2.6 Students Performance and learning Outcomes

2.6.1 Programs outcomes, program specific outcomes and course outcomes for all programs offered by the institution are stated and displayed at in website of the institution (To provide the weblink)

Program Outcomes: Faculty of Science and Technology

After completion of degree of Bachelor of Science a student should have:

(Knowledge and Understanding)

PO1: Acquired the knowledge with facts and figures related to various subjects in pure sciences such as Physics, Chemistry, Botany, Zoology, Mathematics,Computer science etc.

PO2: Understood the basic concepts, fundamental principles, and the scientific theories related to various scientific phenomena and their relevancies in the day-to-day life.

PO3: Realized that knowledge of subjects in other faculties such as humanities, performing arts, socialsciences etc. can have greatly and effectively influence which inspires in evolving new scientific theoriesand inventions.

PO4: Developed scientific outlook not only with respect to science subjects but also in all aspects related to life.

Cognitive (Thinking) Skills (Critical, Analytical, Problem Solving, Innovation)

PO5: Analyzed the given scientific data critically and systematically and the ability to draw the objective conclusions.

PO6: Been able to think creatively (divergently and convergent) to propose novel ideas in explainingfacts and figures or providing new solution to the problems.

PO7: Realized how developments in any science subject helps in the development of other science subjects and vice-versa and how interdisciplinary approach helps in providing better solutions and new ideas for the sustainable developments.

PO8: Imbibed ethical, moral and social values in personal and social life leading to highly cultured and civilized personality.

Practical Skills

PO9: Acquired the skills in handling scientific instruments, planning and performing in laboratory experiments and the skills of observations and drawing logical inferences from the scientific experiments.

PO10: Developed various communication skills such as reading, listening, speaking, etc., which we will help in expressing ideas and views clearly and effectively and develop team spirit.

PO11: Realized that pursuit of knowledge is a lifelong activity and in combination with untiring efforts and positive attitude and other necessary qualities leading towards a successful life.

PO12: Developed flair by participating in various social and cultural activities voluntarily, in order to spread knowledge, creating awareness about the social evils, blind faith, etc.

Program Outcomes: Faculty- Arts

After completion of degree of Bachelor of Arts a student should have:

(Knowledge and Understanding)

PO1: Acquired the knowledge with facts and figures related to various subjects such as History, Geography, Economics, Languages, etc

PO2: Understood the basic concepts, fundamental principles, and various theories in the above mentioned subjects.

PO3: Realized the importance of literature in terms of aesthetic, mental, moral, intellectual development of an individual and accordingly of the society.

PO4: Understood how issues in the social science get influenced by the literature and how the literature can provide solutions to the social issues.

Cognitive (Thinking) Skills (Critical, Analytical, Problem Solving, Innovation)

PO5: Gained the analytical ability to analyze the literature and social issues to appreciate the strength and to suggest the improvements for better results.

PO6: Appreciated that social issues are no longer permanent and largely depend on the political and theeconomical changes.

PO7: Convinced himself/herself that the study of literature and social sciences are not only helpful to evolve better individual and better society but also helpful to make the life of an individual more happy and meaningful.

PO8: Participated in various social and cultural activities voluntarily.

Practical Skills

PO9: Written articles, novels, stories to spread the messages of equality, nationality, social harmony and other human values.

PO10: Emerged as a multifaceted personality who is self-dependent; earning his own bread and butter and also creating opportunities to do so.

PO11: Realized that the pursuit of knowledge is a lifelong process and one can achieve the success only with untiring efforts and positive attitude.

PO12: Developed various communication skills such as reading, listing, speaking, etc., which will be helpful in expressing ideas and views clearly and effectively and develop team spirit.

Nilkanthrao Shinde Science and Arts College, Bhadrawati, District – Chandarpur

ACADEMIC SESSION : 2019-2020

DEPARTMANT OF ZOOLOGY - UG

Program Outcomes : B.Sc. Zoology (C.B.C.S.)

- **PO1** **Critical thinking**: The curriculum helps to enhance the ability and thinking power of students
- **PO2** **Ethics**: Students learn ethical approach to conserve diversity of animal kingdom.
- **PO3** **Self Directed and Life Long Learning**: Engage in lifelong learning, apply the knowledge judiciously and remain continuously employable.
- **PO4** Aware students about knowledge and skill in the fundamentals and systematic of animal kingdom, with respect to non chordate and chordate.
- **PO5** Gain knowledge of anatomical structure and various metabolic functions of organisms
- **PO6** Understand various physiological processes at molecular level of animals from different phyla
- **PO7** To gain information and skill of advanced biological techniques
- **PO8** Awareness about environment and its conservation processes, pollution control and its importance
- **PO9** To gain knowledge about aquatic ecosystems of the world and the processes therein
- **PO10** Information and skill of applied zoology including sericulture, apiculture, fisheries, poultry, agricultural pests and their control, microtechnique, bioninformatics and immunology.
- **PO11** Understand about various concepts of genetics and its importance in social well being.
- **PO12** Make Aware students about animal behavior and evolution
- **PO13** Understand the processes about developmental biology
- **PO14** Gain knowledge of communicable and non-communicable diseases to improve personal and public health
- **PO15** **Effective Citizenship:** Work in ever changing world and be responsive to the changing needs of the society.

Program Specific Outcomes : B.Sc. Zoology (C.B.C.S.)

After Completion of Bachelor of Science Course with Subject Zoology the students will :

- **PSO1** To provide knowledge of various animals from primitive to highly evolved forms.
- **PSO2** Acquire the knowledge with clear concept and facts in various branches of zoology. Understand the nature and basic concept of Taxonomy, Cell biology, Genetics, Physiology, Applied Zoology, Developmental Biology, and Environmental Biology.
- **PSO3** To understand potential of various branches of zoology.
- **PSO4** Apply the knowledge of zoology in higher studies and understand various applications of biological sciences in fisheries and Poultry.
- **PSO5** To equip students with laboratory skills as well as field based studies to become an sussessful entrepreneur.
- **PSO6** Apply this knowledge for competitive subject oriented exams such as Fisheries Development Officer, Forest Officer, CIFA, Central and State Govt. services, and jobs through competitive examinations.
- **PSO7** Apply knowledge in Sericulture, Apiculture, Vermiculture, Lac Culture, Pearl Culture and Aquaculture and develop employability skills.
- **PSO8** Utilize knowledge in analyzing various biological data in problem solving and drawing better conclusion and develop ability to identify common fauna of surrounding areas and also find out various health risk factors.
- **PSO9** To conduct basic and applied research which has societal and environmental value.
- **PSO10** To make aware about ways of conservation and sustainability.
- **PSO11** Develop communication skills, which helps in expressing views and ideas clearly and effectively to get projects and develop respect for nature and its conservation.

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Course Outcomes : B.Sc. Zoology (C.B.C.S.)

B.Sc. Semester - I (C.B.C.S.)

Paper - I : Animal Diversity of Non Chordate (Protozoa to Annelida)

CO1 Distinguish invertebrate phylum Protozoa, Porifera, Coelenterata, Platyhelminthes, Nemathelminthes and Annelida

CO2 Describe general characters and classification of Phylum Protozoa upto Annelida

CO3 Learn about diseases caused by parasitic helminthes.

CO4 Understand the role of various anatomical systems in invertebrate phyla from protozoa to annelida.

CO5 Familiarize with the larval forms and its significance

CO6 The student knows his role in nature as a protector, preserver and promoter of life which he has achieved by learning, observing and understanding life.

Paper-II : Cell Biology

CO1 Develop deeper understanding of what life is and how it functions at cellular level

CO2 Explain the principles of cell theory.

CO3 Differentiate between prokaryotic and eukaryotic cell

CO4 Describe cellular membrane structure, fine structure and functions of cell organelles

CO5 Understand the energy metabolism in mitochondria.

CO6 recognize giant chromosome and explain its structure and function.

CO7 Understand cell division and its significance.

Practical

After completion of this course students will be able to

CO1 Identify and classify the invertebrate laboratory specimen upto class level

CO2 Identify and describe the larval forms and the slides of invertebrates.

CO3 Perform mitotic cell division in onion root tip by squash method.

B.Sc. Zoology Semester- II (CBCS)

Paper I : Non Chordate- Arthropoda to Hemichordata

CO1 The student will be able to understand classify and identify the diversity of animals

CO2 The student knows his role in nature as a protector, preserver and promoter of life which he has achieved by learning, observing and understanding life.

CO3 Study of phylum mollusca with respect to its general characters and classification and study of pila globosa with respect to its digestive system, nervous system, reproductive system and copulation

CO4 Knowledge about pearl and its formation

CO5 General characters and classification of phylum echinodermata

CO6 Study of water vascular system in asterias and larval stages

CO7 General characters and classification of balanoglossus and its various sytems, tornaria larva and affinities of balanoglossus

Paper II : Genetics and Evolution

CO1 Introduction to genetics , mendelian genetics and interaction of genes

CO2 Sex linked inheritance and extra chromosomal inheritance

CO3 Linkage crossing over and syndromes

CO4 History of life with respect to evolutionary theories, direct evidences to evolution

CO5 Processes of evolutionary changes with respect to isolating mechanisms

CO6 Types of natural selection, artificial selection

CO7 Species concept, Macro evolution, Phenomenon of mass extinction, causes, and role of extinction

Practical

CO1 Classification of phylum arthropoda to hemichordate with examples

CO2 Study of slides of different invertebrate larvae and balanoglossus

CO3 Anatomical observations with the help of ICT Tools for digestive system of cockroach and pila

CO4 Identification of wild and muant drosophila

CO5 Study of thalasemia and sickle cell anaemia

CO6 Demonstration of monohybrid and dihybrid cross ratio

CO7 Study of blood groups and barr body in buccal smear

CO8 Study of pictures of human chromosome anomalies and parallel and divergent evolution

Semester-III (CBCS)

Paper-I : Animal Diversity (Chordates) and Comparative Anatomy

CO1 General characters and ascidian tadpole larva and its retrogressive metamorphosis.

CO2 Amphioxus general characters and digestive system.

CO3 Cyclostomata general characters and external morphology.

CO4 Amphibia general characters and classification, parental care.

CO5 Aves general characters and classification, flight adaptations in birds.

CO6 Mammals general characters and classification upto order, prototheria and metatheria

CO7 Comparative anatomy of urinogenital system

CO8 Types of receptors, comparative account of integument and its derivatives, comparative account of aortic arches and heart

Paper-II : Physiology and Biochemistry –I

CO1 Knowledge of basic terms in physiology

CO2 Understand the composition of food and mechanism of digestion absorption and assimilation

CO3 The student will be able to understand the physiological processes in mammals

CO4 Explain the anatomy of various systems

CO5 Gain knowledge of working of kidney

CO6 General properties of enzymes, their classification and factors affecting enzyme activity

CO7 Nutrition and digestion with respect to structure and functions of digestive glands

CO8 Mechanism of respiration, transport of O2 and CO2 and respiratory pigments, respiratory disorders

Practical

CO1 Identification and classification of museum specimens representing phylum urochordata to mammals

CO2 Anatomical observations with ICT for digestive system, reproductive system, and brain and cranial nerves

CO3 Study of skeleton of rabbit or fowl

CO4 Study of permanent slides of fish scales and skin of frog and mammals

CO5 Study of histological slides of mammals

CO6 Study of activity of salivary amylase under optimal conditions

Semester IV (CBCS)

Paper- I : Developmental Biology

CO1 Understand the process of development of animals

CO2 Understand the process of organogenesis of selected organs, development of extra embryonic membrances and the nature and physiology of placenta

CO3 Know the process of Spermatogenesis and Oogenesis

CO4 Understood the process of fertilization its mechanism and significance

CO5 To know the process of early development with respect to types of eggs, its composition, fertilization, cleavage and blastulation process.

CO6 To understand the frog and chick embryology

CO7 To understand the concept of apoptosis, stem cells, IVF, and semen bank and artificial insemination and contraceptives.

Paper- II : Physiology and Biochemistry

CO1 To gain and understand the in depth knowledge of structure of kidney, normal and abnormal constitutions of urine, mechanism of urine formation,

CO2 To understand the structure and functions of pituitary gland, thyroid gland and adrenal gland in detail

CO3 To know the process of Oestrous and Menstrual Cycle in mammals

CO4 To understand nerve and muscle physiology and its aspects in mammals

CO5 To know process of circulation in man ,blood clotting factors in detail and ECG and Blood pressure aspects in detail.

Practical

CO1 To know Developmental biology of frog and chick through slides

CO2 Detection of urea, albumin, sugar and creatine in human urine

CO3 Sperm count of mammals

CO4 Prepration of haemin crystals in human blood and estimation of amino acids using ninhyudrin reaction

Semester- V (CBCS)

Paper- I : Applied Zoology

CO1 Gain knowledge to define the concepts of the applied subjects like fisheries, aquaculture and pest control.

C02 The student will be able to identify, freshwater and marine water fishes

CO3 Gain knowledge to explain the tools and techniques used in aquaculture and agricultural practices

CO4 Describe the common agricultural pests from nearby area.

Paper- II : Aquatic Biology

CO1 Concept of aquatic ecosystems with respect to freshwater ecosystems, estuarine ecosystems and oceanic pelagic and benthic zone

CO2 Lakes origin and classification, their physico- chemical characteristics

CO3 Nutrient cycles in oceans with respect to nitrogen, sulphur and phosphorus cycles.

CO4 Marine ecosystems, adaptations of deep sea organisms and coral reefs

CO5 Aquatic pollution, causes

CO6 Eutrophication and its management

CO7 Water Pollution Acts of india and sewage treatment and water quality assessment with respect to BOD and COD

Practical

CO1 To estimate the physico- chemical characteristics of water with respect to Dissolved Oxygen, Carbon Di Oxide, Alkalinity and turbidity

CO2 Qualitative and quantitative analysis of zooplankton

CO3 Identification of freshwater fishes

CO4 Instruments used in limnology and their significance

Semester –VI (CBCS)

Paper - I : Microtechnique, Bioinformatics and Biostatistics

CO1 Concept of resolving powers of different microscopes, Scanning and transmission electron microscopy

CO2 Different fixation and staining techniques for Electron microscopy, Freeze etch

CO3 Concept of image processing method in microscopy

CO4 Structure and working of microtomes

CO5 Fixation, dehydration, staining embedding and section cutting

CO6 Double staining technique with respect to haematoxyline and eosin and histochemical staining techniques with respect to carbohydrates, proteins, and lipids

CO7 Bioinformatics and its tools, biological databases and applications of bioinformatics

CO8 Measures of central tendency, regression and correlation, t test, chi square test and analysis of variance

Practicals

CO1 Studies of electron microscope photographs SEM and TEM

CO2 Preprations of different grades of alcohol and fixatives and staining solutions

CO3 Use of BLAST and FASTA for retrieval of information

CO4 Prepration of phylogenetic tree

CO5 Collection of data and prepration of standard deviation, standard error and line graph,bar graph, pie diagram using Excel software

Paper-II: Reproductive Biology

CO1 Reproductive system in man

CO2 Hypothalamo hypophysial axis, regulation

CO3 Gonadal hormones types and mechanism

CO4 Reproductive endocrine disorders in male and females

CO5 Histology of male reproductive system in rat and man, structure of testis, epididymis, accessory sex glands, cryptorchidism and castration

CO6 Histology of female reproductive system in rat and man, ovary structure , folliculogenesis, ovulation and formation of corpus luteum

CO7 Gestation,pregnancy diagnosis, foeto maternal relationship, mechanism of parturition and its hormonal regulation

CO8 Lactation and its regulation

CO9 To know the Infertility in male and female causes, diagnosis and management, assisted reproductive technology, IVF, ET, ZIFT, ICSI, modern contraceptive measures

CO10 knowing the Demographic terminologies used in family planning

Practical

CO1 Study of modern contraceptive devices

CO2 examination of vaginal smear in rat

CO3 Pregnancy diagnosis in women

CO4 Principles of surgery in endocrinology

CO5 Analyzing the animal house and its maintainance

CO6 Observations of histological sections from photomicrographs

CO7 Sperm count experiment

SKILL ENHANCEMENT COURSE : For Sem V and Sem VI (CBCS)

SEM V (CBCS) : Apiculture

CO1 History of bee keeping

CO2 Traditional and modern bee keeping

CO3 Types of honey bees

CO4 Life Cycle of Queen,Drone,Workers

CO5 Basic requirements of toolos for starting bee keeping

CO6 Bee keeping equipments

CO7 Economic importance of honey

CO8 Processing of honey

SEM VI (CBCS) : Public Health and Hygiene

CO1 Blood composition

CO2 Blood Groups

CO3 Normal and abnormal constitutents of urine

CO4 Diabetes causes, symptoms ,types

CO5 Tuberculosis causes, types, symptoms, diagnosis

CO6 Hepatitis causes, types, symptoms, diagnosis

CO7 Types of tumors

CO8 Medical imaging, X ray, Ultrasonography, MRI CT Scan

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DEPARTMANT OF ZOOLOGY – P.G.

Nilkanthrao Shinde Science and Arts College, Bhadrawati, District – Chandarpur

Program Outcomes : M.Sc. Zoology (C.B.C.S.)

ACADEMIC SESSION : 2019-2020

PO1 It helps to develop scientific temper and thus can prove to be more beneficial for the society as the scientific developments can make a nation or society to grow at a rapid pace.

PO2 After the completion of this course students have the option to go for higher studies i.e. Doctoral Research and then do some research for the welfare of mankind.

PO3 After higher studies student can join as scientist and can even look for professional oriented courses.

PO4 Students after this course have the option to join Indian Civil services as IAS,IFS officers.

PO5 Science graduate can go to serve in industries or may opt for establishing their own insustrial units.

PO6 After the completion of the M.Sc. Degree there are various other options available for the science students. Often in some reputed universities or colleges in India and abroad. The students are recruited directly by big MNC/s after their completion of the course.

PO7 Apart from research jobs, students can also work or get jobs in marketing, business and other technical fields. P.G. graduates also recruited in the bank sector and find employability in government sectors.

PO8 Science exhibitions, tours, seminars increase their interactive power with others.

PO9 Study of Zoological /life sciences helps them to conserve nature and control pollution of natural resources.

PO10 Innovative Programs organized for them make them innovative to tackle common problems in various fields of life.

PO11 Student gain a deep knowledge of theory, practical and dissertation i.e Project Work and seminar.

PO12 The teaching module helps to develop skill and scientific temperament for research and also develop their overall personality.

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P.G. ZOOLOGY (CBCS)

PROGRAM SPECIFIC OUTCOMES

PSO1 Students develop in depth knowledge of theory, practical and dissertation i.e project work and seminar, which will help them in pursuing research.

PSO2 The teaching modules help to develop skill, scientific temperament for research and also develop their overall personality.

PSO3 Science exhibitions, tours, seminars increase their interactive power with others, which will help them to do innovations beneficial to the society.

PSO4 Study of zoological/life sciences help them to conserve nature and control pollution of natural resources, through scientific management practices relevant in modern times.

PSO5 Innovative programmes organized for them make them innovative to tackle common problems and provide jobs to students.

PSO6 Participation in various programmes builds their confidence which helps them to interact with different individuals in the society and work for the well fare of the community at large.

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COURSE OUTCOME- M.SC. ZOOLOGY (CBCS)

M.Sc. Sem –I (CBCS) Zoology

Paper I : Structure and Function of Invertbrates

CO1 Describe general taxonomic rules on animal classification and modern scheme of animal classification.

CO2 Ultrastructuer of protozoan locomotory organs and mechanism of various modes of locomotion

CO3 Skeletal organization of calcareous sponges

CO4 Polymorphism and metagenesis in coelenterates

CO5 Understand the concept of origin of metazoan

CO6 Coelome and metamerizm

CO7 Evolution of nephridia and its mechanism of excretion

CO8 Peripatus structure, affinities and taxonomic position.

CO9 respiratory organs and mechanism of respiration in crustacean and insect.

CO10 Structure, affinities and taxonomic position of neopilina.

CO11 Neuroanatomy in gastropoda, bivalvia and cephalopoda.

CO12 Structure and function of water vascular system of echinodermata.

CO13 Larval forms of echinodermata.

CO14 Ctenophora and rotifer general account and affinities.

CO15 General account and affinities of entoprocta and ectoprocta

CO16 reproductive system and mechanism of reproduction in dugesia, taenia, ascaris and fasciola.

Paper II : General Physiology

CO1 Students are taught the detailed concept of enzymes, respiratory pigments, neurotransmitters and color change mechanism

CO2 Students are taught the concept of bioluminescence, thermoregulation and osmoregulation and molecular mehanism of peptide and steroid hormonal action.

CO3 Students are taught the concept of myogenic and neurogenic heart, cardiac cycle, ECG and Pace maker.

CO4 Students are taught the concept of digestion and absorption f carbohydrates, proteins and lipids in G.I.tract.

CO5 Carbohydrates classification and metabolism.

CO6 Lipids classification and metabolism

CO7 Hydromineral metabolism

CO8 Cerebrospinal fluid

CO9 Mechanism of reflex action

CO10 Understanding the physiology of environmental stress and strain.

Paper- III : Cell Biology & Genetics

CO1 Structural and functional aspects of cell organelles

CO2 Membrane structure and function

CO3 Structure and function of microtubules

CO4 Cell division and cell cycle

CO5 Concept of cell signaling

CO6 Signal transduction pathways

CO7 Cellular communication

CO8 Cancer and metastasis

CO9 Mendelian and non Mendelian inheritance

CO10 Extension of mendelian principles

CO11 Quantitative genetics

CO12 Concept of mutation, types and causes

CO13 Alterations of chromosomes

CO14 Extrachromosomal inheritance

CO15 Microbial genetics and gene mapping

CO16 Human genetics with respect to pedigree analysis, lod score, karyotypes and genetic disorders.

Paper IV : Advanced reproductive Biology

CO1 Methods of asexual and sexual reproduction in protozoa

CO2 Regeneration, morphogenesis and hormonal control.

CO3 Concept of metamorphosis in insects

CO4 Mechanism of vitellogenesis in insects

CO5 Process of spermatogenesis and its hormonal control

CO6 Mechanism of OOgenesis

CO7 Cytological and molecular mechanism of fertilization

CO8 Cleavage types, blastulation, gastrulation and embryonic induction.

CO9 Male accessory sex glands in mammals

CO10 Semen biochemical composition and sperm abnormality

CO11 Sperm capacitation and decapitation

CO12 Pheromones and sexual behavior in mammals

CO13 Neurohormonal control of fish reproduction and vitellogenesis mechanism

CO14 Molecular induction and organizer concept

CO15 Cryopreservation of gametes, embryo and test tube baby

CO16 In vitro fertilization and its signigicance

Practical I : Structure and Function of Invertebrates and General Physiology

CO1 Study of museum specimens and classification upto order

CO2 Anatomical observations

CO3 Mounting : whole mount preparation

CO4 Study of permanent invertebrate slides

CO5 Physiology experiments viz. TLC, total RBC Count, demonstration of salivary amylase action, rate of O2 consumption, haemoglobin concentration,

CO6 Estimation of sodium, potassium, and chloride in blood

CO7 Estimation of glucose

CO8 estimation of total blood proteins

CO9 estimation of cholesterol in blood

Practical II : Cell Biology, Genetics and Advanced Reproductive Biology

CO1 Study of mitotic metaphasic chromosomes in plant material

CO2 Prepration of human karyotypes

CO3 Demonstration of human karyotypes in human female leucocytes

CO4 Demonstration of polytene chromosomes in diptearn larvae

CO5 Problems on genetics based on mono hybrid and di hybrid cross ratios

CO6 Study of various human genetic traits

CO7 Study of spermatogenesis in grasshopper

CO8 Demonstration of Oogenesis in earthworm

CO9 Semen analysis

CO10 Hypoosmotic swelling for the assessment of normal semen

CO11 Study of vaginal smear in rat

CO12 histology of male and female reproductive organs and accessory repdocutive glands

M.Sc. Sem- II (CBCS) : Zoology

COURSE OUTCOME

Paper V : Structure and Function of Vertebrates

CO1 Origin and ancestry of chordate

CO2 Cephalochordata general organization and affinities

CO3 Structure, development and methamorphosis of ammocoetus

CO4 General characters and affinities of dipnoi.

CO5 Organs and mechanism of respiration in pisces and amphibian

CO6 Vertebrate integument and its derivatives

CO7 Appendicular skeleton in amphibian, reptilian, aves and mammalian

CO8 General body organization and classification of chelonian

CO9 Evolution of urinogenital organs in vertebrates

CO10 Origin of birds

CO11 Genral characters and adaptations of cetacean

CO12 Comparative anatomy of the brain in vertebrates

CO13 Autonomous nervous system in vertebrates, structure and functions

CO14 Evolution of heart in vertebrates

CO15 Sense organs in vertebrates

CO16 Evolution of man

Paper VI : Comparative Endocrinology

CO1 Hormones and functions in coelenterate and helminthes

CO2 Neurosecretory system in annelid structure,hormones and functions

CO3 Neuroendocrine system in mollusca, structure, hormones and functions

CO4 Hormones and functions in echinodermata

CO5 Neuroendocrine system in crustacean, structure and hormones

CO6 Endocrine control of metamorphosis, reproduction and colour change mechanism in crustacean

CO7 Cephalic neuroendocrine system in insects, structure and hormones

CO8 Endocrine control of metamorphosis and reproduction in insects

CO9 Paineal organ, structure hormones and functions

CO10 Hypothalamohypophysial system, structure

CO11 Pituitary cell types, hormones and functions

CO12 Thyroid structure, hormones and functions

CO13 Parathyroid, ultimobranchial glands, structure, hormones and regulatory mechanisms

CO14 Gastroentero pancreatic endocrine system

CO15 Adrenal gland, structure, hormones and functions

CO16 Gondal hormones in vertebrates and their hormonal action, feedback mechanism

Paper VII: Molecular Biology and Biotechnology

CO1 Organelle genome, cot and rot values, DNA structure, forms

CO2 DNA Replication

CO3 DNA damage and repair

CO4 Mismatch repair, recombination repair, double strand break repair

CO5 Transcription

CO6 regulation of transcription

CO7 Translation

CO8 Mobile DNA elements

CO9 Antisense and ribozyme technology

CO10 Isolation and sequencing of DNA, gene amplification and techniques

CO11 Splicing and cloning

CO12 Hybridization techniques

CO13 Medical biotechnology

CO14 Agricultural biotechnology

CO15 Immunobiotechnology

CO16 Industrial and environmental biotechnology

Paper VIII : Advanced Developmental Biology

CO1 Implantation in mammals

CO2 Foetal membranes, types,structure and functions

CO3 Placenta, structure, functions, hormones

CO4 Metamorphosis in amphibian

CO5 regeneration in vertebrates

CO6 Apoptosis

CO7 Agweing

CO8 Polymorphism

CO9 Multiple Ovulation and Embryo Transfer Technology

CO10 Application of embryonic stem cells

CO11 To know about Embryonic sexing, cloning

CO12 Cloning of animals by nuclear transfer

CO13 To gain knowedge about Immunocontraception

CO14 To know about Classical contraceptive techniques

CO15 Anti androgen and anti-spermiogenic compounds

CO16 Role of mutants and transgenics in human welfare.

