create awareness among the students towards the various contemporary issues in management and develop self-learning skills.

### **ORGANISATIONAL BEHAVIOUR**

#### **COURSE OUTCOMES**

- To familiarize the students with basic organisation process to bring about organisational behaviour. Develop ability to observe, understand and analyse the behaviour within the organisation.
- Helpful in developing basic skills to deal with the ongoing behavioural dynamics and contribute to organisational effectiveness.

### **MARKETING MANAGEMENT**

#### **COURSE OUTCOMES**

- The purpose of this course is to develop an understanding of the underlying concepts, strategies and issues involved in the marketing of products and services.

### **FINANCIAL MANAGEMENT**

#### **COURSE OUTCOMES**

- The purpose of this course is to acquaint the students with the broad framework of financial decision-making in a business unit.

### **HUMAN RESOURCE MANAGEMENT**

#### **COURSE OUTCOMES**

- The Objective of this course is to sensitize students to the various facets of managing people and to create an understanding of the various policies and practices of human resource management.

### **OPERATIONS MANAGEMENT**

#### **COURSE OUTCOMES**

- The Course is designed to acquaint the students with decision making in: Planning, schedule and control of Production and Operation functions in both manufacturing and service organization.

### **COST AND MANAGEMENT ACCOUNTING**

#### **COURSE OUTCOMES**

- The objective of this course is to acquaint students with various concepts of costing and highlight the decision-making and control focus of managerial accounting.
- Simple to gradually difficult case situations are taken up to illustrate concepts to the students.

### **RESEARCH METHODOLOGY**

#### **COURSE OUTCOMES**

- To equip the students with the basic understanding of the research methodology and to provide an insight into the application of modern analytical tools and techniques for the purpose of management decision making.
- The Course also helps to instill discrimination in using research appropriately and effectively.

### **CONTEMPORARY ISSUES IN MANAGEMENT - II**

### **COURSE OUTCOMES**

- The objective of the course is to create awareness among the students towards the various contemporary issues in management and develop self-learning skills.

## **STRATEGIC MANAGEMENT**

### **COURSE OUTCOMES**

- The objective of this course is to give an understanding about importance of strategic management in a dynamic environment for business.
- It helps students to learn about different strategy options, appropriate selection and effective implementation and control.

## **BUSINESS ETHICS AND CORPORATE GOVERNANCE**

### **COURSE OUTCOMES**

- To create understanding about need for the business ethics in recent time for the sustainability of business in long run and developing a mindset of students for the ethical decision making.
- It also enables students to understand the importance of transparent business practices through corporate governance.

## **MANAGEMENT OF NEW AND SMALL ENTERPRISES**

### **COURSE OUTCOMES**

- The purpose of this course is to generate a new breed of entrepreneurs on an ongoing basis.
- This course will create in them the necessary knowledge, attitudes, skills and competence to start and manage a new and small enterprise.
- It will also train them to be innovative in creating and managing business units started by them and manage change.

## **SUMMER TRAINING PROJECT**

### **COURSE OUTCOMES**

- Acquire on job the skills, knowledge, attitudes, and perceptions along with the experience needed to constitute a professional identity.
- Get actual supervised professional experiences.
- Get insight into the working of the real organizations
- Develop perspective about business organizations in their totality.
- Explore career opportunities in their areas of interest.
- Devolve research aptitude

## **CONSUMER BEHAVIOUR**

### **COURSE OUTCOMES**

- The basic objective of this course is to develop and understanding about the Decision-making process and its applications in marketing function of firms.

## **SERVICES AND RELATIONSHIP MARKETING**

### **COURSE OUTCOMES**

- The basic purpose of this course is to provide knowledge of service marketing and its structure.

## **FINANCIAL DECISION ANALYSIS & CORPORATE RESTRUCTURING**

### **COURSE OUTCOMES**

- The basic objective of this course is to impart an intensive knowledge about the use of Quantitative techniques in specified financial decision making areas and acquainted with corporate restructuring process.

## **SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT**

### **COURSE OUTCOMES**

- The objective of this course is to impart knowledge to students regarding the theory and practice of Security Analysis and Portfolio Management Decision Making Process.

## **STRATEGIC HUMAN RESOURCE MANAGEMENT**

#### **COURSE OUTCOMES**

- The objective of this paper is to develop a conceptual as well as a practical understanding of Strategic Human Resource System in an organization.

### **HUMAN RESOURCE DEVELOPMENT**

#### **COURSE OUTCOMES**

- The purpose of this paper is to provide an in-depth understanding of the role of training in the HRD, and to enable the course participants to manage the training system and processes

### **DATABASE MANAGEMENT**

#### **COURSE OUTCOMES**

- The students are to be provided basic understanding of the RDBMS & SQL and the skills to these in business organizations.

### **TECHNOLOGY & BUSINESS**

#### **COURSE OUTCOMES**

- To understand the use of technology to design and structure the organization and identifying information and use of technology for Business Initiatives.

### **INTERNATIONAL BUSINESS**

#### **COURSE OUTCOMES**

- The objective of this paper is to provide an overview of the international business environment to the student of management.

### **LEGAL ASPECTS OF BUSINESS**

### **COURSE OUTCOMES**

- The objective of this paper is to make the students aware of legal aspects of business in relevant areas and acquire the knowledge of latest Companies Act. .

## **COMPREHENSIVE PROJECT STUDY**

### **COURSE OUTCOMES**

- The objective of this course is to prepare the student to conduct a research study of an Industry / Organization utilizing the tools and techniques learned in the two years of study.
- The focus of study could be in depth analysis of an industry or a diagnostic problem solving exercise of an organization.
- The student is expected to conduct a detailed survey of literature.
- In case of a status report of an industry, it is expected that the student collects all aspects related to a particular industry analyze data and present the findings.

## **INTEGRATED MARKETING COMMUNICATION**

### **COURSE OUTCOMES**

- To acquaint the students with concepts and techniques used in designing marketing communication.

## **RETAILING MANAGEMENT**

### **COURSE OUTCOMES**

- This course will familiarize students with concepts and practices of retailing and retail marketing and will give them in depth understanding of various aspects of Retail Marketing.

## **INDIAN FINANCIAL SYSTEM**

### **COURSE OUTCOMES**

- The main objectives of this course are to help to learn the various financial services and their role in the overall financial system.

## **RISK MANAGEMENT**



#### **COURSE OUTCOMES**

- The objective of this course is to provide in depth knowledge about the Risk management in financial matters and develop hedging skill among the students.

### **INTERNATIONAL HUMAN RESOURCE MANAGEMENT**

#### **COURSE OUTCOMES**

- The purpose of this paper is to provide an understanding of the ways to deal with international human resource.

### **MANAGEMENT OF INDUSTRIAL RELATIONS**

#### **COURSE OUTCOMES**

- The purpose of this paper is to provide an understanding of the ways to deal with international human resource.

### **STRATEGIC INFORMATION TECHNOLOGY MANAGEMENT**

#### **COURSE OUTCOMES**

- This course is aimed at developing an understanding of Use of Information Technology as a strategic tool for business management.
- The course focuses on development of Information Technology Leadership.

### **BUSINESS PROCESS RE-ENGINEERING**

#### **COURSE OUTCOMES**

- To understand the objectives and need of reengineering the business processes and positive outcomes of it.

## Course Outcomes of M.Sc. Chemistry

### **C-101:**

#### **INORGANIC CHEMISTRY**

- CO1: Understand structure determination, bonding, and geometry of compound.
- CO2: Know of Inorganic reagent and their role in reaction and synthesis of inorganic compounds.
- CO3: The Knowledge of inorganic spectroscopy such as Mossbauer, ESR, symmetry of structure etc. and their applications in understanding the different inorganic complexes.
- CO4: Student also familiar with knowledge of bio inorganic chemistry, nanomaterial and synthesis and their functionality in the field of inorganic chemistry.

### **C-102: ORGANIC CHEMISTRY**

- COs1: Student will be able to generalize the basic concept of organic chemistry, reaction intermediate and reaction pathway.
- COs2: Understanding of Organic reaction, rearrangement and cross-coupling reaction with their mechanism and application. Preparation and use of reagent in organic synthesis.

### **C-103: PHYSICAL CHEMISTRY**

- COs1: students will have fundamental knowledge about different types of solutions. Further, it will be easy for them to understand various processes occurring in solutions
- COs2: Students will also have knowledge about different electrochemical reactions and different types of cells.

### **C-104: ANALYTICAL CHEMISTRY**

- COs1: The learners should be able to: Solve problems based on various analytical concepts.
- COs2: Sophisticated instrument procedures.
- COs3: Quantify analysis with proper data handling and analysis.

### **C-201: INORGANIC CHEMISTRY**

- COs1: Understanding of organometallic type of compound and their synthesis and industrial application
- COs2: Concept of Bioinorganic chemistry is metal ion in body with functioning, metabolic reaction, biological energy transformation system and also bioactive compounds.
- COs3: Ion-exchange chromatography for industrial application as well as working as catalyst and purification processes for inorganic as well as organic compound.

### **C-202: ORGANIC CHEMISTRY**

- COs1: Student will be able to Recognize and comment of Photo-chemical reaction.
- COs2: Advance concept of Pericyclic reaction
- COs3: Understood the aromatic, non-aromatic and anti-aromatic behaviour of compounds.

### **C-203: MACROMOLECULAR PHYSICAL CHEMISTRY**

- COs1: Students will be able to understand the basics of polymer chemistry, types of polymers and polymerization.
- COs2: Various methods for the purification will help to isolate the synthesized polymers.
- COs3: knowledge will help students to understand the application of polymers which is of prime importance in different industries.

### **C-204: ANALYTICAL CHEMISTRY**

- COs1: The fundamental knowledge about the innovative approaches for designing of safer chemical products, processes and use of renewable resources for sustainable development.
- COs2: Students should be in a position to used analytical data in chemical sciences.
- COs3: Students understanding the principles of water and air analysis.

### **C(PM)-301: ADVANCE CHROMATOGRAPHIC TECHNIQUES**

- COs1: Student will be Capable to understand the range and theories of instrumental methods available for separation.
- COs2: Able to select appropriate techniques for the separation of complex mixture into their individual components.
- COs3: Expand skills in the scientific methods of planning, developing, conducting, reviewing techniques for separation and identification of compound in complex mixture.

### **C(PM)-302: ELECTRO ANALYTICAL TECHNIQUES**

- COs1: Student will be Capable to understand the range and theories of instrumental methods available for separation.
- COs2: Able to select appropriate techniques for the separation of complex mixture into their individual components.
- COs3: Expand skills in the scientific methods of planning, developing, conducting, reviewing techniques for separation and identification of compound in complex mixture.

### **C (PM)-303: MACROMOLECULER PHYSICAL CHEMISTRY-II**

- COs1: Students to purify the synthesized polymers and to determine their molecular weights by different methods.
- COs2: Students will be able to process polymers by different techniques.
- COs3: The knowledge of composite helps to use them in different fields.

### **C (PM) - 304: NUCLEAR AND RADIO CHEMISTRY ELECTIVE-I**

- COs1: Students to understand the structure of nucleus and their properties.
- COs2: The concept of radioactivity, their types, detection and measurement will help to use different radioisotopes in different fields.
- COs3: Further, student will understand various different nuclear reactions.

### **(PM)-304: ELECTROCHEMISTRY ELECTIVE-II**

- COs1: Students to understand the concept of electrochemistry, various theories.
- COs2: Students will be able to determine various parameters / properties using different techniques, the knowledge of which helps them to use in different fields

### **PHYSICAL AND MATERIALS CHEMISTRY**

#### **C(PM)-305: PRACTICALS**

- COs1: The knowledge will help students to develop skill to determine physicochemical properties of different compounds and for the synthesis of different polymers.
- COs2: To study various physicochemical properties by different methods and synthesis of different polymers by different types of polymerization.

#### **C(PM)-401: ADVANCE SPECTROSCOPIC TECHNIQUES**

- COs1: learners should be able to: Apply NMR, IR, MS, UV-Vis spectroscopic techniques in solving structure of organic molecules
- COs2: To determination of stereochemistry of unknown molecules.
- COs3: Interpret the above spectroscopic data of unknown compounds.
- COs4: Use these spectroscopic techniques in their research.

#### **C(PM)-402: INSTRUMENTAL TECHNIQUES**

- COs1: Students with the advanced technical skills and knowledge base that is required in the field.
- COs2: Apply the conceptual understanding of the principles and implementation modes of advance instrumental technique.

### **C (PM)-403: CHEMISTRY OF MATERIALS-I**

- COs1: To study different type of materials, their types, synthesis and applications, basics of some analysis related to biological properties of compounds, solar and fuel cells, ultrasonic technique and their applications.
- COs2: Knowledge of different materials will help student to understand their properties and uses in different fields.
- COs3: The knowledge of theories and different type of cells also help student to understand the significance of these modern approaches to older technology.

### **C(PM)-404: REACTION DYNAMICS AND MECHANISMS ELECTIVE-I**

- COs1: To understand the basics of kinetics of fast reactions.
- COs2: Understanding of theories of reaction rates and reaction mechanisms.
- COs3: Knowledge of different types of reactions and catalysts used in reactions and their role in different reactions.
- COs4: student will acquire knowledge of different type of reactions, their mechanisms and theories.

### **C (PM) - 404: CHEMISTRY OF MATERIALS-II ELECTIVE-II**

- COs1: To study different materials, their properties and applications.
- COs2: Understanding of applications of different materials in different fields.
- COs3: Student will acquire knowledge of different type of materials and their applications.

### **C(PA)-301: ADVANCE CHROMATOGRAPHIC TECHNIQUES**

- COs1: student will be Capable to understand the range and theories of instrumental methods available for separation.
- COs2: Able to select appropriate techniques for the separation of complex mixture into their individual components.
- COs3: Expand skills in the scientific methods of planning, developing, conducting, reviewing techniques for separation and identification of compound in complex mixture.

### **C(PA)-302: ELECTRO ANALYTICAL TECHNIQUES**

- COs1: student will be Capable to understand the range and theories of instrumental methods available for separation.
- COs1: Should be able to: Write equations representing electrochemical cell, explain various over potential involved during the operation of the cell. Students can learn different types of electro-analytical techniques.
- COs2: Apply theories in electrochemistry to analyze electrode kinetics. Students should be able to understand principle instrumentation and application of various electro-analytical techniques.

### **303: ADAVANNCES IN ENVIRNOMENTAL CHEMISTRY**

- COs1: Student can learn different types of water Pollution and their effects on nature, physical & biological characteristics of water pollution, specific & non-specific characterization of water, typical water treatment & waste water treatment.
- COs2: Treatment of industrial pollution Treatment of Industrial wastes like electroplating industry, fertilizer industry and pharmaceuticals industries. Carbon and Nitrogen cycles on nature.
- COs3: The students will learn what is toxic, and most importantly, will become an expert on what we can do to find solutions to the challenges of toxic substances in the environment.

### **304: SELECTED TOPICS IN ANALYTICAL CHEMISTRY ELECTIVE-I**

- COs1: Students with the advanced technical skills and knowledge base that is required in the field of industrial product.

- COs2: Students in the area of different types of qualitative and quantitative analysis in various industrial product.
- COs3: To provide overview of the applications of these concepts in applied field.

#### **C(PA)-304: PATENT LAWS AND CASE STUDIES ELECTIVE-II**

- COs1: Student able to use various parameter of pharma regulatory affairs to make proper documentation as per standard protocol.
- COs2: To learn various topics like SOP, ICH guidelines, GMP, GLP, Calibration and validation used in pharma regulatory affairs.
- COs3: To translate certain theoretical concepts learnt earlier into experimental knowledge by providing hands on experience of basic laboratory techniques followed by ICH guidelines.

#### **C(PA)-401: ADVANCE SPECTROSCOPIC TECHNIQUES**

- COs1: the learners should be able to: Apply NMR, IR, MS, UV-Vis spectroscopic techniques in solving structure of organic molecules.
- COs2: To determination of stereochemistry of unknown molecules.
- COs3: Interpret the above spectroscopic data of unknown compounds.
- COs4: Use these spectroscopic techniques in their research.

#### **C(PA)-402: INSTRUMENTAL TECHNIQUES**

- COs1: Students with the advanced technical skills and knowledge base that is required in the field of instrumental analysis and which will enable them to pursue careers as analysts in the chemical and/or pharmaceutical industry.
- COs2: The learners should be able to apply the conceptual understanding of the principles and implementation modes of advance instrumental technique.

#### **C (PA)-403: PHARMA REGULATORY AFFAIRES**

- COs1: Student should be able to use various parameter of pharma regulatory affairs to make proper documentation as per standard protocol.
- COs2: To learn various topics like SOP, ICH guidelines, GMP, GLP, Calibration and validation used in pharma regulatory affairs.
- COs3: To translate certain theoretical concepts learnt earlier into experimental knowledge by providing hands on experience of basic laboratory techniques followed by ICH guidelines.

#### **404: APPLIED ANALYTICAL CHEMISTRY ELECTIVE-I**

- COs1: Students with the advance analytical techniques and knowledge base that is required in the field of analysis.
- COs2: Understand the essential concept used in various analytical technique.
- COs3: To study in detail the basic concept of classical and instrumental technique of analysis of various industrial product.

- COs4: To understand the principle of various analytical techniques.

#### **404: SELECTED TOPICS IN ANALYTICAL CHEMISTRY ELECTIVE-II**

- COs1: The learners should be able to identify the basic principles of analysis related to quality and quantity of the various substances.
- COs2: To provide basic understanding of the principles, instrumentation and application of chemical analysis techniques.

#### **405: PRACTICALS/ DISSERTATION**

- COs1: Students should be in a position to use standardized material to determine an unknown concentration.
- COs2: To gain experience with some statistics to analyse data in laboratory.
- COs3: Students should be in position to use different techniques for qualitative and quantitative estimation.

#### **C(OP)-301: ADVANCE CHROMATOGRAPHIC TECHNIQUES**

- COs1: Student will be Capable to understand the range and theories of instrumental methods available for separation.
- COs2: Able to select appropriate techniques for the separation of complex mixture into their individual components.
- COs3: Expand skills in the scientific methods of planning, developing, conducting, reviewing techniques for separation and identification of compound in complex mixture.

#### **C(OP)-302: ORGANIC SYNTHESIS-A DISCONNECTION APPROACH**

- COs1: The learners should be able to: Use various reagents and organic reactions in organic synthesis.
- COs2: Use retrosynthetic method for the logical dissection of complex organic molecules and devise synthetic methods.
- COs3: To learn various organic reactions and reagents used in them as tools applied in the art of organic synthesis. To learn retrosynthetic approach towards organic synthesis.

#### **C(OP)-303 : HETEROCYCLIC CHEMISTRY**

- COs1: The learners should be able to: Name and structure of heterocycles Design the route for synthesis of heterocyclic compounds.
- COs2: The application of reagents and other heterocycles for the synthesis of other heterocycles.
- COs3: To learn the synthetic strategies, stability and physico-chemical properties of heterocyclic compounds. The application of heterocyclic compounds in various fields.

#### **C(OP)-304 : CHEMISTRY OF NATURAL PRODUCTS ELECTIVE-I**

- COs1: the learners should be able to know the colour properties of chemicals. Structure of Chromophore and Auxochrome and dyeing process.
- COs2: Student learn preparation of dyes, Identify the structure of pigments
- COs3: To know the chemical properties and application of naturally occurring pigments. Unit operation for dyeing process.

### **C(OP)-304: SYNTHETIC DYES AND PIGMENTS**

#### **ELECTIVE-II**

- COs1: The learners should be able to know the complexity of the natural products.
- COs2: Design for the synthesis of natural products and their application.
- COs3: Student learns extraction and isolation of natural product.
- COs4: To know the chemical properties and application of naturally available compounds.

### **C(OP)-305: PRACTICALS**

- COs1: The learners should be able to know Safety point in Laboratory.
- COs2: Handle of Hazardous chemicals and precautions.
- COs3: General process for synthesis, characterization and identification of the products.
- COs4: Students; to know practical approach for the synthesis, optimization of reaction condition.
- COs5: Stoichiometric calculation for reagents, Separation of mixture and

### **C(OP)-401: ADVANCE SPECTROSCOPIC TECHNIQUES**

- COs1: To determination of stereochemistry of unknown molecules.
- COs2: Interpret the above spectroscopic data of unknown compounds.
- COs3: Use these spectroscopic techniques in their research.
- COs4: To learn basic principles of NMR, IR, UV-Vis spectroscopy and mass spectrometry

### **C(OP)-402: CHEMISTRY OF SYNTHETIC DRUGS**

- COs1: Recognize and comment on different synthetic strategies and methods for stereo control when faced with synthetic drugs.
- COs2: Understood different system of human body. Application of drug molecules.
- COs3: To understood the drug metabolism and its action in human body.
- COs4: To learn various nucleophilic, substitution and electrophilic reaction in organic chemistry for drug synthesis. To create an interest of students to learn medicinal chemistry.

### **C(OP)-403: STEREOCHEMISTRY**

- COs1: student will be able to generalize the concept of stereochemistry and reaction pathway.
- COs2: Describe the stereo chemical and conformational structure of molecules.
- COs3: Chemical reactivity and on the mechanism of organic reaction.
- COs4: students familiar with the basic concept of stereo chemistry, which will be used for further studies.



- COs5: Providing the knowledge and in depth understanding stereochemistry, its effect in synthesis, behavior of chiral compounds and properties.

### **C(OP)-404:ADVANCED STEREO CHEMISTRY**

#### **ELECTIVE-I**

- COs1: Student will be able to Generalize the concept of stereo-chemistry and reaction pathway.
- COs2: Describe the stereo chemical and conformational structure of molecules.
- COs3: Chemical reactivity and on the mechanism of organic reaction.
- COs4: Students familiar with the basic concept of stereo chemistry, which will be used for further studies.
- COs5: Providing the knowledge and in depth understanding stereochemistry, its effect in synthesis, behavior of chiral compounds and properties

### **C(OP)-404:ADVANCED MEDICINAL CHEMISTRY ELECTIVE-II**

- COs1: Understand Drug metabolism and mechanism pathway.
- COs2: Recognize and comment on different synthetic strategies and methods for stereocontrol when faced with synthetic drugs.
- COs3: Understood different system of human body. Application of drug molecules.
- COs4: To learn theories and principle related to medicinal chemistry.
- COs5: To learn various nucleophilic, substitution and electrophilic reaction in organic chemistry for drug synthesis.

### **C(OP)-405:PRACTICALS/DISSERTATION**

- COs1: Students should be able to learn how to select and defend a topic of their research, how to effectively plan, execute, evaluate and discuss their experiments.
- COs2: Students should be able to demonstrate considerable improvement in the following areas: In-depth knowledge of the chosen area of research.
- COs3: Competence in research design and planning.
- COs4: Capability to create, analyse and critically evaluate different technical solutions.
- COs5: Ability to conduct research independently. Ability to perform analytical techniques/ experimental methods.

### **C (I)-301: ADVANCE CHROMATOGRAPHIC TECHNIQUES**

- COs1: Student will be Capable to understand the range and theories of instrumental methods available for separation.
- COs2: Able to select appropriate techniques for the separation of complex mixture into their individual components.
- COs3: Expand skills in the scientific methods of planning, developing, conducting, reviewing techniques

for separation and identification of compound in complex mixture.

➤ COs4: To study in detail the fundamental aspects of various Separation experimental and instrumental methods in chemistry.

### **C (I)-302: MOLECULAR SYMMETRY AND GROUP THEORY**

➤ COs1: Symmetry and point group is essential part of inorganic chemistry for determination of molecular structure, stereochemistry of molecule, chemical bond determination, and isomerism.

➤ COs2: Strong field and weak field determination for co-ordination chemistry and practical application pHmetry and spectrophotometer and also for determination of energy of molecule.

➤ COs3: The fundamental and advanced concepts of molecular shape of molecule and symmetry, and symmetry element and operation as well as concept of group theory.

### **C (I)-303: ADVANCE BIOINORGANIC CHEMISTRY**

➤ COs1: Student teaches about metal ion role in human biological system of calcium channel and sodium channel pump.

➤ COs2: Metalloenzymes role in metabolic function with enzyme base process.

➤ COs3: Redox Metalloenzymes for cytochrome system and their role in photo synthesis process, and coordination compound and their function and their application in inorganic medicinal drugs for different medical

➤ COs4: Metal ion role in transportation and storage and metal base enzyme and their role in biological system. Photosynthesis process in plant.

➤ COs5: Coordination Compound and their role in medicinal field.

### **C (I)-304: ORGANOMETALLIC COMPOUNDS AND CATALYSIS**

#### **(ELECTIVE-I)**

➤ COs1: Introduction of organometallic type of compound and their synthesis and application in different field of chemical synthesis.

➤ COs2: Student learns catalyst synthesis and their type and industrial application and uses in hydroformylation reactions.

➤ COs3: Oxidative addition, reductive elimination, insertion and des-insertion reactions. And help full for new route of targeted and efficient synthesis with minimum time and maximum yield.

### **C (I)-304: SELECTED TOPICS IN INORGANIC CHEMISTRY**

### **(ELECTIVE-II)**

- COs1: Student learns about inorganic polymer and their synthesis and industrial application.
- COs2: Human body and metal base enzyme and their function.
- COs3: Organometallic Compounds in radiopharmaceuticals, tracers, ionphorse and sensors with application.

### **C (I)-305: PRACTICALS**

- COs1: Student learned about metal determination with percentage and composition with other metal with Quantitative, Qualitative Spectrophotometric analysis and water contain cations and anion and hardness of water.
- COs2: Introduction of different inorganic analysis procedure for metal and metal composition analysis by Quantitative and Qualitative as well as Spectrophotometric analysis method, water analysis of cations and Anion.

### **C (I)-401: ADVANCE SPECTROSCOPIC TECHNIQUES**

- COs1: Apply NMR, IR, MS, UV-Vis spectroscopic techniques in solving structure of organic molecules to determination of stereochemistry of unknown molecules.
- COs2: Interpret the above spectroscopic data of unknown compounds.
- COs3: Use these spectroscopic techniques in their research.

### **C (I)-402: INORGANIC SPECTROSCOPY**

- COs1: Student learned about spectral analysis of inorganic compound especially metal complexes. Application of Inorganic spectroscopy for determination of their structure.
- COs2: Inorganic spectroscopy is powerful tool for various analysis of metallic compound and their structure determination.

### **C (I)-403: BONDING IN COMPLEXES**

- COs1: Student learned about Crystal Field Theory (CFT) is a model for the bonding interaction between transition metals and ligands.
- COs2: The electrons in the d orbitals of the central metal ion and those in the ligand repel each other due

to repulsion between like charges.

- COs3: To impart concept of Crystal Field Theory.

#### **C (I)-404: COORDINATION CHEMISTRY ELECTIVE-I**

- COs1: Student learned about concept of Coordination Chemistry and Metal Ligands interaction their coordination and application of Coordination bonding to design and synthesis of new ligands and new metal complexes.
- COs2: Student learned about shape and some geometrical information by coordination chemistry and their application toward in industrial approach and some synthesis of catalyst.
- COs3: To impart knowledge of transition metal complexes and its application for synthetic area in inorganic and organic chemistry

#### **C (I)-404: CATALYSIS ELECTIVE-II**

- COs1: Student learned about concept of organometallic chemistry and their application in industrial approach and some synthesis of organic compound using organometallic compound as catalyst.
- COs2: To impart concepts in organometallic chemistry, and their application, and type of catalyst and catalysis process in chemistry synthesis of organic compound using organometallic complexes as catalyst.

#### **C (I)-405: PRACTICALS/DISSERTATION**

- COs1: Student learned about concept of inorganic qualitative analysis and synthetic approach for preparation of some inorganic compound and their separation by chromatographic technique and flame photometric determination and pH metry analysis for inorganic compound.
- COs2: To impart concepts of Qualitative analysis as well as Preparation of metal complexes and various chromatographic separation technique.

## **Course Outcomes of PGDSAIT**

### **SEMESTER-I**

#### **PGDI-101**

#### **BASIC CONCEPTS OF PHARMACEUTICAL AND CHEMICAL ANALYSIS**

##### **Course outcomes (COS)**

CO1: To know the fundamentals of analytical chemistry

CO2: To understand the theory and applications of basic laboratory instruments

CO3: Understanding and practices to volumetric and gravimetric analytical techniques.

#### **PGDI-102**

#### **SEPARATION SCIENCES AND HYPHENATED TECHNIQUES FOR PHARMACEUTICAL AND OTHER ANALYSIS**

##### **Course outcomes (COS)**

CO1: Understanding the fundamental principles theory and applications of chromatographic techniques.

CO2: Understanding the principles, theory and applications of suplicated chromatographic techniques.

CO3: Practices of this techniques in terms of practical's and problems

#### **PGDI-103**

#### **PRACTICALS**

##### **Course outcomes (COs):**

**CO1:** Understanding the theory by performing the particles.

## **Semester – 2**

### **PGDI-201**

#### **ADVANCED SPECTROSCOPIC AND THERMAL METHODS OF ANALYSIS FOR PHARMA AND CHEMICAL PRODUCTS**

##### **Course outcomes (COS)**

**CO1:** Understanding and explanation of principles, theory and applications of spectroscopic techniques.

**CO2:** Know the thermogravimetric and other related instruments techniques.

### **PGDI-202**

#### **IPR, PATENT, DOCUMENTATION, STATUTORY AND REGULATORY AFFAIRS**

##### **Course outcomes (COS)**

**CO1:** Learner should be able to use various parameter of pharma regulatory affairs.

**CO2:** Understanding ICH, SOP, GMP, GLP used in pharma and applied industries.

**CO3:** Case studies of related topics.

### **PGDI-203**

#### **PROJECT WORK/DISSERTATION**

##### **Course Outcomes (COs):**

- Selected analytical problem solving by Specific Sophisticated instrumental technique
- Exposure to the Scientific Database
- Statistical Analysis of the data
- Result, Data compilation and Thesis writing
- Publication

### **PGDI-204 VIVA-VOICE**

## **Course Outcomes of M. Phil. (Commerce)**

### **Paper No. I Elements of Business Research**

**COS1:** Through the knowledge of this course the student can have the basic knowledge of Elements of Research and Business Research.

### **Paper No. 2: Perspective of Finance**

**COS2:** Through the knowledge of this course the student can have the basic knowledge of Financial System of India and International Level. Further the student will have the specialized aspect of Indian Banking System.

### **Paper No. III Functional Management Perspectives**

**COS3:** Through the knowledge of this course the student can have the basic knowledge of Various Functional Management like Human Resource Management, Operations Management and Industrial Engineering. With the help of the knowledge of this course the student can become Human Resource Manager in Corporate World.

### **Dissertation:**

**COS4:** Through this course the student can have the ability of under taking the research in the area of finance, marketing, human resource etc.

## **Course Outcomes of Master of Commerce**

### **Managerial Economics**

**CO2:** This course develops managerial perspective to economic fundamentals as aids to decision making under given environment constraints as well as to equip and orient the students towards the concepts and practices of economics in managerial aspects.

### **Accounting For Management**

**CO3:** The objective of this course is acquainting students with the accounting concepts, tools and techniques for managerial decisions.

### **Financial Management & Policy**

**CO4:** To make students 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.

### **Management of Self & Career**

**CO5:** This course aims to enable the students' understanding about the concepts of personality/self and appreciate the need for personality/ self development as well as managing their careers using through it.

### **Legal Aspects of Corporate Business**

**CO6:** The course aims to acquaint the students with knowledge and understanding of major business laws. And he she can become legal advisor for business laws.

### **International Business**

**CO7:** The purpose of this course is to acquaint the students with nature, scope, structure and operations of international business and familiarize them with trends and developments in International Business Environment and policy framework.

### **Corporate Financial Reporting**

**CO8:** With the help of knowledge of this course the student can become project planning. The objective of this course is acquainting students to strengthen the knowledge and practice of preparing and presenting different kinds of corporate financial reporting in an analytical way with the accounting concepts, tools and techniques.

### **Marketing Management**

**CO9:** Marketing and managerial application etc. are directly exposed to the students of the department of commerce. Further students can get the skill of becoming sales mangers, sales man in various industries. With the help of this course familiarize the students with the basic concepts and principles of marketing and to develop their conceptual and analytical skills to be able to manage marketing operations of a business firm.



### **Global Strategic Management**

**CO10:** To help students to understand strategy making process that is informed integrative and responsive to rapid changes in an organization's globally oriented environment with understanding the tasks of implementing strategy in a global market.

### **Business Research Application**

**CO11:** The objective of this course is to make the students to learn the application of statistical tools and techniques of Research for Business decision making and planning.

### **Advanced Corporate Accounting**

**CO12:** This course helps to students in strengthening the knowledge regarding the advanced practice of preparing and presenting different kinds of corporate accounting and reporting in an analytical way with the accounting concepts-standards, tools and techniques.

### **Advanced Cost Accounting**

**CO13:** Through this course student can have the capability of becoming cost accountant in corporate sector. This course helps to students in strengthening the knowledge regarding the advanced practice of different kinds of cost accounting control concepts with analytical use of tools and techniques.

### **Advanced Cost and Financial Accounting**

**CO14:** Through this course student can have the capability of becoming accountant in corporate sector. This course helps to students in strengthening the knowledge regarding the principles and practice of advanced cost accounting concepts as well as financial accounting concepts with analytical use of different methods, tools and techniques.

### **Advanced Management Accounting**

**CO15:** Through this course student can have the capability of becoming Management Accountant in corporate sector. This course helps to students in acquainting the knowledge regarding the advanced practice of different kinds of managerial investment decision accounting concepts and control mechanism with analytical use of different methods, tools and techniques

### **Indian Financial System**

**CO16:** Through this course the student can have the ability of portfolio, consultant, and managers in capital market. Further he can independently operate in stock exchange. Through this course student can have the capability of becoming accountant in corporate sector. The main objectives of this course are to help in learning various financial services and their role in the overall financial system.

### **Security Analysis**

**CO17:** Through this course the student can have the ability of portfolio, consultant, and managers in capital market. Further he can independently operate in stock exchange. To help students in understanding various issues in Security analysis.

### **Strategic Financial Management**

**CO18:** To provide comprehensive knowledge of financial strategies that affects the value of the firm.

### **Integrated Marketing Communication and Brand Equity**

**CO19:** The objective is to introduce the students to the integrated role of promotion techniques with the special emphasis on advertising.

### **Service Marketing**

**CO20:** Marketing and managerial application etc. are directly exposed to the students of the department of commerce. Further students can get the skill of becoming sales managers, sales man in various industries. This course acquaints students with the basic issues in services marketing and customer relationship management.

### **Supply Chain Management and Logistics**

**CO21:** To acquaint the students with the concepts and tools of supply chain management and logistics as relevant for a business firm.

### **Human Resource Management**

**CO22:** The Objective of this course is to sensitize students to the various facets of managing people with an understanding of the various policies and practices of HRM.

### **Management of Industrial Relation-I**

**CO23:** To help students understand the legal implications in Human Resource Management and handle industrial relations.

### **Strategic Human Resource Management**

**CO24:** The objective of this paper is to develop a conceptual as well as a practical understanding of Strategic Human Resource System in an organization

### **Advanced Business Statistics-1 (Descriptive and Mathematical Statistics)**

**CO25:** The object of this course is to familiarize to students with various statistical methods and tools of mathematical statistics in the commercial fi

### **Advanced Business Statistics-2 (Probability and Probability Distributions)**

**CO26:**The object of this course is to familiarize to students with various statistical methods and tools of mathematical statistics in the commercial field.

### **Advanced Business Statistics-3 (Statistical Inference)**

**CO27:**The object of this course is to familiarize to students with various statistical methods and tools of mathematical statistics in the commercial field.

### **Organizational Behavior**

**CO28:** The objective of the course is to enable students to develop a theoretical understanding about organization structure and its behavior over time. The course will also make them capable of realizing the competitiveness for firms.

### **Financial Accounting for Managers**

**CO29:** The objective of this course is acquainting students to strengthen the knowledge and practice of different kinds of accounting and reporting tools and techniques in an analytical way with the financial and managerial accounting for decisions.

### **Advanced Cost & Management Accounting**

**CO30:** The objective of this course is acquainting students to strengthen the knowledge and advanced practice of different kinds of managerial decision accounting concepts and control mechanism with analytical use of different methods, tools and techniques.

### **Advanced Corporate Tax Accounting**

**CO31:** The objective of this course is acquainting students to develop a detailed understanding of various tax planning management tools of corporate taxation and also to impart knowledge regarding the provisions of the direct taxes and their applications for the purpose of decision making.

### **International Accounting**

**CO32:** The objective of this course is acquainting students to develop some conceptual knowledge and Understanding of International accounting issues. In addition, this course makes students capable of tackling issues in prevailing regulatory environments.

### **Banking & Risk Management**

**CO33:** The objective of this course is to provide in depth knowledge about the Risk management in financial matters and develop hedging skill among the students.

### **Portfolio Management & Evaluation**

**CO34:** To provide comprehensive knowledge of the tools and techniques of Portfolio Management and develop a clear understanding of the practical implications of financial theory for investment success.

### **Financial Institution & Market**

**CO35:** The objective of this course is to acquaint the students with essentials of finance so that they have requisite knowledge, skills and confidence to take charge of their financial future. Further, this paper intends to foster critical thinking skills for personal financial planning and handling financial market constraints.

### **International Marketing**

**CO36:** To familiarize the students with the concept and issues of international marketing and enable them to be able to analyze the foreign market environment and develop international marketing strategies for a business firm.

### **Consumer Behavior**

**CO37:** To provide an in-depth understanding of the consumer and industrial buying processes and their determinants as relevant for marketing decision making.

### **Marketing Research OR Research Report**

**CO38:** The course aims at exposing the students to the concept, tools and techniques of marketing research and developing their skills to be able to apply research techniques to aid marketing decision making.

### **Management of Industrial Relations – II**

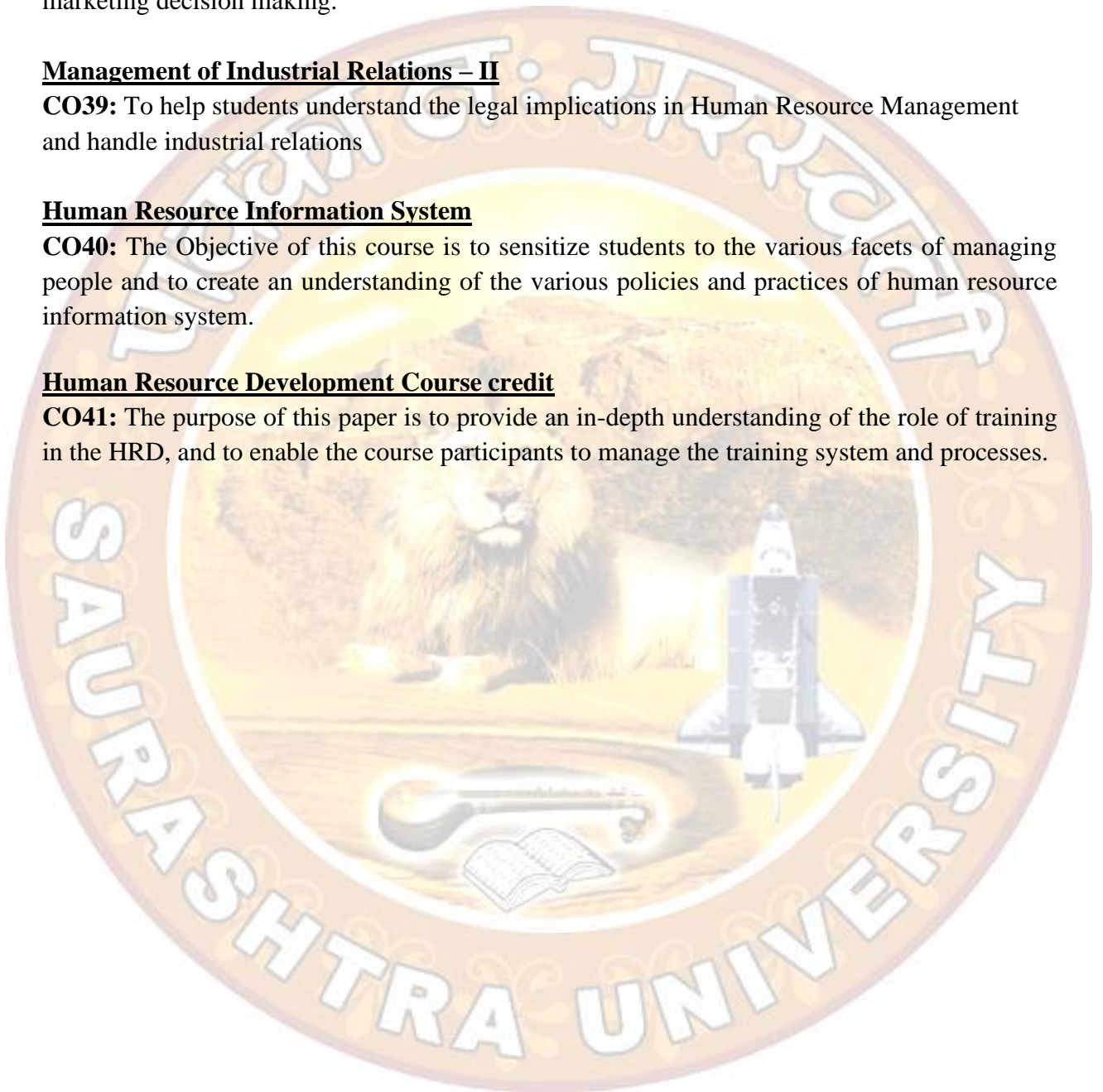
**CO39:** To help students understand the legal implications in Human Resource Management and handle industrial relations

### **Human Resource Information System**

**CO40:** The Objective of this course is to sensitize students to the various facets of managing people and to create an understanding of the various policies and practices of human resource information system.

### **Human Resource Development Course credit**

**CO41:** The purpose of this paper is to provide an in-depth understanding of the role of training in the HRD, and to enable the course participants to manage the training system and processes.



**Advanced Business Statistics-4 (Applied Statistics)**

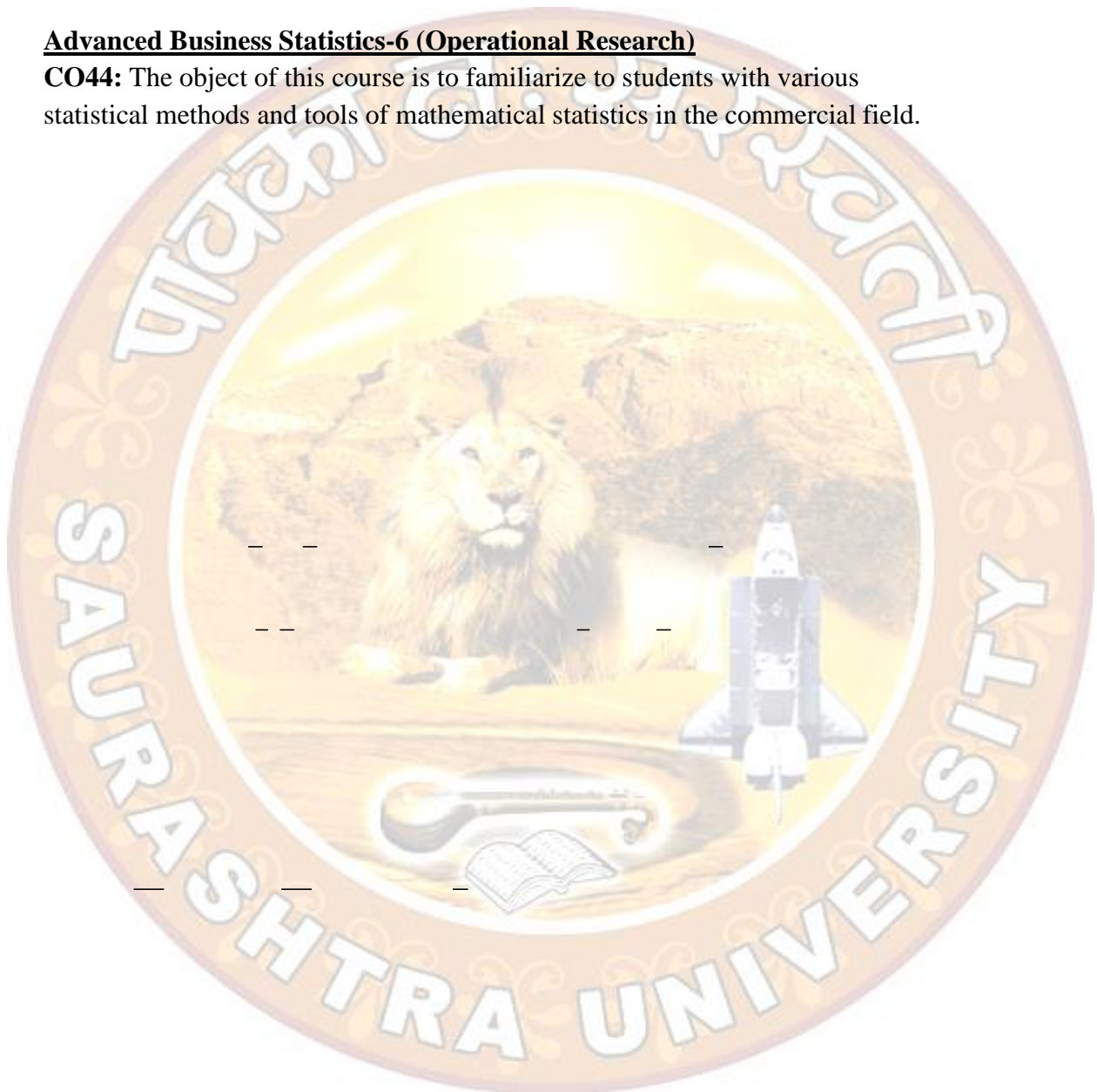
**CO42:**The object of this course is to familiarize to students with various statistical methods and tools of mathematical statistics in the commercial field.

**Advanced Business Statistics-5 (Sampling Methods and Design of Experiments)**

**CO43:** The object of this course is to familiarize to students with various statistical methods and tools of mathematical statistics in the commercial field.

**Advanced Business Statistics-6 (Operational Research)**

**CO44:** The object of this course is to familiarize to students with various statistical methods and tools of mathematical statistics in the commercial field.



## Course Outcome of M.C.A Computer Science

### Semester - I

#### **P1010 : Introduction to programming using C**

**Course outcome:**

- The course gives the knowledge of fundamental of programming.
- Builds the logic of the students.

#### **P1020 : Computer Organization and Architecture**

**Course outcome:**

- It gives the idea of fundamental of computer organization.
- Give the awareness of the students about computer and its peripherals.

#### **P1050 : Computer oriented Numerical & statistical method**

**Course outcomes:**

- The course focuses on mathematical concept from computer point of view and it develops the logic of the students.

### Semester - II

#### **P2010 : Object oriented programming using C++**

**Course Outcome:**

- It gives the concepts of OOP.
- Students are able to analyze any application from OOP view.

#### **P2020 : Computer network**

**course outcomes:**

- Gives the fundamental about the computer network.
- They are able to know the types of network, cables and functionalities of the network and other network related equipment's.

### **P2030 : System analysis and design**

#### **Course outcomes:**

- The course focus on analysis and design of the computer system.
- They are able to convert the real life problem into the computerized system.

### **P2040 : Operating system and Linux programming**

#### **Course outcome:**

- Gives the idea of OS i.e. linux, windows etc.
- It focus how the operating system work.

### **P2050 : Data structure and algorithm**

#### **Course outcome:**

- It gives the inner mechanism of the computer functionality
- Students are focused on linear and non linear data structure
- It gives the idea of data structure, file structure etc. The course is design to develop the students from the fundamental

### **Semester - III**

### **P3010 : Core Java**

#### **course outcomes:**

- Course focus on concepts of OOP and development of web based applications.
- It also focus on java fundamentals

### **P3020 : Software Engineering**

#### **course outcomes:**

- The course is designed to analyze the system.
- The students is able to analyze real life system to be implemented.

### **P3030 : Web programming - 1**

#### **course outcomes:**

- They can develop the real life system for the user
- focus on development of web programming.

### **P3040 : Cloud computing**

#### **course outcomes:**

- Gives the fundamental idea of cloud and its utility.
- Students can identified, how the cloud is useful in real life.

### **P3050 : Operation Research**

#### **course outcomes:**

- The course focuses on mathematical concept from computer point of view and it develops the logic of the students.

### **P4010 : Advance Java**

#### **Course outcomes:**

- focus on database, network programming etc.
- Student are able to develop real life programs and able to implement.

### **P4020 : .NET frame work and C#**

#### **course outcomes:**

- Focus on web based programming
- Course focus on the business logic.

### **P4030 : Web programming – 2**

#### **course outcomes:**

- Focus on web based programming
- Able to build real life web based application and can implement.

### **Semester – IV**

### **E4051: Advanced Networking**

#### **Course outcomes:**

- give the depth idea of the network and its related terms.



### **E4052: Cyber Crime**

#### **Course outcomes:**

- Focus on the cyber threats and its pro and cons.

### **E4053: GIS, GPS & Remote Sensing**

#### **Course outcomes:**

- Fundamentals of GIS, GPS and remote sensing.

### **Semester - V**

### **P5010 : Building application using ADO.NET & ASP.NET**

#### **Course outcomes:**

- focus on development of web based applications.

### **P5020 : Mobile programming language**

#### **course outcomes:**

- Gives the idea of android os and development mobile apps.

### **E5031 : Data ware housing, data mining**

#### **course outcomes:**

- Focus on huge data and its managment

### **E5032: Biometrics technologies**

#### **course outcomes:**

- Focus on biometrics tools and its utility

### **E5033 : Image processing**

#### **course outcomes:**

- Related to the image process.

## Course Outcome of M.Sc. (IT) Computer Science

### CS – 01: APPLICATION DEVELOPMENT USING ADVANCE JAVA

**course outcomes:**

- Learn how to download, setup and configure the Spring Framework
- Explore the Spring Container and Modules
- Understand dependency injection
- Learn aspect oriented programming and how it is used to provide cross cutting concerns
- Understand how Spring deals with transaction management and ORM
- Hibernate: Inheritance mapping collection mapping.
- Understand the HQL.

### CS-02: Advance Web Development in Laravel

**course outcomes:**

- Student should know OOP in PHP
- Student should be able to implement Laravel framework
- Student should be able to design and code responsive website
- Student should be able to meet current modern market requirement and create fruitful products

### CS – 03: NoSQL DATABASE: MongoDB

**course outcomes:**

- To develop proficiency in the specification, representation and various other types in MongoDB using PHP.
- To be able to perform various Analytical as well as to increase the programming skills in PHP using MongoDB.
- To get a good understanding regarding various styles in Programming.
- To develop a good base for No-SQL queries.

### CS – 04: PRACTICAL - 1 (BASED ON CS-01)

- APPLICATION DEVELOPMENT USING ADVANCE JAVA

### CS – 05: PRACTICAL - 2 (BASED ON CS-02 and CS-03)

- ADVANCE WEB DEVELOPMENT IN Laravel
- NoSQL DATABASE: MongoDB

### CS – 06: PROJECT DEVELOPMENT (IN House)

- Project must be developed in the computer laboratory of concern institute under the supervision of faculties of concern institute on any subject of current semester. **(At the time of Project-Viva examination student must show Project Report (In Hard Copy) along with all the Workouts in workbook, implementation of project in SDLC, Documentation, Program codes and project in running mode)**

### CS – 07: APPLICATION DEVELOPMENT USING ADVANCED ANDROID

#### course outcomes:

- To be able to develop mobile applications using advanced android api based on
- Data storage in external and internal memory and database
- To develop app that supports animation, multimedia, camera, sensor
- To develop app that supports Network, Bluetooth-Wi-Fi
- Developing web service and retrieving data using JSON & xml
- Packaging and distributing android app

### CS – 08: INTRODUCTION TO BIG DATA AND HADOOP

#### course outcomes:

- Master the concepts of HDFS and MapReduce framework
- Understand Hadoop Architecture
- Setup Hadoop Cluster and write Complex MapReduce programs
- Learn data loading techniques using Sqoop and Flume
- Perform data analytics using Pig and Hive
- Implement HBase and MapReduce integration
- Implement Advanced Usage and Indexing
- Implement best practices for Hadoop development
- Work on a real life Project on Big Data Analytics

### CS – 09: CLOUD COMPUTING

#### course outcomes:

- To describe cloud computing architecture and services
- To identify cloud platforms and services
- To identify design issues of cloud computing
- To analyze the security factors of implementing cloud environment
- To understand the server virtualization and its implementation
- To review real time applications of cloud computing

### CS – 10: PRACTICAL - 1 (BASED ON CS-07)

- APPLICATION DEVELOPMENT USING ADVANCED ANDROID

### CS – 11: PRACTICAL - 2 (BASED ON CS-08 and CS-09)

- INTRODUCTION TO BIG DATA AND HADOOP
- CLOUD COMPUTING

### CS – 12: PROJECT DEVELOPMENT (In House)

- Project must be developed in the computer laboratory of concern institute under the supervision of faculties of concern institute on any subject of previous semester or current semester. **(At the time of Project-Viva examination student must show Project Report (In Hard Copy) along with all the Workouts in workbook, implementation of project in SDLC, Documentation, Program codes and project in running mode)**

### CS-13 : Hybrid Mobile Applications Development Using Web Technologies

#### course outcomes:

- Focuses on developing multiplatform mobile applications using the Web skills (HTML5, CSS and Javascript).
- Understand AngularJS basic and advanced in depth concepts.
- Using the Cordova hybrid application framework to develop and target multiple mobile platforms with a single codebase.
- Using Ionic framework, one of fastest growing mobile application frameworks, that is built with mobile-optimized HTML5 and CSS based components and AngularJS.
- Understand NodeJS concepts.
- Publish mobile app on play store and app store.
- Understand UI development with Ionic and then using Cordova's modules to access the native mobile platform's capabilities from Javascript.

### CS – 14 : Web Application Development using Django

#### course outcomes:

- Understand how to learn a web development framework.
- Understand how to use Python and Django to develop modern web applications.
- Gain functional knowledge of Python, Databases and the Django framework.
- Understand current web development best practices.
- Build and deploy a Python Django web application that incorporates a database.

## **Course Outcomes of M. Phil. Economics**

### **Research Methodology**

**C.O.1** The main objective of this paper is to analyze the various concept of research methodology, theory of research, research design, research techniques , sampling techniques , selection method etc.

**C.O.2** The Objectives of this paper is to learns skills in research methods and research techniques.

### **Major Theories of Economics**

**C.O.1** To know about recent developments in the Indian Economy.

**C.O.2** Make student familiar with recent policy changes.

### **Quantitative Techniques and Computer Applications in Research**

**C.O.1** The main objective of this paper is to learn data analysis techniques and use of computer.

**C.O.2** This includes statistical techniques of collecting data, its organization and presentation and its analysis to discern the meaning hidden in the plethora of data.

**C.O.3** Students are expected to learn basic fundamentals and its application to economic issues and interpret hidden meaning.

### **Major Contemporary Economic Issues**

**C.O.1** To provide the students with a critical understanding of the Indian economy so that they may be able to engage meaningfully in debates regarding the country's economy

**C.O.2** To help students contribute to the formulation of its policies in order to achieve this,

**C.O.3** To introduces the students to broad contours like the status, issues and policies of the Indian economy at the aggregated (macro) as well as sectoral levels.

**C.O.4** To help to understand the experiences in the pre as well as post reform years, keeping the colonial experience at the background

## Course Outcomes of M.A. Economics

### Micro Economics-1 No.: CORE-I-01

C.O.\_1 This course analyses the economic behaviour of individuals, firms and markets.

C.O.\_2 It is mainly concerned with the Objectives of equipping the students in a rigorous and comprehensive manner with the various aspects of consumer behaviour and demand analysis, production Theory and behaviour of costs, the Theory of traditional markets and equilibrium of firm in modern non-profit maximizing framework.

### Macro Economics-1 No.: CORE-I 02

C.O.\_1 Macroeconomic / aggregative economic analyses have great importance in the days of new economic reforms. So macroeconomics is very important to understand macroeconomic policies to the students of this subject.

C.O.\_2 Because it establishes the functional relationship between the large aggregates.

C.O.\_3 It is essential to analyze the macroeconomic theoretical structure, which is considered for the proper comprehension of the different issues and policies.

C.O.\_4 Macroeconomics now is not only a scientific method of analysis, but also a body of empirical economic knowledge.

C.O.\_5 This paper equips the students at the postgraduate level to understand systemic facts and latest theoretical developments for empirical analysis.

### Public Economics-1 No.: CORE-I 03

C.O.\_1 There is specific role of the state in economic development.

C.O.\_2 It has changed over time.

C.O.\_3 The Public finance is very important subject to analyze the role of the Government in the context of fiscal behaviour.

C.O.\_4 It has been applied to the package of those policies and operations which involve the use of tax and expenditure measures while budgetary policy is an important part to understand the basic problems of use of resources, distribution of income etc.

C.O.\_5 There is wide and vast area of the subject.

C.O.\_6 It analyzes the public revenue and expenditure trends and programmes, budgetary procedures, stabilization instruments debt issue levels of government etc., which raise a spectrum of issues arising from the operation of these institutions.

C.O.\_7 Further the existence of externalities concern from adjustment in the distribution of income and wealth etc.

C.O.\_8 require political processes for their solution in a manner combines individual freedom and justice.

C.O.\_9 This paper combines thorough understanding of fiscal institutions with a careful analysis of the issues, which underline budgetary policies in general, and Indian experience in particular.

### **Managerial Economics: Theory No.: ECT-I 1.1**

C.O.\_1 This Course is essential for a student who aspires for management of a firm / company / any enterprises.

C.O.\_2 this age is age of management. So managerial economics is very important to learn the art of management for achieving predetermined goals.

C.O.\_3 The management means in each measure was as much a response to immediate economic problems and policy issues as much as it was a self-conscious attempt to refine earlier analysis by Correcting mistakes and filling in the gaps in management.

C.O.\_4 Managerial analysis did not evolve in isolation.

C.O.\_5 But were in integral and important part of the evolution of modern economic thought. Prevailing ideas of science, scientific thought and measurement played a significant role in the shaping of economic science at each stage of its evolution.

### **Monetary Economics: Theory and Policy No.: ECT-I 1.2**

C.O.\_1 Money and banking constitute important components towards understanding of economics.

C.O.\_2 A clear understanding of the operations of money and banking and their interaction with the rest of the economy is essential to realize how monetary forces operate through a multitude of channels – market, non-market, institutions and among others, the state.

C.O.\_3 The operation of financial markets and their regulations are to be studied to appreciate their key-role in an economy, especially after the far reaching banking and financial sector reforms in India and elsewhere.

C.O.\_4 The present course is designed to acquaint the students fully with the changing role of financial institutions in the process of growth and development.

C.O.\_5 Accordingly, the paper on ‘Economics of Money and Banking’ is an optimal integration of monetary Theory, banking and non-banking financial institutions, which combine with itself a systematic discussion of the Theory, institutions and policy with special reference to India.

### **Industrial Economics-1 No.: ECT-I 1.3**

C.O.\_1 In the contemporary world with globalization and liberalization m/e and m/e attention is being given to industry.

C.O.\_2 This course intends to provide knowledge to the students on the basic issues such as productivity, efficiency, capacity utilization and debates involved in the industrial development of India.

C.O.\_3 The Objectives is to provide a thorough knowledge about the economics of industry in a cogent and analytical manner, particularly in the Indian context.

C.O.\_4 Paper of Industrial Economics structure conduct and performance paper of Industrial Economics of India both cover all the Objectives and importance of the study of Industrial Development of India.

### **Economics of Regional Development: ECT-I 1.4**

C.O.\_1 In a federal set up like India, balanced regional development is desirable.

C.O.\_2 It involves policy intervention.

C.O.3 Success / failure of such interventions depends on regional characteristics.

C.O.\_4 Hence, for the post graduate students of economics it is of significance to understand functioning of regional economies and regional development perse

C.O.\_5 The course aims at providing basic conceptual understanding.

#### **Economics of Regional Development No.: ECT-I\_1.4**

**C.O.\_1** The main Objectives of this paper is to make the students aware of the importance of population economic development and the various Theories that explain the growth of pupation in country.

**C.O.\_2** The Paper also enlightens the student on the quantitative and the qualitative aspects and characteristics of the population though various demographic techniques.

**C.O.\_3** In recent time gender characteristics of the population have acquired importance and these have also been included in the framework of study.

**C.O.-4** Migration and urbanization are the characteristics of structural change taking place in a society.

**C.O.\_5** Their study is essential to understand the dynamics of this change.

**C.O.\_6** The paper exposes the students to sources of population and related characteristics as also to the rationale, need and evolution of population policy.

#### **Theories of Economic Growth No.: ECT-I\_2.2**

**C.O.\_1** Post war period has witnessed emergence of 'growth economic'.

**C.O.\_2** Economists have tried to capture process of economic growth in form of economic models.

**C.O.\_3** Neo-classical economists popularized this process.

**C.O.\_4** Students must understand process of economic growth well.

**C.O.\_5** This course familiarizes them with different types of growth models.

#### **Economics of Infrastructure-1 No.: ECT-I\_2.3**

**C.O.\_1** It is necessary to know costing and price of infrastructure services for students of economics.

**C.O.\_2** The Present course is theoretical showing economic aspects of development and investment in infrastructure.

**C.O.\_3** It is showing public and private sector contribution in infrastructure growth.

**C.O.\_4** This paper exposes students to issues involved in Infrastructure in developing countries like India.

#### **Hist/y of Economic Thought No.: ECT-I\_2.4**

**C.O.\_1** This course is essential for a student who aspires for advanced training in economics. Cotemporary economic science has evolved over many centuries.

**C.O.\_2** The evolution of economic ideas in each instance was as much a response to immediate economic problems and policy issues as much as it was a self-conscious attempt to refine earlier analysis.

**C.O.\_3** Economic ideas did not evolve in isolation, but were an integral and important part of the evolution of modern social thought.



**C.O.\_4** Prevailing ideas of science, scientific rig/ and measurement played a significant role in the shaping of economic science at each stage of its evolution.

**C.O.\_5** This course, tracing the history of economic thought, would enable the student to understand how contemporary economics came to what it is.

#### **Micro Economics-2 No.: CORE-II 04**

**C.O.\_1** This course deals with the micro and macro Theories of distribution and welfare economics.

**C.O.\_2** It equips students for policy evaluation tools and concepts.

**C.O.\_3** It gives micro and macro perspectives of income distribution and helps in developing insight into Working of economy with reference to welfare of individual and its implications.

#### **Macro Economics-2 CORE-II 05**

**C.O.\_1** Macroeconomics / aggregative economic analysis establishes the functional relationship between the large aggregates.

**C.O.\_2** The aggregate analysis has assumed such a great significance in recent times that a pri/ understanding of macroeconomic theoretical structure is considered essential for the proper comprehension of the different issues and policies.

**C.O.\_3** Macroeconomics now is not only a scientific method of analysis; but also a body of empirical economic knowledge.

#### **Public Economics-2 CORE-II 06**

**C.O.\_1** Role and functions of the Government in an economy have been changing with passage of time.

**C.O.\_2** It is necessary for post-graduate students to know principals of public finance and package of policy executed by the State Government and Central Government.

**C.O.\_3** Budgetary policy is an important part to understand the basic problems of use of resources, distribution of income, etc. This paper aims to well-equipped P.G. students of Economics about tax system, public expenditure, public debt. and budgetary procedure as stabilization instrument.

**C.O.\_4** This paper also explain through understanding of fiscal institutions.

#### **Managerial Economics: Business Environment ECT-II 3.1**

**C.O.\_1** The Objectives of the course is to provide the student with a background of various environment factors that have major repercussions on business and sharpen their mind to watch and update the changes that occur constantly in this sphere.

**C.O.\_2** Managerial analysis did not evolve in isolation. But were in integral and important part of the evolution of modern economic thought and policy.

**C.O.\_3** Prevailing ideas of science, scientific thought and measurement played a significant role in the shaping of economic science at each stage of its evolution.

**C.O.\_4** This course, would enable the student to understand how contemporary society, polity and business interact with each other.

**C.O.\_5** Teaching pedagogy b for this course be based on illustrating 'cases' and not mere description.

### **Economics of Financial Markets and Institutions No.: ECT-II 3.2**

C.O.\_1 The positive and significant role of financial institutions in the process of growth and development has been very well recognized in the literature and indeed has become m/e important during the last two decades as the financial systems of different countries have become integrated in the process of globalization.

C.O.\_2 India is no exception and has taken far reaching measures since 1991 in this direction.

C.O.\_3 It is, therefore, essential that the students of economics should be well conversant with the Theory and practice of different financial institutions and markets to understand and analyze the interconnection between the monetary forces and real forces, their developmental role and limitations in shaping and influencing the monetary and related policies both at the national and international levels.