Practical III : Structure and function of vertebrates and comparative Endocrionology

CO1 Classification of vertebrates upto order and comments representing all vertebrate phyla

CO2 Anatomiacl observations

CO3 Mounting

CO4 Microtomy, histology and skeleton study of fowl and rabbit

CO5 Microtomy

CO5 Histological study

CO6 Anatomical observations

Practical IV : Molecular Biology, Biotechnology and Developmental Biology

CO1 Demonstration of arbohydrates

CO2 Demonstration of DNA

CO3 Demonstration of RNA

CO4 Demonstration of Lipids

CO5 Demonstration of Protein

CO6 Histochemical analysis of alkaline phosphatase

CO7 Histochemical analysis of acid phosphatase

CO8 Biochemical estimation of sugar

CO9 Biochemical estimation of Protein

CO10 Biochemical estimation of DNA

CO11 Biochemical estimation of RNA

CO12 To perform test for qualitative analysis of bile

CO13 Sepration of amino acids by Paper chromatography

CO14 Study of reproductive system in mammals

CO15 Study of different types of eggs

CO16 Study of developmental stages of lymnaea

CO17 Study of developmental stages of insects

CO18 Study of developmetanl stges of frog

CO19 Morphological study of different types of placenta

CO20 Histological study of placenta

CO21 Sperm count expt.

M.SC. SEM –III (CBCS)

COURSE OUTCOME

PAPER IX : PARASITOLOGY AND IMMUNOLOGY

CO1 To know about Life cycle mode of transmission and infection of vibrio cholera and clostridium tetani

CO2 To know about Yersinia pestis life cycle, mode of transmission, infection and treatment

CO3 To gain knowedge about Influenza and H1N1 Viruses life cycle, mode of transmission, infection and treatment.

CO4 To know about Dengue and hepatitis life cycle, mode of transmission, infection and treatment.

CO5 To know about Trypanosoma and entamoeba

CO6 To know about Leishmania and malaria in detail

CO7 Wuchereria and trichinella

CO8 Toxins and antitoxins

CO9 Immune system innate and adaptive immunity, antigens and antibodies and its interaction

CO10 Cells and organs of immune system

CO11 Major histocompatibiloity Complex

CO12 Complement system classical, alternative and lectin pathways, regulation of complement system

CO13 Cytokine receptors, properties of cytokines, cytokine receptors

CO14 Hypersensitivity reactions, types, mechanisms

CO15 Transplantation immunology, blood antigens, transplantation rejection

CO16 Tumor immunology, types and roles of tumor antigens, immune response to tumor, Immunotechnique RIA and ELISA

Semester – III Paper X- Special Group- Aquaculture-I

Fresh Water Aquaculture

CO1 Aquaculture, definition, importance and present status in India

CO2 To gain knowledge of Physicochemical conditions of pond water

CO3 To gain knowledge about Biological conditions aquatic vegetation, association of macro vegetation

CO4 Plankton seasonal distribution, diurnal movement and its role in fisheries

CO5 Pond soil, chemical conditions

CO6 Pond ecosystem, trophic level, food chain and food web in pond

CO7 Methods of productivity measurement

CO8 Planning and construction of fresh water fish farm

CO9 Biology of culturable indigenous carps

CO10 Biology of culturable exotic carps

CO11 Reproductive system and breeding behavior of Indian carps

CO12 Fisheries of major river systems in India

CO13 Riverine collection of fish seed

CO14 Fish breeding in wet and dry bundhs

CO15 Induced breeding by hypophysation

CO16 Hatching techniques and types of hatcheries

Semester – III
Paper XI- Special Group- Aquaculture- II
Aquaculture and Rural Development

CO1 Culture of zooplankton

CO2 Prawn culture and methods of breeding

CO3 Culture of crabs

CO4 Pearl cultue and oyster culture

CO5 Development and advancement of aquaculture in india

CO6 Larvivorous fishes in relation to public health

CO7 Culture of exotic and transplanted fishes

CO8 Breeding and care of fresh water aquarium fishes

CO9 Definition of economics and application of economic principles to aquaculture

CO10 Aquaculture and rural development in India

CO11 Role of FFDA in development of aquaculture in India

CO12 Fishery extension techniques

CO13 Socio-economic status of fishermen community

CO14 Fisheries co-operatives and their role in fish production and marketing

CO15 Organization and operational problems in fisheries co-operative societies

CO16 Fishery legislation and their role in fishery development

Semester –III

Paper- XII- Foundation - I

Fresh Water Fisheries

CO1 Brief outline of riverine fisheries

CO2 Lacustrine and reservoir fisheries

CO3 Physico-chemical characteristics of fresh water

CO4 Construction and layout of ideal fish farm

CO5 History of fish culture in India

CO6 Brief outline of commercially important species of fresh water fishes and prawns, indian and exotic carps, cat fishes, snake headed fishes and macrobrachium sps.

CO7 Present status, scope and importance of fisheries

CO8 Fishery products and bye products

CO9 Induced breeding

CO10 Bundh breeding

CO11 Fish seed production by Chinese circular hatchery

CO12 Transportation of brood fish and fish seed

CO13 Food and feeding habits of commercially important fishes

CO14 Nutritional requirements of fish

CO15 Artificial feeds and their composition

CO16 Crafts and gears used in fresh water fish capture.

Semester – III

Practical V- Parasitology and Immunology

CO1 Study of different types of parasitic protozoa

CO2 Study of different types of parasitic helminthes

CO3 Study of different types of helminthes

CO4 Study of various ecto and eodo parasites

CO5 Study of different types of insect vectors

CO6 Study of life cycles of different parasites

CO7 Demonstration of Gram positive and negative bacteria

CO8 Demonstration of immune electrophoresis

CO9 Immunological diagnosis of pregnancy

CO10 Identification of T and B cells

CO11 Demonstration of double diffusion

Sem –III Practical VI- Special Group – Aquaculture

CO1 Physicochemical analysis of pond water for determination of PH, turbidity, DO, Free

CO2 Ammonia, Alkalinity, Hardness, Nitrates and Phosphates

CO2 Physicochemical analysis of pond soil to determine its texture, PH, particle size, available nitrogen, phosphorus and free $CaCO_3$

CO3 Qualitative and quantitative study of plankton and benthos

CO4 Study of food chain in fresh water pond ecosystem

CO5 Estimation of primary productivity by light and dark bottle method

CO6 Identification of local fish fauna

CO7 Identification and classification of Indian and exotic carps

CO8 Anatomical observations on pituitary gland of carp and catfish

CO9 Visit to fish seed hatchery

M.Sc. Semester –IV (CBCS) Paper-XIII

Biotechniques, Biostatistics, Ethology, Toxicology and Bioinformatics

CO1 Sterilization techniques, media for microbial culture, inoculation methods

CO2 Animal cell and tissue culture

CO3 Basic principles of sedimentation and centrifugation, radioactive isotopes

CO4 Chromatographic sepration –TLA and GC, Electrophoretic sepration techniques

CO5 Cental tendency and dispersion

CO6 Probability and probability distribution

CO7 Sampling types, standard error, standard deviation, significance tests

CO8 Neuronal control, genetic and environmental components in development of animal behavior

CO9 introduction and scope of toxiciology

CO10 entironmental toxicology

CO11 translocation of toxicants

CO12 Toxicity tests types, calculation of LC50

CO13 Introduction and scope of bioinformatics

CO14 Sequence alignment

CO15 Biological databases

CO16 Phylogenetic analysis, tree style, tree building methods

Semester IV : Paper – XIV : Special Group- Aquaculture-III

Aquaculture and Management

CO1 Prepration of pond

CO2 Prestocking management of nursery,rearing and stocking ponds

CO3 Control of aquatic weeds

CO4 Post stocking management

CO5 Nutritional requirement o culturable carps, supplementary feeding, artificial feed.

CO6 transport of live fish seed

CO7 effect of dams on fisheries

CO8 Development of reservoir fisheries in india

CO9 Different systems of aquaculture

CO10 Polyculture of Indian and exotic carps

CO11 Culture of air breathing fishes

CO12 Extensive, intensive, semi intensive and super intensive culture

Semester IV : Paper XV : Special group- Aquaculture- IV

Fish Pathology and Fish Genetics

CO1 Biochemical composition of raw fish

CO2 Nutritional value of raw and preserved fish

CO3 Fish preservation objectives and principles

CO4 Methods of fish preservation

CO5 Fish decomposition, rigor mortis and fish spoilage

CO6 Poisoning, toxicity and allergies from fish as food

CO7 Effect of water pollution on fishes

CO8 Fish products and by products

CO9 Fungal, bacterial, protozoan diseases of fram fishes

CO10 Nutritional diseases of fish

CO11 Worm and crustacean diseases of farm fish

CO12 Diseases caused by aquatic pollutants

CO13 Fish genetic resources and its application in fisheries management

CO14 Hybridization, transgenic fish

CO15 gene banking and application of genetic engineering in aquaculture

CO16 Cryopreservation of gametes

Sem IV- Practical VII : Special group – Aquaculture

CO1 Study of feeding habits of herbivorous carnivorous and omnivorous fish by gut content analysis

CO2 Identification of egg, spawn, fry and fingerlings of Indian major carps

CO3 Preparation of artificial fish feed

CO4 Anatomical observations of reproductive system of carps

CO5 Identification and classification of Palaemnoid prawns, crabs, bivalves, larvivorous and aquarium fishes

CO6 Short term bioassay and determination of LC50

CO7 Study of pathological changes in gills, liver, kidney and intestine of fish

CO8 Biochemical estimation of proteins, lipids, glycogen, DNA and Cholesterol

CO9 Preparation of bacteriological media and determination of bacterial plate count for skin and gut

CO10 Gram staining of bacteria

CO11 Visit to a a fish market and collection of fish landing data

Practical II : Project Work

COURSE OUTCOMES

DEPARTMENT OF MATHEMATICS

Learning Outcomes for Mathematics undergraduate

(B.Sc. with Mathematics)

On successful completion of B.Sc. with Mathematics, undergraduates will be able to-

PSO1: Identify, formulate and analyze complex problems and reach to Substantiated conclusions by using principles of mathematical science.

PSO2: Understand complete mathematical texts.

PSO3: Develop logical and critical thinking, research aptitude and reasoning ability.

PSO4: Recognize and differentiate among diverse cultures through the history of mathematics and develop cultural competency.

PSO5: Demonstrate the ability to apply analytical and theoretical skills to solve mathematical problems. Course Outcomes Mathematics

B.Sc (Mathematics) UG

Semester I

Paper I Code: USMT-01 content: Differential and Integral calculus

After completion of this course students will be able to-

CO1: Evaluate limit of functions of one variable algebraically.

CO2: Check the continuity of function of one variable.

CO3: Differentiate various types functions using differentiate rules: Power, Difference product, Quotient rules, Successive Differentiation.

CO4: Mean value theorem and Rolles theorem.

CO5: Properties of Beta ,Gamma function and problem on it.

CO6: Change the order of integration.

CO7: Transformation of double integral in polar form

paper II Code2: USMT-02 Contents: Differential calculus and Trigonometry

After completion of this course students will be able to -

CO1: Evaluate limit of function of two variables algebraically.

CO2: Check the continuity of function of two variables, partial differentiation.

CO3: Trace curve in Cartesian form.

CO4: Find radius of curvature at any point (x, y).

CO5: Find logarithm of complex quantity, square root of complex number.

Semester II

paper I Code: USMT-03

Contents: ordinary differential Equation and difference equation

After completion of this course students will be able to -

CO1: Solve problems based on first order exact differential equation.

CO2: Solve problems based on first order, higher degree equations solvable for x, y, p, q.

CO3: Solve linear equation with constant coefficient.

CO4: Find wronskian.

CO5: Form Difference equation and solve linear difference equation

Paper II Code: USMT-04 Contents: Partial Differential Equation

After completion of this course students will be able to -

CO1: Solve linear partial differential equation of first order.

CO2: Form partial differential equation by eliminating arbitrary constants and function.

CO3: Solve homogeneous partial differential equation with constant coefficients.

CO4: Solve non-homogeneous linear partial differential equation.

Semester III

Paper I Contents: Real Analysis

After completion of this course students will be able to -

CO1: Evaluate various problems based on limit of sequence.

CO2: Test the convergence of series.

CO3: Solve problems based on metric space, sets.

CO4: Define Riemann Integral and solve the problems based on it.

CO5: Prove fundamental theorem of Integral calculus, Mean value theorem of integral calculus.

Paper II Contents: Set Theory and Laplace Transform

After completion of this course students will be able to-

CO1: Solve problems based on sets and relations.

CO2: Evaluate examples of fuzzy set by using operations: Intersections, union, by complement of fuzzy set.

CO3: Find the Laplace Transformation of a function using definition and by use of formulae.

CO4: Find Inverse Laplace Transformation.

CO5: Solve linear differential equation with constant coefficients and partial differential equation using Laplace transformation.

Semester IV Paper I Contents: Algebra

After completion of this course students will be able to:

CO1: Define group, subgroup, cyclic group, permutation group.

CO2: Solve problems based on groups, subgroups, coset and normal subgroup.

CO3: Solve problems based on homomorphism, isomorphism of group.

CO4: Define ring and properties of ring, subring, integral domain and field.

Paper II Contents: Elementary Number Theory

After completion of this course students are will be able to-

CO1: Solve problems based on divisibility.

CO2: Solve fundamental theorems of arithmetic and linear differential equation.

CO3: Define congruence and properties of congruence.

CO4: Define arithmetic function, mobius function Pythagorean triplets.

Semester V

Paper I Contents: Linear Algebra

After completion of this course students will be able to -

CO1: Define vector space, linear span, linear independence and their basic properties and solve problems based on it.

CO2: Solve problems based on rank nullity theorem and linear transformation problem of isomorphism.

CO3: Understand dual space and bidual space .Abjoint of linear transformation. Eigen values and Eigen vectors of a linear transformation.

CO4: Define Inner Product and solve problems based on it.Solve problems by using Gram-Schmidt orthogonalisation process orthogonal vectors and their compliment.

Paper II Contents: Special Relativity

After completion of this course students will be able to:

CO1: Understand basic ideas involved in theory of relativity,concept of Michelson- Morley experiment.

CO2: Derive and geometrically interpret Lorentz transformation,concept of length contraction and time dialation .

CO3: Derive transformation equation of velocity, acceleration, Lorentz contraction factor.

CO4: Derive Lorentz transformation in index form.

CO5: Define time like, space like, light like intervals, proper time, and word line of particle, Minkowskian space-time.

Semester VI

Paper I Contents: Complex Analysis and Vector Calculus

After completion of this course students will be able to -

CO1: Understand the analytical function, Hormonic function, mobius transformation.

CO2: Complex integration, Cauchy integral formula and singularity.

CO3: Concept of gradient, Divergence , Curl.

CO4: reen, Gauss and strokes theorem and problem on it.

Semester VI Paper II Contents: Special Relativity

After completion of this course students will be able to-

CO1: Tensor analysis, Covariant, contravarient and mixed tensor of different order, fundamental operations on tensor.

CO2: Christoffels symbols, transformation of christoffels symbol, covariant derivative.

CO3: Mass energy equivalence relation, transformation of mass and energy, relativistic force and relativistic lagrangian.

CO4: Transformation equation for charge and current electromagnetic field, Lorentz force.

DEPARTMENT OF MATHEMATICS

Learning Outcomes for Mathematics Postgraduate

(M.Sc. with Mathematics)

On successful completion of M.Sc. with Mathematics, Postgraduates will be able to-

PSO1: Identify, formulate and analyze complex problems and reach to Substantiated conclusions by using principles of mathematical science.

PSO2: Understand complete mathematical texts.

PSO3: Develop logical and critical thinking, research aptitude and reasoning ability.

PSO4: Recognize and differentiate among diverse cultures through the history of mathematics and develop cultural competency.

PSO5: Demonstrate the ability to apply analytical and theoretical skills to solve mathematical problems. Course Outcomes Mathematics

COURSE OUTCOMES

M.Sc-I (Mathematics)

Semester I

Paper I Code: PSCMTHT01 content: ALGEBRA-I

After completion of this course students will be able to-

CO1: The concept of permutation group, group of symmetry, dihedral group, automorphisms, conjugacy and G-Sets .
CO2: Students will observe how so much theory can be developed from just a few simple axioms that define group and ring.
CO3: They will understand the importance of normal series, solvable groups, nilpotent groups, cyclic decomposition of permutation groups, alternating groups.
CO4:
Knowledge of this course can help students to read field theory, another basic concept of Modern algebra, in the next semester
CO5: Ideals and Homomorphism.

Paper II Code2: PSCMTHT02 Contents: REAL ANALYSIS-I

After completion of this course students will be able to -

CO1: Understand basic properties of uniform convergence and continuity, uniform convergence and integration, uniform convergence and differentiation, The Stone-Weierstrass theorem.
CO2: Know contraction principle. The inverse and implicit function theorem, the rank theorem.
CO3: They will understand the topological manifolds, differential manifolds, real projective space, Grassman manifolds, differentiable functions and mapping.
CO4: Recognize the rank of mapping, immersion, sub manifolds, lie groups and examples of Lie groups.

Paper III Code2: PSCMTHT03 Contents: TOPOLOGY-I

After completion of this course students will be able to –

CO1: Understand countable and uncountable sets, examples and related theorem, cardinal numbers and related theorems, Topological spaces and examples
CO2: Discuss open set and limit point, derived sets, closed set and closure operators, interior, exterior and boundary operators, bases and relative topologies.
CO3: Study connected sets and components, compact and countably compact spaces, continuous functions and homeomorphisms.
CO4: Recognize the axioms of countability, separability, regular and normal spaces.

Paper IV Code2: PSCMTHT04 Contents: LINEAR ALGEBRA AND DIFFERENTIAL EQUATIONS

After completion of this course students will be able to –

CO1: Define Vector Space, Quotient space direct sum, linear span and linear independence, basis and inner product.
CO2: Discuss the linear transformations, rank, nullity.
CO3: Find the characteristic equation, eigen values and eigen vectors of a matrix.

CO4: To know homogeneous linear system, A non-homogeneous equation, higher order system, the primary decomposition, The S+N decomposition, Nilpotent canonical forms.
CO5: To Learn Jordan and real canonical forms, canonical forms and differential equations, Higher order linear equations on function spaces, Hyperbolic flows, Generic properties of operators, Significance of genericity.

Paper V Code2: PSCMTHT05 Contents: NUMERICAL ANALYSIS

After completion of this course students will be able to –

CO1: Understand the errors, source of error and its effect on any numerical computations and also analysis the efficiency of any numerical algorithms.
CO2: Learn how to obtain numerical solution of nonlinear equations using bisection, secant, Newton and fixed-point iterations methods and convergence analysis of these methods.
CO3: Solve linear and nonlinear systems of equations numerically.
CO4: Apply numerical methods to find eigen value and eigen vectors.
CO5: Handle the functions and data set using interpolation and least square curves.
CO6: Minimum approximation problem.

M.Sc-I (Mathematics)

Semester II

Paper I Code: PSCMTHT06 content: ALGEBRA -II

After completion of this course students will be able to-

CO1: Understand the concepts of unique factorization domains, Principal ideal domains, Euclidean domains, polynomial rings over unique factorization domains.
CO2: Understand irreducible polynomials and Eisenstein criterion, adjunction of roots, normal extensions and multiple roots.
CO3: Understand the concepts of fundamental theorem of Galois Theory and fundamental theorem of algebra.
CO4: Find the roots of unity and cyclotomic polynomials, cyclic extensions, polynomials solvable by radicals, Ruler and compass constructions.

M.Sc-I (Mathematics)

Semester II

Paper II Code: PSCMTHT07 content: REAL ANALYSIS -II

After completion of this course students will be able to-

CO1: Understand how Lebesgue measure on R is defined, Littlewoods three principles.
CO2: Understand basic properties are measurable functions.
CO3: Understand convex function, Riesz-Fischer theorem , bounded linear functions on Lp- spaces.
CO4: Know the basic convergence theorems for the Lebesgue integral.
CO5: Understand the compact metric spaces, baire category theorem, Arzela ascoli theorem, Locally compact spaces, Sigma compact spaces.

M.Sc-I (Mathematics)

Semester II

Paper III Code: PSCMTHT08 content: TOPOLOGY-II

After completion of this course students will be able to-

CO1: Understand Urysohn's lemma, tietze extension theorem, Compactness for metric spaces, properties of metric spaces.
CO2: Know quotient topology, Nets and filters.
CO3: Study product topology.
CO4: Understand locally finite topological spaces, paracompact spaces, urysohn's metrization theorem.

M.Sc-I (Mathematics)

Semester II

Paper IV Code: PSCMTHT09 content: CLASSICAL MECHANICS

After completion of this course students will be able to-

CO1: Know the equation of motion, Infinitesimal canonical transformation and conservation theorem in the Poisson bracket formulation.
CO2: Understand the equation of canonical transformation and examples of canonical transformation, Poisson bracket sand other canonical invariants.
CO3: Understand Variational Principle.
CO4: Analyze the Derivation of Lagrange's Equations from Hamilton's Principle and Extension of Hamilton's Principle to Non-holonomic Systems.
CO5: Study the concept of the legendre transformations and the Hamilton equation of motion, the Hamiltonian formulation of relativistic mechanics
CO6: Rouths procedure and oscillations.
CO7: Equation of motion.

M.Sc-I (Mathematics)

Semester II

Paper V Code: PSCMTHT10 content: DIFFERENTIAL GEOMETRY

After completion of this course students will be able to-

CO1: Know compact surfaces whose points are umbilics, Gaussian or mean curvature, two dimensional Riemannian manifolds.
CO2: Understand second fundamental form, principle curvature, lines of curvature, Surface of constant curvature.
CO3: Learn to normal property of geodesics, existence theorems, geodesics curvature. Gauss Bonnet theorem.
CO4: Understand the definition of surface, curves on a surface, helicoids Intrinsic properties, Geodesics.
CO5: Problem of continuation.

M.Sc-II (Mathematics)

Semester III

Core Paper-XI content: COMPLEX ANALYSIS

After completion of this course students will be able to-

CO1: Understand impossibility of ordering complex number, Extended Complex numbers and stereographic projection. Properties and example of Analytic function.
CO2: Know analytic function as mappings, Mobius transformation, and power series representation of analytic function.
CO3: Study Cauchy's theorem and integral formula the homotopic version of cauchy's theorem and simple connectivity, counting zero's, Goursat's theorem and classification of singularites.
CO4:Know the maximum principle Schwarz's lemma, convex function and Hadamards three circles theorem, Phragmen-lindel of theorem.

M.Sc-II (Mathematics)

Semester III

Core Paper-XII content: FUNCTIONAL ANALYSIS

After completion of this course students will be able to-

CO1: Study category theorem, uniform boundness theorem, strong and weak convergence, convergence of sequences of operators and functional.
CO2 Understand representation of functionals on Hiberts spaces, reflexive spaces.
CO3: Know linear functional, normed spaces of operators, dual spaces, inner product space, and properties of inner product spaces, Hilbert space orthonormal sets and sequences.
CO4: Understand normed spaces, Banach spaces , properties of normed spaces, finite dimensional normed spaces and subspaces, compactness in finite dimension, bounded and continous linear operators.

M.Sc-II (Mathematics)

Semester III

Core Paper-XIII content: MATHEMATICAL METHODS

After completion of this course students will be able to-

CO1: Study fourier integral theorem, Fourier theorem, Fourier cosine and sine transform, solution of partial differential equation by means of Fourier transform.
CO2 Understand the calculation of Laplace transform of some elements function, the convolution of two functions inverse formula for the laplace transform.

CO3:
Understand finite Hankel transform, finite Legendre transform, and finite Mellin transform.
CO4:Study finite Fourier transform, Finite sturm-Liouville transform, generalized finite Fourier transform.

M.Sc-II (Mathematics)

Semester III

Core Paper-XIV content: GENERAL RELATIVITY-I

After completion of this course students will be able to-

CO1: Understand the tensor formula, Riemannian geometry, curvature tensor.
CO2: Learn about the principle of covariance, the principle of equivalence, geodesic principle.
CO3: Understand gravitational field equations in free space.
CO4: Find Weyl's solution of linearized field equations, Interior Schwarzchild's solution.
CO5:Study Newton's equations of motion as an approximation geodesic equations.

M.Sc-II (Mathematics)

Semester III

Core Paper-XV content: OPERATIONS RESEARCH I

After completion of this course students will be able to-

CO1: Develop a report that describes the model and the solving technique, analyze the results and propose recommendations in language understandable to the decision-making processes.
CO2: Study simplex method,theory of simplex method,duality,dual simplex method.
CO3: Understand the mathematical tools that are needed to solve optimization problems.
CO4 : Solve transportation and assignment problems.
CO5 : Study dynamic programming.

M.Sc-II (Mathematics)

Semester IV

Core Paper-XVI content: DYNAMICAL SYSTEMS

After completion of this course students will be able to-

CO1: Understand dynamical systems and vector fields, the fundamental theorem, the flow of a differential equation.
CO2: Know asymptotic stability of closed orbit.
CO3: Study limit sets, the Poincare Bendixson theorem and it's application.
CO4: Learn nonlinear sink, gradient and inner product.

M.Sc-II (Mathematics)

Semester IV

Core Paper-XVII content: PARTIAL DIFFERNTIAL EQUATIONS

After completion of this course students will be able to-

CO1: Study first order partial differential equations in two independent variables and the Cauchy problems.
CO2:Understand classification of second order partial differential equations.
CO3:Study the diffusion equation and parabolic differential equations.
CO4: Know wave equation and it's application.

M.Sc-II (Mathematics)

Semester IV

Core Paper-XVIII content: INTEGRAL EQUATIONS

After completion of this course students will be able to-

CO1: Understand approximate methods of solutions for linear integral equations.
CO2: Know types of Voltera equations.
CO3: Obtain solutions of integral equations with Green's function type kernels.
CO4: Learn preliminary concept of integral equations, Classification of linear integral equation.