### **Industrial Economics-2 No.: ECT-II 3.3**

C.O.\_1 This paper aims at application of economic Theories for industrial development.

C.O.\_2 It is necessary for M.A students to know various Theories and practices for industrial location and development.

C.O.\_3 Moreover, students interested to start his own industry must know locational factors, regional factors, industrial finance and problems of industrial management.

C.O.\_4 Therefore this paper is very useful as applied knowledge to M.A economics students.

### **Economics of Urbanisation No.: ECT-II 3.4**

C.O.\_1 Urbanization is fast spreading in India.

C.O.\_2 Critical analysis of the economics of cities and urban regions is gaining importance day after day.

C.O.\_3 The post graduate students can pursue a bright career as an urban analyst.

C.O.\_4 The course will cover a wide range of theoretical approaches and policy options such as the existence and growth of cities, land use Theories, urban transportation, pollution, poverty, crime, and housing.

### **Economics of Demography-2 No.: ECT-II 4.1**

C.O.\_1 The main Objectives of this paper is to make the students aware of the importance of population in economic development and the various Theories that explain the growth of population in a country.

C.O.\_2 The paper also enlightens the student on the quantitative and the qualitative aspects and characteristics of the population through various demographic techniques.

C.O.\_3 In recent times, gender characteristics of the population have acquired importance and these have also been included in the framework of study.

C.O.\_4 Migration and urbanization are the characteristics of structural change taking place in a society.

C.O.\_5 Their study is essential to understand the dynamics of this change.

C.O.\_6 The paper exposes the students to sources of population and related characteristics as also to the rationale, need and evolution of population policy.

### **Theories of Economic Development ECT-II 4.2**

C.O.\_1 Economic development is a process under which economics go for several changes.

C.O.\_2 It is necessary for P.G. students in economics to know Theories, practices and policies.

C.O.\_3 Most of the development Theories reveal process to manage development process in developing countries.

C.O.\_4 A student of developing countries like India can be benefited the knowledge of such process.

### **Economics of Infrastructure-2 ECT-II 4.3**

C.O.\_1 This course highlights basic problem of infrastructural development.

C.O.\_2 It is necessary for students to know economic problems and reCored policies for infrastructure growth in India.

C.O.\_3 Economic policy requires under reform to boost infrastructure growth in developing country like India.

C.O.\_4 Development issues and policies for infrastructure appear equally important for postgraduate students of Economics.

C.O.\_5 This paper has greater operational utility in consultancy services by an economist and hence detail case-study approach is required while teaching at postgraduate level.

### **Indian Economic Thoughts and Thinkers ECT—II 4.4**

C.O.\_1 The Objectives of this course is to expose students to Indian Economic thoughts.

C.O.\_2 India is one of the ancient civilizations of the w/l.d. India has rich heritage of culture and ethos reflecting economic thought of relevant time.

C.O.\_3 Since ancient time India has produced economic thinkers whose ideas have shaped destiny of this nation.

C.O.\_4 Students shall enrich their understanding of the contemporary economic policies and practices better by familiarizing themselves with Works and economic ideas of these great thinkers from India.

### **International Economics-1 CORE-III 07**

C.O.\_1 International trade acts as an engine of growth.

C.O.\_2 It is necessary for P.G. students in economics to know International trade Theories, practices and policies, It will help them to examine impact of trade policies followed by welfare implications.

### **Contemporary Issues in Indian Economy-1 CORE- III 08**

C.O.\_1 The Objectives of this paper at the post-graduate level would be to sharpen the analytical ability of the student by highlighting, and integrated approach to the functioning aspects of the Indian economy.

C.O.\_2 Keeping in view the scope for alternative approaches, such an analysis is essential because the Indian economy is a unique amalgam of alternative competing and often conflicting Theories and a proper understanding of its Working is imperative if the student is to comprehend the ramification that underline most of the observed phenomena in the Indian economic set-up.

C.O.\_3 The emphasis of the paper is an overall social, political and economic environment influencing policy decisions.

C.O.\_4 To develop all the themes, the course is divided into specific modules.

C.O.\_5 Paper of planning and development and paper of policies for sector al development fulfill above Objectivess.

### **Environmental Economics: Theories No.: CORE-III 09**

C.O.\_1 This course in meant to acquaint student with the basic Theories of environment economics so that they can develop and use appropriate theoretical frame to analyze and understand important environmental issues.

### **Agricultural Economics: Theories No.: ICT-III 1.1**

C.O.\_1 The Objectives of the course is to familiarize student with policy issue that are relevant to Indian Agricultural Economics sand enable them to analyze the issues.

C.O.\_2 Using basic micro economic concepts.

### **Basic Mathematics for Economists No.: ICT-III 1.2**

C.O.\_1 Mathematics has found its applications in economics in the form of model building for planning and development.

C.O.\_2 Mathematical transformation of the economic Theory provides precision to the logic and understanding of economics.

C.O.\_3 This paper intends to train and equip student with the basic understanding of Mathematics, which they may use in advance courses of this subject

### **Economics of Financial Management No.: ICT-III 1.3**

C.O.\_1 Finance is heart of all commercial activity.

C.O.\_2 Mangers of enterprises today have to deal with financial aspects of commerce.

C.O.\_3 So those who intent to apply knowledge of Theory of finance need to get aquatinted with applied aspect of Theory.

C.O.\_4 This course aims to fulfill this aspect.

C.O.\_5 This course is Inter /Multi disciplinary in nature as this could taken as an applied course by any post graduate student.

### **Economics of Gender and Development No.: ICT-III 1.4**

C.O.\_1 Gender biases in societal practices and development polices have resulted in persistent gender inequalities.

C.O.\_2 It is increasingly being realized that mitigating such inequalities and enhancing women's capabilities and entitlements are crucial to the overall development of the country.

C.O.\_3 This course, Economics of Gender and Development will provide students understanding of nature of the economic role of women and their contribution to the national economy and economic development on the basis of scientific and non-sexist analysis.

C.O.\_4 Specificity of issues pertaining to India be highlighted while teaching.

### **Labour Economics : Theories No.: ICT-III 2.1**

C.O.\_1 Labour sector is very vast and wide.

C.O.\_2 It included white collar and blue collar jobs.

C.O.\_3 As a post-graduate student of Economics, it is necessary to study Labour Economics.

C.O.\_4 It is also important to know the labour Theories, approaches etc. for analyzing labouring problems.

C.O.\_5 In India most of the labour are in unorganized sector and their problems are specific.

C.O.\_6 The study of labour economic should be systemic, scientific and analytical.

C.O.\_7 The syllabus is structured Accordingly for this.

C.O.\_8 Here the subject is divided in two parts, namely, Labour Theories and Labour problems. In this section, the Theories of labour are analyzed. In these Theories of labour, the main Theories are Theories of labour market, Theories of wages, Theories migration, productivity Theory, etc

### **Econometrics No.: ICT-III 2.2**

C.O.\_1 Applications of economic Theory need a reasonable understanding of economic relationships and relevant statistical methods.

C.O.\_2 The econometric Theory thus becomes a very powerful tool for understanding of applied economic relationships and for meaningful research in economics.

C.O.\_3 This paper Accordingly is devoted to equip the students with basic Theory of econometrics and relevant applications of the methods.

C.O.\_4 The topics covered in the course include various problems faced in estimation of both single equations and simultaneous equations models.

C.O.\_5 The course also covers various econometric methods applicable to different topics in economics and those needed for applied economic research.

C.O.\_6 An introductory module on multivariate methods has also been included in the course which constitutes an important tool for analysis in multivariable data in development-related studies.

### **Economics of Insurance Services No.: ICT-III 2.3**

C.O.\_1 The vital role of insurance in the task of risk-bearing and risk-elimination in the economic affairs has not been appreciated adequately in our country.

C.O.\_2 Given that the element of risk / uncertainty is a universal and fundamental phenomenon in our economic life, the importance of insurance as a means of reducing uncertainty and risk in regard personal and business activities cannot be overemphasized.

C.O.\_3 The role of insurance sector in mobilizing a country's saving for channeling them into capital formation and thus contribute to a country's economic development is also documented.

C.O.\_4 There is a wide spread recognition that insurance, particularly life insurance, is a prominent segment of applied economics.

C.O.\_5 Insurance industry is an important constituent of financial services industry in India and is a major investment institution and prominent player in the capital market.

C.O.\_6 However, in our country, study of the subject of insurance has largely remained neglected.

C.O.\_7 With the opening of the insurance for private Indians and foreign players, the interest in the subject has been kindled.

C.O.\_8 The course on Insurance Economics attempts to give a fairly comprehensive view of the subject to the postgraduate students in Economics and pave the way for possible future expansion of the teaching of an important branch of economics.

#### **Computer Applications in Economic Analysis – 1 No.: ICT III 2.4**

C.O.\_1 The growth and spread of computer and its invasive presence in every sphere of intelligent human activity is forcing every educational system and discipline to adopt and integrate its fundamentals into course curricula.

C.O.\_2 It is to produce computer literate and well-educated post-graduates who can get not only employment but also create Work and produce value added output in the society, for which present syllabus is being designed.

C.O.\_3 We believe this will make our new graduates m/e proficient, suitable and fit to face the future challenges in society.

#### **International Economics-2 No.: CORE-IV 10**

C□□□□□ It is necessary to for P.G. student in economics international trade finance and trade finance and trade managing institutions in era of globalization of national economics.

C□□□□□ Economic health of a nation is known by positive balance of payment situation of a nation.

#### **Contemporary Issues in Indian Economy-2 No.: CORE-IV 11**

C.O.\_1The Objectives of this paper at the post-graduate level would be to sharpen the analytical of the student and functioning of Indian economy with various policies with alternative approaches for further growth.

C.O.\_2This means that P.G. Students need to be well aware about different policies utilized during planning period in India

#### **Environmental Economics: Issues and Policies No.: CORE- IV 12**

C.O.\_1 The main Objectives of this course is to appraise and sensitive student about major environment issues of India and develop skill to analyze them with the help of appropriate theoretical frames.

**Agricultural Economics: Issues and Policies No.: ICT-IV 3.1**

C.O.\_1 The Objectives of this course is to provide a detailed treatment of issues in agricultural economics to those who intend to specialize in agricultural economics.

C.O.\_2 The course of the paper help to familiarize student with policy issues relevant to Indian agriculture and enable student to analyze issue problems and policies of the important sector of Indian economy.

**Basic Statistics for Economists No.: ICT-IV 3.2**

C.O.\_1 Statistics has found its application in economic Forecasting.

C.O.\_2 This paper intends to prepare students with basic understanding of statistical concepts, which may be useful later on for choosing Econometrics.

**Economics of Regionalism No.: ICT-IV 3.3**

C.O.\_1 Post 1990s have witnessed a new global trend in international trade and relations.

C.O.\_2 This /der is to stay in coming years.

C.O.\_3 Post Graduate students ought to get themselves familiarize with this new economic /der and its implications.

C.O.\_4 Besides, others who are practitioners of trade and commerce may benefit from this course.

**Economics of Transportation No.: ICT –IV 3.4**

C.O.\_1 Transp/t is vital sector of a developing economy.

C.O.\_2 Post Graduate students need to learn principles, policy and issues of transp/t economics.

C.O.\_3 FOR a geographically huge economy like ours, this sector offers job opp/tunities. This course shall enhance job potential of learners.

**Labour Economics : Issues and Policies No.: ICT-IV 4.1**

C.O.\_1 In labour economics we can explain various economics labour problems with the help of labour Theories.

C.O.\_2 Form the study of the whole subject student can know the basic Labour TheoriesLabour problems, specific problems of child and women labour and problems of unorganized labour, Indian trade union, its weakness, globalization and labour sector , etc, This type of study is very helpful to understand Indian labour problems and Indian labour market.

C.O.\_3 Considering this approach security, in industrial relations and its problems, globalization and labour problems, labour reforms, etc.

**Econometrics Applications No.: ICT-IV 4.2**

C.O.\_1 The aim of this course is to provide an overview of the state-of-the-art of econometric tools and techniques applicable empirical modeling in applied Micro- and Macroeconomics.

C.O.\_2 The focus is on building, estimating and interpreting output from models using Actual data.

C.O.\_3 The course intends to equip students with application skills, necessary to execute independent research projects.

### **Law and Economics No.: ICT-IV 4.3**

C.O.\_1 In present time Law has become an integral part of economic and commercial activity.

C.O.\_2 Firm, Contract, Family, Government, International Trade/agreements etc are important aspects in study of economics which are related to law.

C.O.\_3 Hence this course shall prepare students to understand intricacies of law in general and its economic aspects in particular.

### **Computer Applications in Economic Analysis -2 No.: ICT IV 4.4**

C.O.\_1 The direction towards the knowledge society shall be resting on a healthy economics and proper use of Information Technology.

C.O.\_2 Economics being an empirical science, computers have emerged as the pivotal instruments of economic analysis, research and Forecasting.

C.O.\_3 SPSS based computer applications are getting popular besides the MS Office Excel program for handling and analysis of data.

C.O.\_4 Therefore, the future economists must be equipped with skills and tools based on computers, which this course shall provide to them.

C.O.\_5 This will not only enhance their employability but also prepare them for the challenges of the future.



## **Course Outcomes of M. Ed.**

### **CC-1 Methodology of Educational Research-1**

CO1: Understand the concept and place of research in education.

CO2: Gets acquainted with various resources for research.

CO3: Achieves skill in writing and interpreting research reports.

CO3: Are initiated into research by undertaking a piece of research and preparing a dissertation.

### **CC-2 Historical, Sociological, Political and Economic Perspectives of Education.**

CO1: To enable the student to develop knowledge and understanding of the history of education.

CO2: To enable the students to understand the historical foundation of education as manifest in the historical documents such as the reports of different commissions and committees.

CO3: To enable the students to understand concept and process of social organization and institution.

CO4: To acquaint the students with role of politics in education.

CO5: To enable the students to understand relationship between politics and education.

CO6: To acquaint the students with role of education in economic development.

### **CC-3 Psychology of Development and Learning**

CO1: Appreciate the contribution of psychologists in relation to the theories of learning developed by them

CO2: Develops a deeper understanding of the implications of learning theories in class- room teaching

CO3: Know the essential components of teaching-learning situations

CO4: Acquiring himself with the theory of instruction

CO5: Acquaints himself with concept and application of constructivism in teaching learning.

### **CC-4 Educational Studies**

CO1: Understand and appreciate the theoretical development in education in their proper perspective.

CO2: Analyze the concept and relevance of educational opportunity for the equality.

CO3: Examine critically the role of education sustainable development.

CO4: Critically examine the perspectives of quality achievement in the educational system.

CO5: Understand the education as a interdisciplinary subject.

### **CC-5 Methodology of Educational Research-II**

CO1: Understand the concept and place of research in education.

CO2: Gets acquainted with various resources for research.

CO3: Becomes familiar with various methods of research.

CO4: Gets conversant with the problems of research design, tools of collecting data, methods and techniques of analysis.

### **CC-6 Teacher Education**

CO1: Understand the history and policy perspectives related to teacher education.

CO2: Get sensitized to objectives and development of teacher education in India.

CO3: Develop understanding of the process of in-service teacher education.

CO4: Understand structure and management of teacher education.

CO5: Understand research in teacher education

CO6: Acquaint with the teacher competencies and teacher professional for effective transaction.

CO7: Reflect on issues and problems of teacher and teacher education.

### **CC-7 Curriculum Studies**

The students will be able to

CO1: Understand the meaning and concept of curriculum.

CO2: Become familiar with the foundation of curriculum development.

CO3: Understand the need for curriculum change.

CO4: Understand the process of curriculum planning.

CO5: Develop skill for selection of content and evaluation of curriculum.

### **CC-8 Philosophical Perspectives of Education**

(Philosophical perspectives of Education)

CO1: Be introduced to Indian Philosophy.

CO2: Know & Compare Indian and Western Philosophy

CO3: Perceive and summarise from Indian philosophical resources.

CO4: Lead their lives physically, mentally, intellectually and spiritually sound and healthy.

CO5: Absorb and accept the ideologies of Indian philosophers in their lives.

CO6: Experience philosophical thoughts and ideology through activities.

CO7: Grow & develop physically and mentally through Yoga and sports.

### **CC-9 Methodology of Educational Research-III**

- CO1: To understand Concept of Treatment of data.
- CO2: To Know about various Statistical techniques.
- CO3: To understand about qualitative Research.
- CO4: To Develop Skill of Research Report Writing.

### **SpC-1**

#### **SECONDARY AND HIGHER SECONDARY EDUCATION-I**

- CO1: Know the evolution of secondary and higher secondary education in India
- CO2: Understand the concept of secondary and higher secondary education
- CO3: Know and analyze the different Structures of Secondary and Higher Secondary Education
- CO4: Have an understanding of Global Perspectives of Secondary and Higher Secondary Education

### **SpC-2**

#### **SECONDARY AND HIGHER SECONDARY EDUCATION-II**

- CO1: understand the Organization of Curriculum in Secondary and Higher Secondary Education
- CO2: To enable students to gain an understanding of Evaluation at Secondary and Higher Secondary Education
- CO3: To enable students to know the New Trends and Innovation in Secondary and Higher Secondary Education
- CO4: To enable students to know the status and role of teachers in Secondary and Higher Secondary Education

### **CC-10 Teacher Education-2**

- CO1: Understand the history and policy perspectives related to teacher education.
- CO2: Get sensitized to objectives and development of teacher education in India.
- CO3: Develop understanding of the process of in-service teacher education.
- CO4: Understand structure and management of teacher education.
- CO5: Understand research in teacher education
- CO6: Acquaint with the teacher competencies and teacher professional for effective transaction.
- CO7: Reflect on issues and problems of teacher and teacher education.

### **SpC-3**

#### **Curriculum and Assessment in Secondary Education**

- CO1: Understand concept of Instructional design
- CO2: Develop knowledge about instructional design model and model of teaching
- CO3: Understand Psychological Principles of developing story board.
- CO4: Develop skills for developing story board
- CO5: Clarify the concept and need of question banking
- CO6: Understand various types of questions

#### SpC-4

##### **Guidance and Counseling**

CO1: To know and nature and principal of Guidance.

CO2: To know nature of Counseling.

CO3: To Understand elements of Counseling and role of counselor

CO4: To understand meaning and nature of group Guidance.

#### SpCE-1 (Group-A)

##### **Special Elective : Assessment in Secondary Education Psychological Testing**

CO1: Understand Concepts of Measurement

CO2: Differentiate between evaluation and measurement.

CO3: Know and evaluate characteristics of evaluation

CO4: Clarify the Concepts of instructional objectives.

CO5: Understand need and importance standardized tests.

CO6: Develop Knowledge of test Construction Procedure.

CO7: Understand need of Measurement of interest, personality, Intelligence, Attitude and will be familiar with some of these tests.

#### SpCE-1 (Group-B)

##### **Statistical Methods for analysis of data**

CO1: To Understand fundamental of statistics.

CO2: To understand the concepts of normal probability curve.

CO3: To understand meaning of correlation

CO4: To understand parametric and non-parametric tests.

## **Course Outcomes of M. Phil. (Education)**

### **Core course : 1 Advanced Research Methodology in Education**

**Course Out comes :** The students' will be able to

CO1:Understand the concept and place of research in education.

CO2:Gets acquainted with various resources for research.

CO3:Achieves skill in writing and interpreting research reports.

CO3:Are initiated into research by undertaking a piece of research and preparing a dissertation.

### **Core Course :2 Philosophical and Sociological Foundation of Education**

**Course Out comes :**

CO1:Be introduced to Indian Philosophy.

CO2:Know & Compare Indian and Western Philosophy

CO3:Perceive and summarise from Indian philosophical resources.

CO4:Absorb and accept the ideologies of Indian philosophers in their lives.

### **Elective course-1 CURRICULUM DEVELOPMENT**

**Course Out comes : On Completion of this Course the Students will be able to...**

CO1: Understand concept of Instructional design

CO2: Develop knowledge about instructional designmodel and model of teaching

CO3: Develop skills for developing story board

CO4: Clarify the concept and need of question bankings

## **Course Outcome of M.Sc. (ECI)**

### **Paper: 1- Foundation of Science and Mathematics**

#### **Course outcome:-**

- CO.1: Student will able to solve and simplify linear and nonlinear equations, algebraic equations, and other basics mathematical logic and equations.
- CO.2: Student will able to understand basic principle of speed, acceleration, motion, rest, scalar, vector, velocity, gravity etc.

### **Paper 2: Foundation of Electronics**

#### **Course outcome:-**

- CO.1: This paper inculcate the basic concepts of capacitor, inductor, resistor, semiconductor material, electron, proton and all the basic terms of electronic subject which will be very helpful to understand the advance studies of electronics subjects.

### **Paper 3: Fundamental of Digital Electronics**

#### **Course outcome:-**

- CO.1: To make students able to develop digital logic concept and apply it to solve problems.
- CO.2: To make students able to analyze, design and implement digital circuits.

### **Paper 4: Introduction to electronics devices and circuits**

#### **Course outcome:-**

- CO.1: To make students able to know the characteristics of diodes and transistors and their applications.
- To make students able to able to design simple circuits and mini projects.

### **Paper 5: Basic circuit analysis**

#### **Course outcome:-**

- CO.1: To make students able to apply concept of electrical network nodes, branches, loops, mesh to solve circuits.
- CO.2: To make students able to understand the basic concept of graph and analyze the circuits using them.
- CO.3: To make students able to simplify network circuits using proper network Theorems.

### **Paper 6: Advanced digital electronics**

#### **Course outcome:-**

- CO.1: Students will be able to design analyze and implement different sequential circuits.
- CO.2: Students will be able to design various digital circuits using appropriate PLDs.

### **Paper 7: Mathematics for electronics Paper**

#### **Course outcome:-**

- CO.1: To make students able to understand the mathematical concepts used in further study of electronic subjects.
- CO.2: To make them able to understand the concepts like, integration, differentiation, various types of series calculation, derivation, and matrix derivation etc.

### **Paper 8: Amplifier and Oscillators**

#### **Course outcome:-**

- CO.1: Students will be able to identify as well as making their own amplifiers and oscillator circuits. Students also be able to understand various amplifiers and oscillator circuits used in most of electronic devices.
- CO.2: To make students able to understand the basic concepts of transistor and transistor amplifiers and oscillator.

### **Paper 9: Advanced circuit and network concepts**

#### **Course outcome:-**

- CO.1: To apply concepts of electric network topology, nodes, branches, loops to solve circuit problems including the use of computer simulation.
- CO.2: To disseminate the basic concepts of graph and analyze the basic electrical circuits using graph theory.
- CO.3: To make students understand various functions of network and also the stability of network.
- CO.4: To make students able to synthesize the network using passive elements

### **Paper 10: Fundamental of communication electronics**

#### **Course outcome:-**

- CO.1: To make the students understand the basic concepts of communication in the world of electronics, how the whole system of communication system works.

### **Paper 11: Power electronics**

#### **Course outcome:-**

- CO.1: To make the students understand the concepts of power diodes, choppers, power amplifiers, controllers and inverters. Students can troubleshoot the power electronics circuit by learning this course.

### **Paper 12: Circuit simulation and PCB designing tools**

#### **Course outcome:-**

- CO.1: After completing this course, students would be able to make any complex electronic circuits and before physical implementation of circuits, by using simulation software students can check that, how circuit will work.
- CO.2: To make the students able to design and simulate their own circuits for their project work and also for making prototypes also.

### **Paper 13: Advance communication electronics**

#### **Course outcome:-**

- CO.1: To make the students understand able to understand the digitalisation of the analog signals, various multiplexing and de-multiplexing methods used in communication, coding-decoding, serial and parallel communication, framing concepts in communication.

### **Paper 14: Op-Amp and its applications**

#### **Course outcome:-**

- CO.1: To make the students understand working of operational amplifier and its characteristics.  
CO.2: Design the solution for linear & non-linear applications using IC741  
CO.3: Elucidate, design and realize the active filters and oscillators.  
CO.4: Identify the needs of voltage regulators and timers and design accordingly.

### **Paper 15: Elements of C language**

#### **Course outcome:-**

Upon completion of this course, students will acquire knowledge about:

- CO.1: Able to implement the algorithms and draw flowcharts for solving Mathematical and Engineering problems.  
CO.2: Ability to design and develop Computer programs, analyzes, and interprets the concept of pointers, declarations, initialization, operations on pointers and their usage.  
CO.3: Able to define data types and use them in simple data processing applications also he/she must be able to use the concept of array of structures. Student must be able to define union and enumeration user defined data types.  
CO.4: Develop confidence for self-education and ability for life-long learning needed for Computer language.

### **Paper 16: Basic instrumentation**

#### **Course outcome:-**

- CO.1: Students can learn various measurements techniques of frequency measurements, characteristic analysis. Students can also be handy with Different types of voltmeters, ammeters, multimeters, oscilloscopes and signal generators used in various circuit to measure the different behaviour of V and I.

### **Paper 17: Basic concepts of control system**

#### **Course outcome:-**

- CO.1: Students can understand the gist of control systems and the response of the control system used in industries. Students also gain the knowledge of mathematical modelling of various control system, which is useful to design a better control system.

### **Paper 18: Fundamental of Computer Hardware**

#### **Course outcome:-**

After finishing this course students will have ability to:

- CO.1: Indicate the names and functions of hardware ports and the parts of the motherboard.  
CO.2: Identify the names and distinguishing features of different kinds of input and output devices.



CO.3: Describe how the CPU processes data and instructions and controls the operation of all other devices.

CO.4: Identify the names, distinguishing features, and units for measuring different kinds of memory and storage devices.

### **Paper 19: Advance Instrumentation**

#### **Course outcome:-**

CO.1: Students would be able to use the various instruments like wave analyser, harmonic distortion measuring instrument, different types of bridges, recorders, transducers. They will be able to make the various measurement setups by learning this course.

### **Paper 20: Microprocessor and Microcontroller**

#### **Course outcome:-**

Students will be able to

CO.1: Know the importance of microcontroller and AVR processors in designing embedded systems.

CO.2: Develop interfacing with real devices.

CO.3: Design microcontroller based system for various applications.

### **Paper 21: Fiber Optics**

#### **Course outcomes:-**

After completion of the course, the student is able to

CO.1: Distinguish Step Index, Graded index fibers and compute mode volume.

CO.2: Explain the Transmission Characteristics of fiber and Manufacturing techniques of fiber/cable.

CO.3: Demonstrate an understanding of optical fiber communication link, structure, propagation and transmission properties of an optical fiber.

CO.4: Estimate the losses and analyze the propagation characteristics optical signal in different types of fibers.

### **Paper 22: Advance concepts of Control System**

#### **Course outcomes:-**

CO.1: Students can learn the concepts of root locus analysis and design, frequency response analysis and design to make better control system for industry.

### **Paper 23: Basic programmable controllers**

#### **Course outcome:-**

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

CO.1: Program Programmable Logic Controllers

CO.2: Will understand different types of Devices to which PLC input and output modules are connected

CO.3: Identify various types of PLCs applicable to specific process/project.

CO.4: Able to create ladder diagrams from process control descriptions.

CO.5: Use various industrial motor drives for the Industrial Automation.

### **Paper 24: Computer Aided Designing**

#### **Course outcome:-**

CO.1: This is demanding field of present scenario, with help of this paper students able to make any type of 3d model in NX software with proper and accurate dimensions. Students also able to make prototype. This will lead to inculcate the entrepreneurship in young minds.

### **Paper 25: Introduction to MATLAB**

#### **Course outcome:-**

On successful completion of the course, the students should be able to

CO.1: Understand the need for simulation/implementation for the verification of mathematical functions.

CO.2: Understand the main features of the MATLAB program development environment to enable their usage in the higher learning.

CO.3: Implement simple mathematical functions/equations in numerical computing environment such as MATLAB.

CO.4: Interpret and visualize simple mathematical functions and operations there on using plots/display.

CO.5: Analyze the program for correctness and determine/estimate/predict the output and verify it under simulation environment using MATLAB tools.

### **Paper 26: Automobile and Automotive Electronics**

#### **Course outcome:-**

CO.1: Student should able to understand basic of steering mechanism, break system, driving mechanism, tyres and wheel terminology, electrical system and basics of suspension system.

CO.2: Student should able to understand basics of servicing of various components and system.

CO.3: Student should able to understand history and basics of automobile and frame chassis and body construction.

### **Paper 27: Robotics**

#### **Course outcome:-**

CO.1: Students will demonstrate knowledge of the relationship between mechanical structures of industrial robots and their operational workspace characteristics.

CO.2: Students will demonstrate an ability to apply spatial transformation to obtain forward kinematics equation of robot manipulators.

CO.3: Students will demonstrate an ability to solve inverse kinematics of simple robot manipulators.

CO.4: Students will demonstrate an ability to generate joint trajectory for motion planning.

### **Paper 28: Electromagnetics**

#### **Course outcome:-**

CO.1: Inculcating the basic concepts of electromagnetics and all the coordinate systems. Students also able to understand the concepts of the electromagnetic field, vectors and its various mathematical treatments. These all lead to understand the advance electromagnetic field theory.

### **Paper 29: Military applications of electronics and technology**

**Course outcome:-**

CO.1: By learning this paper, students can understand the various electronic defence systems used in military, sensors and their functions used in various weapons, different types of weapon systems, electronic intercept systems.

**Paper 30: ARDUINO: Fundamentals & Practice**

**Course outcome:-**

CO.1: After the completion of the course, the students will be specialized in Embedded System Design using Arduino.

CO.2: Learn how to make prototype using Arduino.

CO.3: Learn the Arduino programming language and IDE.

CO.4: Program the Arduino microcontroller to make the circuits work.

CO.5: Connect the Arduino microcontroller to a serial terminal to understand communication and stand-alone use.

**Paper 31: JAVA: Fundamentals and practice**

**Course outcome:-**

CO.1: An ability to apply knowledge of computing and mathematics appropriate to the discipline.

CO.2: An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution.

CO.3: An ability to design, implement and evaluate a computer-based system, process, component, or program to meet desired needs.

CO.4: An ability to use current techniques, skills, and tools necessary for computing practices.

**Paper 32: Advance Electromagnetics**

**Course outcome:-**

CO.1: To provide insight to understand the advance concepts of electromagnetics.

**Paper 33: LAB-VIEW: an Introduction**

**Course outcome:-**

CO.1: Lab-View software and its vast applications in the field of electronics make students creative to develop various types of data logging applications and devises. Students would be able to make various types of simulation circuits in this software for prototype making.

**Paper 34: Website development using Mysql, PHP and HTML**

**Course outcome:-**

CO.1: Students would be able to make different kinds of websites with interactive and attractive menus and images of relevant products. Students also able to develop informative and good websites, pages etc. by learning this course.

**Paper 35: Emerging technology: 3D printer**

**Course outcome:-**

CO.1: Students can develop their own physical 3D models using this technology. The study of 3D scanner makes students interactive in case of physical model to virtual model.

**Paper 36: Radar and Navigation**

**Course outcome:-**

CO.1: Students would be able to understand the concepts of radar technology used in various applications in the field of communication. Students also understand the concepts of navigation field by learning this technology.

**Paper 37: Internet of things**

**Course outcome:-**

CO.1: Students can understand the basic concepts of IoT, Home automation, M2M and system management, IoT design methodology and logical design using python and IoT physical devices and end points and physical servers and cloud offerings. Students also can make their own IoT system by learning this course.

**Paper 38: Fundamentals of Drone Technology**

**Course outcome:-**

CO.1: Students learn the basic concepts of drone making and flying technology and the science behind the drone flying, electronics parts like motors, controller board, remote control, GPS technology. After completing this, students can make their own drone.

**Paper 39: Matlab and Simulink for electronics**

**Course outcome:-**

CO.1: Students can understand the fundamentals of Simulink, Basic Electrical engineering applications, Simulation of rectifiers and inverters, and various applications of this Simulink in the field of electronics.

**Paper 40: Microwave Electronics (Elective-1)**

**Course outcome:-**

- CO.1: To study generation of microwaves.
- CO.2: To study design of microwave integrated circuits.
- CO.3: To study basics of waveguide and its components.

**Paper 40: Fundamentals of Industrial Automation (Elective-2)**

**Course outcome:-**

CO.1: Students can get the knowledge of Basic (fluid) laws and principles, Basic pneumatic and hydraulic system, pumps and compressors, Fluid accessories, cylinders and motors, control valves, Circuits, Pneumatic logic circuits, Fluidics, Transfer devices and feeders.

**Paper 40: Digital Signal Processing (Elective-3)**

**Course outcome:-**

- CO.1: To provide comprehensive treatment of the important issues in design, implementation and applications of digital signal processing theory and algorithms as well as architectures and design techniques for digital filters.
- CO.2: To disseminate basic understanding of signals, Fourier transform and its application.
- CO.3: Student can Identify the signals and systems and apply the principles of discrete-time signal analysis to perform various signal operations as well as apply the principles of Fourier transform analysis to describe the frequency characteristics of discrete- time signals and systems. Perform Fourier transform and inverse Fourier transform

- CO.4: The students will able to acquire basic knowledge of Laplace and z-transforms and can apply the same for various applications.
- CO.5: To disseminate the theory of basic discrete-time signal and system types, convolution sum, impulse and frequency response concepts for linear, time- invariant (LTI) systems, difference equation realization of LTI systems and discrete-time Fourier transform and basic properties of these and make students able to plot and interpret magnitude and phase of LTI system frequency responses.
- CO.6: To make students able to design digital filter using various design methods and types.



## Course Outcome of M.Sc. (Electronics)

### Paper: 1- Fundamental of Electronics Technology

#### Course outcome:-

- CO.1: To disseminate foundation of electronics principles and theories.
- CO.2: To make students understand working of various passive and active electronic devices and their applications.
- CO.3: Understanding fundamentals of digital electronics
- CO.4: To learn about electronic measurements .

### Paper: 2- Foundation of Communication Electronics

#### Course Outcomes:

- CO.1: To make the students understand concept on Communication principles.
- CO.2: To introduce students with the essential approaches, fundamental concepts and design issues in communication science and make them understand and design various circuits for communication using Amplitude Modulation like DSBFC, DSBSC, SSB, SSBSC.
- CO.3: To imbibe concepts of frequency modulation (FM) and Phase modulation (PM).
- CO.4: To familiarize students with various techniques for FM demodulation with the operation of the tuned-circuit FM demodulators like slope detectors, balanced slope detector, Foster-Seeley discriminator and ratio detector.
- CO.5: To study various types of receivers like AM, FM and its characteristics.

### Paper-3: Electromagnetics

#### Course Outcome:

- CO.1: To make students learn various principles and theorems of electromagnetics.
- CO.2: To learn all basic electrostatic theorems and behaviour of electric field in various mediums.
- CO.3: To study behaviour of motion of charges in time varying fields into various mediums
- CO.4: To make students digest Critical concepts and be ready for problem solving

### Paper-4: Computer Hardware

#### Course outcome:

After studying this course, student should be able to:

- CO.1: Understand the fundamental hardware components that make up a computer's hardware and the role of each of these components.
- CO.2: Understand the difference between an operating system and an application program, and what each is used for in a computer.
- CO.3: Student will be able to assemble and/or troubleshoot a personal computer.
- CO.4: Understand the capabilities and limits of the personal computer and Operating System.
- CO.5: Understand computer architecture at the operating level - including expansion buses, operating speed, and memory addressing capability, address bus, Data bus etc.

### **Paper-5: The C Language**

#### **Course outcome:**

- CO.1: To make students able to develop algorithms, which will help them to create programs, applications in C.
- CO.2: Learning basic structure of C program, various components like data types, variables, constants, strings, tokens, conditional statements, loops, arrays, structures, subroutines, memory management, pointers, pre-processor programming, macros etc.

### **Paper-6: The advance electromagnetics**

#### **Course outcome :**

- CO.1: To disseminate advanced concepts of electromagnetics
- CO.2: To make students apply the learned concepts.

### **Paper-7: Digital Communication System**

#### **Course outcome :**

- CO.1: To introduce students with conventional digital communication.
- CO.2: To explain concepts of digital modulation using ASK, FSK, PSK, QAM, and DPSK.
- CO.3: Studying digital transmission and multiplexing of PCM encoded signals and comprehensive description of telephone instruments, signals and wireline systems used in the public telephone network.
- CO.4: To study telephone instruments and the technology of public telephone exchanges.
- CO.5: Learning the concepts of wireless telephone systems, including cellular and PCs

### **Paper-8: Advance Digital Electronics**

#### **Course outcome :**

- CO.1: Learning various digital electronic circuits, programmable logic devices, flip flops, multiplexers and de multiplexers, counters and registers. Learners would be able to design different types of digital devises themselves.
- CO.2: To give concepts of 8 bit microprocessor programming.

### **Paper-9: Circuits and Network**

#### **Course Outcome :**

- CO.1: Learning different types of electronic circuits.
- CO.2: To make students able to analyse the electronic circuits and solve the complex networks for analytical purpose.

### **Paper-10: Control System Analysis**

#### **Course outcome**

- CO.1: To make students learn concept of control, process, its analysis and control strategy
- CO.2: To prepare students to learn various control mechanisms and understand their consequences on the process.

### **Paper-11: Op-Amp and its Applications**

#### **Course outcome:**

This course distributed into four units are as below.

- CO.1: Understand working of operational amplifier and its characteristics.
- CO.2: Design the solution for linear & non-linear applications using IC741
- CO.3: Elucidate, design and realize the active filters and oscillators.
- CO.4: Identify the needs of voltage regulators and timers and to design accordingly.

### **Paper-12: x86 Microprocessor system**

#### **Course outcome:**

- CO.1: Making students understand basic architecture of 8086, interfacing of 8086 with memory and peripheral chips involving system design and techniques for programming 8086 microprocessor.
- CO.2: To make the students able to write programs for 8086 microprocessor.
- CO.3: To inculcate the deep understanding of the microprocessor architecture, its instruction set and hardware interfacing around it.

### **Paper-13: Automation with PLC and SCADA**

#### **Course outcome :**

At the end of the course student will be:

- CO.1: Able to understand different types of Devices to which PLC input and output modules are connected
- CO.2: Able to create ladder diagrams from process control descriptions.
- CO.3: Able to use different types PLCs for particular application
- CO.4: Able to develop a coil and contact control system and control motor drives for the Industrial Automation.

### **Paper-14: Embedded Programming using AVR**

#### **Course outcome :**

- CO.1: Understand the architecture, software model and interfacing of AVR microcontroller.
- CO.2: Learning programming of AVR microcontroller based systems for various embedded applications.
- CO.3: Learning various tools for programming and debugging.

### **Paper-15: Computer Aided Designing**

#### **Course outcome:**

- CO.1: To train to the students to develop the different kinds of 3D models using Siemens software NX 1.
- CO.2: To disseminate fundamental knowledge required for creation of such models.

### **Paper-16: Optional**

#### **1. VHDL**

#### **Course outcome :**

- CO.1: Learning the concepts of Verilog Hardware Description Language
- CO.2: To make students would be able to program FPGA and CPLD ICs for numerous types of applications of embedded system world.



## **2. Digital signal Processing**

### **Course outcome :**

- CO.1: To provide comprehensive treatment of the important issues in design, implementation and applications of digital signal processing theory and algorithms as well as architectures and design techniques for digital filters.
- CO.2: To disseminate basic understanding of signals, Fourier transform and its application.
- CO.3: Student can Identify the signals and systems and apply the principles of discrete-time signal analysis to perform various signal operations as well as apply the principles of Fourier transform analysis to describe the frequency characteristics of discrete- time signals and systems. Perform Fourier transform and inverse Fourier transform
- CO.4: The students will able to acquire basic knowledge of Laplace and z-transforms and can apply the same for various applications.
- CO.5: To disseminate the theory of basic discrete-time signal and system types, convolution sum, impulse and frequency response concepts for linear, time- invariant (LTI) systems, difference equation realization of LTI systems and discrete-time Fourier transform and basic properties of these and make students able to plot and interpret magnitude and phase of LTI system frequency responses.
- CO.6: To make students able to design digital filter using various design methods and types.

## **3. Radar and Navigation**

### **Course outcome :**

After studying this course, student should be able to:

- CO.1: Acquire knowledge in the topic such as fundamental of RADAR.
- CO.2: To become familiar with fundamentals of different types of RADAR.
- CO.3: To gain in depth knowledge about the different types of RADAR and their operation.
- CO.4: Understand signal detection in RADAR and various detection techniques.
- CO.5: Understand navigational aids and modern Navigation.

## **4. Microwave Electronics**

### **Course outcome :**

- CO.1: To study generation of microwaves.
- CO.2: To study design of microwave integrated circuits.
- CO.3: To study basics of waveguide and its components.

## Course Outcome of M.A. (English)

### **CCT - 01 Elizabethan Literature**

- CO 1: To know an important period in the history of English Literature.  
CO 2: To explore works of Elizabethan dramatists and poets.  
CO 3: To understand the contribution of Renaissance writers in the whole history of English history.

### **CCT-02 English Literature of the Restoration and Neo Classical Periods**

- CO 1: to have complete understanding of two Periods of English Literature.  
CO 2: to understand how these two Ages were different.  
CO 3: to know how different forms of literature develop in each age and how some forms are dominant in a particular age.

### **CCT - 03 Linguistics and English Phonology & Grammar**

- CO 1: to understand concepts of Linguistics, Phonetics and Grammar.  
CO 2: to use language with understanding of right manner of articulation.  
CO 3: to improve their speaking skills after learning communicative grammar.

### **ECT – 01(A) Literary Criticism: Early 20<sup>th</sup> Century Development**

- CO 1: Students will understand the changing trends in Literary Criticism.  
CO 2: Students will know 20<sup>th</sup> century schools of Critics who contributed significantly in the field of Criticism and theory.

### **ECT – 01(B) Indian English Literature-19<sup>th</sup> Century**

- CO 1: to know how Indian English writers made significant contribution by bringing reforms in society through writing.  
CO 2: to understand the beginning and development of Indian English literature during 19<sup>th</sup> Century.

### **ECT – 01(C) New Literatures: African Literature**

- CO 1: to explore a different culture through studying African literary works.  
CO 2: to make a comparative study of African works of literature with works of other literatures for their research.

### **ECT – 01(D) European Classics: Greek and Roman**

- CO 1: to have complete idea of the Greek and Roman periods and the representative classics of these ages that set European literary tradition.  
CO 2: to get complete understanding of the ancient forms-epic, tragedy and comedy.  
CO 3: to have understanding of how the tradition of Literary Criticism begins with Plato and Aristotle's pioneering contribution.

### **ECT – 01(E) Comparative Literature**

- CO 1: to make comparative study of works of literature.

CO 2: to understand different schools of Comparative Literature.

CO 3: to analyze works of literature with comparative perspective that would help them to understand literary works in a better way.

### **ICT – 01 Research Methodology**

CO : It would help students in their M.Phil. and PhD research.

### **CCT 04 English Literature of the Romantic Period**

CO 1: to get complete understanding of Romantic Era and characteristics of the literature of the Age.

CO 2: to understand the development of Poetry for which Romantic Age is known.

CO 3: to be familiar with the representative works of the Age.

### **CCT 05 English Literature of the Victorian Period**

CO 1: to have complete understanding of Victorian Age in English literature.

CO 2: to understand the significance of the Age in the history of English literature.

CO 3: to have complete idea of the characteristic features of literature of the Age.

### **CCT 06 Criticism as a Response to Literature I**

CO 1: to know the role of Criticism in evaluating/analyzing/interpreting literature.

CO 2: to develop understanding of how a literary work can be better explored and interpreted through critical responses.

### **ECT-02(A) Contribution of the Teacher Critics**

On completing the Course, the student will be able to

CO : to know the contribution of teacher critics in the field of literary criticism and theory.

### **ECT-02(B) Indian English Literature-1900-1950**

CO 1: to understand the development of Indian English Literature during these fifty years.

CO 2: to know the contribution of Indian writers who wrote and influenced the society during these years of colonial period.

### **ECT-02(C) New Literatures: Caribbean Literature**

CO 1: to get an idea some representative works of Caribbean Literature.

CO 2: to know a different culture through the study of Caribbean works.

### **ECT-02(D) European Classics: Medieval to 17<sup>th</sup> Century**

CO 1: to understand some path-breaking works of European literature that set new traditions.

CO 2: to know the contribution of some pioneers of English literature.

### **ECT-02 (E) Reception Study: Comparative Literature**

1. To develop understanding of the nature of literary transactions

2. to realize the changes brought into a literary system as a result of contact with another culture.

3. To understand the transformation of the elements received.

### **ICT-02 General Semantics**

- 1.to gain total understanding of the basic ideas, theories and applications of General Semantics
- 2.to know the socio-cultural and epistemological contexts of General Semantics as a philosophical-scientific method propounded by Alfred J. Korzybski
- 3.to understand the implications of General Semantics in the domains of thought, language, communication and action
- 4.to train themselves in developing the mental habits recommended by Alfred Korzybski

### **CCT 7: Modern British Literature**

- CO 1: Understand the experimentations in literature ushered in the twentieth century.
- CO 2: Get an idea of the avant-garde in arts and literature in the Modern period.
- CO 3: Gain awareness of the significant changes challenging the literary-cultural perspectives of the „old world‘.

### **CCT 8: Postmodern British Literature**

- CO 1: Get an idea of the array of problems the post-World War II ushered in.
- CO 2: Understand the literary responses to the changed realities in England and Europe after World War II.
- CO 3: Gain knowledge of the ‘postmodern’ in English literature.

### **CCT 9: Criticism as a Response to Literature II**

- CO 1: Gain an understanding of the trajectory of criticism taken beyond the Medieval period.
- CO 2: Understand the transition of ‘criticism’ into ‘theory’.
- CO 3: Link this course with Course CCT 06 taught in the previous semester thus extending their knowledge of literary criticism in the Enlightenment and the Romantic periods.

### **ECT 3 – A: Critical -Theoretical ‘isms’-I**

- CO 1: Acquaint themselves with the important theorists and their contribution.
- CO 2: Familiarize themselves with the seminal texts (essays) by these theorists.
- CO 3: Draw the linkages between literary and critical-theoretical studies.

### **ECT 3 – B: Indian English Literature- 1950-1980**

- CO 1: Study the growth and development of post-independence IEL.
- CO 2: Familiarize themselves with the major modern Indian English writers.
- CO 3: Understand the modern trends in IEL and its historical, cultural and social context.

### **ECT 3 – C: New Literatures: 20<sup>th</sup> C American Literature**

- CO 1: Gain an exposure wider than just British literature.
- CO 2: Realise that just like in India, literature originally written in English language emanates from diverse parts of the world.
- CO 3: Acquire a comparative sense of literature and literary trends vis-à-vis English literature.

### **ECT 3 – D: European Literature: 19<sup>th</sup> Century Classics**

- CO 1: Acquaint themselves with the European literary classics of the 19<sup>th</sup> century.  
CO 2: Understand the term 'classic' in the context of literature of the period under consideration.  
CO 3: Familiarize themselves with the various literary trends of 19<sup>th</sup> century Europe.

**ECT 3E: Comparative Literature: Translation Study**

- CO 1: Acquaint themselves with the major issues in the field of translation studies.  
CO 2: Become aware of the different types of translation.  
CO 3: Gain knowledge about the various theories of interpretation.

**ECT-4(A): Women's Empowerment: Feminist Critical Discourse**

- CO 1: Understand feminist ideology.  
CO 2: Gain comprehensive knowledge about a major feminist text.  
CO 3: Gain sensitivity about feminist issues and women's empowerment.

**ECT-4-B: Film Studies: Theory**

- CO 1: Gain an overall exposure to this genre – Cinema – often considered as the 'new text'.  
CO 2: Study the key terms and concepts of this medium.  
CO 3: Acquaint themselves with the canonical film-makers, Western and Indian and learn to critically appreciate them.

**ECT-4-C: New Genres-Travel Writing and Memoir**

- CO 1: Gain knowledge of the new literary genres beyond the three conventional genres of poetry, drama and fiction.  
CO 2: Study travel writing, memoirs and autobiography and how to critically appreciate these.  
CO 3: Expand the reading horizon and to make them aware how these genres contribute to our understanding of life in general and societies / cultures in particular.

**Semester III ECT-4-D: Western Folklore**

- CO 1: Familiarize themselves with the discipline of folklore studies.  
CO 2: Gain exposure to the vibrancy of oral literatures in the West.  
CO 3: Gain a critical acumen for forms of cultural representations like folktales and folk songs.

**Semester III ECT-4-E: Ecocriticism**

- CO 1: Understand why ecology and environment are accorded the topmost concern in these times.  
CO 2: Develop a shared responsibility through a study of this course that encompasses ecological issues and that this area should not be left to the realms of science and technology alone.  
CO 3: Understand the human angle to this discipline, and acquaint themselves with the areas like 'environmental criticism', 'ecocriticism' and 'green studies'.

**CCT-10 English Language Teaching**

- CO 1: To equip themselves to teach English as Second Language at the undergraduate levels.  
CO 2: To introduce themselves to various aspects of language teaching.  
CO 3: To make themselves aware of various theories of language teaching and testing.

### **CCT-11 Indian Poetics**

- CO 1: To introduce and bring out salient features of the major schools of Indian Poetics  
CO 2: To introduce various schools of Literature  
CO 3: To examine its suitability for understanding various issues like Literature, Creative Artist, Literary experience, Meaning and its Interpretation etc.  
CO 4: To propose areas of comparison between Indian and western poetics.

### **CCT-12 Indian Literature in Translation**

On completing the Course, the student will be able to

- CO 1: To introduce themselves to Indian Literatures through their translations.  
CO 2 : To approach the prescribed texts for their literary value and cultural significance.  
CO 3: To approach these texts from cross-cultural perspectives.

### **ECT-5 A Critical-Theoretical 'Isms' -II**

On completing the Course, the student will be able to

- CO 1: acquaint themselves with the important theorists and their contribution  
CO 2: familiarize themselves with the seminal texts (essays) by these theorists  
CO 3: draw the linkages between literary and critical-theoretical studies

### **ECT-5 B : Indian English Literature- Post 1980s**

On completing the Course, the student will be able to

- CO 1: study the trends in Indian English Literature after 1980s.  
CO 2: introduce themselves to the major contemporary Indian English writers.  
CO 3: develop insights into the historical cultural and social contexts in Indian English Writing and the emerging trends.

### **ECT-5 C: New Literatures: Canadian Literature**

- CO 1: have an adequate exposure to an important segment of non-British literature, i.e., Canadian Literature.  
CO 2: supplement their exposure to other non-British literatures written in English studied by them in the previous two semesters.  
CO 3: comprehend important/canonical Canadian authors and their works.

### **ECT-5 D 20<sup>th</sup> Century European Literature**

- CO 1: understand the varieties of European literature.  
CO 2: understand the classics of European literature  
CO 3: understand human issues and concerns reflected in the modern literature

### **ECT-5 E: Practical Translation**

- CO 1: Prepare themselves for research in future.

CO 2: Learn practical translation with the help of theories learnt by them.

CO 3: Learn to organize their thoughts, relate them with the contexts and assess them in the light of theories.

### **ECT-6 A Women Empowerment- Feminists Creative Writings**

CO 1: Understand the major women creative writers

CO 2: Acquaint themselves with the seminal works of women creative writers

CO 3: Equip themselves with the knowledge and sensibilities to appreciate women writers and issues projected in their works

### **ECT-6 B Film Studies (Practice): Appreciating Indian Films**

CO 1: practically complement their theoretical understanding of the films in the previous semester.

CO 2: Appreciate four very famous Indian (Hindi) films applying the knowledge of what they have learnt in the theory paper

### **ECT-6 C : New Genres- Autobiography and Biography**

CO 1: develop interest in the study of new genres of literature

CO 2: equip themselves with the skills of appreciating the new genres

CO 3: make themselves aware of the art of biography and autobiography

### **ECT-6 D: Indian Folklore**

CO 1: realize the importance of the rich tradition and treasure of folklore

CO 2: understand the issues involved in the study of folklore

CO 3: understand the relationship between literature and folk literature

### **ECT-6 E : Postcolonial Ecocriticism**

CO 1: Relate the aspects of this interdisciplinary area of knowledge beyond the scope of the previous semester

CO 2: add the perspective of postcolonialism to ecocriticism.

CO 3: make themselves aware of the interrelationships between humans, animals and the environment against the backdrop of human activities in the first (and only) colony for the humans i.e. the Earth.

## **Course Outcome of M.Phil. (English)**

### **Course Title: CCT 01 - Research Methodology**

- CO-1 to acquaint the students with the fundamentals and mechanics of literary research.  
CO-2 to make them aware of the operations of human thought and analysis, interpretation, generalizations and evaluation of these thoughts with reference to the texts.  
CO-3 to train them for research papers, research proposals and thesis.  
CO-4 to develop research skills in the students

### **Title of the Course: CCT-2: Theories of Evaluation**

- CO-1 to acquaint learners with critical theories.  
CO-2 to evaluate fundamental cornerstones of human society and its condition from a relatively contemporary perspective.  
CO-3 balance Western and Asian theoreticians achieving thereby a modicum of inclusivity.

### **Title of the course: ECT-1 (A) Application of Indian Literary Approaches to Specific Texts**

- CO-1 to apply Indian critical approaches to specific texts.  
CO-2 to apply a critical approach to a text in a way preparing them to become better readers and researchers.  
CO-3 to enhance the enjoyment of both reading texts and knowing critical theories.

### **Title of the course: ECT-1 (B) Applying Western Theories to Specific Texts**

- CO-1 to apply Western Theories to specific texts.  
CO-2 to form a link between the learner's activities in their Master's programme.  
CO-3 to study texts and critical theories in isolation.

### **Title of the Course: ECT 01 (C) – Cultural Studies**

- CO-1 to provide learners with the theoretical understanding of the concept of culture and its emergence as an independent academic discipline.  
CO-2 to examine the works of the key thinkers in this discipline.  
CO-3 to examine the various schools in this discipline.  
CO-4 to examine its links / overlap with literary studies.  
CO-5 to evaluate its salient features and anticipate the emerging areas in the twenty-first century.



## **Course Outcome of M.A. Gujarati**

### **CCT – 01 Language - Literature Skills**

CO1 : To get Information about the interest of poetry.

CO2 : To cultivated of the Understand to rhyme and Ornaments.

CO3 : To aware and understanding of language purity can be cultivated.

### **CCT - 02 Linguistics**

CO1 To Get a Classical information of various meanings of language.

CO2 Student can obtained Knowledge of the scope and methods of study of linguistics. To aware about Theoretical thinking of linguistics.

### **CCT – 03 Author’s study (Medieval) Shamal**

CO1 Introduction to Medieval Literature

CO2 Student can get acquainted with the contributions of Shamal in medieval literature.

Notable works of Shamal can be understood.

### **ECT - 01 The study of Literature forms : Form of Drama (Optional)**

CO1 To get a information of literature form of drama in detail

CO2 Get a origin and development of Gujarati drama

CO3 To get introduction of traditional and experimental drama.

### **ECT - 01 Folklore (Optional)**

CO1 Get classical information about folklore

CO2 Get acquainted with the forms and features of folklore.

CO3 Get knowledge of difference between folk literature and colloquial literature

### **ICT - 01 The Classical text of Indian literature**

CO1 To get a definition of classic literature

CO2 Student can archive the literature enjoy to study in different Indian languages

### **CCT- 04 Literature and Modernity**

CO1 The concept of modernity should be understood

CO2 Get information of various literary theories

CO3 Student will get a test of Modern Gujarati literary text

### **CCT - 05 Gujarati Language Thought**

CO1 To get Introduction of Indo-European Linguistics and its Branches

CO2 Information of the various types and forms of Prakrit and Apabhramsa should be available.

CO3 The origin and development of Gujarati language can be studied.

### **CCT - 06 Author's Study (Modern) Raghuveer Chaudhary:**

CO1 Raghuveer Chaudhary's locus in modern Gujarati literature can be known.

CO2 An introduction to the life and literature of Raghuveer Chaudhary should be found. Raghuveer Chaudhary's novels and short stories can be studied.

### **ECT - 02 Contemporary literature (Optional)**

CO1 Contemporary literature have been introduced

CO2 Notable short stories and essay of contemporary literature can be introduced,.

### **ECT-02 Discussion of the form of folklore: (Optional)**

CO1 To get the classical information about the folklore

CO2 Introduce the forms and features of folklore.

CO3 Understand the difference between folklore and colloquial literature.

### **ICT - 02 Different approaches to criticism**

CO1 To get Introduction of various approaches to criticism

CO2 To get the Special introduction to morphological and sociological approaches

### **CCT -07 Bharti Sahity Mimansa**

CO1 To get information of Bharti Sahity Mimansa

CO2 Student can study about Ras, Dhvani, Vakrokti, Auchitya, Ramaniyata and Riti.

### **CCT - 08 Indianness and Indian Literature:**

CO1 Get information about the concept of Indianness

CO2 The material of Indianness reflected in Gujarati literature should be found.

CO3 Student can study to various literary texts in Indian languages

### **CCT - 09 Traditions of Gujarati Criticism:**

CO1 The form, characteristics and type of Criticism can be introduced.

CO2 To clear about the tradition of Gujarati criticism

CO3 Student can studied of the main critic of Narmad era to postmodern era

**ECT-03 Literature and Film: (Optional)**

CO1 The form, purpose and scope of literature and film can be introduced.

CO2 Introduce films based on Gujarati and Indian literary text.

**ECT - 03 Study of Folklore Researchers and Editors: (Optional)**

CO1 To understood the Folklore Research in Gujarati.

CO2 To understood the editor of Gujarati folklore.

**ECT - 04 Jain literatures and saint literature: (Optional)**

CO1 To get introduction of Jain literature

CO2 Forms and researches of Jain literature can be studied.

CO3 Forms and researches of saint literature can be studied

**ECT - 04 Gandhian Literature and Gandhi-Affected Literature: (Optional)**

CO1 An introduction to Gandhiji's personality and literature.

CO2 Gandhian ideology and its influence on Gujarati literature.

**CCT – 10 Pashchatay Sahity Mimansa**

CO1 Introduction to Pashchatay Sahity Mimansa

CO2 A study of the main Pashchatay Sahity Mimansak can be done.

CO3 Student can comparative study of Indian Sahity Mimansa and Pashchatay Sahity Mimansa can be done.

**CCT- 11 World Literature**

CO1 Introduction to World Literature

CO2 The major works of world literature can be studied.

CO3 The concept of Gujarati literature should be found in the context of world literature

**CCT - 12 modern Gujarati literature**

CO1 Introduction to modern Gujarati literature.

CO2 Special study of modern Gujarati poetry and fiction can be done.

CO3 To get introduction of notable modern Gujarati literary texts

**ECT - 05 Feminism and Gujarati Literature: (Optional)**

CO1 An introduction to Feminist Gujarati literature.

CO2 Some feminist Gujarati literary texts can be studied.

**ECT - 05 Charni Literature: (Optional)**

CO1 Introduction to Charni Literature.

CO2 Comparative study of Charni literature and colloquial literature can be done

**ECT – 06 Comparative Literature: (Optional)**

CO1 Theoretical introduction to comparative literature.

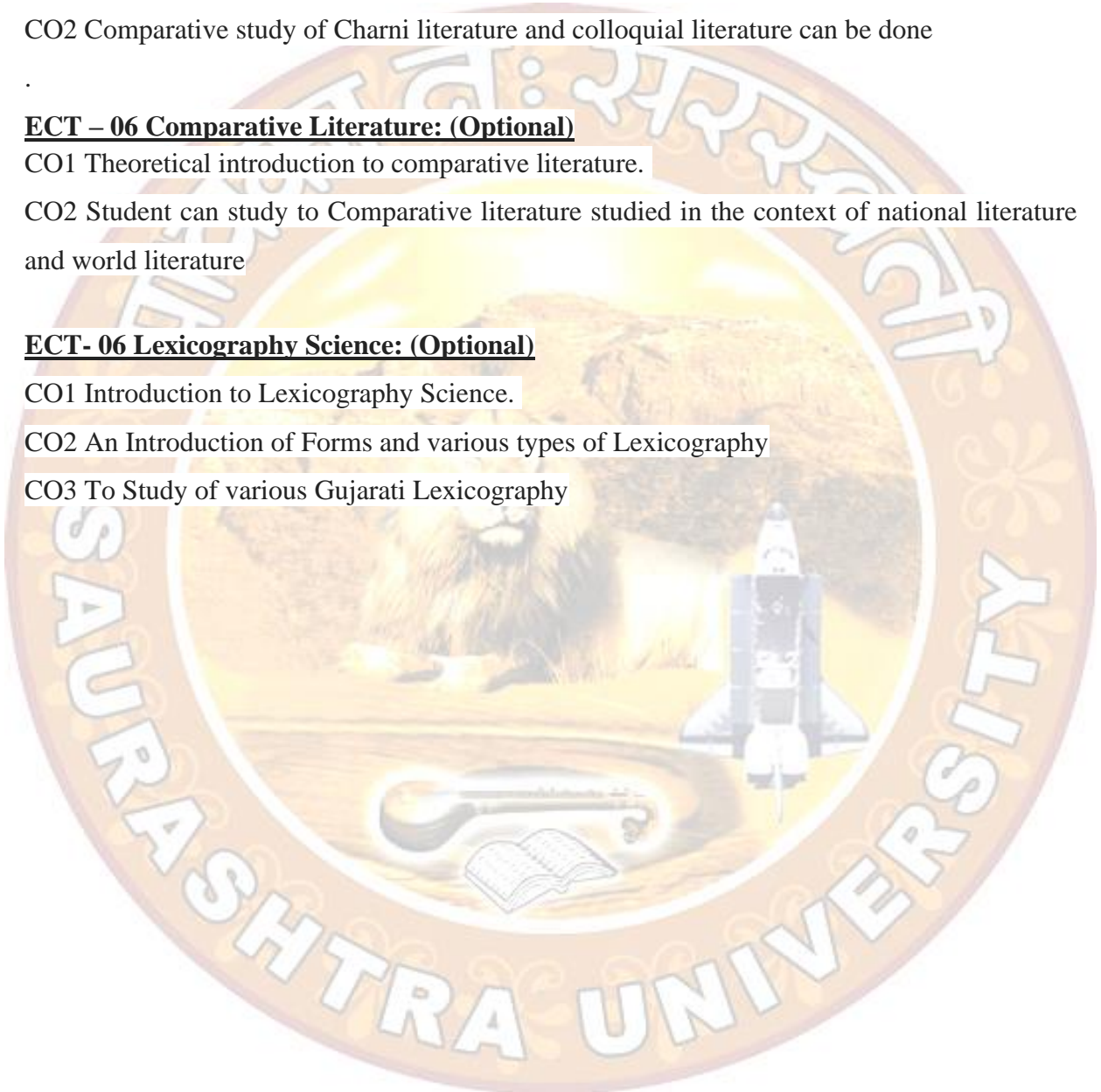
CO2 Student can study to Comparative literature studied in the context of national literature and world literature

**ECT- 06 Lexicography Science: (Optional)**

CO1 Introduction to Lexicography Science.

CO2 An Introduction of Forms and various types of Lexicography

CO3 To Study of various Gujarati Lexicography



## **Course Outcomes of M.Phil. Gujarati**

### **CCT - 01 Research Methodology**

CO1 The purpose and form of research can be studied.

CO2 Student can study the scope of research and the differences between research and Criticism.

### **CCT – 02 New trends of criticism.**

CO1 An Introduction of New trends of criticism.

CO2 Special study of morphology and structuralism can be done.

CO3 Special study of neo-criticism movement and postmodernism can be done.

### **ECT - 01 Contribution of Gujarati Literature Researcher (Optional)**

CO1 An introduction of Contribution of Gujarati literature researchers.

CO2 Student can study the research of K. K. Shastri, Bhogilal Sandesara and Jayant Kothari.

CO3 Student can study the research of Umashankar Joshi, Harivallabh Bhayani and Urmi Desai.

### **ECT - 01 Gujarati literature Research Books (Optional)**

CO1 An introduction of Gujarati Literature Research Books.

CO2 Student can study some selected Midvale Literature Research Books.

CO3 Student can study some selected modern Literature Research Books.

### **CCT - 03 Dissertation**

CO1 Cultivate student's Research Vision.

CO2 The Student's writing skills develop.

CO3 The student practices writing a Dissertation.