M.Sc-II (Mathematics)

Semester IV

Core Paper-XIX content: GENERAL RELATIVITY -II

After completion of this course students will be able to-

CO1: Realize galaxy count.
CO2: Know density and pressure of the present universe.
CO3: Study cosmological principle.
CO4: Understand static cosmological models of Einstein and de sitter and their derivation it's properties.
CO5: Nature of universe, age of the universe, matter dominated era.

M.Sc-II (Mathematics)

Semester IV

Core Paper-XX content: OPERATIONS RESEARCH -II

After completion of this course students will be able to-

CO1: Study quadratic programming, fraction programming and goal programming.
CO2: Understand non-linear programming.
CO3: Study queuing theory and sequencing
CO4: Understand integer programming.

DEPARTMENT OF PHYSICS

Learning Outcomes for Physics Undergraduate Program

PSO'S(B.Sc. with Physics as one subject)

Upon successful completion of B.Sc. with Physics as one of the subjects, graduates are expected to:

PSO1: Develop a conceptual understanding of principles in Physics. They will be able to demonstrate knowledge on selected topics of Newtonian mechanics, Electricity and Magnetism, Wave mechanics, Thermodynamics and Statistical Mechanics, Solid State Physics, Optics, Quantum Mechanics, Relativity, Nuclear Physics and be able to apply this knowledge to analyze a broad range of physical phenomena.

PSO2: The student will demonstrate the ability to use appropriate mathematical techniques and concepts to obtain quantitative solutions to problems in physics.

PSO3: Students will develop state-of-the-art laboratory skills. Students will be able to design and conduct experiment (or series of experiments) demonstrating their understanding of the scientific method and processes. They will be able to demonstrate an understanding of the analytical methods required to interpret and analyze results and draw valid conclusions as supported by their data.

PSO4: Graduates in physics will be able to demonstrate written and oral communication skills in Communicating physics-related topics and will prove that they can think critically and work independently.

PSO5: Students will develop an understanding of the impact of physics and science on society.

COURSE OUTCOMES

Semester I

Paper I Code USPHT01 Contents: Mechanics and Relativity

After completion of this course students will gain -

CO1: an understanding of Newton's Laws of motion and its applications and in general a core idea about Newtonian mechanics.

CO2: an understanding in momentum, energy, collision and its applications.

CO3: an understanding in dynamics of rigid body and rotational motion.

CO4: an understanding in special theory of relativity, negative results of Michelson Morley experiments and its impact.

CO5: problem solving skills, improve mathematical proficiency and logical reasoning.

Paper II Code USPHT02 Contents: Gravitation, Oscillation andProperties of Matter

After completion of this course students will gain -

CO1: an understanding of Gravitation and related laws, motion of satellite and its applications and GPS.

CO2: an understanding of Oscillations and types of Oscillations and their related terms

CO3: an understanding of Elastic behavior of substances and working of Torsional Pendulum.

CO4: an understanding of different properties of matter like Viscosity and surface tension and their applications to phenomenon like lift of airplane and rise of water in plants.

CO5: Learn problem solving skills; improve mathematical proficiency and logical reasoning.

Semester I Practical Code USPHP01 Contents: 10 experiments

After completion of this course -

CO1: Students will design and conduct an experiment (or series of experiments) demonstrating their understanding of the scientific method and processes based on mechanics, properties of matter and gravitation.

CO2: Students will demonstrate an understanding of the analytical methods required to interpret andanalyze results and draw conclusions as supported by their data.

Semester II

Paper I Code USPHT03 Contents: Vector Analysis and Electrostatics

After completion of this course students will gain -

CO1: an understanding of vectors and their application in studying electrostatics.

CO2: an understanding of static electricity, its origin and phenomenon related to it.

CO3: an understanding of Gauss's theorem and its applications and electric potential.

CO4: an understanding of Dielectrics, capacitors and their applications.

CO5: logical and mathematical problem solving skills through the numerical on all the topics.

Paper II Code USPHT04 Contents: Magneto statics and Electromagnetic Waves

After completion of this course students will gain -

CO1: an understanding of magneto statics, related laws and magnetic properties of materials.

CO2: an understanding of laws of electromagnetic induction, construction and working of transformer and its applications.

CO3: an understanding of Maxwell's equations and Electromagnetic wave propagation, formula for speed of light.

CO4: an understanding of steady and alternating electric currents and different types of circuits.

CO5: Students will gain logical and mathematical problem solving skills through the numerical on all the topics.

Practical: Code USPHP02 Contents: 10 experiments

After completion of this course -

CO1: Students will design and conduct an experiment (or series of experiments) demonstrating their understanding of the scientific method and processes based on electricity and magnetism.

CO2: Students will demonstrate an understanding of the analytical methods required to interpret andanalyze results and draw conclusions as supported by their data.

Semester III

Paper I Code USPHT05 Contents: Thermal Physics

After completion of this course students will gain -

CO1: an understanding of kinetic theory of gases and transport phenomena in physics and their applications.

CO2: an understanding of basic concepts in thermodynamics i.e. flow of heat and energy, zeroth law and internal energy and specific heat.

CO3: an understanding of 2nd and 3rd law of thermodynamics, the usefulness of these laws in explaining the physical behavior of a system when it responds to the flow of heat or thermal energy and concept of entropy and its usefulness. Students will get to know about heat engines and their applications.

CO4: an understanding of thermodynamic potentials, concept of latent heat, Joule-Thomson effect and its applications.

CO5: logical and mathematical problem solving skills through the numerical on all the topics.

Paper II Code USPHT06 Contents: Radiation and Statistical Mechanics

After completion of this course students will gain -

CO1: an understanding of radiation as a mode of heat transfer, black body radiation and radiation laws.

CO2: an understanding of use of probability theory in physics and statistical basis of thermodynamics.

CO3: an understanding of fundamental concepts in statistical mechanics and theory of Maxwell-Boltzmann statistics and its application.

CO4: an understanding of theory of BE and FD statistics and their applications.

CO5: logical and mathematical problem solving skills through the numerical on all the topics

Practical Code USPHP03 Contents: 10 experiments

After completion of this course -

CO1: Students will design and conduct an experiment (or series of experiments) demonstrating their understanding of the scientific method and processes based on Thermodynamics, statistics and radiation physics.

CO2: Students will demonstrate an understanding of the analytical methods required to interpret andanalyze results and draw conclusions as supported by their data.

Semester IV

Paper I Code USPHT07 Contents: Wave, Acoustics and Laser

After completion of this course students will gain -

CO1: an understanding of superposition of two harmonic oscillators, phenomenon of Beats, Lissajous figures and their applications.

CO2: an understanding of wave motion, Fourier theorem and its applications.

CO3: an understanding of ultrasonic waves- its properties and applications, basics of acoustics, music and acoustics of building.

CO4: an understanding of LASER- its properties, types, construction and working of different types of lasers and their applications in real life.

CO5: logical and mathematical problem solving skills through the numerical on all the topics.

Paper II Code USPHT08 Contents: Optical Physics

After completion of this course students will gain -

CO1: an understanding of basic concepts of light waves, phenomenon of interference, interference in thin films and applications.

CO2: an understanding of Newton's rings experiment and its applications and Michelson Interferometer and its applications.

CO3: an understanding of phenomenon of diffraction, its types, and applications.

CO4: an understanding of phenomenon of polarization, related laws, Nicol prism- its applications and polarization theory.

CO5: logical and mathematical problem solving skills through the numerical on all the topics.

Practicals Code USPHP04 Contents: 10 experiments

After completion of this course -

CO1: Students will design and conduct an experiment (or series of experiments) demonstrating their understanding of the scientific method and processes based on Sound, LASER, Acoustical physics and Optics.

CO2: Students will demonstrate an understanding of the analytical methods required to interpret andanalyze results and draw conclusions as supported by their data.

Semester V (OLD PTTERN)

Paper I (5S-PHY 501): Statistical Physics and Relativity

After completion of this course students will gain -

CO1: an understanding of use of probability theory in physics and statistical basis of thermodynamics.

CO2: an understanding of fundamental concepts in statistical mechanics and theory of Maxwell-Boltzmann statistics and its application.

CO3: an understanding of theory of BE and FD statistics and their applications.

CO4: an understanding in special theory of relativity, negative results of Michelson Morley experiments and its impact.

CO5: logical and mathematical problem solving skills through the numerical on all the topics.

Paper II (5S-PHY 502): X-rays and Solid State Physics,

After completion of this course students will gain -

CO1: an understanding of X-rays- its production and applications

CO2: an understanding of basics of solid state physics, crystal structure- its types, Braggs law and its application.

CO3: an understanding of Bonding between pair of atoms- types of bonding, magnetic properties of materials.

CO4: an understanding of free electron theory and Band theory of solids.

CO5: logical and mathematical problem solving skills through the numerical on all the topics.

Practical (5S- PHY 503)

After completion of this course -

CO1: Students will design and conduct an experiment (or series of experiments) demonstrating their understanding of the scientific method and processes based on Statistical physics, X-rays and solid state physics.

Course Outcomes Physics Page 9

CO2: Students will demonstrate an understanding of the analytical methods required to interpret andanalyze results and draw conclusions as supported by their data.

Semester VI (OLD PTTERN)

Paper I (6S-PHY 601): Nuclear Physics, Nanotechnology and Biophysics

After completion of this course students will gain -

CO1: an understanding of basics of nuclear physics, interaction of charged particles with matter,types of charged particle counters.

CO2: an understanding of structure of nuclei and its theories, nuclear fusion, theory of alphadecay.

CO3: an understanding of basics of Nanoscience and nanotechnology, nanomaterials andmethods of synthesis and characterization of nanomaterials.

CO4: an understanding of applications of nanotechnology, concepts in biophysics and principles

of ECG and EEG.

CO5: logical and mathematical problem solving skills through the numerical on all the topics.

Paper II (6S-PHY 602): Fibre Optics, Communication and Digital Electronics

After completion of this course students will gain -

CO1: an understanding of theory of optical fibers and their applications.

CO2: an understanding of AM, FM and PM communication and their applications

CO3: an understanding of number system and digital logic gates and their applications.

CO4: an understanding of Multivibrators, Flip flops, Counters and registers in digitalelectronics.

CO5: logical and mathematical problem solving skills through the numerical on all the topics.

Practical (6S- PHY 603)

After completion of this course -

CO1: Students will design and conduct an experiment (or series of experiments) demonstrating their understanding of the scientific method and processes based on Statistical physics, X-rays and solid state physics.

CO2: Students will demonstrate an understanding of the analytical methods required to interpret andanalyze results and draw conclusions as supported by their data.

Semester V (CBCS)

Elective Paper I Code USDSEPHT09 Contents: Elements of ModernPhysics

After completion of this course, students will gain -

CO1: an understanding of failure of classical mechanics and basic formulation of quantummechanics.

CO2: an understanding of Schrodinger's wave equation and it's applications.

CO3: an understanding of nucleus and its stability and basics of radioactivity**.**

CO4: an understanding of process of beta decay, gamma decay and fission fusion reactions andtheir applications.

CO5: logical and mathematical problem solving skills through the numerical on all the topics.

Elective Paper II Code USDSEPHT10 Contents: Solid State Physics

After completion of this course students will gain -

CO1: an understanding of basics of solid state physics, crystal structure- its types, Braggs lawand its application.

CO2: an understanding of Dia-, Para-, Ferri- and Ferromagnetic Materials and their theories.

CO3: an understanding of dielectric properties of materials.

CO4: an understanding of elements of Band theory of solids and superconductivity.

CO5: logical and mathematical problem solving skills through the numerical on all the topics.

Elective Paper III Code USDSEPHT11 Contents: Medical Physics

After completion of this course students will gain -

CO1: an understanding of mechanics of body movements and energy consumption in body.

CO2: an understanding of the acoustics of a body.

CO3: an understanding of physics of diagnostics and therapeutic systems and radiationphysics.

CO4: an understanding of radiation detectors and medical imaging.

CO5: logical and mathematical problem solving skills through the numerical on all the topics.

Elective Paper IV Code USDSEPHT12 Contents: Mathematical Physics

After completion of this course students will gain -

CO1: an understanding of Fourier Series and its applications.

CO2: an understanding ofFrobenius method and its applications to differential equations. Legendre, Bessel, Hermite and Laguerre Differential Equations.

CO3: an understanding of Some Special Integrals like Beta and Gamma Functions and Relation between them and partial differential equations and their solution methods.

CO4: an understanding of complex analysis**.**

CO5: an understanding of problem solving methods.

Practicals Code USDSEPHP05 Contents: 10 Experiments

After completion of this course -

CO1: Students will design and conduct an experiment (or series of experiments) demonstrating

their understanding of the scientific method and processes based on any two of the disciplinespecific elective papers.

CO2: Students will demonstrate an understanding of the analytical methods required to interpretandanalyze results and draw conclusions as supported by their data.

Skill Enhancement Course Code USSECPH01 Contents: PhysicsWorkshop Skill

After completion of this course students will gain -

CO1: an understanding of different types of measurement system.

CO2: an understanding of different electrical and electronic instruments like multimeter, oscilloscopes, timer circuits etc also learn about soldering of electrical circuits.

CO3: an understanding of mechanism of prime movers (machines).

CO4: an understanding of designing of various electrical circuits on bread boards.

CO5: will gain practical training on physics lab skills.

Semester V (CBCS) Skill Enhancement Course Code USSECPH02 Contents: Electrical Circuitsand Network Skills

After completion of this course students will gain -

CO1: an understanding of electricity principles and electrical circuits.

CO2: an understanding of electrical drawings, symbols, generators and transformers.

CO3: an understanding of electrical motors, solid state devices like Diodes, Transistors, Thermisters and LED, Diode and rectifiers and their uses.

CO4: an understanding of electrical safety methods through fuses and circuit breakers.

CO5: will gain practical training on electrical circuits and network skills.

Semester VI (CBCS)

Elective Paper I Code USDSEPHT13 Contents: Nuclear and Particle Physics

After completion of this course students will gain -

CO1: an understanding of general properties of nuclei.

CO2: an understanding of different types of nuclear models.

CO3: an understanding of nuclear reactions and interaction of radiation with matter.

CO4: an understanding of different types of radiation detectors and particle accelerator.

CO5: logical and mathematical problem solving skills through the numerical on all the topics.

Elective Paper II Code USDSEPHT14 Contents: Digital &Analog Circuitsand Instrumentation

After completion of this course students will gain -

CO1: an understanding of digital circuits and their applications.

CO2: an understanding of solid state devices and their applications.

CO3: an understanding of bipolar junction transistors, their characteristics and voltage amplifiers.

CO4: an understanding of Operational amplifiers and their applications.

CO5: logical and mathematical problem solving skills through the numerical on all the topics.

Elective Paper III Code USDSEPHT15 Contents: Embedded system: Introduction to Microcontrollers

After completion of this course students will gain -

CO1: an understanding of embedded systems and general purpose computer systems andmicroprocessors.

CO2: an understanding of architecture and overview of 8051 microcontroller.

CO3: an understanding of assembly language programming of 8051 microprocessor.

CO4: an understanding ofStructure of embedded program, infinite loop, compiling, linking and locating, downloading and debugging, and design and development of embedded systems.

CO5: logical and mathematical problem solving skills through the numerical on all the topics.

Elective Paper IV Code USDSEPHT16 Contents: Quantum Mechanics

After completion of this course students will gain -

CO1: an understanding of Time dependent & Time independent Schrodinger equation anddynamical evolution of a quantum state; Eigen functions and eigen values.

CO2: an understanding of boundary conditions, application to one-dimensional roblemsquare well potential and Quantum mechanics of simple harmonic oscillator.

CO3: an understanding of quantum theory of hydrogen like atoms.

CO4: an understanding of quantum states of atoms in electric and magnetic fields.

CO5: logical and mathematical problem solving skills through the numerical on all the topics.

Practical Code USDSEPHP06 Contents: 10 experiments

After completion of this course -

CO1: Students will design and conduct an experiment (or series of experiments) demonstratingtheir understanding of the scientific method and processes based on any two of the disciplinespecific elective papers.

CO2: Students will demonstrate an understanding of the analytical methods required to interpret andanalyze results and draw conclusions as supported by their data.

Skill Enhancement Course Code USSECPH03 Contents: BasicInstrumentation Skills

After completion of this course students will gain -

CO1: an understanding of basics of measuring instruments and multimeter.

CO2: an understanding of working of electronic voltmeter and its use.

CO3: an understanding of cathode ray oscilloscope and it's working.

CO4: an understanding of design and working of digital instruments.

CO5: will gain practical training on instrumentation skills.

Skill Enhancement Course Code USSECPH04 Contents: RenewableEnergy and EnergyHarvesting

After completion of this course students will -

CO1: learn about fossil fuels and alternate sources of energy.

CO2: learn about solar energy and its importance.

CO3: learn about wind energy harvesting and geothermal energy.

CO4: learn about harvesting ocean energy and hydro power energy.

CO5: gain practical training on renewable energy and energy harvesting.

DEPARTMENT OF PHYSICS

Learning outcomes for Postgraduate Programme, M.Sc. Physics

Program Specific Outcomes:

At the end of the program students will be able to-

PSO1: Understand and apply principles of physics for understanding the scientific phenomenon in classical domain. Students would be benefited with knowledge of core subjects likeMathematical Physics, Classical Mechanics, Electrodynamics, and Electronics, Solid statePhysics, Quantum Mechanics, Statistical Physics, Spectroscopy and Nuclear Physics

PSO2: Understand and apply mathematical techniques for describing and deeper understanding of physical systems.

PSO3: Understand and apply statistical methods for describing the classical and quantumparticles in various physical systems and processes.

PSO4: Understand and apply inter-disciplinary concepts and computational skills forunderstanding and describing the natural phenomenon.

PSO5: Understand and apply principles of Quantum mechanics for understanding the physicalsystems in quantum realm.

PSO6: Get exposure in various specializations of Physics (Solid State Physics/NuclearPhysics/Particle Physics/Material Science etc).

PSO7: Get exposure to advanced experimental/theoretical methods for measurement, observation, and fundamental understanding of physical phenomenon/systems. Demonstratehighest standards of Actuarial ethical conduct and Professional Actuarial behavior, critical,interpersonal and communication skills as well as a commitment to life-long learning.

PSO8: Engage in research and life-long learning to adapt to changing environment and prepare s for many competitive exams like NET SET GATE. Develop into Knowledgeable, disciplined students with good values, ethics; kind hearted thus helps in nation building. Student should be aware of ethical issues and regulatory considerations while addressing society needs for growth with honesty.

M.Sc. Semester I

Core 1 paper 1 (PSCPHYT01) Mathematical Physics

Core 2 paper 2 (PSCPHYT02) Complex Analysis and Numerical Methods

Core 3 paper 3 (PSCPHYT03) Electronics

Core 4 paper 4 (PSCPHYT04) Electrodynamics I

Practical Core 1 and 2 (PSCPHYP01 & P02) Practical I (Paper 1 & 2)

Practical Core 3 and 4 (PSCPHYP03 & P04) Practical II (Paper 3 & 4)

M.Sc. Semester II

Core 5 paper 5 (PSCPHYT05) Quantum Mechanics I

Core 6 paper 6 (PSCPHYT06) Statistical Physics

Core 7 paper 7 (PSCPHYT07) Classical Mechanics

Core 8 paper 8 (PSCPHYT08) Electrodynamics II

Practical Core 5 and 6 (PSCPHYP05 & P06) Practical 3 (Paper 5 & 6)

Practical Core 7 and 8 (PSCPHYP07 & P08) Practical 4(Paper 7 & 8)

M.Sc. Semester III

Core 9 paper 9 (PSCPHYT09) Quantum Mechanics II

Core 10 paper 10 (PSCPHYT10) Solid state Physics and Spectroscopy

Core Elective I paper 11 (PSCPHYT11) Atomic and Molecular Physics I

Foundation Course I paper 12 (PSCPHYT12) Fundamentals of Spectroscopy

Practical 5 (Based on Core 9 and 10)

Practical 6 (Based on Elective I)

M.Sc. Semester IV

Core 11 Paper 13 (PSCPHYT13) Nuclear and Particle Physics

Core 12 Paper 14 (PSCPHYT14) Solid State Physics

Core Elective II Paper 15 (PSCPHYT15) Atomic and Molecular Physics II

Foundation Course II paper 16 (PSCPHYT16) Spectroscopic Applications

Practical 7 (Practical 7 Based on Core 11, 12 and elective II)

Project

M.Sc. Semester I

1. Mathematical Physics

On successful completion of this course a student will be able to –

CO1: Have knowledge about, and being able to use, advanced mathematical methods and theories on various mathematical and physical problems.

CO2: Use mathematical formulations, analyses and models to obtain insight inspecialized areas of Physics.

CO3: Be able to apply skills of mathematical, statistical and physical modeling in appliedfields and on technological problems.

CO4: Be able to carry out, present and document a comprehensive independent work,demonstrating command of the terminology of the subject area.

CO5: Identify different special mathematical functions.

CO6: Apply techniques of vector analysis, such as gradient of scalar, divergence ofvector, curl of vector

CO7: To the study of special functions of mathematical physics

CO8: To understand Cartesian (X, Y, Z), Spherical polar (r,θ,φ) and Cylindrical (ρ,φ,z)co-ordinate systems and their transformation equations.

CO9: To understand expression for gradient, divergence, curl and Laplacian incurvilinear, spherical polar and cylindrical co-ordinate systems.

CO10: Solve partial differential equations with appropriate initial or boundary conditionswith Green function techniques

CO11: Have confidence in solving mathematical problems arising in physics by a varietyof mathematical techniques

CO12: To understand special relativity theory and to solve Lorent'z transformationequations, Length contraction, time dilation.

2. Numerical Methods and Complex Analysis

After completion of this course students will be able to-

CO1: To understand Complex number (Addition, Subtraction, Multiplication, Division,Complex conjugate) and Exponential form of complex number.

CO2: To solve problems using Euler's formula,

CO3: To state de-Moivere's theorem and to Trigonometrical functions Application ofexponential form for power and roots of complex numbers.

CO4: Be able to solve relevant theoretical problems.

CO5: To solve partial differentiation.

CO6: To understand Vector Algebra including Scalar and Vector product Scalar tripleproduct and its geometrical interpretation, Vector triple product

CO7: To apply vector algebra to interpret physical quantities such as angulardisplacement, angular velocity and angular acceleration.

CO8: Application of vector analysis such as vector operator, Gradient, Divergence, Curlof a vector to solve the problems of Physics.

3. Electronics-I

After completion of this course students will be able to-

CO1: To distinguish between P-N diode, Zener diode, LED and Photodiode.

CO2: To understand Half wave, full wave and bridge rectifiers and filters: capacitancefilter, inductor filter and filter.

CO3: To demonstrate voltage regulation using Zener diode.

CO4: To understand basic construction and operation of bipolar transistors (NPN andPNP),

CO5: To distinguish between transistor circuit configurations (CB, CE, CC), currentgains (, and) and their interrelationship.

CO6: To solve problems of electronics using decimal and hexadecimal number system.

CO7: To learn logic gates and to design R-S, clocked R-S, D , JK and T flip flops usinglogic gates.

CO8: To state De Morgan's theorems and understand symbols, Boolean expression andtruth tables for gates.

4. Electrodynamics I

After completion of this course students will be able to-

CO1: To state Gauss law and its application to obtain electric field for different cases.
CO2: Describe and explain the relationship between the electric field and the electrostaticpotential.
CO3: Understand the relation between Electric displacement vector D, Susceptibility,Permittivity, Dielectric constant.
CO4: To understand Lorentz force on a point charge moving in a magnetic field.
CO5: To state Biot and Savart's law and Ampere's circuital law to Describe and explain the generation of magnetic fields by electrical currents;
CO6: Be able to solve relevant theoretical problem and use their conceptualunderstanding of the electromagnetic laws in order to qualitatively describe the behaviour of the solution to the problem
CO7: Understand origin of Maxwell's equations in magnetic and dielectric media
CO8: Write down Maxwell's equations in linear, isotropic, homogeneous media
CO9: To derive continuity conditions on electromagnetic fields at boundaries
CO10: To derive electromagnetic wave solutions and propagation in dielectric and other media and understand transport of energy and Poynting vector.
CO11: To Show laws of geometric optics originate with Maxwell's equations atdielectric boundaries calculate reflection and transmission coefficients for waves atdielectric boundaries.

5. Practical I (Paper 1 & 2)

At the end of the course, the student will be able to

CO1: Write a program to find the largest or smallest of a given set of numbers and execute
CO2: Write a program for Bubble sort and execute.
CO3: Write a program for Matrix multiplication and execute
CO4: Write a program for Lagrange Interpolation method.

CO5: Write a program for Newton-Raphson Method.

6. Practical 2 (Paper 2 &3)

At the end of the course, the student will be able to

CO1: Design a regulated power supply
CO2: Design Basic, TTL, NAND and NOR gates.
CO3: Design and study Combinational logic gates
CO4: Design and study Flip-Flops.
CO5: Design and study Astable, Monostable and Bistablemultivibrator.

7. Quantum Mechanics I

After completion of this course students will be able to-

CO1: To develop a knowledge and understanding of the concept that quantum states livein a vector space.
CO2: To solve quantum mechanics problems.
CO3: Formulation of Schrödinger equation-time dependent and time independent forms.
CO4: To derive energy Eigen value and eigen functions particle in a box and 1-Dharmonic oscillator.
CO5: To formulate the Schrödinger wave equation in terms of spherical polarcoordinates for its application to solve Hydrogen atom problem.
CO6: To understand Postulate of quantum mechanics, operators and use of commutationand commutative algebra of operators to solve quantum mechanics problem.

8. Statistical Mechanics Physics

After completion of this course students will be able to-

CO1: To understand basic concepts of probability and probability distribution.

CO2: To solve Random walk problem in one dimension and Gaussian probabilitydistribution.

CO3: To understand specification of the state of the system (Classical & Quantum).

CO4: To state Basic postulate of equal a priori probability,

CO5: To understand Statistical Ensembles and Calculation of microstates of an idealmonatomic gas.

CO6: To understand Distribution of energy between systems in equilibrium.

CO7: To state Boltzmann relation for entropy and to perform Statistical calculations ofthermodynamic quantities.

CO8: To state Equipartition theorem and its application to mean K.E. of a molecule in agas and to Harmonic oscillator.

CO9: To derive Maxwell's equations from thermodynamic potentials

CO10: To state TdS and energy equation.

9. Classical Mechanics

On successful completion of this course a student will be able to –

CO1: Apply the basic laws of physics in the areas of classical mechanics, Newtoniangravitation, Types of forces: Forces of Gravitation, Lorentz force, Hooks Force,
Frictional Force, and Fundamental Forces of Nature.