## Course Outcomes of M.A. (Hindi)

### कला संकाय (अनुस्नातक हिन्दी) पाठ्यक्रम वर्ष - २०१६

पाठ्यक्रम उद्देश्य : COs 1. छात्रगण आदिकालीन काव्यों का परिचय प्राप्त करें।

- COs 2. पाठ्यक्रम संबंधी छात्र पृथ्वीराज चौहान की वीरता, धीरता, विवेक एवं मर्यादा को विस्तार से जाने।
- COs 3. प्रस्तुत पाठ्यक्रम द्वारा छात्रगण राष्ट्रीय कवि अमीर खुसरो के बारे में विस्तार से जानें।
- COs 4. प्रस्तुत पाठ्यक्रम के अध्येता अमीर खुसरो की पहलियाँ, मुकरियों का ज्ञान प्राप्त करें।
- COs 5. छात्रगण आल्हा और उदल नामक वीरों की वीरता को विस्तार से जानें।
- COs 6. प्रस्तुत पाठ्यक्रम द्वारा छात्रगण हिन्दी मुसलमान कवियों और उनके साहित्य के बारे में ज्ञान प्राप्त करें।

### कला संकाय (अनुस्नातक हिन्दी) पाठ्यक्रम वर्ष - २०१६

पाठ्यक्रम उद्देश्य : COs 1. प्रस्तुत पाठ्यक्रम के अध्ययन से अध्येता मानव चित्तवृत्तियों की विकसित परंपरा के साथ साहित्य परंपरा के विकास को जानें।

- COs 2. छात्रगण हिन्दी साहित्य के इतिहास के अध्ययन से भारतीय जीवन मूल्यों का परिचय प्राप्त करें।
- COs 3. हिन्दी साहित्य के इतिहास के अध्ययन से छात्रगण भारतीय भाषा, साहित्य एवं संस्कृति की अस्मिता को जानें।
- COs 4. छात्रगण हिन्दी साहित्य के इतिहास के अध्ययन से साहित्यिक संवेदना को विस्तार से समझे।
- COs 5. हिन्दी साहित्य के इतिहास के अध्ययन से अध्येता राष्ट्रीय एवं अंतर्राष्ट्रीय सामाजिक, सांस्कृतिक, राजनैतिक, आर्थिक एवं साहित्यिक हलचलों से अवगत होगा।

- COs 6. प्रस्तुत पाठ्यक्रम के अध्ययन से अध्येता इतिहास के विभिन्न काल-खण्डों की प्रवृत्तियों को विस्तार से जानें।
- COs 7. छात्रगण हिन्दी साहित्य के इतिहास को पढ़कर साहित्य-स्वरूपों की बदलती प्रक्रिया को भी विस्तार से जानें।

### कला संकाय (अनुस्नातक हिन्दी) पाठ्यक्रम वर्ष - २०१६

पाठ्यक्रम उद्देश्य : COs 1. प्रस्तुत पाठ्यक्रम संबंधित छात्र भाषा-विज्ञान के सैद्धांतिक एवं व्यावहारिक स्वरूप को विस्तार से जानें।

- COs 2. छात्रगण भाषा एवं भाषा विज्ञान के अंतःसंबंध को जानें।
- COs 3. भाषा विज्ञान के अध्यापन के द्वारा अध्येता को भाषा उच्चारण, प्रयोग एवं उपयोग की शिक्षा देना।
- COs 4. भाषा विज्ञान के अध्ययन के द्वारा छात्रगण विश्व-भाषाओं के परस्पर संबंध को विस्तार से समझे।
- COs 5. छात्रगण भाषा विज्ञान का अध्ययन करके विश्व की विभिन्न भाषाओं की समानता स्थापित करके विश्व-एकता और विश्व-बन्धुत्व का भाव समझें।
- COs 6. छात्रगण भाषा विज्ञान का शिक्षण प्राप्त करके बोली, भाषा, विभाषा का अंतः संबंध जानें।

### कला संकाय (अनुस्नातक हिन्दी) पाठ्यक्रम वर्ष - २०१६

पाठ्यक्रम उद्देश्य : COs 1. पाठ्यक्रम संबंधी छात्र प्रस्तुत पाठ्यक्रम अध्ययन के द्वारा भारतीय भाषाओं के साहित्य का ज्ञान प्राप्त करें।

- COs 2. छात्रगण प्रस्तुत पाठ्यक्रम का अध्ययन करके भारतीय एकता एवं अखण्डितता को मूल-भूत रूप से जानें।
- COs 3. छात्रगण प्रस्तुत पाठ्यक्रम का अध्ययन करके विश्व-बन्धुत्व की भावना को सुदृढ़ करें।
- COs 4. छात्रगण प्रस्तुत पाठ्यक्रम अध्ययन करके जन-जन में भारतीय सांस्कृतिक चेतना को जागृत करें।
- COs 5. छात्रगण बंगला-साहित्य के बारे में विस्तृत जानकारी प्राप्त करें।
- COs 6. छात्रगण बंगला साहित्य का अन्य भारतीय साहित्य पर अंकित प्रभाव को समझें।

### कला संकाय (अनुस्नातक हिन्दी) पाठ्यक्रम वर्ष - २०१६

पाठ्यक्रम उद्देश्य :

- COs 1. छात्रगण हिन्दी महिला लेखन के इतिहास से परिचित होंगे।
- COs 2. पाठ्यक्रम संबंधी छात्रगण पुरुष प्रधान समाज में महिलाओं की स्थिति जानें।
- COs 3. छात्रगण नारी चेतना, नारीवाद, नारी-विमर्श का भेद जानें।
- COs 4. पाठ्यक्रम संबंधी छात्र नारी द्वारा नारी-अस्मिता के सर्जन को विस्तार से जानें।
- COs 5. प्रस्तुत पाठ्यक्रम के द्वारा समाज में आये नारी-जीवन परिवर्तनों को विस्तार से जानें।
- COs 6. छात्रगण बदलती पुरुष-प्रधान समाज व्यवस्था में नारी समाज-जीवन का भविष्य जानें।

### कला संकाय (अनुस्नातक हिन्दी) पाठ्यक्रम वर्ष - २०१६

- पाठ्यक्रम उद्देश्य : COs 1. छात्रगण तुलनात्मक साहित्य का स्वरूप जानें ।  
COs 2. छात्रगण के लिए तुलनात्मक साहित्य के अध्ययन की परिधि सस्पष्ट हो ।  
COs 3. छात्रगण तुलनात्मक साहित्य का इतिहास समझें ।  
COs 4. छात्रगण तुलनात्मक साहित्य और तुलनात्मक भारतीय साहित्य की अवधारणा को समझें ।  
COs 5. छात्रगण भारतीय साहित्य का अध्ययन कर भारतीयता का स्वरूप समझें ।  
COs 6. छात्रगण विश्व साहित्य की अवधारणा को समझते हुए तुलनात्मक साहित्य और संस्कृति का स्वरूप समझें ।

### कला संकाय (अनुस्नातक हिन्दी) पाठ्यक्रम वर्ष - २०१६

- पाठ्यक्रम उद्देश्य : COs 1. छात्रगण उपन्यास सम्राट मुन्शी प्रेमचंद के व्यक्तित्व एवं कृतित्व को समझे ।  
COs 2. छात्रगण प्रस्तुत पाठ्यक्रम के माध्यम से प्रेमचंद के कृषि जीवन के वैचारिक आन्दोलन को विस्तार से समझे ।  
COs 3. छात्रगण हिन्दी मनोवैज्ञानिक उपन्यासकारों के उपन्यासों के प्रति आकृष्ट हों ।  
COs 4. छात्रगण 'त्यागपत्र' पढ़कर आत्मचेतना को ओर भी अधिक समझने का प्रयत्न करें ।  
COs 5. छात्रगण आत्मकथा का स्वरूप जानें ।  
COs 6. छात्रगण हिन्दी आत्मकथाओं में महिला आत्म कथाकारों की आत्मकथाओं से परिचित होंगे ।  
COs 7. छात्रगण हिन्दी दलित साहित्य का ज्ञान प्राप्त करें ।  
COs 8. प्रस्तुत पाठ्यक्रम के माध्यम से छात्रगण मानव समाज-जीवन में समन्वयात्मक दृष्टिकोण को अपनायें ।

### कला संकाय (अनुस्नातक हिन्दी) पाठ्यक्रम वर्ष - २०१६

- पाठ्यक्रम उद्देश्य : COs 1. छात्रगण दृश्य-श्रव्य माध्यमों का परिचय प्राप्त करें ।  
COs 2. छात्रगण प्रौद्योगिकी युग में दृश्य-श्रव्य माध्यमों की उपयोगिता को विस्तार से जानें ।  
COs 3. प्रस्तुत पाठ्यक्रम के अध्येता जनसंचार माध्यम में हिन्दी की उपयोगिता का महत्व जानें ।  
COs 4. छात्रगण प्रस्तुत पाठ्यक्रम का अध्ययन करके रोजगारी प्राप्त करें ।  
COs 5. छात्रगण रेडियो में प्रयुक्त हिन्दी भाषा का ज्ञान प्राप्त करके मौखिक अभिव्यक्ति की प्रतिभा को विकसित करें ।  
COs 6. छात्रगण हिन्दी प्रचार-प्रसार में दृश्य-श्रव्य माध्यमों की भूमिका समझे ।

### कला संकाय (अनुस्नातक हिन्दी) पाठ्यक्रम वर्ष - २०१६

- पाठ्यक्रम उद्देश्य : COs 1. पाठ्यक्रम से संबंधित छात्र कबीर, तुलसी, बिहारी एवं रसखान के जीवन-वृत्त को जानें ।  
COs 2. छात्रगण हिन्दु-मुस्लिम ऐक्य की पीठिका पर रसखान का महत्व जानें ।  
COs 3. छात्रगण मध्यकालीन, भक्ति, समाज, संस्कृति एवं राजनीति का वर्तमान परिपेक्ष्य में मूल्यांकन करें ।  
COs 4. प्रस्तुत पाठ्यक्रम में अध्ययनरत छात्र को बिहारी लौकिक-अलौकिक दार्शनिकता को विस्तार से जानें ।  
COs 5. छात्रगण वर्तमान जाति, धर्म, सम्प्रदाय की समस्याओं के बीच तुलसी का महत्व प्रस्थापित करें ।  
COs 6. छात्रगण कबीर की साम्प्रत-महत्ता को विस्तार से जानें ।

### कला संकाय (अनुस्नातक हिन्दी) पाठ्यक्रम वर्ष - २०१६

- पाठ्यक्रम उद्देश्य : COs 1. हिन्दी साहित्य के आधुनिक काल को पढ़कर छात्रगण प्रस्तुत काल के निर्माण की परिस्थितियों को जानें ।  
COs 2. प्रस्तुत पाठ्यक्रम को पढ़कर पाठकगण पुनर्जागरण, नवजागरण, पुनरुत्थान की चेतना से अवगत होंगे ।  
COs 3. छात्रगण प्रस्तुत पाठ्यक्रम को पढ़कर देशप्रेम की बलवती भावना से परिचित होंगे ।  
COs 4. छात्रगण प्रस्तुत पाठ्यक्रम अध्ययन के माध्यम से इतिहास में व्यक्त विभिन्न दर्शनों को विस्तार जानें ।  
COs 5. हिन्दी साहित्य के आधुनिक युग को पढ़कर पाठक मनुष्य की अधुनातन मानसिकता को जानें ।  
COs 6. छात्रगण प्रस्तुत पाठ्यक्रम को पढ़कर नये साहित्यिक स्वरूपों से परिचित होंगे ।  
COs 7. छात्रगण आधुनिक हिन्दी साहित्य के इतिहास को पढ़कर नये साहित्यिक स्वरूपों में आये वैचारिक आन्दोलनों को जानें ।  
COs 8. छात्रगण प्रस्तुत पाठ्यक्रम के अध्ययन से गद्यसाहित्य रूपों का उद्भव एवं विकास समझें ।

### कला संकाय (अनुस्नातक हिन्दी) पाठ्यक्रम वर्ष - २०१६

- पाठ्यक्रम उद्देश्य : COs 1. पाठ्यक्रम संबंधित छात्र प्रस्तुत पाठ्यक्रम के अध्ययन से प्राचीन, मध्यकालीन एवं आधुनिक आर्य-भाषाओं का परिचय प्राप्त करें ।  
COs 2. छात्रगण हिन्दी भाषा के विकास क्रम को जानें ।  
COs 3. छात्रगण हिन्दी और उसकी बोलियों के बारे में विस्तार से समझें ।

- COs 4. छात्रगण हिन्दी वाक्य-रचना से वाक्य-सृजन कौशल्य को ओर भी प्रशिक्षित करें ।  
 COs 5. छात्रगण हिन्दी शब्द-रचना को विस्तार से जानें ।  
 COs 6. छात्रगण हिन्दी के विविध रूपों को समझकर भारतीय भाषा के निर्माण में भारतीय साहित्यकारों का योगदान समझें ।  
 COs 7. छात्रगण लिपि का इतिहास जानकर लिपि के आवश्यक सुधारों पर अपना मत व्यक्त करें ।

### कला संकाय (अनुस्नातक हिन्दी) पाठ्यक्रम वर्ष - २०१६

- पाठ्यक्रम उद्देश्य : COs 1. प्रस्तुत पाठ्यक्रम अध्येता हिन्दी-गुजराती पुनर्जागरणकालीन साहित्य का विस्तार से परिचय प्राप्त करें ।  
 COs 2. छात्रगण गिरीश कर्नाड लिखित 'हयवदन' नाटक की अध्यान्त समझ प्राप्त करें ।  
 COs 3. छात्रगण हिन्दी गुजराती पुनर्जागरण युगीन साहित्य की प्रवृत्तियों के बारे में जानें ।  
 COs 4. प्रस्तुत पाठ्यक्रम के अध्ययन द्वारा छात्रगण भारतीय महिला लेखिकाओं का परिचय प्राप्त करें ।  
 COs 5. छात्रगण भारतीय भाषाओं में लिखित नाटक साहित्य का परिचय प्राप्त करें ।  
 COs 6. छात्रगण गिरीश कर्नाड लिखित 'हयवदन' नाटक की अध्यान्त समझ प्राप्त करें ।  
 COs 7. प्रस्तुत पाठ्यक्रम के अध्ययन द्वारा छात्रगण भारतीय महिला लेखिकाओं का परिचय प्राप्त करें ।  
 COs 8. प्रस्तुत पाठ्यक्रम का अध्ययन करने से छात्रों में भारतीय आदिवासी समाज की स्थिति का विस्तार से पता चले ।

### कला संकाय (अनुस्नातक हिन्दी) पाठ्यक्रम वर्ष - २०१६

- पाठ्यक्रम उद्देश्य : COs 1. छात्रगण हिन्दी दलित लेखन का इतिहास को जानें ।  
 COs 2. छात्रगण हिन्दी दलित लेखन में समाज-सुधारकों के योगदान को जानें ।  
 COs 3. छात्रगण दलित चेतना का अर्थ, परिभाषा एवं स्वरूप को जानें ।  
 COs 4. छात्रगण समाज में जीवन वर्ग-संघर्ष की भाषा को प्रस्तुत पाठ्यक्रम के द्वारा निकृष्ट करें ।  
 COs 5. छात्रगण राष्ट्रीय अस्मिता के विकास में हर जातियों के योगदान को समझें ।

### कला संकाय (अनुस्नातक हिन्दी) पाठ्यक्रम वर्ष - २०१६

- पाठ्यक्रम उद्देश्य : COs 1. छात्रगण अनुवाद क्या है, इसको जानें ।  
 COs 2. छात्रगण अनुवाद-प्रक्रिया में अनुवाद कैसे किया जाय, उससे अवगत हो ।  
 COs 3. छात्रगण गद्य और पद्य कृतियों के अनुवाद करते समय किन समस्याओं का सामना करना पड़ता है इससे परिचित हों ।  
 COs 4. छात्रगण अनुवाद संबंधी समस्याओं का समाधान अनुवाद की प्रयुक्ति के माध्यम से जानें ।  
 COs 5. छात्रगण अनुवाद का भविष्य तथा सीमाओं को जानें ।  
 COs 6. छात्रगण सांस्कृतिक शब्दों, लोकोक्तियों और मुहावरों के अनुवाद से परिचित हों ।  
 COs 7. छात्रगण भविष्य में अनुवाद के क्षेत्र में रोजगारी के अवसरों से परिचित हों ।

### कला संकाय (अनुस्नातक हिन्दी) पाठ्यक्रम वर्ष - २०१६

- पाठ्यक्रम उद्देश्य : COs 1. प्रस्तुत पाठ्यक्रम को पढ़कर छात्रगण भारतीय मजदूर-आन्दोलनों के बारे में विस्तार से जानें ।  
 COs 2. छात्रगण प्रभा खेतान की नारी विषयक चेतना से अवगत होंगे ।  
 COs 3. पाठ्यक्रम संबंधित छात्र यशपाल के मार्क्सवादी विचारों को जानें ।  
 COs 4. छात्रगण भारत-विभाजन की पृष्ठभूमि को प्रस्तुत पाठ्यक्रम का अध्ययन करने से जानें ।  
 COs 5. छात्रगण भारत विभाजन के नियामक तत्त्वों को जानें ।  
 COs 6. छात्रगण भारतीय मजदूर समाज की समस्याओं को विस्तार से जानें ।  
 COs 7. छात्रगण मारवाडी समाज की नारी-समस्याओं को विस्तार से जानें ।  
 COs 8. छात्रगण हिन्दी के ऐतिहासिक उपन्यासों का परिचय प्राप्त करें ।

### कला संकाय (अनुस्नातक हिन्दी) पाठ्यक्रम वर्ष - २०१६

- पाठ्यक्रम उद्देश्य : COs 1. छात्रगण टेलिविज़न के उद्भव एवं विकास को जानें ।  
 COs 2. छात्रगण प्रस्तुत पाठ्यक्रम का अध्ययन करके हिन्दी फिल्मों में प्रयुक्त भाषा-अभिव्यक्ति का प्रशिक्षण प्राप्त करें ।  
 COs 3. प्रस्तुत पाठ्यक्रम में अध्येता साहित्य का फिल्मांकन कैसे किया जाय, उसका प्रशिक्षण प्राप्त करें ।  
 COs 4. प्रस्तुत पाठ्यक्रम से संबंधित छात्र इंटरनेट का प्रयोग समझे ।  
 COs 5. छात्रगण दृश्य-श्रव्य माध्यमों में हिन्दी भाषा का प्रयोग करते समय किन-किन बातों का ध्यान रखना चाहिए, इन बातों से अवगत हो ।  
 COs 6. छात्रगण मोबाईल, कम्प्यूटर आदि नवीनतम् दृश्य-श्रव्य उपकरणों में हिन्दी प्रयोग का प्रशिक्षण प्राप्त करें



## Course Outcomes of M. Phil. (Hindi)

### एम.फिल.(हन्दी) पाठ्यक्रम वर्ष - २०१७

- पाठ्यक्रम उद्देश्य :
- COs 1. पाठ्यक्रम संबंधी शोध-प्रविधि का ज्ञान प्राप्त करें।
  - COs 2. छात्रगण शोध के विविध आयामों को समझें।
  - COs 3. पाठ्यक्रम संबंधी छात्रगण शोध-प्रबंध का प्रारूप समझें।
  - COs 4. छात्रगण शोध-विषय की विविध शोध पद्धतियों का ज्ञान प्राप्त करें।
  - COs 5. पाठ्यक्रम संबंधी छात्र शोध-प्रबंध के विश्वविद्यालय के नियमों को जानें।
  - COs 6. छात्रगण कृति की समालोचना के बारे में विस्तार से जानें।

### एम.फिल.(हन्दी) पाठ्यक्रम वर्ष - २०१७

- पाठ्यक्रम उद्देश्य :
- COs 1. छात्रगण साहित्य सृजन के संदर्भ में विचारधारा के महत्त्व को समझें।
  - COs 2. छात्रगण मध्ययुगीन बोध और विभिन्न धर्म साधनाओं की भूमिका को विस्तार से जानें।
  - COs 3. छात्रगण हिन्दी साहित्य से सम्बन्धित विशिष्ट मतवाद के स्वरूप को जानें।
  - COs 4. आधुनिकता बोध और औद्योगिक संस्कृति का स्वरूप समझें।
  - COs 5. छात्रगण राष्ट्रीयता और अंतर्राष्ट्रीयता के स्वरूप को जानें।
  - COs 6. छात्रगण भारत के राष्ट्रीय स्वातंत्र्य आंदोलन के संदर्भ में पुनर्जागरण और लोक जागरण का महत्त्व समझें।
  - COs 7. छात्रों को साहित्य के संदर्भ में समाजशास्त्र, इतिहास दर्शन, मनोवैज्ञानिक दर्शन तथा सांस्कृतिक अध्ययन की अवधारणा विदित हो।

### एम.फिल.(हन्दी) पाठ्यक्रम वर्ष - २०१७

- पाठ्यक्रम उद्देश्य :
- COs 1. छात्रगण साहित्य के विभिन्न स्वरूपों से परिचित होंगे।
  - COs 2. छात्रगण नाथ-सिद्ध योगियों का दार्शनिक विचार से अवगत होंगे।
  - COs 3. छात्रगण भारतीय धर्म-साधना में नाथों के योगदान को जानें।
  - COs 4. छात्रगण भारत विभाजन की त्रासदी को जानें।
  - COs 5. छात्रगण महाभारतकालीन शिक्षण-व्यवस्था से अवगत होंगे।
  - COs 6. छात्रगण व्यंग्य साहित्य के स्वरूप को जानें।

### एम.फिल.(हन्दी) पाठ्यक्रम वर्ष - २०१७

- पाठ्यक्रम उद्देश्य :
- COs 1. छात्रगण साहित्य के विभिन्न स्वरूपों से परिचित होंगे।
  - COs 2. छात्रगण नाथ-सिद्ध योगियों का दार्शनिक विचार से अवगत होंगे।
  - COs 3. छात्रगण भारतीय धर्म-साधना में नाथों के योगदान को जानें।
  - COs 4. छात्रगण भारत विभाजन की त्रासदी को जानें।
  - COs 5. छात्रगण महाभारतकालीन शिक्षण-व्यवस्था से अवगत होंगे।
  - COs 6. छात्रगण व्यंग्य साहित्य के स्वरूप को जानें।

## Course Outcomes of M. Phil. (Hindi)(SF)

### एम.फिल.(तुलनात्मक साहित्य) पाठ्यक्रम वर्ष – २०१७

- पाठ्यक्रम उद्देश्य :
- COs 1. पाठ्यक्रम संबंधी शोध-प्रविधि का ज्ञान प्राप्त करें ।
  - COs 2. छात्रगण शोध के विविध आयामों को समझें ।
  - COs 3. पाठ्यक्रम संबंधी छात्रगण शोध-प्रबंध का प्रारूप समझें ।
  - COs 4. छात्रगण शोध-विषय की विविध शोध पद्धतियों का ज्ञान प्राप्त करें ।
  - COs 5. पाठ्यक्रम संबंधी छात्र शोध-प्रबंध के विश्वविद्यालय के नियमों को जानें ।
  - COs 6. छात्रगण कृति की समालोचना के बारे में विस्तार से जानें ।

### एम.फिल.(तुलनात्मक साहित्य) पाठ्यक्रम वर्ष – २०१७

- पाठ्यक्रम उद्देश्य :
- COs 1. छात्रगण तुलनात्मक साहित्य क्या है, इसको जानें ।
  - COs 2. छात्रगण के लिए तुलनात्मक साहित्य के अध्ययन की परिधि सस्पष्ट हो ।
  - COs 3. छात्रगण तुलनात्मक अध्ययन कैसे किया जाता है, उससे विदित हों ।
  - COs 4. छात्रगण तुलनात्मक साहित्य और तुलनात्मक भारतीय साहित्य की अवधारणा को समझें ।
  - COs 5. छात्रगण भारतीय साहित्य का अध्ययन कर भारतीयता का स्वरूप समझें ।
  - COs 6. छात्रगण विश्व साहित्य की अवधारणा को समझते हुए तुलनात्मक साहित्य और संस्कृति का स्वरूप समझें ।

### एम.फिल.(तुलनात्मक साहित्य) पाठ्यक्रम वर्ष – २०१७

- पाठ्यक्रम उद्देश्य :
- COs 1. छात्रगण अनुवाद क्या है, इसको जानें ।
  - COs 2. छात्रगण अनुवाद-प्रक्रिया में अनुवाद कैसे किया जाय, उससे अवगत हो ।
  - COs 3. छात्रगण गद्य और पद्य कृतियों के अनुवाद करते समय किन समस्याओं का सामना करना पड़ता है इससे परिचित हों । उन समस्याओं के यथासम्भव समाधान छात्रों को मिलें ।
  - COs 4. छात्रगण अनुवाद का भविष्य तथा सीमाओं को जानें ।
  - COs 5. छात्रगण सांस्कृतिक शब्दों, लोकोक्तियों और मुहावरों के अनुवाद से परिचित हों ।
  - COs 6. छात्रगण भविष्य में अनुवाद के क्षेत्र में रोजगारी के अवसरों से परिचित हों ।

### एम.फिल.(तुलनात्मक साहित्य) पाठ्यक्रम वर्ष – २०१७

- पाठ्यक्रम उद्देश्य :
- COs 1. छात्रगण अनुवाद क्या है, इसको जानें ।
  - COs 2. छात्रगण अनुवाद-प्रक्रिया में अनुवाद कैसे किया जाय, उससे अवगत हो ।
  - COs 3. छात्रगण गद्य और पद्य कृतियों के अनुवाद करते समय किन समस्याओं का सामना करना पड़ता है इससे परिचित हों । उन समस्याओं के यथासम्भव समाधान छात्रों को मिलें ।
  - COs 4. छात्रगण अनुवाद का भविष्य तथा सीमाओं को जानें ।
  - COs 5. छात्रगण सांस्कृतिक शब्दों, लोकोक्तियों और मुहावरों के अनुवाद से परिचित हों ।
  - COs 6. छात्रगण भविष्य में अनुवाद के क्षेत्र में रोजगारी के अवसरों से परिचित हों ।

## **Course Outcomes of M.Phil. History**

### **Course Name: Research Method in History & Historiography**

CO-1 To acknowledge student about philosophy of history and tradition of writing history.

CO-2 To inspire learners to historiography.

CO-3 To acknowledge students about Indian and western of historians.

### **Course Name: The Age of Gandhi (1920 - 1948)**

CO-1 To acknowledge students about life of Gandhi and his works.

CO-2 . To acknowledge students about Various movement in Gandhian Era.

CO-3. To acknowledge students about thoughts and heritage given by Gandhi.

### **Course Name: History of Gujarat (modern Period) 1857 To 1947 A.D.**

CO-1 To acknowledge student about role of Gujarat in upheaval of 1857 and about various movement and position of women, Tribal Culture

CO-2 To acknowledge student about development in field of education, literature and journalism in Gujarat.

CO-3 To acknowledge student about religious reform movements, fine arts, architecture, archeology, museum.

### **Course Name: Application of Tourism in History**

CO-1 The objective of the course is to foster the growth and development of tourism

CO-2 The objective of understanding the impact of tourism on economics, Cultural and Social development.

## Course Outcomes of M.A. History

### **Course (Paper) Name & No.: Paper 01- Elements of Historical Methods**

#### **Course Outcome:**

- CO-1. Students will be able to assemble information on history.
- CO-2. Students will be able to critically assess the writing in history.
- CO-3. Students will be able to compare and contrast various sources of history and its trustworthiness.

### **Course (Paper) Name & No.: Paper 02- World History(Ancient)**

#### **Course Outcome:**

- CO-1 Students will be able to classify various aspects of Egyptian , Sumerian , Assyrian , Babylonian and Indus Valley civilizations.
- CO-2 Students will be able to explore Indian Vedic Culture and its underlying values.
- CO-3 Students will be able to distinguish Chinese , Western , Greek and roman civilizations.

### **Course (Paper) Name & No.: Paper 03- History of Modern World (1848 to 1930)**

#### **Course Outcome:**

- CO-1 Students will be able to appraise about Indus Civilization and Industrial Revolution.
- CO-2 Students will be able to observe Japan's Modernisation.
- CO-3 Students will be able to analyse Chinese and Russian Revolution , World Wars, Efforts for world peace through United Nations Organization and the great Depression.

### **Course (Paper) Name & No.: Paper 04- History of India(320 B.C. -1206 A.D.)**

#### **Course Outcome:**

- CO-1 Students will be able to acquaint with the sources of Ancient Indian History.
- CO-2 Students will be able to arrange various Dynasties of Ancient India along with their Political , Economic and Cultural Aspects.
- CO-3 Students will be able to trace the journey of Chinese Travelers and Muslim Invaders to India and identify the subsequent impacts.

### **Course (Paper) Name & No.: Paper 04-. Women in Indian History (Optional)**

#### **Course Outcome:**

- CO-1 Students will be able to determine the position of women in India during the Ancient , Medieval and Modern Eras.
- CO-2. Students will be able to constrict the development of women during the social religious and educational reform movements.
- CO-3. Students will be able to specify women's participation and leadership in Panchayats , Corporation, State Assemblies and Parliament , before and after the independence of India.

**Course (Paper) Name & No.: Paper 05- History of Tourism in India and its Application**

**Course Outcome:**

CO-1 Students will be able to conjugate tourist places , differentiate between its environment and types, evolve tourism from ancient to modern times , the progress made in sea routes , tourism as an industry and its various aspects.

CO-2 Students will be able to evaluate the administration of International, National and Private Tourist places, boarding , lodging and transport facilities , marketing in Tourism and the role of Media.

CO-3 Students will be able to identify new trends in Tourism , effects of Tourism, ancient movements , importance of museums, tourist spots in India.

**Course (Paper) Name & No.: Paper 05- Management in Tourism**

**Course Outcome:**

CO-1 Students will be able to the course is to foster the growth and development of tourism.

CO-2 Students will be able to Tourism has been acknowledged as one of the most rapidly growing industries in recent years.

CO-3 The course deals with various aspects of tourism its development and importance. It will help in understanding the impact of tourism on economic, cultural and social development.

Subject: HISTORY

Course (Paper) Name & No.: Paper 06- Historiography

**Course Outcome:**

CO-1 Students will be able to enlist the Outcomes , structure the style of historians.

CO-2 Students will be able to de-classify the methods of historical writing of Indian, Greek, Roman, Islamic and Chinese and the patterns of other nations.

CO-3 Students will be able to rationalize modern thinking of history and the styles of various historians.

Subject: HISTORY

Course (Paper) Name & No.: Paper 07- World History(Medieval & Early Modern)

**Course Outcome:**

CO-1 Students will be able to know the rise of Christianity & Islam during the middle ages.

CO-2 Students will be able to understand Renaissance in Europe and its reasons.

CO-3 Students will be able to understand the Reformation and its impact on Geographical discoveries.

Subject: HISTORY

Course (Paper) Name & No.: Paper 08- History of Modern World (1930 to 2000 A.D.)

**Course Outcome:**

CO-1. Students will be able to know the Modern World. To acquaint the student with the Socio-economic & political developments in other countries. And understand the contemporary world in the light of its background History.

CO-2. Students will be able to orient with the political history of Modern World. Impart knowledge about world concepts.

CO-3. Students will be able to understand the economic transition in World during the 20<sup>th</sup> century. To acquaint the students with growth of various political movements that shaped the modern world.

Subject: HISTORY

Course (Paper) Name & No.: Paper 09- History of India(1206 to 1526)

**Course Outcome:**

CO-1 Students will be able to acquaint with the rulers of sultanate Dynasty.

CO-2 Students will be able to know about Vijaynagar Empire and its rulers.

CO-3 Students will be able to appreciate the culture of sultanate Dynasty.

Subject: HISTORY

Course (Paper) Name & No.: Paper 09- History of India(1526 to 1756) (Optional)

**Course Outcome:**

CO- 1 Students will be able to appraise with the history of Mughal Era.

CO- 2 Students will be able to assemble the cultural and social Aspects of Mughal Era.

CO-3 Students will be able to resurrect the rise of Maratha Power , the rule of Shivaji and subsequent Maratha Rulers.

Subject: HISTORY

Course (Paper) Name & No.: Paper 10- Constitutional History of India: 1858-1950 A.D.

**Course Outcome:**

CO-1 To make students acquainted with the different programs launched by the British Government and the policies of law and legislation during this period.

CO-2 To make students acquainted with the Indian constitution and the policies of British towards the states and with the condition of local self reliant organization.

CO-3 To make students acquainted with the policies of British Government during the time of deaught and policies & performance of General public service commission.

Subject: HISTORY

Course (Paper) Name & No.: Paper 10- Peasant and Tribal Movements in Colonial India

**Course Outcome:**

CO-1 To make students acquainted with the mentality of agrarian society with the social contribution and with the different protects held by them during 19<sup>th</sup> century.

CO-2 To make students acquainted with the Nationalism in India with the Gandhian philosophy on the problems of farmers.

CO-3 To make students acquainted with the social ideologies and with movements pursued by farmers in the 20<sup>th</sup> century.

Subject: HISTORY

Course (Paper) Name & No.: Paper-11 History of Saurashtra (Political)  
(1807- 1948 A.D.)

**Course Outcome:**

CO-1 Students will be able to acquaint with the Geographical and Historical Aspects of Saurashtra.

CO-2 Students will be able to evaluate the establishment of British Political Agency in Saurashtra and its work.

CO-3 Students will be able to compare and contrast Saurashtrian's Kingdoms , their various rulers and their work.

Subject: HISTORY

Course (Paper) Name & No.: Paper-12 State in India (Ancient, Medieval)

**Course Outcome:**

CO-1 Students will be able to assess various Dynasties of Ancient India along with their administration and institutions.

CO-2 Students will be able to compare and contrast the administration of Delhi Sultanate and Vijaynagar Kingdom.

CO-3 Students will be able to acquaint with the administration of Mughal and Maratha Dynasties.

Subject: HISTORY

Course (Paper) Name & No.: Paper-13 History of India(1757-1857)

**Course Outcome:**

CO-1 Students will be able to interpret various situations in India before the arrival of British.

CO-2 Students will be able to explore various battles fought by the British in India and the legislations in Parliament.

CO-3 Students will be able to evolve the progress of modern education in India , farmers and tribal movements , cultural Struggle and the Revolt of 1857.

Subject: HISTORY

Course (Paper) Name & No.: Paper-14 Economic History of India

**Course Outcome:**

CO-1 To make students acquainted with the form of Indian economy during the mid of the 19<sup>th</sup> century with the major and revenue system.

CO-2 To make students acquainted with the government policies of Royal Commission and the Crisis.

CO-3 To make students acquainted with the causes forms of draught of the beginning of the 19<sup>th</sup> century ,with the remedies given by the British government for this calamity ,with the reasons of higher population rate and its impacts , responsible factors of urbanization and its impacts and with the development of different roots of transportation and its impacts.



Subject: HISTORY

Course (Paper) Name & No.: Paper-14 An Out line of Indian Archeology and Epigraphy  
(Optional)

**Course Outcome:**

- CO-1 To make students acquainted with the archeological activities of India and different places of Gujarat which have been archeologically evacuated.
- CO-2 To make students acquaint with the importance of fossils found during archeological evacuation.
- CO-3 To make students acquainted with the importance of inscriptions and their implication in the study of history.

Subject: HISTORY

Course (Paper) Name & No.: Paper-15 Politics in India (1947-1971A.D.)  
(Optional)

**Course Outcome:**

- CO-1 To make students acquainted with the heritage of colonial state of India , Sardar Patel and his contribution in the unification of India.
- CO-2 To let students informed about the development of the different national groups.  
Besides  
make students aware about the relationship the state Government and the central Government development of the local self reliant organizations and emergencies.
- CO-3 To make students acquainted with different movements & challenges ,North-East states,  
problems related language & community , foreign policies & regional relationship of South-Asia.

Subject: HISTORY

Course (Paper) Name & No.: Paper-15 Social and Religious Reform Movement in India ( Optional )

**Course Outcome:**

- CO-1 To make students acquainted with the different Bhakti movements with the development in education during the reign of Britishers ,with the development of unifying agencies , railways and press(media) and with the manifestation of the middle class.
- CO-2 To make students acquainted with the reform movements on westernizes in the 19<sup>th</sup> century like- Brahmosamaj, Prarthnasamaj, Theosophical society.
- CO-3 To make students acquainted with the social problems with the contribution of different social reformers and with the impacts of this on society.

Subject: HISTORY

Course (Paper) Name & No.: Paper- 16 History of Saurashtra (Economic, Social and Cultural ) (1807-1948A.D.)

**Course Outcome:**

CO-1 Students will be able to enlist Social Reforms in Saurashtra , Social Reformers and their contribution.

CO-2 Students will be able to assess sources of communication and transport in Saurashtra.

CO-3 Students will be able to recognize the progress in Educational Field , Art and craft, Establishments and Journalism in Saurashtra.

Subject: HISTORY

Course (Paper) Name & No.: Paper- 17 State In India (Modern)

**Course Outcome:**

CO-1 Students will be able to evaluate the Administration Policy of the British.

CO-2 Students will be able to trace India's journey from the British rule to Independence.

CO-3 Students will be able to distinguish the powers and functions of India's President ,Prime Minister, Lok Sabha , Rajya Sabha, Vidhan Sabha and Supreme Court.

Subject: HISTORY

Course (Paper) Name & No.: Paper- 18 History of Freedom Movement in India:  
(1858-1947 A.D.)

**Course Outcome:**

CO-1 Students will be able to compare various movements against the British Government and their policies.

CO-2 Students will be able to trace India's journey from the British rule to Independence.

Subject: HISTORY

Course (Paper) Name & No.: Paper- 19 Economic History of India

**Course Outcome:**

CO-1 Students will be able to assess various Industrial Politics of the British.

CO-2 Students will be able to analyse the development in the Industrial field.

CO-3 Students will be able to enumerate the Farmers and Tribal Movements in India and the Contributions of various leaders with their ideologies and methodologies.

Course (Paper) Name & No.: Paper- 19 An Outline of Indian Numismatics, Museology and Archives (Optional)

**Course Outcome:**

CO-1 Students will be able to classify different types of coins of Ancient India.

CO-2 Students will be able to acquaint with the Museums its importance and types.

CO-3 Students will be able to generate the rise of Office Culture in India its development and work.

Subject: HISTORY

Course (Paper) Name & No.: Paper- 20 Social and Economic History of India ( 1947-1971)

**Course Outcome:**

CO-1 Students will be able to assess the situation in India after Independence ,the challenges of New States ,Greek Revolution ,Tribal and Labour movements.

CO-2 Students will be able to enlist the challenges of Urbanization in India , contributions of Dalits and women.

CO-3 Students will be able to gange the challenges of Education in India ,Progress of Higher Education in Science Technology and Environment.

Course (Paper) Name & No.: Paper- 20 Social and Religious Reform Movement in India (Optional)

**Course Outcome:**

CO-1 Students will be able to estimate Muslim Reform Movements the position of women in India and the efforts for their progress.

CO-2 Students will be able to outline the efforts for the progress of Backward Classes.

CO-3 Students will be able to identify the problems of Backward classes after India's Independence ,Languages ,Religious and the problems of Indian Society.

Subject: HISTORY

Course (Paper) Name & No.: Paper- 20 Constructive Activities and Institutions in Gujarat during 20<sup>th</sup> Century. (Optional)

**Course Outcome:**

CO-1 Students will be able to draw the social structure of Gujarat and the contributions of leaders.

CO-2 Students will be able to acquaint the tradition of Asharams in Gujarat and their functions.

CO-3 Students will be able to estimate Social Institution of Gujarat ,their contribution ,the economic development including Industrialization.

## Course Outcomes of M.Phil. History

### **M.PHIL. OUTCOME:**

#### **Research Methodology in History and historiography**

Subject: **History**

Course Name : : **Research Methodology in History and historiography**

Course Outcome:-

**CO-1** The main objective of this paper is to analyze the various concept of research methodology, theory of research, research design, research techniques , sampling techniques , selection method and contribution to Historians.

Subject: **History**

Course Name : : **The Age of Gandhi (1920-1948)**

Course Outcome:-

**CO-1** University post graduate student need to learn more about Gandhiji, his work, his strategy and his achievements. This course lightes all there aspects. so, that contain youth and can remain in tune Gandhis Ideas thoughts and legecy.

Subject: **History**

Course Name : : **History of Gujarat-Modern Period (1857A.D. to 1947 AD.)**

Course Outcome:-

**CO-1** usually students study World History and Indian History, but due Weightage to the regional history, often is neglected therefore this course, attempts to do Away with this lacunal. the course is designed to update students with History, Heritage culture and Histoecial process of Gujarat during 1857 - 1947

## Course Outcomes of General Home Science

### Course Title: RESEARCH METHODS

#### Course Outcome

CO1: To understand the significance of statistics and research methodology in Home Science research

CO2: To understand the types, tools and methods of research and develop the ability to construct data gathering instruments appropriate to the research design.

CO3: To understand and apply the appropriate statistical techniques for the measurement scale and design.

### Course Title: Extension Management & Media Production

#### Course Outcome

To enable students to:

CO1: Understand the concepts and process of management.

CO2: Realize the importance of management for achieving organizational goals.

CO3: Apply the principles of management to the management of extension organizations / services.

### ENTREPRENEURSHIP AND MARKETING MANAGEMENT

#### Course Outcome

CO1: To provide conceptual inputs regarding entrepreneurship management.

CO2: To sensitize and motivate the students towards entrepreneurship management.

CO3: To orient and impart knowledge towards identifying and implementing entrepreneurship opportunities.

CO4: To develop management skills for entrepreneurship management.

CO5: To become aware of different market organizations in our economy.

CO6: To understand the different marketing functions and the distribution system in our economy.

CO7: To familiarize with the marketing strategies and market research.

### **Course Title: MATERNAL NUTRITION**

#### **Course Outcome**

This course is designed to enable the students to:

CO1: Understand physiological changes in pregnancy and lactation.

CO2: Understand the inter-relationship between nutrition and growth and development during life cycle.

### **Course Title: RESIDENTIAL INTERIOR SPACE DESIGN**

#### **Course Outcome**

CO1: To understand the factors influencing space design organization for optimum comfort and functionalism.

CO2: To understand the application of anthropometric data in designing interior

CO3: To evaluate ergonomically residential interior space for various activities.

CO4: To provide adequate facility for work, relaxation, rest, comfort, privacy, care, aesthetics etc. through interior space designing.

CO5: To study the materials along with fittings and fixtures used in residential interiors.

CO6: To develop skills of drawing the working details and execution drawings.

### **Course Title: Rural Development**

#### **Course Outcome**

CO1: To make students aware about rural Indian society.

CO2: To make students aware about conditions and living in rural areas.

CO3: To make students aware about ongoing rural development programmes.

CO4: To make students aware about need for future development in rural areas.

### **Course Title: Clinical and Therapeutic Nutrition**

#### **Course Outcome**

CO1: Understand the etiology, Physiologic and Metabolic Anomalies of acute and chronic diseases and patient needs.

CO2: Know the effect of the various diseases on nutritional status and nutritional and dietary requirements.

CO3: Be able to recommend and provide appropriate nutritional care for prevention / and treatment of the various diseases.

## **Course Title: Care of elderly**

### **Course Outcome**

CO1: To gain knowledge and insight regarding principles of early childhood care and education.

CO2: To develop the skill and techniques to plan activities in ECCE centers of different types, to different types to conduct activities in early childhood care and education and to work effectively with parents and community.

### **Course Outcome**

CO1: To enable students to become aware and sensitized to issues related to care of the elderly.

CO2: To enable students to understand the theoretical perspectives of the aging process.

CO3: To develop skills for organizing activities for the elderly.

## **Course Title: APPAREL AND TEXTILE DESIGN**

### **Course Outcome**

CO1: To impart an in-depth knowledge of style reading, pattern making and garment construction technique.

CO2: To development and understand the principles of pattern making through flat pattern and drapping

## **Course Title: FOOD SCIENCE**

### **Course Outcome**

CO1: Provide an understanding of composition of various food stuffs.

CO2: Familiarize students with changes occurring in various foodstuffs as a result of processing and cooking.

CO3: Enable students to use the theoretical knowledge in various applications and food preparations.

## **Course Title: Nutrition for Health & Fitness**

### **Course Outcome**

CO1: Understand the components of health and fitness and the role of nutrition in these.

CO2: Make nutritional, dietary and physical activity recommendations to achieve fitness and well-being.

CO3: Develop ability to evaluate fitness and well-being.

**Course Title: Consumer information and redressal**

**Course Outcome**

- CO1: To equip and impart knowledge on consumer related facts and issues
- CO2: To provide an understanding of the significance of consumer information
- CO3: To develop and acquire skills in consumerism and utilizing the provisions in redress mechanism

**Course Title: Child and Human Rights**

**Course Outcome**

- CO1: To develop awareness and perspective of Human Rights as a professional in the field of Human Development.
- CO2: To develop sensitivity to Human Rights with specific reference to children's rights
- CO3: To gain knowledge about Charter on Human and Children's rights
- CO4: To work with women and children to create awareness about their rights and to guide them to access their rights.

**Course Title: Statistics & Computer Application**

**Credit: 04**

**Contact hour/week=04**

**Course CourseOutcome**

- CO1: To understand the role of statistics and computer applications in research.
- CO2: To apply statistical techniques to research data for analyzing & interpreting data meaningfully.

**Course Title: DEVELOPMENT COMMUNICATION (Core)**

**Course Outcome**

- CO1: To understand the concept of development, its indices and relationship with development communication.
- CO2: To understand the concept of development communication and its relevance to fostering development.
- CO3: To impart knowledge about the processes involved in developmental communication with special emphasis on design of communication strategy.



CO4: To impart skill and knowledge about the relevance, potential and use of various media in development communication with due consideration to government policies and regulations.

Course Title: CARE OF CHILDREN WITH DISABILITIES  
AND ILLNESSES

**Course Outcome**

To gain information on different impairments and illnesses that affect children.

CO1: To be sensitive to desires and wishes of children.

CO2: To identify and assess impairment, illnesses, disability and the child's physical and social environment.

CO3: To plan for inclusive educational programmes for children and involving the disabled child in the process.

CO4: To become sensitive to concerns of parents of children with disabilities and collaborate with them for children's education and development.

CO5: To interact and relate sensitively with children with disability, accepting individual differences and enable others to do so.

**Course Title: Guidance and Counseling**

**Credit: 02**

**Contact hour/week=02**

**Course Outcome**

CO1: To understand the need for guidance and counseling in human development.

CO2: To introduce basic concepts in guidance, counseling and therapy.

CO3: To discuss the processes involved in counseling at different stage in life.

Course Title: SCIENTIFIC WRITING (Skill-Oriented)

**Credit: 04**

**Contact hour/week=04**

**Course Outcome**

CO1: To be able to appreciate and understand importance of writing scientifically.

CO2: To develop competence in writing and abstracting skills.

**Course Title: COMMUNICATION TECHNOLOGIES IN EXTENSION****Credit: 04****Contact hour/week=04****Course Outcome**

CO1: To impart knowledge and understanding of various communication systems.

CO2: To provide a sound knowledge base for the relevance and applicability of the various media used in human communication and their complementary role towards each other.

CO3: To enhance the versatility of the students in the selection and use of media in different socio-cultural environments.

CO4: To provide basic knowledge of concept of advertising and use of media in advertising.

CO5: To impart skill in preparation of various Computer Aided Media messages.

**COURSE TITLE: INSTITUTIONAL MANAGEMENT****Course Outcome**

CO1: To develop a knowledge base in key areas of Institutional Food Administration

CO2: To provide practical field level experience in Institutional Food Administration.

CO3: To impart necessary expertise to functional as a food service manager

CO4: To equip individual to start their own food service unit leading to entrepreneurship

CO4: To develop critical abilities and provide basic grounding in research techniques.

**Course Title: ADVANCE APPAREL AND FASHION DESIGN****Course Outcome**

CO1: The course aims at providing in depth working knowledge of line development and enables a student to use and practice skills and knowledge already acquired, use it to market situation.

CO2: To help develop skills in pattern making and construction.

**Course Title: Family and Child Welfare****Credit: 02****Contact hour/week=02**

**Course Outcome**

CO1: To enable students to become aware and sensitized to issues related to welfare of child, women & elderly.

**Course Title: ENVIRONMENT MANAGEMENT (Elective)****Course Outcome**

CO1: To be aware of the holistic ecological approaches to environment.

CO2: To be aware of the environmental problems, hazards and risks

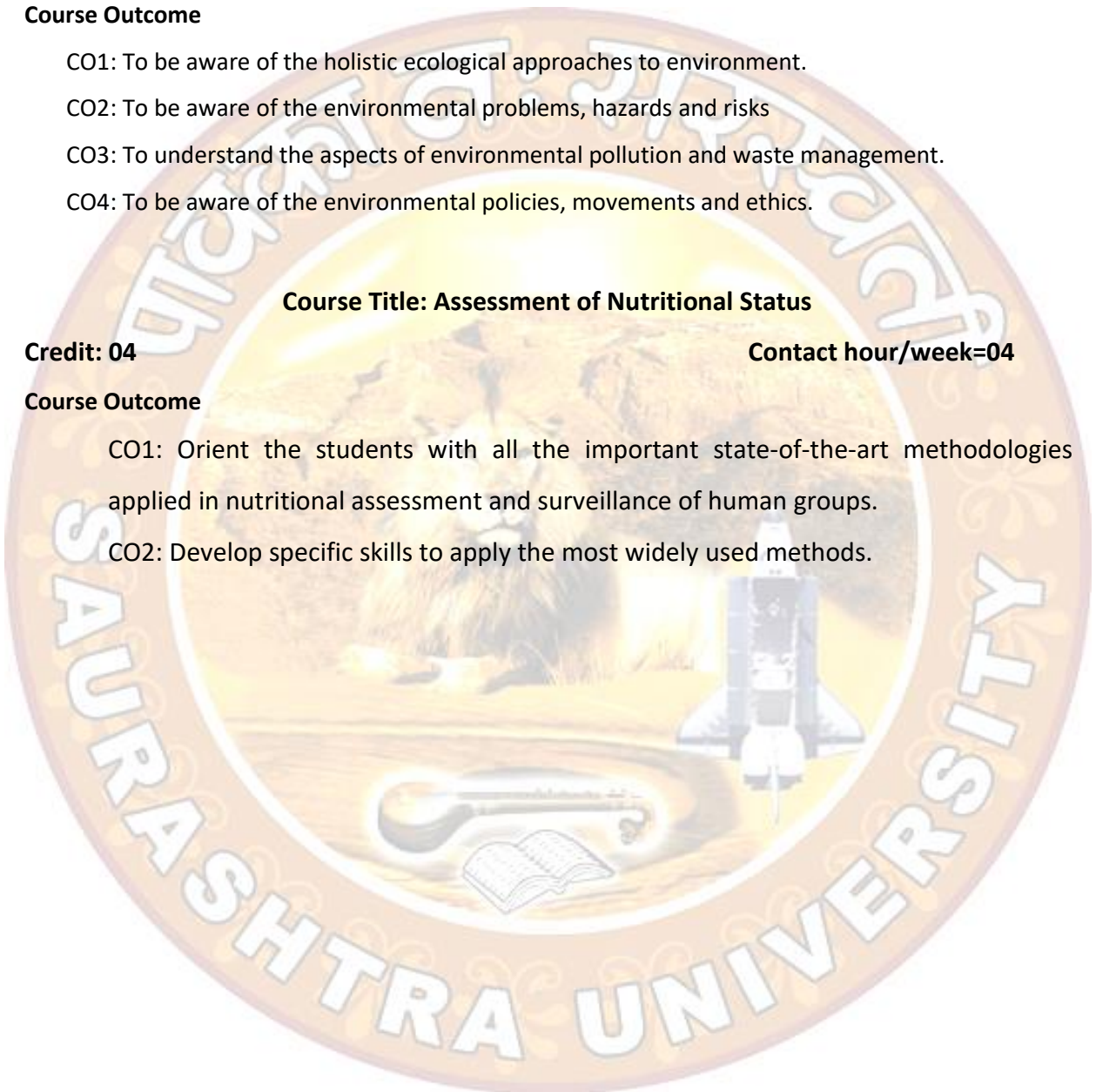
CO3: To understand the aspects of environmental pollution and waste management.

CO4: To be aware of the environmental policies, movements and ethics.

**Course Title: Assessment of Nutritional Status****Credit: 04****Contact hour/week=04****Course Outcome**

CO1: Orient the students with all the important state-of-the-art methodologies applied in nutritional assessment and surveillance of human groups.

CO2: Develop specific skills to apply the most widely used methods.



## Course Outcomes of FOODS & NUTRITION

### PAPER-1

#### Course Title: RESEARCH METHODS

##### Course Outcome

CO1: To understand the significance of statistics and research methodology in Home Science research

CO2: To understand the types, tools and methods of research and develop the ability to construct data gathering instruments appropriate to the research design.

CO3: To understand an

CO4: To apply the appropriate statistical technique for the measurement scale and design.

#### Course Title: ADVANCED NUTRITIONAL BIOCHEMISTRY

##### Course Outcome

This course will enable the students to:

CO1: Augment the biochemistry knowledge acquired and at the undergraduate level

CO2: Understand the mechanisms adopted by the human body for regulation of metabolic Pathways

CO3: Get an insight into interrelationships between various metabolic pathways

CO4: Become proficient for specialization in nutrition.

CO5: Understand integration of cellular level metabolic events to nutritional disorders and imbalances.

#### Course Title: Methods of Investigation

##### Course Outcome

This course will enable the students to:

CO1: To understand the principles of various analytical techniques available for nutrition research.

CO2: To familiarize with the applications of the above techniques.

### **Course Title: Geriatric Nutrition**

#### **Course Outcome**

The course is designed to:

- CO1: Familiarize the students with the multifaceted aspects of ageing.
- CO2: Make the students competent for nutritional and health care of the elderly.

### **Course Title: Food Packaging**

#### **Course Outcome**

This Course is designed to enable students to:

- CO1: Gain knowledge about various packaging materials and importance of packaging.
- CO2: Be familiar with testing and evaluation of packing media.
- CO3: Be familiar with packaging laws and regulations.
- CO4: Be able to select appropriate packaging material for a variety of food stuffs vis-à-vis the need for preventing environment degradation.

### **Course Title: CLINICAL AND NUTRITION AND DIETETICS**

#### **Course Outcome**

This Course will enable students to:

- CO1: Understand the etiology, Physiologic and Metabolic Anomalies of acute and chronic diseases and patient needs.
- CO2: Know the effect of the various diseases on nutritional status and nutritional and dietary requirements.
- CO3: Be able to recommend and provide appropriate nutritional care for prevention / and treatment of the various diseases.

### **Course Title: Maternal & Child Nutrition**

#### **Course Outcome**

This course is designed to enable the students to:

- CO1: Understand physiological changes in pregnancy and lactation.
- CO2: Get acquainted with growth and developmental changes.
- CO3: Understand the inter-relationship between nutrition and growth and development during life cycle.

**Course Title: Advanced Nutrition-I**

**Course Outcome**

This course is designed to:

CO1: Provide in-depth knowledge of the physiological and metabolic role of various nutrients and their interactions in human nutrition.

CO2: Enable students to understand the basis of human nutritional requirements and recommendations through the life cycle.

CO3: Enable students to understand the pharmacological actions of nutrients and their implications.

CO4: Familiarize students with recent advances in nutrition.

**Course Title: FOOD SCIENCE AND TECNOLOGY**

**Credit: 04**

**Contact hour/week=04**

**Course Outcome**

This Course is designed to:

CO1: Provide an understanding of composition of various food stuffs.

CO2:Familiarize students with changes occurring in various foodstuffs as a result of processing and cooking.

CO3: Enable students to use the theoretical knowledge in various applications and food preparations.

**Course Title: Nutrition for Health & Fitness**

**Credit: 02**

**Contact hour/week=02**

**Course outcome**

This course will prepare the students to:

CO1: Understand the components of health and fitness and the role of nutrition in these.

CO2: Make nutritional, dietary and physical activity recommendations to achieve fitness and well-being.

CO3: Develop ability to evaluate fitness and well-being.

**Course Title: Statistics & Computer Application**

**Credit: 04**

**Contact hour/week=04**

**Course outcome**

CO1: To understand the role of statistics and computer applications in research.

CO2: To apply statistical techniques to research data for analyzing & interpreting data meaningfully.

*NOTE: Students should be given hands on experiences to use appropriate software packages for selected statistical analyses.*

**Course Title: Institutional Food Administration**

**Credit: 04**

**Contact hour/week=04**

**Course outcome**

CO1: To develop a knowledge base in key areas of Institutional Food Administration

CO2: To provide practical field level experience in Institutional Food Administration.

CO3: To impart necessary expertise to functional as a food service manager

CO4: To equip individual to start their own food service unit leading to entrepreneurship

CO5: To develop critical abilities and provide basic grounding in research techniques.

**Course Title: Advanced Food Microbiology**

**Credit: 04**

**Contact hour/week=04**

**Course Outcome**

This course will enable the student to:

CO1: Gain deeper knowledge of role of micro-organisms in human and environment.

CO2: Understand the importance of micro-organism in food spoilage and to learn advanced, techniques used in food preservation.

CO3: Understand the latest procedures adopted in various food operations to prevent food-borne. Disorders and legal aspects involved in these areas.

## **Course Title: Advanced Human Physiology**

**Credit: 04**

**Contact hour/week=04**

### **Course Outcome**

This course will enable students to:

CO1: Advance their understanding of some of the relevant issues and topics of human physiology.

CO2: Enable the students to understand the integrated function of the system and the grounding of nutritional science in physiology.

CO3: Understand alterations of structure and function in various organs and systems in disease conditions.

## **Course Title: Instrumentation for Food Analysis Practical**

### **Course Outcome**

This course is designed to:

CO1: Introduce students to various modern instrumental techniques in food analysis.

CO2: Understand the applications, strengths and limitations of different methods.

## **Course Title: Food Toxicology**

### **Course Outcome**

This course is designed for students to:

CO1: Familiarize with hazards and toxicity associated with food and their implications for health.

CO2: Know the various kinds of hazards.

CO3: Be familiar with various tests.

## **Course Title: Scientific Writing**

**Credit: 04**

**Contact hour/week=04**

### **Course Outcome**

CO1: To be able to appreciate and understand importance of writing scientifically.

CO2: To develop competence in writing and abstracting skills.



**Course Title: FOOD PROCESSING AND TECHNOLOGY (Core)**

**Credit: 04**

**Contact hour/week=04**

**Course Outcome**

This course is designed for students to:

CO1: Impact systematic knowledge of basic and applied aspects of food processing and technology.

CO2: Provide the necessary knowledge of basic principles and procedures in the production of important food products.

CO3: Orient the students to potential use of various by products of food industry.

**Course Title: ADVANCED NUTRITION – II**

**Credit: 04**

**Contact hour/week=04**

**Course Outcome**

This course is designed to:

CO1: Provide in depth knowledge of the physiological and metabolic role of various nutrients and their interactions in human nutrition.

CO2: Enable students to understand the basis of human nutritional requirements and recommendations through the life cycle.

CO3: Enable students to understand the pharmacological actions to nutrients and their implications.

CO4: Familiarize students with the recent advances in nutrition.

**Course Title: FOOD SAFETY AND QUALITY CONTROL (Core)**

**Credit: 04**

**Contact hour/week=04**

**Course Outcome**

This Course will enable students to:

CO1: Know the importance of quality assurance in food industry.

CO2: Know the various tests and standards for quality assessment and food safety.

CO3: Know the various test used to detect food adulterants

CO4: Be familiar with the fundamentals that should be considered for successful quality control programme.

**Course Title: FOOD SAFETY AND QUALITY CONTROL Practical**

**Credit: 02**

**Contact hour/week=04**

**Course Outcome**

CO1: To test different foods for their quality

CO2: To detect adulteration in different foods

CO3: To be familiar with test used for quality control.

**Course Title: ASSESSMENT OF NUTRITIONAL STATUS**

**Credit: 04**

**Contact hour/week=04**

**Course Outcome**

The course is designed to:

- Orient the students with all the important state-of-the-art methodologies applied in nutritional assessment and surveillance of human groups.
- Develop specific skills to apply the most widely used methods.

## **Course Outcomes of LLM (Human Rights)**

### **MODULE-1 : LAW AND SOCIAL TRANSFORMATION IN INDIA.** (Core Course)

#### **Course Outcome:**

- Co.1 This course is designed to offer the teacher and the taught with
- Co.2 Awareness of Indian approaches to social and economic problems in the context of law as a means of social control and change; and
- Co.3 A spirit of inquiry to explore and exploit law and legal institutions as a means to achieve development within the framework of law.
- Co.4 The endeavour is to make the students aware of the role the law has played and has to play in the contemporary Indian society

### **MODULE – 2 : JUDICIAL PROCESS.** (Core course)

#### **Course Outcome:**

- Co.1 A lawyer, whether academic or professional, is expected to be competent to analyse and evaluate the legal process from a broader juristic perspective.
- Co.2 Hence a compulsory paper on Judicial Process is essential in the LL.M curriculum.
- Co.3 The objective of this paper is to study the nature of judicial process as an instrument of social ordering.
- Co.4 It is intended to highlight the role of court as policy maker, participant in the power process and as an instrument of social change.
- Co.5 This paper further intends to expose the intricacies of judicial creativity and the judicial tools and techniques employed in the process.
- Co.6 Since the ultimate aim of any legal process or system is pursuit of justice, a systematic study of the concept of justice and its various theoretical foundations is required.
- Co.7 This paper, therefore, intends to familiarise the students with various theories, different aspects and alternative ways, of attaining justice.

### **MODULE – 3 : HUMAN RIGHTS & DUTIES** (Core course)

#### **Course Outcome:**

- Co.1 Protection of Human Rights (HR) became an important issue after the second world war and after the acceptance of Universal Declaration of Human

Rights. The growth of HR Law and jurisprudence thereafter was spontaneous and continuous. The changes in the global scenario bring new concept of HR protection against violation. In one sense, HR can be said as the rights which the nature has endowed with human beings. However, they are not mere privileges given to the subjects by the ruler but are liberties permitted to the „citizens“ in a democracy. Manifestly a law that violates human rights is no law at all. Probably this perspective may give an impression that human rights are not different from natural rights envisaged by the natural law school.

Co.2 Although Indian polity waited for more than one score and five years for adoption of Fundamental Duties in the Constitution, it is beyond doubt that every human being has responsibilities and obligation not only towards the other fellow beings, but also towards the society at large. Only when a society is aware of this right-duty relationship can there be any meaning to human rights.

Co.3 Human rights are the rights of all human beings. Violation of these rights in human rights violations. Due to frequent violations to particular groups in disadvantageous position, new categories of human rights have emerged. These groups are of people such as women, children, prisoners and dalits. Violation of human rights of these groups is of great concern of every nation today. The officials of the state like the police force commit such violations. This is only an illustration. There are several other categories of violations.

Co.4 This course is intended to highlight the concept of human rights, their evolution their importance in our society and duties.

**MODULE -3A:            DRUG ADDICTION, CRIMINAL JUSTICE AND  
**Elective Course            HUMAN RIGHTS****

**Course Objectives:**

Co.1 Almost all the major dilemmas of criminal policy surface rather acutely in combating drug addiction and trafficking through the legal order.

Co.2 The issue of interaction between drug abuse and criminality is quite complex.

Co.3 At least three important questions have been recently identified as crucial for comparative research. First, to what extent drug dependence contributes to criminal behaviour? Second, in what ways do criminal behaviour patterns determine drug abuse? Third, are there any common factors which contribute to the determination of both drug abuse and criminal behaviour?

## **MODULE – 3B : CONCEPT AND DEVELOPMENT OF HUMAN RIGHTS**

**(Elective Course)**

### **Course Outcome:**

Co.1 Protection of Human Rights (HR) became an important issue after the Second World War and after the acceptance of Universal Declaration of Human Rights.

Co.2 The growth of HR Law and jurisprudence thereafter was spontaneous and continuous.

Co.3 The changes in the global scenario bring new concept of HR protection against violation. In one sense, HR can be said as the rights which the nature has endowed with human beings. However, they are not mere privileges given to the subjects by the ruler but are liberties permitted to the 'citizens' in a democracy.

Co.4 Manifestly a law that violates human rights is no law at all.

Probably this perspective may give an impression that human rights are not different from natural rights envisaged by the natural law school.

Co.5 Although Indian polity waited for more than one score and five years for adoption of Fundamental Duties in the Constitution, it is beyond doubt that every human being has responsibilities and obligation not only towards the other fellow beings, but also towards the society at large.

Co.6 Only when a society is aware of this right-duty relationship can there be any meaning to human rights.

Co.7 This course is intended to highlight the concept of human rights, their evolution and their importance in our society now particularly in the era of privatisation, globalisation and liberalisation.

## **MODULE – 1 : LEGAL EDUCATION AND RESEARCH**

**Core Course                      METHODOLOGY.**

### **Course Outcome:**

Co.1 A post-graduate student of law should get an insight into the objectives of legal education. He should have an exposure to programmes like organisation of seminars, publication of law journals and holding of legal aid clinics.

Co.2 Law is taught in different ways in different countries.

Co.3 The LL.M course, being intended also to produce lawyers with better competence and expertise, it is imperative that the student should familiarise himself with the different systems of legal education.

Co.4 The lecture method both at LL.B level and LL.M level has many demerits. The existing lacunae can be eliminated by following other methods of learning such as case methods, problem method, discussion method, seminar method and a combination of all these methods.

Co.5 The student has to be exposed to these methods so as to develop his skills. Growth of legal science in India depends on the nature and career of legal research.

Co.6 The syllabus is designed to develop also skills in research and writing in a systematic manner.

**PAPER – 4 : PRACTICAL EXAMINATION.**

**Course Outcome:**

- Co.1 Learning while doing
- Co.2 Sensitize the students for research
- Co.3 Sensitize the students for teaching
- Co.4 Sensitize the students for social work

The practical examination shall be held at the end of the third semester on Research Methodology Law. Teaching and Clinical work. There shall be 25 Marks each for doctrinal research and for non doctrinal research and 25 marks each for law teaching and clinical work.

**MODULE -2A : FORENSIC SCIENCE**

**(Elective Course)**

**Course Outcome:**

- Co.1 Crime in the society is as old as human race.
- Co.2 With the advancement of science and technology types and methods of crime have undergone a radical change.
- Co.3 Intelligent criminal has been quick to exploit science and technology for commission of crime.
- Co.4 Present scenario of criminal justice system is sad
- Co.5 Large percentage of criminals goes scot free These frequent acquittals not only waste the huge amount of public money and precious time but embolden the criminals, escalate crime and multiply criminals.
- Co.6 Now a days old techniques of criminal investigation has become obsolete
- Co.7 Use of third degree does not find favour with the new generation of administrators, judges and the public at large.
- Co.8 Forensic Science has proved a very useful tool for identification the crime, criminal and victim.
- Co.9 The syllabus is designed to make aware the students of this new science and technology.

**MODULE – 2B : PROTECTION AND ENFORCEMENT OF HUMAN RIGHTS IN INDIA**

**(Elective Course)**

**Course Outcome:**

- Co.1 A reading of fundamental rights and duties in the Constitution of India reveals that they constitute the human rights charter in India.

Co.2 The judiciary, the major protective and enforcement machinery, is very active in protecting human rights.

Co.3 Judicial activism in this field has added new dimensions to human rights jurisprudence.

Co.4 There are a number of cases where courts apply the provisions of the international conventions to fill the gaps in legislation.

Co.5 The apex court has also ventured to apply international convention even where there was no legislation in the area.

Co.6 Thus the judiciary has been directly implementing international conventions at the national level. This course aims at familiarising students with the judicial activism in protecting human rights and enables them to evaluate the adequacy of the methods of enforcement.

**MODULE -3A : PRIVILEGED CLASS DEVIANCE**

**(Elective Course)**

**Course Outcome:**

Co.1 This course focuses on the "Criminality of the "Privileged classes". The definition of "privileged classes" in a society like India should not pose major problem at all; the expression nearly includes wielders of all forms of state and social (including religious) power.

Co.2 Accordingly, the course focuses on the relation between privilege power and deviant behaviour.

Co.3 The traditional approaches which highlight "white-collar offences", "socio-economic offences" or "crimes of the powerful" deal mainly with the deviance of the economically resourceful.

Co.4 The dimension of deviance associated with bureaucracy, the new rich (nouveau riche), religious leaders and organizations, professional classes and the higher bourgeoisie are not fully captured here.

**MODULE – 3B : HUMAN RIGHTS OF DISADVANTAGED GROUPS  
: PROBLEMS AND ISSUES IN THE PROTECTION  
AND ENFORCEMENT**

**(Elective Course)**

**Course Outcome:**

Co.1 Human rights are the rights of all human beings. Violation of these rights is human rights violations.

Co.2 Due to frequent violations to particular groups in disadvantageous positions, new categories of human rights have emerged.

Co.3 These groups are of people such as women, children, prisoners and dalits. Violation of human rights of these groups is of great concern of every nation today.

Co.4 The officials of the state like the police force commit such violations. This is only an illustration. There are several other categories of violations.

**MODULE -1 : INDIAN CONSTITUTIONAL LAW : THE NEW CHALLENGES.**  
(Core Course)

**Course Outcome:**

- Co.1 The Constitution, a living document, is said to be always in the making. The judicial process of constitutional interpretation involves a technique of adapting the law to meet changing social mores.
- Co.2 Constitution being the fundamental law, an insight into its new trends is essential for a meaningful understanding of the legal system and processes.
- Co.3 The post graduate students in law who had the basic knowledge of Indian Constitutional Law at LL.B level, should be exposed to the new challenges and perspectives of constitutional development while they are allowed to choose an area of law for specialisation.

**MODULE -2A: PENOLOGY : TREATMENT OF OFFENDERS**

(Elective Course)

**Course Outcome:**

- Co.1 **This course offers a specialist understanding of criminal policies**
- Co.2 It includes theories of punishment, their supposed philosophical and sociological justifications and
- Co.3 The problematic of discretion in the sentencing experience of the 'developing' societies, a focus normally absent in law curricula so far.

**MODULE – 2B : ENVIRONMENT AND INTERNATIONAL LEGAL ORDER**

(Elective Course)

**Course Outcome:**

- Co.1 Through the centuries of their growth, societies had done their best to keep their neighbourhood clean and health.
- Co.2 Industrialisation brought in its wake unprecedented and unpredicted environmental hazards and upset the old ethos and equilibrium.
- Co.3 The environmental consciousness is an offshoot of this saga of industrial growth. It is said that the world environmental consciousness had made a radical change in the character of international law from a moral code of ethics among nations to an almost positive law imposing on the states to observe environmental norms.
- Co.4 Striking a significant note at the close of the last millennium, areas of international concern on environment are legion.
- Co.5 Modes of reconciling the conflicts are also varied. The concept of sustainable development is a significant tool both at the international level and at the domestic system for reconciliation of environmental values and developmental needs.



## **MODULE -3A : JUVENILE DELINQUENCY**

**(Elective Course)**

### **Course Outcome:**

Co.1 This is a crucial area of Indian development with which traditional, western, criminology is not overly preoccupied.

Co.2 Collective political violence (CPV) is the order of the day, whether it is agrarian (feudal) violence, or it is atrocities against untouchables, communal riots, electoral violence, police violence (encounters), political violence by militant and extremist groups, gender-based violence or violence involved in mercenary terrorism and its containment.

Co.3 The emphasis of the course will be on fashioning overall democratic understanding and responses to meet this problem.

## **MODULE – 3B : INTERNATIONAL HUMANITARIAN LAW AND REFUGEE LAW**

**(Elective Course)**

### **Course Outcome:**

Co.1 The two world wars had had enough of lessons to teach. But the present scenario shows that the nations have not learnt any lesson : wars continue to be there.

Co.2 The International Humanitarian Law aims at humanising war though war itself is inhuman. Human rights do have value only in peace time. War is the negation of all human rights.

Co.3 Though the United Nations Charter does not permit war, it has shown the wisdom to regulate the war if one occurs. War is one of the factors which creates the problem of refugees.

Co.4 There have been some endeavours on the part of the international community to protect the interests of refugees. But due to political interference, the formulation of the definition of the term 'refugee' in the 'Convention relating to the status of refugees' has been such that it helps the developed countries to shirk the responsibility towards the refugees leaving the burden to the developing countries.

Co.5 This course intends to equip the students with the awareness of the various problems of refugees and to inspire them to critically evaluate the international conventions and national legislation.

**MODULE -4A : COLLECTIVE VIOLENCE AND CRIMINAL**  
**(Elective Course) JUSTICE SYSTEM**

**Course Outcome:**

Co.1 This is a crucial area of Indian development with which traditional, western, criminology is not overly preoccupied.

Co.2 Collective political violence (CPV) is the order of the day, whether it is agrarian (feudal) violence, or it is atrocities against untouchables, communal riots, electoral violence, police violence (encounters), political violence by militant and extremist groups, gender-based violence or violence involved in mercenary terrorism and its containment.

Co.3 The emphasis of the course will be on fashioning overall democratic understanding and responses to meet this problem.

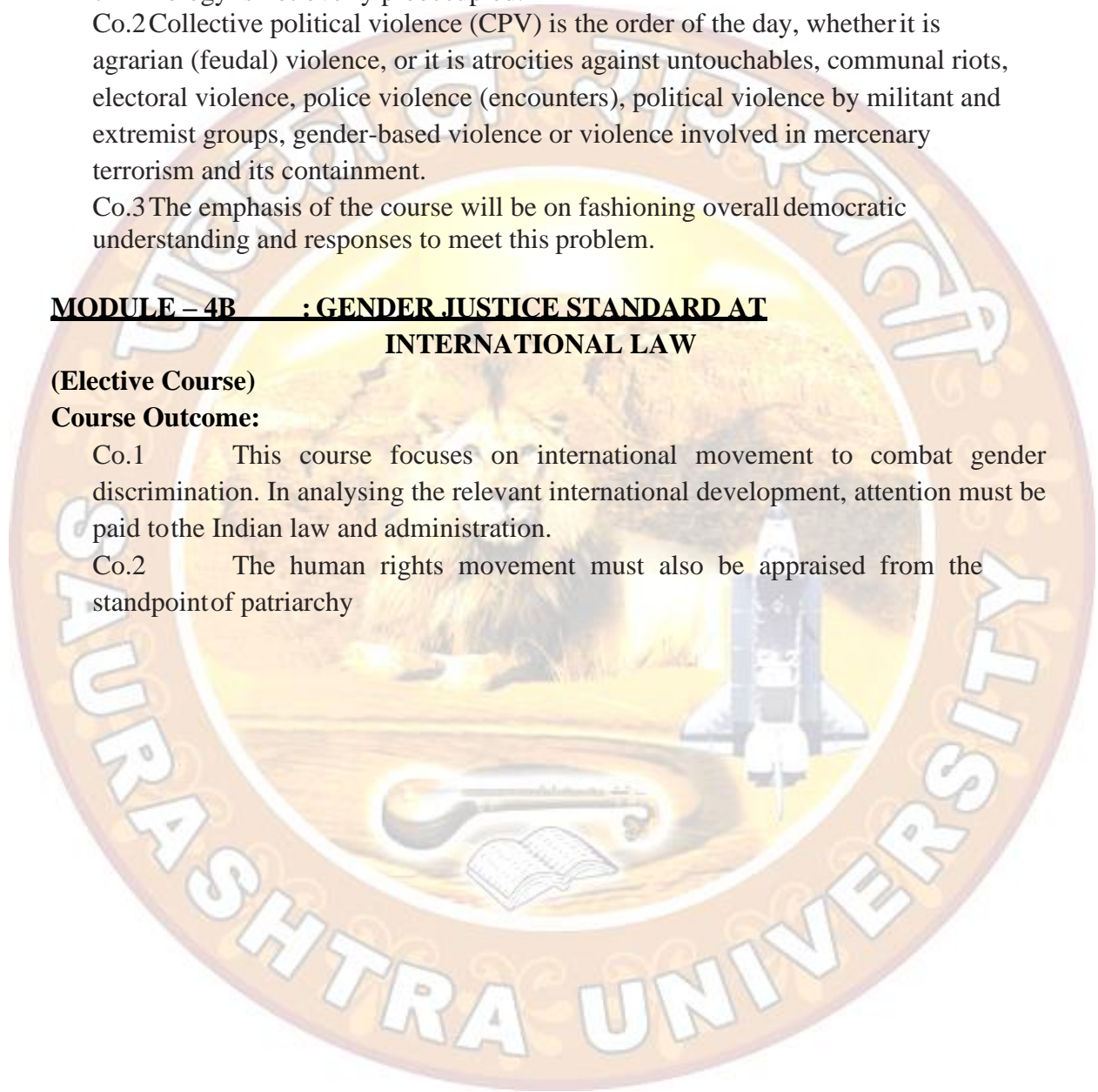
**MODULE – 4B : GENDER JUSTICE STANDARD AT**  
**INTERNATIONAL LAW**

**(Elective Course)**

**Course Outcome:**

Co.1 This course focuses on international movement to combat gender discrimination. In analysing the relevant international development, attention must be paid to the Indian law and administration.

Co.2 The human rights movement must also be appraised from the standpoint of patriarchy



## Course Outcomes of M.Phil. (JOURNALISM)

M.PHIL 2019-20

### COURSE OUTCOMES

#### SEM-1

COS 1 The students are academically enriched about.

- Research Methodology
- Mass communication Research

COS 2 The students are academically enriched about.

- Concept of Teaching Techniques
- Concept of Communication theories

#### SEM-2

COS 1 The students are academically enriched about.

- Role of media in development
- Cyber journalism & Cyber media

COS 2 The students are academically enriched about.

- Present Media Context
- New Media Technology

COS 3 The Students should, enrich their knowledge about a particular subject or area and write a master essay on it. The essay should be based on research and of approximately 150 pages. This (dissertation) is supposed to be submitted before 31st March.

## Course Outcomes of MJMC (JOURNALISM)

MJMC 2018-19

### COURSE OUTCOMES

#### SEM-1

COS 1 The students are academically enriched about.

- Concept of research & development
- Importance of development communication

COS 2 The students are academically enriched about.

- Concept of Science Communication
- Importance of Science Communication

COS 3 The students are academically enriched about.

- Importance of Cinema as a medium
- Various Folk media

COS 4 The students are academically enriched about.

- Origin & growth of Gujrati Press
- Various Gujrati journals of Saurashtra & Gujrat

COS 5 The students are academically enriched about.

- Various media of India
- Indian journalism

COS 6 The students are academically enriched about.

- Concept of Culture
- Concept of intercultural Communication

COS 7 The students are academically enriched about.

- Introduction & Importance of Business Communication
- Current Scenario of Business Communication

## SEM-2

COS 1 The students are academically enriched about.

- Concept of Media & development
- Importance of Media research

COS 2 The students are academically enriched about.

- Concept of Science communication
- Importance of Science communication.

COS 3 The students are academically enriched about.

- Importance of Cinema as a medium
- Various Folk media

COS 4 The students are academically enriched about.

- Origin & growth of American & British Press.
- Rise & growth of Press in India

COS 5 The Students should, enrich their knowledge about a particular subject or area and write a master essay on it. The essay should be based on research and of approximately 100 pages. This (dissertation) is supposed to be submitted by the end of academic year.

COS 6 The students are academically enriched about.

- Importance of Radio and Television as a medium
- Importance of E-journalism

COS 7 The students are academically enriched about.

- Importance of web journalism
- Current scenario of Web-journalism

## Course Outcomes of PGDMC (JOURNALISM)

PGDMC 2018-19

### COURSE OUTCOMES

#### SEM-1

COS 1 The students are academically enriched about.

Concept of journalism

Various mass media

COS 2 The students are academically enriched about.

Principles of Editing

Reporting for Print Media

COS 3 The students are academically enriched about.

Various reading materials of print Media.

Practical aspects of reading materials of Print Media

COS 4 The students are academically enriched about.

Concept of advertising

Importance of advertising

COS 5 The students are academically enriched about.

Concept of Magazine Journalism

Areas of Magazine Journalism

COS 6 The students are academically enriched about.

Concept and area of media ethics

Introduction and Importance of media laws

COS 7 The students are academically enriched about.

Concept and areas of Sports Journalism

Importance of sports journalism

## SEM-2

COS 1 The students are academically enriched about.

Concept of communication

Concept of mass communication

COS 2 The students are academically enriched about.

Concept of Public Relations

Importance of Public Relations

COS 3 The students are academically enriched about.

Concept of News Editing & Practical

Indian History & current affairs

COS 4 The students are academically enriched about.

Invention of Radio & Television

Invention of Cinema

COS 5 The students are academically enriched about.

Concept of Language

Concept of Translation

COS 6 The students are academically enriched about.

Concept of Media Management

Areas of Media Management

COS 7 The students are academically enriched about.

Concept of Print Media Writing

Concept of Electronic Media Writing

## Course Outcomes of LL.M. (Law)

### MODULE-1: LAW AND SOCIAL TRANSFORMATION IN INDIA.

(Core Course)

**Course Outcomes:**

This course is designed to offer the teacher and the taught with

**Cos1.** awareness of Indian approaches to social and economic problems in the context of law as a means of social control and change; and

**Cos2.** a spirit of inquiry to explore and exploit law and legal institutions as a means to achieve development within the framework of law.

**Cos3.** The endeavour is to make the students aware of the role the law has played and has to play in the contemporary Indian society

### MODULE – 2 : JUDICIAL PROCESS.

(Core course)

**Course Outcomes:**

**Cos 1.** A lawyer, whether academic or professional, is expected to be competent to analyse and evaluate the legal process from a broader juristic perspective. Hence a compulsory paper on Judicial Process is essential in the LL.M curriculum.

**Cos 2.** The objective of this paper is to study the nature of judicial process as an instrument of social ordering.

**Cos 3.** It is intended to highlight the role of court as policy maker, participant in the power process and as an instrument of social change.

**Cos 4.** This paper further intends to expose the intricacies of judicial creativity and the judicial tools and techniques employed in the process.

**Cos 5.** Since the ultimate aim of any legal process or system is pursuit of justice, a systematic study of the concept of justice and its various theoretical foundations is required.

**Cos 6.** This paper, therefore, intends to familiarize the students with various theories, different aspects and alternative ways, of attaining justice.

### MODULE – 3 : HUMAN RIGHTS & DUTIES

(Core course)

**Course Outcomes:**

Protection of Human Rights (HR) became an important issue after the second world war and after the acceptance of Universal Declaration of Human Rights.

**Cos 1. To create awareness for Protection of Human Rights**

The growth of HRs Laws and jurisprudence thereafter was spontaneous and continuous. The changes in the global scenario bring new concept of HR protection against violation. In one sense, HR can be said as the rights which the nature has endowed with human beings. However, they are not mere privileges given to the subjects by the ruler but are liberties permitted to the 'citizens' in a democracy. Manifestly a law that violates human rights is no law at all. Probably this perspective may give an impression that human rights are not different from natural rights envisaged by the natural law school.



**Cos 2. To make the perception clear about Human Rights**

Indian polity adopted Fundamental Duties in the Constitution after a long time. It is beyond doubt that every human being has responsibilities and obligation not only towards the other fellow beings, but also towards the society at large.

**Cos 3. To make understand this right-duty relationship.** Only when a society is aware of this can there be any meaning to human rights.

Human rights are the rights of all human beings. Violation of these rights in human rights violations. Due to frequent violations to particular groups in disadvantageous position, new categories of human rights have emerged. These groups are of people such as women, children, prisoners and dalits. Violation of human rights of these groups is of great concern of every nation today. The officials of the state like the police force commit such violations. This is only an illustration. There are several other categories of violations.

**Cos 4** This course is intended to clear the concept of human rights, understand the importance duties in our society making a responsible citizen of the nation

**MODULE -2A : FORENSIC SCIENCE - [ Multi-disciplinary ]  
(Elective Course)**

**Course Outcomes:**

Crime in the society is as old as human race. With the advancement of science and technology types and methods of crime have undergone a radical change. Intelligent criminal has been quick to exploit science and technology for commission of crime.

**COs. 1.** To acquire the knowledge of technology, methods of crime adopted by the criminals Present scenario of criminal justice system is sad large percentage of criminals goes scot free. These frequent acquittals not only waste the huge amount of public money and precious time but embolden the criminals, escalate crime and multiply criminals.

**COs.2.** to make aware of this sad situations and how to get rid of this Now a days old technique of criminal investigation has become obsolete. Use of third degree does not find favour with the new generation of administrators, judges and the public at large. Forensic Science has proved a very useful tool for identification of the crime, criminal and victim.

**COs.3.**The syllabus is designed to make aware the students of this new science and technology.

**MODULE – 3B : LAW OF EXPORT IMPORT REGULATION  
(Elective Course)**

**Course Outcomes:**

After independence India has embarked upon all round efforts to modernize her economy through developmental ventures. Greater and greater emphasis is placed on increase of production in both industrial and agricultural sectors. Besides, there was the ever-pressing need for raising capital for

investment in certain basic and key industries. All these required a considerably high rate of investment of capital.

The process of modernization necessitated the adoption of newer technologies for industry and agriculture. These technologies had to be borrowed from other developed countries.

This, in turn, needed foreign exchange which could be earned by the increased exports of goods and raw materials from India.

**COs.1** This course is designed to acquaint the students about the parameters of legal controls on imports and exports.

**COs 2.** To develop the professional and entrepreneur skill in the students

**COs 2.** To understand the global scenario of export and import of goods and services

### **MODULE – 1 :           LEGAL EDUCATION AND RESEARCH METHODOLOGY.**

#### **Core Course**

#### **Course Outcomes:**

**COs. 1** A post-graduate student of law should get an insight into the objectives of legal education.

**COs 2.** To expose students to programmes like organisation of seminars, publication of law journals and holding of legal aid clinics.

**COs 3.** Law is taught in different ways in different countries. The LL.M course, being intended also to produce lawyers with better competence and expertise, it is imperative that the student should familiarise himself with the different systems of legal education.

**COs 4.**The lectures method both at LL.B level and LL.M level has many demerits. The existing lacunae can be eliminated by following other methods of learning such as case methods, problem method, discussion method, seminar method and a combination of all these methods.

The student has to be exposed to these methods so as to develop his skills.

**COs 5.** Growth of legal science in India depends on the nature and career of legal research. The syllabus is designed to develop also skills in research and writing in a systematic manner.

### **PAPER – 2       :           PRACTICAL EXAMINATION.**

#### **Course Outcomes:**

**COs 1.**Learning while doing

**COs 2.**Sensitize the students for research

**COs 3.**Sensitize the students for teaching

**COs 4.**Sensitize the students for social work

The practical examination shall be held at the end of the third semester on Legal Education and Research Methodology. Teaching and Clinical work. There shall be 25 Marks each for doctrinal research and for non doctrinal research and 25 marks each for law teaching and clinical work.

### **MODULE – 2B       : COMPARATIVE CRIMINAL PROCEDURE** **(Elective Course)**

**Course Outcomes:**

Criminal Procedure is being taught as a compulsory paper at the level of LL.B. today.

**COs 1.** To make students aware that a jurisprudential thrust has to be given to this subject at the post-graduate level as this is a subject which has constitutional undertones and jurisprudential importance.

**COs 2.** A study of comparative criminal procedure helps students to develop an ecumenical approach and broadens their vision. It inspires them renew and revise their laws to be in tune with developed systems.

**COs 3.** To have a comparative study with reference to India, England, France and China

**MODULE – 2B : LAW OF INSURANCE**

**(Elective Course)**

**Course Outcomes:**

**COs 1 .** To provide the operational framework of insurance idea by the general principles of contract.

**COs 2.** To make student aware about the insurance policy, being a contract, is subject to all the judicial interpretative techniques. Besides, the insurance idea has a compensatory justice component. This brings it in the arena of the law of tort as well. It is even suggested that a fully grown and developed law of insurance may, if not totally displace, decrease the significance of the law of tort.

**COs 3.** This course is designed to acquaint the students with the conceptual and operational parameters of insurance law in the context of the development of the general principles of law and judicial interpretation to inform the students about the use of law for the establishment of "just" order in insurance and to develop the appreciative and evaluative faculties of the students.

**MODULE -3A : PRIVILEGED CLASS DEVIANCE**

**(Elective Course)**

**Course Outcomes:**

This course focuses on the "Criminality of the "Privileged classes". The definition of "privileged classes" in a society like India should not pose major problem at all; the expression nearly includes wielders of all forms of state and social (including religious) power.

**COs 1 .** To understand the relation between privilege power and deviant behaviour

**COs 2.** To make aware about the traditional approaches which highlight "white-collar offences", "socio-economic offences" or "crimes of the powerful" deal mainly with the deviance of the economically resourceful.

The dimension of deviance associated with bureaucracy, the new rich (nouveau riche), religious leaders and organizations, professional classes and the higher bourgeoisie are not fully captured here.

**MODULE – 3B : BANKING LAW.**

**(Elective Course)**

**Course Outcomes:**

A vitally important economic institution the banking system is deeply influenced by socio-political and economic changes.

**COs 1.** To aware about the emerging changes in India, particularly after the initiation of the planning process as an instrument of rapid economic development had moulded and affected the banking structure, policies, patterns and practices.

A significant development in the banking system is diversification in banks financing. The commercial banks entered 'into the field of wide ranging financial assistance to industry, both large and small scale, requiring the need for social control of the banking system eventually leading to the nationalization of banks.

**COs 2.** This course is designed to acquaint the students with the conceptual and operational parameters of banking law, the judicial interpretation and the new and emerging dimensions of the banking system.

### **MODULE -1 : INDIAN CONSTITUTIONAL LAW : THE NEW CHALLENGES.**

**(Core Course)**

#### **Course Outcomes:**

**COs1.** To make understand that the Constitution, a living document, is said to be always in the making. The judicial process of constitutional interpretation involves a technique of adapting the law to meet changing social mores.

**COs2.** To aware about the Constitution being the fundamental law, an insight into its new trends is essential for a meaningful understanding of the legal system and processes.

**COs3.** The post graduate students in law who had the basic knowledge of Indian Constitutional Law at LL.B level, should be exposed to the new challenges and perspectives of constitutional development while they are allowed to choose an area of law for specialisation.

### **MODULE -2A : PENOLOGY : TREATMENT OF OFFENDERS**

**(Elective Course)**

#### **Course Outcomes:**

**COs1.** This course offers a specialist understanding of criminal policies It includes theories of punishment, their supposed philosophical and sociological justifications and

**COs2.** To aware the students about the problematic of discretion in the sentencing experience of the 'developing' societies, a focus normally absent in law curricula so far.

### **MODULE – 2B : LAW OF INDUSTRIAL AND INTELLECTUAL PROPERTY**

**(Elective Course)**

#### **Course Outcomes:**

The concept of intellectual property rights as developed in India cannot be divorced from the developments in the international arena as well as in the nation-to-nation relations.

**COs1.**The impact of IPR regime on the economic front is emphasized in this paper. In particular, greater attention would be given here to the law relating to unfair and restrictive trade practices as affecting the regime of intellectual property rights.

**COs2.** To aware about the new areas of development, especially plant patenting and patenting of new forms of life (biotechnology) should receive special attention.

**COs3.**Evidentiary aspects of infringement, and human right dimensions of the regime of intellectual property law will also be addressed.

### **MODULE -3A : JUVENILE DELINQUENCY**

**(Elective Course)**

#### **Course Outcomes:**

Juvenile delinquency is considered an important branch of criminology. The impact of juvenile delinquency upon the formation of Indian criminology tradition does not seem to be noticeable.

**COs1.** To make students aware that no understanding of crimes and treatment of offenders can be complete without a sure grasp of causes, carrots, and cures of juvenile delinquency

**COs2.** To make them realize that young offenders require a wholly different centre of criminal justice system and should not be treated in the same way as the adult offenders.

**COs3.** To know that Juvenile Justice System, although a part of the criminal justice system has now its own autonomous characteristics.

### **MODULE – 3B : PREVENTION AND CONTROL OF POLLUTION**

**(Elective Course)**

#### **Course Outcomes:**

Pollution hazards bring the worst harm to the environment. Legal measures are attempted to prevent or control various kinds of pollution and their aftermath.

**COs1.** To make students aware about land pollution hazards be presented or controlled effectively by criminal sanctions especially in a developing country like India?

**COs2.** To know what other legal strategies can be adopted at this level? To what extent can corporate civil liability be extended for remedying pollution maladies particularly mass disasters. One has to be a critic of the existing laws and to look forward to desirable mechanism of control over pollution hazards.

**COs3.**This paper aims at shedding light on these areas.

### **MODULE -4A: COLLECTIVE VIOLENCE AND CRIMINAL JUSTICE SYSTEM**

**(Elective Course)**

#### **Course Outcomes:**

**COs1.** To make the students aware that this is a crucial area of Indian development with which traditional, western, criminology is not overly preoccupied. Collective political violence (CPV) is the

order of the day, whether it is agrarian (feudal) violence, or it is atrocities against untouchables, communal riots, electoral violence, police violence (encounters), political violence by militant and extremist groups, gender-based violence or violence involved in mercenary terrorism and its containment.

**COs2.**The emphasis of the course will be on fashioning overall democratic understanding and responses to meet this problem.

**MODULE – 2B : CORPORATE FINANCE.**

**(Elective Course)**

Course Outcomes:

COs1.To make students aware about importance of corporate sector in India

COs2. To aware about the various financial resources for corporate sector

COs3.To have the knowledge of regulatory measures and authority for corporate finance

Course Contents:

**DISSERTATION / PROJECT as decided by Head of the Department.**

Course Outcomes

COs1. To develop the research aptitude

COs2. To develop the research skill

COs3. To develop the thought process

COs1. To develop the creative potential of the students



## Course Outcomes of PG Diploma in Banking Law

### Course Outcomes:

A vitally important economic institution the banking system is deeply influenced by socio-political and economic changes.

**COs 1.** To aware about the emerging changes in India, particularly after the initiation of the planning process as an instrument of rapid economic development had moulded and affected the banking structure, policies, patterns and practices.

A significant development in the banking system is diversification in banks financing. The commercial banks entered 'into the field of wide ranging financial assistance to industry, both large and small scale, requiring the need for social control of the banking system eventually leading to the nationalization of banks.

**COs 2.** This course is designed to acquaint the students with the conceptual and operational parameters of banking law, the judicial interpretation and the new and emerging dimensions of the banking system.

### Course Outcomes :

- To make the students aware of practical problems.
- To create in students his or her creative potential.
- To stimulate the students to deal with the practical problems.
- To use the theoretical knowledge in practical life.

## Course Outcomes of PG Diploma in Export-Import (EXIM)

After

independence India has embarked upon all round efforts to modernize her economy through developmental ventures. Greater and greater emphasis is placed on increase of production in both industrial and agricultural sectors. Besides, there was the ever-pressing need for raising capital for investment in certain basic and key industries. All these required a considerably high rate of investment of capital.

The process of modernization necessitated the adoption of newer technologies for industry and agriculture. These technologies had to be borrowed from other developed countries.

This, in turn, needed foreign exchange which could be earned by the increased exports of goods and raw materials from India.

**COs.1** This course is designed to acquaint the students about the parameters of legal controls on imports and exports.

**COs 2.** To develop the professional and entrepreneur skill in the students

**COs 3.** To understand the global scenario of export and import of goods and services

### Course Outcomes :

COs1. To make the students aware of practical problems.

COs2. To create in students his or her creative potential.

COs3. To stimulate the students to deal with the practical problems.

COs4. To use the theoretical knowledge in practical life.



## Course Outcomes of PG Diploma in Forensic Science

Crime in the society is as old as human race. With the advancement of science and technology types and methods of crime have undergone a radical change. Intelligent criminal has been quick to exploit science and technology for commission of crime.

**COs. 1.** To acquire the knowledge of technology, methods of crime adopted by the criminals

Present scenario of criminal justice system is sad large percentage of criminals goes scot free. These frequent acquittals not only waste the huge amount of public money and precious time but embolden the criminals, escalate crime and multiply criminals.

**COs.2.** to make aware of this sad situations and how to get rid of this

Now a days old technique of criminal investigation has become obsolete. Use of third degree does not find favour with the new generation of administrators, judges and the public at large.

Forensic Science has proved a very useful tool for identification of the crime, criminal and victim.

**COs.3.**The syllabus is designed to make aware the students of this new science and technology.

### Course Outcomes :

- To make the students aware of practical problems.
- To create in students his or her creative potential.
- To stimulate the students to deal with the practical problems.
- To use the theoretical knowledge in practical life.

# Course of PG Diploma in Legal Process Outsourcing (Online)

## Unit- 1.

### Foreign English

#### Course Outcomes

COs.1 This course is designed to acquaint the students about the Vocabulary in US.

COs.2 To acquaint with the Grammar in US

COs.3 To develop the reading skills, computer typing skills, etc

COs.4 To acquaint with the English language in other Countries

## Unit-2. Internet Skills

#### Course Outcomes

COs.1 This course is designed to acquaint the students about the computer operation

COs.2 To acquaint with the Data Security

COs.3 To develop the skills of using computer including MS Windows XP, MS Office, etc

COs.4 To acquaint with the Manupatra, Lexis Nexis

## Unit-3. Law of Contract

COs.1 This course is designed to acquaint the students with the important provisions of Law of Contract

COs.2 To develop the skills of forming the legal and valid contract

COs.3 To acquaint with the consequences of breach of contract

## Unit-1 US Legal System

#### Course Outcomes

COs.1 This course is designed to acquaint the students about the civil litigation process in US.

COs 2. To develop the professional and drafting skill in the students particularly conveyances in US

COs 3. To understand the legal process Mergers and Amalgations (UK Law) Business, Entities in US

**COs 4.** To acquaint the legal provisions of US Intellectual Property Law and US Family Law

## **Unit-2 UK Legal System.**

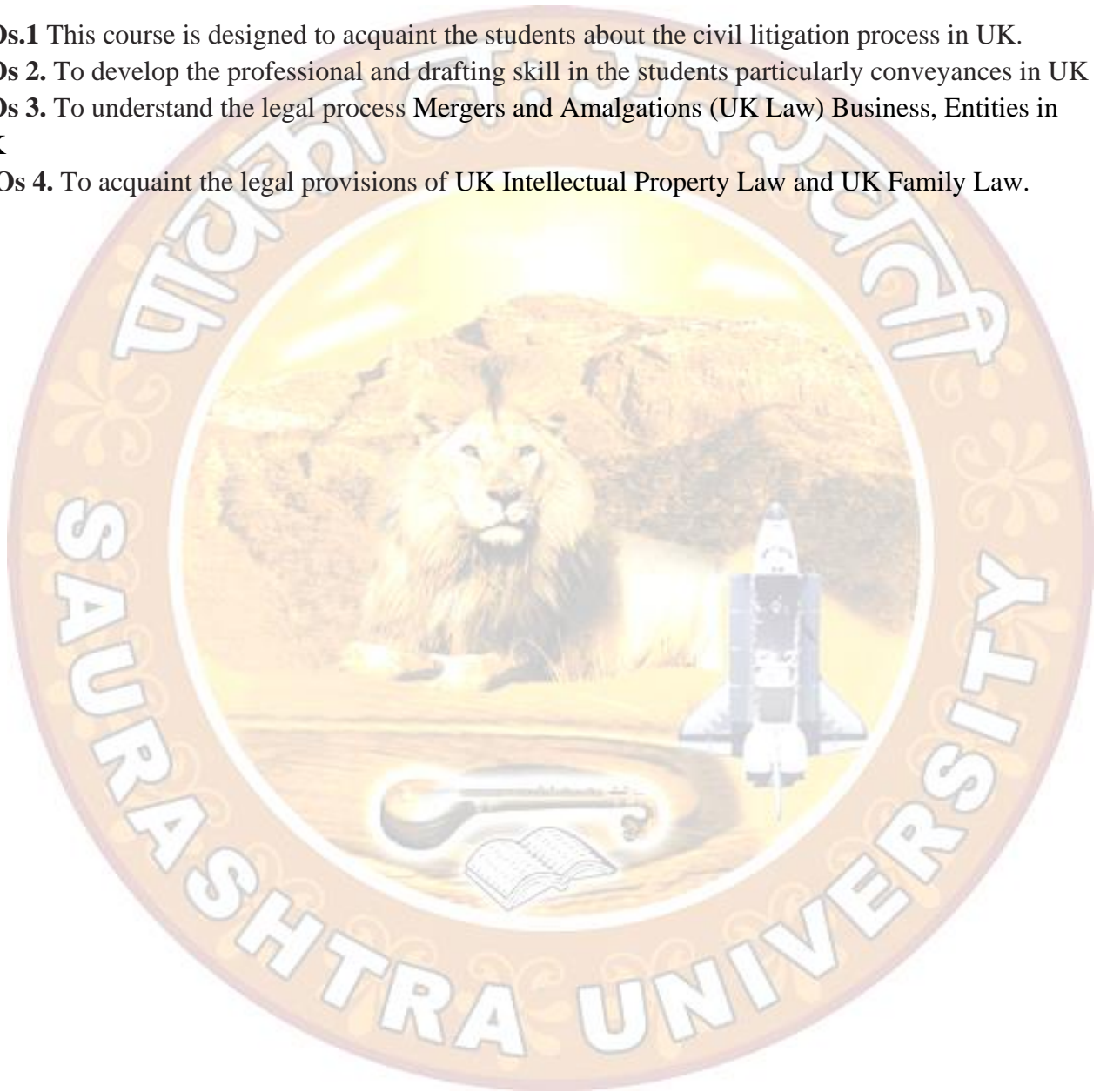
### **Course Outcomes**

**COs.1** This course is designed to acquaint the students about the civil litigation process in UK.

**COs 2.** To develop the professional and drafting skill in the students particularly conveyances in UK

**COs 3.** To understand the legal process Mergers and Amalgations (UK Law) Business, Entities in UK

**COs 4.** To acquaint the legal provisions of UK Intellectual Property Law and UK Family Law.



After

## **Course Outcome of Bachelor of Library Science and Information Science**

**studying this course, students shall be able to:**

- CO: 01. Comprehend the concept of librarianship and the discipline of Library and Information Science
- CO: 02. Comprehend the basic philosophy and ethics of librarianship.
- CO: 03. Know the role of libraries in the development of various aspects of society
- CO: 04. Classify libraries on the basis of their purpose and functions
- CO: 05. Understand laws related to libraries and information
- CO: 06. Understand librarianship as a profession and its professional ethics.
- CO: 07. Assess the role of national and international library associations and organizations
- CO: 08. Understand the concept of resource sharing and legal political and ethical aspect of information use.

**Subject: LIBRARY & INFORMATION SCIENCE**  
**Course Name & No.: LIBRARY MANAGEMENT**

**Course Outcomes :**

**After studying this course, students shall be able to:**

- CO: 01. Understand the basic concept and functions library administration.
- CO: 02. Carry out housekeeping operations of Library and Information Centres
- CO: 03. Manage, preserve and provide access to various print non-print information resources
- CO: 04. Comprehend the concept of financial management and human resource management
- CO: 05. Maintain the library statistics and prepare annual report

**Subject: LIBRARY & INFORMATION SCIENCE**  
**Course Name & No.: KNOWLEDGE ORGANISATION & PROCESSING-1**

**Course Outcomes :**

**After studying this course, students shall be able to:**

- CO: 01. Understand the nature of library classification
- CO: 02. Explain the nature and attributes of universe of knowledge
- CO: 03. Elaborate meaning and types of subjects and modes of subject formation
- CO: 04. Illustrate knowledge as mapped in different classification schemes
- CO: 05. Express the meaning, purpose, functions, theories and canons of library classification
- CO: 06. Elucidate various facets of notation and call number
- CO: 07. Discuss the characteristics, merits and demerits of different species of library classification schemes
- CO: 08. Highlight salient features of major classification schemes
- CO: 09. Review current trends in library classification

**Subject: LIBRARY & INFORMATION SCIENCE**

Course Name & No.: LIBRARY DEVELOPMENT

**Course Outcomes :**

**After studying this course, students shall be able to:**

- CO: 01. Understand the development of libraries in India
- CO: 02. Know about various existing laws regarding books and press in India
- CO: 03. Understand the development of public libraries in Gujarat, India U.S.A and U.K
- CO: 04. Comprehend the basics of library legislations and compare various state library legislations.
- CO: 05. Highlight role of various national level library organisation in India
- CO: 06. Highlight role of various library promoters at the national and international level

**Subject: LIBRARY & INFORMATION SCIENCE**

Course Name & No.: LIBRARY EDUCATION

**Course Outcomes :**

**After studying this course, students shall be able to:**

CO: 01. Understand the nature and core of library and information profession.

CO: 02. Comprehend concepts of Library Science education in general.

CO: 03. Profile the discipline of Library and Information Science

CO: 04. Understand development of Library and Information Science education in India.

CO: 05. Understand development of Library and Information Science education in U.S.A and U.K

CO: 06. Grasp and appreciate the role of UGC in development of LIS education in India.

CO: 07. Know about the status, levels and types of various programmes in LIS education.

CO: 08. Comprehend current research trends and effect of ICT on LIS education

**Subject:**

**LIBRARY & INFORMATION SCIENCE**

Course Name & No.:

**LIBRARY CLASSIFICATION & CATALOGUING PRACTICAL -1**

**Course Outcomes :**

**After studying this course, students shall be able to:**

CO: 01. Construct class numbers for documents with simple, compound and complex subjects

CO: 02. Synthesize class numbers by using the standard subdivisions/common isolates/auxiliary tables

CO: 03. Compile book numbers and be able to use index of the classification scheme

**Course Outcomes :**

**After studying this course, students shall be able to:**

CO: 01. Use the catalogue codes and standards

CO: 02. Prepare catalogue entries for various types of information sources

CO: 03. Derive subject headings using various methods and tools

**Subject:**

**LIBRARY & INFORMATION SCIENCE**

Course Name & No.:

**INFORMATION SKILLS**

**Course Outcomes:**

**After studying this course, students shall be able to:**

- CO: 01. Understand the basics of information landscape.  
CO: 02. Comprehend information needs and acquire skill to articulate such needs  
CO: 03. Proficiently use various types of information sources.  
CO: 04. Understand the concept of information literacy and be an information literate learner  
CO: 05. Effectively searches, evaluates needed information and use it ethically and legally.  
CO: 06. Understand and use information organisation and citation style

**Subject:** LIBRARY & INFORMATION SCIENCE

Course Name & No.: INFORMATION SOURCES

**Course Outcomes :**

**After studying this course, students shall be able to:**

- CO: 01. Understand, identify and explore the different types of information sources  
CO: 02. Critically evaluate various types of information sources  
CO: 03. Explore, collate and facilitate access to the electronic resources

**Subject:** LIBRARY & INFORMATION SCIENCE

Course Name & No.: INFORMATION SERVICES

**Course Outcomes :**

**After studying this course, students shall be able to:**

- CO: 01. Understand the nature and purpose of different types of reference and information services  
CO: 02. Comprehend Ranganathan's views regarding reference service  
CO: 03. Conduct reference interview as explained in the reference process  
CO: 04. Design a user education programme.  
CO: 05. Effectively provide various library services to different types of library users

**Subject:** LIBRARY & INFORMATION SCIENCE

Course Name & No.: COMPUTER APPLICATIONS

**Course Outcomes :**

**After studying this course, students shall be able to:**

- CO: 01. Understand the basics of computer technology
- CO: 02. Understand the structure of computer and functions of its various units
- CO: 03. Comprehend nature and components of computer networks, their protocols and standards
- CO: 04. Understand, plan and implement automation in library housekeeping operations and services
- CO: 05. Evaluate various library management software
- CO: 06. Be aware of the impact of computer technology in Library and Information work
- CO: 07. Create, edit and manage files using Word Processing, and PPT
- CO: 08. Carry out basic library housekeeping operations using library management software

**Subject: LIBRARY & INFORMATION SCIENCE**

Course Name & No.: KNOWLEDGE ORGANISATION & PROCESSING-2

**Course Outcomes :**

**After studying this course, students shall be able to:**

- CO: 01. Understand the dynamic theory of classification
- CO: 02. Familiarized with the isolates, devices systems, specials rounds and levels of classification schemes.
- CO: 03. Comprehend the canons principles and postulates of library classification

**Course Outcomes :**

**After studying this course, students shall be able to:**

- CO: 01. Understand methods of providing subject access.
- CO: 02. Comprehend nature and process of subject analysis, representation and subject cataloguing.



- CO: 03. Effectively use standard subject heading list.
- CO: 04. Appreciate the need for standardization in cataloguing.
- CO: 05. Understand the concept of Indexing and types of Indexing systems.
- CO: 06. Explain the current trends in library cataloguing
- CO: 07. Know the standards for bibliographic interchange and communication

**Subject:** LIBRARY & INFORMATION SCIENCE  
Course Name & No.: USER STUDIES

**Course Outcomes :**

**After studying this course, students shall be able to:**

- CO: 01. Understand the types of information users and their information needs.
- CO: 02. Understand their information seeking behaviour.
- CO: 03. Comprehend the concept, nature and techniques of user studies.
- CO: 04. Plan and execute library and user surveys

**Subject:** LIBRARY & INFORMATION SCIENCE  
Course Name & No.: SCHOOL LIBRARIANSHIP

**Course Outcomes :**

**After studying this course, students shall be able to:**

- CO: 01. Understand the nature and functions of School Library
- CO: 02. Understand the development of School Libraries in India and Gujarat
- CO: 03. Highlight the role of School Library in inculcating reading habit among school students
- CO: 04. Select, acquire organize and manage collection of School Library
- CO: 05. Promote reading among children and young adults.
- CO: 06. Provide various types of library services to school students
- CO: 07. Organize library orientation programmes for school students
- CO: 08. Automate school library and be part of resource sharing initiatives.

**Subject:** LIBRARY & INFORMATION SCIENCE  
Course Name & No.: LIBRARY CLASSIFICATION & CATALOGUING PRACTICAL -2

**Course Outcomes :**

**After studying this course, students shall be able to:**

CO: 01. Construct class numbers for documents with simple, compound and complex subjects

CO: 02. Synthesize class numbers by using the standard subdivisions/common isolates/auxiliary tables

CO: 03. Compile book numbers and be able to use index of the classification scheme

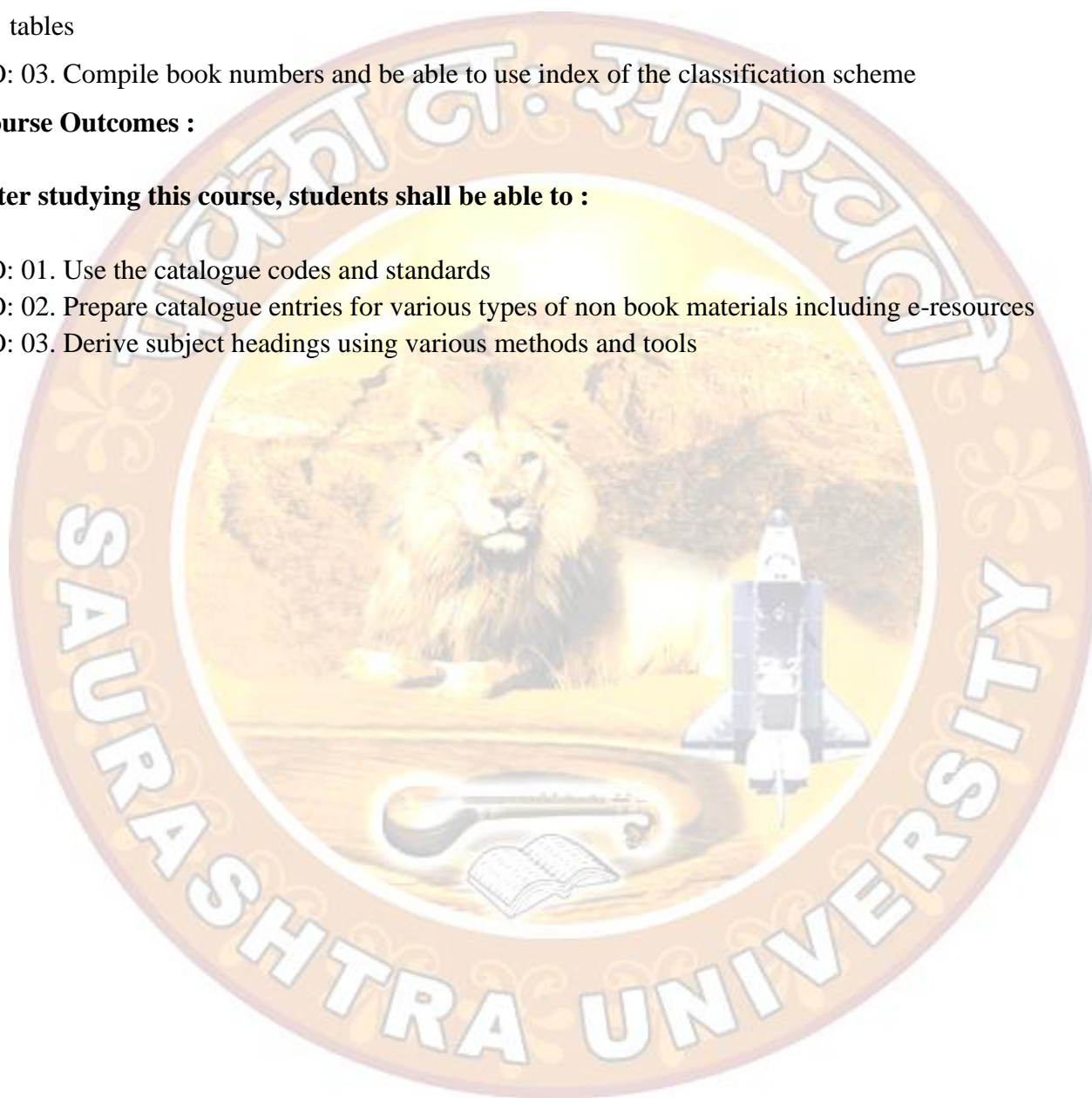
**Course Outcomes :**

**After studying this course, students shall be able to :**

CO: 01. Use the catalogue codes and standards

CO: 02. Prepare catalogue entries for various types of non book materials including e-resources

CO: 03. Derive subject headings using various methods and tools



## **Course Outcome of Master of Library Science and Information Science**

**Subject:** LIBRARY & INFORMATION SCIENCE  
**Course Name & No.:** INFORMATION AND COMMUNICATION  
**Course Outcomes :**

**After studying this course, students shall be able to:**

- CO: 01. Comprehend the concepts of Data, Information, Knowledge and fair use of information.
- CO: 02. Understand the role of information in society and communication channels.
- CO: 03. Know about Information Science as a discipline.
- CO: 04. Elaborate the concepts of Information Society and Knowledge Society
- CO: 05. Figure out the changing role of libraries and information centres in society
- CO: 06. Understand various law, act, policies, commission, and mission relating to information.
- CO: 07. Know about the economics & management of Information and Knowledge
- CO: 08. Understand various concepts of Informetrics.

**Subject:** LIBRARY & INFORMATION SCIENCE  
**Course Name & No.:** LIBRARY AUTOMATION & NETWORKING

**Course Outcomes :**

**After studying this course, students shall be able to:**

- CO: 01. Comprehend various aspects of library automation.
- CO: 02. Elaborate library Automation planning and Procedures
- CO: 03. Assess various integrated library management software.
- CO: 04. Carry out various automated in-house library operations.
- CO: 05. Understand basic concept of computer networks and use of Internet in libraries.
- CO: 06. Explore use of AI, expert systems, robotics, cloud computing and web applications

**Subject:** LIBRARY & INFORMATION SCIENCE  
**Course Name & No.:** RESEARCH METHODS AND STATISTICAL TECHNIQUES

**Course Outcomes :**

**After studying this course, students shall be able to:**

- CO: 01. Understand basics of research its methods, types and design.
- CO: 02. Comprehend various data collection, analysis and interpretation techniques.
- CO: 03. Familiarize with various statistical techniques.
- CO: 04. Understand basics of research reporting and prepare a research report.

**Subject:** LIBRARY & INFORMATION SCIENCE  
**Course Name & No.:** INFORMATION SOURCES, SERVICES AND SYSTEMS IN HUMANITIES & SOCIAL SCIENCES

**Course Outcomes :**

**After studying this course, students shall be able to:**

- CO: 01. Comprehend structure and development of Humanities and Social Sciences.
- CO: 02. Explore various disciplines in the field of Humanities and Social Sciences.
- CO: 03. Understand information sources, services and systems of Humanities and Social Sciences
- CO: 04. Highlight the role of available databases in these fields.
- CO: 05. Plan and design databases in Humanities and Social Sciences when required
- CO: 06. Carry out professional services in the libraries of Humanities and Social Science institutions

**Subject:** LIBRARY & INFORMATION SCIENCE  
**Course Name & No.:** INFORMATION SOURCES, SERVICES AND SYSTEMS IN SCIENCES & TECHNOLOGY

**Course Outcomes :**

**After studying this course, students shall be able to:**

- CO: 01. Comprehend structure and development of Science and Technology.
- CO: 02. Explore various disciplines in the field of Science and Technology.
- CO: 03. Understand information sources, services and systems of Science and Technology
- CO: 04. Highlight the role of available databases in these fields.
- CO: 05. Plan and design databases in Science and Technology when required
- CO: 06. Carry out professional services in the libraries of Science and Technology institutions

**Subject:** LIBRARY & INFORMATION SCIENCE

Course Name & No.: INFORMATION SYSTEMS AND PRODUCTS

**Course Outcomes :**

**After studying this course, students shall be able to:**

- CO: 01. Comprehend the activities and services of different Information Systems
- CO: 02. Elaborate the role of national, regional and global information systems
- CO: 03. Understand various traditional and modern information products and services.
- CO: 04. Know and evaluate various information providers.
- CO: 05. Manage and provide access to consortia based information products and services

**Subject:** LIBRARY & INFORMATION SCIENCE

Course Name & No.: INFORMATION PROCESSING & RETRIEVAL

**Course Outcomes :**

**After studying this course, students shall be able to:**

- CO: 01. Understand the concept of IR and its tools
- CO: 02. Comprehend the concept of information analysis, repackaging and consolidation
- CO: 03. Elaborate and use various indexing techniques.
- CO: 04. Acquaint with various bibliographic description standards.
- CO: 05. Appreciate the role of Data and its management in the current era.
- CO: 06. Use different search strategies, techniques and evaluate IR system.

**Subject:** LIBRARY & INFORMATION SCIENCE

Course Name & No.: INFORMATION TECHNOLOGY: APPLICATIONS

**Course Outcomes :**

**After studying this course, students shall be able to:**

- CO: 01. Understand the concept of ICT and its application in libraries.
- CO: 02. Comprehend the role of electronic information
- CO: 03. Know the role of digital libraries and process of digitization.
- CO: 04. Assess various digital library initiatives and provide access to such initiatives.
- CO: 05. Understand communication tools and techniques.
- CO: 06. Know how Internet based communication works and provide data security

**Subject:** LIBRARY & INFORMATION SCIENCE  
**Course Name & No.:** MANAGEMENT OF LIBRARIES AND INFORMATION CENTRES

**Course Outcomes :**

**After studying this course, students shall be able to:**

- CO: 01. Understand the concept, history of management and its modern techniques
- CO: 02. Elaborate styles, approaches, schools of thought, principles and functions of management
- CO: 03. Manage various operations of Library and Information Centres
- CO: 04. Manage, preserve and provide access to various print and non-print information sources
- CO: 05. Comprehend the concept of decision making, organising and quality management.
- CO: 06. Comprehend the concept of human resource management and financial management

**Subject:** LIBRARY & INFORMATION SCIENCE  
**Course Name & No.:** ACADEMIC LIBRARY SYSTEM & SERVICES

**[Structure of Semester-end Examination:** Total 5 Questions with internal options. Q 1 to 3

**Course Outcomes :**

**After studying this course, students shall be able to:**

- CO: 01. Comprehend the structure and development of the higher education in India.
- CO: 02. Assess the role of UGC in development of libraries in India.
- CO: 03. Assess the role of library in higher education.
- CO: 04. Understand academic librarianship, its types, collection, HR and finance
- CO: 05. Professionally manage an academic library and provide access to its resources and services.

**Subject:** LIBRARY & INFORMATION SCIENCE  
**Course Name & No.:** INDUSTRIAL LIBRARY SYSTEM & SERVICES

**Course Outcomes :**

**After studying this course, students shall be able to:**

- CO: 01. Comprehend the structure and development of industries in India.
- CO: 02. Assess the role of library in industrial setup.
- CO: 03. Understand Industrial librarianship, its types, collection, HR and finance
- CO: 04. Professionally manage an industrial library and provide access to its resources and services.

**Subject:** LIBRARY & INFORMATION SCIENCE  
**Course Name & No.:** HEALTH SCIENCES LIBRARY SYSTEM & SERVICES

**Course Outcomes :**

**After studying this course, students shall be able to:**

CO: 01. Comprehend the structure and development of Health Sciences in India.

CO: 02. Assess the role of library in Health Sciences institutions setup.

CO: 03. Understand Health Sciences librarianship, its types, collection, HR and finance

CO: 04. Professionally manage a Health Sciences library, provide access to its resources and services.

**Subject: LIBRARY & INFORMATION SCIENCE**

**Course Name & No.: DISSERTATION**

**Course Outcomes :**

**After studying this course, students shall be able to:**

CO: 01. Understand practical application of research methods in the field of LIS

CO: 02. Know the use of data collection, analysis and interpretation techniques.

CO: 03. Carry out a useful research study and submit its report.

**Subject: LIBRARY & INFORMATION SCIENCE**

**Course Name & No.: PROJECT WORK**

**Course Outcomes :**

**After studying this course, students shall be able to:**

CO: 01. Understand practical application of research methods in the field of LIS

CO: 02. Know the use of data collection, analysis and interpretation techniques.

CO: 03. Carry out a useful research project and submit its report.

## Course Outcome of M.Sc. (Mathematics)

### M.Sc. SEMESTER 1

Sub. Code: CMT-1001

Core Sub. 1: Algebra- 1

#### Course Outcomes:

Upon completion of the course student will be able to

**CO1.** Understand basic principles of algebraic structures like groups, fields rings and division rings.

**CO2.** Recognize and understand the concept of Ideals.

**CO3.** Recognize and understand the concepts of Euclidean domains, Unique factorization domains, polynomial rings as well as Einstein irreducibility criterion.

### M.Sc. SEMESTER 1

Sub. Code: CMT-1002

Core Sub. 2: Real Analysis

#### Course Outcomes:

Upon completion of the course student will be able to

**CO1.** Understand, define algebra of sets.

**CO2.** Define and understand measurable sets and various types of measures.

**CO3.** Define, understand and utilize the concept of differentiation of monotone functions and absolute continuity.

**CO4.** State and prove theorems including Holder's inequality and Minkowski's inequality.

### M.Sc. SEMESTER 1

Sub. Code: CMT-1003

Core Sub. 3: Topology -1

#### Course Outcomes:

Upon completion of the course student will be able to

**CO1.** Recognize and interpret the topological structures and their characterizations.

**CO2.** Identify and understand the subspace topology and product topology.

**CO3.** Identify and classify the type of topology including quotient topology and metric topology.



**CO4.** Understand and differentiate the hierarchy of the topological spaces and their characterizations.

### **M.Sc. SEMESTER 1**

Sub. Code: **CMT-1004**

Core Sub. 4: **Theory of Ordinary Differential Equations**

#### **Course Outcomes:**

Upon completion of the course student will be able to

**CO1.** Understand the meaning of Ordinary Differential Equations.

**CO2.** Understand and solve Partial differential equation.

**CO3.** Identify and solve Gauss hyper geometric equation.

**CO4.** Understand, identify and solve Cauchy Problem including Charpit's and Jacobi's method.

### **M.Sc. SEMESTER 1**

Sub. Code: **EMT-1001**

Elective Sub.1: **Classical Mechanics -1**

#### **Course Outcomes:**

Upon completion of the course student will be able to

**CO1.** Understand and describe elementary principles of motion.

**CO2.** Understand and criticize equations of motion and classify the dynamical systems.

**CO3.** Derive and utilize Lagrange's equation of motions.

**CO4.** Identify, understand and solve two body central force problem.

### **M.Sc. SEMESTER 2**

Sub. Code: **CMT-2001**

Core Sub. 1: **Algebra- 2**

#### **Course Outcomes:**

Upon completion of the course student will be able to

**CO1.** List and understand advance concepts of Algebra.

**CO2.** Identify, define and perform operations on modules.

**CO3.** Define and verify automorphisms and homomorphism of modules.

### **M.Sc. SEMESTER 2**

Sub. Code: **CMT-2002**  
Core Sub. 2: **Complex Analysis**

**Course Outcomes:**

Upon completion of the course student will be able to

- CO1.** Understand the concept of complex plane and generalize the concept of coordinate plane.
- CO2.** Determine continuity/differentiability/analyticity of a complex function and find the derivative of a function.
- CO3.** Evaluate a contour integral using parameterization, fundamental theorem of calculus and Cauchy's integral formula.
- CO4.** Compute the residue of a function and use the residue theory to evaluate a contour integral or an integral over the real line.
- CO5.** Analyze and classify the singularities of complex function in given region.

**M.Sc. SEMESTER 2**

Sub. Code: **CMT-2003**  
Core Sub. 3: **Topology- 2**

**Course Outcomes:**

Upon completion of the course student will be able to

- CO1.** Understand, define and verify connectedness of topological spaces.
- CO2.** Understand, define and verify nets and filters.
- CO3.** State and prove the Tychonoff's theorem.
- CO4.** List, compare and classify the separation axioms of topological spaces.
- CO5.** Understand, define and verify concept of compact spaces.

**M.Sc. SEMESTER 2**

Sub. Code: **CMT-2004**  
Core Sub. 4: **Methods in Partial Differential Equations**

**Course Outcomes:**

Upon completion of the course student will be able to

- CO1.** Identify and understand the higher order partial differential equations.
- CO2.** Understand and utilize the methods to solve the given partial differential equations
- CO3.** Understand and solve the given Boundary value problems and Equipotential surfaces.



## **M.Sc. SEMESTER 2**

Sub. Code: **EMT-2001**

Elective Sub. 1: **Classical Mechanics -2**

### **Course Outcomes:**

Upon completion of the course student will be able to

**CO1.** Understand, define and verify Rigid Body Equations of Motion.

**CO2.** Understand and compare theory of relativity in classical mechanics.

**CO3.** Derive the Hamilton's equation of motion.

**CO4.** Understand and utilize the Canonical transformations and Generating functions.

## **M.Sc. SEMESTER 3**

Sub. Code: **CMT-3001**

Core Sub. 1: **Prog. In C & Numerical Methods**

### **Course Outcomes:**

Upon completion of the course student will be able to

**CO1.** Apply suitable and effective methods called Numerical Methods, for obtaining approximate representative numerical results of the problems.

**CO2.** Solve problems in the field of Applied Mathematics, Theoretical Physics and Engineering which requires computing of numerical results using certain raw data.

**CO3.** Develop logics which will help them to create programs, applications in C.

**CO4.** By learning the basic programming construction, they can easily switch over to any other language in future.

## **M.Sc. SEMESTER 3**

Sub. Code: **CMT-3002**

Core Sub. 2: **Functional Analysis**

### **Course Outcomes:**

Upon completion of the course student will be able to

**CO1.** Understand the concept of Normed Linear Spaces and Banach Spaces.

**CO2.** Classify the weak and strong convergence of sequences.

**CO3.** State and prove uniform boundedness theorem.

**CO4.** Understand the structures of Inner Product Spaces and Hilbert Spaces.

**CO5.** State and Prove the Hahn-Banach Theorem.

### **M.Sc. SEMESTER 3**

Sub. Code: **CMT-3003**

Core Sub. 3: **Number Theory – 1**

#### **Course Outcomes:**

Upon completion of the course student will be able to

- CO1.** Understand the basic concepts of number theory.
- CO2.** Recognize and identify the properties of prime numbers.
- CO3.** Understand the concepts of congruences.
- CO4.** Utilize the concept of combinatorial number theory.
- CO5.** Construct mathematical proofs of statements and find counterexamples to false statements in number theory.

### **M.Sc. SEMESTER 3**

Sub. Code: **CMT-3004**

Core Sub. 3: **Discrete Mathematics**

#### **Course Outcomes:**

Upon completion of the course student will be able to

- CO1.** Understand the algebraic structures including semigroups and monoids.
- CO2.** State and prove basic results of homomorphism between semigroups.
- CO3.** Understand the concept of Boolean algebra and derive related results.
- CO4.** Understand and apply the finite state machine and coding theory.

### **M.Sc. SEMESTER 3**

Sub. Code: **EMT-3011**

Elective Sub. 1: **Differential Geometry**

#### **Course Outcomes:**

Upon completion of the course student will be able to

- CO1.** Understand and define the curves and surfaces.
- CO2.** Understand the concepts of curvature, torsion, tangent, normal and binormal
- CO3.** Prove Frenet – Serret theorem.
- CO4.** Derive the formulae for first and second fundamental forms.

### **M.Sc. SEMESTER 3**

Sub. Code: **EMT-3021**

Elective Sub. 2: **Special Theory of Relativity and Tensor Analysis**

#### **Course Outcomes:**

Upon completion of the course student will be able to

- CO1.** Use tensor notation in relativity theory.
- CO2.** Apply the concepts of length contraction and time dilation as well as use Lorentz transformations.
- CO3.** Analyze Einstein's field equations as well as know and use some important solutions to these.
- CO4.** Report some experimental tests of general relativity.
- CO5.** Have knowledge about cosmological models.