CO2: Recognize how observation, experiment and theory work together to continue toexpand the frontiers of knowledge of the physical universe.

CO3: Apply basic mathematical tools commonly used in physics, including elementaryprobability theory, differential and integral calculus, vector calculus, ordinary differentialequations, partial differential equations, and linear algebra.

CO4: To solve Lagrange's equation, Properties and simple application of Lagrange's equation (simple pendulum, harmonic oscillator, compound pendulum, atwoods machine),

CO5: To solve Hamiltonian, Hamilton's canonical equation of motion, and to understandPhysical significance Advantages and Applications of Hamilton's equations of motion(simple pendulum, compound pendulum, Linear harmonic oscillator).
CO6: To understand Central force, Reduction of two body problem into equivalent onebody problem, Motion in inverse square law force field and to state Kepler's laws.
CO7: To apply Rotating coordinates system and to Derive the Corioli's force fromLagrangian formulation

10. Electrodynamics II

On successful completion of this course a student will be able to –

CO1: Understand Scalar waves, Vector waves and their properties.
CO2: Understand Symmetries of Maxwell equations and Lorentz transformations andapplication of Lagrangian for EM field.
CO3: Understand Motion of a charge in EM fields.
CO4: Understand Wave guides and their types, Bremsstarhlung and its application insynchrotron

11. Practical 3

At the end of the course, the student will be able to

CO1: Determination of e/m by Thomson method
CO2: Determination of Plank's constant.
CO3: Determination of Stephan's constant
CO4: Construction and determination of dielectric constant.
CO5: Study of B-H Curve.

12. Practical 4

At the end of the course, the student will be able to

CO1: Thickness of thin wire with lasers

CO2: Measurement of wavelength of He-ne laser light using ruler..

CO3: Ultrasonic velocity of liquid mixtures- Interferometer

CO4: Determination of wavelength of monochromatic source using MICHELSONInterferometer.

CO5: Study of Hall Effect in semiconductors.

13. Quantum mechanics II

CO1: Understand time independent perturbation theory in Quantum mechanics and it'sapplications.

CO2: understand Time dependent perturbation theory and WKB approximation.

CO3: Understand identical particles and Born Oppenheimer Approximation.

CO4: Understand the interaction picture, S-matrix, and Wick's Theorem.

CO5: Understand Scattering theory and its importance

CO6: Understand Relativistic wave equations, Klein Gorden equations and Dirac'srelativistic equations.

14. Solid State Physics and Spectroscopy

Students should gain basic knowledge of solid state physics. This implies that the student will:

CO1: Be able to account for interatomic forces and bonds

CO2: Have a basic knowledge of crystal systems and spatial symmetries

CO3: Be able to account for how crystalline materials are studied using diffraction,including concepts like the Edwald's sphere, form factor, structure factor, and scatteringamplitude.

CO4: Be able to perform structure determination of simple structures

CO5: Understand the concept of reciprocal space and be able to use it as a tool to knowthe significance of Brillouin zones

CO6: Know what phonons are, and be able to perform estimates of their dispersive andthermal properties

CO7: Be able to calculate thermal and electrical properties in the free-electron modeland know Bloch's theorem and energy band and distinction between metals,semiconductors and insulators

CO8: Be able to estimate the charge carrier mobility and density.

CO9: Be able to account for what the Fermi surface is and how it can be measured.

CO10: To understand Lattice heat capacity and to compare Classical theory, Einstein'stheory, Debye's theory of specific heat of solids.

CO11: To apply techniques of X-Ray Diffraction and UV Spectroscopy to study crystals.

15. Atomic and Molecular Physics I

Upon successful completion of this course it is intended that a student will be able to:

CO1: State and explain the key properties of vector atom model and the importance ofthe Pauli Exclusion Principle.

CO2: To explain the observed dependence of atomic spectral lines on externally appliedelectric and magnetic fields.

CO3: To state and justify the selection rules for various optical spectroscopies in terms ofthe symmetries of molecular vibrations.

CO4: List different types of atomic and molecular spectra and related instrumentation.

CO5: Describe theories explaining the structure of atoms and the origin of the observedspectra

CO6: Identify atomic effect such as space quantization and Zeeman Effect.

CO7: To understand the Origin and nature of x-ray, Characteristic x-ray spectra,

CO8: To state Moseley's law and its importance, regular and irregular doublets and their laws.

16. Fundamentals of Spectroscopy

CO1: Understand hydrogen atom and three quantum numbers, Zeeman effect, Paschen-Back effect and Stark effect.

CO2: Understand Molecular spectra and IR spectra

CO3: Understand Raman Spectroscopy and determine structure using Raman and IRspectra.

CO4: Understand electronic spectra of diatomic molecules.

CO5: Understand Franck-Condon Principle and dissociation energy

CO6: Understand rotational fine structure of electronic-vibrational transition.

17. Practical 5

At the end of the course, the student will be able to

CO1: Measure wavelength in the emission spectra of iron (Iron arc).

CO2: Determine Rydberg‟s constant.

CO3: Determine Planck's constant

CO4: Understand and design crystal structure.

CO5: Measure wavelength and different properties of LASER

18. Practical 6

At the end of the course, the student will be able to

CO1: Analyze the fluorescence spectrum of a sample.

CO2: Determine E/m of electron..

CO3: To measure the ultrasonic velocity in unknown liquid

CO4: Understand and design experiments with He-Ne Laser

CO5: Measure and study the polarization of LASER Light

19. Nuclear and Particle Physics

After completion of this course students will be able to-

CO1: To understand nuclear compositions and Elementary particles, charge symmetryandindependence, spin dependence of nuclear force.

CO2: To state Law of radioactive decay and its application.

CO3: To distinguish between Types of nuclear models: Single particle shell model andLiquid drop model.

CO4: To understand nuclear reactions and conservation laws.

CO5: To understand nuclear fission on the basis of liquid drop model and nuclear fusion.

CO6: To understand basic principles and classification of Nuclear Reactor.

CO7: To learn types of detectors and classification of accelerators.

20. Solid State Physics

After completion of this course students will be able to-

CO1: Understand Band theory and it's applications

CO2: Understand magnetic properties of materials and quantum theory ofparamagnetism.

CO3: Understand Lattice dynamics, Theories of lattice specific heat, Dulong and Petit‟slaw, and Einstein and Debye models for specific heat

CO4: Understand Free electron theory of metals and Seebeck effect, thermoelectricpower ofmetals

CO5: Understand Superconductivity and Landau's theory of superconductivity.

21. Atomic and Molecular Physics II

After completion of this course students will be able to-

CO1: Understand Time dependence in quantum mechanics and importance of timedependent perturbation theory.

CO2: Understand Saturation spectroscopy, Experimental methods of saturationspectroscopy in laser and its application in condensed matter physics

CO3: Understand Roseneweig and Greshow theory and it application in spectroscopy

CO4: Understand Stimulated Raman scattering and its Quantum mechanical treatment,Fluorescence spectroscopy, Phase sensitive detectors.

CO5: Understand Matrix isolation spectroscopy and Fourier transforms spectroscopy,

CO6: Understand Group theory, Normal coordinates, normal modes, Application ofgroup theory to molecular vibrations.

22. Spectroscopic Applications

After completion of this course students will be able to-

CO1: Understand the Principle of spectroscopic instruments- UV-VIS instruments and its working

CO2: Understand the analysis of representative spectra of metal complexes with variousfunctional groups at the coordination sites through Raman and IR spectroscopy

CO3: Understand NMR phenomenon and its applications

CO4: Understand the Electronic spectroscopy its basic principle & electronic transitions in organic, inorganic and organometalic molecules and application to structure elucidation.

CO5: Understand the Electron paramagnetic resonance (EPR) spectroscopy of inorganic and organic compounds

CO6: Understand the Mossebauer spectroscopy, Mass spectroscopy and their applications

23. Practical 7

At the end of the course, the student will be able to

CO1: Measure resistivity of a semiconductor by four probe method at different temperaturesand determine band gap energy.

CO2: Measure Hall coefficient of given semiconductor: identify type of semiconductor andestimate charge carrier concentration.

CO3: Determine Dielectric constant

CO4: Understand and measure the Random decay of nuclear disintegration using dice

24. Project

After completion of this course students will be able to-

CO1: Explain the significance and value of problem in physics, both scientifically and inthe wider community.

CO2: Design and carry out scientific experiments as well as accurately record the resultsof experiments.

CO3: Critically analyze and evaluate experimental strategies, and decide which is mostappropriate for answering specific questions.

CO4: Research and communicate scientific knowledge in the context of a topic related tomaterial science/Electronics/Solid state Physics, in oral, written and electronic formats toboth scientists and the public at large.

CO5: Explore new areas of research in physics and allied fields of science andTechnology.

DEPARTMENT OF CHEMISTRY

UG CHEMISTRY DEGREE PROGRAM

Program specific outcomes (PSOs), Course outcomes (COs)

PROGRAM SPECIFIC OUTCOMES (PSO s) –

After completion of B.Sc. with chemistry as one of the subjects, Students will-

PSO1: have a firm foundation in the fundamentals and application of current chemical and scientific theories including those in Inorganic, Organic and physical chemistry.

PSO2: be able to design and carry out scientific experiments as well as accurately record and analyze the results of such experiments.

PSO3: be skilled in problem solving, critical thinking and analytical reasoning as applied to scientific problem.

PSO4: be able to explore new area of research in both chemistry and related field.

COURSE OUTCOMESB.Sc. SEM-I

PAPER I: INORGANIC CHEMISTRY

After completion of this course students will gain -

CO1: PAPER I code USCHTO1: INORGANIC CHEMISTRY

After completion of this course students will gain knowledge of-

CO1: Atomic structure in detail, different principles which are useful to write the electronic configuration of different elements and periodic properties of elements.

CO2: Covalent bond, bond parameter, hybridisation, molecular orbital theory and different M.O. diagrams of related molecules.

CO3: S-Block elements and P-Block elements in detail.

CO4: Hydrogen bonding,Chemistry of noble gases and different theories involved in volumetric analysis.

PAPER-II: CODE: USCHT02: **ORGANIC CHEMISTRY**

After completion of this course students will gain –

CO1: knowledge of fundamentals of organic chemistry like classification, type of reagents, Reaction intermediates, types of chemical reactions and its applications in organic chemistry Understand inductive effects classify a group into +I or –I group . Understand mesomeric or resonance effect Classify a group into +M or –M group. Apply these effects on organic substrates to locate electron deficient and electron rich sites.

CO2: Distinguish between different kinds of isomers .Assign cis/trans or E/Z configuration to an alkene. Draw the E or Z-isomer of a given alkene .Distinguish between mirror images that are superimposable and mirror images that are not superimposable . Decide whether an object is chiral or achiral . Locate asymmetric carbons (stereogenic centres) in a molecule. . Define enantiomers . Draw chiral molecules in tetrahedral form. Draw chiral molecules in Fischer projection.

Compare chiral molecules drawn in perspective formulas, Newman projection or in Fischer projection .Recognise a plane of symmetry. Decide if a stereoisomer is a meso compound. Propose a method for the separation of two enantiomer.

CO3. Translating between the structure and the name of an alkane, alkene or alkyne compound. Understanding unsaturated hydrocarbon containing at least one carbon–carbon double bond.
Understanding unsaturated hydrocarbon containing at least one carbon—carbon triple bond between two carbon atoms.Studying nomenclature, classification, orbital pictures, method of formation, physical and chemical properties, Reaction mechanism, applications of alkanes, alkene, alkadienes, alkyne, cycloalkanes.

CO4 : Able to drawthe structure of benzene and discuss its resonance properties, the IUPAC system to give correct names for benzene and its derivatives.Understanding the meaning of the term: Polynuclear Aromatic Hydrocarbon (PAH) able to study of characteristic reactions of benzene and its derivatives**,** Hucel rule for aromaticity, orbital pictures of benzene, , Effect of substituent on reactivity of aromatic compounds.

CODE: USCHP01: CONTENT 15: EXPERIMENTS

After completion of this course students will -

CO1: be able to handle different chemicals, laboratory instruments and glassware.

CO2: develop skill in titration and understand principle involved in titration.
CO3: acquire basic knowledge in evaluation of analytical data and embodied in practical record.
CO4: be able to identify organic compounds qualitatively by performing preliminary test, elements detection, functional group identification, preparation of derivative and recording melting point of compounds and derivatives.

COURSE OUTCOMES
B.SC. SEM-II
PAPER-I: CODE: USCHT03: ORGANIC CHEMISTRY

After completion of this course students will –

CO1: be able to know nomenclature, classification, orbital pictures, method of generation, physical and chemical properties, Reaction mechanism, applications of alkyl halide and aryl halide. Writing an electron-pushing mechanism for an SN2 reaction between an alkyl halide and a nucleophile.Describing the rate law and relative rate of reaction of alkyl halides of different degree foran SN2 substitution reaction, the mechanistic detail of the SN2 mechanism relating the geometrical structureof the transition state to the stereochemistry of the reactant and product at the atom wheresubstitution occurs, the effect of leaving group stability on the rate of an SN2 reaction

CO2:able toClassify alcohol phenol and ether and also name them according to IUPAC nomenclature.Understand the various reactions involved in the preparation of alcohol phenol and ether.Correlation the gradation in melting , boiling points and other physical properties with their Structure, the chemical reactions of alcohol phenol and ether and understand the mechanisms involved in various reactions.be able to understand nomenclature, classification, orbital pictures, method of generation, physical and chemical properties, Reaction mechanism, and applications of aliphatic aldehyde monohydric alcohol, dihydric alcohol, phenols and aliphatic and aromatic ethers.

CO3: Explaining the difference between an aldehyde and a ketoneNaming aldehydes and ketones according to the IUPAC system given the structural formulas and vice versa. Discuss the physical properties of aldehydes and ketones, characteristic reactions of aldehydes and ketones Defining keto-enol tautomerismbecome familiar with nomenclature, classification, orbital pictures, method of generation, Reaction mechanism, applications of aliphatic carbonyl compounds like formaldehyde, acetaldehyde, acetone, benzaldehyde and benzophenone.

CO4: Identifing the carboxyl group in a carboxylic acid
Naming carboxylic acids according to the IUPAC system given the structural formulas and vice versaDiscussing the physical properties of carboxylic acidscharacteristic reactions of carboxylic acids , the properties of fatty acids, soaps and detergentsIllustrating the synthesis of an ester using Fischer esterificationbe able to know nomenclature, classification, orbital pictures, method of generation, physical and chemical properties, Reaction mechanism, applications of mono carboxylic acid, dicarboxylic acid like succinic acid, phthallic acid and their derivatives like acid chloride, amide, ester and unhydride.

PAPER-II: Code USCChT04: Physical Chemistry
After completion of this course students will gain -
CO1: Mathematical concepts i.e., Logarithmic relations, Linear graphs, calculation of slopes, differentiation of functions like kx ex, xn sinx logx etc. maxima and minima, Integration of useful /

relevant functions, C. G. S. and S. I.units and their inteconversion and ionic equilibrium involved in physical chemistry
CO2: Thermodynamic terms, first law of thermodynamics and concept of thermo chemistry**.**
CO3: Different terms and theories involved in gaseous state.
CO4: Properties of liquid i.e., surface tension, viscosity CODE: USCHP02: CONTENT**:**

20 EXPERIMENTS
AFTER COMPLETION OF THIS COURSE
They will be able to know one step synthesis of organic compounds and their characterization by finding melting point. They will know about physical chemistry practical in regard to principle and application.

COURSE OUTCOMES
B.Sc. SEM-III

PAPER-I: Code- USCChT05: Inorganic Chemistry

After completion of this course student will gain knowledge of-

CO1: Hydrides of boron, basic properties of iodine, interhalogen compounds and oxy acids of sulphur and silicates.

CO2: Ionic solids, metallic bonding and acids and bases.

CO3: First transition elements, second transition elements and third transition elements.

CO4: Chemistry of lanthanides and actinides.

PAPER-II: Physical Chemistry

After completion of this course students will gain knowledge of -

CO1: Phase rule, liquid-liquid mixtures, and partial miscible liquids and immiscible liquids.

CO2: Second law of thermodynamic, need and application of second law of thermodynamic, free energy functions, system of variable compositions.

CO3: Chemical kinetics, collision theory of bimolecular reactions and characteristic and classification of catalysis

CO4: Methods of expressing concentration of solutions, determination of molecular mass from different colligative properties.

Contents: 15 Experiments

After completion of this course –

CO1: Students will design and conduct an experiment acid-base titration and demonstrate their understanding of the scientific method..

CO2: Students will demonstrate an understanding of the heat of solution (series of experiments) required to interpret and analyze results and draw conclusions as supported by their data.

COURSE OUTCOMES
B.Sc. SEM-IV

PAPER-I: Code- USChT07: Inorganic Chemistry
After completion of this course student will gain knowledge of –

CO1: Co-ordination compounds, different theories of co-ordination compounds and isomerism in co-ordination compounds.
CO2: Classification of hard and soft acids, concept of SHAB principle and its application and bases and oxidation and reduction**.**
CO3: Metal-ligand **bonding in transition metal complexes and electronic spectra of transition metal complexes.**
CO4: Thermodynamic and kinetic aspects of metal complexes and information about colorimetry and spectrophotometry**.**

PAPER-II: Organic Chemistry

After completion of this course students will gain –

CO1: Giving examples of a primary, secondary and tertiary amine
Naming amines according to the IUPAC system given the structural formulas and vice versa
Discussing the physical properties of amines including their basicity, characteristic reactions of amines, illustrating reduction of nitro compounds.

CO2: an understanding of term and reactions of organometallic compound preparation of some reagent, understanding heterocyclic compounds.

CO3: an able to understand amino acids, proteins., explain peptide linkage, describing some of the functions of proteins such as structure, catalysis, movement, transport, hormones, protection, storage and regulationDrawing structures for all twenty amino acids, zwitterions Defining what is meant by the primary, secondary, tertiary and quaternary structure of a protein the properties of some common proteins.

CO4: an understanding of concept of carbohydrates, different types of carbohydrates, conversion of aldose to fructose and vice versa , types and preparation of dyes, uses of drugs , effect of drugs on human body

CONTENT 15: EXPERIMENT
AFTER COMPLETION OF THIS COURSE

CO1: The students will be able to handle different chemicals, laboratory instruments and glassware. They will develop skill in titration and understand principle involved in titration. They will acquire basic knowledge in evaluation of analytical data and embody in practical record. They will be able to identify organic compounds qualitatively by performing preliminary test, elements detection, functional group identification, preparation of derivative and recording melting point of compounds and derivatives.
CO2: The students will be able to understand concepts of gravimetric analysis and conduct the experiments.

COURSE OUTCOMES
B.Sc. SEM-V

PAPER-I (Organic Chemistry)

After completion of this course students will gain -

CO1: able to understand Nuclear Magnetic Resonance Spectroscopy. , nuclear shielding, deshielding, chemical shift, Spin-spin splitting and coupling constant. An understanding of Interpretation of NMR spectra of organic molecules. Learning problem pertaining to the structure elucidation of simple organic molecules by NMR technique.

CO2: able to know enolates, preparation of enolates, synthetic application of acetoacetic ester, its tautomerism diethyl malonates

CO3: an understanding isolate the key design features of a product which relate directly to the material(s) used in its construction indicate how the properties of polymeric materials can be exploited by a product designer the role of rubber-toughening in improving the mechanical properties of polymers identify the repeat units of particular polymers and specify the isomeric structures which can exist for those repeat units.

CO4: understandthe term green chemistry, principals of green chemistry, hazardous waste, toxicity, different types of solvent used in green chemistry

PAPER-II
COURSE OUTCOMES
Contents: Physical Chemistry
COURSE OUTCOMES

After completion of this course students will gain knowledge of -
CO1: Concept of electrical transport in metals, electrolytic solution, different terms, different theories of electrochemistry, kohlrausch's law and its application and conductometric Titrations.
CO2: Types of electrochemical cells, faradays laws and definition and determination of transport number by different methods**.**
CO3: Types of electrodes, Nernts equation, concentration cell and application of EMF measurement.
CO4: Main aspects, postulates, different theories of quantum mechanicsand be able to discuss and interpret experiments that reveal the wave properties of matter**.**

Experiments Contents: Organic and Physical Chemistry
After completion of this course students will -
CO1: Design and conduct an experiment (or series of experiments) demonstrating their understanding of the scientific method and processes based on analysis.
CO2: Demonstrate an understanding of the analytical methods required to interpret and analyze results and draw conclusions as supported by their data**.**

Experiments Contents: Organic and Physical Chemistry
After completion of this course students will -
CO1: design and conduct an experiment (or series of experiments) demonstrating their understanding of the scientific method and processes based on analysis.
CO2: demonstrate an understanding of the analytical methods required to interpret and analyze results and draw conclusions as supported by their data.

Skill Enhancement Course

SEC I

Contents: Pharmaceutical chemistry

After completion of this course students will gain -

CO1: an understanding of basics of Drug discovery, design and development.

CO2: an understanding of analgesic agent, antipyretic agent and anti-inflammatory agent

CO3: an understanding concept of antibiotic, antibacterial, antiviral agent and antifungal agent.

CO4: an understanding concept of fermantation.

Practical

After completion of this course students will -
CO1: Prepare and analysis different drug like Aspirin, magnesium bisilicate and paracetamol.

CO2: perform analytical method of validation

SEC II

Contents: Chemistry of cosmetics and perfume

After completion of this course students will -

CO1: an understanding preparation and uses of hair dye, hair spray, shampoo, suntan lotion, face powder, lipsticks, talcum powder, nail enamel.

CO2: learn about solar energy and its importance.

CO3: learn about creams like cold, vanishing and shaving cream.

Practical

After completion of this course students will -

CO1: Prepare shampoo, talcum powder, enamel, hair remover, face cream, nail polish and nail polish remover.

B. Sc. SEM-VI

PAPER-I CODE USCDSEChT13: Inorganic Chemistry

COURSE OUTCOMES

After completion of this course students will gain knowledge of -

CO1: Qualitative and quantitative aspects of analysis and Flame photometry.

CO2: Separation techniques like chromatography, ion-exchange, solvent extraction and Fertilizer and Basic principle of soil chemistry.

CO3: Organometallic chemistry and Nanomaterial.

CO4: Water pollution involving hydrological cycle, source and nature of water pollutant, water purification methods and Industrial waste management.

PAPER-II

CHE 02 Contents: Physical Chemistry

After completion of this course students will gain -

CO1:an understanding of Interaction of radiation with matter,

CO2:an understanding of Spectroscopy, Rotational spectra of diatomic molecules, Application of rotational spectra for determination of bond length of diatomic molecules

CO3: an understanding of Surface Chemistry, freundlich adsorption isotherm, Langmuirs theory of adsorption, Adsorption chromatography and concept of colloidal chemistry

CO4: students are able to know about structure of atom , nucleons, decay of atoms, disintegration law. Use of radioisotoptes in medicin , agricultures, carbon dating.

Chemistry Practicals Contents: 10 experiments

After completion of this course -

CO1: Students will design and conduct experiment (or series of experiments) demonstrating their understanding of the scientific method and processes based on spectroscopy, photochemistry and colloidal chemistry.

CO2: Students will demonstrate an understanding of the analytical methods required to interpret and analyze results and draw conclusions as supported by their data.

Skill Enhancement Course

SEC III

Contents: Pesticides chemistry

After completion of this course students will gain -

CO1: an understanding of general introduction of pesticides.

CO2: an understanding of synthesis and uses of representive pestsides.

Practical

After completion of this course students will -
CO1: calculate acidity and alkalinity of given sample of pesticides.

CO2:prepare certain pesticides like organophosphates, phosphonate and thiophosphates

SEC IV

Contents: Analytical clinical Biochemistry

After completion of this course students will gain-

CO1: an understandingof structure property and function of carbohydrates, protein and lipid.

CO2: an understanding concept of enzymes.

CO3: an understanding concept of biochemistry of diseases.

Practical

After completion of this course students will gain -
CO1: identification and estimation of carbohydrates, lipids, cholesterol, protein.

CO2: determination of iodine no. of oil, saponification no. of oil.

DEPARTMENT OF CHEMISTRY
PG CHEMISTRY DEGREE PROGRAM

Program specific outcomes (PSOs), Course outcomes (COs)
After completion of M.S. Chemistry program students will -
PSO1: Gain complete knowledge about all fundamental aspects of all the elements of chemistry.
PSO2: learn about the potential use of analytical industrial chemistry, green chemistry and medicinal chemistry.
PSO3: gathers knowledge about physical aspects of atomic structure, dual behavior, reaction pathways with respect to time, various energy transformations, significance of electro chemistry and molecular segregation using their symmetry.
PSO4: learn the importance of various elements present in the periodic table, coordination chemistry and structure of molecules, properties of compounds and structural determination of complexes using theories and instruments.
PSO5: Carry out experiments in the area of organic analysis, estimation, separation, derivative process, inorganic semi-microanalysis, preparation, conductometric and potentiometric analysis thus developing research aptitude and employability skills.

COURSE OUTCOMES
Class- M.Sc. SEMESTER-I
PAPER 1: INORGANIC CHEMISTRY
SUBJECT CODE: CH 101
CO1: After completion of this course the students will develop an advance level of understanding and basic knowledge about various theories and concepts in inorganic chemistry.
CO2: The students will be able to learn, interpret and develop research abilities.

PAPER 2: ORGANIC CHEMISTRY
SUBJECT CODE: CH 102
CO1: After completion of this course the students will develop and be able to write mechanism of reaction.
CO2: They will become aware of various chemicals reagents used in chemical reaction in organic transformation and conversion.
CO3: Students will learn various concepts in stereochemistry and acquire skills to identify stereo chemical aspects of molecules, nature and bonding in various organic molecules.

PAPER 3: PHYSICAL CHEMISTRY
SUBJECT CODE: CH 103
CO1 After completion of this course the students will be able to understand about various physical concepts and their importance through quantum mechanics, classical thermodynamics, phase Equilibria and chemical kinetics.
PAPER 4: ANALYTICAL CHEMISTRY
SUBJECT CODE: CH 104
CO1: After completion of this course the students will be able to understand about qualitative and quantitative analysis and various techniques used for analysis purpose such as chromatography, gravimetric analysis and spectrophotometers.

CO2: By studying analytical chemistry, students will gain information about working of instruments.

PRACTICAL – 1 (INORGANIC CHEMISTRY)

SUBJECT CODE: CH 105

CO1: At the end of course student will be able to separate and perform semi-micro analysis of inorganic mixture and also, will become expert in quantitative and qualitative analysis.