### **M.Sc. SEMESTER 4**

Sub. Code: **CMT – 4001**

Core Sub. 1: **Linear Algebra**

#### **Course Outcomes:**

Upon completion of the course student will be able to

- CO1.** Understand the concepts of linear algebra including transformations and canonical transformations.
- CO2.** State, prove and apply the Cayley-Hamilton theorem
- CO3.** Analyze and select proper methods to solve a given system of linear equations
- CO4.** Understand and utilize the Sylvester's law of inertia.
- CO5.** Understand the concept of bilinear and quadratic forms.

### **M.Sc. SEMESTER 4**

Sub. Code: **CMT-4002**

Core Sub. 2: **Integration Theory**

#### **Course Outcomes:**

Upon completion of the course student will be able to

- CO1.** Define and understand basic notions in abstract integration theory, integration theory on topological spaces and the n-dimensional space
- CO2.** Describe and apply the notion of measurable functions and sets and use Lebesgue monotone and dominated convergence.
- CO3.** Develop an appreciation of the basic concepts of measure theory.
- CO4.** These methods will be useful for further study in a range of other fields, e.g. Stochastic calculus, Quantum Theory and Harmonic analysis.

#### **M.Sc. SEMESTER 4**

Sub. Code: **CMT-4003**

Core Sub. 3: **Number Theory – 2**

#### **Course Outcomes:**

Upon completion of the course student will be able to

- CO1.** Understand, analyses and solve the Diophantine Equations.
- CO2.** Approximate Irrationals by Rationales.
- CO3.** State and prove the Hurwitz's Theorem.
- CO4.** Understand the concepts of partition function and Ferrers graphs.

#### **M.Sc. SEMESTER 4**

Sub. Code: **CMT-4004**

Core Sub. 4: **Graph Theory**

#### **Course Outcomes:**

Upon completion of the course students will be able to

- CO1.** Understand the fundamental concepts of graphs.
- CO2.** Characterize the Euler and Hamiltonian Graphs.
- CO3.** Understand and apply the Kruskal's and Prim's algorithm.
- CO4.** Determine the planarity of the given graph.
- CO5.** Understand the concept of graph coloring.

#### **M.Sc. SEMESTER 4**

Sub. Code: **EMT-4011**  
Elective Sub. 1: **Financial Mathematics**

**Course Outcomes:**

Upon completion of the course student will be able to

- CO1.** Categorize the various financial markets including stock markets, currency market and bond markets.
- CO2.** Differentiate between options and contracts.
- CO3.** State and prove Ito's lemma.
- CO4.** State and prove Black – Sholes theorem.

**M.Sc. SEMESTER 4**

Sub. Code: **EMT-4021**  
Elective Sub. 2: **General Theory of Relativity & Cosmology**

**Course Outcomes:**

Upon completion of the course student will be able to

- CO1.** Know the fundamental principles of the general theory of relativity.
- CO2.** Know the meaning of basic concepts like the equivalence principles, inertial frames and how gravity is understood as a manifestation of a curved space-time.
- CO3.** Familiar with some of the main contents of the theory: motion in the gravitational field, time dilation and frequency shifts, bending of light, gravitational waves and cosmological models with expanding space.

**M.Sc. SEMESTER 4**

Sub. Code: **EMT – 4031**  
Elective Sub. 3: **Commutative Ring Theory**

**Course Outcomes:**

Upon completion of the course students will be able to

- CO1.** Know basic definitions concerning elements in rings, classes of rings, and ideals in commutative rings.
- CO2.** Know constructions like tensor product and localization, and the basic theory for this.
- CO3.** Know basic theory for noetherian rings and Hilbert basis theorem.
- CO4.** Know basic theory for integral dependence, and the Noether normalization lemma.
- CO5.** Know the interplay between ideals in polynomial rings, and the corresponding geometric objects: affine varieties.

**M.Sc. SEMESTER 4**

Sub. Code: **EMT – 4041**



## Course Outcome of M.Sc. (Mathematics)

### Elective Sub. 4: Introduction to Mathematical Cryptography

#### Course Outcomes:

Upon completion of the course student will be able to

- CO1.** Explain the idea of public-key cryptography and the common algorithms used.
- CO2.** Describe the basic issues around finding large prime numbers and factoring large composite numbers, including various techniques for both.
- CO3.** Explain the significance of these problems to public-key cryptography.
- CO4.** Define elliptic curves and explain the group law on these curves, both geometrically and formulaically.
- CO5.** Explain how elliptic curves are used in certain cryptographic algorithms.
- CO6.** Explain and use basic theorems about arithmetic in the ring's  $\mathbb{Z}/n$ , the theory of finite abelian group, and elliptic curves.

#### Course Outcomes:

Upon completion of the course students will be able to

- CO1.** Understand basic principles of algebraic structures like groups, fields rings and division rings.
- CO2.** Recognize and understand the concept of Ideals.
- CO3.** Recognize and understand the concepts of Euclidean domains, Unique factorization domains, polynomial rings as well as Einstein irreducibility criterion.

#### Course Outcomes:

Upon completion of the course students will be able to

- CO1.** Learn pigeonhole principle, the principle of inclusion and exclusion.
- CO2.** Understand the notion of graphs and its related concepts.
- CO3.** Learn the concept of domination and its applications.

#### Course Outcomes:

Upon completion of the course students will be able to

- CO1.** Develop the ability of independent thinking for the solution of mathematical problems.
- CO2.** Develop a habit to prepare presentation on the given topic.
- CO3.** Know the current trends of research.

**Course Outcomes:**

Upon completion of the course students will be able to

- CO1.** Recognize and interpret the topological structures and their characterizations.
- CO2.** Identify and understand the concepts of Ideals and Filters.
- CO3.** Identify and classify the type of topology including product topology and compactification.
- CO4.** Understand the concepts of Banach Algebra.

**Course Outcomes:**

Upon completion of the course students will be able to

- CO1.** Develop a skill of systematic writing and presentation.
- CO2.** Develop the ability of independent thinking for the analysis and solution of mathematical problems.
- CO3.** Know the current trends of research available in the topic of own interest.

**Course Outcomes:**

Upon completion of the course students will be able to

- CO1.** Review the literature in the relevant field.
- CO2.** Develop the skill of research methodology.
- CO3.** Develop the skill of analysis of mathematical research problems.
- CO4.** Develop the skill of writing and review the research paper.

## Course Outcome of M.Sc. (Applied Physics) Integrated Nanoscience & Advanced Materials

Under the B.Sc. / M.Sc. (Applied Physics) programme, the students have to undergo various courses during TEN semester duration.

### CO 1

Applied Physics – I and II courses at semesters- I and II level are helpful for understanding the basic concepts in Physics for applications.

### CO 2

Modern Physics – I and II courses at semesters- II and III are highly useful for students to gain knowledge about the latest development in Modern Physics of 20<sup>th</sup> Century.

### CO 3

Also, courses, such as, Plasma Physics and Electrodynamics and Applied Nuclear Physics at semesters III and IV are useful for the latest knowledge in the field of Nuclear energy generation and Fusion technology.

### CO 4

Courses on Nanoscience and Nanotechnology, Material Science are useful for the students to know about the industrial and medical applications of various materials.

### CO 5

At M.Sc. (Applied Physics) semesters VII and VIII level, students are exposed to Applied Materials and Application course and course on Mathematical Methods in Physics, which are very useful for shaping their career as good physics researcher.

### CO 6

In addition, students undertake experimental projects at semester V and VI (i.e. B.Sc. III year) on various aspects of Applied Physics. This helps them in getting trained in practical understanding of the subject.

## **Semester – I**

### **Paper I: Foundation Course (Communication Skills)**

**Course Outcome:**

**CO 1:** Useful for basic communication skill in English language.

**CO 2:** To develop the writing and reading skill in English language.

## **Semester – I**

### **Paper II: Fundamental of Mathematics**

**Course Outcome:**

**CO 1:** To develop a strong base in fundamental of mathematics and its use in applied physics.

**CO 2:** To understand the basic principles, theorems and calculations in mathematics.

## **Semester – I**

### **Paper III: Applied Physics – I**

**Course Outcome:**

**CO 1:** To understand the fundamental in the mechanics, fluid dynamics and heat in applied physics.

**CO 2:** To gain the knowledge about various types of vibration in applied physics.

## **Semester – I**

### **Paper IV Applied Physics –II**

**Course Outcome:**

**CO 1:** Useful in understanding basic and application of sound and wave mechanics.

**CO 2:** To gain the knowledge about DC electricity and electrostatic useful in day to day life.

## **Semester – II**

### **Paper V: Environmental Studies**

**Course Outcome:**

**CO 1:** To gain the basic knowledge about environment around us.

**CO 2:** To understand the effects of water, air and sound pollution on human life.

## **Semester – II**

### **Paper VI: Applied Mathematics**

**Course Outcome:**

**CO 1:** This course will be useful for using mathematics and its tools to understand the various applied physics aspects.

**CO 2:** This course will help the students to apply their knowledge of mathematics for problem solving in applied physics.

**SEMESTER II:  
PAPER VII MODERN PHYSICS I**

**Course Outcome:**

- CO 1:** By learning this course student will get knowledge about fundamentals of atoms, its structure and energy levels.
- CO 2:** This course will be useful in understanding the use of atoms and molecules in various applications in modern physics.

**Semester – II  
Paper VIII: Basic Electronics**

**Course Outcome:**

- CO 1:** By learning this course, students will understand the basic principles of electronics.
- CO 2:** Students will use the basic electronic devices in applied circuits.

**SEMESTER III  
PAPER IX –Non- Conventional Energy Resources (Revised)**

**Course Outcome:**

- CO 1:** At the end of this course students will be able to identify energy demand and relate with available energy resources.
- CO 2:** Students will understand the importance of energy resources and how to preserve them.
- CO 3:** Students will be able to understand use of solar energy, wind energy, bio-energy and geo- thermal energy.

**SEMESTER III  
PAPER X - APPLIED ELECTRONICS (Revised)**

**Course Outcome:**

- CO 1:** By learning this paper, students will be benefited in starting their own start-up related to electronics and instrumentation.
- CO 2:** Students will be trained to design and fabricate useful domestic and industrial circuits for various applications.

**SEMESTER III  
PAPER XI - BASIC NUCLEAR PHYSICS (Revised)**

**Course Outcome:**

- CO 1:** This course will be useful for the students to understand basic aspects of nuclear physics.

**CO 2:** This course will help the student to gain knowledge about various properties of nuclei such as, radio activity, nuclear reactions, etc, useful in getting jobs in nuclear establishments.

### **SEMESTER III**

#### **PAPER XII - MODERN PHYSICS II (Revised)**

**Course Outcome:**

**CO 1:** This course will help the students to understand various techniques in modern physics.

**CO 2:** It will be useful for students to know about particle accelerators and their use in advanced research in materials science and nuclear physics.

### **SEMESTER IV**

#### **PAPER XIII - MODERN COMPUTATIONAL TECHNIQUES AND PROGRAMMING (Revised)**

**Course Outcome:**

**CO 1:** By learning this course, the students will be able to develop basic programs useful in physics applications.

**CO 2:** This course will help the student to gain knowledge about various programming languages and skill development in computers.

### **SEMESTER IV**

#### **PAPER XIV APPLIED NUCLEAR PHYSICS (Revised)**

**Course Outcome:**

**CO 1:** By studying this course, the students will understand about various nuclear reactors and their applications.

**CO 2:** This course will help the student to understand the concept of fusion and fission of nuclei and its use in nuclear energy production.

### **SEMESTER IV**

#### **PAPER XV FUNDAMENTALS OF MATERIALS SCIENCE (Revised)**

**Course Outcome:**

**CO 1:** This course will be useful for the students to understand various processes involved in ceramic industries and metal alloys related manufacturing unit.

**CO 2:** Students will get knowledge about the phase formation in various materials and its applications in industries.

### **SEMESTER IV**

#### **PAPER XVI ELECTRODYNAMICS & PLASMA PHYSICS (Revised)**

**Course Outcome:**

**CO 1:** This course is designed for the students to understand the basics of electrodynamics and its applications in various topics in physics.

**CO 2:** By learning the fundamentals and applications of plasma, the students will be trained to appear for jobs, training programs in Institute for Plasma Research, Gandhinagar.

### **SEMESTER V**

#### **PAPER XVII– Statistical Physics**

**Course Outcome:**

**CO 1:** This course will be useful for the students to understand basic aspects of statistical physics and its use in basic physics.

**CO 2:** This course will help the student to gain knowledge about various mechanisms related to sub-atomic particles and its use in advanced physics courses.

### **SEMESTER V**

#### **PAPER - XVIII - ADVANCED ELECTRONICS**

**Course Outcome:**

**CO 1:** By learning this course, students will be able to develop electronic kits of higher level useful in industrial application.

**CO 2:** This course will help the student to gain knowledge about various integrated circuits and different amplifiers in the day-to-day applications.

### **SEMESTER V**

#### **PAPER XIX– Applied Condensed Matter Physics**

**Course Outcome:**

**CO 1:** By learning this course, students will get basic and applied knowledge about structural and electrical properties of solid crystalline materials.

**CO 2:** Basic and applied concepts in condensed matter physics will be clear to the students.

### **SEMESTER V**

#### **PAPER XIX– Applied Physics Projects**

**Course Outcome:**

**CO 1:** By undertaking one project related to applied physics, the student will perform practical related to new developments in the topic of their choice.

**CO 2:** This course will develop confidence in students to carry out independent project under the assigned guide in the field of applied physics.

### **SEMESTER VI**

## **PAPER XXI- Elements of Nanoscience and Nanotechnology**

### **Course Outcome:**

- CO 1:** This course will give knowledge to the students related to basic aspects of nanoscience, nanomaterials and their applications.
- CO 2:** This course will help the student to understand various techniques of growing nanomaterials and to study their properties.

## **SEMESTER VI**

### **PAPER XXII- Experimental Techniques in Physics**

#### **Course Outcome:**

- CO 1:** By learning this course, the students will be able to understand fundamental of optical and spectroscopic techniques for material characterizations.
- CO 2:** This course will help the student to gain knowledge about basic principles about the interferometry, polarimetry, atomic and molecular spectroscopy.

## **SEMESTER VI**

### **PAPER XXIII – Digital Communication and Electronics**

#### **Course Outcome:**

- CO 1:** By learning this course, the students will understand various digital communication methods.
- CO 2:** This course is designed for the students to gain knowledge about electronic circuit useful in digital communications.

## **SEMESTER VI**

### **PAPER XXIV– Applied Physics Projects**

#### **Course Outcome:**

- CO 1:** By undertaking one project related to applied physics, the student will perform practical related to new developments in the topic of their choice.
- CO 2:** This course will develop confidence in students to carry out independent project under the assigned guide in the field of applied physics.

## **SEMESTER VII**

### **CORE – I: PAPER - I MATHEMATICAL METHODS IN PHYSICS**

#### **Course Outcome:**

- CO 1:** By learning this course, the students will understand how to use various mathematical methods in solving physics problems.
- CO 2:** This course will be useful to the students to understand various mechanisms underlying physics using various mathematical tools.

## **SEMESTER VII**

### **CORE – II: PAPER - II APPLIED QUANTUM MECHANICS**

#### **Course Outcome:**

- CO 1:** This course will help the students to know about the various phenomena in quantum mechanics.



**CO 2:** This course will be useful to the students to understand about the various electronic energy levels and its use in the solving problems of fundamental physics.

### **SEMESTER VII**

#### **CORE – III : PAPER - III SEMICONDUCTOR DEVICES AND APPLICATIONS**

**Course Outcome:**

**CO 1:** By learning this course, students will be trained to use various power electronic devices in industrial applications.

**CO 2:** This course will be useful for students to use semiconductor devices such as, thyristors, diac, etc., in electronic instrumentation.

### **SEMESTER VII**

#### **CORE – IV : PAPER – IV ADVANCED MATERIALS AND APPLICATIONS**

**Course Outcome:**

**CO 1:** Students will be trained to use various advanced materials such as, manganites, ferrites, composites in various applications.

**CO 2:** By studying this course, students will be able to seek jobs in industries related to polymers, plastics, composites, ceramics etc.

### **SEMESTER VIII**

#### **CORE - V: PAPER- V VACUUM TECHNOLOGY & THIN FILMS**

**Course Outcome:**

**CO 1:** This course will give the knowledge about fundamental of vacuum science useful in laboratory and industry.

**CO 2:** The students will get knowledge about various techniques of thin film depositions.

### **SEMESTER VIII**

#### **CORE–VI : PAPER- VI NANOMATERIALS – I : SYNTHESIS AND TYPES**

**Course Outcome:**

**CO 1:** Students will understand how to synthesize various nanomaterials, such as, nanoparticles, nanofiber, nanotubes, etc.

**CO 2:** By learning this course, students will able to develop own their own, few new nanomaterials for specific applications.

### **SEMESTER VIII**

#### **CORE - VII: PAPER VII SIGNAL PROCESSING AND COMMUNICATION**

**Course Outcome:**

- CO 1:** This course will help the students about the basics of signal processing and method used.  
**CO 2:** By studying this course, students will get knowledge about various types of modulations used in radio and TV communications.

**SEMESTER VIII**  
**CORE-VIII -PAPER - VIII**  
**ADVANCED EXPERIMENTAL TECHNIQUES FOR MATERIALS**  
**CHARACTRIZATION**

**Course Outcome:**

- CO 1:** This course is specially designed for the students to gain knowledge about few advanced techniques, such as, XRD, SEM, etc. for structural and micro structural characterization of materials.  
**CO 2:** This course will help the students to understand techniques of characterization useful in studying electrical and magnetic properties of materials.

**SEMESTER IX**  
**CORE - IX : PAPER- IX**  
**NANOMATERIALS II: PROPERTIES AND APPLICATIONS**

**Course Outcome:**

- CO 1:** This course is designed for master students to study the properties and applications of few selected nanomaterials.  
**CO 2:** Students will be able to synthesize and characterized interesting nanomaterials for desired applications.

**SEMESTER IX**  
**ID – 1 : PAPER- X**  
**NUMERICAL TECHNIQUES FOR COMPUTATIONAL ANALYSIS**

**Course Outcome:**

- CO 1:** By studying this course, the students will be able to make use of numerical methods suitable for the computational analysis.  
**CO 2:** It will be useful to understand the various numerical techniques for fitting large data using existing models and theories.

**SEMESTER IX**  
**ELECTIVE GROUP C - 1: PAPER XI**  
**PHYSICS OF ACCELERATORS**

**Course Outcome:**

- CO 1:** This elective paper will give knowledge to the students about the fundamentals of accelerator physics.

**CO 2:** This course will help the students to understand the different parts of particle accelerators and their applications.

## **SEMESTER IX**

### **ELECTIVE GROUP C - 2: PAPER XII**

#### **MATERIAL MODIFICATIONS WITH LOW ENERGY ION BEAMS**

**Course Outcome:**

**CO 1:** This course is specially designed to understand the effect of low- energy ion beams (<2MeV) in material modifications.

**CO 2:** Various method used in low energy ion beam irradiation will be explained to the students.

## **SEMESTER X**

### **CORE - X : PAPER- XIII**

#### **ION BEAMS IN MATERIAL SCIENCE**

**Course Outcome:**

**CO 1:** This core paper will be useful to the students to understand various ion beam interaction with mater.

**CO 2:** This course will help the students to study about the nanostructuring by ion beams and various methods used.

## **SEMESTER X**

### **ID - 2 : PAPER- XIV**

#### **NANOTECHNOLOGY AND ENVIRONMENT**

**Course Outcome:**

**CO 1:** This course is specially designed to understand the use of nanotechnology in the environmental protection.

**CO 2:** By studying this course, the students will know about various applications of nanomaterials in environmental issues, such as, ground water remediation, soil strength and absorption, etc.

## **SEMESTER X**

### **ELECTIVE GROUP C - 3 : PAPER XV**

#### **SWIFT HEAVY IONS FOR MATERIAL MODIFICATIONS**

**Course Outcome:**

**CO 1:** This elective paper will help to know about the effect of swift heavy ions (>5MeV) in the modifications of material properties.

**CO 2:** This course will be useful to understand the effect of swift heavy ions on the properties of functional oxides useful in practical applications.

**SEMESTER X**

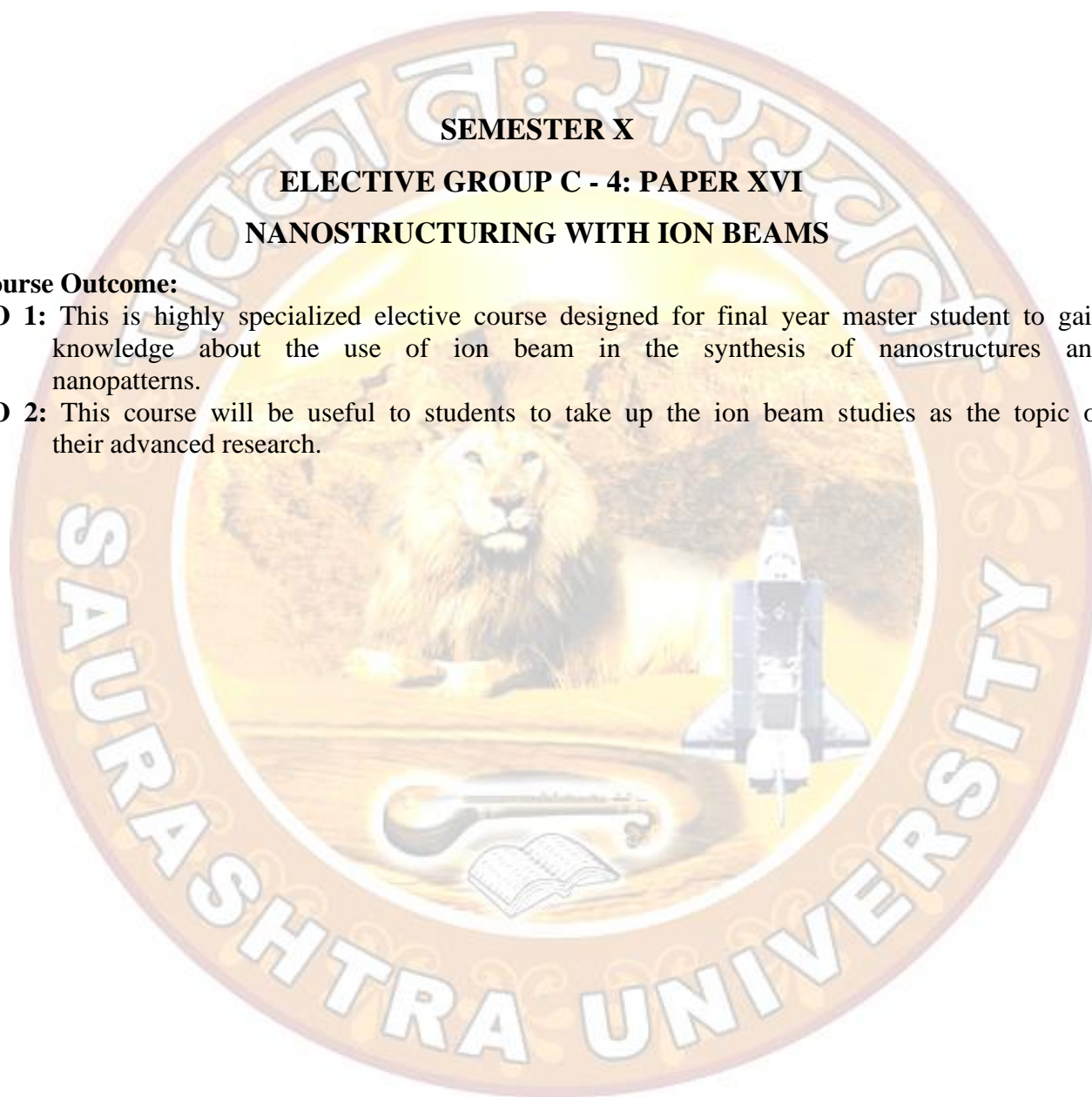
**ELECTIVE GROUP C - 4: PAPER XVI**

**NANOSTRUCTURING WITH ION BEAMS**

**Course Outcome:**

**CO 1:** This is highly specialized elective course designed for final year master student to gain knowledge about the use of ion beam in the synthesis of nanostructures and nanopatterns.

**CO 2:** This course will be useful to students to take up the ion beam studies as the topic of their advanced research.



## Course Outcomes of B.Pharm Pharmacy

### HUMAN ANATOMY AND PHYSIOLOGY-I

**CO1:** A gateway to careers in health related fields, athletics training etc., as a foundation to advanced scientific studies, for understanding pathology of disease and pathological changes

**CO2:** To provide base for proper understanding of effects of drug on body and factors affecting various physiological processes and its effects.

### PHARMACEUTICAL ANALYSIS I

**CO1:** To demonstrate an understanding of the theory and applications of the most common basic methods of pharmaceutical analysis.

**CO2:** Learn the practical aspects of various titration techniques with calibration of glasswares and checking precision and lower limit of quantitation of titrimetric methods.

### PHARMACEUTICS- I

**CO1:** A good understanding of the basic concepts of derive properties and measurements powders, rheological properties of liquids and mixing of materials in various field of pharmacy.

**CO2:** Students should be able to know the methods of preparation of different buffer solution and Complexation of polymer and drug material.

### PHARMACEUTICAL INORGANIC CHEMISTRY

**CO1:** Satisfy the diverse needs of these students.

**CO2:** Advanced coursework and educational activities outside the traditional classroom.

**CO3:** At graduation, chemistry majors should have a set of fundamental competencies that are knowledge-based, performance/skills-based, and affective. Graduates will be able to solve problems competently by identifying the essential parts of a problem and formulating a strategy for solving the problem.

**CO4:** They will be able to rationally estimate the solution to a problem, apply appropriate techniques to arrive at a solution, test the correctness of the solution, and interpret their results.

### **COMMUNICATION SKILLS**

**CO1:** A good understanding of the basic concepts of computer software applicability in various field of pharmacy.

**CO2:** Students should be able to know the development interview skill and leadership.

### **REMEDIAL BIOLOGY**

**CO1:** Gives basic study of natural sources such as plant and animal origin.

**CO2:** This subject has been introduces to the pharmacy course in order to make the student aware of various naturally occurring drugs and its history, sources, classification, distribution and the characters of the plants and animals.

**CO3:** This subject gives basic foundation to Pharmacognosy.

### **REMEDIAL MATHEMATICS**

**CO1:** Understanding of Concepts rather than on complexities of Computational Techniques.

**CO2:** Stress is also given on Visual perception through Mathematical Software. Relevant Illustrations will be provided from the Real World processes.

**CO3:** Sufficient home assignments will be given to the students which will test their fundamentals and ability to relate Mathematical concepts with reality.

### **HUMAN ANATOMY AND PHYSIOLOGY-II**

**CO1:** A gateway to careers in health related fields, athletics training etc., as a foundation to advanced scientific studies, or understanding pathology of disease and pathological changes, provide base for proper understanding effects of drug on body and factors affecting various physiological processes and its effects.

**CO2:** Overall effective maintenance of individual and community health. Acquisition of intellectual and motor skills.

### **PHARMACEUTICAL ORGANIC CHEMISTRY –I**

**CO1:** A good understanding of the history and basic concepts of organic chemistry.

**CO2:** Students should be able to describe in detail synthetic approaches as well as mechanisms of action of some important organic base therapeutic and diagnostic agents.

**CO3:** The course may help the students in understanding rational approaches towards the design of important therapeutic agents and their biological implications.

### **BIOCHEMISTRY**

**CO1:** Satisfy the diverse needs of these students. Advanced coursework and educational activities outside the traditional classroom.

**CO2:** At graduation, chemistry majors should have a set of fundamental competencies that are knowledge-based, performance/skills-based, and affective.

**CO3:** Graduates will aware about carbohydrates, Lipid,enzymes, Water Minerals Metabolism and also about Biochemical Organization of the cell and Transport Processes Across Cell Membrane

### **PATHOPHYSIOLOGY**

**Course outcomes:** At the end of the course, the student will be able to:

**CO1:** Understand the concept of pathophysiology which is a prime requirement to understand the concepts of pharmacology.

**CO2:** In addition they will be able to know about pathogenesis of common diseases.

## **COMPUTER APPLICATIONS IN PHARMACY**

**CO1:** A good understanding of the basic concepts of derived measurement of computer and its application in pharmacy.

**CO2:** The advanced concept of information systems software and web designing should provide great idea about the application of computer in pharmacy.

## **ENVIRONMENTAL SCIENCES**

**CO1:** Tthe knowledge of different environmental problems and its impact on society.

**CO2:** It includes not only the study of physical and biological characters of the environment but also the social and cultural factors and the impact of man on environment.

## **PHARMACEUTICAL ORGANIC CHEMISTRY-**

**CO1:** A good understanding of the history and basic concepts of organic chemistry. Students should be able to describe in detail synthetic approaches as well as mechanisms of action of some important organic base therapeutic and diagnostic agents.

**CO2:** The course may help the students in understanding rational approaches towards the design of important therapeutic agents and their biological implications.

## **PHYSICAL PHARMACEUTICAL-I**

**CO1:** A good understanding of the basic concepts of derive properties and measurements powders, rheological properties of liquids and mixing of materials in various field of pharmacy.

**CO2:** Students should be able to know the methods of preparation of different buffer solution and Complexation of polymer and drug material.

## **PHARMACEUTICAL MICROBIOLOGY**



**CO1:** Understand about the growth cycle of microorganisms including effects of various chemical agents on their growth and various staining techniques used for identification of microorganisms by using microscope.

**CO2:** Describe the various methods used for controlling the growth of microorganisms in various fields of pharmaceutical industries.

**CO3:** Describe various tests for detection of presence of microorganisms in sterile and non-sterile dosage forms. Do cultivation and identification of the microorganisms in the laboratory Appreciate the behavior of motility and behavioral characteristics of microorganisms.

### **PHARMACEUTICAL ENGINEERING**

**CO1:** A good understanding of the basic concepts of clarification and purification of solid and liquid raw materials in pharmacy.

**CO2:** Students should be able to know the appropriate instrumental requirement for different types of unit operations used in pharmaceutical industry.

### **MANAGEMENT PROCESS AND ORGANIZATIONAL BEHAVIOR**

**CO1:** Clear exposure to the functional areas of management and the roles managers assume for managerial performance.

**CO2:** To enable them to manage and lead for high performance with the human being at the centre of the organisation.

### **PHARMACEUTICAL ORGANIC CHEMISTRY-III**

**CO1:** A set of fundamental competencies that are knowledge-based, performance/skills-based, and affective.

**CO2:** Graduates will be able to solve problems competently by identifying the essential parts of a problem and formulating a strategy for solving the problem.

**CO3:** They will be able to rationally estimate the solution to a problem, apply appropriate techniques to arrive at a solution, test the correctness of the solution, and interpret their results.

### **MEDICINAL CHEMISTRY-I**

**CO1:** Know the basic concepts of medicinal chemistry, its scope and various branches. Know the mechanism of action and effects of drugs on various organs of the body.

**CO2:** To study about chemistry of individual drug molecule. To study about drug interactions and adverse effects.

**CO3:** To study in detail about the SAR (structure activity relationship) of different classes of drugs. Know about the development of new drug.

**CO4:** To study separation techniques (physical and chemical) of mixture component and identification methods of the same.

### **PHYSICAL PHARMACEUTICS-II**

- **CO1:** A good understanding of the basic concepts of derive properties and measurements powders, rheological properties of liquids and mixing of materials in various field of pharmacy.
- **CO2:** Students should be able to know the methods of preparation of different buffer solution and Complexation of polymer and drug material.

### **PHARMACOLOGY-I**

**CO1:** Understand basic concepts of pharmacology like how drug acts and how body reacts to drug at receptor and molecular level.

**CO2:** In addition, Students will be aware of effect of drugs on different systems of body.

### **PHARMACOGNOSY AND PHYTOCHEMISTRY-I**

**CO1:** Understand the preliminary basis of Pharmacognosy. The students are expected to Understand different methods to cultivate the medicinal plants.

**CO2:** Differentiate between different types of the organs of medicinal plants. Understand various options available- *in vivo* and *in vitro* to improve the quality of the phytoconstituents obtained from the natural sources.

**CO3:** Understand different types of adulteration of crude drugs. Understand different evaluation methods ascertain the presence or absence of adulteration. Recognize the crude drugs mentioned in the course.

**CO4:** Learn the pharmacognostic aspects specifically, the sources, the preparation methods and utilization of those substances obtained from the natural sources.

## **MICRO AND MACRO ECONOMICS**

**CO1:** Developed an appreciation of the principles of micro-economics and their potential for firm level decision-making, a keen desire for reading news of economic and financial changes/developments on a regular basis, and engaging in discussion and critical evaluation of such developments.

**CO2:** To provide them sufficient exposure to the world of industry, trade and commerce, so as to make them feel comfortable reading and understanding daily economic and financial news about firms, and engaging in critical discussion on economic issues affecting firms.

## **MEDICINAL CHEMISTRY-II**

**CO1:** Knowledge of medicinal chemistry from practical and theoretical aspect, its scope and various branches.

**CO2:** To identify pharmacophoric binding sites in drug responsible to bind with receptor.

**CO3:** To study about which methods to apply for purification for different synthesized crude product. To study about chemistry of individual drug molecule.

**CO4:** To study about drug interactions and adverse effects.

## **INDUSTRIAL PHARMACY-I**

**CO1:** A good understanding of fundamentals of controlled drug delivery systems & their various types in detail.

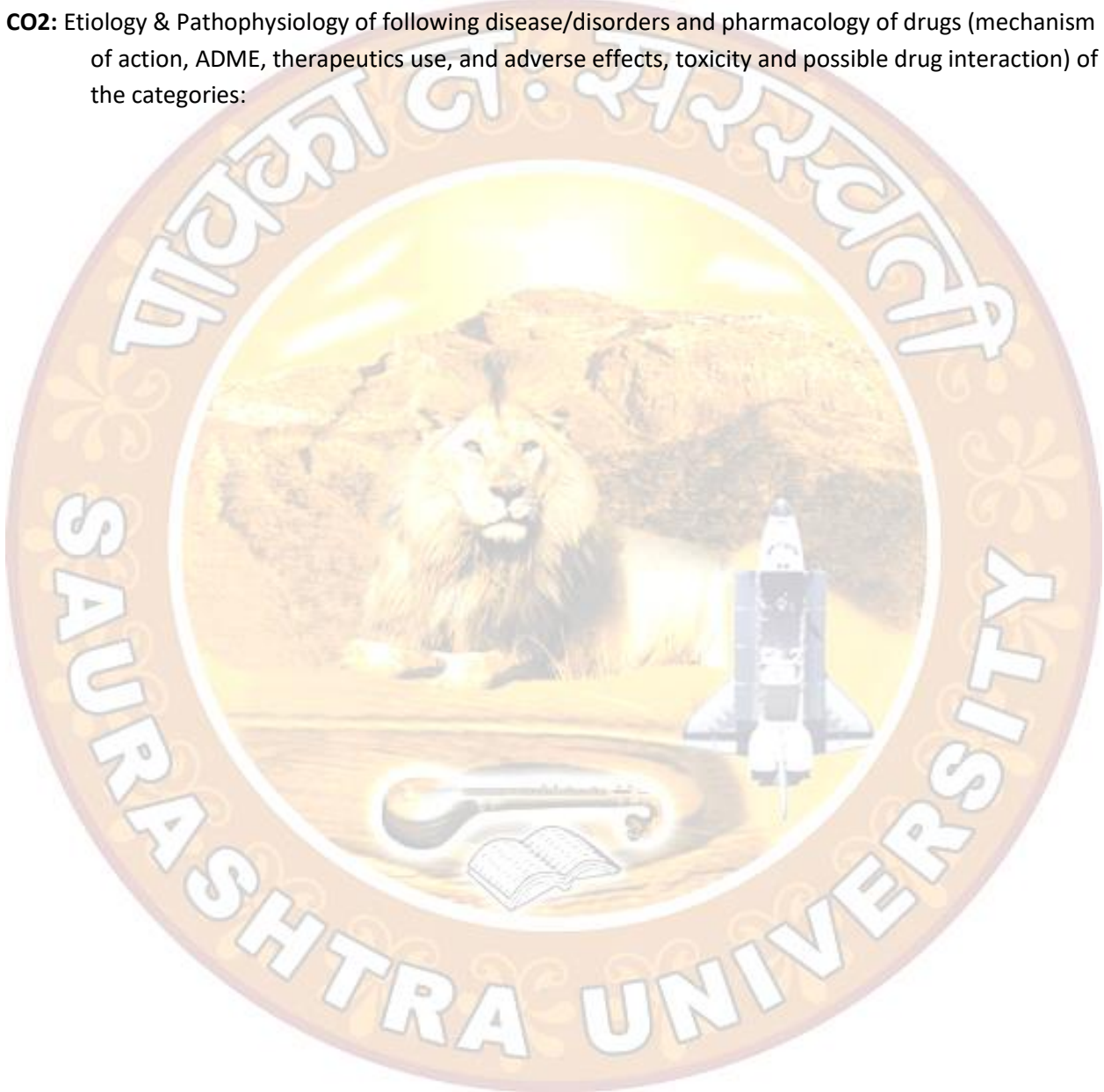
**CO2:** Students should be able to learn about targeted drug delivery systems & its significance.

**CO3:** Formulate solid, liquid and semisolid dosage forms and evaluate them for their quality

## **PHARMACOLOGY-II**

**CO1:** Understand the fundamental scientific principles of drug action, mechanisms of action, pharmacokinetics data (absorption, distribution, metabolism and elimination of drugs in the body), different dosing regimens of drugs useful in Cardiovascular Disorders, Neurological Disorders, Psychiatric Disorders, Blood related disorders and kidney diseases.

**CO2:** Etiology & Pathophysiology of following disease/disorders and pharmacology of drugs (mechanism of action, ADME, therapeutics use, and adverse effects, toxicity and possible drug interaction) of the categories:



## **PHARMACOGNOSY AND PHYTOCHEMISTRY-II**

**CO1:** The pharmacognostic aspects specifically, the sources, the preparation methods and utilization of Glycosides and pharmaceutical aid containing drugs.

**CO2:** Learn the concept of Plant tissue culture.

**CO3:** Understand basic idea of extraction, isolation and separation of active phytoconstituents from medicinal plants.

## **PHARMACEUTICAL JURISPRUDENCE**

**CO1:** How to become a responsible person while discharging duty as a pharmacist in different facets of pharmacy profession.

**CO2:** To acquire certain knowledge related to laws that help in becoming a pharma entrepreneur.

**CO3:** The code of ethics during the pharmaceutical practice

## **PHARMACEUTICAL MARKETING AND DRUG STORE MANAGEMENT**

**CO1:** Understand the fundamental scientific principles of Drugs store Management and inventory control, Strategic marketing process, Consumer market and Retail and whole sale drugs store.

## **MEDICINAL CHEMISTRY-III**

**CO1:** Know the basic concepts of chemotherapy and the mechanism of action and effects of drugs on various organs of the body.

**CO2:** To study about chemistry of individual drug molecule. To study about drug interactions and adverse effects.

**CO3:** To explore the role of metabolism in various pro-drugs, soft-drugs and hard-drugs. To study in detail about the SAR (structure activity relationship) of different classes of drugs.

**CO4:** Know about the development of new drug. To study separation techniques (physical and chemical) of mixture component in different physical state and identification methods of the same. Know the basic concepts of chemotherapy.

## **PHARMACOLOGY-III**

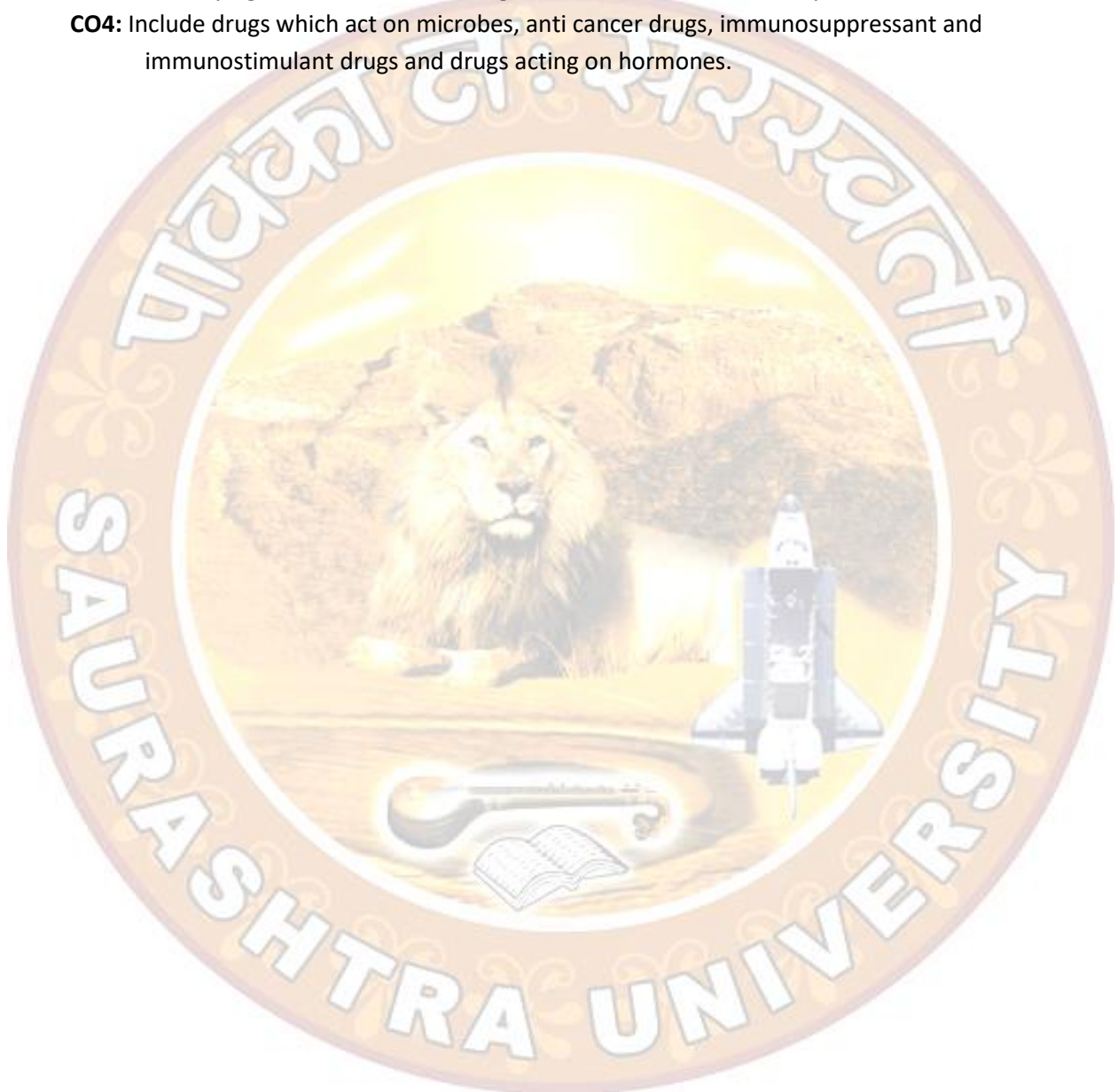
**CO1:** Understand the fundamental scientific principles of drug action and the various mechanisms by which drugs can mediate their pharmacological effect, understand the

fundamental principles of pharmacokinetics that underlie the absorption, distribution, metabolism and elimination of drugs in the body.

**CO2:** Understand the biochemical reactions that result in the metabolism of drugs within the body.

**CO3:** Understand the rationale behind designing different dosing regimens of particular drugs in specific patient populations, understand how specific patient characteristics and genetics can affect the response to a particular class of drugs, understand the scientific basis underlying how two different drugs can interact within the body.

**CO4:** Include drugs which act on microbes, anti cancer drugs, immunosuppressant and immunostimulant drugs and drugs acting on hormones.



## **HERBAL DRUG TECHNOLOGY**

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**CO1:** The pharmacognostic aspects of Alkaloids, Enzyme marines, plant sweetener, pesticides and herbicides specifically, the sources, the preparation methods and utilization of containing drugs.

**CO2:** Understand basic idea of extraction, isolation and separation of active phytoconstituents from medicinal plants.

**CO3:** Understand concept of phytochemical screening of the phytoconstituents obtained from the natural sources.

## **BIOPHARMACEUTICS AND PHARMACOKINETICS**

**CO1:** A good understanding of preformulation and stability aspects of various dosage forms.

**CO2:** Students should be able to learn in detail about role of various excipients used in various formulations.

**CO3:** Students should be able to understand what drug does to the body and what body does to the drug.

**CO4:** To understand the concepts of bioavailability and bioequivalence of drug products and their significance.

**CO5:** Understand various pharmacokinetic parameters, their significance & applications.

## **PHARMACEUTICAL BIOTECHNOLOGY**

**CO1:** A good understanding about the microbial genetics and microbial biotransformation processes.

**CO2:** Understand Immunology and its derived products. Understand the Importance of fermentation techniques and Biotechnological including blood products.

**CO3:** Importance of Monoclonal antibodies in Industries

**CO4:** Appreciate the use of microorganisms in fermentation technology

## **PHARMACEUTICAL QUALITY ASSURANCE**

**CO1:** Demonstrate an understanding of the QA and QC, quality, good pharmacy practices, regulatory guidelines, and patent issues related with different drugs and pharmaceuticals.

**CO2:** Understand the responsibilities of QA & QC departments.

**CO3:** Understand the scope of quality certifications applicable to pharmaceutical industries

### **FINANCIAL MANAGEMENT**

**CO1:** Working capital estimation and management.

**CO2:** Knowledge on venture capital financing, corporate strategy, financial policy and shareholder value creating etc.

### **INSTRUMENTAL METHOD OF ANALYSIS**

**CO1:** To demonstrate an understanding of the theory and applications of the most basic spectroscopic methods used in pharmaceutical analysis.

**CO2:** Learn the practical aspects and importance of quantitative and qualitative analysis of different drugs, pharmaceuticals and compounds involving various spectroscopic techniques.

### **INDUSTRIAL PHARMACY II**

**CO1:** To demonstrate an understanding of the QA and QC, quality, good pharmacy practices, regulatory guidelines, and patent issues related with different drugs and pharmaceuticals.

**CO2:** Know different Laws and Acts that regulate pharmaceutical industry

### **PHARMACY PRACTICE**

**CO1:** Good understanding of the hospital organization and formulary.

**CO2:** Students can also know what are the working procedures in hospital as a pharmacist in various departments.

**CO3:** Able to know the methods of preparation and handing of sterile material in hospital. Able to work as a community pharmacist as a part of Health Care system. interpret selected laboratory results (as monitoring parameters in therapeutics) of specific disease states.

**CO4:** Know pharmaceutical care services

**CO5:** Do patient counseling in community pharmacy; appreciate the concept of Rational drug therapy.

### **NOVEL DRUG DELIVERY SYSTEM**



**CO1:** A good understanding of fundamentals of controlled drug delivery systems & their various types in detail.

**CO2:** Students should be able to learn about targeted drug delivery systems & its significance

### **MATERIAL AND OPERATION MANAGEMENT**

**CO1:** Product layout, process layout, Integrated materials management, production and operations management etc.

### **BIOSTATISTICS AND RESEARCH METHODOLOGY**

**CO1:** Descriptive statistics, Graphics, Correlation, Regression, logistic regression Probability theory, Sampling technique, Parametric tests, Non Parametric tests, ANOVA.

**CO2:** Introduction to Design of Experiments, Phases of Clinical trials and Observational and Experimental studies, SPSS, R and MINITAB statistical software's, analyzing the statistical data using Excel.

### **SOCIAL AND PREVENTIVE PHARMACY**

**CO1:** A number of national health programmes, the roles of the pharmacist, solves the problems related to health and pharmaceutical issues.

**CO2:** Have a critical way of thinking based on current healthcare development.

**CO3:** Evaluate alternative ways of solving problems related to health and pharmaceutical issues

### **PHARMA MARKETING MANAGEMENT**

**CO1:** Good expertise on the marketing aspects and be a decision taken in the market platform.

**CO2:** Applied these knowledge for fulfill the challenging task in the sale and production point of view.

### **PHARMACEUTICAL REGULATORY SCIENCE**

**CO1:** The process of drug discovery, development and generic product development

**CO2:** Describe the regulatory approval process and registration procedures for API and drug products in various countries

**CO3:** Learn the basic understanding of regulations of India with other global regulated markets

## **PHARMACOVIGILANCE**

**CO1:** Development of pharmacovigilance as a science, basic terminologies used in pharmacovigilance, global scenario of Pharmacovigilance, train students on establishing pharmacovigilance programme in an organization

**CO2:** Various methods that can be used to generate safety data and signal detection. This paper also develops the skills of classifying drugs, diseases and adverse drug reactions.

**CO3:** Drug safety evaluation in paediatrics, geriatrics, pregnancy and lactation Pharmacovigilance Program of India (PvPI) requirement for ADR reporting in India

**CO4:** ICH guidelines for ICSR, PSUR, expedited reporting, pharmacovigilance planning, CIOMS requirements for ADR reporting, writing case narratives of adverse events and their quality.

## **QUALITY CONTROL AND STANDARDIZATION OF HERBALS**

**CO1:** Know the details of various methods and guidelines for the evaluation and standardization of herbs and herb drugs.

**CO2:** Know the regulatory approval process and their registration in Indian and international markets

**CO3:** Appreciate EU and ICH guidelines for quality control of herbal drugs

## **COMPUTER AIDED DRUG DESIGN**

**CO1:** A good understanding of design and discover of lead molecules.

**CO2:** Detail understanding of QSAR and docking and knowledge of drug development stages.

## **CELL AND MOLECULAR BIOLOGY**

**CO1:** A detail understanding a microscopic and molecular level of cell biology research encompasses both the great diversity of single-celled organisms like bacteria and protozoa, as well as the many specialized cells in multi-cellular organisms such as humans, plants, and sponges.

**CO2:** Describe protein structure and function.

**CO3:** Describe cellular membrane structure and function, basic molecular genetic mechanisms, summarize the Cell Cycle.

### **COSMETIC SCIENCE**

**CO1:** Understanding of the preparation of understanding of the preparation of parenteral products, cosmetics, semi-solid dosage forms and their evaluation.

**CO2:** Students should be aware with pilot plant scale up technology. Students should be able to understand cGMPs from pharmaceutical industry point of view.

### **PHARMACOLOGICAL SCREENING METHODS**

**CO1:** Understand their role as clinical pharmacist as a health care team member.

**CO2:** Importance of proper prescribing, its review and required communication skills and counselling for better therapeutic efficacy.

**CO3:** Needs to identify the patient-specific parameters relevant in initiating drug therapy, and monitoring therapy including physiological conditions, time-course of clinical and laboratory indices of therapeutic response and adverse effects.

**CO4:** Basic principles and management of poisoning in general and specific. Importance of therapeutic drug monitoring in individualizing the therapy in various conditions.

### **ADVANCED INSTRUMENTATION TECHNIQUES**

**CO1:** To demonstrate an understanding of the theory and applications of different spectroscopic techniques used in pharmaceutical analysis.

**CO2:** Learn the importance of quantitative and qualitative applications of different drugs, pharmaceuticals and compounds involving various spectroscopic techniques.

### **DIETARY SUPPLEMENTS AND NUTRACEUTICALS**

**CO1:** An understanding of the concepts behind the theoretical applications of dietary supplements.

**CO2:** Students can be familiar with systems of medicines and nutraceuticals as well as herbal cosmetics. Student learn different biosynthetic pathways

### **PHARMACEUTICAL PRODUCT DEVELOPMENT**

**CO1:** A good understanding of fundamentals of controlled drug delivery systems & their various types in detail.

**CO2:** Students should be able to learn about targeted drug delivery systems & its significance

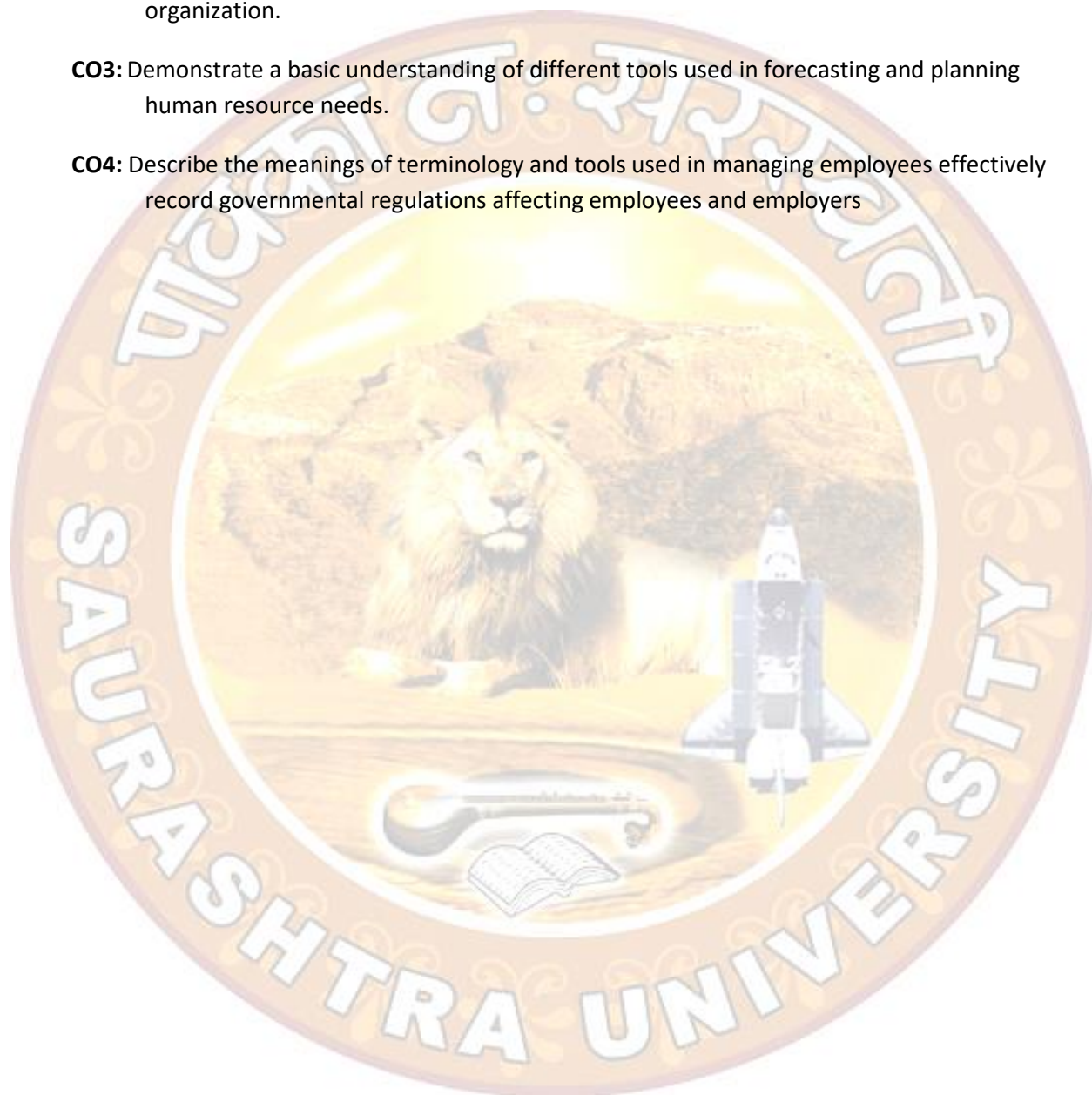
## **HUMAN RESOURCE MANAGEMENT**

**CO1:** Development, maintenance of Human resource, separation process and research etc.

**CO2:** Explain the importance of human resources and their effective management in organization.

**CO3:** Demonstrate a basic understanding of different tools used in forecasting and planning human resource needs.

**CO4:** Describe the meanings of terminology and tools used in managing employees effectively record governmental regulations affecting employees and employers



## **Course Outcomes of Certificate Course Pharmacy**

### **Anatomy and Pathophysiology of kidney (Theory) (CCDT-101)**

- CO1:** Write detailed note on anatomy and physiology of nephron
- CO2:** Write detailed note on physiology of urine formation.
- CO3:** Write detailed note on Aetiology, Clinical Manifestation and diagnosis of chronic and acute renal failure
- CO4:** Write detailed note on Renal Anemia
- CO5:** Explain impact of diabetes on end stage renal failure and steps to prevent it.
- CO6:** Write detailed note on various stages of renal failure
- CO7:** Give various drugs to treat hypertension associated with end stage renal failure.

### **Management of dialysis (Theory) (CCDT-102)**

- CO1:** Write in detail about Dialysis preparation
- CO2:** Write down application and advantages of Haemodialysis over peritoneal dialysis.
- CO3:** Write down the role of anticoagulant in dialysis process.
- CO4:** Write detailed note on heparin.
- CO5:** Explain in detail precautionary diet and medication for patient on dialysis.
- CO6:** Write detailed note on Vascular Access Parameters of Dialysis.

### **Course in Dialysis Technique (CCDT) Haemodialysis and peritoneal dialysis (Theory) (CCDT-103)**

- CO1:** Explain in detail about various complication of dialysis
- CO2:** Write in detail about Urea Kinetic modelling
- CO3:** Explain in detail history and concept of Peritoneal Dialysis.
- CO5:** Explain in detail history and concept of Haemodialysis
- CO4:** Note on Plasmapheresis Replacement Technique
- CO5:** Explain in detail about CAPD.

### **Haemodialysis and Peritoneal Dialysis procedures and clinical evaluation (Practical) (CCDT-104)**

- CO1:** How to set up Dialysis unit.
- CO2:** How to document and record the details
- CO3:** How to actually conduct Haemodialysis.
- CO4:** How to set up Peritoneal Dialysis
- CO5:** How to maintain proper hygiene in dialysis unit.

## **Course Outcomes of M. Pharm. (Pharmaceutical Biotechnology)**

### **Course Outcomes**

- CO1:** Principles and basic theory behind several analytical techniques
- CO2:** Apply these techniques successfully in practical situations.
- CO3:** Design experiments both in vivo and in vitro for elucidating drug targets.

### **SEMESTER I MICROBIAL AND CELLULAR BIOLOGY**

#### **Course Outcomes**

- CO1:** Importance of Microorganisms in Industry
- CO2:** Various biological processes which regulate the growth of microbes
- CO3:** Basics of molecular biology
- CO4:** Animal based cell cultures system which will help them to take up biological research such as vaccine preparation as well as placement in the relevant biotech industry.

### **BIOPROCESS ENGINEERING AND TECHNOLOGY**

#### **Course outcome**

- CO1:** Appreciate relevance of microorganisms from industrial context;
- CO2:** Give an account of design and operations of various fermenters;
- CO3:** Present unit operations together with the fundamental principles for basic methods in production technique for bio-based products
- CO4:** Calculate yield and production rates in a biological production process, and also interpret data
- CO5:** Give an account of important microbial/enzymatic industrial processes in food and fuel industry.

### **SEMESTER I ADVANCED PHARMACEUTICAL BIOTECHNOLOGY**

#### **Course Outcome**

- CO1:** The impact of genetic engineering in modern society, the students should be endowed with strong theoretical knowledge of this technology.

**CO2:** The basics of enzyme technologies used in pharmaceutical industry

**CO3:** Understand the overview of pharmacogenomics

### **SEMESTER I**

## **PHARMACEUTICAL BIOTECHNOLOGY PRACTICAL – I**

### **Course Outcome**

**CO1:** The basic biochemical tests and analytical techniques in the field of pharmaceutical sciences

**CO2:** Identify proper research lab working in area of biotechnology interests

**CO3:** Able to handle sophisticated analytical equipment

**CO4:** Able to isolate, characterize and identify common bacterial organism.

### **SEMESTER II**

## **PROTEINS AND PROTEIN FORMULATIONS**

### **Course Outcome**

**CO1:** Identify structural, function and membrane proteins and develop skills on various techniques used in functional proteomics such as mRNA expression and miRNA expression and Interpret data obtained through high throughput expression studies.

**CO2:** Analyse and correctly interpret the molecular mechanisms operating in living beings and identify their applications

**CO3:** Bioinformatics tools to solve problems in biochemistry, molecular biology and biomedicine.

**CO4:** Different methodologies, techniques and tools commonly used in protein sequencing, assembly and annotation, interatomic and metabolomics

### **SEMESTER II**

## **IMMUNOTECHNOLOGY**

### **Course Outcome**

**CO1:** Evaluate the usefulness of immunology in different pharmaceutical companies

**CO2:** Identify the proper research lab working in the area of their own interests

**CO3:** Apply their knowledge and design immunological experiments to demonstrate innate, humoral or cytotoxic T lymphocyte responses and figure out the kind of immune responses in the setting of infection (viral or bacterial) by looking at cytokine profile.

### **SEMESTER II**

## **BIOINFORMATICS AND COMPUTATIONAL BIOTECHNOLOGY**

## **Course outcome**

- CO1:** Develop an understanding of the basic theory of these computational tools
- CO2:** Develop required database extraction, integration, coding for computational tools and methods necessary for all Omics
- CO3:** Create hypothesis for investigating specific contemporary biological questions, provide help to experiment with or develop appropriate tools, Searching the biological databases and understanding various methods of drug designing

## **SEMESTER II BIOLOGICAL EVALUATION OF DRUG THERAPY**

### **Course Outcome**

- CO1:** Knowledge to understand the importance of biological and evaluation of drug therapy of biological medicines.
- CO2:** Understanding about the general concept of standardization of biological.
- CO3:** Understanding the importance of transgenic animals and knockout animals.
- CO4:** Understanding the biological medicines in development of various diseases.
- CO5:** Biological evaluation of drugs in vitro and in vivo

## **SEMESTER II PHARMACEUTICAL BIOTECHNOLOGY PRACTICAL - II**

### **Course Outcome**

- CO1:** Acquire basic microbiology techniques and principles;
- CO2:** Get first-hand experience that will coincide with what is taught in the lecture portion of the class
- CO3:** Gain hands-on experience in gene cloning, protein expression and purification.

## **SEMESTER III RESEARCH METHODOLOGY & BIOSTATISTICS**

### **Course Outcome**

- CO1:** Students should know why educational research is undertaken, and the audiences that profit from research studies.
- CO2:** Students should be familiar with ethical issues in educational research, including those issues that arise in using quantitative and qualitative research.



**CO3:** To learn and develop skill in statistical tests and its application in research

**CO4:** Students should be familiar with how to write different components of good research paper

**CO5:** Knowledge about the CPCSEA guidelines for laboratory animal facility



**Course Outcomes of M. Pharm.  
(Pharmaceutics)**

**M.PHARM SEMESTER I  
MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES (MPH  
101T)**

**Course Outcomes**

- CO1:** At the end of the course, the student will be able to understand the fundamental concept of modern analytical techniques
- CO2:** This is important for qualitative as well as quantitative analysis of drug substances and drug product.
- CO3:** Moreover. Several aspects of the interpretations of the various spectroscopic data will be taught.

**M.PHARM SEMESTER I  
DRUG DELIVERY SYSTEMS (MPH 102T)  
Theory: 4 Hrs. /Week**

**Course Outcomes**

- CO1** At the end of the course, the student will get acquainted with approaches, formulations, technologies, and systems of New Drug Delivery Systems for transporting a pharmaceutical compound in the body as needed to safely achieve its desired therapeutic effect.
- CO2** Moreover, students can select research-based project in subsequent semesters for specific type of delivery systems.
- CO3** The knowledge gained by the students during the study of this course can also help them in handling of NDDS related research projects in Pharma industry

**M.PHARM SEMESTER I  
MODERN PHARMACEUTICS (MPH 103T)**

**Course Outcomes**

- CO1** At the end of the course, the student will be able to understand the various structural and documentary requirements in the pharmaceutical industry.
- CO2** The students will also be able to get useful information regarding the management of pharmaceutical industry.

- CO3** Moreover, they will understand the importance about the preformulation considerations as well as time saving optimization techniques like designs which are very useful in successful and efficient formulation

**M.PHARM SEMESTER I  
REGULATORY AFFAIRS MPH 104T)**

**Theory: 4 Hrs. /Week**

**Course Outcomes**

- CO1** At the end of the course, the student will be having a good understanding of the drug development process as a whole and the practical concepts, regulatory aspects related to Research & Development as well as manufacturing and marketing of Pharmaceutical Products.
- CO2** The students will become familiar to various guidelines and regulatory requirements of various countries
- CO3** The students will acquire knowledge regarding the protocols in developing clinical trials and various procedures regarding the same.
- CO4** Information regarding the important pharmacokinetic parameters and various tests will be achieved

**M.PHARM SEMESTER II  
MOLECULAR PHARMACEUTICS (NANO TECHNOLOGY &  
TARGETED DDS) (NTDS)**

**Course Outcomes**

- CO1** The students should be able to select the right kind of materials, able to develop nano formulations like Liposomes, Niosomes, Aquasomes, Phytosomes, Electrosomes with appropriate technologies
- CO2** Design drug delivery systems for targeting drugs to tumours and to the brain
- CO3** Design various formulation approaches like aerosols, nebulizers and dry powder inhalers for effective pulmonary delivery.
- CO4** Develop strategies for improving nasal absorption in the design of nasal drug delivery systems
- CO5** Apply knowledge of gene therapy in the treatment of cancer and inherited diseases
- CO6** Design novel drug delivery systems by apply knowledge of antisense molecules and aptamers.

**M.PHARM SEMESTER II  
ADVANCED BIOPHARMACEUTICS & PHARMACOKINETICS**

**Course Outcomes**

- C01** Learn the mechanism of drug absorption & various factors affecting drug absorption
- C02** understand the concept of dissolution, In - vitro dissolution testing models and In-vitro-  
*In-vivo* correlation
- C03** Learn various biopharmaceutic factors affecting drug bioavailability
- C04** Understand basic considerations of pharmacokinetic models and different  
compartment model and non-compartment model.
- C05** Explain the design and evaluation of dosage regimens of the drugs using  
pharmacokinetic and biopharmaceutic parameters.
- C06** Understand the objectives of bioavailability, concept and measurements of bio-  
availability. learn the regulatory aspects of bio-availability and bioequivalence studies
- C07** Design and evaluation of bioequivalence studies.

### **M.PHARM SEMESTER II COMPUTER AIDED DRUG DEVELOPMENT (**

#### **Course Outcomes**

- C01** learn the applications of computers in pharmaceutical product development
- C02** Learn various in silicon models of Drug Disposition
- C03** Understand the basics of Quality by design in formulation development
- C04** Learn computational model for biopharmaceutical characterization of drugs
- C05** Learn computer Simulations in Pharmacokinetics and Pharmacodynamics
- C06** Study the use of computers in Clinical Data Collection and Management
- C07** Understand the prerequisite of industrial automation by application of artificial  
intelligence, robotics and computational fluid dynamics

### **M.PHARM SEMESTER II COSMETICS AND COSMECEUTICALS**

#### **Course Outcomes**

- C01** Learn various the regulatory provisions related to the import and manufacture of  
cosmetics
- C02** Apply the knowledge of various Biological aspects in the development of optimized  
cosmetic formulation.
- C03** Able to select key ingredients suitable in the formulation of various cosmetics
- C04** Utilize various technologies for designing cosmetics and cosmeceuticals with desired  
safety, stability and efficacy

**CO5** Select herbal ingredients in the formulation of cosmetics for hair care, skin care and oral care

**CO6** Learn various the regulatory provisions related to the herbal cosmetics

**M.PHARM SEMESTER III**  
**RESEARCH METHODOLOGY & BIostatISTICS**

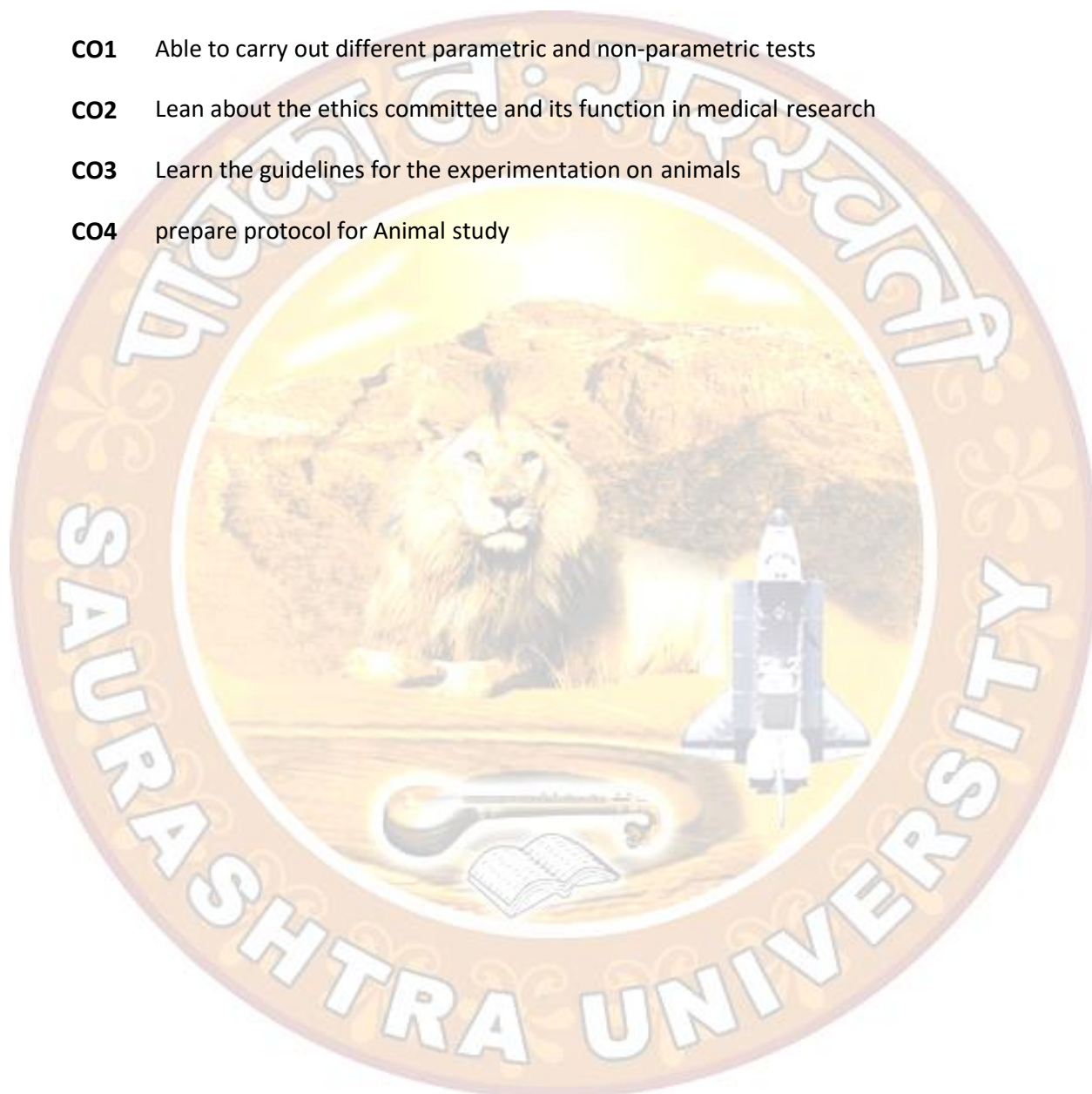
**Course Outcomes**

**CO1** Able to carry out different parametric and non-parametric tests

**CO2** Learn about the ethics committee and its function in medical research

**CO3** Learn the guidelines for the experimentation on animals

**CO4** prepare protocol for Animal study



**Course Outcomes of M. Pharm.  
(Pharmacognosy)**

**M PHARM SEMESTER 1  
MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES  
Course Outcomes**

- CO1:** Identification of drug or plant constituents with various analytical techniques
- CO2:** Analysis of drug or plant constituents with various analytical techniques
- CO3:** Student will expose to different analytical data like LC-MS, GC-MS, IR, DSC etc. theoretically and practically.
- CO4:** Fellow student will able to handle different analytical data to predict the unknown structures. The fellow student will gain the interpretation skills
- CO5:** At the end of the course student should know to handle different hyphenated instruments data

**M PHARM SEMESTER 1  
ADVANCED PHARMACOGNOSY – I  
Course outcomes**

- CO1:** Knowledge about cultivation of medicinal plants and different guidelines related to cultivation
- CO2:** Marine drug discovery and study of marine natural products
- CO3:** Scope, medicinal value and standardization of nutraceuticals and regulatory aspect of nutraceuticals
- CO4:** Occurrence, isolation, characterization, identification, biosynthesis and activity profile of biologically active natural products.
- CO5:** WHO guideline study for quality and safety monitoring of herbal drugs and study about herb drug, food drug interaction and adverse effect of herbals.

**M PHARM SEMESTER 1  
PHYTOCHEMISTRY  
COURSE OUTCOMES**

- CO1:** Biogenesis and biological activity of natural products coming from mevalonate: terpenoids and steroids

- C02:** Extraction procedures for natural compounds, their differences and their applications the main pathways of aromatic amino acids, alkaloids, phenylpropanoids
- C03:** Herbal Drug discovery and development. Optimization of Lead compounds.
- C04:** After finishing the course, the students will get professional, Practical skills & time management skills in extraction, Isolation and Phytochemical analysis of Natural products.
- C05:** Course provides skill in separation of the active constituents obtained from natural sources, in addition to the different methods of separation (chromatography).
- C06:** Application of HPTLC and GC technique in fingerprinting, analysis and identification of phytoconstituents. Structure elucidation of unknown molecule

**M PHARM SEMESTER 1**  
**INDUSTRIAL PHARMACOGNOSTICAL TECHNOLOGY**  
**COURSE OUTCOMES**

- C01:** Starting up of new herbal drug industry. Regulatory requirements/ documentation for starting a new natural drug industry.
- C02:** Regulatory requirements/ documentation for starting a new natural drug industry. ISO documentation and Export and import policies in herbal industry sector. GMP / GLP in Herbal drug sector.
- C03:** Monograph preparation and documentation of herbal drugs and extracts. WHO guidelines in safety assessment of herbal drugs.
- C04:** Develop skill in testing of herbal drugs and Knowledge about IPR and Patenting.

**M.PHARM SEMESTER-II**  
**MEDICINAL PLANT BIOTECHNOLOGY**  
**COURSE OUTCOME:**

- C01:** Describe mechanisms of plant pollination and differentiate between haploid and diploid cells and their role in sexual reproduction
- C02:** Develop skill in Plant tissue culture techniques for production of genetically modified plants.
- C03:** Develop skill in Hairy root culture for production of different primary and secondary metabolites.
- C04:** Different methods of cloning and its applications.
- C05:** Knowledge about Application of PCR in plant genome analysis.
- C06:** Plant fermentation technology in production of secondary metabolites.

**M.PHARM SEMESTER-II**  
**ADVANCED PHARMACOGNOSY – II**

**COURSE OUTCOME:**

- CO1:** Students will study the role of ethno botany and ethnopharmacology in drug development
- CO2:** Critically evaluate the use of plant and plant products as medicinal agents
- CO3:** Develop analytical profile of different classes of phytochemicals
- CO4:** Discuss the therapeutic actions of main classes of phytochemical and their interactions with other herbs or drugs and become familiar with DNA fingerprinting techniques.
- CO 5:** To study the toxicity and regulations of herbal vs conventional drugs
- CO6:** Students will study the biological screening of herbal drugs and related guidelines.

**M.PHARM SEMESTER-II**  
**INDIAN SYSTEMS OF MEDICINE (MPG 203T)**  
**Theory: 4 Hrs. /Week**

**SCOPE**

To make the students understand thoroughly the principles, preparations of medicines of various Indian systems of medicine like Ayurveda, Siddha, Homeopathy and Unani. Also focusing on clinical research of traditional medicines, quality assurance and challenges in monitoring the safety of herbal medicines.

**OBJECTIVES:**

After completion of the course, student is able to

- To understand the basic principles of various Indian systems of medicine
- To know the clinical research of traditional medicines, Current Good Manufacturing Practice of Indian systems of medicine and their formulations.

**COURSE OUTCOME:**

- CO1:** Students will get knowledge of fundamental concepts of Ayurveda, siddha, unani and homeopathic system of medicine. Basic principles and healing potentials of Yoga, Naturopathy and Aromatherapy.
- CO2:** Students will get knowledge of formulation development and standardisation of various traditional formulations. Various purification process (Shodana and Marana concepts)
- CO3:** Quality control and quality assurance concepts involved in traditional system of medicine.



**CO4:** Study the concepts of AYUSH, ISM, CCRAS, CCRS, CCRH, CCUR.

## **M.PHARM SEMESTER-II HERBAL COSMETICS**

### **COURSE OUTCOME:**

- CO1:** Study of herbal formulations, cosmeceutical and regulatory requirements of herbal drugs along with biological screening for their therapeutic efficacy will help the student to understand the overall process of formulation and development of herbal drugs.
- CO2:** Develop skill in Herbal cosmeceutical development and standardization Raw product analysis
- CO3:** Students will study import and export of herbal cosmetics.
- CO4:** Students will also become familiar with possible interactions between chemicals and herbs
- CO5:** Develop skill in Quality control and quality assurance of herbal cosmetics. To learn toxicological and allergen screening techniques

## **M. PHARM SEMESTER III RESEARCH METHODOLOGY & BIOSTATISTICS**

### **Course Outcomes**

- CO1** Able to carry out different parametric and non-parametric tests
- CO2** Learn about the ethics committee and its function in medical research
- CO3** Learn the guidelines for the experimentation on animals
- CO4** prepare protocol for Animal study

**Course Outcomes of M. Pharm.  
(Pharmacology)**

**M.PHARM PHARMACOLOGY SEMESTER I  
Modern Pharmaceutical Analytical Techniques (MPL 101T)  
Theory: 4 Hrs. /Week**

**Course Outcomes**

- CO.1:** The subject will teach graduates advanced analytical techniques like NMR, Mass spectrometer, IR, HPLC, HPTLC etc. which can help them in their professional carrier.
- CO.2:** This will learn student's theoretical practical skills of the instruments and even the qualitative and quantitative parameters of the drug.

**M.PHARM PHARMACOLOGY SEMESTER I  
Advanced Pharmacology – I (MPL 102T)  
Theory: 4 Hrs. /Week**

**Course Outcomes**

- CO.1:** It strengthens the knowledge of Pharmacology, Pathophysiology and Pharmacotherapeutics.
- CO.2:** It makes students to understand the mechanism of the drug at molecular level, adverse drug effect, clinical use, Contraindications, and dosage of the drug

**M.PHARM PHARMACOLOGY SEMESTER I  
Pharmacological and Toxicological Screening Methods – I  
(MPL 103T)**

**Theory: 4 Hrs. /Week**

**Course Outcome**

- CO.1:** Exhibit awareness and responsiveness to the system of health care including preclinical evaluation of drugs, ethical requirement for the usage of animal experiments, and regulations of the experiments.
- CO.2:** Graduates are able to understand the process of drug discovery, in-vivo, in-vitro experiments, and newer screening methods.

**M.PHARM PHARMACOLOGY SEMESTER I**  
**Cellular and Molecular Pharmacology (MPL 104T)**  
**Theory: 4 Hrs. /Week**

**Course Outcome**

- CO.1:** Graduates will be able to take interest in research & development in all areas pertaining to Pharmacology.
- CO.2:** They are able to understand receptor signal transduction processes, molecular pathways affected by drugs.
- CO.3:** This information will further help the student to apply the knowledge in drug discovery process.

**SEMESTER II**  
**M.PHARM PHARMACOLOGY SEMESTER II**  
**Advanced Pharmacology – II (MPL 201T)**  
**Theory: 4 Hrs. /Week**

**Course Outcomes**

- CO.1:** strengthens the knowledge of Pharmacology, Pathophysiology and Pharmacotherapeutics.
- CO.2:** It makes students to understand the mechanism of the drug at molecular level, adverse drug effect, clinical use, Contraindications, and dosage of the drug

**M.PHARM PHARMACOLOGY SEMESTER II**  
**Pharmacological and Toxicological Screening Methods – II (MPL 202T)**  
**Theory: 4 Hrs. /Week**

**Course Outcome**

- CO.1:** Exhibit awareness and responsiveness to the system of health care including preclinical evaluation of drugs, ethical requirement for the usage of animal experiments, and regulations of the experiments.
- CO.2:** Graduates are able to understand the process of drug discovery, in-vivo, in-vitro experiments, and newer screening methods.

**M.PHARM PHARMACOLOGY SEMESTER II**  
**Principles of Drug Discovery (MPL 203T)**  
**Theory: 4 Hrs. /Week**

**Course Outcome**

- CO.1:** Graduates will be able to take interest in research & development in all areas pertaining to Pharmacology.
- CO.2:** They are able to understand receptor signal transduction processes, molecular pathways affected by drugs.
- CO.3:** This information will further help the student to apply the knowledge in drug discovery process.

**M.PHARM PHARMACOLOGY SEMESTER II**  
**Clinical Research and Pharmacovigilance (MPL 204T)**  
**Theory: 4 Hrs. /Week**

**Course Outcome**

- CO.1:** Graduates are able to demonstrate different phases of clinical trial, able to understand regulatory requirements for clinical trial.
- CO.2:** Students are able to design, conduct and manage the clinical trial. They can detect new adverse drug reactions.
- CO.3:** They are able to understand the principles of Pharmacovigilance.

**M. PHARM SEMESTER III**  
**RESEARCH METHODOLOGY & BIostatISTICS**  
**(MRM 301T)**

**Theory: 4 Hrs. /Week**

**Course Outcomes**

- CO1** Able to carry out different parametric and non-parametric tests
- CO2** Learn about the ethics committee and its function in medical research
- CO3** Learn the guidelines for the experimentation on animals
- CO4** prepare protocol for Animal study

**Course Outcomes of M. Pharm.  
(Pharmaceutical Quality Assurance)**

**M. PHARM SEMESTER I**

**Modern Pharmaceutical Analytical Techniques (MQA 101T)  
Theory: 4 Hrs. /Week**

**Course Outcomes**

- CO.1:** The subject will teach graduates advanced analytical techniques like NMR, Mass spectrometer, IR, HPLC, HPTLC etc. which can help them in their professional carrier.
- CO.2:** This will learn student's theoretical practical skills of the instruments and even the qualitative and quantitative parameters of the drug.

**M. PHARM (QA) SEMESTER I  
QUALITY MANAGEMENT SYSTEMS (MQA 102T)  
Theory: 4 Hrs. /Week**

**Course Outcome**

- CO1:** Got fundamental knowledge and concepts about various quality management principles and systems utilized in the manufacturing industry.
- CO2:** Understand the importance of quality, tools for quality improvement, quality evaluation of pharmaceuticals.
- CO3:** Familiarized with statistical approaches for quality.
- CO4:** Understand the concept of stability testing of drug products and drug substances.

**M. PHARM (QA) SEMESTER I  
QUALITY CONTROL AND QUALITY ASSURANCE  
(MQA 103T)  
Theory: 4 Hrs. /Week**

**Course Outcome**

- CO1:** Understand Various aspects of quality control and quality assurance in pharmaceutical industries.
- CO2:** Familiarised with important aspects like cGMP, QC tests, documentation, quality certifications, GLP and regulatory affairs.

- CO3:** Understand the importance of documentation and responsibilities of QA & QC departments.
- CO:4** Understand the scope of quality certifications applicable to pharmaceutical industries.

**M. PHARM (QA) SEMESTER I  
PRODUCT DEVELOPMENT AND TECHNOLOGY TRANSFER (MQA  
104T)**

**Theory: 4 Hrs. /Week**

**Course Outcome**

- CO1:** Understood the concept of technology transfer from R&D to first receiving site and technology transfer related to post-marketing changes in manufacturing places.
- CO2:** Understand the new product development process.
- CO3:** Understand the necessary information to transfer technology from R&D to actual manufacturing by sorting out various information obtained during R&D.
- CO4:** Familiarized with basic principles of drug discovery and development like IND, NDA, ANDA etc..

**M. PHARM (QA) SEMESTER II  
HAZARDS AND SAFETY MANAGEMENT (MQA 201T)**

**Theory: 4 Hrs. /Week**

**Course outcome**

- CO1:** Realization of environmental problems and gain the knowledge of environment and its allied problems.
- CO2:** They are aware about actual industry environment and know the safety standards in pharmaceutical industry.
- CO3:** They gain comprehensive knowledge on the safety management
- CO4:** Develop thoughts of management mechanism in various types of hazard management system.
- CO5:** Know about hazards assessment methodology and its application at industry for safety.

**M. PHARM (QA) SEMESTER II  
PHARMACEUTICAL VALIDATION (MQA 202T)**

**Theory: 4 Hrs. /Week**

**Course outcome**

- CO1:** Demonstrate the knowledge of calibration, qualification and validation for various aspects of pharmaceutical analytical, bio-analytical and quality assurance.

- CO2:** Knowledge about the qualification of various manufacturing, analytical and laboratory equipment.
- CO3:** Knowledge about types, application and guidelines of process validation.
- CO4:** State the concept of analytical method development and validation parameters for estimation of analytes.
- CO5:** Cleaning validation of equipment employed in the manufacture of pharmaceuticals
- CO6:** Information about intellectual property rights

**M. PHARM (QA) SEMESTER II**  
**AUDITS AND REGULATORY COMPLIANCE (MQA 203T)**  
**Theory: 4 Hrs. /Week**

**Course outcome**

- CO1:** Importance of audit in pharma industry and also help to develop the professional skills required for a dynamic professional.
- CO2:** Know about the methodology of audit in various departments of Pharmaceuticals.
- CO3:** Develop the leadership qualities and interpersonal skills for carry out the audit process
- CO4:** Prepare the check list for auditing of various pharmaceutical department and audit report

**M. PHARM (QA) SEMESTER II**  
**PHARMACEUTICAL MANUFACTURING TECHNOLOGY**  
**(MQA 204T)**  
**Theory: 4 Hrs. /Week**

**Course outcome**

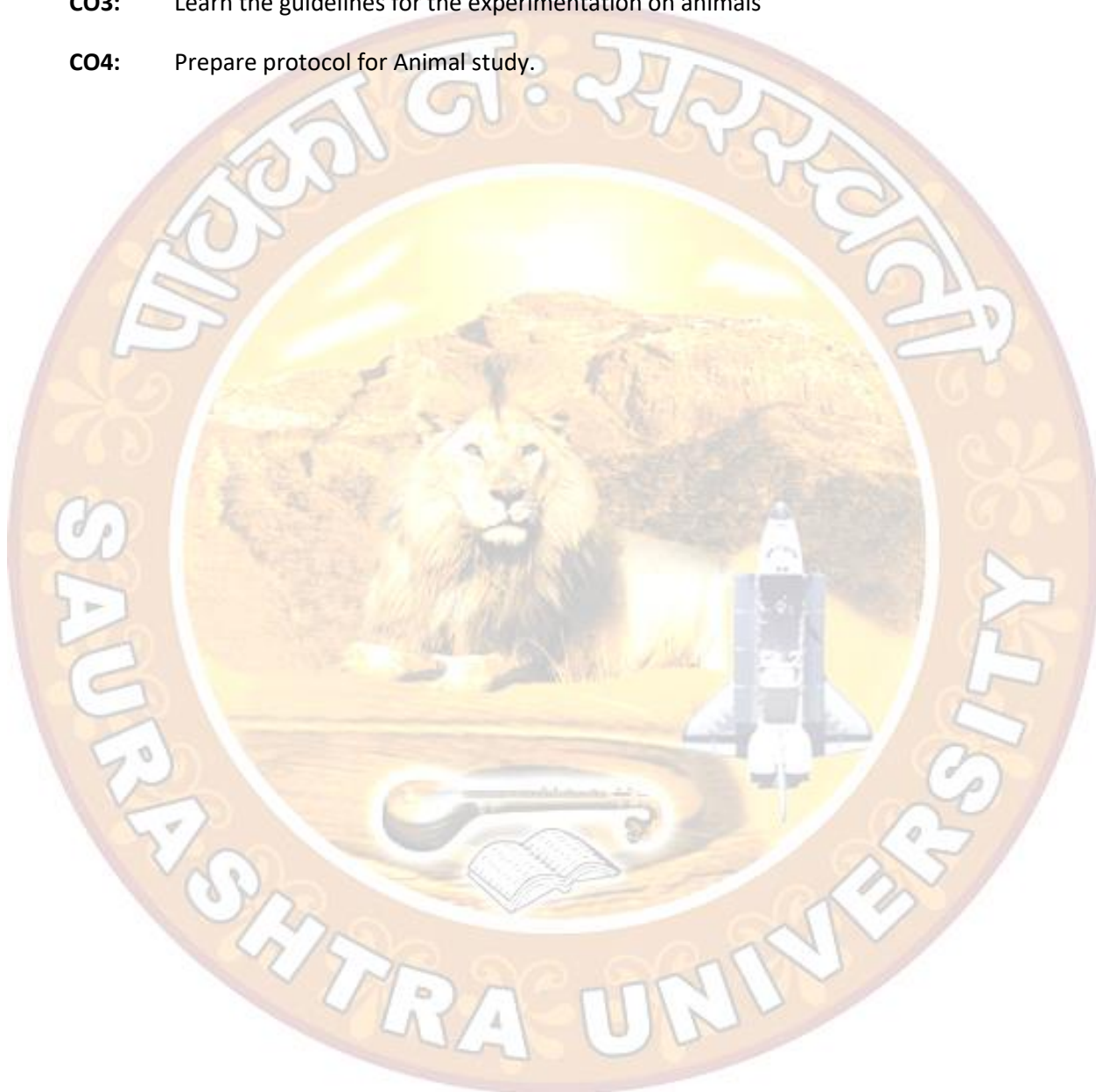
- CO1:** Practices and legal requirements for pharmaceutical industry developments, plant layout and production planning.
- CO2:** Information about the general principles and practices for aseptic process technology, non-sterile manufacturing technology and packaging technology.
- CO3:** Understanding the concept regarding the implementation of Quality by design (QbD) and its elements and process analytical technology (PAT) in pharmaceutical manufacturing

**M. PHARM QA SEM III**

**Research Methodology & Biostatistics (MRM 301T)**  
**Theory: 4 Hrs. /Week**

**Course Outcomes**

- CO1:** Able to carry out different parametric and non-parametric tests.
- CO2:** Learn about the ethics committee and its function in medical research.
- CO3:** Learn the guidelines for the experimentation on animals
- CO4:** Prepare protocol for Animal study.





## Course Outcomes of M. Pharm (Regulatory Affairs)

### Course Outcome:

- CO1:** Understanding and implementation of Current Good Manufacturing Practices, Good Laboratory Practices, Good Automated Practices and Good Distribution Practices in routine industrial work.
- CO2:** Awareness regarding the Change control, Validation etc.
- CO3:** Understanding the requirement of ISO and ICH guidelines and implementing the same in document preparation.
- CO4:** Determination of basic concept of GMP, GLP and GDP requirement of USFDA and CDSCO.

### M. PHARM SEMESTER I (RA) Documentation and Regulatory Writing (MRA 102T) Theory: 4 Hrs. /Week

### Course Outcome:

- CO1:** Understanding different types of documents required in pharmaceutical industry.
- CO2:** Awareness regarding Audit and Inspection kind of activities, their requirements and related rules and regulations.
- CO3:** Gives idea regarding post approval changes and their document requirements.
- CO4:** Understanding basic concepts like recall, risk management system, life cycle management etc.

### M. PHARM SEMESTER I (RA) Clinical Research Regulations (MRA 103T) Theory: 4 Hrs. /Week

### Course Outcome:

- CO1:** Awareness regarding different types and phases of clinical trials.
- CO2:** Understanding regulations history, origin & concept of different ethical guidelines related to clinical trials.
- CO3:** Gives idea regarding requirements of conduct of clinical trial in India, US and Europe.

**M. PHARM SEMESTER I (RA)**  
**Documentation and Regulatory Writing (MRA 104T)**  
**Theory: 4 Hrs. /Week**

**Course Outcome:**

- CO1:** Gives idea regarding the concept of Bioavailability and Bioequivalence.
- CO2:** Understanding the rules, regulations and guidelines of different countries for pharmaceutical products, food & nutraceuticals, biological & herbs as well as medical devices.
- CO3:** Recognize the Indian pharmacopoeial, BIS and ISO standards.

**M.PHARM SEMESTER II (RA)**  
**Regulatory Aspects of Drugs & Cosmetics (MRA 201T)**  
**Theory: 4 Hrs./Week**

**Course Outcome:**

- CO1:** Acquired the knowledge of regulatory approval process and registration procedures for drug products in USA, Canada, EU, Australia, Japan and Brazil
- CO2:** Understand the role of various committees across the globe like APEC, EAC, GCC, PANDRH, SADC, etc.
- CO3:** Learnt the requirements for registration of drugs and post approval requirements in ASEAN countries
- CO4:** Learned the regulatory prerequisites related to Marketing authorization requirements for drugs and post approval requirements in CIS countries
- CO5:** Understand the concept of Certificate of Pharmaceutical Product (CoPP) in General and Country Specific

**M.PHARM SEMESTER II (RA)**  
**Regulatory Aspects of Herbal and Biologicals (MRA 202T)**  
**Theory: 4 Hrs./Week**

**Course Outcome:**

- CO1:** Understand the regulation for newly developed biologics and biosimilars
- CO2:** Took information about of the pre-clinical and clinical development considerations of biologics

- CO3:** Acquired Knowledge about the regulatory requirements of blood and/or its components including blood products and label requirements
- CO4:** Learned the legislation, quality and safety of herbal products
- CO5:** Learned about the regulatory requirements for herbal products, biologics and vaccines

**M.PHARM SEMESTER II (RA)**  
**Regulatory Aspects of Medical Devices (MRA 203T)**  
**Theory: 4 Hrs./Week**

**Course Outcome**

- CO1:** Understand the new era of digitalisation
- CO2:** Developed the knowledge of the different ethics, clinical investigation regarding medical devices
- CO3:** Learnt about regulatory approval process of medical devices in USA and EU
- CO4:** Acquired knowledge of IMDRF and guidance of documents in ASEAN, China & Japan

**M.PHARM SEMESTER II (RA)**  
**Regulatory Aspects of Food & Nutraceuticals (MRA 204T)**  
**Theory: 4 Hrs./Week**

**Course Outcome:**

- CO1:** Learn the history of nutraceuticals and their regulations
- CO2:** Discuss the scope and opportunities in nutraceuticals market, Information regarding regulatory approval process of medical devices in USA and EU
- CO3:** Learn the global aspects of regulations in food and nutraceuticals markets, and regulation in India, USA and EU
- CO4:** Understand and compare the Recommended Dietary Allowance in various regulated countries

**M.PHARM SEMESTER III (RA)**  
**Research Methodology & Biostatistics (MRM 301T)**  
**Theory: 4 Hrs./Week**

**Course Outcomes**

- CO1:** Able to carry out different parametric and non-parametric tests.
- CO2:** Learn about the ethics committee and its function in medical research.
- CO3:** Learn the guidelines for the experimentation on animals
- CO4:** Prepare protocol for Animal study.

## Course Outcomes of Post Graduate Diploma in Clinical Research

### Course Outcome:

Upon Successful completion of the syllabus, a student will:

- CO1:** Describe the various types of clinical studies and the method used to appropriate design.
- CO2:** Discuss the collections, evaluation, and reporting of adverse event data in clinical trial.
- CO3:** Discuss the new drug discovery process in detail.
- CO4:** Understand the basic terminology used in clinical research.
- CO5:** Acquired knowledge about the systemic toxicology, Carcinogenicity, Mutagenicity, Teratogenicity, Reproductive toxicity, Genotoxicity, animal toxicity requirements.
- CO6:** Understand the drug discovery and drug development process.

### **POST GRADUATE DIPLOMA IN CLINICAL RESEARCH (PGDCR) SEMESTER-I Pharmacokinetics and BA/BE studies (Theory) (PGDCR-102)**

**Course Outcome:** At the end of the course student will be able to

- CO1:** Acquired the knowledge about various clinical pharmacokinetics study.
- CO2:** Understand about Pharmacokinetic profile of drug and variuos factor that are affect the pharmacokinetic data of drug.
- CO3:** Student should able to Describe in detail about Phase-I and Phase-II metabolism.
- CO4:** Acquired knowledge about how to collect, evaluate, and report the adverse event data in clinical trial.
- CO5:** Explain about when and why TDM is required, and what is indication of TDM?
- CO6:** Select the correct Pharmacokinetic model based on plasma level or urinary excretion data that best describe the process of drug absorption, distribution, metabolism and elimination.
- CO7:** Define bioavailability and discuss various method of bioavailability enhancement.
- CO8:** Acquired knowledge about bioequivalence study.

### **POST GRADUATE DIPLOMA IN CLINICAL RESEARCH (PGDCR)**

**SEMESTER-I**  
**Clinical trials: Design and regulations Theory**  
**(PGDCR-103)**

**Course Outcome:** At the end of each unit of learning students will be able to:

- CO1:** Discuss about various types and design of clinical trials.
- CO2:** Acquired knowledge about Schedule Y and ICMR guideline.
- CO3:** Discuss the role of Indian GCP guideline.
- CO4:** Acquired knowledge about how to apply for clinical trial in India.
- CO5:** Discuss Investigator Brochure and Informed Consent Form as essential document in clinical trial.

**Pharmacovigilance and Pharmacoepidemiology Theory**  
**(PGDCR-104)**

**Course Outcome:**

- CO1:** Discuss about Pharmacovigilance study.
- CO2:** Understand how to detect signal and report ADR.
- CO3:** What is the role of clinical pharmacist in Reporting, evaluation, monitoring, prevention and management of ADR.
- CO4:** Describe the Various types of Pharmacoepidemiology study.
- CO5:** Differentiate the epidemiology and clinical medicines.
- CO6:** How to measure epidemiology data.

**POST GRADUATE DIPLOMA IN CLINICAL RESEARCH (PGDCR)**  
**SEMESTER - II**  
**Dissertation**  
**(PGDCR-201)**

**Course Outcome:**

- CO1:** Identify Research methods
- CO2:** Identify literature review
- CO3:** Apply knowledge and understanding in clinical research.
- CO4:** Demonstrate advanced critical research skill in relation to career development or work-related learning studies.

## Course Outcomes of Doctor of Pharmacy

### First Year

#### PD – 101: HUMAN ANATOMY & PHYSIOLOGY (THEORY)

**Theory: 3 Hrs. /Week**

##### Course outcomes: (COs)

- CO1:** Describe the structure (gross and histology) and functions of various organs of the human body;
- CO2:** Describe the various homeostatic mechanisms and their imbalances of various systems;
- CO3:** Identify the various tissues and organs of the different systems of the human body;
- CO4:** Perform the hematological tests and also record blood pressure, heart rate, pulse and Respiratory volumes;
- CO5:** Appreciate coordinated working pattern of different organs of each system and
- CO6:** Appreciate the inter linked mechanisms in the maintenance of normal (homeostasis) of human body

#### PD – 103: PHARMACEUTICS (THEORY)

##### Course outcomes :( COs)

- CO1:** Know the formulation aspects of different dosage forms;
- CO2:** Do different pharmaceutical calculation involved in formulation;
- CO3:** Formulate different types of dosage forms.
- CO4:** Appreciate the importance of good formulation for effectiveness.

#### PD – 105: MEDICINAL BIOCHEMISTRY (THEORY)

**Theory: 3 Hrs. /Week**

##### Course outcomes (COs):-

The objective of the present course is providing biochemical facts and the principles to the students of pharmacy. Upon completion of the subject student shall be able to:

- CO1:** Understand the catalytic activity of enzymes and importance of iso enzymes in diagnosis of diseases;
- CO2:** Know the metabolic process of biomolecules in health and illness (metabolic disorders);

**CO3:** the genetic organization of mammalian genome; protein synthesis; replication; mutation and repair mechanism;

**CO4:** Know the biochemical principles of organ function tests of kidney, liver and endocrine gland; and

**CO5:** Do the qualitative analysis and determination of biomolecules in the body fluids.

### **PD – 107: PHARMACEUTICAL ORGANIC CHEMISTRY (THEORY)** **Course outcomes (COs):-**

This course is designed to impart a very good knowledge about

**CO1:** IUPAC/Common system of nomenclature of simple organic compounds belonging to different classes of organic compounds;

**CO2:** Some important physical properties of organic compounds;

**CO3:** Free radical/ nucleophilic [alkyl/ acyl/ aryl] /electrophilic substitution, free radical/ nucleophilic / electrophilic addition, elimination, oxidation and reduction reactions with mechanism, orientation of the reaction, order of reactivity, stability of compounds;

**CO4:** Some named organic reactions with mechanisms

**CO5:** Methods of preparation, test for purity, principle involved in the assay, important medicinal uses of some important organic compounds.

### **PD – 109: PHARMACEUTICAL INORGANIC CHEMISTRY (THEORY)**

#### **Course outcomes (COs):-**

**CO1:** Understand the principles and procedures of analysis of drugs and also regarding the application of inorganic pharmaceuticals;

**CO2:** Know the analysis of the inorganic pharmaceuticals their applications; and

**CO3:** Appreciate the importance of inorganic pharmaceuticals in preventing and curing the disease.

### **PD – 111: REMEDIAL MATHEMATICS/ BIOLOGY (THEORY)** **Course outcomes (COs):-**

**CO1:** Know Trigonometry, Analytical geometry, Matrices, Determinant, Integration, Differential equation, Laplace transform and their applications;

**CO2:** Solve the problems of different types by applying theory; and

**CO3:** Appreciate the important applications of mathematics in pharmacy.

**SECOND YEAR**  
**PD – 201: PATHOPHYSIOLOGY (THEORY)**

**Course outcomes (COs):-**

- CO1:** Describe the etiology and pathogenesis of the selected disease states;
- CO2:** Name the signs and symptoms of the diseases; and
- CO3:** Mention the complications of the diseases.

**PD – 202: PHARMACEUTICAL MICROBIOLOGY (THEORY)**  
**Theory: 3 Hrs. /Week**

**Course outcomes (COs):-**

- CO1:** Know the anatomy, identification, growth factors and sterilization of microorganisms;
- CO2:** Know the mode of transmission of disease-causing microorganism, symptoms of disease, and treatment aspect;
- CO3:** Do estimation of RNA and DNA and there by identifying the source;
- CO4:** Do cultivation and identification of the microorganisms in the laboratory;
- CO5:** Do identification of diseases by performing the diagnostic tests; and
- CO6:** Appreciate the behavior of motility and behavioral characteristics of microorganisms.

**PD – 204: PHARMACOGNOSY & PHYTOPHARMACEUTICALS (**  
**Course outcomes (COs):-**

- CO1:** understand the basic principles of cultivation, collection and storage of crude drugs;
- CO2:** know the source, active constituents and uses of crude drugs; and appreciate the applications of primary and secondary metabolites of the plant.

**PD – 206: PHARMACOLOGY – I (THEORY)**

**Course outcome (COs):-**

- CO1:** Understand the pharmacological aspects of drugs falling under the above-mentioned chapters;
- CO2:** Handle and carry out the animal experiments;
- CO3:** appreciate the importance of pharmacology subject as a basis of therapeutics; and correlate an apply the knowledge therapeutically.



### **PD – 207: COMMUNITY PHARMACY (THEORY)**

#### **Course outcome (COs):-**

- CO1:** know pharmaceutical care services;
- CO2:** know the business and professional practice management skills in community pharmacies;
- CO3:** do patient counselling & provide health screening services to public in community pharmacy;
- CO4:** respond to minor ailments and provide appropriate medication;
- CO5:** show empathy and sympathy to patients
- CO6:** appreciate the concept of Rational drug therapy.

### **PD – 208: PHARMACOTHERAPEUTICS - I(THEORY)**

**Theory: 3 Hrs. /Week**

#### **Course outcome (Cos):-**

- CO1:** The pathophysiology of selected disease states and the rationale for drug therapy;
- CO2:** The therapeutic approach to management of these diseases;
- CO3:** the controversies in drug therapy;
- CO4:** the importance of preparation of individualized therapeutic plans based on diagnosis;
- CO5:** needs to identify the patient-specific parameters relevant in initiating drug therapy, and monitoring therapy (including alternatives, time-course of clinical and laboratory indices of therapeutic response and adverse effects);
- CO6:** describe the pathophysiology of selected disease states and explain the rationale for drug therapy;
- CO7:** summarize the therapeutic approach to management of these diseases including reference to the latest available evidence;
- CO8:** discuss the controversies in drug therapy;
- CO9:** discuss the preparation of individualized therapeutic plans based on diagnosis; and
- CO10:** identify the patient-specific parameters relevant in initiating drug therapy, and monitoring therapy (including alternatives, time-course of clinical and laboratory indices of therapeutic response and adverse effects).

**Third Year**  
**PD – 301: PHARMACOLOGY – II (THEORY)**  
**Theory : 3 Hrs. /Week**

**Course outcome (COs):-**

- CO1:** Understand the pharmacological aspects of drugs falling under the above-mentioned chapters,
- CO2:** Carry out the animal experiments confidently,
- CO3:** Appreciate the importance of pharmacology subject as a basis of therapeutics, and
- CO4:** Correlate and apply the knowledge therapeutically.

**PD – 303: PHARMACEUTICAL ANALYSIS (THEORY)**  
**Theory: 3 Hrs. /Week**

**Course Outcome (Cos):**

- CO1:** Understand the principles of volumetric and electro chemical analysis
- CO2:** Carryout various volumetric and electrochemical titrations
- CO3:** Develop analytical skills

**PD – 305: PHARMACOTHERAPEUTICS – II(THEORY)**  
**Theory: 3 Hrs. /Week**

**Course outcome (Cos):-**

- CO1:** know the pathophysiology of selected disease states and the rationale for drug therapy
- CO2:** know the therapeutic approach to management of these diseases;
- CO3:** know the controversies in drug therapy;
- CO4:** know the importance of preparation of individualized therapeutic plans based on diagnosis; and
- CO5:** appreciate the needs to identify the patient-specific parameters relevant in initiating drug therapy, and monitoring therapy (including alternatives, time-course of clinical and laboratory indices of therapeutic response and adverse effects).

**PD – 307: PHARMACEUTICAL JURISPRUDENCE (THEORY)****Theory: 2 Hrs. /Week****Course outcome (COs):-**

- CO1:** practice the Professional ethics;
- CO2:** understand the various concepts of the pharmaceutical legislation in India;
- CO3:** know the various parameters in the Drug and Cosmetic Act and rules;
- CO4:** Know the Drug policy, DPCO, Patent and design act;
- CO5:** understand the labeling requirements and packaging guidelines for drugs and cosmetics;
- CO6:** be able to understand and the concepts of Dangerous Drugs Act, Pharmacy Act and Excise duties Act; and
- CO7:** other laws as prescribed by the Pharmacy Council of India from time to time including International Laws.

**PD – 308: MEDICINAL CHEMISTRY (THEORY)****Theory: 3 Hrs. /Week****Course outcomes (COs):-**

- CO1** Understand the chemistry of drugs with respect to their pharmacological activity
- CO2** Understand the drug metabolic pathways, adverse effect and therapeutic value of drugs
- CO3** Know the Structural Activity Relationship of different class of drugs
- CO4** Study the chemical synthesis of selected drugs

**PD – 310: PHARMACEUTICAL FORMULATIONS (THEORY)****Course outcomes (COs):-**

- CO1:** Understand the principle involved in formulation of various pharmaceutical dosage forms;
- CO2:** Prepare various pharmaceutical formulation;
- CO3:** Perform evaluation of pharmaceutical dosage forms; and
- CO4:** Understand and appreciate the concept of bioavailability and bioequivalence, their role in clinical situations.

**Fourth Year****PD – 401: PHARMACOTHERAPEUTICS – III (THEORY)****Course outcomes (COs):-**

- CO1:** The pathophysiology of selected disease states and the rationale for drug therapy;
- CO2:** The therapeutic approach to management of these diseases;
- CO3:** The controversies in drug therapy;
- CO4:** The importance of preparation of individualized therapeutic plans based on diagnosis;
- CO5:** Needs to identify the patient-specific parameters relevant in initiating drug therapy, and monitoring therapy (including alternatives, time-course of clinical and laboratory indices of therapeutic response and adverse effects);
- CO6:** Describe the pathophysiology of selected disease states and explain the rationale for drug therapy;
- CO7:** To summarize the therapeutic approach to management of these diseases including reference to the latest available evidence;
- CO8:** To discuss the controversies in drug therapy;
- CO9:** To discuss the preparation of individualized therapeutic plans based on diagnosis
- CO10:** Identify the patient-specific parameters relevant in initiating drug therapy, and monitoring therapy (including alternatives, time-course of clinical and laboratory indices of therapeutic response and adverse effects).

**PD – 403: HOSPITAL PHARMACY (THEORY)****Theory: 2 Hrs. /Week****Course outcomes (COs):-**

- CO1:** Know various drug distribution methods;
- CO2:** Know the professional practice management skills in hospital pharmacies;
- CO3:** Provide unbiased drug information to the doctors;
- CO4:** Know the manufacturing practices of various formulations in hospital setup;
- CO5:** Appreciate the practice-based research methods; and
- CO6:** Appreciate the stores management and inventory control.

**PD – 405: CLINICAL PHARMACY (THEORY)****Theory: 3 Hrs. /Week****Course outcomes (COs):-**

- CO1:** Monitor drug therapy of patient through medication chart review and clinical review;
- CO2:** Obtain medication history interview and counsel the patients;
- CO3:** Identify and resolve drug related problems;
- CO4:** Detect, assess and monitor adverse drug reaction;
- CO5:** Interpret selected laboratory results (as monitoring parameters in therapeutics) of specific disease states; and
- CO6:** Retrieve, analyse, interpret and formulate drug or medicine information.

**PD – 408: BIOPHARMACEUTICS AND PHARMACOKINETICS (THEORY)****Course outcomes (COs) :-**

- CO 1:** Understand the basic concepts in biopharmaceutics and pharmacokinetics and their significance.
- CO 2:** Use of plasma drug concentration-time data to calculate the pharmacokinetic parameters to describe the kinetics of drug absorption, distribution, metabolism, excretion, elimination.
- CO 3:** To understand the concepts of bioavailability and bioequivalence of drug products and their significance.
- CO4:** Understand various pharmacokinetic parameters, their significance & applications.

**PD – 410: CLINICAL TOXICOLOGY (THEORY)****Course outcomes (COs):-**

- CO1:** After the course the students shall have the necessary knowledge and understanding of basic toxicology (including toxico kinetics) relevant for drugs, and the principles for toxicological testing of new drugs and toxicological follow-up of drugs already on the market.
- CO2:** In addition, the students shall know the most usual acute-toxic drugs and chemicals, poisoning symptoms, treatments and antidotes

**Fifth year****PD – 501: CLINICAL RESEARCH (THEORY)****Course outcomes (COs) :-**

- CO1:** Demonstrate competency in biopharmaceutical clinical trial research designs and regulatory affairs management to meet the health and medical needs of current and future biopharmaceutical product consumers
- CO2:** Evaluate critical domestic and global regulatory and health care issues that challenge and influence biopharmaceutical product development
- CO3:** Effectively assess and manage ethical clinical trial programs and biopharmaceutical development projects
- CO4:** Forecast the resources necessary for developing and managing biopharmaceutical clinical research grants and trials as required and regulated by global regulatory agencies

**PD – 502: PHARMACOEPIDEMIOLOGY AND PHARMACOECONOMICS (THEORY)****Theory: 3 Hrs. /Week****Course Outcomes (COs):-**

- CO1: Identify the applications of pharmacoepidemiology and pharmacoeconomics in clinical settings
- CO2: Discuss the various pharmacoepidemiological outcome measures
- CO3: Describe the concept of risk in pharmacoepidemiology and different methods of measuring risk
- CO4: Explain the various pharmacoepidemiological methods
- CO5: Explain the sources of data for pharmacoepidemiological studies
- CO6: Explain the various systems for studying drug effects in populations
- CO7: Discuss the methods to measure outcomes in pharmacoeconomic studies
- CO8: Describe the current pharmacoeconomic evaluation methods

**PD – 503: CLINICAL PHARMACOKINETICS AND PHARMACOTHERAPEUTIC DRUG MONITORING (THEORY)****Course outcomes (COs) :-**

- CO1:** Formulate and design a dosage regimen for individual patients
- CO2:** Interpret and correlate the plasma drug concentration with patient's therapeutic outcomes
- CO3:** Recommend dosage adjustment in renal and hepatic disease

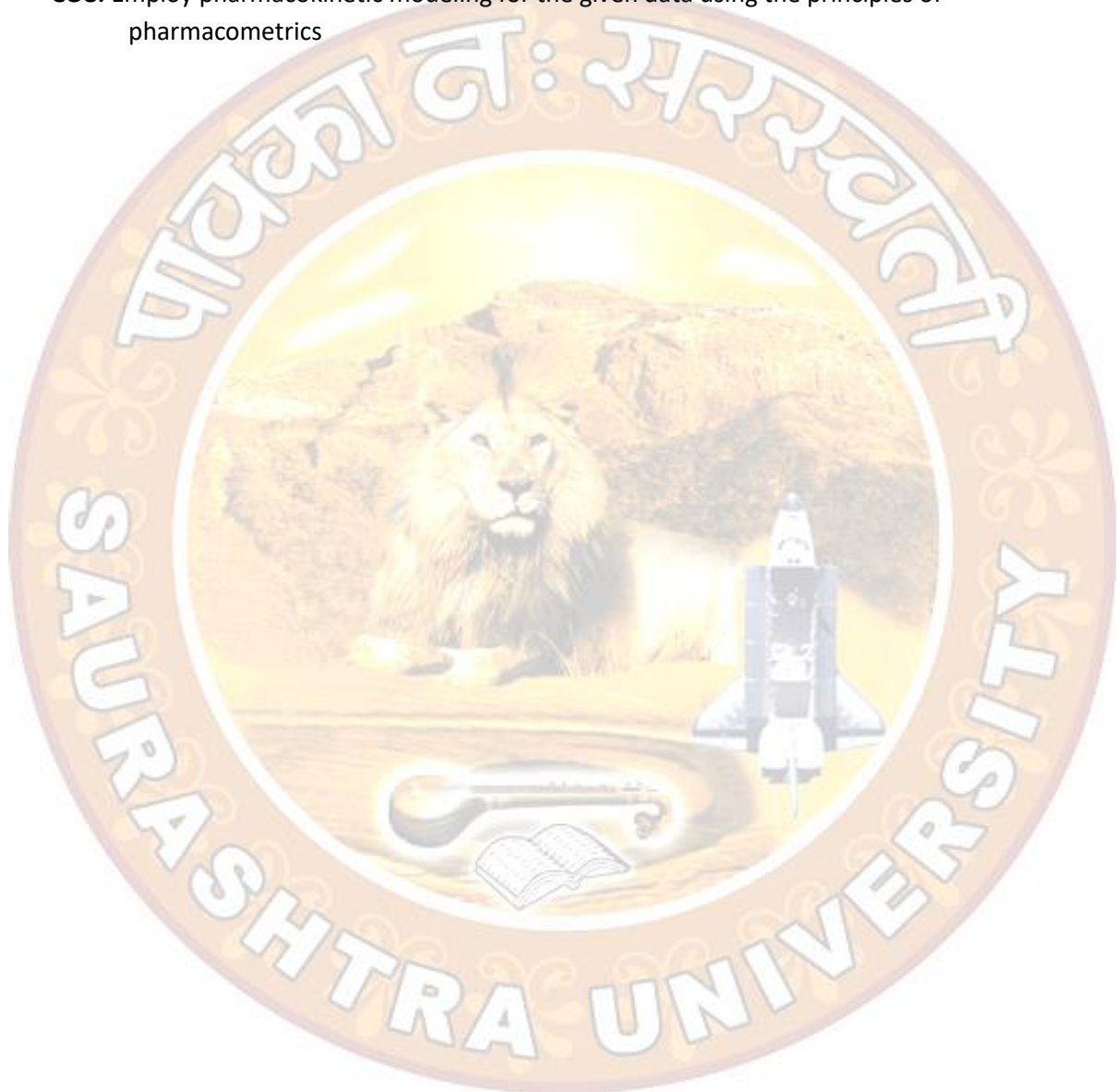
**CO4:** Recommend dosage adjustment for paediatrics, geriatrics and obese patients

**CO5:** Analyze and resolve pharmacokinetic drug interactions

**CO6:** Illustrate and apply pharmacokinetic parameters in clinical settings

**CO7:** Interpret the impact of genetic polymorphisms of individuals on pharmacokinetics and pharmacodynamics of drugs

**CO8:** Employ pharmacokinetic modeling for the given data using the principles of pharmacometrics



### Course Outcome of M.A (Philosophy)

	3 Course Outcome :- Course Outcome are mentioned in the syllabus before the description of each course.
COs1	M.A. Semester I 1 Classical Indian Philosophy I Student becomes familiar with rich Vaidic tradition and develops spiritualistic view of life.
COs1	2 Classical Indian Philosophy II The basic rationalistic and spiritualistic tradition of philosophy is introduced
COs1	3 Contemporary Indian Philo. The content provides the variety of rich thoughts of great Contemporary Indian Thinkers.
COs1	4 Ethics (Indian) Student develops essential moval consciousness and outlook for the Indian way of life. Or 4 Philosophy of Yoga The basic theoretical and practical aspects of Yoga becomes familiar to students.
COs1	5 Philosophy of reigion The essential spiritulistic meaning of reigion is intrroduced to students. Or 5 Vedanta tradition and Swaminarayan Vedanta.



	The great tradition of Vedant and its contemporary application becomes known to the students.
COs1	M.A. Semester II 1 Classical Western Philosophy  Student becomes familiar with socratic wisdom the system of Plato and Aristotle with implications.
COs1	2 Modern western philosophy.  Students goes in deep study of rationalistic and empirictic tradition and philosophy of Kant and hegel.
COs1	3 Symbolic Logic  The Sdvance techniques of symbolic logic - propositional and predicate logic are introduced to students.
COs1	4 Mathematies logic  The advanced results of mathematical logic are proved and comprehended  Or  4 Ethics Western  The basic theoretical concepts of western ethics are introduced.
COs1	5 Philosophy of Rudolf Carnap.  The essential philosophy and his work on intrro and syntaxa are studied.  Or  5 Contemporary Western Philosophy  The rich tradition of contemporary western philosophy is introduced where conant philosophing pats then the fromfier of researcher.

COs1	M.A.Semester III 1 Epistemology (Indian & Western))  The theory of knowledge in Indian and western philosophy is deeply introduces to the students.
COs1	2 Metaphysics (Indian & Western))  The basic metaphysical concepts and problems of Indian and western philosophy is studied.
COs1	3 Philosophy of language (Indian)  The rich tradition of Indian philosophy of language and its various theories are introduced.
COs1	4 Indian logic  Student becomes master of different techniques and concepts of Indian logic  Or  4 Advanced symbolic logic  The feled of logic goes to Advanced level and student becomes matter of advanced techniques of logic.
COs1	5 Essentials of Indian Philosophy  Students get pedogogical and entere traditions of Indian Philosophy.  Or  5 Foundation of Set theory and Mathematical logic  The interdisceplinary aspect of this paper enahles students to do research in set theory and logic.
COs1	M.A. Semester IV 1 Analytic philosophy

	The great tradition of analytic philosophy is articulated and comprehended to the student.
COs1	2 Philosophy of Kant  Student goes deeply in the philosophy of Kant and becomes able to take part in international research.
COs1	3 Philosophy of Science  The current trends of philosophy of science are introduced in this paper about methodology and interpretation.
COs1	4 Many Valued logic  The advanced concept of many valued logic and fuzzy logic with computer application is introduced.  Or  4 Philosophy of mathematics  The basic theories and concepts of contemporary philosophy of mathematics are introduced in this paper.
COs15	5 Social Political Philosophy  Student becomes familiar with advanced contemporary social political theories  Or  5 Philosophy of Physics and Cosmology  The recent developments in contemporary physics and cosmology together with philosophical application are introduced.



### Program Outcome of M. Phil. (Philosophy)

	<b>3 Course Outcome :- Course Outcome are mentioned in the syllabus before the description of each course.</b>
	<b>M.PHIL.</b>
<b>COs1</b>	<b>M.PHIL Semester 1</b> <b>1 Research methodology</b> <b>The student gets the basic tools and theories of research with particular emphasis on philosophical research. This enable meaningful research.</b>
<b>COs1</b>	<b>M.PHIL semester 1</b> <b>2 Advanced mathematical logic</b> <b>Here the advanced and recently discussed at international level theories and concepts of mathematical logic are mastered by the students researcher.</b>
<b>COs1</b>	<b>M.PHIL. semester 2</b> <b>1 Indian Dialectic</b> <b>The student masters the methods and techniques of the rich tradition of Indian Dialectic which enables him to do research in Indian logic, epistemology and metaphysics.</b>

## Program Specific Outcome of M.Phil. (Physics)

Name of Programme: **M.Phil.**

Subject: **PHYSICS**

Course (Paper) Name & No.: **RESEARCH METHODOLOGY IN PHYSICS : PAPER-1**

**Course outcome:**

**CO1:** Strengthening Foundations of research methodology in the subject of Physics

**CO2:** Introducing thrust areas of research of the Department

**CO3:** Fundamental course on prerequisites for higher studies in materials science and Space Physics

Name of Programme: **M.Phil.**

Subject: **PHYSICS**

Course (Paper) Name & No.: **ADVANCES IN PHYSICS : PAPER-2**

**Course outcome**

**CO1:** Strengthening Foundations of research methodology in the subject of Physics

**CO2:** Introducing thrust areas of research of the Department

**CO3:** Fundamental course on prerequisites for higher studies in materials science and Space Physics

**M.Phil (Physics) Semester – 2**

**Paper – 2: ADVANCES IN PHYSICS**

**Course Outcome of M.Sc. (Physics)****Semester: 1**

- CT1 Mathematical Physics and Classical Mechanics
- CT2 Solid State Electronic Devices and Circuits
- CT3 Quantum Mechanics - 1
- CT4 Electrodynamics and Plasma Physics

**Semester: 2**

- CT5 Quantum Mechanics - 2 and Statistical Mechanics
- CT6 Atomic and Molecular Physics
- CT7 Space Physics
- CT8 Solid State Physics

**Semester: 3**

- CT9 Nuclear and Particle Physics
- CT10 Physics and Chemistry of Nanomaterials

Six Elective Theory Papers: (a student has to select any two out of the following)

- ET1 Synthesis of Materials
- ET2 Physics of ionosphere-magnetosphere system

ET3	Space Technology
ET4	Analog and Digital Systems
ET5	Nuclear Radiation Detectors & Accelerators
ET6	Neutron Physics and Nuclear Reactor Theory

#### Semester: 4

CT11	Numerical Analysis and Computer Programming
CT12	Experimental Techniques with interdisciplinary applications

Six Elective Theory papers: (a student has to select any two)

ET7	Materials Characterization
ET8	Functional Materials
ET9	Remote sensing and Applications
ET10	Pulse & Microwave Electronics
ET11	Electronic Communications
ET12	Nuclear Reactions, Nuclear Energy and Nuclear Models

**FACULTY OF SCIENCE**  
**M. Sc. (Physics) Semester-I**

**Core Paper: CT-1: Mathematical Physics and Classical Mechanics**

#### Course outcome:

**CO1:** Ability developed to solve homogeneous and inhomogeneous differential equation



- CO2:** Ability developed to solve integral and inverse Fourier and Laplace transforms
- CO3:** Ability developed to use integral and differential equations of orbits to different astronomical and scattering problems
- CO4:** Ability achieved to apply canonical transformations and Hamilton Jacobi equation to various Physical problems, i.e., harmonic oscillator, etc.
- CO5:** In depth knowledge of pseudo forces, i.e., Coriolis Force, etc., and their existence due to rotation of Earth and related phenomenon observed on Earth.

**FACULTY OF SCIENCE**  
**M. Sc. (Physics) Semester-I**

**Course outcome:**

- CO1:** A student shall be able to explain the physics of various optoelectronic devices
- CO2:** A student shall be able to explain characteristics and applications of various solid state Electronic devices
- CO3:** A student shall be able to design combinational logic circuit and implement by using suitable hardware

**FACULTY OF SCIENCE**  
**M. Sc. (Physics) Semester-I**

**Core Paper: CT-3: Quantum Mechanics – I (CT-3)**

**Syllabus**

**Course outcome:**

- CO1:** Ability developed to solve one dimensional and three dimensional harmonic oscillator differential equations by power series method. Apply this to understand hydrogen spectrum.
- CO2:** Ability to derive angular momentum operators and spherical harmonics with polar diagrams
- CO3:** Ability to derive the time independent and time dependent perturbation equations and apply to explain different phenomenon
- CO4:** Ability to apply approximation methods to understand various phenomenon, estimate ground state energy, etc.

**FACULTY OF SCIENCE  
M. Sc. (Physics) Semester-I**

**Core Paper: CT-4: Electrostatics and Plasma Physics**

**Syllabus**

**Course outcome:**

- CO1:** Electrostatics and plasma physics belong to basic research disciplines that have many different areas of applications; students will be well acquainted with fundamental and applied aspects
- CO2:** A student shall be equipped with strong foundations of electrostatics and plasma physics which will help to understand theories of communication electronics, dielectrics, radio wave propagation and various properties of plasma

**FACULTY OF SCIENCE  
M. Sc. (Physics) Semester-II**

**Core Paper: CT-5: Quantum Mechanics – II and Statistical Mechanics**

**Course outcome:**

- CO1:** Understanding the concepts of various ensembles in classical and quantum statistics and applicability
- CO2:** Super fluid nature of liquid helium and understanding of various phenomena
- CO3:** Ability to use Ising model to explain magnetism, lattice gas, and binary alloys
- CO4:** Ability to apply Born approximation to different scattering problems, i.e., square well potential and Yukawa Potentials, etc.
- CO5:** Ability to understand scattering by Born approximation, Eikonal approximation, Partial Wave analysis and solve problems.

**FACULTY OF SCIENCE  
M. Sc. (Physics) Semester-II**

**Core Paper: CT-6: Atomic and Molecular Physics**

**Course outcome:**

**CO1:** To understand the basic mechanism taking place inside the atom and molecule.

**CO2:** To understand the spectrum of Hydrogen like species, molecular structure and Spectroscopy.

**CO3:** To distribute electrons in elements and to analyze/interpret rotational and vibrational spectra.

**FACULTY OF SCIENCE  
M. Sc. (Physics) Semester-II**

**Core Paper: CT-7: Space Physics**

**course outcome:**

**CO1:** Students will get basic knowledge of atmospheric science and also learn the techniques of observations

**CO2:** Some introduction to remote sensing will make them realize the importance and applications of it

**FACULTY OF SCIENCE  
M. Sc. (Physics) Semester-II**

**Core Paper: CT-8: Solid State Physics**

**Course outcome:**

**CO1:** Knowledge and understanding of solid state materials for their basic properties and possible technological applications

**CO2:** The use of fundamental properties and other well developed mechanisms / theories of solid state materials for their better applications in various technological fields

**CO3:** Development of transferable knowledge and explanation capabilities in master degree physics students for their better career point of views in research and academic fields

**M. Sc. (Physics) Semester-III**

**Core Paper: CT-9: Nuclear and Particle Physics**

**Syllabus**

**Course outcome:**

**CO1:** Understand the basic nuclear properties and phenomena

**CO2:** Understand the nuclear transformations

**CO3:** Understand the nuclear reactions mechanism

**CO4:** Understand about the elementary particles and their quantum numbers

**FACULTY OF SCIENCE  
M. Sc. (Physics) Semester-III**

**Core Paper: CT-10: Physics and Chemistry of Nanomaterials**

**Course outcome:**

**CO1:** A student will have clear basic concepts of nano-structured materials

**CO2:** It is expected to train the students for synthesis of various nano-materials, various characterization methods and applications

**CO3:** A student will be able to appreciate the importance of nano-materials in regard to numerous applications

**FACULTY OF SCIENCE  
M. Sc. (Physics) Semester-III**

**Elective Paper: ET-1:**

**Synthesis of Materials**

**Course outcome:**

**CO1:** The students will be able to carry out laboratory experiments under guidance for synthesis of bulk and nano-materials by ceramic and wet-chemical methods

**CO2:** The students will be able to implement any of the techniques for crystal growth under expert supervision

**CO3:** The students will be well acquainted with the various techniques of thin film deposition.

**FACULTY OF SCIENCE  
M. Sc. (Physics) Semester-III**

**Elective Paper: ET-2:**

**Physics of Ionosphere-Magnetosphere System**

**Course outcome:**

**CO1:** The Students will understand the dynamics of the different parts of the atmosphere. They will get the idea about how to monitor and interpret the atmospheric changes

**CO2:** The students will also get exposure to the instrumental techniques for ionospheric studies, observations and data analysis, this will give them thorough idea about the various atmospheric phenomena.

**FACULTY OF SCIENCE  
M. Sc. (Physics) Semester-III**

**Elective Paper: ET-3:**

**Space Technology**

**Course outcome:**

**CO1:** Students will understand the basic laws of Physics governing the satellites in its orbits.

**CO2:** How the power is generated in space? Powers storage devices and deep space requirements will be very interesting for them. Students will also learn about the ground and space based observation techniques.

**FACULTY OF SCIENCE  
M. Sc. (Physics) Semester-III**

**Elective Paper: ET-4: Analog and Digital Systems**

**Course outcome:**

**CO1:** The students will be able to explain the functioning of various operational amplifier based circuits including filters

**CO2:** The students will be able to design and implement various digital combinational and sequential circuits including ADC/DAC.