PRACTICAL – 2 (ORGANIC CHEMISTRY) SUBJECT CODE: CH 106

CO2: At the end of course student will be able to separate and identify the organic mixture and also, will become expert in organic synthesis.

SEMINAR 1: CH 107

CO1: Students will be able to gain deep knowledge about given specific topic and develop teaching skill.

M.SC SEMESTER II

PAPER5: INORGANIC CHEMISTRY

SUBJECT CODE: CH 201

CO1: After completion of this course students will be able to understand about the electronic spectra of transition metal complex, their magnetic properties, and their reaction mechanisms and about metal-pi complexes.

PAPER 6: ORGANIC CHEMISTRY:

SUBJECT CODE: CH 202

CO1: After completion of this course students will be able to gain knowledge about carbon-carbon multiple bonds, mechanism of molecular arrangement, free radical reactions and about green chemistry.

PAPER 7: PHYSICAL CHEMISTRY

SUBJECT CODE: CH 203

CO1: After completion of this course students will gain knowledge about application of quantum mechanics, thermodynamics, solid state chemistry and nuclear chemistry.

PAPER 8: ANALYTICAL CHEMISTRY

SUBJECT CODE: CH 204

CO1: After completion of this course students can understand and gain knowledge about sampling and process used for it, chromatographic techniques, and optical methods used for analysis and electrochemical methods used for analysis.

PRACTICAL – 3 (PHYSICAL CHEMISTRY)

SUBJECT CODE: CH 205

CO1: At the end of course student will gain information about chemical kinetics experiments, volume contraction and CST.

PRACTICAL – 4 (ANALYTICAL CHEMISTRY)

SUBJECT CODE: CH 206

CO1: At the end of course student will gain information about various instrumental technics.

SEMINAR 2: CH 207

CO1: Students will be able to gain deep knowledge about given specific topic, develop teaching skill.

M.SC SEMESTER III

PAPER 9: SPECTROSCOPY

SUBJECT CODE: CH 301

CO1: After completion of this course the students will be able to understand about the symmetry of molecules and group theory, mass spectroscopy, Mossbauer, microwave spectroscopy, infrared and Raman spectroscopy in detail.

PAPER 10: SPECIAL 1- ORGANIC CHEMISTRY

SUBJECT CODE: CH 302

CO1: After completion of this course the students will be able to gain knowledge about photochemistry, pericyclic reaction and all types of oxidation and reduction reactions and the chemistry of P, S, Si, B, Ti compounds.

PAPER 11: SPECIAL 2- ORGANIC CHEMISTRY

SUBJECT CODE: CH 303

CO1: After completion of this course the students will be able to understand deeply about the structures and composition and various synthesis methods in terpenoids, alkaloids, and steroids and know about plant pigments. Carbohydrate and detail knowledge about amino acids and peptides.

PAPER 12: ELECTIVE POLYMER CHEMISTRY

SUBJECT CODE: CH 304

CO1: After completion of this course the students will be able to understand about polymers, its classification and types. It also deals with the molar mass determination of polymer.

CO2: Student will gain knowledge about physical properties of polymer and also studied in a detail about various commercial polymer.

PRACTICAL – 5 (ORGANIC CHEMISTRY SPECIAL)

SUBJECT CODE: CH 305

CO1: At the end of course student will be able to develop skill in organic synthesis.

PRACTICAL – 6 (POLYMER CHEMISTRY)

SUBJECT CODE: CH 306

CO1: At the end of course student will be able to develop skill in polymer synthesis.

SEMINAR 3: CH 307

CO1: Students will be able to gain deep knowledge about given specific topic, develop teaching skill.

M.SC SEMESTER IV
PAPER 13: SPECTROSCOPY
SUBJECT CODE: CH 401
CO1: After completion of this course the students will be able to understand about different spectrographic methods used for different analysis such as NMR, UV-VISIBLE, diffraction techniques.
PAPER 14: SPECIAL 1 ORGANIC CHEMISTRY
SUBJECT CODE: CH 402
CO1: After completion of this course the students will be able to gain knowledge about carbanions and organometallic reagents in detail and about advanced spectrochemistry and retrosynthesis.
PAPER 15: SPECIAL 2 ORGANIC CHEMISTRY
SUBJECT CODE: CH 403
CO1: After completion of this course the students will be able to study about enzymes and their mechanism, about different heterocyclic compound, nucleic acids and mechanism of dyes and their nature and about drugs and their properties.
PAPER 16: ELECTIVE POLYMER CHEMISTRY
SUBJECT CODE: CH 404
CO1: After completion of this course the students will be able to know about different polymerization techniques, their characteristics, and about biomedical polymers, inorganic and coordination polymer.
PRACTICAL – 7 (ORGANIC CHEMISTRY SPECIAL)
SUBJECT CODE: CH 405
CO1: At the end of course student will be able to develop skill in organic synthesis.

PRACTICAL – (PROJECT)
SUBJECT CODE: CH 406
CO1: Students will develop research ability and try to solve research problem.
SEMINAR 3: CH 407
CO1: Students will be able to gain deep knowledge about specific topic, develop teaching skill.

U.G. DEPARTMENT OF COMPUTER SCIENCE

Course: B.Sc. (Computer Science)

Program Outcomes (PO)

After completion of B.Sc. with computer science students will be able to-

PSO1: Develop an ability to apply knowledge of computing, mathematics and basic science that may be relevant to the domain.

PSO2: Develop an ability to analyze a problem, identify and define the computing requirements, which may be appropriate to its solution.

PSO3: Develop an understanding of professional, ethical, legal security, social issues and responsibilities.

PSO4: Develop an ability to communicate effectively among a range of audience.

PSO5: Recognize the need for and an ability to engage in continuous professional development.

PSO6: Develop an ability to use and apply current technical concepts and practices in the core development of solutions in the form of information technology.

Course Outcomes

Class : - B.Sc. (Computer Science)

SEMESTER: - I

Paper Name: - Paper-I (Information and Communication Technology):
Course Code: - USCST01

At the end of this course, the student will be able: **Course Outcomes**

CO1 : To understand the block diagram of the computer system and the working of each unit.
CO2 : To get the knowledge of all the available number systems used.
CO3 : To understand the various types of input and output devices with their working.
CO4 : To understand the windows operating system and its components.
CO5 : To get the knowledge of networking and its various topologies.
CO6 : To get the knowledge about the open source technology.

Paper Name:- Paper-II (Programming Techniques & Introduction To 'C'):
Course Code: - USCST02

At the end of this course, the student will be able: **Course Outcome**

CO1 : To Understand the Programming Concept and Design.
CO2 : To get the Knowledge of Different Programming Languages.
CO3 : To get the Knowledge of Design Flowchart and Write Algorithms.
CO4 : To Understand the Condition and Looping in Use C Program.
CO5 : To get the Knowledge of Expression and Operator in C Program
CO6 : To Understand the Program Writing and Execution of C Language.

Practical based on IT, Office Automation: Course Code: - USCST01

At the end of this Practical, the student will be able: **Course Outcome**

CO1: To understand the structure element of MS-Word and Create and design Word page.
CO2: To get the knowledge of MS-Excel And Create Spreadsheet and Chart Etc.
CO3: To understand the various types of design and function with their working.
CO4: To understand the design the Presentation of any Work in MS-PowerPoint and its Function and Buttons.

CO5 : To get the knowledge of MS-Access and Create a Database in MS-Access.
CO6 : To get the Practical Based knowledge about in Office Automation.

Practical Based on 'C'- PRACTICAL: Course Code: - USCST02
At the end of this Practical, the student will be able: **Course Outcome**
CO1 : To understand the structure of C Programming.
CO2 : To get the Knowledge of write program in C Programming.
CO3 : To Understand the command and Syntax of C Programming
CO4 : To understand the Computation of different Operation in C Programming.
CO5 : To Understand the use of C Programming.
CO6 : To understand the Algorithms and Flowchart.

SEMESTER : - II

Paper-I (Operating System & Linux): Course Code: - USCST03
At the end of this course, the student will be able:
Course Outcome
CO1 : To understand the basics of the Operating System.
CO2 : To differentiate between various types of the operating system.
CO3 : To describe the basics of Linux commands and the shell of Linux.
CO4 : To understand the basics of the shell scripts.
CO5 : To implement the shell script.
CO6 : To design various shell scripts.

Paper-II (Structured Programming With 'C') Course Code: - USCST04
At the end of this course, the student will be able:
Course Outcome
CO1 : To get the Knowledge of Design, implement, test, debug, and document programs in C.
CO2 : To Understand the Program with pointers and arrays, perform pointer arithmetic, and use the preprocessor.
CO3 : To Understand the Program low-level input and output routines in C.
CO4 : To Understand how to write and use functions, how the stack is used to implement function calls, and parameter passing options.
CO5 : To Understand and use the common data structures typically found in C programs — namely arrays, strings, lists, trees, and hash tables.
CO6 : Create a program that measures or simulates performance and use it to analyzebehavior

Practical Based on LINUX
Course Code: - USCST03
At the end of this Practical, the student will be able:
Course Outcome
CO1 : To get the basic knowledge of Linux Operating System and their Different Command.
CO2 : To Understand the Use Command base in Linux OS
CO3 : To understand the File Management Command and their use in Linux OS.
CO4 : To understand the Directory Command and their use in Linux OS.
CO5 : To get the Knowledge of Shell Script Programming.
CO6 : To understand and Write the Shell Script Program and Execute in OS.

Course Name: - 'C' – Practical Course Code:

At the end of this Practical, the student will be able:

Course Outcome

CO1 : To understand the C Programming Basic Command and their Function.
CO2 : To get knowledge use of C Programming.
CO3 : To get knowledge different command and Compile and Execute the Program
CO4 : To understand the Introduction of C Programming and their Applications.
CO5 : To write different types of computation based on C Programming.
CO6 : To use in software design in IT Sector.

SEMESTER : - III

Paper-I (Database Management & System Analysis)

Course Code: - USCST05

At the end of this course, the student will be able: **Course Outcome**

CO1 : Master the basic concepts and appreciate the applications of database systems
CO2 : Be familiar with the relational database theory, and be able to write relational algebra expressions for queries.
CO3 : Be familiar with basic database storage structures and access techniques: file and page organizations, indexing methods including B-tree, and hashing.
CO4 : Be familiar with the basic issues of transaction processing and concurrency control.
CO5 : To get the knowledge of System, its Design
CO6 : To get the knowledge about the analysis of the system

Paper-II (Object Oriented Programming with C++)

Course Code: - USCST06

At the end of this course, the student will be able:

Course Outcome

CO1 : To Understand the Map an object-oriented program design into the class and template model of C++.
CO2 : To get the Knowledge of Element of Programming and their function.
CO3 : To get the Knowledge of use Classes and Object in C++.
CO4 : To get the Knowledge of Use Constructors, Destructors, Inheritance, and Operator overloading and the Standard Template Library in C++.
CO5 : To Understand the streaming input and output operators in C++.

Practical Based on MS-ACCESS: Course Code: - USCST05

At the end of this Practical, the studentwill be able:

Course Outcome

CO1 : To understand the MS-Access Component and Different Commands.
CO2 : To get knowledge of Create Database and Table in MS-Access.
CO3 : To get knowledge of Using Query in Database in MS-Access.
CO4 : To understand Design Report and Form in MS-Access.
CO5 : To create the Report and database.
CO6 : To design and Create various table in MS-Access.
CO7 : To Understand the Pointers Virtual & Friend functions and file handling.

Practical on Object Oriented Programming with C++
Course Code: - USCST06
At the end of this Practical, the student will be able: **Course Outcome #**
Course Outcome
CO1 : To understand the Object Oriented and Object Based Program in C++ .
CO2 : To get knowledge Create the Different Application in C++.
CO3 : To get knowledge of Command and Syntax in C++ Programming.
CO4 : To understand C++ Programming and its importance by using various Ways.
CO5 : To create the different Program using C++.
CO6 : To Understand the file handling command in C++ Etc.

SEMESTER : - IV

Paper-I (Algorithm & Data Structures)
Course Code: - USCST07
At the end of this course, the student will be able: **Course Outcome**
CO1 : To Understand the Introduction of Data Structure and Their Algorithms.
CO2 : To get the Knowledge of Sorting and Searching Method.
CO3 : To Understand the Use of Stack and Queues.
CO4 : To get the Knowledge of Recursion Method and their Examples.
CO5 : To Understand the Linked List and their Uses.
CO6 : To get the Knowledge of Tree and Graph and Their Uses.

Paper-II (VISUALBASIC & INTRODUCTION To .NET)
Course Code: - USCST08
At the end of this course, the student will be able: **Course Outcome**
CO1 : To Understand how to perform operations and store results.
CO2 : To Understand the concept of data-driven program execution flow control in Visual Basic programming.
CO3 : The student will apply and synthesize knowledge of user interface design.
CO4 : The student will demonstrate understanding and application of a modern Integrated Development Environment (IDE).
CO5 : The student will demonstrate database connectivity useful for Projects
CO6 : The student get idea about the basic concept of .Net

Practical Based on Data Structure
Course Code: - USCST07
At the end of this Practical, the student will be able: **Course Outcome**
CO1 : To understand the Data Structure and their Different algorithms.
CO2 : To get knowledge of algorithms and their use in C++ Programming.
CO3 : To get knowledge different function and their implementation in C++ Programming.
CO4 : To understand the tree and graph Operation and Implement in C++ Programming.
CO5 : To Write Different algorithms and solve numerical Operation of Data Structure and use in C++ Programming.
CO6 : To Understand the fundamental Operation of data Structure and use in C++

Practical Based on Visual Basic & Introduction to .NET

Course Code: - USCST08
At the end of this Practical, the student will be able:

Course Outcome
CO1 : To understand the Visual Basic Structure and their Commands.
CO2 : To get knowledge of Design Form and coding of VB.
CO3 : To get knowledge of Command, Syntax in Visual Basic and .NET.
CO4 : To get the Knowledge for design Software in Using Visual Basic.
CO5 : To understand the Different types of Software Designing in .NET.
CO6 : To Understand the Multiple form designing and their Execution.

SEMESTER: - V

Paper-I : E-Commerce &Web Designing

Course Code: -USCST09.1

At the end of this course, the student will be able:

Course Outcome

CO1 : To understand the basic difference between Commerce and E- commerce
CO2 : To get knowledge of EDI and the trade cycle.
CO3 : To get knowledge of Internet and its various services.
CO4 : To understand HTML and its importance by using various tags.
CO5 : To create the WebPages using HTML
CO6 : To design various web forms using HTML.
CO7: To design advance HTML using CSS (Creating of Style Sheet)
CO8: To design the CSS Id , Class and Box Model

Paper-II : Database Programming with Oracle

Course Code: -USCST09.2

At the end of this course, the student will be able:

Course Outcome

CO1 : Enhance the knowledge and understanding of Database analysis and design.

CO2 : Get the Knowledge about the SQL.

CO3 : Enhance the knowledge of the processes of Database Development and Administration using SQL and PL/SQL.

CO4 : Enhance Programming and Software Engineering skills and techniques using SQL and PL/SQL.

CO5 : Use the Relational model and how it is supported by SQL and PL/SQL.

CO6 : Use the PL/SQL code constructs of IF-THEN-ELSE and LOOP types as well as syntax

and command functions.

CO7 : Use of Database Objects as well as how to implement sub queries

CO8 : Use of packages and Triggers in the programs

Practical Based on Web Designing and Oracle

At the end of this Practical, the student will be able:

Course Outcome

CO1 : To understand the Formatting Style tags

CO2: To get knowledge of HR tag and alignment

CO3: To understand Order and Unorder list

CO4: To get knowledge of Image Hyperlink

CO5: To understand the CSS Grid

CO7 : To understand the Database Management by using Oracle.

CO8 : To get knowledge of SQL And PL/SQL Command in Oracle.

CO9 : To get knowledge of Using different Query in Database by using Oracle.

CO10 : To understand Create the Table and manipulate the Record and View.

CO11 : To Understand the Structure of PL/SQL Programming and their use.

CO12 : To Create various Database and Connecting the front End Language

Skill Enhancement Course (SEC-I)

Paper I: Computers for Managers

Paper Code: USCST010.1

At the end of this Course, the student will be able:

Course Outcome

CO1 : To understand the Internet and Its applications in day to day life

CO2 : To get knowledge of structure of MIS

CO3 : To get knowledge Business Intelligence and Online Analytical Processing.

CO4 : To understand Data Mining Text Mining and Web Mining

CO5 : To Understand the Geographic Information Systems (GIS),.

CO6 : To get knowledge of Virtual Reality, Real-Time Business Intelligence (BI)

CO7: To understand theRole of Scorecards and Dashboards in Performance Management.

SEMESTER: - VI

Paper-I : CORE JAVA

Course Code:- USCST11.1

At the end of this course, the student will be able:

Course Outcome

CO1 : To understand History and Features of Java

CO2 : To get knowledge JDK Environment,.

CO3 : To get knowledge of Java Programming Concepts.

CO4 : To understand how object and class are work

CO5 : To understand the language features and java package to implement

CO6 : To design various programs which implement exception handling concept.

CO7: To understand how thread life cycle is working

CO8: To get knowledge of Abstract Window Toolkit

CO9: To understand how applet life cycle is working

Paper-II : Data Communication with Cloud Computing

Course Code: - USCST11.2

At the end of this course, the student will be able:

Course Outcome

CO1 : Describe the components of a data communications system.

CO2 : Explain the role of line codes in a data communications network.

CO3 : Describe the various types of signals and their features.

CO4 : Describe the features and functions of multiplexing and modulation.

CO5: To get knowledge of Communication Network

CO6 : To understand the LAN and MAN types

CO7 : To understand how the topologies is established in various ways.

CO8: To study various Protocol and Architecture like OSI, TCP/IP etc

CO9: To get knowledge how Internetworking

CO10: Basics of cloud computing

CO11 : Different Cloud Computing services

Practical Based On CORE JAVA.

At the end of this Practical, the student will be able to:

Course Outcome

CO1 : To built the program depending on else if ladder.

CO2 : To built the program on control structure.

CO3 : To get knowledge how to make array programs.

CO4 : To understand how constructor and destructor used in the programming

CO5: To built the program by using reference calling

CO6: To understand how string functions are implement in the program

CO7: To get knowledge how Applet, Thread and Exception handling in implemented in the Program

CO8: To understand how grid layout and check box are implemented in the program

Skill Enhancement Course (SEC-II)

Paper IV: PC-Maintenance

Paper Code: USCST12.4

At the end of this Course, the student will be able:

Course Outcome

CO1 : To understand Active Hardware and Software Maintenance

CO2 : To get knowledge Heat and Temperature Control

CO3 : To get knowledge BIOS and CMOS

CO4 : To understand different types of CPUs

CO5 : To Understand RAM and ROM working

CO6 : To get knowledge of Video Cards and Monitors

CO7: To understand CRT and LCD working

CO8: To get knowledge of different type of Drives

CO9: To understand the working of Hard Drive Interfaces- IDE, SCSI, SATA

CO10: To understand the installing of sound card, Modem, Motherboard and power supply

CO11: To understand printer features and types of printers

CO12: To understand formatting PC and how backup data is taking before formatting the disk

CO13: To get knowledge of trouble shooting

DEPARTMENT OF BOTANY

UG BOTANY DEGREE PROGRAM

Program specific outcomes (PSOs), Course outcomes (COs)

Learning outcomes for Botany Undergraduate Programme B.Sc. Botany

Upon successful completion of B.Sc. Botany Under-Graduates are expected to-

PSO1: Develop a conceptual understanding of principles and importance of Botany. They will be able to demonstrate knowledge on selected topic of microbiology, cytology, and genetics, plant Biotechnology, angiosperm and be able to apply this knowledge to analyze a broad range of different phenomenon.

PSO2: Understand the nature and basic concept of Diversity of lower and higher plants, taxonomy, Anatomy, Physiology and Ecology Applied Botany, Cytogenetic and identify & classify the plant that occurs locally.

PSO3: to develop laboratory skill and be able to test soil, water, different physiological experiment. Applied course of Botany have tremendous scope in Vermicomposting, Apiculture, Floriculture.

PSO4: to demonstrate written and oral communication skills in communicating Botany – related topics and will provide and wok independently.

PSO5: to develop an understanding of the impact of botany and science on society and develop respect for conservation of environment.

B. Sc. I Semester I

Paper I: Plant Diversity-I

After completion of this course students will gain knowledge of -

CO1: General characteristics of Viruses and their economic importance, Bacteria, Mycoplasma, Cyanobacteria.

CO2: Life history of Algae such as-Oedogonium, Chara, Vaucheria, Ectocarpus.

CO3: Life history of fungi such as- Albugo, Mucor, Penecillium, Puccinia, etc.

CO4: Types of Lichens and Plant pathology-Viral, Fungal, Bacterial diseases.

Paper II : Plant Diversity-II

After completion of this course students will gain knowledge of -

CO1: Classification, General characteristic and economic importance of Bryophyta such as - Riccia, Anthocerose and Funaria.

CO2: Classification, General characteristic and economic importance of Pteridophyta such as – Rhynia, Selaginella, Equisetum, Marsilea.

CO3: Classification, General characteristic and economic importance and external morphology and reproduction of Gymnosperm such as – Cycas, Pinus.

CO4: study of paleobotany- Geological time scale, Fossils, types of Fossils and process of fossilization, fossil gemnosperm- glassopteris and cycadeoidea.

Code USCBOT-P01 (Practical Work)

Contents: Plant Diversity-I & Plant Diversity-II

After completion of this course-

CO1: Student can identify different types ofalgaesuch ascyanobacteria , Nostoc and gleocapsa other different algae.

CO2: Student can classify and identify the Algal and fungal genus and specimen included.

CO3: Student can make micro preparation of the material of Pteridophyta and bryophytes and identify them anatomically.

CO4: Student can make micro preparation of the material of Gymnosperm and identify them anatomically and study of different fossils.

Semester II

Paper I: Plant Morphology & Anatomy of angiosperm

After completion of this course students will gain knowledge of -

CO1: Vegetative morphology of Angiosperm such as Root, Stem, Leaves.

CO2: Reproductive morphology of Angiosperm such as inflorescent flower and fruit types.

CO3: Apical meristem of Root & Shoot, types of tissues, Vascular Bundles, Xylem, Phloem, Cambium, Periderm.

CO4: Primary structure of -Dicot root, stem, leaf. Monocot root, stem and leaf.

Paper II: Taxonomy & Diversity of Angiosperms

After completion of this course students will gain knowledge of -

CO1: The Fossil Angiosperm, Botanical nomenclature and brief history of classification.

CO2: The Classification of Angiosperms, botanical nomenclature and herbarium techniques.

CO3: Diversity of flowering plants Dicot families such as- Malvaceae,Solanaceae, Brassicaceae, Fabaceae.

CO4: Diversity of flowering plants Dicot families such as- Lamiaceae, Apocynaceae, Asteraceae. Diversity of flowering plants Monocot families such as- Liliaceae, Poaceae, Orchidaceae.

Code USCBOT-P02 (Laboratory Work)

Contents: Plant Morphology &Anatomy & Taxonomy& Diversity of Angiosperms

After completion of this course-

CO1: Student will develop the skill and be able to prepare double stained micro preparation of the given material and identify on the basis of observation and also study the vegetative morphology and reproductive morphology..

CO2: Students will gain the skill to identify the fossil specimen.

Semester III

Paper I: Reproductive Biology and development in Angiosperm

After completion of this course students will gain knowledge of -

CO1: The structure of Stamen, Pistil, Ovule, Embryo Sac, Pollination types.

CO2: Double fertilization, formation of seed, deed dormancy and strategies of seed disease cell.

CO3: The growth and development, plant growth regulators and movements in the plants.

CO4: Physiology of flowering, Phytochromes, Photoperiodism, and Senescence and abscission.

Code USCBOT-T06 Contents: Plant Biochemistry & Plant Physiology

After completion of this course students will gain knowledge of -

CO1: The structure, properties and uses of Carbohydrates, Lipids and Proteins.

CO2: Structure, properties, mechanism of Enzymes and Metabolism of Nitrogen.

CO3: Plants, Water related function of Ascent of Sap, Transpiration, Absorption and phloem transport.

CO4: Mechanism of Photosynthesis and Respiration.

Code USCBOT-P03 (Laboratory Work)

Contents: Reproductive Biology and development in Angiosperm &Plant Biochemistry and Physiology

CO1: Student will perform total Experiment in practical demonstrate/Study- Physiological and Biochemistry.

CO2: Photographs, permanent slides, herbarium sheets and other submission of the assignment given to them.

Semester IV

Code USCBOT-T07 Contents: Cell Biology, Biotechnology & Genetics

After completion of this course students will gain knowledge of -

CO1: The structure & function of cell inclusion, cell division, DNA- RNA types and their structure.

CO2: The Mendelism laws and interaction of gene and extra nuclear genome.

CO3: The linkage, crossing over, variation, mutation and structural changes in chromosome numbers.

CO4: The plant tissue culture, genetic engineering regulation of genes.

Code USCBOT-T08 Contents: Plant Ecology

After completion of this course students will gain knowledge of -

CO1: The ecological and climatic, abiotic and biotic factors

CO2: The ecosystem, biogeochemical cycle and environmental Pollution.

CO3: The autecology and synecology their characters and importance.

CO4: The plant succession and phytography.

Code USCBOT-P04 (Laboratory Work)

Contents: Cell Biology, Biotechnology & Genetics & Plant Ecology

CO1: Student will be able to conduct the laboratory exercise based on paper.

CO2: Student will perform the laboratory experiments based on paper.

Semester V

Code USCBOT-T09 Contents: Genetics and Plant Breeding-I

After completion of this course -

CO1: Student will gain idea about mendelisum, Lathel gene

CO2: Student will understand the Cytoplasmic Inheritance, Chromosome theory of Inheritance

CO3: Student will know the Modes of reproduction in crop plants, plant Breeding, Crop Improvement

CO4: Student will able to know the plant genetic resources, plant introduction, hybridization

Code USCBOT-T10 Contents: Genetics and Plant Bredding-II

After completion of this course -

CO1: Student will able to know the RNA, Genetic Code, Population Genetics

CO2: Students are expected to understand Karyotype, Chromosome Organization, Speical type of chromosome

CO3: Student will define the Inbreeding and Heterosis, Concept of Germplasm

CO4: Student will gain the knowledge of Plant breeding and crop improvement, concept of hybridization

Code USCBOT-P05 (Laboratory Work)

Contents: Genetics and Plant Bredding-I & II

After completion of this course-

CO1: Student will understand the practical such as mendal's I law and mendal's II law of Genetics and problem related to lethal genes, co-daminance and epistacis gene interaction, sex determination in plants and animals, plant hybridisationtechnique, pollen viability test.