**FACULTY OF SCIENCE  
M. Sc. (Physics) Semester-III**

**Elective Paper: ET-5: Nuclear Radiation Detectors & Accelerators**

**Syllabus**

**Course outcome:**

**CO1:** The students will be able to explain the functioning of various types of radiation detectors including high energy particle detectors

**CO2:** The students will acquire in-depth knowledge in the area of nuclear particle accelerators

**Semester-3**  
**FACULTY OF SCIENCE**  
**M. Sc. (Physics) Semester-III**

**Elective Paper: ET-6: Neutron Physics and Nuclear Reactor Theory**

**Course outcome:**

- CO1:** The students will be able to the interaction of neutrons with matter, moderation of neutrons and neutron diffusion
- CO2:** The students shall acquire fundamental knowledge of reactor physics and also be aware about the radiation hazards

**FACULTY OF SCIENCE**  
**M. Sc. (Physics) Semester-IV**

**Core Paper: CT-11: Numerical Analysis and Computer Programming**  
**Syllabus**

**Course outcome:**

- CO1:** The students will be able to explain various methods of numerical analysis taught in units: 1 – 3
- CO2:** The students will learn the capabilities of FORTRAN language. The students will be able to write computer programme in FORTRAN language for solving numerical problems and curve fitting

**FACULTY OF SCIENCE**  
**M. Sc. (Physics) Semester-IV**

**Core Paper: CT-12: Experimental Techniques with Interdisciplinary Applications**

**Course outcome:**

- Students will be able to explain principle, characteristics and applications of different types of radiation detectors

- Students will be able to explain the instrumentation of X-ray generation and X-ray spectroscopy and applications
- Students will be able to explain different types of Spectroscopic characterizations and their applications

**FACULTY OF SCIENCE  
M. Sc. (Physics) Semester-IV**

**Elective Paper: ET-7:**

**Materials Characterization**

**Course outcome:**

**CO1:** After taking up the course on materials characterizations, the students shall be able to explain the principle, instrumentation and application of each technique learnt.

**CO2:** The students will also wisely select the required characterization technique for study of specific material property

**FACULTY OF SCIENCE  
M. Sc. (Physics) Semester-IV**

**Elective Paper: ET-8:**

**Functional Materials**

**Course outcome:**

**CO1:** After taking up this elective course, the students will be able to appreciate the necessity of acquiring knowledge of various functional materials in order to select a material for intended specific application

**CO2:** The students will be motivated for research in the area of functional materials as they will have the required prerequisite knowledge.



**FACULTY OF SCIENCE**  
**M. Sc. (Physics) Semester-IV**

**Elective Paper: ET-9: Elective Theory Paper: Remote sensing and Applications**

**Course outcome:**

**CO1:** Students will have thorough idea about the various types of camera and sensors used in remote sensing.

**CO2:** They will also be able to understand the defects and its solutions in the space borne images.

**CO3:** Students will be able to interpret the remote sensing images for different aspects.

**Semester-4**

**FACULTY OF SCIENCE**  
**M. Sc. (Physics) Semester-IV**

**Elective Paper: ET-10: Pulse & Microwave Electronics Syllabus**

**Course outcome:**

**CO1:** After taking up the course on pulse and microwave electronics, the students will be able to design the required pulse circuits and explain operation of microwave tubes, microwave solid state devices, types of antenna and RADAR

**FACULTY OF SCIENCE**  
**M. Sc. (Physics) Semester-IV**

**Elective Paper: ET-11: Electronic Communication**

**Course outcome:**

**CO1:** The students taking up this elective course on electronic communication shall be able to understand the intricacies involved in the wire-less electronic communication like using ionosphere/troposphere, LOS, satellite communication and digital modulation.

**CO2:** The students will be able to explain theoretical aspects of electronic communication with some medium like transmission line, waveguide and fiber optic cables.

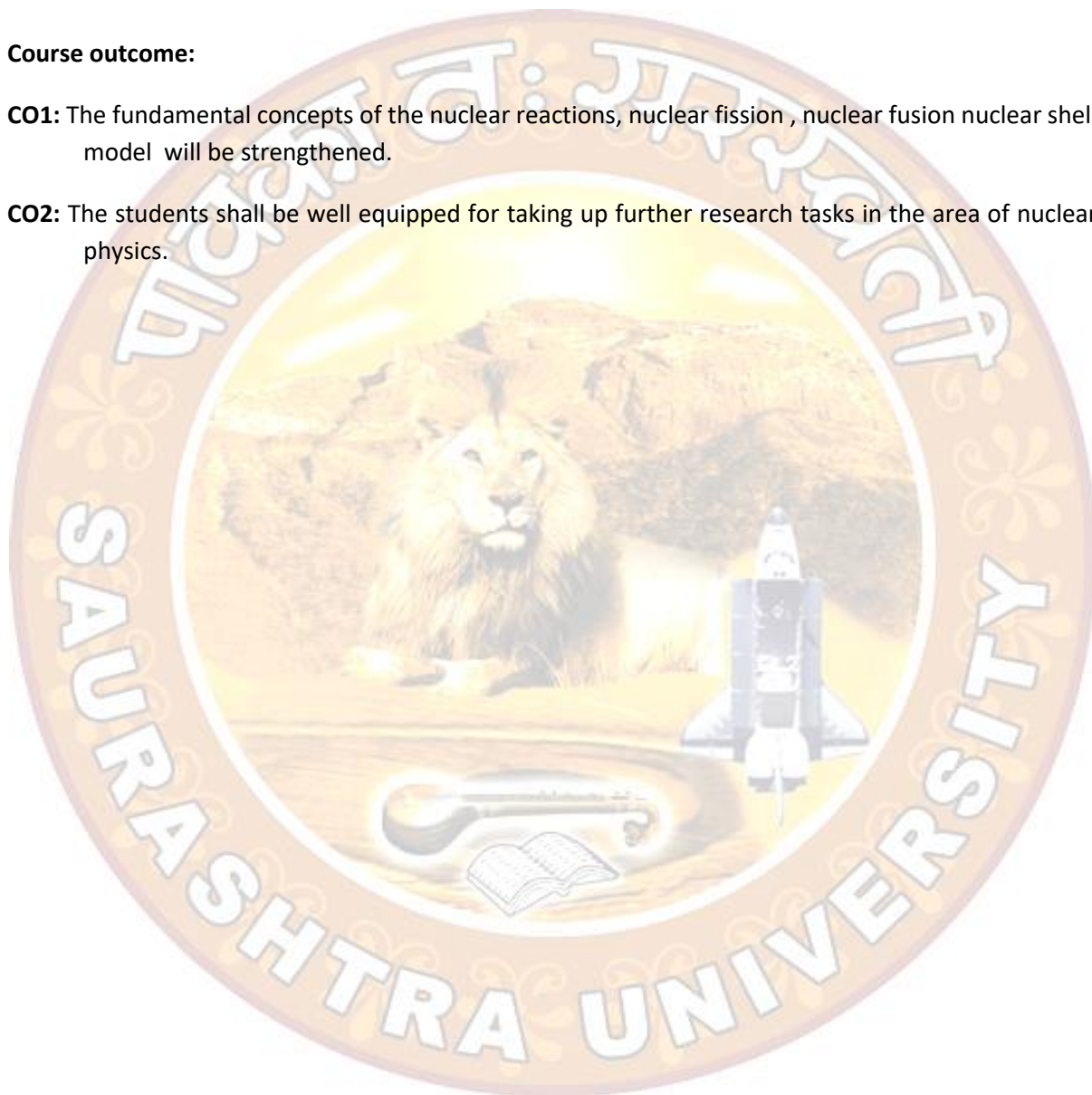
**FACULTY OF SCIENCE**  
**M. Sc. (Physics) Semester-IV**

**Elective Paper: ET-12: Nuclear Reactions, Nuclear Energy and Nuclear Models**

**Course outcome:**

**CO1:** The fundamental concepts of the nuclear reactions, nuclear fission , nuclear fusion nuclear shell model will be strengthened.

**CO2:** The students shall be well equipped for taking up further research tasks in the area of nuclear physics.



## Course Outcome of M.A. (Psychology)

Course (Paper) Name & No: **ADVANCED EXPERIMENTAL PSYCHOLOGY THEORY / CCT-01**

**Course Outcomes:** This course should help Students:

- CO1: Able to Understand the rationale, strengths and limitations of the experimental method of Gaining knowledge about mental and behavioral processes; learn how to do experimental and non-experimental studies.
- CO2: Able to use the various methods used in experimental psychology, including those for humans, both instrument and non-instrument based.
- CO3: Able to use Psychology and other information sources.
- CO4: Able to apply APA ethical guidelines in research with humans and animals.
- CO5: Able utilizes scientific methods to answer which factors influences on people's behavior and mind.
- CO6: Able to Understand Transfer of learning
- CO7: Able to Describe general taxonomic of experimental psychology
- CO8: Gaining knowledge about mental and behavioral processes
- CO9: Describe Experimental Methods, Design and report writing
- CO10: Know about Attention and its meaning, characteristics, types etc.
- CO11: Understand Conditioning

Course (Paper) Name & No: **RESEARCH PROCESSES IN PSYCHOLOGY /CCT-02**

**Course Outcomes:** This course should help Students

- CO1: Understand the fundamental knowledge of research methods and design used in psychology.
- CO2: Able to understanding for how using valid scientific methods can improve and create knowledge in the field of psychology.
- CO3: Guide and mentor students in developing, completing, writing, and presenting a valid and ethical psychology experiment.
- CO4: Able to enhanced postgraduate research experience
- CO5: Know about various aspects of the research process
- CO6: Framing useful research questions, research design, data collection, analysis, writing and presentation.
- CO7: Understand Types of research, research problem and variable
- CO8: Developing, completing, writing, and presenting valid and ethical tools

Course (Paper) Name & No: **INTRODUCTION TO COGNITIVE PSYCHOLOGY/CCT-03**

**Course Outcomes:** This course should help Students

- CO1: Able to research on human cognitive abilities

CO2: To expose students to recent findings and ideas concerning the neural bases of cognitive functions, particularly to those provided by neuropsychology and functional neuroimaging research.

CO3: To train students in reading original articles in experimental cognitive psychology.

CO4: Able to scientific study of mind as an information processor.

CO5: Able to involves the study of all the process that persists inside in brain

CO6: Encompasses many aspects like attention, formation of knowledge, memory, reasoning, problem solving, decision making etc

CO7: It is helpful for linguistics, neuroscience, psychiatry, education, philosophy, anthropology, biology, physics and computer science.

CO8: Understand Meaning and nature of learning and its theories

Course (Paper) Name & No: **HEALTH PSYCHOLOGY/ ECT-01**

**Course Outcomes:** This course should help Students

CO1: Able to know about Health behavior, health habits and Health enhancing behavior

CO2: Able to learn Advancing and terminal illness

CO3: Able to know about interface between biology, behavior, and social context.

CO4: Able to know about variety of activities ranging from basic and clinical research, through education, and clinical service

CO5: Understand AIDS and Cancer and its impact

Course (Paper) Name & No: **ADVANCED SOCIAL PSYCHOLOGY/ECT-01**

**Course Outcomes:** This course should help Students

CO1: Able to develop an understanding about one's-self, how people think about, influence and relate to one another

CO2: To orient them to the dynamics of attraction, love and aggression, and application of the principles of social psychology in different fields.

CO3: Able to scientific study of how people's thoughts, feelings, and behaviors are influenced by the actual, imagined, or implied presence of others

CO4: An understanding about one's-self, how people think about, influence and relate to one another

CO5: Describe about different societies and its norms

CO6: Understand Group conflict and social conflict

Co7: Understand about Analysis Aggression and social Violence

Course (Paper) Name &No: **BASIC PSYCHOLOGY OF EMOTION /ECT-02**

**Course Outcomes:** This course should help Students

CO1: Able to understand the basic issues and state-of- the art knowledge in the field of emotions.

CO2: To acquaint students to the neurophysiologic bases of emotion.

CO3: understanding of bodily changes in emotion and measurements of emotions.

CO4: able to Learn Emotional Intelligence

CO5: able to how to react in situation

- CO6: Able to know about Positive and negative emotions and measurement of emotion
- CO7: Able to Discuss about basic issues in the study of emotions
- CO8: Able to Describe physiological bases of emotions
- CO9: Able to Understand measurement of Emotions

Course (Paper) Name & No: **PSYCHOLOGY OF ADOLESCENCE/ECT-02**

**Course Outcomes:** This course should help Students

- CO1: The focus of this course is an advanced examination of the processes, contexts, and clinical issues associated with adolescent development.
- CO2: There will be an emphasis on understanding normal developmental processes as well as the contexts which compromise adolescent mental health and wellbeing.
- CO3: understanding of the adolescent developmental issues (e.g., factual , methods, principles, generalizations, theories),
- CO4: Learning to apply course material to your work (to improve thinking, problem solving, and decisions)
- CO5: Able to Describe Adolescence and its age
- CO6: Able to Analysis about problems of adolescence
- CO7: Able to Learn how to cope with conflict situation
- CO8: Able to Psychological intervention of issues of gender related

Course (Paper) Name & No: **PRACTICAL PSYCHOLOGY/CCT-04**

**Course Outcomes:** This course should help Students

- CO1: Able to conducting experiments on various subjects of psychology.
- CO2: To acquaint students with the administration, scoring and interpretation of various psychological tests.
- CO3: To Understand Conducting experiments on various subjects of psychology
- CO4: To Describe scoring and interpretation of various psychological tests

Course (Paper) Name & No: **THEORIES OF COGNITIVE PSYCHOLOGY/CCT-06**

**Course Outcomes:** This course should help Students

- CO1: Able to research on human cognitive abilities
- CO2: To expose students to recent findings and ideas concerning the neural bases of cognitive functions, particularly to those provided by neuropsychology and functional neuro images research.
- CO3: To train students in reading original articles in experimental cognitive psychology.
- CO4: Understand meaning and its stages
- CO5: Able to Describe nature of forgetting
- CO6: Able to Understand Definition and nature of intelligence and its tests
- CO7: Able to Understand Thinking, problem solving
- CO8: Know about creativity

Course (Paper) Name & No: **REHABILITATION PSYCHOLOGY/ECT-03**

Course Outcomes:

- CO1: Disability sector is one of the areas that has been especially overlooked by social scientists. It is need of the time to acquire knowledge about Professional issues regarding understanding the disabled, its causes, concerns, management and intervention. The present paper aims at providing the same.
- CO2: Learn As one of the oldest psychology specialties active in interdisciplinary medical centers and health and public policy
- CO3: Focuses on the optimal adjustment of individuals with disabilities, their families, and primary support systems.
- CO4: Learner knows the concept of disability, personality, factors affect on disabilities.
- CO5: Understand Personality Development of disabled person and intervention.
- CO6: Understand psychological intervention

Course (Paper) Name & No: **PSYCHOLOGY OF INDIAN PROBLEMS/ ECT-03**

**Course Outcomes:** This course should help Students

- CO1: To acquaint students with the concepts of Indian problems.
- Co2: To familiarize students with the problems of Indian.
- CO3: To acquaint students with modern problems.
- CO4: To introduce concept and types of Indian problems phenomenon.
- CO5: To acquaint students with correlates/ consequences of Indian problems.
- CO6: Able to Discuss about the concepts of Indian problems
- CO7: Familiarize students with the Indian problems
- CO8: Focus on issues of societies
- CO9: Understand social psychology, social problems, social systems in India
- CO10: Discuss social problems like poverty, Deprivation, anti social behaviour, Domestic violence etc.

Course (Paper) Name & No: **STRESS AND STRESS MANAGEMENT/ECT-04**

**Course Outcomes:** This course should help Students

- CO1: To Introduce students to the role of moderating variables in Stress/well-being linkage
- CO2: To identify and evaluate the relative efficacy of various cognitive and behavioral interventions for coping with stress in its various forms and manifestation
- CO3: Able To Practice a wide range of Stress Management Techniques and evaluate their effectiveness in dealing with own personal challenges.
- CO4: To introduce concept, types and sources of stress phenomenon.
- CO5: To acquaint students with correlates/ consequences of stress.
- CO6: To acquaint students with measurements of various types of stress.
- CO7: Able to Recognize the stressor and its different effect
- CO8: Able to know about How to deal with Stress
- CO9: Able to Classify different factors of stress

CO10: Understand Psychological skills for reduce stress

CO11: Know about stress and psychological health

Course (Paper) Name & No: **PSYCHOLOGICAL THEORIES OF EDUCATION /ECT-04**

**Course Outcomes:** This course should help Students

CO1: To acquaint students with the general concepts of learning theory;

CO2: To review, understand, and critique research related to theories of learning.

CO3: To provide students the opportunity to engage in critical analysis of theories through class discussion and class assignments.

CO4: To give students opportunities to think about how to apply course material into their personal philosophy and future practice.

CO5: Recognize theories and methods of Education

CO6: Able to Classify Different approaches of Education

Course (Paper) Name & No: **PSYCHOLOGY OF BRAIN PROBLEMS/CCT-07**

**Course Outcomes:** This course should help Students

CO1: To acquaint the students with, this course is to cater to knowledge in the area of brain and behavior.

CO2: The emphasis of this course lies on the study of patients with neurological disorders for assessment, diagnosis, intervention and rehabilitation.

CO3: Knowledge about brain, behavior and Discuss about physiological neuro systems

CO4: Understand frontal lobe & parietal lobe syndromes

CO5: Knowledge about occipital lobe & Temporal lobe

Course (Paper) Name & No: **PSYCHO-DIAGNOSTICS METHODS/CCT-08**

**Course Outcomes:** This course should help Students

CO1: To know them with the process of Psycho-diagnostics.

CO2: Understand the theoretical foundation of Various Psycho-diagnostics methods.

Co3: Understand of Various Projective Techniques as a diagnostic Methods.

CO4: able to apply their theoretical knowledge to different setting requiring Psycho-diagnostics methods.

CO5: Understand history and scope of psycho- diagnostics

CO6: Knowledge about projective techniques

Course (Paper) Name & No: **MODELS OF PSYCHO-PATHOLOGY/CCT-09**

**Course Outcomes:** This course should help Students

CO1: Be familiar with and able to discuss several different theoretical perspectives in the general field of psychopathology as well as the empirical support for these theories.

CO2: able to apply these theoretical perspectives in reviewing each of the psychopathological conditions covered in the course.

CO3: able to discuss the DSM-IV multiracial classification of mental disorders and the criteria for diagnosing these disorders.

CO4: able to apply the DSM-IV classification system in determining the appropriate diagnosis of clinical cases.

CO5: knowledge about psychopathology to apply in formulating appropriate and effective intervention strategies to treat a broad spectrum of psychopathological conditions.

Course (Paper) Name & No: **BEHAVIOR MODIFICATION/ECT-05**

**Course Outcomes:** This course should help Students

- CO1: To understand Behavior Modification: Foundations
- CO2: Able to Classical and Social conditioning
- CO3: know Operant Conditioning techniques
- CO4: understand to Cognitive behavior modification techniques

Course (Paper) Name & No: **WORK PLACE COUNSELLING/ECT-05**

**Course Outcomes:** This course should help Students

- CO1: To understand Work place counseling concept
- CO2: able to Individual employee counseling
- CO3: To understand Stress at workplace
- CO4: understand Group Counseling and Industrial Counseling
- CO5: Understand work place counseling and training of work place counseling

Course (Paper) Name & No: **THEORIES OF PSYCHOLOGY-I /ICT-01**

**Course Outcomes:** This course should help Students

- CO1: Students will acquire the requisite knowledge in the core domain of psychology, including social, biological, developmental, cognitive/affective bases of behavior, and history and system, which are required to be a competent psychologist.
- CO2: Students will utilize psychological theory and the empirical literature to guide their research and clinical practice.
- CO3: Able to Describe social, biological, developmental, cognitive bases of behavior
- CO4: Able to Describe empirical literature to guide their research
- CO5: Able to Understand theory construction
- CO6: Understand Conditioning and objective psychology

Course (Paper) Name & No: **POSITIVE PSYCHOLOGY/ICT-01**

**Course Outcomes:** This course should help Students

- CO1: Able to Understand concepts of positive psychology
- CO2: Able to explore what makes people happy.
- CO3: To equip students to enhance subjective well-being.
- CO4: Discuss concepts of positive psychology
- CO5: Able to Enhance subjective wellbeing



- CO6: Understand positive psychology and its basic areas  
 CO7: Understand positive emotions states and process  
 CO8: Know about pro social behaviour and well being

Course (Paper) Name & No: **ASSESSMENT AND TREATMENT OF BRAIN/CCT-10**

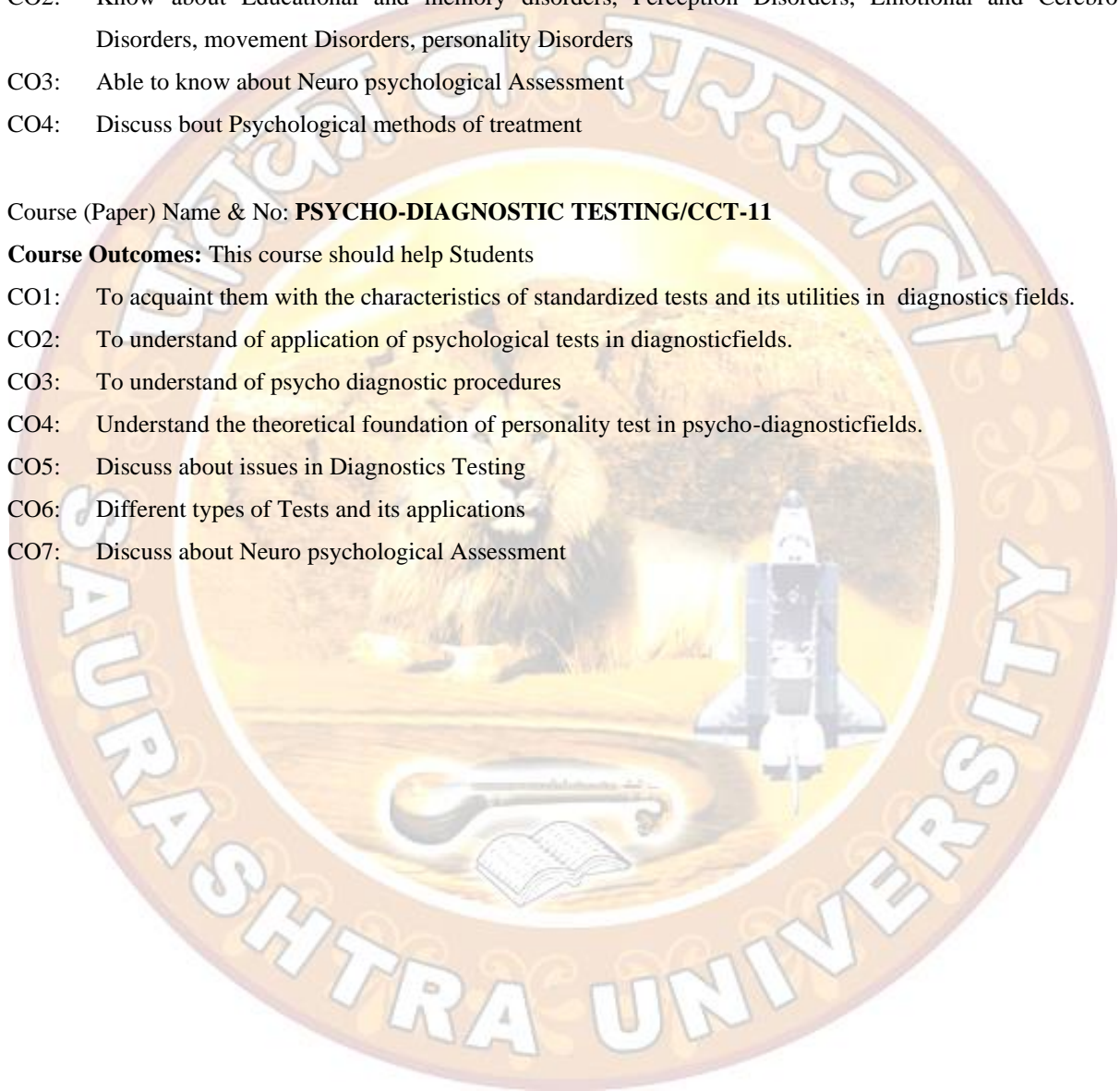
**Course Outcomes:** This course should help Students

- CO1: Able to Discuss about Hemispheric Asymmetry of functions  
 CO2: Know about Educational and memory disorders, Perception Disorders, Emotional and Cerebro Disorders, movement Disorders, personality Disorders  
 CO3: Able to know about Neuro psychological Assessment  
 CO4: Discuss bout Psychological methods of treatment

Course (Paper) Name & No: **PSYCHO-DIAGNOSTIC TESTING/CCT-11**

**Course Outcomes:** This course should help Students

- CO1: To acquaint them with the characteristics of standardized tests and its utilities in diagnostics fields.  
 CO2: To understand of application of psychological tests in diagnosticfields.  
 CO3: To understand of psycho diagnostic procedures  
 CO4: Understand the theoretical foundation of personality test in psycho-diagnosticsfields.  
 CO5: Discuss about issues in Diagnostics Testing  
 CO6: Different types of Tests and its applications  
 CO7: Discuss about Neuro psychological Assessment



Course (Paper) Name & No: **PSYCHOPATHOLOGY/CCT-12**

**Course Outcomes:** This course should help Students

- CO1: Be familiar with and able to discuss several different theoretical perspectives in the general field of psychopathology as well as the empirical support for these theories.
- CO2: Be able to apply these theoretical perspectives in reviewing each of the psychopathological conditions covered in the course.
- CO3: Be familiar with and able to discuss the DSM-IV multiaxial classification of mental disorders and the criteria for diagnosing these disorders.
- CO4: Be able to apply the DSM-IV classification system in determining the appropriate diagnosis of clinical cases.
- CO5: Have a substantial foundation of knowledge about psychopathology to apply in formulating appropriate and effective intervention strategies to treat a broad spectrum of psychopathological conditions.
- CO6: Able to Discuss about Nature and types of anxiety Disorders
- CO7: Understand Nature of Dissociative Disorders
- CO8: Discuss about Psycho somatic Disorder
- CO9: Understand Nature of Personality Disorder
- CO10: Able to Discuss about Schizophrenia
- CO11: Able to Classify cognitive Disorders

Course (Paper) Name & No: **PSYCHOTHERAPEUTICS /ECT-06**

**Course Outcomes:** This course should help Students

- CO1: Understand Various Psychotherapies and its basic Procedure.
- CO2: Learn Effectiveness of specific psychotherapy in solution of particular problem.
- CO3: Understand Different psychotherapeutic skills.
- CO4: Understand Different Psychotherapies
- CO5: Discuss about Adlerian therapy and Existential Therapy
- CO6: Know about Person Centered and Family therapy
- CO7: Understand CBT

Course (Paper) Name & No: **THEORIES OF PSYCHOLOGY-II/ICT-02**

**Course Outcomes:** This course should help Students

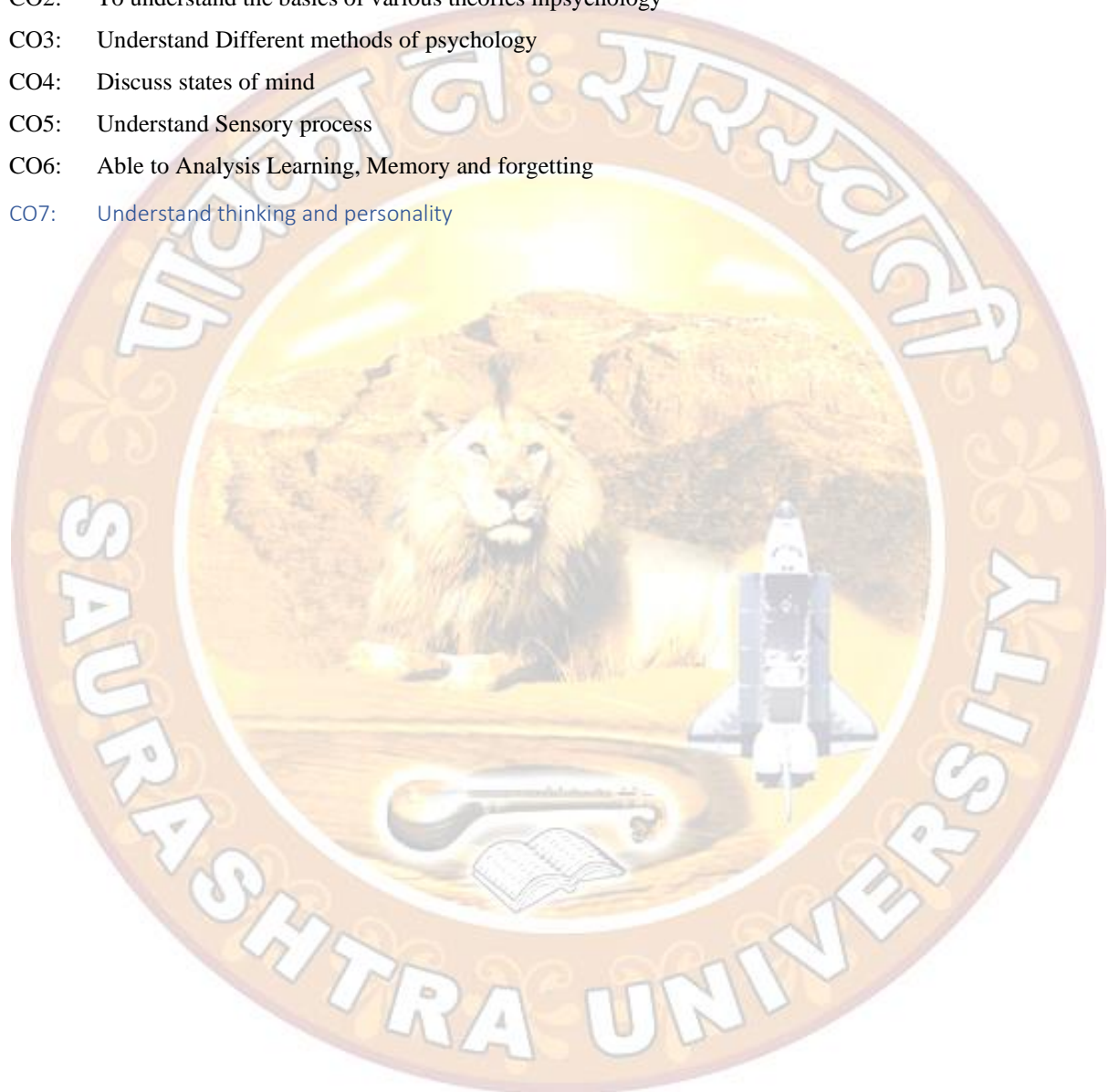
- CO1: Students will acquire the requisite knowledge in the core domain of psychology, including social, biological, developmental, cognitive/affective bases of behavior, and history and system, which are required to be a competent psychologist.
- CO2: Students will utilize psychological theory and the empirical literature to guide their research and clinical practice.
- CO3: To introduce the alternative voices in the discipline of psychology.
- CO4: Discuss about Gestalt and Field Theory

- CO5: Understand Psychoanalysis and individual Psychology  
CO6: Classify new theories in sociological Approach  
CO7: Introduction to Indian Psychology

Course (Paper) Name & No: **ADVANCED GENERAL PSYCHOLOGY/ ICT-02**

**Course Outcomes:** This course should help Students

- CO1: To familiarize the students with the concepts of basic psychological processes  
CO2: To understand the basics of various theories in psychology  
CO3: Understand Different methods of psychology  
CO4: Discuss states of mind  
CO5: Understand Sensory process  
CO6: Able to Analysis Learning, Memory and forgetting  
CO7: Understand thinking and personality



## Program Outcome of M.A. (Psychology)

### Course (Paper) Name & No.: RESEARCH METHODOLOGY & STATISTICS/ CCT-01

#### Course Outcomes:

- CO1: To acquaint students with various aspects of research process in psychology.
- CO2: To acquaint students with various statistically techniques required to analyze the data of research.
- CO3: Understand research methodology and sample design and its meaning
- CO4: Able to Discuss features of good design
- CO5: Know about factorial Design
- CO6: Understand Psychological tests and its types

### Course (Paper) Name & No: PERSONALITY MEASUREMENT/ ECT-01

#### Course Outcomes:

- CO1: To familiarize students with the key approaches to the study of personality.
- CO2: To help students understand the various approaches to measure personality.
- CO3: To acquaint students with the procedure of construction, administration and interpretation while using various tools to measure personality.
- CO4: Understand meaning, dimensions of personality and history of personality Measurement
- CO5: Discuss about Theoretical approaches of personality
- CO6: Analysis of projective techniques
- CO7: Know about projective technique

### Course (Paper) Name & No.: MAIN THEORIES OF PSYCHOLOGY/ECT-01

#### Course Outcomes:

- CO1: Define the terms phenomenon and theory and distinguish clearly between them.
- CO2: Explain the purposes of scientific theories.
- CO3: Explain why there are usually many plausible theories for any set of phenomena.
- CO4: To acquaint students with various theory of psychology.
- CO5: Understand about theories of perception and attention
- CO6: Knowledge about Learning and memory

CO7: Able to Analyze about motivation and emotions theories

CO8: Understand theories of intelligence and personality

Course (Paper) Name & No: **PEACE PSYCHOLOGY/ ECT-01**

**Course Outcomes:**

CO1: To become more knowledgeable concerning the core concepts and methods involved in peace psychology.

CO2: To become familiar with various forms of direct violence ranging from intimate violence to mass violence and war

CO3: To examine the concept of structural violence and its impact on individuals, groups, and communities

CO4: To become familiar with the importance of and the strategies involved in understanding the various aspects of conflict including partisan perceptions

CO5: To examine the nature of conflict resolution including the psychological dimensions associated with peacekeeping and peacemaking for all parties involved in a conflict.

CO5: To examine the psychological aspects of peace building as individuals, groups, and communities move from intervention to reconciliation and reconstruction.

CO6: Knowledge about peace psychology, scope, thoughts of Gandhi and ambedkar

CO7: Knowledge about Direct violence and psychological roots of terrorism

CO8: Knowledge about Structural violence, globalizations and its impact

Course (Paper) Name & No: **PSYCHOLOGY OF COUNSELLING AND GUIDANCE/ECT-02**

**Course Objectives:**

CO1: Develop an understanding of the concepts of guidance and counseling.

CO2: Acquire the skills necessary for counseling.

CO3: Know about different areas of counseling.

CO5: Create awareness about working of guidance organizations.

CO6: Know about the basic needs of guidance services.

CO7: Develop the knowledge about different fields of Guidance & Counseling.

CO8: Know about the necessity of Career Guidance & Counseling

CO9: Understand Professional preparation and training for counseling

Course (Paper) Name & No.: **PSYCHOLOGICAL THEORIES OF LEARNING AND VALUE EDUCATION**

**Course Objectives:**

CO1: To acquaint students with the general concepts of learning theory;

CO2: To review, understand, and critique research related to theories of learning;

CO3: To provide students the opportunity to engage in critical analysis of theories through class discussion and class assignments;

Co4: To give students opportunities to think about how to apply course material into their personal philosophy and future practice.

**CO5:** Understand methods and theories of learning and education techniques

CO6: Understand Value oriented education

Course (Paper) Name & No: **ORGANIZATIONAL BEHAVIOUR/ ECT-02**

**Course Objectives:**

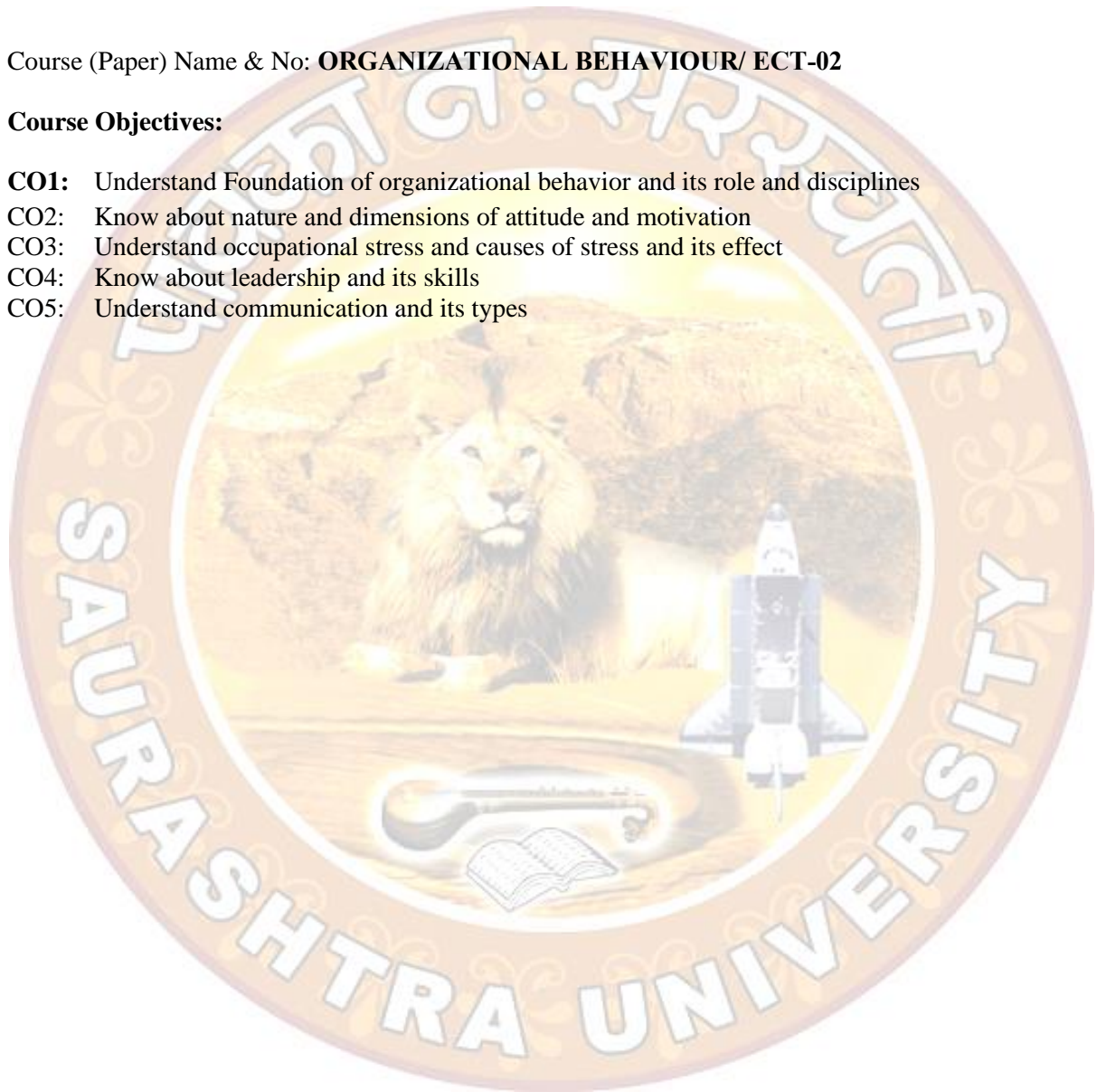
**CO1:** Understand Foundation of organizational behavior and its role and disciplines

CO2: Know about nature and dimensions of attitude and motivation

CO3: Understand occupational stress and causes of stress and its effect

CO4: Know about leadership and its skills

CO5: Understand communication and its types



## Course Outcome of M.Phil. (Sanskrit)

**Course (Paper) Name & No.: Research Methodology and Textual Criticism - CCT-01**

**Course Outcomes:**

CO1 : Acquaintance to the methodology of research

CO2 : Introduction to the types of research in Sanskrit

CO3: Introduction to the textual criticism and importance of critical edition

**Course (Paper) Name & No.: Indian and Western Poetic - CCT-02**

**Course Outcomes :**

CO1 : Introduction of the salient features of schools of Indian Poetics

CO2 : Knowledge of various schools of Literature

CO3 : Ability to evaluate and compare Indian and Western poetics

**Course (Paper) Name & No.: Form of Sanskrit Literature : Rūpaka : Mrchakaṭika of Sūdraka -ECT-01**

**Course Outcomes :**

CO1 : Introduction to the tradition of drama in Sanskrit literature

CO2 : Acquaintance of to the form of drama

CO3 : Comprehension of original Sanskrit text of Mrchakaṭika

**Course (Paper) Name & No.: Form of Literature : Champū : Nalacampū - Uucchavāsa 1 to 3 - ECT-02**

**Course Outcomes :**

CO1 : Acquaintance of the Campū literature

CO2 : Introduction to the form of Campū

CO3 : Comprehension of the original Sanskrit text of Nalacampū

**Course (Paper) Name & No.: Form of Literature : Gadya : Kādambarī of Bānabhaṭṭa ECT-03**

**Course Outcomes :**

CO1 : To acquaint the students to the tradition of prose literature

CO2 : To introduce the form of prose literature

CO3 : To teach the students prose literature through the Sanskrit text of Kādambarī

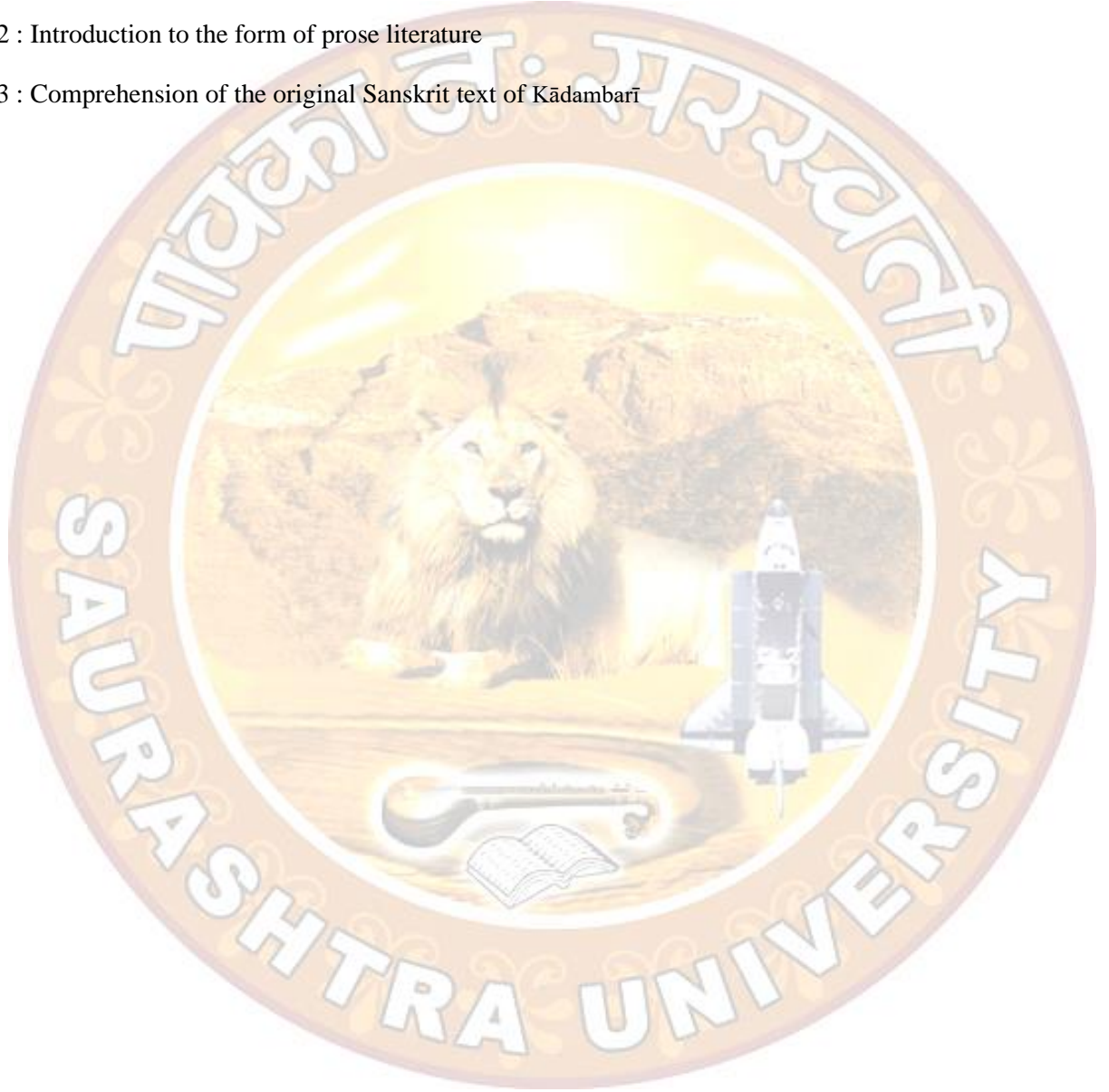
**Course (Paper) Name & No.: Dissertation – CCT-03**

**Course Outcomes**

CO1 : Acquaintance of the tradition of prose literature

CO2 : Introduction to the form of prose literature

CO3 : Comprehension of the original Sanskrit text of Kādambarī





## Course Outcome of M.A. (Sanskrit)

**Course (Paper) Name & No.: Vedic Text and Grammar CCT-01**

**Course Outcomes :**

CO1 : Introduction of some chapters of R̥gveda, Yajurveda and Atharvaveda

CO2 : Introduction of Brahmaṇa Literature

CO3 : Understanding of some features of Vedic Grammar and compare with classical Sanskrit Grammar

**Course (Paper) Name & No.: Classical Epic : Raghuvamśa Canto - 1 and Kirātārjunīya Canto - 1 CCT-02**

**Course Outcomes :**

CO1 : Acquiring knowledge of some portion of Classical Sanskrit epics

CO2 : Introduction of the form of Classical Sanskrit epics

CO3 : Comparison of the style of two great poets Kālidāsa and and Bhāravi

**Course (Paper) Name & No.: Darśana : Tarksaṅgraha and Vedāntasāra CCT-03**

**Course Outcomes**

CO1 : Introduction to the systems of Indian philosophy

CO2 : Comprehension of the text of Tarksaṅgraha of Annambhaṭṭa

CO3 : Comprehension of the text of Vedāntasāra of Sadānanda

**Course (Paper) Name & No. :**

**Alaṅkāraśāstra : Kāvyaṅprakāśa Selected Topics and Sāhityadarpaṇa Pariccheda - 1,4 - ECT-01**

**Course Outcomes :**

CO1 : Introduction to the Sanskrit poetics

CO2 : Compression of some portions from Kāvyaṅprakāśa and Sāhityadarpaṇa

CO3 : Comparison with two great authors of Sanskrit poetics

**Course (Paper) Name & No.: Vedāntasāstra : Vedāntaparibhāṣā and Pañcadaśī Chapter-1 - ECT-01**

**Course Outcomes:**

CO1 : Introduction of the tradition of Vedānta in Sanskrit literature

CO2 : Comprehension of some portion of Adaita Vedānta

CO3 : Understanding of some definitions of Vedānta

**Course (Paper) Name & No.: Introduction to Rāmāyaṇa - ICT-01**

**Course Outcomes:**

CO1 : Introduction to the great epic Rāmāyaṇa

CO2 : Evaluation of Rāmāyaṇa as a source of later Sanskrit literature

CO3 : Understanding of the social elements described in Rāmāyaṇa

**Course (Paper) Name & No. : Vedāṅga: Nirukta Adhyāya 1 and Selected metres CCT-04**

**Course Outcomes:**

CO1 : Understanding the importance of Nirukta as a Vedāṅga

CO2 : Comprehension of the text of Nirukta and principles of etymology

CO3 : Knowledge of the tradition of Sanskrit prosody with the definition of some metres

**Course (Paper) Name & No.: Gadyakāvya : Harṣacarita: Ucchavāsa 5 and Daśakumāracarita : Ucchavāsa 8 CCT-05**

**Course Outcomes:**

CO1 : Acquaintance of the prose literature

CO2 : Comprehension of the text of Harṣacarita and Daśakumāracarita

CO3 : Comparison of the style of Bāṇa Bhaṭṭa and Daṇḍī

**Course (Paper) Name & No. : Grammar : Siddhāntakaumudī, Sañjnā and Kāraka Prakaraṇa CCT-06**

**Course Outcomes:**

CO1 : Acquaintance of the tradition of Pāṇinīya Sanskrit grammar

CO2 : Understanding of the contribution of Bhaṭṭoji Dīkṣita to Sanskrit grammar

CO3 : Comprehension of Sanskrit text of Siddhāntakaumudī

**Course (Paper) Name & No. : Alāṅkāśāstra : Nāṭyaśāstra Adhyāya 2,6 and Daśarūpaka Prakāśa 1,3 ECT-02**

**Course Outcomes:**

CO1 : Introduction of the tradition of dramaturgy in Sanskrit literature

CO2 : Understanding the theory of Rasa according to Bharatamuni

CO3 : Comprehension of the original Sanskrit text of Daśarūpaka of Dhanañjaya

**Course (Paper) Name & No. : Vedāntasāstra : Śāṅkarabhāṣya on Brahmasūtra 1.1.1-4 ECT-02**

**Course Outcomes:**

CO1 : Introduction to the contribution of Śāṅkarācārya to Vedāntasāstra

CO2 : Comprehension of the Śāṅkarabhāṣya on Catuḥsūtrī

CO3 : Evaluation of the style of Śāṅkarabhāṣya

**Course (Paper) Name & No. : Introduction to Mahābhārata - ICT-02**

**Course Outcomes:**

CO1 : Introduction of the great epic Mahābhārata

CO2 : Evaluation of Mahābhārata as a source of later Sanskrit literature

CO3 : Understanding of the social elements described in Mahābhārata

**Course (Paper) Name & No.: Unseen, Essay and Meghadūta (पूर्वमेघ - श्लोक 1 से 20) - CCT-07**

**Course Outcomes:**

CO1 : Ability to translate into Sanskrit

CO2 : Ability to write essay in Sanskrit

CO3 : Ability to understand the commentary on original Sanskrit text

CO4 : Acquiring the skill of translation into Sanskrit some chapters form autography of Mahatma Gandhi

**Course (Paper) Name & No.: Rūpaka – Uttarāmacarita CCT-08**

**Course Outcomes:**

CO1 : Evaluation of the contribution of Bhavabhūti in Sanskrit literature

CO2 : Comprehension of the Sanskrit text of Uttarāmacarita

CO3 : Understanding of the special features of the style of Bhavabhūti

**Course (Paper) Name & No.:**

**Grammar : Mahābhāṣya : Paspasāhnikā and Siddhāntakaumudī : Bhvādīprakaraṇa CCT-09**

**Course Outcomes:**

CO1 : Acquaintance of the tradition of Pāṇinīya Sanskrit grammar

CO2 : Comprehension of first Āhnika of Mahābhāṣya and understanding its importance

CO3 : Comprehension of Sanskrit text of Siddhāntakaumudī

**Course (Paper) Name & No.:**

**Alaṅkāraśāstra : Kāvyaḷaṅkāra of Bhāmaha, Pariccheda 1,2 and Kāvyaṁīmāṁsā, Adhyāya 1-6  
ECT-03**

**Course Outcomes:**

CO1 : Evaluation of the contribution of Bhāmaha in Sanskrit poetics

CO2 : Evaluation of the the contribution of Rājaśekhara in Sanskrit poetics

CO3 : Acquaintance of some part of Kāvyaḷaṅkāra and Kāvyaṁīmāṁsā

**Course (Paper) Name & No.: Vedāntasāstra : Upaniṣad ECT-03**

**Course Outcomes:**

CO1 : Introduction to the Upaniṣad literature

CO2 : Comprehension of original Sanskrit text of some Upaniṣads

CO3 : Discrimination of various principles of Indian philosophy described in Upaniṣads

**Course (Paper) Name & No.: Purāṇaśāstra – Viṣṇupurāṇa Aṁśa 1and 2 ECT-04**

**Course Outcomes:**

CO1 : Introduction of the origin and development of Purāṇa literature

CO2 : Comprehension of some part of Viṣṇupurāṇa

CO3 : Comparison of the various myths and episodes of Viṣṇupurāṇa with other available sources

**Course (Paper) Name & No.:**

**Dharmaśāstra : Introduction to Dharmaśāstra and Gautamadharmaśūtra Adhyāya 1 and 13 ECT-04**

**Course Outcomes:**

CO1 : Introduction of the tradition of Dharmaśāstra in Sanskrit literature

CO2 : Comprehension of the original Sanskrit text of Gautamadharmasūtra

CO3 : Knowledge of the rules of Gautamadharmasūtra and examining its importance in today life

**Course (Paper) Name & No.: Vedāᅅga : Nirukta Adhyāya 2, Pāᅅinīyaśikᅅā and Selected metres CCT-10**

**Course Outcomes:**

CO1 : Introduction of the thought of Yāska on deities as described in Nirukta

CO2 : Comprehension of the Pāᅅinīyaśikᅅā and its place in Vedāᅅga

CO3 : Knowledge of mathematics of prosody and the definition of some metres

**Course (Paper) Name & No.: Classical Epic – Buddhacarita Canto 1 and Śīsupālavadha Canto 1 CCT-11**

**Course Outcomes:**

CO1 : Introduction of Buddhacarita of Aśvaghōᅅa

CO2 : Evaluation of the contribution of Aśvaghōᅅa and Māgha to the tradition of Sanskrit epic

CO3 : Ability to examine the sources of Buddhacarita and Śīsupālavadha

**Course (Paper) Name & No.: Darśana Arthasaᅅgraha and Pātaᅅjala-yogasūtra Adhyāya 2 (Sādhana-pāda) CCT-12**

**Course Outcomes:**

CO1 : Introduction of the tradition of Indian philosophy

CO2 : Comprehension of Sanskrit text of Arthasaᅅgraha

CO3 : Comprehension of the Sanskrit text of Taittirīyopaniᅅad

**Course (Paper) Name & No.: Alaᅅkāraśastra: Dhvanyāloka Udyota 1 and Vakroktiᅅvita Unmeᅅa 1 ECT-05**

**Course Outcomes:**

CO1 : Understanding of the contribution of Ānandavardhana in Sanskrit poetics

CO2 : Understanding of the contribution of Kuntaka in Sanskrit poetics

CO3 : Acquaintance of some portion of Dhvanyāloka and Vakroktijīvita

**Course (Paper) Name & No.: Vedāntasāstra : Śrībhāṣya and Aṇubhāṣya on Brahmasūtra 1.1.2-4 ECT-05**

**Course Outcomes:**

CO1 : Introduction of various explanations on Brahmasūtra

CO2 : Evaluation of the contribution of Rāmānujācārya and Vallabhācārya in Vedānta literature

CO3 : Comparison of the principles of Rāmānujācārya and Vallabhācārya

**Course (Paper) Name & No.: Purāṇasāstra – Viṣṇupurāṇa Aṁśa 3 and 4 ECT-06**

**Course Outcomes:**

CO1 : Comprehension of some parts of Viṣṇupurāṇa

CO2 : Comparison of the episode of Viṣṇupurāṇa to other available sources

CO3 : Evaluation of literary and poetic elements found in Viṣṇupurāṇa

**Course (Paper) Name & No.: Dharmasāstra: Āpastambadharmasūtra and Manusmṛti Adhyāya 1,2 ECT-06**

**Course Outcomes:**

CO1 : Introduction of the tradition of Dharmasāstra in Sanskrit literature

CO2 : Comprehension of the original Sanskrit text of Āpastambadharmasūtra and Manusmṛti

CO3 : Ability to explain the rules described herewith and examine its importance in today life

**Course (Paper) Name & No.: Dissertation ECT-06**

**Course Outcomes:**

CO1 : Interest develop in the concern fields of research

CO2 : Ability to use library books as reference

CO3 : Knowledge of primary information about research methodology

## Course Outcome of M.Phil. (Sociology)

### **M.Phil. SWC 101 - RESEARCH METHODOLOGY**

**Course Outcome:**

**CO1:**To understand major research strategies, meaning, scope and importance of social work research.

**CO2:**To develop attitudes favorable to the judicious integration of practice, research and theory.

### **M.Phil. SWC 102 -ADVANCE THEORY OF SOCIAL WORK**

**Course Outcome:**

**CO1:**To understand the recent trends in various methods and field of social work.

**CO2:**To get aware about the concept of empowerment and social work as a profession.

### **M.Phil. SWE 103.1 - WOMEN WELFARE**

**Course Outcome:**

**CO1:**To get knowledge about the status of women in through the ages

**CO2:**To understand different types of violence emerging against women

**CO3:**TO understand the problems of rural women

### **M.Phil. SWE 103.2 - MEDICAL SOCIAL WORK**

**Course Outcome:-**

**CO1:**To understand the emerging of medical social work.

**CO2:**To get knowledge about health and Public health

**CO3:**To understand the role of social worker in the field of medical social work.

## Course Outcome of M.S.W.

### **SWCC-1001 - Social Work History Concept and As a Profession**

#### **Course Outcome: -**

- CO1.** Understand the history of evolution of social work profession, both in India and the west.
- CO2.** Develop insights into the origin and development of ideologies/approaches to social change.
- CO3.** Understand rationale, goals, ideals and ethics for social change.
- CO4.** Develop skills to understand contemporary reality in its historical context.

### **SWCC-1002 - Methods of Social Work-I**

#### **Course Outcome: -**

- CO1.** Understand case work method and its contribution to social work practice.
- CO2.** Develop capacity to understand and accept the uniqueness of individuals and groups.
- CO3.** Appreciate the importance of groups in the life of an individual.
- CO4.** Develop knowledge of the skills and techniques to be used by the social worker in groups and case work.

### **SWCC-1003 - Methods of Social Work– II**

#### **Course Outcome: -**

- CO1.** Understand the critical elements of community organization practice.
- CO2.** Enhance critical understanding of the models and strategies for community organization practice.
- CO3.** Develop attitudes conducive to participatory activities for a civil society.
- CO4.** The students should enrich their knowledge about Social Welfare Administration Social Action, Community Organization, Social Defense, Integrated Social work practice. Human Rights, Social Justice, Empowerment.

### **SWEC-1004.1 - COMPUTER APPLICATION**

#### **Course Outcome**

- CO1.** To know the fundamentals of the computer technology.
- CO2.** To implement the computer technology and different aspects.
- CO3.** To also know the e-mail technology and their uses in the communication system.
- CO4.** To also know the technology web designing and their uses.
- CO5.** To know and understand the increasing role of computer technology in the education world.

### **SWEC-1004.2 - CHILD & WOMEN EMPOWERMENT**

#### **Course Outcome: -**

- CO1.** Facilitate a critical analysis of the mass media, in terms of the modes in which it



reproduces the dominant power relations in society be they of gender class race or any other.

**CO2.**Work towards alternative, participatory uses of the media, with specific reference to Campaigns

**CO3.**Facilitate the acquisition of media skills related to visual design, street theatre and other low-cost participatory media.

**CO4.**Allow for the practical application of these media skills through the process of designing and conducting a campaign.

#### **SWIC-1005 - COMMUNICATION SKILLS**

**Course Outcome: -**

**CO1.**Facilitate a critical analysis of the mass media, in terms of the modes in which it reproduces the dominant power relations in society be they of gender class race or any other.

**CO2.**Work towards alternative, participatory uses of the media, with specific reference to campaigns

**CO3.**Facilitate the acquisition of media skills related to visual design, street theatre and other low-cost participatory media.

**CO4.**Allow for the practical application of these media skills through the process of designing and conducting a campaign.

#### **SWIC-1006 - FIELD WORK**

**Course Outcome: -**

**CO1.**To develop professional attitude conducive to deal with human problems.

**CO2.**To develop sensitivity towards the needs and problems of individuals and families.

**CO3.**To develop skills to deal with human problems, skills in teamwork, skills in developing and maintaining rapport with individuals and agencies.

**CO4.**To familiarize the students with professional role of social workers.

**CO5.**To develop skills in report writing and use of supervision.

**CO6.**To develop skills in facing professional social work teachers/instructors, participating in discussion and seeking guidance during individual and group conferences.

#### **SWCC-2001 - Social Work Research**

**Course Outcome: -**

**CO1.** Teach the basic concepts and procedure of quantitative, qualitative and participatory research methods for understanding social work research.

**CO2.** Inculcate understanding of the significance of using basic concepts and procedures of social work research for the improvement of social work practice.

**CO3.** Develop student's ability to conceptualize and conduct simple research projects.

#### **SWCC-2002 - MANAGEMENT OF DEVELOPMENT AND WELFARE SERVICES**

**Course Outcome: -**

**CO1.**Understand the overall environment and its impact on the nature, structure and development of the organization in corporate, public and voluntary sectors in the context of social work profession.

**CO2.**Understand policies and procedures involved in establishing and maintaining human service organizations, need for change.

**CO3.**Acquire skills to network and participate in the management of resources-human, material, environmental and network.

**CO4.**Develop skills to participate in management of programmes as a part of the interdisciplinary team and initiate as well as develop new programmes.

**CO5.** Develop ability to analyses the practices applied in specific setting.

### **SWCC-2003 - Human Resource Management**

#### **Course Outcome: -**

The students should enrich their knowledge about

**CO1.**To familiarize the students with basic concept of personal management and H.R.D.

**CO2.**To sensitize students to the various facets of managing people.

**CO3.**To create understanding of the various policies and practices of human resource management

### **SWEC-2004.1 - CORRECTIONAL SOCIAL WORK**

#### **Course Outcome: -**

**CO1.**To equip the students with the knowledge of advanced theoretical information on causes of juvenile delinquency.

**CO2.**It will prepare the students to enrich and sharpen methods of intervention and practice skills.

### **SWEC-2004.2 - FAMILY SOCIAL WORK**

#### **Course Outcome: -**

**CO1.**To understand family as a social group its functioning and role in development of individual.

**CO2.**To acquaint with the various welfare programmes for members of the family.

**CO3.**Develop an understanding of issues and problems at family level and acquire skills in handling them.

### **SWIC-2005 - ORGANIZATION BEHAVIOUR & ORGANIZATION DEVELOPMENT**

#### **Course Outcome: -**

**CO1.**The introduction of OB and OD studies aims at sensitizing the students about the basic organizational process.

**CO2.**To understand the importance of Human Element in the organization

**CO3.**The behavioral aspects and sharpen their skills so as to enable them to act as change agents striving for organizational effectiveness and change.

### **SWP-2006.1 - FIELD WORK**

#### **Course Outcome: -**

**CO1.**To develop an understanding of community (Structure, Needs, Self-Help Etc.)

**CO2.**To develop ability and skills to effect changes in individual, group & community situation and trying out innovation in practice.

**CO3.**To develop capacity for planning, organizing and evaluating different community Programme.

**CO4.**To develop the skills to undertake mini scientific study (survey) on social problems.

### **SWP-2006.2 - STUDY CAMP**

**Rural/Tribal/Innovative Project/Camp**

**(Out of Saurashtra Region)**

**(Minimum 7 working Days)**

**Course Outcome: -**

**CO1.**To develop an understanding of community (Structure, Needs, Self-Help Etc.)

**CO2.**To develop an understanding of Agency set up

**CO3.**To develop ability and skills to effect changes in individual, group & community situation and trying out innovation in practice.

**CO4.**To develop capacity for planning, organizing and evaluating different community Programme.

**CO5.**To develop the skills to undertake mini scientific study (survey) on social problems.

**SWCC-3001 - HUMAN GROWTH AND DEVELOPMENT****Course Outcome: \_**

**CO1.**Develop an overall understanding of the principles of growth, their relevance and application to behavior at various phases in the span.

**CO2.** Understand interactional nature of growth and development at various stages in the life span and impact of cultural aspects.

**CO3.** Develop sensitivity towards needs, development tasks and health status along with need for development programmers for the same.

**CO4.** Apply the information of growth, development in social work practice in general and to individuals, groups and communities in particular.

**SWCC-3002 - CORPORATE SOCIAL RESPONSIBILITY****Course Outcome: -**

**CO1.** Understand the structure and curriculum of Corporate Social Responsibility.

**CO2.** Enhance skills in use of participatory educational technology.

**CO3.** Develop an attitude to equire self as a facilitatore.

**SWCC-3003 - Industrial Relation & Labor Welfare****Course Outcome:**

**CO1.**The Legal system pertaining to labour – management relations require careful study by students of labor welfare.

**CO2.**To make students understand the importance of industrial relation.

**CO3.**To familiar the students about the role in IR System.

**SWEC-3004.1 - RURAL COMMUNITY AND PANCHAYATI RAJ****Course Outcome: -**

The students should enrich their knowledge about.

**CO1.** Indian Rural Community

**CO2.** Rural Social Institutions

**CO3.** Panchayati Raj

**SWEC-3004.2 - MANAGEMENT OF NGO****Course Outcome: -**

**CO1.**On successful completion of the course the students would enrich their knowledge about the structure development and establishment of NGOs.