CO2: student should know the knowledge of types of RNA, study of special types of chromosomes, heterosis breeding, mutation breeding, mutant variety, broblems about monogenic inheritance, polgenic inheritance, polyploidy, study of genetic engineering.

SEC-I

Paper: Mushroom Culture Technology

After completion of this course -

CO1: Student will able to know the poisonous mushrooms and edible mushrooms, cultivation of mushrooms

CO2: Students are expected to understand cultivation technology, pure culture, low cost composing technology

CO3: Student will define the storage and nutrition.

CO4: Student will gain the knowledge of mushroom recipes, research centers, cost benefit ratio, marketing in india

Semester VI

Code USCBOT-T11 Contents: Plant Diversity and Conservation-I

After completion of this course students will be able to -

CO1: Define the process Concept of Biodiversity, Biodiversity at Genetics and global

CO2: Define the process Biodiversity in Terestrial Environment, Aquatic Environment

CO3: know the growth Biodiversity distribution, biographically classification of india

CO4: understand the concept of Threats to biodiversity, listing of threatened biodiversity

Code USCBOT-T12 Contents: Plant Diversity and Conservation-II

After completion of this course -

CO1: Student will be able to understand the concept of conservation with reference of forest and wild life

CO2: Student will understand the importance conservation by network of protected areas, role of NGO in conservation

CO3: Student will get the knowledge of plant tissue culture, media preparation

CO4: Student will be able to understand the conservation through tissue culture.

Code USCBOT-PO6 (Laboratory Work)

Contents: Plant Diversity and Conservation-I

To study the phytogeographic map of india, National park

To Preparation of synthetic seed.

To study plant tissue culture

To studty the frequency and density of plant

SEC-II

Paper: Medicinal Botany

After completion of this course -

CO1: Student will able to know history, scope and importance of medicinal plant

CO2: Students are expected to understand conservation of medicinal plant, insitu conservation and national park

CO3: Student will understood objective of nursery, use of green house foe nursery production

CO4: Student will understood ethnobotany in india, application of ethnobotany to control various disease

DEPARTMENT OF BOTANY

PG BOTANY DEGREE PROGRAM

Program specific outcomes (PSOs), Course outcomes (COs)

Learning outcomes for Postgraduate Programme M.Sc. Botany

Upon successful completion of M.Sc. Botany Post-Graduates are expected to-

PSO1: Develop a conceptual understanding of principles and importance of Botany. Students would be benefited with knowledge of core subjects like plant diversity, physiology and biochemistry, molecular cytogenetic and application of statistics etc. which are offered in these subjects Modules on analytical techniques, plant tissue culture and photochemistry would make them obtain skills that help in doing research.

PSO2: Learn about practical technique in lab for detail study of plant cell structure, reproduction, anatomy, breeding procedures for hybridization. Maintain a high level of scientific excellence in botanical research with specific emphasis on the role of plants. Create, select and apply appropriate techniques, resources and modern technology in multidisciplinary way. Practice of subject with knowledge to design experiments, analyze and interpret data to reach to an effective conclusion.

PSO3: They would identify, formulate and analyze the complex problems with reaching a substantiated conclusion. Logical thinking with application of biological, physical and chemical sciences. Learning that develops analytical and integrative problem-solving approaches.

PSO4: Students would perform functions that demand higher competence in national/international organizations with sporty and helping spirits. Prepare the students for many competitive exams like MPSC, UPSC NET SET GATE.

PSO5: Best problem-solving skills in students would encourage them to carry out innovative research projects thereby making them to use knowledge creation in depth. Enable the students to be resourceful in identifying the plants

PSO6: Knowledgeable, disciplined students with good values, ethics, and kind heart will help in nation building globally. Student should be aware of ethical issues and regulatory considerations while addressing society needs for growth with honesty.

M.Sc. I Semester I

COURSE OUTCOMES

Code PSCBOTT01 Contents: Microbiology, Algae & Fungi

After completion of this course -

CO1: Students will be able to understand the structure, type and identification of Bacteria and cyan bacteria.

CO2: Students will gain understanding of Thallus structure, reproduction and economic importance algae.

CO3: Students will gain understanding of the classification, structure of mycelium reproduction of fungal species. They will know about the hazardous and useful fungi. Student will also know and learn classification and evolutionary trends in fungi.

CO4: Students will gain understanding of the plant diseases, causal organism, host and their relationship and control measure for plant diseases, Understanding of fungicide and use of chemical physical and biological controlling of diseases mentioned in the unit.

Code PSCBOTTO2 Contents: Bryophytes and Pteridophytes

After completion of this course students will gain knowledge of -

CO1: the characters, distribution, classification and regeneration in Bryophytes.

CO2: the characters of different orders of Bryophytes.

CO3: How the stele evolution occurs in Pteridophytes and also familiar with the work done by Indian pteriodologist.

CO4: the classification of Pteridophytic classes and the morphological and anatomical characters of genus included in the different Pteriodophytic order.

Code PSCBOTPO1 (Lab Work) 25 Laboratory exercise

Contents: Microbiology, Algae &Fungi&Bryophytes and Pteridophytes

CO1: Student can identify different types of forms of cyanobacteria.

CO2: Student can classify and identify the Algal and fungal genus and specimen included.

CO3: Student can make micropreparation of the material of Pteridophyta and bryophytes and idenfied anatomically.

CO4: Student can collect few species from locality and identify morphologically during collection of material in the local visit.

Code PSCBOTTO3 Contents: Gymnosperm and Paleobotany

After completion of this course -

CO1: **Students will gain** Understanding the meaning of fossil and its use in the determination of age of plant materials, Understanding the applied knowledge and different aspects of Paleobotany.

CO2: Students can critically differentiate fossil and living fossil. Students will also understand the evolutionary tendencies and comparative morphology of Cycadales, Cycadeodales and Pteridospermales.

CO3: Students can compare the characters of different orders &relationship of each order from Cordaitales to Gnetales.

CO4: Student can critically differentiate the characters of three orders of Gymnosperm i.e., Ginkogales, Coniferales, and Taxales.

Code PSCBOTTO 4: Contents: Cytology and Genetics

After completion of this course students will gain -

CO1: Understanding of the history of gene from 'something', 'factor'; and gene and one gene one enzyme one characters hypothesis. Student will also know the interaction of gene, genetic recombination producing the characters differently.

CO2: Understanding of the structure of chromosome and how the packaging of DNA occurs. Student can differentiate Euchromatin and heterochromatin region of chromosome on the basis of staining properties. Student can draw a good karyotype and Idiograms of Karyotype, and also how the evolution of Karyotype takes place.

CO3: Understanding of the different structural and numerical changes why? And how? It occurs in the chromosome students, can able to use the trisomic and monosomic for the chromosome mapping.

CO4: Understanding the role and process of mutation and different mutagenic agent which brings about mutation in the organism. Students will also understand the role of mutation in crop improvement and permutation.

Code PSCBOTPO2: 20 Laboratory exercise

Contents: Gymnosperm and Pale botany & Cytology and Genetics

CO1: Student will develop the skill and will be able to prepare double stained micro preparation of the given material and identify on the basis of observation.

CO2: Students gain the skill of identifying the fossil specimen.

CO3: Understands the action of low treatment of colchicine and para-dichlorobenzene to plant tissue creating polyploidy in the organism

CO4: Student can also draw good figure of chromosome directly from microscope with the help of Camera Lucida and prepared an ideogram of chromosome on graph paper.

Semester II

Code PSCBOTTO5 Contents: Plant physiology and Biochemistry

After completion of this course -

CO1: Students will understand the importance of photosynthesis in plants. They will also understand photosynthesis is one of the most important processes that allow plants to Live.

CO2: Students will come to know that, energy produced by respiration is essential for normal functioning of body.

CO3: Student will understand importance of metabolism to maintain living state of cells. They also understand role of nitrogen cycle in environment.

CO4: Students will understand how enzymes serve important function in body, in digestion and metabolism. They have developed knowledge about pathways of water through xylem and phloem.

Code PSCBOTTO6 Contents: Plant development and Reproduction

After completion of this course -

CO1: Student will understand the role of various hormones in plant development. They will understand how growth of shoot apical meristem takes place.

CO2: Student will get knowledge about the various arrangement of leaf in plants. They will have developed knowledge about photoperiodisms.

CO3: Student will understand the structure of anther and role of gene expression during pollen development. They will get to know about fertilization and how pollen stigma interaction takes place.

CO4: Students will understand how endosperm provides nutrition to embryo development. They also understand how germination of seed takes place in plants.

Code PSCBOTPO3: Laboratory exercise 22 experiments

Contents: Plant Physiology and Biochemistry &Plant Development and Reproduction

CO1: Student can extract chloroplast pigment from leaves.

CO2: Student can identify structure of stomata while peeling epidermis leaves of Tradescantia.

Code PSCBOTTO7 Contents: Cell and Molecular Biology-I

After completion of this course -

CO1: Student will understand the importance of cell wall. They also get to know about plasmodesmata.

CO2: Student will understand the role of various cell organelles. They will have developed knowledge about various phases of cell division.

CO3: Students will have developed knowledge about nucleus and its ultrastructure. They will also identify various forms of DNA.

CO4: Student will understand the importance of stresses in plants and how it responses.

Code PSCBOTTO8 Contents: Angiosperm-I

After completion of this course -

CO1: Student will understand floral structure of Angiospermic plants and how stamens and carpels are evolved. They will also understand adaptive feature of pollinators.

CO2: Students will get to know about scope, aim, principles of taxonomy. They will get knowledge about concepts of taxa, genus etc.

CO3: Students will get knowledge about various taxonomic evidences. They will also understand how to prepare herbarium sheets and how to read floras.

CO4: Students will understand about biosystematics. They will also understand adaptive features of ICBN.

Code PSCBOTPO4: 17 experiment for exercise

Contents: Cell and Molecular biology-I & Angiosperm-I

CO1: Students will develop skill and will be able to prepare staining of salivary gland chromosomes of Chironomous larva.

CO2: Students will be able to understand the isolation of chloroplast.

CO3: Students will gain knowledge about floral symmetry and anatomical features of various taxa.

CO4: Student can also draw good diagrams of pollen types and stamens and carpels.

Semester III

Code PSCBOTTO9 Contents: Plant Ecology

After completion of this course -

CO1: Students will understand the vegetative organization in community. Students will get to know about how changes take place during ecological succession.

CO2: Student will have developed knowledge about structure and function of ecosystem. They also will understand about biogeochemical cycle in environment and its role.

CO3: Students will understand the effect of air, water and soil pollution in environment. They will also develop knowledge about greenhouse gases its sources and role.

CO4: Student will get knowledge about invasive species of plant. They will get to know about how ecological management takes place.

Code PSCBOTT10 Contents: Cell and Molecular biology-II

After completion of this course -

CO1: Students will understand the structure and functions of ribosomes. They will get to know about how transcription and translation takes place in Prokaryotes and Eukaryotes.

CO2: Students will understand about fine structure of gene. They will also understand machinery involved in protein sorting.

CO3: Students will get to know about the structure of phage genome. They will also develop knowledge about genetic recombination.

CO4: Students will understand about cell cycle and apoptosis. They will get knowledge about the process of signal transduction.

Code PSCBOTPO5: 18 Experiment for exercise

Contents: Plant Ecology & Cell and molecular biology-I

CO1: Student will have developed knowledge about distribution of various plant species by quadrate Method.

CO2: They will understand presence of specific by Elisa method.

Code PSDBOTT 11

Molecular Biology and Plant Biotechnology-I

After the completion of this course-

CO1 : Students will understand DNA replication, DNA damage and repair, repair system

CO2 : Students will understand isolation of gene and nucleotide sequence, molecular probing.

CO3 : Students will understand splicing of foreing DNA into cloning vector, introduction of foreing DNA into host cell isolation of genes of protein products from clones, polymerase chain reactions.

CO4 : Students will understand sequence aliganment and phylogenetic trees; genomics and proteomics.

Code PSSBOTT12

Contents:- Plant Diversity and human welfare-I

After the completion of this course.

CO1: Student will understand plant diversity and its scope, plant diversity at the ecosystem level, Agrobiodiversity and cultivated plant taxa, wild taxa.

CO2 : Student will understand values and uses of Biodiversity; Precautionary principle, Methodslogies for valuation, uses of plants uses of microbes.

CO3 : Student will understand loss of biodiversity and projected scenario for biodiversity loss.

CO4 : Student will understand management of plant Biodiversity organizations associated with biodiversity management methodology for execution – IUCN, UNEP, UNESCO, WWF, NBPGR, Biodiversity legislation and conservations, biodiversity information management and communication.

Code : PSDBOTT11

Experiments for exercises

Contents :- Molecular biology and p;ant biotechnology –I

CO1: Students will understand and perform the experiments on detection of DNA damage by mutagens.

CO2 : Bacterial for transformation and selection of transformed cells.

CO3 : To detect molecular polymorphism at different species.

CO4 : To demonstrate the presence of particular polypeptide by western blotting

CO5 : To design PCR primers for isolation of given gene and to clone it in the given vector.

CO6 : Amplification and sequencing of nrDNA by PCR.

CO7 : To find the sequences of given protein SWISS. prot, uni-frot

CO8 : To work out the sequence from given artoradiogram and to identify it from genebank by BLAST Method

CO9 : To generate pairwise and multiple sequence alignment of a given organism.

CO10 : To generate phyllogentic trees using given sequence

CO11 : To predict a protein from given sequence by using online tools from NCBT.

Semester IV

Code PSCBOTT13 Contents: Plant Biotechnology

After completion of this course -

CO1: Students will get knowledge about importance of recombinant DNA technology for the production of vaccines. Students will be able to know about crop developed by genetic engineering used to enhance yields & nutritional quality.

CO2: Students will have knowledge about creative genetically modified bacteria. They will get knowledge that advance proteomic technologies can help us to develop better drugs.

CO3: Students will know how they can grow disease free plant by tissue culture technique. They will develop understanding about how gene technology has helped in improving various qualities in Crops.

CO4: Students will know about the use of computational approach to analyze, manage & store biological data. They are able to know, the use of information technology in biotechnology for data storage, Analyzing the DNA sequences.

Code PSCBOTT14Contents: Angiosperm-II

After completion of this course -

CO1: Students will have developed the knowledge of identifying floral variation.

CO2: Students will know the interesting features & systematic position of cucurbitaceae, cactaceae, orchidaceae, etc.

CO3: Students will be able to know the probable ancestors of angiosperms, extinct species.

CO4: Students will develop understanding about the role of biodiversity in Ecosystem functions.

Code PSCBOTPO7: 10 Experiment based on Angiosperm-II for exercise

Contents: Plant Biotechnology & Angiosperm-II

CO1: Students are able to isolate protoplast and determine its viability

CO2: Students will be able to conduct experiment on preparation of media for plant tissue culture.

CO3: Students are able to comments on specimen from locally available families.

CO4: Students are able to make herbaria

Code PSCBOTT15Contents: Reproductive biology of Angiosperms-II

After completion of this course -

CO1: Students will get knowledge about reproduction in plants. They are able to differentiate the types of endosperms.

CO2: Students can understand the relation between embryo and endosperm. Students will get idea about practical importance of polyembryony.

CO3: Students are able to know overall development of endosperms. Students will develop understanding of the formation of embryo from somatic cell.

CO4: Students are able to know protoplast culture. They will also know production of useful compounds through cell culture.

Code PSDBOTT 15

Contents : Molecular biology and plant biotechnology-II

After the completions of this couse

CO1 : Student will understand applications of transgenics.

CO2 : Student will understand applications of transformation, metabolic engineering through transgenic plants.

CO3 : Student wil understand plant tissue culture, gene expression and regulation of gene expression.

CO4 : Student will understand Nitrogen fixing genes, DNA finger printing and marker assisted breeding and clear biotechnology- pollution control through genetically modified organisms.

Code: PSDBOTT 15

Experiments for exercises

Contents : Molecular biology and p;ant biotechnology-II

Students will understand and perform the experients

CO1 : Agrobacterem timefaciens mediation gene transfer in suitable plant

CO2 : Induction of selondary metabolic synthesis in suspension culture.

CO3 : Use of RAPD/RELP/SSCP etc. markers to detect molecular polymorphism of different specis

CO4 : Isolation and protein profiling in different plant species by SDSPAGE

CO5 : Raising f suspension culture and plotting of growth curve.

CO6 : Bacterial transformation and selection of transformed cells

CO7 : Study of expression of inducible genes at biochemical level

CO8 : Elisa testing of Bt gene in cottan.

CO9 : Isolation of secondary metabolites by gel filtration

CO10 : Purification of plant metabolite protein by colun chromatography

CO11 : DNA ligation and analysis of ligated DNA on agarose gel (cloning and analysis using GUS gene)

CO12 : Organogenesis and somatic embryogenesis using appropriate explants and preparation of artificial seeds.

CO13 : Demonstration of another culture.

Code PSSBOTT 16

Contents : Plant diversity and human welfare-II

After the completion of this couse

CO1 : Student will understand conservation of biodiversity, insitu and exsitu conservation

CO2 : Student will understand secial approaches to conservation biodiversity awareness programmes sustainable development

CO3 : Student will and erstand rale of plants in relation to human welfare- importance of forestry, their utilization and commercial aspects avenue trees, ornamental plants of india.

CO4 : Student will understand role of plants in relation to human welfare alcoholic beverages through ages, fruits and nuts: Important fruit crops, their commercial importance wood and its uses

Department of Microbiology

UG CHEMISTRY DEGREE PROGRAM

Program Specific Outcomes

After completion of B.Sc. with Microbiology, students will be able to-

PSO1: Communicate scientific information effectively specially relating to microbiological organisms and the roles of microbial organisms in ecosystem functions and health related issues.

PSO2: Develop proficiency in the quantitative skills necessary to analyze biological problems with the knowledge of specialized techniques used in microbiology.

PSO3: Collect, analyze and interpret scientific data, thus developing familiarity with microbiology laboratory technique and safety procedures.

PSO4: Describe unique microbial genetic systems, i.e. prokaryotic and viral genomes, lateral gene transfer, plasmid structure and functions.

PSO5: Asses and interrogate the primary scientific literature and develop awareness about leading journals in the field of microbiology.

PSO6: gain familiarity with the role of microbes, human disease, in issues of international health and the human immune response to microbial infections and can develop pathological consciousness.

Course Outcomes

B.Sc. Semester I

Paper I: Fundamentals of Microbiology.

Course code: - USMBT01: Credits: **- 2**

After completion of this course, the students will be able to –

CO1: Understand the fundamentals of microbial world.

CO2: Understand the history and development of Microbial world.

CO3: Understand the scope of Microbiology and understand the future aspect of Microbiology.

CO4: Understand structure, function of prokaryotes and eukaryotes.

CO5: Understand the evolutionary aspect of microbial world through taxonomy and classification.

CO6: Understand the nature, symmetry and life cycle of the viruses. Simultaneously students will be

able to understand the techniques of cultivation of viruses.

Paper II: Microbial Techniques.

Course code: USMBT02: Credits: 2

After completion of this course, the students will be able to –

CO1: Understand about the various microbial technique used during study of microbes.

CO2: Understand the principle, working mechanism of microscopy. Students will be able to use, handling and care of microscope.

CO3: Understand about morphology of microbes.

CO4: Understand the various staining technique and learn about morphological aspect of bacteria.

CO5: Understand the various technique used for the cultivation of bacteria.

CO6: Understand the Nutritional requirement for the cultivation and growth bacteria.

CO7: understand the various methods of isolation and preservation of microbial Culture.

Course Outcomes Microbiology Page 3

CO8: Understand the various techniques of sterilization and disinfection processes and students will be

able to understand the use of disinfectant in Microbial control.

Practical Course code: USMBP01: Credits: 2

After completion of this course the students will be able to –

CO1: Understand the rules and laboratory practices to follow in the laboratory, understand the biosafety in the microbiology lab.

CO2: Use, care and handle the instruments used in microbiology laboratory .skills and application of instruments will help students in their future.

CO3: Gain knowledge of various staining technique and bacterial structure.

CO4: Prepare and use various nutrient medium for growth and cultivation of microorganism. Students will be able to select specific nutrient media for cultivation specific microorganism. Students will be able to understand composition, preparation of selective nutrient medium.

CO5: Use the different isolation technique. They will able to isolate microbial pure by performing various isolation techniques.

CO7: Understand the fungal isolation and identification technique. learn about morphology of fungi and understand about nutrient requirement for the growth of fungi.

CO8: Understand and test the effect of antibiotics and heavy metal on the growth of bacteria, by

doing this students will be able to test the antibiotics sensitivity of microbes that will help in industrial work and research.

Semester II

Paper I – General Biochemistry.

Course code: USMBTO3

After completion of this course the students will be able to –

CO1: understand the fundamental of chemical microbiology.

CO2: understand some bio chemical principal used in the study of biomolecules

Course Outcomes Microbiology Page 4

CO3: understand study about structure, classification and types of protein biomolecules and also understand the biological significance of protein

CO4: understand structure function types and classification of carbohydrate and lipids to understand these biological importance of these biomolecules i.e. carbohydrate and lipids

CO5: understand structure of nucleic acid (DNA /RNA) different forms of DNA and It's composition and understand structure of RNA function and it's types

Paper II– Applied Microbiology.

Course code: USMBT04. Credits: 2

After completion of this course students will be able to:

CO1: Understand and gain awareness about environmental, cleanliness, health and hygiene.

CO2: Understand the sources of microorganism in air .Understand different methods used to enumerate the microorganism present in air. Gain awareness about air borne disease and its control by various techniques. Become aware about the technique like radiation, fumigation, laminar air flow technique used in controlling the microorganism present in air.

CO3: understand the different technique used in bacteriological analysis of water. By that they will be able to understand about potable and polluted water and understand the important significance of water pollution. e.g :fecal and non fecal coliforms.

CO4: understand the various method of water treatment to make the water potable.

PRACTICAL Course code: USMBP02: Credits: 2

After completion of this course students will be able to:

CO1: understand the quantitative estimation of carbohydrates, proteins and lipids.

CO2: understand the estimation of proteins by Lowery method, sugar by DNS method, DNA by DPA method and RNA by Orcinol method.

CO3: understand the bacteriological analysis of water by using various methods.

Course Outcomes Microbiology Page 5

CO4: understand the potability of water and make them to understand the difference between faceal and non- faceal coliform bacteria.

CO5: Gain awareness about the determination of quality of milk and simultaneously make them to perform milk testing for the completion of pasteurization of milk.

CO6: understand the potability and water pollution by determining the Biological Oxygen Demand and Dissolved Oxygen content of water.

CO7: understand the Chlorination process used for disinfection of water.

CO8: Gain awareness and perform the various techniques for isolation of air micro flora.

Semester III

Paper - I: Microbial Physiology and Metabolism.

Course Code: USMBT05. Credits-2

After completion of this course students will be able to:

CO1: understand the Fundamental of Physiological and metabolic pathways.

CO2: understand the Bacterial growth along with the Growth factors and growth phases.

CO3: understand various methods for measuring growth Bacteria.

CO4: understand the enzymes & their classification, specificity and interactions.

CO5: understand the kinetics & immobilization of enzymes and also factors affecting their activity.

CO6: understand different metabolic pathways necessary for Bacterial survival.

CO7: understand pathways for microbial fermentations.

Paper II: Food, soil Microbiology and Microbial

ecology

Course Code: USMBTO6: Credits: 2

After completion of this course students will be able to

CO1: understand the fundamentals of Microbial ecology.

CO2 :understand the sources of contamination of food, their examinations, significations and preservations of food.

CO3: understand the composition and types of soil with the signification of microbes in it.

Course Outcomes Microbiology Page 6

CO4: understand the elemental transformations occur in environment.

CO5: understand the Microbial ecology and various microbial associations in the environment.

CO6: understand about the Environmental Biotechnology.

Practical: Credits - 2: Course code: USMBPO3

After Completion of this course students will be able to-

CO1: understand and perform to demonstrate enzyme activity viz,; catalase, Lecithin's (lipase) Amylase, caseinase (protease), Urease.

CO2: understand the technique used in the isolation of Rhizobium from root nodules and Azotobacter from soil.

CO3: understand &perform to demonstration the symbiotic associations like synergism, Antibiosis and syntrophism.

CO4: understand about the Bacteriological examination of food by SPC & MPN.

CO5: understand production of amylase enzyme & its assay by using bacterial Strain.

CO6: understand how the cellulose degrades and also the solubilization of phosphate by mycorhizal

CO7: understand the method of preparation of Rhizobium Bio fertilizers and its application.

Semester IV

Paper I: Industrial Microbiology.

Course code: USMBT07. Credits-2

After completion of this course work students will be able to -

CO1: Understand the fundamentals of industrial process and the mechanism involved in fermentation process.

Course Outcomes Microbiology Page 7

CO2: Understand about various fermentation processes, its mechanism. Gain awareness about different types of fermentation and good manufacturing practices to be applied in the industrial product formation.

CO3: isolate and identify the microbes which has important role in industrial fermentation

process. Gain awareness about maintenance of this industrially important microorganism.
CO4: understand various processes, steps involved in product formation, recovery and purification of product and also understand to test the sterility of product.
CO5: understand the fermentation process used to obtained desired product .To understand the strain, fermentation, media, condition during fermentation process and metabolic pathway involved in specific fermentation process.

Paper II: Paper – II: Microbial Genetics and
molecular biology. Course code – USMBT08. Credits: 2.

After completion of this course students will be able to understand–
CO1: Fundamentals of technique of genetic and genetic engineering.
CO2: Microbial DNA as genetic material and replication of DNA. Understand the RNA **as** viral genetic material.
CO3: Mutation, types of mutation and type of mutagenic agents in microbial genetics.
CO4: the mechanism of RNA synthesis, processing and translation.
CO5: Bacterial recombination and perspective of genetics .Concept and mechanism of different genetic process like transformation, conjugation and transduction and transposable genetic elements.
Course Outcomes Microbiology Page 8
CO6: Structure and genetics of bacterial chromosome and bacterial plasmid and screening Nucleic acid by using mass spectrometry.
Practical: Course code: USMBPO4: Credit: 2
Out comes: After completion of this course work-
CO1: Student will be able to understand the technique and procedure used in industrial fermentation and microbial genetics
CO2: Students will be able to understand the primary screening of antibiotics producers' amylase producer and organic acid producers.
CO3: Student will be able to understand the production of wine, ethanol, citric acid, penicillin by fermentation
CO4: Students will be able to understand the extraction and purification of RNA form yeast.