**CO2.** contents of project identification, budgeting, and funding

**CO3.** project personnel empowerment and monitoring and evaluation.

**SWEC-3005.1 - CRIMINAL SOCIAL WORK****Course Outcome: -**

**CO1.**To enable the students with advanced theoretical information in the field of correctional social work. It will give analytical insight to understand the causes of crime.

**CO2.**The course will equip the students with knowledge to understand the criminals and to reform and rehabilitate the criminal back to the society.

**SWEC-3005.2 - Social Policy, Planning and Development****Course Outcome: -**

**CO1.**Gain knowledge of policy analysis and the policy formation process.

**CO2.**Acquire skills in critical analysis of social policies and development plans. Study social policies, plan and programmers.

**CO3.**Critically understand the concept, content and process of social development

**CO4.**Develop the capacity to identify linkages between social needs, problems, development, issues, policies.

**SWP-3006.1 - FIELD WORK****(GO/NGO/Co-Op/Industry)****Course Outcome: -**

**CO1.**To develop professional attitude conducive to deal with human problem

**CO2.**To develop sensitivity towards the needs and problems of individuals and families.

**CO3.**To develop capacity for observation and analyzing social realities.

**CO4.**To develop an understand to organization set-up of an Institute.

**CO5.**To develop an understand to functions of an institute.

**CO6.**To development the understanding of the role of social workers in different settings.

**CO7.**To develop process-oriented skills in working with individuals, families and groups with special reference to social support system.

**SWP-3006.2 - ACADEMIC TOUR****Course Outcome: -**

**CO1.**To develop an understand organization set-up of Institute.

**CO2.**To development the understanding of the role of social workers in different settings.

**CO3.**To develop skills in observation, interviewing, recording, group discussion and leadership.

**SWCC-4001 - Social Security & Relevant Law****Course Outcome: -**

**CO1.** In a rapidly industrializing country like India, Balancing the conflicting interest of Labor and Capital is not a delicate task that's why they need social security.

**CO2.** For the social security, some of the laws are made, through its students can get rapid knowledge.

**SWCC-4002 - ENVIRONMENT AND DISASTER MANAGEMENT****Course Outcome:**

**CO1.** Develop an understanding of process of disaster management

**CO2.** Develop skills to participate in disaster management

**CO3.** Develop an understanding of the social workers role in the team for disaster management

**CO4.** Examine population policy plan and initiatives

**CO5.** Understand inter relatedness of human life, living organisms, environment

**CO6.** Examine utilization and management of resources.

**SWCC-4003 - Medical Social Work****Course Outcome:**

The students should enrich their knowledge about.

**CO1.** The basics of medical social work.

**CO2.** Different medical systems and changing perspective of health care.

**CO3.** Aware about public health programmes.

**CO4.** Role of medical social worker in dealing with patients.

**SWEC – 4004.1 - Urban Development****Course Outcome:**

**CO1.** Sensitize trainees to the need and problems of urban communities;

**CO2.** Develop a critical understanding in the trainees about the programmes of urban development.

**SWEC-4004.2 - LEGAL SYSTEM IN INDIA****Course Outcome: -**

**CO1.** Acquire information on the legal rights of people.

**CO2.** Develop and understanding of the legal system and get acquainted with the process of the legal systems with emphasis on functioning in India, Understand the role of the police, prosecution, judiciary and correction.

**CO3.** Gain insight into the problems faced by the people belonging to different strata of society, in interacting with this system

**CO4.**Develop an understanding of the processes and problems of public interest litigation and legal aid to marginalize.

### **SWEC-4005.1 - PSYCHIATRIC SOCIAL WORK**

#### **Course Outcome: -**

This subject divided in three sub-areas, and understanding creates in depth of psychiatry problems and management.

**CO1.**Concept of mental health and changing concept of mental health, psychiatric problems as per D.S.M.

**CO2.**Global, national and state level functionary to reduce mental health problems.

**CO3.**Concept, Role, Skill, therapy and polices. Methodology of psychiatric social worker.

### **SWIC-4005.2 - SOCIAL ENTREPRENEURSHIP AND INNOVATION**

#### **Course Outcome: -**

**CO1.**The objective of this course is to teach students different concepts regarding social entrepreneurship and innovation.

**CO2.** The points are to introduce students to different of entrepreneurship in detail.

### **SWP-4006.1 - BLOCK PLACEMENT**

#### **Course Outcome: -**

**CO1.**To develop professional attitude conducive to deal with human problem

**CO2.**To develop sensitivity towards the needs and problems of individuals and families.

**CO3.**To develop capacity for observation and analyzing social realities.

**CO4.**To develop an understand organization set-up of Institute.

**CO5.**To develop an understand functions of an institute.

**CO6.**To development the understanding of the role of social workers in different settings.

### **SWP-4006.2 - Dissertation**

#### **Course Outcome: -**

**CO1.**To develop an understanding of scientific approach to human inquiry in comparison to native or common-sense approach in various aspects and process.

**CO2.**To develop an ability to see the linkages between theory, research and practice and understand their essential role in enriching on another.

**CO3.**To develop an understand to prepare a how to do research.

**CO4.**To develop the ability to conceptualize, formulate and conduct simple research projects.

## Course Outcome of M.S.W.

**Subject :Master of Social Work**

**Course (Paper) No.01 Name: Social Work History Concept and As a Profession**

**Course Outcomes:**

- CO1** - Understand the history of evolution of social work profession, both in India and the west.
- CO2** -Develop insights into the origin and development of ideologies/approaches to social change.
- CO3** -Understand rationale, goals, ideals and ethics for social change.
- CO4**-Develop skills to understand contemporary reality in its historical context.

**Subject :Master of Social Work**

**Course (Paper) No.02 Name: Methods of Social Work-I**

**Course Outcomes:**

- CO1**-Understand case work method and its contribution to social work practice.
- CO2**- Develop capacity to understand and accept the uniqueness of individuals and groups.
- CO3**- Appreciate the importance of groups in the life of an individual.
- CO4**- Develop knowledge of the skills and techniques to be used by the social worker in groups and case work.

**Subject :Master of Social Work**

**Course (Paper) No.03 Name: Methods of Social Work– II**

**Course Outcomes:**

- CO1**- Understand the critical elements of community organization practice.
- CO2**- Enhance critical understanding of the models and strategies for community organization practice.
- CO3**- Develop attitudes conducive to participatory activities for a civil society.
- CO4**- The students should enrich their knowledge about Social Welfare Administration Social Action, Community Organization, Social Defense, Integrated Social work practice. Human Rights, Social Justice, Empowerment.

**Subject :Master of Social Work**

**Course (Paper) No.04 Name: Life Skills For Social Work Practice**

**Course Outcomes:**

- CO1** -To know the basics of life skills.
- CO2**- To know emotions & Pranayama, Yoga, Meditation etc.
- CO3**- To know thanking & coping skills.
- CO4**- To know time management, study skills, Work ethics etc.
- CO5**-To know and understand the effective communication & inter personal skills

**Subject :Master of Social Work**

**Course (Paper) No.05 Name: Computer Application**

**Course Outcomes**

**CO1-** To know the fundamentals of the computer technology.

**CO2-** To implement the computer technology and different aspects.

**CO3-** To also know the e-mail technology and their uses in the communication system.

**CO4-** To also know the technology web designing and their uses.

**CO5-** To know and understand the increasing role of computer technology in the education world.

**Subject :Master of Social Work**

**Course (Paper) No.06 Name: Field Work Practice in Social Work**

**Course Outcomes**

**CO1-** To develop professional attitude conducive to deal with human problems.

**CO2-** To develop sensitivity towards the needs and problems of individuals and families.

**CO3-** To develop skills to deal with human problems, skills in teamwork, skills in developing and maintaining rapport with individuals and agencies.

**CO4-** To familiarize the students with professional role of social workers.

**CO5-** To develop skills in report writing and use of supervision.

**CO6-** To develop skills in facing professional social work teachers/instructors, participating in discussion and seeking guidance during individual and group conferences.

**Subject :Master of Social Work**

**Course (Paper) No.07 Name: Field Work (Agency Visit)**

**Course Outcomes:**

**CO1-** To develop professional attitude conducive to deal with human problems.

**CO2-** To develop sensitivity towards the needs and problems of individuals and families.

**CO3-** To develop skills to deal with human problems, skills in teamwork, skills in developing and maintaining rapport with individuals and agencies.

**CO4-** To familiarize the students with professional role of social workers.

**CO5-** To develop skills in report writing and use of supervision.

**CO6-** To develop skills in facing professional social work teachers/instructors, participating in discussion and seeking guidance during individual and group conferences.

**Subject :Master of Social Work**

**Course (Paper) No.08 Name: Social Work Research**

**Course Outcomes:**

**CO1-** Teach the basic concepts and procedure of quantitative, qualitative and participatory research methods for understanding social work research.

**CO2-** Inculcate understanding of the significance of using basic concepts and procedures of social work research for the improvement of social work practice.

**CO3-** Develop student's ability to conceptualize and conduct simple research projects

**Subject :Master of Social Work**

**Course (Paper) No.09 Name: Rural Community And Panchayati Raj**



**Course Outcomes:****CO1-**Develop an understanding of rural communities**CO2-**Acquire knowledge about the contribution of Government & Non-government Organizations to rural development**CO3-**Develop an understanding of the functions of panchayati Raj Institutions with particular reference to Gujarat**CO4-** Obtain knowledge about the application of social work in rural development programs.**Subject :Master of Social Work****Course (Paper) No.10 Name: Human Resource Management****Course Outcomes:****CO1-** The students should enrich their knowledge about**CO2-**To familiarize the students with basic concept of personal management and H.R.D.**CO3-**To sensitize students to the various facets of managing people.**CO4-**To create understanding of the various policies and practices of human resource management**Subject :Master of Social Work****Course (Paper) No.11 Name: Social Defense& Correctional Services****Course Outcomes:****CO1-**To equip the students with the knowledge of advanced theoretical information on causes of juvenile delinquency.**CO2-**It will prepare the students to enrich and sharpen methods of intervention and practice skills.**Subject :Master of Social Work****Course (Paper) No.12 Name: Family Social Work****Course Outcomes:****CO1-** To understand family as a social group its functioning and role in development of individual.**CO2-**To acquaint with the various welfare programs for members of the family.**CO3-**Develop an understanding of issues and problems at family level and acquire skills in handling them.**Subject :Master of Social Work****Course (Paper) No.13 Name: Human Rights And Justice System****Course Outcomes:****CO1-**To gain knowledge about human rights & social legislation.**CO2-** To understand the mechanism for protecting human rights in India.**CO3-**To acquire competency to apply knowledge of human rights and social legislation in social work practice.**CO4-**To know social justice system in India.**Subject :Master of Social Work****Course (Paper) No.14 Name: FIELD WORK**

Course Outcomes :

CO1- To develop an understanding of community (Structure, Needs, Self-Help Etc.)

CO2-To develop ability and skills to effect changes in individual, group & community situation and trying out innovation in practice.

CO3-To develop capacity for planning, organizing and evaluating different community program.

CO4-To develop the skills to undertake mini scientific study (survey) on social problems.

**Subject :Master of Social Work**

**Course (Paper) No.15 Name: Rural / Tribal Camp**

**Course Outcomes:**

CO1-To develop an understanding of community (Structure, Needs, Self-Help Etc.)

CO2-To develop an understanding of Agency set up

CO3-To develop ability and skills to effect changes in individual, group & community situation and trying out innovation in practice.

CO4-To develop capacity for planning, organizing and evaluating different community program.

CO5-To develop the skills to undertake mini scientific study (survey) on social problems.

**Subject :Master of Social Work**

**Course (Paper) No.16 Name: Human Growth And Development**

**Course Outcomes:**

CO1-Develop an overall understanding of the principles of growth, their relevance and application to behavior at various phases in the span.

CO2-Understand interactional nature of growth and development at various stages in the life span and impact of cultural aspects.\

CO3-Develop sensitivity towards needs, development tasks and health status along with need for development programs for the same.

CO4- Apply the information of growth, development in social work practice in general and to individuals, groups and communities in particular.

**Subject :Master of Social Work**

**Course (Paper) No.17 Name: Urban Development**

**Course Outcomes:**

CO1-Sensitize trainees to the need and problems of urban communities

CO2-Develop a critical understanding in the trainees about the program of urban development

**Subject :Master of Social Work**

**Course (Paper) No.18 Name: Industrial Relation & Labour Welfare**

Course Outcomes:

CO1-The Legal system pertaining to labour – management relations require careful study by students of labour welfare.

CO2-To make students understand the importance of industrial relation.

CO3-To familiar the students about the role in IR System.

**Subject :Master of Social Work**

**Course (Paper) No.19 Name: Politically Economy & Planning in India**

**Course Outcomes:**

- CO1-**Understand political and economic system and processes
- CO2-**Examine concept of democracy and constitution foundations of Indian State.
- CO3-**Understand planning and its impact on various areas.

**Subject :Master of Social Work****Course (Paper) No.20 Name: Management Of Development And Welfare Services****Course Outcomes:**

- CO1-**Understand the overall environment and its impact on the nature, structure and development of the organization in corporate, public and voluntary sectors in the context of social work profession.
- CO2-**Understand policies and procedures involved in establishing and maintaining human service organizations, need for change.
- CO3-**Acquire skills to network and participate in the management of resources-human , material, environmental and network.
- CO4-** Develop skills to participate in management of programs as a part of the interdisciplinary team and initiate as well as develop new programs.
- CO5-**Develop ability to analyse the practices applied in specific setting.

**Subject :Master of Social Work****Course (Paper) No.21 Name: Corporate Social Responsibilities****Course Outcomes:**

- CO1-**Understand the structure and curriculum of Corporate Social Responsibility.
- CO2-**Enhance skills in use of participatory educational technology.
- CO3-**Develop an attitude to acquire self as a facilitator.

**Subject :Master of Social Work****Course (Paper) No.22 Name: Disaster Management****Course Outcomes:**

- CO1-**Understand key concepts, theories and approaches of disaster management with specific reference to Indian context
- CO2-**Develop skills to analyse factors contributing to disaster
- CO3-**Develop an understanding of the process of disaster management
- CO4-**Develop an understanding of the social worker's role in the team for disaster management

**Subject :Master of Social Work****Course (Paper) No.23 Name: Field Work****Course Outcomes:**

- CO1-**To develop professional attitude conducive to deal with human problem
- CO2-**To develop sensitivity towards the needs and problems of individuals and families.
- CO3-**To develop capacity for observation and analyzing social realities.
- CO4-**To develop an understanding to organization set-up of an Institute.
- CO5-**To develop an understanding to functions of an institute.
- CO6-**To develop the understanding of the role of social workers in different settings.
- CO7-**To develop process oriented skills in working with individuals, families and groups with special reference to social support system.

**Subject :Master of Social Work**

**Course (Paper) No.24 Name: Social Security & Relevant Law**

**Course Outcomes:**

**CO1-** In a rapidly industrializing country like India, Balancing the conflicting interest of Labor and Capital is not a delicate task that's why they need social security.

**CO2-**For the social security, some of the laws are made; through it students can get rapid knowledge

**Subject :Master of Social Work**

**Course (Paper) No.25 Name: Environment And Population**

**Course Outcomes:**

**CO1-**Understand characteristics, determinants of population growth.

**CO2-**Examine population policy, plan and initiatives.

**CO3-**Understand inter-relatedness of human life, living organisms and environment.

**CO4-**Examine utilization and management of resources.

**CO5-**Develop skills to participate in activities related to the two areas.

**Subject :Master of Social Work**

**Course (Paper) No.26 Name: Medical Social Work**

**Course Outcomes:**

**CO1-**The basics of medical social work.

**CO2-**Different medical systems and changing perspective of health care.

**CO3-**Aware about public health programs.

**CO4-**Role of medical social worker in dealing with patients.

**Subject :Master of Social Work**

**Course (Paper) No.27 Name: Social Work Personnel Training & Development**

**Course Outcomes:**

**CO1-**Understand the structure and curriculum of Social Work Education in India and its ideological framework.

**CO2-**Identify and develop skills in curriculum designing for training social work personnel at different levels.

**CO3-**Enhance skills in use of participatory educational technology.

**CO4-**Develop an attitude to equip self as a facilitator/trainer.

**Subject :Master of Social Work**

**Course (Paper) No.28 Name: Management Of NGO's**

**Course Outcomes:**

**CO1-** On successful completion of the course the students would enrich their knowledge about the structure development and establishment of NGOs.

CO2-contents of project identification, budgeting, and funding  
 CO3-Project personnel empowerment and monitoring and evaluation.

**Subject :Master of Social Work**

**Course (Paper) No.29 Name: Psychiatric Social Work**

Course Outcomes:

- CO1-This subject divided in three sub-areas, and understanding creates in depth of psychiatry problems and management.
- CO2-Concept of mental health and changing concept of mental health, psychiatric problems as per D.S.M.
- CO3-Global, national and state level functionary to reduce mental health problems
- CO4-Concept, Role, Skill, therapy and polices. Methodology of psychiatric social worker.

**Subject :Master of Social Work**

**Course (Paper) No.30 Name: Social Entrepreneurship And Innovation**

Course Outcomes:

- CO1-The objective of this course is to teach students different concepts regarding social entrepreneurship and innovation.
- CO2-The points is to introduce students to different of entrepreneurship in detail.

**Subject :Master of Social Work**

**Course (Paper) No.31 Name: Block Placement**

Course Outcomes:

- CO1-To develop professional attitude conducive to deal with human problem
- CO2-To develop sensitivity towards the needs and problems of individuals and families.
- CO3-To develop capacity for observation and analyzing social realities.
- CO4- To develop an understand organization set-up of Institute.
- CO5-To develop an understand functions of an institute.
- CO6-To development the understanding of the role of social workers in different settings.

**Subject :Master of Social Work**

**Course (Paper) No.32 Name: Dissertation**

Course Outcomes:

- CO1-To develop an understanding of scientific approach to human inquiry in comparison to native or common sense approach in various aspects and process.
- CO2- To develop an ability to see the linkages between theory, research and practice and understand their essential role in enriching on another.
- CO3-To develop an understand to prepare a how to do research.
- CO4-To develop the ability to conceptualize, formulate and conduct simple research projects.

## Course Outcome of M.A. Sociology

<b>Subject: -</b>	<b>Sociology</b>
<b>Course (Paper) Name &amp; No. : -</b>	<b>Classical Sociological Tradition (No.-01)</b>

### Course Outcomes:

**CO1:** To introduce the students to the different thinkers viewed the societal changes from different perspectives.

**CO2:** To understand the issues related to development of Sociology as a science Acquaintance with the writings of classical thinker would equip the students with theoretical insights to know, analyse and interpret the social scenario around then and would also familiarize them with the different sociological perspectives and theories.

<b>Subject: -</b>	<b>Sociology</b>
<b>Course (Paper) Name &amp; No. : -</b>	<b>Research Methodology No.- 02</b>

### Course Outcomes:

**CO1:** This course plan aims to provide exposure to the fundamentals of various research techniques and methods. It tries to build upon the basic assumptions in adopting different methodologies for different kinds of research themes.

**CO2:** It includes certain philosophical ideas underlying the emergence of different methodologies in social sciences.

<b>Subject: -</b>	<b>Sociology</b>
<b>Course (Paper) Name &amp; No. : -</b>	<b>Perspective on Indian Sociology No.-03</b>

### Course Outcomes:

**CO1:** The students will have acquired a spicily adequate and comprehensive understanding on Indian Society in all its multi-faceted dimensions.

**CO2:** Their course is aimed at sensitizing them to the diversity as well as inter-connectedness of theoretical perspectives on Indian Society, thereby adding depth as well as insight to their understanding of the subject.

<b>Subject: -</b>	<b>Sociology</b>
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<b>Course (Paper) Name &amp; No. : -</b>	<b>Gender &amp; Society</b> <b>No.-01</b>
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**Course Outcomes:**

**CO1:** The course seeks to account students with theoretical understanding of gender sensitization.

**CO2:** It is also to get informed about the model of action for improvement of the status of women and to be aware of the diversity in values and problems of women from different part and states of India.

<b>Subject: -</b>	<b>Sociology</b>
<b>Course (Paper) Name &amp; No. : -</b>	<b>Human Resource Management</b> <b>No.-01</b>

**Course Outcomes:**

**CO1:** In the current situation Human Resource Management focuses on developing HR leaders by stimulating critical thinking and focusing on innovations in this field.

**CO2:** HRM is one of the most important functions in an organization.

**CO3:** This programme helps the students to understand the role of the HR manager in this ever growing competitive industry/ society.

**CO4:** It is a programme which should be done by candidate who wants to pursue their career in recruitment, training and development.

<b>Subject: -</b>	<b>Sociology</b>
<b>Course (Paper) Name &amp; No. : -</b>	<b>Political Sociology</b> <b>No.-01</b>

**Course Outcomes:**

**CO1:** In modernized societies the political system has become one of the most dominant components of the total social structure, accordingly, the major objectives of teaching this course are

**CO2:** To acquaint the students with the nature and functioning of political system(s), and the political processes.

**CO3:** To generate in the minds of students an awareness of their status and role as citizens of the state.

**CO4:** To make the students aware of the prerequisite of sound democratic political system and its vulnerability.

<b>Subject: -</b>	<b>Sociology</b>
<b>Course (Paper) Name &amp; No. : -</b>	<b>Sociology of Sanitation</b>

	<b>No.- 02</b>
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**Course Outcomes:**

**CO1:** In modernized societies the political system has become one of the most dominant components of the total social structure, accordingly, the major objectives of teaching this course are

**CO2:** To acquaint the students with the nature and Sanitation.

**CO3:** To generate in the minds of students an awareness of their status and role as citizens of the Nation.

**CO4:** To know about Sociology of Sanitation

**CO5:** To understand the problems of sanitation in India.

**CO6:** To understand the relation between Society and Sanitation.

<b>Subject: -</b>	<b>Sociology</b>
<b>Course (Paper) Name &amp; No. : -</b>	<b>Theoretical Perspectives In Sociology</b> <b>No.-04</b>

**Course Outcomes:**

**CO1:** This course is intended to introduce the students to the substantive, theoretical and methodological issues which have shaped the sociological thinking in the latter half of 20th century, and which continue to concern the practitioners of sociology, today.

**CO2:** The main focus of this course will be on structure, functional & conflict theories and phenomenology ethno methodology and neo-Marxism.

<b>Subject: -</b>	<b>Sociology</b>
<b>Course (Paper) Name &amp; No. : -</b>	<b>Methods And Techniques In Social Research</b> <b>No.-05</b>

**Course Outcomes:**

**CO1:** Teaching certain quantitative methods, statistical techniques and qualitative methods to collect and analyze the data would help them organize and analyze the information gathered by them.

**CO2:** Exposure to the fieldwork at the post Graduate level is intended to enhance the research interest and inculcate the spirit of inquiry among students who may be motivated to continue higher studies in research.

<b>Subject: -</b>	<b>Sociology</b>
<b>Course (Paper) Name &amp; No. : -</b>	<b>Social Change &amp; Development In India</b> <b>No.-06</b>



**Course Outcomes:**

**CO1:** Social change has always been a central concern of sociological study.

**CO2:** The course is designed to achieve the following objectives:

**CO3:** To provide conceptual and theoretical understanding of social Change and development as it has emerged in sociological literature;

**CO4:** To offer an insight into the ways in which social structure impinges On development and development on social structure; and

**CO5:** To address in particular the Indian experience of social change and development.

**CO6:** To prepare the students for professional careers in the field of development planning, including governmental, non-government and international agencies engaged in development.

<b>Subject: -</b>	<b>Sociology</b>
<b>Course (Paper) Name &amp; No. : -</b>	<b>Social Movements In India</b> <b>No.-02</b>

**Course Outcomes:**

**CO1:** The objective of this course is to sensitize postgraduate students to the variety and dynamics of social movements and their role in social transformation.

**CO2:** The course will hopefully enable the students to look at social movements in a sociological and comparative perspective.

<b>Subject: -</b>	<b>Sociology</b>
<b>Course (Paper) Name &amp; No. : -</b>	<b>Sociology Of Family And Counseling</b> <b>No.-02</b>

**Course Outcome:**

**CO1:** An exposure to the different approaches, issues and databases in studies of marriage and family will enable the student to appreciate how a subject dealing with such mundane and private aspects of everyday life as births, marriages and family formation can constitute a technical field of study capable of generating contentious issues for academicians.

<b>Subject: -</b>	<b>Sociology</b>
<b>Course (Paper) Name &amp; No. : -</b>	<b>Sociology of Health</b> <b>No.-02</b>

**Course Outcomes:**

**CO1:** The course introduces students to sociological approaches to health, illness medicine and healthcare.

**CO 2:** A diversity of topics will be covered including health inequalities, health policy, health profession and the organization of health care delivery, ethnicity and health, mental health and the social construction of medical knowledge.

<b>Subject: -</b>	<b>Sociology</b>
<b>Course (Paper) Name &amp; No. : -</b>	<b>Social Anthropology No.-02</b>

**Course Outcomes:**

**CO1:** The course introduces students to sociological approaches to anthropology. A diversity of topics will be covered including anthropology, cast, race, culture, kinship, etc.

**CO2:** Special use in regional research in caste and tribal community.

**CO3:** To know inter relation between deferent community and race.

<b>Subject: -</b>	<b>Sociology</b>
<b>Course (Paper) Name &amp; No. : -</b>	<b>Rural Sociology No.-07</b>

**Course Outcomes:**

**CO1:** The agrarian structure and development in India are the two principal sources of approach to study the rural society in India. This course plan emerges as a basis for developing a sociological skill on peasant and social structure.

**CO2:** To provide sociological understanding of rural social structure, change and development in India.

**CO3:** To impart sociological skills to reconstruct rural institution and rural development programmes to plan, monitor and evaluate rural development programmes.

**CO4:** To acquaint students with the prevailing two approaches to the study of rural society; rural community and peasantry.

<b>Subject: -</b>	<b>Sociology</b>
<b>Course (Paper) Name &amp; No. : -</b>	<b>Sociology of Tribal People No.-08</b>

**Course Outcomes:**

**CO1:** The tribal people constitute a significant segment of Indian society.

**CO2:** The objectives of this course are to provide a comprehensive profile of tribal people in terms of their distribution and concentration, demographic features, social structure and cultural patterns.

<b>Subject: -</b>	<b>Sociology</b>
<b>Course (Paper) Name &amp; No. : -</b>	<b>Sociology Of Development</b> <b>No.-09</b>

**Course Outcomes:**

**CO1:** India is undergoing rapid economic development,

**CO2:** To be able to understand, assess and explore its sociological implication, in this paper the student is sought to be familiarised with the various paths and issues of development.

<b>Subject: -</b>	<b>Sociology</b>
<b>Course (Paper) Name &amp; No. : -</b>	<b>Environment &amp; Society</b> <b>No.-03</b>

**Course Outcomes:**

**CO1:** The course plan aims to provide knowledge and scholarship of sociological basis of environment and society interface.

**CO2:** It seeks to impart social skills in environmental concerns in order to understand the human suffering.

**CO3:** As a prelude to it, the course focuses on "Environment in Sociological Theory", both classical and contemporary.

**CO4:** The course also aims at providing knowledge of the debate on environment and development with a focus on environmental justice, policy and action.

**CO5:** The study of inter connections between environment and society has gained in enormous significance in recent times on account of the debilitating effects on the environment and society.

**CO6:** The course is designed to focus on the environmental issues in the perspective of environmental Sociology.

<b>Subject: -</b>	<b>Sociology</b>
<b>Course (Paper) Name &amp; No. : -</b>	<b>The Study Of Indian Diaspora</b> <b>No.- 03</b>

**Course Outcomes:**

**CO1:** This course is intended to introduce the students to the India Diaspora.

**CO2:** After explaining Diasporas as an area of sociological study, it describes the socio-historical background of the Indian Diasporas, analyses the processes of changes and continuity among the Diaspora Indians, and examines the issues confronting them, and discusses the mutual orientations of the Diaspora Indians and India.

<b>Subject: -</b>	<b>Sociology</b>
<b>Course (Paper) Name &amp; No. : -</b>	<b>Sociology Of Mass Communication</b> <b>No.-04</b>

**Course Outcomes:**

**CO1:** This course introduces students to the study of mass and presents a multidisciplinary examination of the complex interplay between mass communication and social life.

**CO2:** To understand the media encompasses individuals, families, communities, corporations, nations, and world systems.

**CO3:** Students will critically engage all forms of mass media, ranging from traditional print, radio and television media to the new information technologies.

<b>Subject: -</b>	<b>Sociology</b>
<b>Course (Paper) Name &amp; No. : -</b>	<b>Project work</b> <b>No.-04</b>

<b>Subject: -</b>	<b>Sociology</b>
<b>Course (Paper) Name &amp; No. : -</b>	<b>Sociology In Practice</b> <b>No.-04</b>

**Course Outcomes:**

**CO1:** To train students as sensible citizens of the country

**CO2:** To develop strong relationship between sociological knowledge and practice.

**CO3:** To develop abilities and skills for meaningful social work

**CO4:** Student will train about the social work and experience with community work

**CO5:** In this paper sum micro level study which requirement of social science

<b>Subject: -</b>	<b>Sociology</b>
<b>Course (Paper) Name &amp; No. : -</b>	<b>Regional Sociology</b> <b>No.-10</b>

**Course Outcomes:**

**CO1:** To provide an additional capacity for the students to discover enough about the society in the region.

**CO2:** To develop skills for regional sociological approach analogous to regional economics in order to plan for development and action strategies.

**CO3:** To enable the students to construct the local knowledge on culture and nature of the region as social space.

<b>Subject: -</b>	<b>Sociology</b>
<b>Course (Paper) Name &amp; No. : -</b>	<b>Industry &amp; Society</b> <b>No.-11</b>

**Course Outcomes:**

**CO1:** As industrial society is a part-society with all its distinctive characteristics and as industrialization has been seed-bed of sociological treatise on society, the knowledge and scholarship on industry and society should be the necessary requirement for the P.G. students.

**CO2:** As there is a distinct pattern of work and its organisation with all its technological conditioning factors, the work in industrial society, the labour, the labour and organization require to be an essential sociological knowledge for students as a corollary to it, the management and organisation aspect of work and workers in industrial organisation has to be the inevitable skill to diagnose the sociological trends in industrial community.

**CO3:** To expose the P.G. students with the knowledge on industrial society and sociological order, industrialisation process, work transformation, Industrial tours and cities and also on industrial organisation with personnel management practices.

<b>Subject: -</b>	<b>Sociology</b>
<b>Course (Paper) Name &amp; No. : -</b>	<b>Sociology of Religion</b> <b>No.-12</b>

**Course Outcomes:**

**CO1:** Religion is an ubiquitous phenomenon and its relation to society, culture and polity raises important sociological issues.

**CO2:** This paper introduces the students to the subfield of sociology of religion.

**CO3:** After analyzing the basic concepts and key interpretations of religion, it focuses on the interface between religion and society in India and the contestation over religion in contemporary times. It concludes with an analysis of social change in relation to religion.

<b>Subject: -</b>	<b>Sociology</b>
<b>Course (Paper) Name &amp; No. : -</b>	<b>Sociology of Disaster Management</b> <b>No.-05</b>

**Course Outcomes:**

**CO1:** The course introduces for the conceptual understanding of disasters and its relationship with society and development.

**CO2:** To gain understand approaches of disaster risk reduction to understand Psycho-Social response to disasters and to build skills to respond to disasters.

**CO3:** To understand and role of various agencies GO and NGO.

<b>Subject: -</b>	<b>Sociology</b>
<b>Course (Paper) Name &amp; No. : -</b>	<b>Criminology</b> <b>No.-05</b>

**Course Outcomes:**

**CO1:** The course is designed to acquaint the students with recent advances in criminology; changing profile of crime and criminals, particularly in India;

**CO2:** Prison reforms in India; co relational measures and programmes in prisons; alternatives to imprisonment; and victim logy and its implications and crime control and prevention to prepare the students for professional roles of correctional agents in agencies of criminal justice administration, particularly in prisons and correctional institutions.

<b>Subject: -</b>	<b>Sociology</b>
<b>Course (Paper) Name &amp; No. : -</b>	<b>Project Work</b> <b>No.-05</b>

<b>Subject: -</b>	<b>Sociology</b>
<b>Course (Paper) Name &amp; No. : -</b>	<b>Sociology Of Education</b> <b>No.-05</b>

**Course Outcomes:**

**CO1:** To get acquainted with Theories in the Sociology of Education.

**CO2:** To understand the Colonial and Post-Colonial Policies on education in the context of contemporary issues.

**CO3:** To become aware of new alternative educational practices emerging in India.

<b>Subject: -</b>	<b>Sociology</b>
<b>Course (Paper) Name &amp; No. : -</b>	<b>Sociology of Voluntary Organisation</b> <b>No.-05</b>

**Course Outcome:**

**CO1:** To expose the P.G. students with the knowledge on fieldwork and voluntary organisation, its formulation work, administration and N.G.O. studies.



## Course Outcome of M.Phil. (Sociology)

### Course Outcomes:

<b>Subject: -</b>	<b>Sociology</b>
<b>Course (Paper) Name &amp; No. : -</b>	<b>Research Methodology</b>

### Course Outcomes:

**CO1:** This unit introduces advanced data analysis skills for the social sciences based on secondary data analysis and project work. The unit will apply all the skills and capabilities learned through the social science program to the analysis of data in practice.

**CO2:** The use of SPSS statistical package is supported by a choice of secondary data analysis.

<b>Subject: -</b>	<b>Sociology</b>
<b>Course (Paper) Name &amp; No. : -</b>	<b>Sociological Theories</b>

### Course Outcomes:

**CO1:** This subject fosters an in-depth understanding of sociological theory to enable critical awareness of problems and issues confronting contemporary society.

**CO2:** By reading, analyzing and assessing the arguments, merits and drawbacks of original social theory texts, students will develop and enhance their capacity for theoretical analysis through practice.

<b>Subject: -</b>	<b>Sociology</b>
<b>Course (Paper) Name &amp; No. : -</b>	<b>Monograph</b>

### Course Outcomes:

**CO1:** This course is intended to introduce the expert other work for students to the substantive, theoretical which have shaped the sociological thinking in the current era and which continue to concern the practitioners of sociology today.

**CO2:** The main focus of this course will be on specific community and area.



<b>Subject: -</b>	<b>Sociology</b>
<b>Course (Paper) Name &amp; No. : -</b>	<b>Rural Development and Ecology</b>

**Course Outcomes:**

- CO 1:** Teaching certain quantitative methods, statistical techniques and qualitative methods to collect and analyze the data would help them organize and analyze the information gathered by them.
- CO 2:** Exposure to the fieldwork at the post Graduate level is intended to enhance the research interest and inculcate the spirit of inquiry among students who may be motivated to continue higher studies in research.
- CO 3:** To provide conceptual understanding of rural development and ecology of coastal area and aware about coastal community and develop the new research area.

<b>Subject: -</b>	<b>Sociology</b>
<b>Course (Paper) Name &amp; No. : -</b>	<b>Dissertation</b>

## Course Outcome of M.Phil. (Statistics)

### SMT– 1001: APPLIED STATISTICS AND STATISTICAL COMPUTING WITH R

#### Course Outcomes:

**CO1:** Student equipped with knowledge of operation research and R language.

1. Linear programming problem: feasible, basic feasible and optimal solution. Example of LPP. Solution of LPP using graphical method, Simple method, revised simple solution, dual, dual simple method.
2. Transportation and assignment problem (both balanced and unbalanced case). Game theory: Two person games, pure and mixed strategies, finding solution in  $2 \times 2$ ,  $2 \times m$ , and  $m \times n$  games. (Equivalent of rectangle game and linear programming.)
3. Basic characteristics of queuing system, different performance measures, steady state solution of markov queuing models:  $M/M/1$ ,  $M/M/1$  with limited waiting space,  $M/M/c$ ,  $M/M/c$  with limited waiting space.
4. Inventory problems and analytical structure. Simple deterministic and stochastic models of inventory controls. Replacement problems: block and age replacement policies, dynamic programming approach for maintenance problems; replacement of terms with long life, PERT and CPM. Sequencing and scheduling problems.
5. R – Language.: Introduction to R, elementary programming, application to data analysis.

### SMT– 1002: PRACTICAL: DATA ANALYSIS USING SPSS AND R- PROGRAMMING

#### Course Outcomes:

**CO1:** Practical knowledge of programming in R language and data analysis using SPSS.

### SEMESTER– 2

### SMT – 2001: Dissertation and Viva

#### Course Outcomes:

**CO1:** Research Skill development.

# Course Outcome of M.Sc. (Statistics)

## SEMESTER -1

### Course Outcomes:

#### MS – 101: BASICS OF STATISTICAL METHODS

**CO1:** Acquire knowledge of exploratory data analysis and descriptive statistics.

**CO2:** Knowledge of SPSS package.

1. Exploratory data analysis and Descriptive Statistics: Random Variables, Types of Variable and Data Types, Graphical Displays of Sample Data, Histograms, Box plot, Scatter plot, Bar chart, Measures of Centre Tendency, Measures of Dispersion, Moments, Skewness and Kurtosis.
2. Theory of Probability: Basic Ideas, Definitions and Properties. Conditional Probability and Independent Events, Bays Formula.
3. Classical Probability Distributions:

Discrete Distributions: Bernoulli, Binomial, Poisson, Negative Binomial, Geometric, Hypergeometric,

Continuous Distributions: Normal, Uniform, Gamma, Beta distribution of first kind, Beta distribution of second kind, Exponential, Weibul, Cauchy, Central Limit Theorem.

4. Sampling Distributions: Chi-Square Distribution, t-distribution, F- distribution.
5. Statistical Inference and Hypothesis Testing: One sample tests, two sample tests, several sample tests. Applications: Case-Control Studies, Test of Association.
6. Correlation and Regression: Karl Pearson's Coefficient of Correlation, Spearman's rank correlation coefficient, Linear Regression.
7. SPSS: Introduction to SPSS, Statistical analysis using SPSS.

#### MS – 102: STATISTICAL COMPUTING AND NUMERICAL METHODS

**CO1:** Knowledge acquirement of various statistical and numerical methods and its applications.

**CO2:** Computer programming logic development.

1. Concept of random number generator, congruential method of generating uniform Variate. Concept of simulation: Generation of Binomial, Poisson, Geometric, Negative Binomial & Multinomial variate. Proofs of related results.
2. Generation of continuous random variables covering Exponential, Normal, Gamma, Chi-square, Bivariate exponential, Bivariate Normal distributions, and mixture of distributions.
3. Excel Introduction to MSEXCEL and exercises on using EXCEL for Statistical analysis covering frequency distribution, histograms, t-test, and test for Independence in 2x2 contingency tables.
4. R – Language. : Introduction to R, elementary programming, application to data analysis.
5. Solution to a nonlinear equation: Bisection method, Newton-Raphson method.
6. Iterative methods: Jacobi, Gauss-Seidel methods with convergence analysis.

## MS – 103: STATISTICAL INFERENCE AND NON PARAMETRIC TESTS

**CO1:** Knowledge implementation various none-parametric tests and application implementation of statistical inference.

1. Viewed on unbiasedness, efficiency, consistency and sufficiency. Neyman Factorization theorem, minimal sufficient statistics.
2. Method of estimations: maximum likelihood method, method of moments, minimum Chi square method. Minimum variance unbiased estimators, Rao-Blackwell theorem. Completeness, Lehman – Scheffe's necessary and sufficient condition for MBUE, Cramer – Rao lower bound approach and Bhattacharya's system of lower bounds for a single parameter.
3. Test of hypothesis: simple and composite hypothesis, two types of errors, critical regions, randomized tests, power function, and most powerful and most powerful tests. Neyman Pearson lemma, generalized Neyman Pearson lemma.
4. Unbiased tests: uniformly most powerful unbiased test, similar test, relation between UMP unbiased test and a UMP similar test, application to one parameter exponential family. Tests with Neyman structure. Inference on scale and location parameters: estimation and tests.
5. Rank test, locally most powerful rank test, linear rank statistics and their distributional properties under null hypothesis.
6. Statistical decision problem: Non randomized and randomized decision rules. Loss function, expected loss, risk function. Concept of admissibility, Bayes rule, admissibility of Bayes rules.
7. Minimax rules, least favorable distributions, complete class and minimal complete class. Decision problem for finite parameter space. Convex loss function. Bayes minimax estimators, illustrations.
8. One sample location problem, sign test, signed rank test, two sample Kolmogorov – Smirnov tests. Two sample location and scale problems. Wilcoxon – mann – Whitney tests. Krusal – Wallis k sample tests.

## MS – 104: PROBABILITY AND DISTRIBUTION THEORY

**CO1:** Knowledge implementation of probability theory and distribution theory

1. Introduction of Probability, Probability Spaces, random variables, expectations and moments, Minkowski inequality, Schwartz inequality, Jensen inequality, Markov inequality, Holder's inequality and Tchebyshev's inequality.
2. Law of large numbers: Weak law of large numbers, Strong law of large numbers for i. d. sequence, strong law of large numbers, Kolmogorov's strong law of large numbers. Borel 0-1 law, Borel - Cantelli lemma, Kolmogorov 0 – 1 law.
3. Convergence in Probability, in distribution and in mean. Central limit theorem for a sequence of independent random variables under Lindberg's condition, Liapounov's CLT ( only statement).
4. Brief review of basic distribution theory. Joint, Marginal and Conditional probability mass function ( pmf) and probability density function ( pdf ) , Discrete and continuous distributions.
5. Function of random variables and their distributions using Jacobin of transformation and their tools, probability distribution of a random variables, properties of distribution functions, Characteristics functions and its properties, Inversion theorem, uniqueness

- theorem and Convolutions.
6. Power series distribution: its mean, variance, mgf, cgf, and recurrence relations. Various discrete distributions as its particular cases.
  7. Sampling distributions: Non central chi square, t and f – distributions and their properties. Distributions of quadratic form under normality.
  8. Order statistics: their distribution and properties, joint and marginal distributions of order statistics. Extreme values and their asymptotic distributions (Statement only) and its applications.

#### MS – 105: MATHEMATICAL STATISTICS

**CO1:** Knowledge acquirement of various mathematical terms and techniques.

1. Set of real numbers, countable and uncountable sets, countability of rationals and uncountability of the interval (0,1) Supremum and Infimum of bounded sets, limit point of a set, open, closed, dense and compact sets. Bolzano-Weierstrass and Heine- Borel Theorems (Statements only). Applications of these theorems.
2. Sequence of real numbers, convergence, divergence. Cauchy sequence. Convergence of bounded monotone sequence. Limit inferior and limit superior of the sequences.
3. Series of numbers, tests for convergence (without proof) test for absolute convergence, convergence of sequences of non-negative terms.
4. Vector space, subspace, linear dependence and independence, basis, dimension of a vector space, example of vector spaces.
5. Null space, Special types of matrices: elementary operations, rank of a matrix. Orthonormal basis and orthogonal projection of a vector. Gram-Schmidt orthogonalisation, Kronecker product. Idempotent matrices, inverse of a matrix, their Simple properties, Partitioned Matrices, Orthogonal matrices.
6. Characteristic roots of a matrix, algebraic and geometric multiplicities, characteristic vectors and their orthogonal property. Caley-Hamilton Theorem and applications.

#### MS-106 Practical

**CO1:** Practical implementation of statistical methods, program logic development and data analysis using SPSS.

#### SEMESTER -2

#### MS-201: Data Warehousing and Data Mining

**CO1:** Acquisition of data warehousing and data mining techniques and algorithms.

**CO2:** Implementation of ETL system.

**CO3:** Practical study using WEKA software.

**CO4:** Case studies of various sections.

1. Introduction of Data Warehouse: Operational and Informational systems, OLTP and DSS systems, Characteristics of Data Warehouse, Data Warehouse software and hardware architecture, Basic steps to develop data warehouse architecture, Architectural components of data warehouse, Data warehouse system architecture (Two-Tiered and Three-Tiered).

2. Data Marts: Data Mart structure, Usage of Data Mart, Security in Data Mart, Data warehouse and Data Mart
3. Online Analytical Transactional Process: OLTP and OLAP systems, Types of OLAP (MOLAP, ROLAP and HOLAP) with advantages and disadvantages.
4. ETL: Extraction of Data, Transformation of Data, Loading of Data, Comparison and contradiction of various ETL tools, Practical study of popular ETL tools.
5. Data Mining: Foundation of Data Mining, Data Mining Process, Data Understanding, Data Preparation, Creating database for data mining, Exploring database, creating for data mining model, building a data mining model, evaluating a data mining model, deployment of data mining model.
6. Data Mining Techniques: Statistics: Point Estimation, Model based summarization, Bayes theorem, Hypothesis testing, Correlation and regression. Machine Learning, Decision Trees, Neural Networks.
7. Data Mining Algorithms: Genetic Algorithms, Cross-over techniques, Mutation Function, Fitness Function. Association Rules: Apriori Algorithm, Sampling Algorithm, Partitioning algorithm, Pincer-Search algorithm, FP-Tree Growth algorithm. Clustering: Hierarchical algorithm, Agglomerative algorithm, Divisive clustering, K- Means, Nearest Neighbor, clustering large database
8. Practical Study in WEKA environment: Implementation of data set into WEKA, Rules generated using charts, Analysis of data using WEKA, Comparison of various algorithms.
9. Case Study: Insurance, Financial services, Healthcare and medicine, Telecommunications, Retail Marketing, Government, Education,

**MS - 202: PLANNING AND ANALYSIS OF INDUSTRIAL EXPERIMENTS**

**CO1:** Knowledge of practical implementation of Design of Experiments.

1. Introduction to designed experiments. General block design and its information matrix C. Properties of block design: Connectedness, balance and orthogonality.
2. Balanced incomplete block design, its properties, parametric relations, intra block analysis of BIB design. Finite group and finite field geometry projective and Euclidean. Mutually orthogonal lattice square design. Construction of (1) MOLS and (2) BIB designs using MOLS, PG (N, S), EG(N, S) and other methods.
3. Lattice design: simple and balanced lattice design. Analysis of lattice design. Missing plot techniques, estimation of missing observation and its analysis of variance of RBD and LSD design.
4. General factorial experiment, main effects and interaction effects.  $2^n$  and  $3^n$  factorial experiment. Analysis of  $2^n$  and  $3^n$  factorial experiments in randomized block. Confounding experiments: complete partial and balanced confounding and its ANOVA table.
5. Two associated PBIB design association scheme and intra block analysis. Group divisible designs, dual and linked block designs, resolvable and affined resolvable designs.

1. Diallel Crosses: complete diallel crosses, its analysis and efficiency factor, optimal diallel crosses plane. Robustness of designs. Robustness of diallel crosses plan against the loss of  $1 \leq s \leq k$  observation in a block.

MS - 203: APPLIED MULTIVARIATE ANALYSIS

**CO1:** Acquisition of multivariate normal distribution, MLE, Hotelling's  $T^2$  and factor analysis.

1. Multivariate normal distribution, two definitions and their equivalence, singular and nonsingular normal distribution, characteristic function, moments, marginal and conditional distributions.
2. Maximum likelihood estimators of the parameters of the multivariate normal distribution and their sampling distributions.
3. Wishart matrix and its distribution of properties of Wishart distribution, distribution of generalized variance.
4. Hotelling's  $T^2$  Statistic and its distribution. Applications of  $T^2$  statistics and its relationship with Mahalanobis'  $D^2$  statistic. Confidence region for the mean vector.
5. Discrimination and classification. Fisher's discriminant function and likelihood ratio procedure, minimum ECM rule, Rao's U statistics and its use in tests associated with discriminant function, classification with three populations.
6. Principal components. Dimension reductions, Canonical Correlation and canonical variables.
7. Introduction to factor analysis, Cluster analysis, Hierarchical and non-Hierarchical clustering. Single, complete, average linkage method and K-means clustering.

MS - 204: SAMPLING TECHNIQUES

**CO1:** Study and analysis of data using various sampling techniques and Non-sampling errors.

1. Concept of population and sample, Need for Sampling, census & sample surveys, basic concepts in sampling and designing of large-scale surveys design, sampling scheme and sampling strategy. Basic methods of sample selection: SRSWR, SRSWOR.
2. Stratification, Allocation and estimation problems. Construction of Strata: deep stratification, method of collapsed strata.
3. Systematic sampling: The sample mean and its variance, comparison of systematic with random sampling, comparison of systematic sampling with stratified sampling, comparison of systematic with simple and stratified random sampling for certain specified population. Estimation of variance, Two stage sample: Equal first stage units, Two stage sample: Unequal first stage units; systematic sampling of second stage units.
4. PPSWR methods: Cumulative total method, Lahiri's method related estimation Problems and PPSWOR methods and related estimation of a finite population mean (Horwitz- Thompson and Des Raj estimators for a general sample size and Murthy's estimator for a sample of size 2), Midzuno sampling.
5. Use of supplementary information for estimation: ratio and regression estimators and Their properties. Unbiased and almost unbiased ratio type estimators, Double sampling.
6. Cluster sampling. Two – stage sampling with equal number of second stage units.
7. Non - sampling errors: Response and non- response errors. Hansen – Horwitz and Deming's techniques.

### MS - 205 Base SAS Programming

**CO1:** Knowledge gathering of SAS environment.

**CO2:** Programming knowledge of SAS.

**CO3:** Data analysis and representation using SPSS.

1. Introduction to SAS programs, running SAS Programs, diagnosing and correcting syntax errors. Producing List Reports using PRINT procedure; sequencing and grouping observations, using special WHERE statement operators; customizing report appearance – formatting data values, creating HTML reports. Programming with the DATA step – reading SAS data sets and creating variables, executing statement conditionally, dropping and keeping variables. Assigning and Changing variable attributes, Combining merging and SAS Data Sets Producing Summary Reports using REPORT procedure.
2. Using SAS Enterprise Guide: naming a project, working with existing code, diagnosing and correcting errors, creating SAS programs, accessing data sources with the LIBNAME statement, understanding Output Delivery System (ODS). Using Graphics in SAS Enterprise Guide. Controlling Input and Output – controlling when a record loads, reading hierarchical raw data files; outputting multiple observation, selecting variables and observations, writing to multiple SAS data sets, writing to external files. Processing Data iteratively using DO loop, SAS array processing.
3. Using SQL with SAS: Understanding the purpose, design, uses, and terminology of SQL; Basic Queries, using SQL procedure, summarizing data with column and row functions, grouping data, performing analyses on groups of data, subquerying, and remerging, ordering data, customizing query output. Combining Tables – querying multiple tables using joins, using union, intersect, and other set operators to combine tables. Creating and Modifying Tables and Views, using views to simplify queries and access changing data, creating and using indexes; maintaining tables, views, and indexes.

### MS - 206 PRACTICAL

**CO1:** Practical implementation of statistical methods, program logic development and data analysis using SAS.

### SEMESTER-3

### MS - 301 SURVIVAL ANALYSIS AND CLINICAL TRIALS

**CO1:** Study and implementation of survival analysis clinical trials and design of phase 1-3, analysis of phase 1-3 trials.

1. Life time distributions, survival functions, hazard rate, cumulative hazard function, residual life time, survival function of residual life time, mean residual life time, one correspondence of these functions. Computation of these function for Common life time distributions: exponential Weibull, Gamma, Pareto, Rayleigh, log-normal etc: computation of survival and failure rate function proportional hazard models and proportional hazard model.
2. Concept of censoring, various types of censoring, Estimation and Testing of parameters of exponential distribution under various types of censoring.



3. Estimation of survival function: Actuarial Estimator, Kaplan Meir product limit estimator, properties: self-consistency and MLE.
4. Two-sample problem: Log rank test, Mantel Haenszel test. Semi parametric regression for failure rate – Cox's proportional hazards model. Related estimation and test procedures. Epidemiological studies: case-control and cohort designs; odds ratio and relative risk; logistic and multiple regression models.
5. Introduction to clinical trials and other types of clinical research, bias and random error in clinical studies, overview of Phase I-IV trials.
6. Design of Phase 1-3 clinical trials: parallel vs. cross-over designs, cross-sectional vs. longitudinal designs, review of factorial designs, objectives and endpoints of clinical trials, formulation of appropriate hypotheses (equivalence, non-inferiority, etc.); sample size calculation.
7. Analysis of Phase 1-3 trials: Use of generalized linear models; analysis of categorical outcomes.

#### MS - 302: INDUSTRIAL STATISTICS

**CO1:** Data analysis and implementation of various control charts for measurement and attributes.

1. Basic concept of quality control, process control and product control, seven SPC tools Flowchart. Histogram, Check sheet. Ishikawa diagram, Pareto chart, Defect concentration diagram, control chart. Deming's PDCA cycle for continuous improvements and its applications.
2. Control charts for measurements and attributes  $\bar{x}$ , R, S, p, np. Charts with subgrouping, CUSUM chart, tabular form and V-mask use of these charts for process control. Moving average and exponentially weighted moving average charts.
3. Sampling Inspection plans: for attribute inspection: Single, double & sequential sampling plans and their properties. Dodge & Roming characterization by OC curve and ARL-Inspection by variables for one or two sided specifications.
4. Multivariate control charts for measurements data. Hotelling T2 control charts.
5. Simulation of  $\bar{X}$ -bar and R control charts, estimation of ARL and process capability indices.

#### MS - 303: OPTIMIZATION TECHNIQUES

**CO1:** Knowledge implementation using various optimizing techniques like LPP, theory of games, transportation problems, assignment problem, replacement problem, etc.

1. Linear programming problem (LPP): Theorems related to the development of Simplex algorithm, Proof of the theorems related to a basic feasible solution (b.f.s); Reduction of a feasible solution to a basic feasible solution, Improvement of a basic feasible solution, Existence of unbounded solution, Optimality conditions. For other related theorems, statements only.
2. Artificial variable technique; two phase and Big M method, the case of redundancy. Revised simplex method.
3. Concept of Duality, theorems related to duality, complementary slackness property and development of dual simplex algorithm..
4. Theory of games: two person zero sum games, minimax and maximin principles, Saddle point, mixed strategies; rules of dominance, solution of 2 x 2 game by algebraic method,

- 13 Graphical method, Reduction of the game problem as LPP, Minimax and maximin theorem (without proof).
5. Transportation problem: North-West method, Least – Cost method, Vogel's approximation method, Modi method.
6. Assignment Problem: Introduction, Mathematical Statement, Hungarian Method, Variations of assignment problem.
7. Replacement Problem, Project Management: PERT and CPM, Inventory Control Models, Queuing theory.

**MS - 304: STOCHASTIC PROCESSES.**

**CO1:** Knowledge implementation through gambler's ruin problem, poison process, Birth process, Branching process, etc.

1. Introduction to stochastic process (sp"s): classification of sp"s according to state space and time domain. Countable state markov chain (mc"s), stationary process, classification of states, transition probability, Chapman kolmogorow questions, calculations of n steps transition probability (higher transition probability) and its limit.

2. Random walk and gambler"s ruin problem: effect of changing bet, duration of game, probability of gamblers ruin in exactly n games, one and two dimensional random walk.

3. Poisson process: introduction, probability mass function, probability generating function and property of Poisson process.

4. Birth process: Yule fury process, death process, birth and death process, its distribution, mean and variance, wiener process.

5. Branching process: Galton Watson branching process, its mean and variance, probability of ultimate extinction.

**MS - 305 APPLIED ECONOMETRICS**

**CO1:** Implementation of various econometrics models like GLM, OLS, GLS, etc.

- 1 Nature of econometrics: the general model (GLM) and its existence. Ordinary least square (OLS) estimation and prediction. Use of dummy variables. Generalized least square (GLS) estimation and prediction. Heteroscedastic disturbance.
- 2 Auto correlation, its consequences and tests. Their BLUE procedure. Estimation and prediction. Multi co linearity problem, its implication and tools for handling the problem. Ridge regression.
- 3 Linear regression and stochastic regression. Instrumental variable equation, error in variables. Auto regressive linear regression. Distributed Lag models.
- 4 Simultaneous linear equations model. Examples Identification problem. Restriction on structural parameter rank and order condition.
- 5 Estimation on simultaneously equation model, 2 SLS estimators, limited information estimator, 3 SLS estimation, full information maximum likelihood method. Monte Carlo studies and simulation.

MS - 306 PRACTICAL

**CO1:** Practical implementation of statistical methods, program logic development and data analysis using EXCEL.

SEMESTER-4

MS – 401: Project and Viva

**CO1:** Project and viva study includes implementation of knowledge in real life using following aspects

**CO2:** Problem selection

**CO3:** Objective of study

**CO4:** Significant of study

**CO5:** Literature review

**CO6:** Design of questionnaires.

**CO7:** Gathering a primary and secondary data

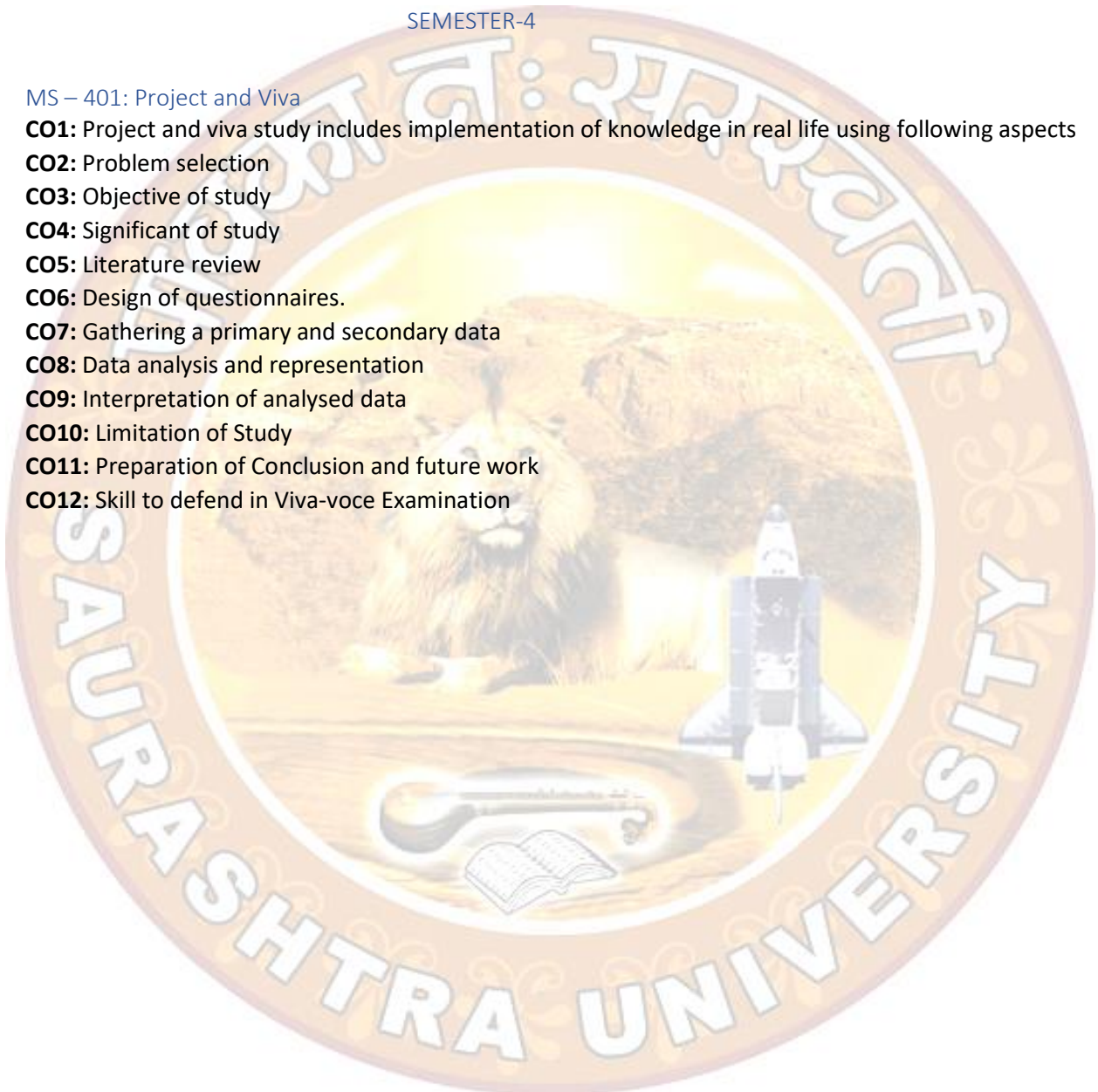
**CO8:** Data analysis and representation

**CO9:** Interpretation of analysed data

**CO10:** Limitation of Study

**CO11:** Preparation of Conclusion and future work

**CO12:** Skill to defend in Viva-voce Examination



## Course Outcome of PGDHM

### SEMESTER – I

#### PAPER I: BIOSTATISTICS

##### Course Outcomes:

**CO1:** Recognize the importance of data collection and its role in determining scope of inference.

**CO2:** To develop appreciation of statistics and modern medical sciences

**CO3:** Collection of biomedical data and its statistical analysis

**CO4:** Developing decision models for prediction of medical principles in health field.

#### PAPER II: PREVENTIVE MEDICINE

##### Course Outcomes:

**CO1:** Preventive Medicine is the medical specialty primarily concerned with the health of populations.

**CO2:** Describe the measure of mortality and morbidity

**CO3:** Measure the validity of diagnostic test from data provided

**CO4:** Describe the various epidemiologic study design and discuss their relative merits

**CO5:** Develop information system in their work situation which can help them in making management decision.

#### PAPER III: HEALTH CARE ADMINISTRATIVE

##### Course Outcomes:

**CO1:** Students will exhibit the knowledge regarding various attributes of leadership and demonstrate the capacity for leadership roles in health care administrative.

**CO2:** Measure the validity of diagnostic test from data provided

**CO3:** Describe the various epidemiologic study design and discuss their relative merits

**CO4:** Develop information system in their work situation which can help them in making management decision.

## **PAPER IV MANAGING PEOPLE AND ORGANISATION**

### **Course Outcomes:**

- CO1:** Identify the roles which are fulfilled while working as a manager. Identify managerial activities that contribute to managerial effectiveness.
- CO2:** Articulate the key elements of management, theory and leadership
- CO3:** Articulate the working concept of an organization and its strategy
- CO4:** Assess his or her effectiveness as a manager and management decision maker
- CO5:** Assess the structure of an organization and differentiate its effectiveness.

## **PAPER V: LABOUR LAW**

### **Course Outcomes:**

- CO1:** Students will know the development and the judicial setup of Labour Laws.
- CO2:** Concepts of various laws concerning with Hospital problem

## **PAPER VI: COMPUTER AND INFORMATION SYSTEMS**

### **Course Outcomes:**

- CO1:** Understand the difference between an operating system and an application program, and what each is used for in a computer.
- CO2:** The main objective of this course is to strengthen the knowledge of the student regarding the usage of the computer and its application in information systems, especially in hospital management.

## **SEMESTER-II**

## **PAPER VII: OPERATIONS RESEARCH**

### **Course Outcomes:**

- CO1:** Identify and develop operational research models from the verbal description of the real system.
- CO2:** To introduce the concepts, models and techniques related to quantitative aspects of decision making and control.
- CO3:** To develop skills in utilizing operations research techniques for help in decision making

## **PAPER VIII: FINANCE OF HOSPITAL**

### **Course Outcomes:**

- CO1:** Student will lead to problems with aging hospital infrastructure and Demonstrate an understanding of healthcare financial management.
- CO2:** The basic concepts of Financial Accounting, Cost Accounting, Management Accounting and Financial Management and enable them to analyze and interpret the financial statements for proper decision making in the realms of Finance and Cost Management and Control. Aim will be to relate these to hospitals and health care system.

## **PAPER-IX HOSPITAL SUPPORTIVE AND UTILITY SERVICES**

### **Course Outcomes:**

- CO1:** Hospital support and utility services in providing quality patient care.

## **PAPER X: HOSPITAL ADMINISTRATION**

### **Course Outcomes:**

- CO1:** Develop awareness of the responsibilities of senior hospital management, including understanding the role and functions of hospitals
- CO2:** The course deals with concepts, models and techniques to help the hospital administrator with quantitative methods for decision making and control in health management operations.

## **PAPER XI: TECHNICAL COMMUNICATION**

### **Course Outcomes:**

- CO1:** This course develops an understanding of how technical communication and clearly convey specialized information from a technical field to a non-specialized audience.
- CO2:** The main objective of the course is to inculcate the skills of technical communication relevant to the students' world of the work. This objective is to be realized by developing oral and written communication skills and by providing practice in their use for various communicative tasks performed by them in discharging their duties as professionals.

## PAPER–XII PROJECTS AND VIVA

### Course Outcomes:

**CO1:** The main purpose of project is to inform action, to prove a theory, and contribute to developing knowledge in a field work or study

**CO2:** Every students has to undergo for a survey and to collect either primary or secondary data for any hospital directed by department and then to analyse the data after which the report will be submitted in hide binding. A viva-voce will also take place which will be as a part of project