CO5: Students will be able to understand the extraction of bacterial plasmid DNA by Agarose gel method.

CO6: Students will be able to understand the digestion of DNA by using restriction enzyme.

CO7: Students will be able to understand the demonstration of bacterial conjugation and transformation.

Semester V

Paper I: Medical Microbiology:

Course Code: USMBT09

Outcomes: After completion of this course-

CO1: Students will be able to understand the fundamentals of diseases, causative agent and their preventions.

Course Outcomes Microbiology Page 9

CO2: Students will be able to understand various dynamics of Disease Transmission.

CO3: Students will be able to understand the portals of entry and exit for microbes in body and also the host stability.

CO4: Students will be able to understand Mechanism of pathogenecity and virulence

CO5: Students will to understand virulence determining factors along with in infectivity, invasiveness, toxicity, vaccine, toxoid and their types.

CO6: Students will able to understand the Microbial diseases of Humans viz. bacterial, viral, protozooal and fungal diseases.

Practical: Credits: 2: Course code: USMBTO5

After completion of this course-

CO1: Students will be able to understand the morphology, cultural and bio chemical characteristic of some organism viz. *S. Typhi , S. aureus , V. cholerae and E. coli* by using isolation and identification technique.

CO2: Students will be able to understand normal flora of skin and oral cavity

CO3: Students will be able to understand detection of malaria parasite, chikengunia and dengue

CO4: Students will be able to understand the technique of determination of minimum inhibitory concentration(MIC) of antibiotics.

CO5: Students will be able to understand estimation of blood sugar by GOD-POD method.

CO6: Students will be able to understand the detection of Liver functioning by SGOT-SGPT method.

CO7: : Students will be able to understand the detection Kidney function test and estimation of blood cholesterol.

Paper II: Bioinstrumentation

Course code: USMBT10

After completion of this course Course

Outcomes Microbiology Page 10

CO1: Students will be able to understand the fundamentals of analytical tools and technique

CO2: Students will be able to understand basic analytical technique in microbiology like colorimetry and spectrophotometry.

CO3: Students we will be able to understand the different chromatographic techniques

CO4: Students will be able to understand the principle and procedure of different electrophoresis technique

CO5: Students will be able to understand Basic concept, principle and types of centrifuge.

CO6: Students will be able to understand the modern analytical technique like radioisotopes, scintillation counter, radioactive labeling and autoradiography.

Practical: Bioinstrumentation

Credits: 2: Course code: USMBPO6

After completion of this course-

CO1: Students will be able to understand the separation of Amino acid/Sugars by Paper Chromatography.

CO2: Students will be able to understand the separation of lipid/amino acids by TLC.

CO3: Students will be able to understand separation of components by paper electrophoresis.

CO4: Students will be able to understand column packing in any form of column chromatography.

CO5: Students will be able to understand separation of protein mixture by any form of chromatography.

CO6: Students will be able to understand separation of protein by SDS-PAGE.

Paper III: Virology(DSE-3)

Course code: USMBT-11, Credits:2

After completion of this course-

CO1: Students will be able to understand the fundamental of virology, nature and properties of viruses

CO2: Students will be able to understand cultivation of viruses, isolation and purification of viruses

CO3: Students we will be able to understand the taxonomy, bacteriophage and virus replication

CO4: Students will be able to understand the oncogenic virus and application of virology

CO5: Students will be able to understand prevention and control of viral disease

CO6: Students will be able to understand the application of virology.

Practical: Virology

Credits: 2: Course code: USMBPO7

After completion of this course-

CO1: Students will be able to understand the structure of animal virus using electron microscopy.

CO2: Students will be able to understand the isolation of animal virus by chick embryo technique.

CO3: Students will be able to understand cytopathic effects of viruses using photograph.

CO4: Students will be able to understand local lesion technique for assaying plant viruses.

CO5: Students will be able to understand the structure of important plant virus.

CO6: Students will be able to understand important bacterial viruses.

CO7**:** Students will be able to understand isolation of bacteriophage from water.

Paper IV: Pharmaceutical Microbiology (DSE-4).

Course code: USMBT12, Credits:2

After completion of this course-

CO1: Students will be able to understand phytopharmaceticals

CO2: Students will be able to understand the drug development.

CO3: Students will be able to understand antimicrobial activity.

CO4: Students will be able to understand gene therapy and vaccine.

CO5: Students will be able to understand probiotics and neutrachemical.

Practical: Pharmaceutical Microbiology

Credits: 2: Course code: USMBPO7

After completion of this course-

CO1: Students will be able to understand the preparation of medical plant extract.

CO2: Students will be able to understand the sterility testing of vaccines and injections.

CO3: Students will be able to understand the antibacterial activity of antibiotic preparations.

CO4: Students will be able to understand antifungal test

CO5: Students will be able to understand the estimation of thymine, riboflavin, ascorbic acid content of multivitamin formulations.

CO6: Students will be able to understand proteolytic digestion of antibiotics.

B.Sc.III (SEMESTER V): SKILL ENHANCEMENT COURSES (SEC) (Any one)

PAPER I: MICROBIAL DIAGNOSIS IN HEALTH CLINICS

COURSE CODE- USMBSEC-01, CREDITS: 2

After completion of this course-

CO1: Students will be able to understand common diseases and collection of clinical sample.

CO2: Students will be able to understand steps involved in the diagnosis of disease.

CO3: Students will be able to understand the technique in the serological test.

CO4: Students will be able to study the rapid diagnosis test and kits- HIV, Dengue kit Swine flu kit.

CO5: Students will be able to understand the action of antibiotics.

CO6: Students will be able to understand methods involved in the antibiotic sensitivity and resistance detection.

B.Sc.III (SEMESTER V): PAPER I: PRACTICAL for SKILL ENHANCEMENT COURSES (SEC-1)

After completion of this course

CO1: Students will be able to understand technique of detection of malaria parasite from blood sample.

CO2: Students will be able to understand rapid disease diagnosis test and kit for HIV.

CO3: Students will be able to understand technique of determination of MIC of given antibiotics against the clinical isolates.

B.Sc.III (SEMESTER V): SKILL ENHANCEMENT COURSES (SEC-2)

PAPER II: FERMENTED FOOD AND MICROBIAL QUALITY CONTROL IN FOOD

COURSE CODE- USMBSEC-02, CREDITS:2

CO1: Students will be able to understand fermented food and probiotic food

CO2: Students will be able to understand types of fermented food

CO3: Students will be able to understand microbial analysis of food

standard for drinking water and food.

CO4: Students will be able to understand food safety and microbial standard.

CO5: Students will be able to understand microbial

B.Sc.III (SEMESTER V): PAPER II: PRACTICAL for SKILL ENHANCEMENT COURSES (SEC-2)

After completion of this course

CO1: Students will be able to understand technique of preparation of fermented foodpickle/ dahi/idli at laboratory level.

CO2: Students will be able to perform MPN (most probable number) for determination of colliform in food material.

CO3: Students will be able to perform MBRT for detection of quality of milk.

CO4: Students will be able to performrapid detection method of microbiological quality at milk collectioncenter..

CO5: Students will be able to understand food industry.

Semester VI

Paper I: Recombinant DNA technology (DSE-1).

Course code: USMBT13

After completion of this course-

CO1: Students will be able to understand fundamental tools of genetic engineering

CO2: Students will be able to understand the techniques of genetic engineering

CO3: Students will be able to understand the amplification and sequence analysis of DNA.

CO4: Students will be able to understand the detection of DNA sequences by DNA finger printing and microarray.

CO5: Students will be able to understand the application of genetic engineering in medical field, agricultural field and medicine field. They will also able to understand about molecular farming.

Practical: Recombinant DNA Technology .

Course code: USMBP09. Credits-2

After completion of this course-

CO1: Students will be able to understand the isolation of plasmid DNA.

CO2: Students will be able to understand the isolation of genomic DNA by gel electrophoresis.

CO3: Students will be able to understand the digestion of DNA by using restrictions enzymes.

CO4: Students will be able to understand the ligation of digested DNA fragments.

CO5: Students will be able to understand DNA amplification by PCR.

CO6: Students will be able to understand the cloning of GFP gene.

Paper II: Immunology (DSE- 2)

Course Code: USMBT14 : Credits: 2

After completion of this course students will be able to:

CO1: understand the fundamentals of Immunology.

CO2: understand structure and functions of immune system.

CO3: understand the mechanism and applications of Antigen & antibody reaction and their applications in serology.

CO4: understand the General properties and structure of Antigens and antibodies.

CO5: understand the hypersensitivity and Allergy and its mechanism and classification.

CO6: understand the Mechanism of hypersensitivity and concept of auto immunity and auto immune disorders.

Practical: Immunology: Course code: USMBP10

After completion of this course-

CO1: Students will be able to understand the detection of blood group and Rh factor

CO2: Students will be able to understand hematology (TLC, DLC and Hb %)

CO3: Students will be able to understand detection of diseases by serological test (Widal, VDRL and

HCG)

CO4: Students will be able to understand ELISA technique

CO5: Students will be able to understand test for rheumatoid arthritis (RA)

CO6: Students will be able to understand estimation of antigen by RIA method

Paper III: Bioinformatics (DSE- 3)

Course Code: USMBT15 : Credits: 2

After completion of this course students will be able to:

CO1: understand the introduction to the computer, bioinformatics and biological databases

CO2: understand sequence alignments, phylogeny and phylogenetic tree.

CO3: understand the genome organization and analysis.

CO4: understand the viral prokaryotic and eukaryotic gemones.

CO5: understand protein structure prediction.

Practical: BIOINFORMATICS. Course code: USMBP11

After completion of this course-

CO1: Students will be able to understand different operation system UNIX, LINUX and windows

CO2: Students will be able to understand bioinformatics database NCBI/PDB/DDBI, Uniport

CO3: Students will be able to understand sequence retrieval using BLAST.

CO4: Students will be able to understand sequence alignment and phylogenetic analyasis using clustalW and phylip.

CO5: Students will be able to understand procedure of picking out a given gene from genomes usingGenscan or other software.

CO6: Students will be able to understand technique of protein structure prediction.

CO7: Students will be able to understand prediction of drfferent feature of a functional gene.

Paper IV: MICROBES IN SUSTAINABLE

AGRICULTURAL AND DEVELOPMENT (DSE- 4)

Course Code: USMBT16 : Credits: 2

After completion of this course students will be able to:

CO1: Students will be able to understand soil microbiology.

CO2: Students will be able to understand microbial activity in soil and green house gases.

CO3: Students will be able to understand the concept of biofertilizer, Phytostimulation, Bioinsecticides.

CO4: Students will be able to understand secondary agricultural biotechnology.

CO5: Students will be able to understand genetically modified crops.

Practical: Microbes in sustainable agriculture and development.

Course code: USMBP12

After completion of this course-

CO1: Students will be able to study soil profile.

CO2: Students will be able to study microflora of different type of soils.

CO3: Students will be able to understand technique of Rhizobium as soil inoculants characteristics and field application.

CO4: Students will be able to understand technique of Azatobacter as soil inoculants characteristics and field application.

CO5: Students will be able to understand design and functioning of a biogas plant.

CO6: Students will be able to understand isolation of cellulose degrading organism.

B.Sc.III (SEMESTER VI): SKILL ENHANCEMENT COURSES (SEC-03) (Any one)

PAPER I: BIOFERTILIZER AND BIOPESTICIDES.

COURSE CODE- USMBSEC-03 CREDITS:2

After completion of this course students will be able to:

CO1: Students will be able to understand microbes use as fertilizers.

CO2: Students will be able to understand symbiotic nitrogen fixation.

CO3: Students will be able to understand non symbiotic nitrogen fixation.

CO4: Students will be able to study the phosphate solubilizing microbes.

CO5: Students will be able to study the mycorrhizalbiofertilizer.

CO5: Students will be able to study microbes used as bioinsecticides.

B.Sc. III (SEMESTER VI): PRACTICAL: PAPER I: BIOFERTILIZER AND BIOPESTICIDES COURSE CODE- USMBSEC-03 CREDITS:2

After completion of this course students will be able to:

CO1: Students will be able to understand Spawn preparation of mushroom.

CO2: Students will be able to understand lab scale cultivation of button mushroom.

CO3: Students will be able to understand disease in mushroom.

CO4: Students will be able to understand the technique of preparation of mushroom powder.

CO5: Students will be able to study the morphology of spirullina and lab scale production.

B.Sc.III (SEMESTER VI): PAPER II: MUSHROOM AND SPIRULLINA CULTIVATION.(SEC-04)

COUSE CODE- USMBSEC-04, CREDITS: 2

CO1: Students will be able to understand edible and non-edible mushroom and cultivation of mushroom

CO2: Students will be able to understand economics of mushroom cultivation and precaution of mushroom.

CO3: Students will be able to understand production of SCP.

CO4: Students will be able to understand the microbial standards of mushroom and spirullina cultivation and effect of light and pH in spirullina cultivation

B.Sc.III (SEMESTER VI): PRACTICAL: PAPER II: MUSHROOM AND SPIRULLINA CULTIVATION.(SEC-04)

CO1: Students will be able to understand spawn preparation and lab scale cultivation of button mushroom.

CO2: Students will be able to prepare mushroom powder.

CO3: Students will be able to understand lab scale production of spirullina.

CO4: Students will be able to understand the set up of mushroom and spirullia cultivation plant after the visit of respective plants.

DEPARTMENT OF MARATHI

LEARNING OUTCOMES FOR UNDERGRADUATE PROGRAMME OF MARATHI

Program specific Outcomes

Students of B. A. with Marathi programme will be able to-

PSO1: Gain Knowledge, skill and positive attitude towards Marathi Literature.

PSO2: Develop critical and analytical thinking & social interaction and cultural understanding.

PSO3: Understand how society has changed and developed from past to present.

PSO4: change their outlook and develop in them a sense of confidence and responsibility.

PSO5: Improve their creative writing abilities towards writing in Marathi to enable them to contribute towards Marathi literature.

COURSE OUTCOMES

MARATHI LITRATURE

B.A. SEM. I

After completion of B. A. Sem I with Marathi Literature students will be able to-

CO1: Gain knowledge about stories of different writers like GangadharGadgil, VenkateshwarMadgulkar, Shankar Patil, BaburaoBagul, G .A. Kulkarni Kamal Desai etc.

CO 2: Learn to analyze, interpret and develop employable skills.

CO3: Learn to understand and analyse the character value of Heroes of the story**.**

CO4: Develop communicative and practical skills.

B.A. SEM. II

After completion of B. A. Sem II with Marathi Literature students will be able to-

CO1: Gain knowledge about Novel of S.. N. Pendase - “Garambichabapu”.

CO2: Learn to understand and analyse the character value and real life hero of social work.

CO3: Learn about social, moral and religious values.

CO4: Develop communicative and practical skills.

B.A. SEM. III

After completion of B. A. Sem III with Marathi Literature students will be able to-

CO1: Gain knowledge about criticism of books, its characters, style, plot, language and expression.

CO2: Learn to understand and analyse the character value of hero of the drama "Natsamrat".

CO3: Understand the difference between drama and Act- play. Also develop social, moral and critical value from the role of characters played in the text book of Tragedy "Natsamrat" writer by V.V. Shirwadkar.

CO4: Gain knowledge about criticism (sahityavichar) and develop critical and analytical thinking.

CO5: Develop communicative and practical skills.

B.A. SEM. IV

After completion of this course, students will be able to:

CO1: Learn about poet Suresh Bhatt.

CO2: Learn and enjoy gazal, songs and poem. Those are sort of parodies which enhance philosophy of human.

CO3: Learn from the poem of the poets Suresh Bhatt and criticism of book SahityaVichar Edited by ArvindKulkarni.

CO4: Develop the skills of the writing poetry and articles.

B.A. SEM. V

After completion of this course, students will be able to:

CO1: Learn about characters from the Biography of mahanubhavSantGovind- Prabhu.

CO2: Analyse depth in the Powada and Lawani poem.

CO3: Learn to write critical appreciation of the poems.

CO4: Gain knowledge about the writer and poets of modern era**.**

CO5: Gain knowledge about the poets and poems of critical period (1939-1960).

B.A. SEM VI

After completion of this course, students will be able to:

CO1: Learn about special song of Maharashtra Lawani and Powada**.**

CO2: Study about Marathi WangmyachaItihas written by Nasirabadkar.

CO3: Gain knowledge about Saint Tukaram, Saint Dnyaneshwar, Saint Namdev and Saint Ekanath.

CO 4: Learn and enjoy Abhanga and Bhajan and Ovi.

B.A. SEM. V (2019-2020)

After completion of this course, students will be able to:

CO1: Learn to think, analyse and review critically about History of Prachin Marathi Literature.

CO2: Analyse depth in the critical writings of Saint Tukaram, Ramdas, Ghaindev, and Mukandraj.andBakhar Literature.

CO3: Learn to write critical appreciation of the poems.

CO4: Gain knowledge about the writer and poets of modern era like kayyashastra**.**

CO5: Gain knowledge about the poets and poems of critical period (1600-1900)

B.A. SEM VI (2019-2020)

After completion of this course, students will be able to:

CO1: Learn about special writers and their literature like P.L.Deshpandey"sApuravai

CO2: Study about Marathi language phonetics in Bhashavighayan by Dr S.G.Malshe.

CO3: Gain knowledge about different cultures and traditions by travelling through different countries while reading Deshpandey'sApuravai

CO 4: Learn to enjoy and analyse Marathi Sahitya..

COURSE LEARNING OUT COMES

B.Sc. I

SEMESTER I

After completion of B. Sc.SEM I with Marathi students will be able to-

CO1: Gain knowledge of about different writers, poet and novels, social workers, get introduction of different type s of people while reading text.Writer by Gadgebaba, Dr. B. R. Ambedkar, JyantNarlikar ,KachruGirhe and UttamKamble.Then poet by Saint Dyaneshawar, Keshawsut, B. C. Mardhekar, Kusumagraj , and UshakiranAtram.

CO 2: Learn to analyse, interpret and write advertisement and reports.

CO3: Develop writing and communicative skills.

SEMESTER II

After completion of B. SC. I SEM II with Marathi students will be able to -

CO1: Gain knowledge of about different writers V. D. Sawarkar, RastantTukdojiMaharaj ,

P. L. Deshapende , V. Warhadpande and Baba Bhand. Than poet by Saint Tukaram , Sane Guruji ,Keshavkumar , ShantaShelake , DyaneshWakudkar .

CO2: Learn about library of books and grammar. Letter writing and Swarsandhi**.**

CO3: Learn tradition and culture of Indian villages.

COMPULSORY MARATHI COURSE LEARNING OUTCOMES

B. A. SEMESTER I

Students after completion of B.A. Semester I with compulsory Marathi will be able to-

CO1: Gain knowledge about different writers like Sane Guruji, Mhainbhatt ,Dr. B. R. Ambedkar , P. K. Attre, V. S. Khandekar ,and VijayaRajadhaksha. Poets like SantNamdeo, SantTukadojiMaharaj, AnantaFandi ,BhinabaiChaudhari, MangeshPadgawkar and Indrajit Bhalerao. And real life social workers like BaburaoBagul.

CO2: Learn about social, moral and religious values.

CO3: develop logical, critical and analytical thinking aptitude.

CO4: develop reading, writing and communicative skills.

B. A. SEM II

Students after completion of B.A. Semester II with compulsory Marathi will be able to-

CO1: Gain knowledge about different writer like G. G. Agarkar, Gadgebaba, Y.Waghamare, N. Mirjkar, B.Kale and Urmilapawar& poet Saint Dhyaneshwar, B. C. Mardhekar, S. Shelake, V. Wagh, S.Gaydhani, K. Alam.

CO2: Understand and analyse the social work and Self work and develop logical, critical and analytical thinking aptitude.

CO3: Learn tradition and culture of Indian villages and develop reading, writing and communicative skills.

B. A. SEM III

Students after completion of B.A. Sem III with compulsory Marathi will be able to-

CO1: Gain knowledge about different writers like Lokhitwadi, Mahatma phule, N. Dabholkar, M. Wakode, B. L. Bhole and E. Bhadke& poet like that Saganbhau, Savitrybai phule, Y. Manohar, K. Dudal, P. Vitthal and E. Sheikh stories while reading text.

CO2: Learn to understand and analyse the character value and real life hero of social work.

CO3: Learn about social moral and religious values.

CO4: Gain knowledge of social structure and problems of society.

B.A. SEM IV

Students after completion of B.A. Semester IV with compulsory Marathi will be able to

CO1: Gain knowledge of about different writers like ShahuMaharaj, JyantNarlikar, Social worker like Dr.Abhay Bang, Shankar Kharat, SrchndraMuktibodh and Anil Awachat. Poets likeKusumagraj, Baba Amate, Indira Saint, C. Patil, B. Saradkar and Anuradhapatil, while reading their text.

CO2: Learn about characters, Biography and social workers.

CO3: Develop the skills of writing poems and articles.

CO4: Learn about library of computers and technology of different place like at airport, railway station, telephone office.

B.A. SEM V

Students after completion of B.A. Semester V with compulsory Marathi will be able to-

CO1: Learn to analyse depth in the real life and human rights.

CO2: Learn to write critical appreciation of the poems.

CO3: Gain knowledge about the poets of modern era.

CO4: Learn and understand reference to context and explanation of poems.

CO5: Different writers like M. Phule, K. Jibran, D. K. Bedekar, AnnabhuSathe, Y. Madgulkar, A. H. Salunkhe and poets like Saint Janabai, B. C. Mardhekar M. Kondwilkar, F. M. Shinde, N. Dhasal and B. Meshram.

B.A. SEM VI

Student after completion of B.A. Semester VI with compulsory Marathi will be able to

CO1: Develop knowledge of vocabulary and grammar. Learn expression and translation.

CO2: Learn to analyse interpret and write advertisement and report which also develops employable skills.

CO3: Learn about journal front page and last page writing and News in news paper, Television and Radio.

CO4: Gain knowledge of social structure and problems of society.

CO5: Develop skills to write and read news at radio, T.V. station.

CO6: learn about different writers like that Diwaker, Dr. B. R. Ambedkar, VinobaBhave, V. V. Shirwadkar V. Rajadhaksh Francis Dibrito and poets like K. N. Mudgal, Keshavsut, V. Karndikar, S. Shelake, B. Nemade, J. V. Pawar.

B.A. SEM V (2019-2020)

Communicative Marathi

Students after completion of B.A. Semester V with communicative Marathi will be able to-

CO1: Learn about role and applications of communicative Marathi language.

CO2: Develop writing skills and Learn to write precise, reports and translations. .

CO3: Broaden the knowledge of Marathi language.

CO4: Learn to transfer information and also learn about techniques used to face and write reports of interviews.

CO5: Learn to comprehend and write notices and also learn the role and importance of internet in learning Marathi language

CO6: Develop Writing skills, vocabulary, and expression through presentations.

. **B.A. SEM VI (2019-2020)**

Student after completion of B.A. Semester VI with communicative Marathi will be able to

CO1: Develop knowledge of vocabulary and grammar. Learn expression and translation.

CO2: Learn to analyze interpret and write advertisement and report which also develops employable skills.

CO3: Learn to write invitations of different forms .and also learn about journal front page and last page writing and News in news paper, Television and Radio.

CO4: .Develop writing skills to write complains and group discussions

CO5: Develop skills to write and read news at radio,& T.V. station.

CO6: **:**Develop creativity and leadership skills through essay writing thus learn to think quickly, write persuasively and present well connected ideas in a compact manner.

DEPARTMENT OF ENGLISH

Learning programme outcomes for undergraduate Programme BA/B.SC English

Subject: Compulsory English

Students with compulsory and supplementary English after the completion of B.A.and B.Sc. programme will be able -to--

PSO-1 Develop language skills like listening, speaking, reading and writing.

PSO-2 Develop and improve comprehension, understanding and communicative skills.

PSO-3 Learn to demonstrate proficiency in communication fluency, specialized knowledge about poets and writers and applied learning.

PSO-4 Identify the salient features of literary texts and learn to interpret texts in social and Culturalcontexts .

PSO-5 Learn uses of English grammar correctly.

Course Outcomes for English Undergraduate programme

Semester I: Compulsory English

After completion of compulsory English courseI Semester students will be able t–o

CO1: learn to read various types toefxts on their own and discuss them among the peers.

CO2: learn the ability to read, understand, interpret and analyze from the texts like Strong Roots, Maintaining Democracy and Black Money and Black Economy. Thus learn about the diverse tradition of English language .

CO3: Gain knowledge about different poets like Rabindranath Tagore, Robert Frost and William Shakespeare and also learn to identify the style, rhythmic pattern and expression in their writing.

CO4: Learn vocabulary, tenses and aitpsplacations. Thus knowledge of tenses and uses of Articles and prepositions raise students' level of proficiency.

CO5: Learn various communication skills such as congratulating and responding to Congratulations. Also

CO6: Learn how to write job application and prepare C Vs.

SEMESTER II Compulsory English

After completion of compulsory English course of IIndSemester, students will be able to –

CO1: will be able to communicate through written and spoke one and develop abilities to Communicate in English language in social, academic and professional situations.

CO2: develop social and moral values while reading Swami Vivekananda, Ruskin Bond

and Pamela Hutchinson.

CO3: Learn to interpret and understand the poetic texts of Kamala Das, P.B. Shelley and Edgar Allan Poe.

CO4: Learn vocabulary like Synonyms, Antonyms and its applications. The knowledge of tenses and its usage raise students' level of language proficiency.

CO5: become aware of differencecommunication skills needed while meeting people, exchanginggreetings/salutations.

CO6: learn how to compose paragraphs and how to write formal letters.

Semester III - Compulsory English

After completion of compulsory English course of IIIrdSem., students will be able to –

CO1: learn to read various types of texts on their own and discuss them among th e peers.

CO2: learn the ability to read, understand, interpret and analyze from these. Tehxuts learn about the diverse tradition of English language.

CO3: Gain knowledge about different poets like Emerson, Wordsworth and DilipChitra and also learn to identify the style, rhythmic pattern and expression in their writing.

CO4: Learn vocabulary, tenses and its applications. Thus knowledge of tense and uses of prefix and suffix raise students' level of proficiency.

CO5: Improve comprehension and understanding skills and also learn various communications skills like thanking and apologizing .

CO6: develop language skills like listening, speaking reading and writing.

Semester IV – Compulsory English

After completion of this course, students will be able to –

CO1: will be able to communicate through written and spoken mode and develop abilities to Communicate in English language in social, academic and professional situations.

CO2: develop social and moral values while reading text of Dr.Radha Krishnan and Toynbee.

CO3: Learn to interpret and understand the poetic texts of Dickenson, Rossettiiltaonnd. M

CO4: learn grammar skills and their applications like, change the voice, make nouns from adjective and adjective from nouns.

CO5: become aware of different communication skills like making request and responding to it, Calling for help in an emergency.

CO6: develop writing skills like report and advertisement writing.

Semester V- Compulsory English

After completion of compulsory English course**Vth**Semester students will be able to

CO1: learn the ability to read, understand and, interpretanalyze from the texts. Thus learn about the diverse tradition, cultures and historical periods with reference to the prose given in the Syllabus.

CO2: Develop social and moral, cultural and human values while reading the text of Ruskin Bond, Leo Tolstoy William Slim and Mansfield .

CO3: Learn to apply critical and technical vocabulary to describe and analyze literary poems like Where the mind is without fear by Tagore and Money Madness by Law rence.

CO4: Learn to comprehend world better through creativereesxsipons of one act play "Villa For sale", and are therefore better equipped to navigate the challenges.

CO5: Develop Writing skills, vocabulary, and expression while learning Newspaper and Official Report Writing

Semester VI –Compulsory English

After completion of this course, students will be able –t o

CO1: learn to read various types of texts on their own and discuss them among th e peers.

CO2: learn the ability to read, understand, interpret and analyze from the texts of R.K. Laxman, Brayne, C. Jonesn ad G. Venkatarama n.

CO3: learn about the diverse tradition, cultures and historical periods with reference to the poems Ulysses, A River, and Success is counted sweetest periods .

CO4: Learn to comprehend world better through creative expressioonnseaocft play "Day of Atonement", and are therefore better equipped to navigate the challenges

CO5: Develop creativity and leadership skills through essay writing thus learn to think quickly, write persuasively and present well connected ideas in a compact manner.

Semester V- Communicative English [2019-2020]

After completion of compulsory English carouse of**V th**Semester students will be able to

CO1: Enhance the communicative abilities.

CO2: Broaden the knowledge of English language .

CO3: Learn to transfer information and also learn about techniques used to face interviews.

CO4: Learn to comprehend write notices, agenda, minutes of meetings a-MndaiEls.

CO5: Develop Writing skills, vocabulary, and express thorough presentations .

Semester VI –Communicative English [2019-2020]

Course Outcomes UG English Page 4

After completion of this course, students will be able to

CO1: Enhance the communicative abilities.

CO2: learn to be self –expressive, develop Editing skills and learn basic concepts and skills of Businessconcepts.

CO3: Develop writing skills, vocabulary, and expression while learning Official Report Writing .**CO4**: Learn to deal with soft kills and also use correct and appropriate expressions.

CO5: Develop creativity and leadership skills through essay writing thus learn to think quickly, write persuasively and present well connected ideas in a compact manner.

Program Specific Outcomes

Subject: English Literature

Students of B.A. English Literature after the completion of B.A. programme will be able to

PSO-1 Learn to demonstrate proficiency in communication fluency, critical thinking, specialized Knowledge and applied learning.

PSO-2 Learn the utilization of the English language through the study of literature and also learn to express themselves in variety of forms.

PSO-3 Identify the salient features of literary text from a broad range of English paranoids learn to interpret texts in social and cultural contexts.

PSO-4 Learn to employ knowledge of literary traditions to produce imaginative writings.

PSO-5 Learn to identify, analyze, interpret and describe the critical ideas, values and themes that appear in texts and understand the way these ideas, values and themes inform and impact society both now and in the pa st.

PSO-6 Learn to gather, understands evaluate and synthesize information from a variety of written and electronic sources

COURSE OUTCOMES

B.A. Semester I- English Literature

After completion of this course, Students will be able to:

CO1: Learn to differentiate between subjective and objective try and also learn to write critical appreciation of the poem s.

CO2: Develop interpretive, analytical and critical proficiency by reading poems of Shakespeare,

Wordsworth, Milton, Pope, John Donne and Robert Browning.

CO3: Acquire knowledge about originstructure and features of different poetical types like lyric, ode, sonnet, elegy, epic, idyll and sa tire.

CO4: Learn variety of literary terms like Allusion, Antithesis, blank verse, conceit and Epithet used in terms of figurative language in poetry.

CO5: gain knowledge and learn about conventions and writing of different schools and movementslik-e Renaissance, Metaphysical school of poets and Augusta n age.

Semester II- English Literature

After completion of this course, Students will be able to:

CO1: Develop critical thinking, social interaction and cultural understanding while reading poems of Toru Dutt, Sarojini Naidu, AurobindoGhosh, DilipChitra, Emily Dickenson and Cambell.

CO2: Gain knowledge about origin, characteristics and poets of diffesrechnotols and movements' like- Victorian, Pre-Raphaelities, Indian and African Poe try.

CO3: Acquire knowledge of different stanza forms like Heroic couplet, Terza Rima, Chaucerian stanza, Ottava Rima, Spenserian stanza and Ballad Stanza. Learn abouitgtinhesitrruocrture and rhythmic pattern .

CO4: Learn to identify and use literary terms like Caesure, Paradox, wit, Free verse and Imagery in poetry.

Semester III- English Literature

Students will be able to -

CO1: develop analytical, critical and interpretiveefficiency while readings novel of George Eliot and understand the social and cultural background of British and Indian S ociety.

CO2: Learn the art of reading and comprehension of essays written by Francis Bacon, Sir Richard Steele, Oliver Goldsmith andhaCrles Lamb.

CO3: learn about growth of English essays from Elizabethan age to the Victorian Age, and also growth of novel with special emphasis on Victorian No vel.

CO4: Learn about the characteristics and difference between the different types of linkoevels Picaresque Novel, Sentimental Novel, Historical and Gothic N ovel.

CO5: Improve comprehension and understanding skills and learn the literary terminology used

in the text of English literatur e.

CO6: learn to identify, differentiate and use variouesrlaitry terms like rhetoric, motif and theme, prosody and pestora l.

CO7: Improve comprehension and understanding skills and learn the literary terminology used in the text of English literatur e.

Semester IV –English Literature

After completion of this course, students will be able to:

CO1: develop sensibility and sensitivity to the literary text while reading the– tSexatmidha.

CO2: learn to interpret, analyze and critically appreciate prose texts and develop cultural and social understanding of the csieoty while the reading the prose texts of Ruskin Bond, Premchand, and Rabindranath Tago re.

CO3: learn about growth of Short Story as an independent Genre..

CO4: Learn about various art forms like Autobiography, biography.

CO5: learn to identify and use deferent literary terms like fable, narrative, m-efitcation and point of view.

CO6: learn the art of self learning and self expressing, and develop linguistic and pragmatic competency .

CO5: learn to identify and use different figure of speech like symmboelter, metaphor, Pun, Onomatopoeia .

CO6: learn the art of self learning and self expressing, and develop linguistic and pragmatic competency .

Semester V- English Literature

After completion of English Literature course of Vthsemester, students will be able to –

CO1: Gain knowledge about different writers, poets and dramatists and also learn to classify prose, poetry and drama by learning text book.

CO2: Learn about the difference between drama and one act play; identifytahgeopnists and other characters and their values.

CO3: Gain knowledge of English Theatre, stage and direction to achieve the required effect on the stage. Learn about use of different dramatic devices like dramatic irony, soliloquy and aside, expectation sand surprise .

CO4: Acquire knowledge of different dramatic types and acquire skills of interpretation critical

thinking and clean writing

CO5: Learn to be curious eloquent, motivated and self aware by reading Shakespeare's Comedy – "The Merchant of Venice".

CO6: Learn variety of literary terms like surprise and suspense, cloasmeta d, rsub plot and three unities and use them in terms of style and figurative language.

CO7: Learn about the difference between fiction and drama, farce and melodrama, tradgedy an comedy, and also trag-iccomedy, the masque, the dramatic monologue and one ac t play.

CO8: Read drama with interpretation, critical and analytical proficiency and understand how society has changed and developed from one era to another.

CO9: Read and leanr about one act pla- ythe Swan song by Chekhov and How she lied to her husband by G B. . Shaw .

Semester VI –English Literature

After completion of this course, Students will be able to:

CO1: Learn to read and understand Shakespeare's tragedy Macbeth with interpretive, analytical and critical proficiency .

CO2: Learn to identify the tragic hero and his tragic flaw in tragedy. Also learn aHbaomuatrtia and catharsis in Shakespeare's tragedies.

CO3: Learn and gain knowledge about characteristics of Shakespeare's comedy and tragedy, romance, historical and Roman place.

CO4: Acquire knowledge of dramatic moderni-s min late 19th century. Thus understand the political and cultural changes in Europetearfworld war .

CO5: Learn to identify and use literary terms like invective, folk drama, domestic tragedy, expressionism, impressionism and surrealism in drama.

CO6: Learn to understand literature in broader context and the interrelation between society and literature.

Semester V- English Literature [2019-2020]

After completion of English Literature course of Vthsemester, students will be able to –

CO1: Gain knowledge about different writers, poets and dramatists and also learn to classify prose, poetry and drama by learning text bso. ok

CO2: Learn about the difference between drama and one act play; identify the protagonists and other characters and theviarlues .

CO3: Gain knowledge of English Theatre, stage and direction to achieve the required effect on the stage. Learn about use of different dramatic devices like dramatic irony, soliloquy and aside, expectationsansdurprise while reading Shakespeare's King Lear.

CO4: Acquire knowledge of different dramatic types and acquire skills of interpretation critical thinking and clean writing

Course Outcomes UG English Page 8

CO5: Learn to be curious eloquent, motivated and self aware by reSadhiankgespeare and Girish Karnad'

CO6: Read drama with interpretation, critical and analytical proficiency and understand how society has changed and developed from one era to a.n other

CO7: Learn variety of literary terms likPerologue, Imitation, Buskin Subplot, Antihero, Comic Relief, Aside, and Climax and use them in terms of style and figurative langue.

CO8: Learn about theStructure of Dram,a farce and melodrama, tragedy and comedy, and also tragic-comedy.

Semester VI –English Literature [2019-2020]

After completion of this course, Students will be able to:

CO1: Learn to read and understand Indian Writing in English While reading Mahesh Dattani and Vijay Tendulkar Dramaswith interpretive, analytical and critical proficiency.

CO2: Learn to identify hte tragic hero and his tragic flaawn d catharsis inp lays of Indian writers .

CO3: Learn and gain knowledge about charaactnedr plot while reading Aristotle Poetics

CO4: Acquire knowledge of dramaticodernism and understand the political and cultural changes in Indian culture.

CO5: Learn to identify and use literary terms l ikMeonologue, Soliloque, Stock character, Catharsis, Dramatic Irony, Cosmic Irony, Denoument, and Three Unities.

CO6: Learn to understand literature in broader context and the interrelation between society and literature.

DEPARTMENT OF ENGLISH

Compulsory English

Course Outcomes for B.sc Semester I

After completion of this programme, students will be able to:

CO1: Develop the ability to read works of literary, rhetorical and cultural criticism like 'The Homecoming' by Tagore, 'Prospects of Democracy in India' by Dr Ambedkar and deploy ideas from texts in their own reading and writing.

CO2: Learn how individuals in specific historical, cultural and rhetorical circumstances represent their experience and ideas through the medium of language through prescribed poems in syllabus.

CO3: Demonstrate the skills needed to participate in a conversation that builds knowledge collaboratively, while listening carefully to others' viewpoints, articulating their own ideas in relation to the other voices and ideas.

CO4: Engage effectively for avinery of professional and social settings, with reference to soft skills. They will practice it as a process of motivated inquiry, engaging other writers ideas as they explore and develop their own.

Course Outcomes for B.sc Semester II

After completion of this programme, students will be able to:

CO1: Identify main ideas in professionals like in "Prospects of Democracy in India" by Dr. B. R. Ambedkar, and describe overall effectiveness of authors' techniques.

CO2: Analyze prose to identify main and subordteinideas, distinguish various modes of argument, define audience and purpose, and outline methods of development.

Course Outcomes UG English Page 12

CO3: Use a variety of reading strategies to foster comprehension and to construct personally meaningful and cultural relevant connections context .

CO4: Employ a writing process and demonstrate the ability to write clear sentences and construct paragraphs and essays that effectively make use of supporting details, examples, and evidence.

Supplementary English

Course Outcomes for B.sc Semester I

After completion of this programme, students will be able to:

CO1: Use a variety of reading strategies to foster comprehension and to construct personally meaningful and cultural relevant connections to the text like "Playing the English Gelnetman",

“The Home Coming”.

CO2: Gain knowledge about different poets like William Shakespeare, Oliver Gold smith and John Masefield and also learn to identify the style, rhythmic pattern and expression in their writing.

CO3: Employ a writing process and demonstrate the ability to write clear sentences and construct paragraphs and essays through the Grammar prescribed in the Syllabus.

CO4: Learn vocabulary, tenses and its applications. Thus knowledge of tenses and uses of articles and prepositions raissteu dents’ level of proficiency.

Course Outcomes for B.sc Semester II

After completion of this programme, students will be able to:

CO1: Analyze prose to identify main and subordinate ideas, distinguish various modes of argument, define audience and purp, oasned outline methods of developreading “A Cup of Tea”, “The Last Leaf” and “KalpanaChawla”

CO2: Learn to interpret and understand the poetic texts of Maya Angelou, Imtiaz D harkar and Kamala Das.

CO3: Learn grammar skills and their application change the voice, Interchange of simple, compound and complex sentences and use it accordingly.

CO4: Employ a writing process and demonstrate the ability to write clear sentences and construct paragraphs and essays that effectively make use of examples and evidence.

Department of History

UG Department of History

Program specific Outcomes and Course Outcomes

Students of B.A. History on completion of B.A. will be able to:-

PSO 1:- Gain historical Knowledge and develop an ability to convey verbally their Knowledge

PSO 2:- Demonstrate thinking Skills by analyzing, synthesizing and evaluating historical information from multiple sources.

PSO 3:- Learn how societies are influenced by their geographical location, Natural resources and physical relation to other parts of the world.

PSO 4:- Demonstrate factual and conceptual understanding of the subject.

PSO 5:- Cite sources appropriately and quote the sources accurately & effectively.

PSO 6:- Understand the distinction between Primary and secondary sources and read in critical way.

B.A. SEMESTER-I

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

CO1:-Gain Historic Knowledge of ancient India and also origin, trade and religious, culture of Harpan, Vedic and Indus civilization.

CO2:-Understand Historical truths about Jainism and Buddhism, Empire and administration ofMauryas and significance Of Kalinga war &AshokasDhamma.

CO3:-Gain knowledge about achievements, administration, socio-Eco & Religious conditions of Gupta and chola Dynasty.

CO4:- Learn about policy, religion and Reforms during empire of Allauddhinkhelji.

CO5:- Gain Historical Knowledge about socio – economic conditions of the society during sultanate period. Thus learning how race, gender, class, ethnicity and religious ideas have influenced the past.

B.A. SEMESTER-II

On completion of this course students will be able to:

CO1:- Understand how historical changes have occurred over time in Mughal Empire from Babar to Akbar.

CO 2 :- Understand historical truths about IstBattle of Panipat, khanua battle, Ghagare

battle and battle of Chausa and causes of Humayu downfall &Bahadurshaha conflict and Shershahas reforms.

CO 3:- Understand how societies are influenced by Mughals and Marathas and also learn about their geographical Location & conflicts.

CO 4:- Understand the Historical facts about rise of Maratha power and the relationships betweenmughals& Marathas, shevajis administration and his historical role.

CO 5 :- Gain historical Knowledge of Akbar and Rajputs reign , their relationship and their religious policies, also learn about downfall of Mughal empire and Maratha war of Independence.

CO 6:- Understand how socio- economic, religious conditions of society changed from earlier times to the IIIrdbattle of panipat.

B.A. SEMESTER-III

On completion of this course students will be able to:

CO 1:- Gain historical knowledge of modern India, rise of British power in Bengal and battle of plassy&Buxor.

CO 2:- Understand historical truths about revolt of 1857, its effects & causes.

CO 3:- Learn about effect of British rule on Indian economy, trade, agriculture, Industry and administration.

CO 4:- Understand how religious and social reforms movement influenced Indian society in 19 thcentury.

CO 5:- Gain knowledge of administration and reforms of Lord lytton, Ripon &Curzan.

CO 6:- Gain knowledge of establishment of Indian national congress and rise of Indian nationalism.

B.A. SEMESTER-IV

On completion of this course students will be able to:

CO 1:- Understand how revolutionary movement and revolutionists influenced India's Independence struggle.

CO 2:- Learn historical truths about Non Co-operation, civil disobedience, Simon commission, Nehru report and round table conference, Quit India Movement, & Indian national Army.

CO 3:- Gain knowledge about Indian constitution, Non alignment policy and Integration

of status.

CO 4:- Learn historical truths about Indo- China & Indo-Pak war.

B.A. SEMSTER-V

Students of B.A. (History) on completion of Vthsemester will be able to :

CO 1:- Understand and gain knowledge about American and French revolution and also its effects on the society.

CO 2:- Understand about effects of European colonialism of Asia & Foreign policy of Bismarck and Kaiser William from history Perspective.

CO 3:- Demonstrate factual and conceptual knowledge and understanding about various treaties, Russian revolution and League of Nations.

CO 4:- Learn causes and effects of First World War &Balken war I & II on nations & society Growth, health, administration & economy.

B.A. SEMESTER-VI

On completion of this course students will be able to:

CO 1:- Analyze the causes and effects of Nazism and fascism and also learn about Hitler and Mussolini foreign policies.

CO 2:- Analyze& evaluate Russian Progress under Stalin & UNOs Structure and administration& achievement.

CO 3:- Learn Historical truths about causes and effects of IInd world war and distinguish between cold war and Berlin crisis.

CO 4:- Learn about Nelson Mandela’s struggle & his contribution to the Society.

CO 5:- Learn about impact of fall of soviet state in Russia and globalization on the society.

CO 6:- Learn about the process and importance of development of science and Technology, communication & information; also learn its application in life.

Department of Geography

UG Department of Geography

Program Specific Outcomes (POs) and Course Outcomes (CO s)

After completion of B.A. with geography, students will be able to-

PSO1: acquire an understanding of an appreciation for the relationship between geography and culture.

PSO2: think in special terms to explain what has occurred in the past as well as using geographic principles to understand the present and plan for the future.

PSO3: develop the ethical aptitudes and disposition necessary to acquire and hold leadership position in industries.

PSO4: read, interpret and generate maps and other geographical representations as well as extractanalyze, and present information from a special perspective.

PSO5: have a general understanding of physical, geographic processes, the global distribution of landforms and ecosystems, and the role of the physical environment on human population.

PSO6: understand various methodological approaches in both physical and human geography and develop research aptitude and critically analyze both qualitative and quantitative data for research.

PSO7: utilize cartographic tools and other visual formats for employability and develop awareness about geo tourism.

Semester I

After completion of this course students will-

CO1: develop understanding of concepts of space, place and region and their importance in explaining world affairs.

CO2: understand the man-nature relationship, and the causes of the seasons, day night, rotation and revolution of the earth and its consequences.

CO3: understand global and regional patterns of cultural, political and economic institutions, and their effects on the preservation, use and exploitation of natural resources and landscapes.

Lab work:

CO1: Students will be able to learn the cartographic methods to make the map.

CO2: The scale is very important aspects in map, students will be able to locate on map major physical features and individual states and urban centres.

CO3: Students will be able to understand different types of scale and convert one scale into another. They will also learn the statistical methods to calculate the mean, median and mode of the statistical series.

Semester II

After completion of this course students will-

CO1: understand the key concepts in process of heating and cooling of the atmosphere, understand the general set up and composition of the atmosphere.

CO2: learn the process of making of climate in any region. They also understand how to measure the humidity.

CO3: learn classification of climate, atmospheric disturbances, cyclone, tropical and temperate cyclones, anticyclones and global warming.

Lab work (Practicals)

CO1: Students will learn to make the lines of isotherm and isobars and also he Histogram, Hythergraph, and wind rose Diagram.

CO2: The students will understand the relation between geomorphology and climatology. They also learn to use various weather instruments like Thermometer, Barometer dry and wet bulb thermometer, Rain Gauge, Anemometer etc.

Semester III

After completion of this course, students will be able to-

CO1: learn the nature and scope of geomorphology and the stages of development of any Geographical features on the surface of the earth.

CO2: understand the basic causes behind earthquakes and volcanoes.

CO3: learn the continental drift theory postulated by Alfred Wegener and will be able to understand the present Geographic picture of the earth and can interpret any geomorphic landscape.

Lab work (Practical)

CO1: Students will be able to learn the contours and their uses to draw the various topographical features.

CO2: students will also learn the Indian topography maps along with the plane table survey

and understands the structure of Earth and the complex processes of volcanoes.

Semester IV

CO1: Students will learn about basic principles of Geomorphology and Oceanography.

CO2: Students will gain knowledge about glaciers and their types, glaciations, the work of glaciers and landforms developed due to glaciations.

CO3: Students will learn about underground water, deposition in the abyssal plain, surface configuration of the ocean floor, Continental shelf, Continental slope, mid oceanic ridges and trenches.

CO4: Students will be able to understand about the circulation of the ocean water specially with Tides and currents. They also understand the environmental danger of Al Nino and LA Nina.

LAB WORK (Practical)

CO1: students will learn various types of projections like Zenithal stereographic projection, zenithal gnomonic projection, simple conical with one standard parallel, simple conical projection with two standard parallel.

CO2: Students will also learn Windows statistic and also learn mean deviation, quartile deviation, and standard deviation.

SEMESTER V

After completion of this course,

CO1: students will be able to learn physiographic and administrative divisions in Maharashtra like drainage pattern, rainfall distribution and characteristic rainfall.

CO2: Students will also learn climatic region, forest types and their distribution in Maharashtra, the major commodities and crops and minerals and their distribution like coal, iron ore and magnesium in Maharashtra.

CO2: This syllabus is at par with MPSC syllabus (geography) and thus helps students to prepare for competitive exams.

LAB WORK (Practical)

CO1: Students will learn methods of enlargement and reduction of the map, basic principles of surveying, Prismatic compass survey, divided rectangles and population pyramids.

CO2: Students will be able to draw the maps and profile of any region with the help of Prismatic compass. With the help of population pyramid they will be able to understand the

problems of that related region.

SEMESTER VI

CO1: Students will be able to learn major physiographic divisions in India and major rivers in Indian subcontinent.

CO2: Students will be able to learn about the climate of India, the characteristic of Indian climate, monsoon rainfall distribution and climatic region in India.

CO3: Students will gain knowledge about the major minerals distribution in India along with the hydroelectricity.

CO4: Students will learn to analyze the population density and distribution of population in Indian subcontinent and also will become aware about the population problems and their solution, in various parts of India.

CO5: Students will be able to elaborate the impact of the agricultural Revolution on Indian land and soil, and can also provide solutions.

CO6: Students will learn to use instruments of GPS and will be able to conduct socio economic survey of any village.

LAB WORK (Practical)

Students will learn the various Computer Based techniques to create the maps, Thailand GIS, and GPS. And also understand the use of geographical instruments dumpy level.

DEPRATMENT OF ECONOMICS

UGDEPRATMENT OF ECONOMICS

PROGRAM SPECIFIC OUTCOMES &COURSE OUTCOMES OF ECONOMICS

PROGRAM SPECIFIC LEARNING OUTCOMES –

After completion of the course:-

PSO1: Students will be able to understand core economic terms, concepts, and theories.

PSO2: Students will be able to apply the concept of equilibrium to both microeconomics and macroeconomics.

PSO3: Students will be able to explore new area of research in economics.

PSO4: Students will appreciate the central role of economics in our society and able to function as a member of an interdisciplinary problem solving team.

PSO5: Students will develop the ability to analyze historical & current events from an economic perspective.

B.A. SEM-I: COURSE OUTCOMES

Contents: Fundamentals of Microeconomics- I

After completion of this course students will gain -

CO1: an understanding of general introduction of economics.

CO2: an understanding of demand and supply analysis of economics.

CO3: an understanding of theory of consumer behavior.

CO4: an understanding of theory of production and cost.

B.A. SEM-II: COURSE OUTCOMES

Contents: Fundamentals of Microeconomics -II

After completion of this course students will gain -

CO1: an understanding of market structure and perfect completion of markets.

CO2: an understanding of price determination in imperfect competition market..

CO3. an understanding of factors pricing related to theory of distribution, theory of rent, wages ,interest ,and theory of profit.

CO4: an understanding of welfare economics and statistics.

B.A. SEM-III: COURSE OUTCOMES

Contents: Macroeconomics -I

After completion of this course students will gain -

CO1: an understanding of invention of money.

CO2: an understanding of value of money.

C03: an understanding of output and employment.

C04: an understanding of investment function, MEC, principles of multiplier.

B.A. SEM-IV: COURSE OUTCOMES

Contents: Macroeconomics -II

After completion of this course students will gain -

CO1**:** an understanding of different types of banking.

CO2: an understanding of public finance in detail.

CO3: an understanding of concept, importance and theories of international trade.

CO4: an understanding of different international finance institute.

B.A. SEM-V: COURSE OUTCOMES

Contents: Indian Economy -I

After completion of this course students will gain -

CO1**:** an understanding of structure of Indian economy.

CO2: an understanding of economic planning in India.

CO3: an understanding of concept, importance of agricultural sector in India.

CO4: an understanding of industry and service sectors.

B.A. SEM-VI: COURSE OUTCOMES

Contents: Indian Economy -II

After completion of this course students will gain -

CO1**:** an understanding of external sectors, role of foreign trade, trends in exports and imports.

CO2: an understanding of problems of poverty in India, inequality in India, problems of unemployment in India, rising prices and industrial disputes.

CO3: an understanding of economic development and economic growth in India.

CO4: an understanding of detailed relation between environment, ecology and pollution control.

B.A. SEM-V: COURSE OUTCOMES [2019-2020]

Contents: Indian Economy -I

After completion of this course students will gain -

CO1**:** an understanding of structure of developing economy.

CO2: an understanding of India's Population Policy and causes, problems and measures of Growing population in India.

CO3: an understanding of concept and meaning of Poverty, Unemployment and Inequality and also their causes and measures.

CO4: an understanding of place of Agriculture in India Economy, causes, defects and measures of agricultural marketing and productivity and also causes & measures to prevent suicide of farmers.

B.A. SEM-VI: COURSE OUTCOMES [2019-2020]

Contents: Indian Economy -II

After completion of this course students will gain -

CO1**:** an understanding of role of Industrialization, meaning &classification of Labour and Trade Unions and causes& measures of Industrial Disputes.

CO2: an understanding of meaning, objectives and types of "Economic Planning andNitiAayog's Objectives and functions.

CO3: an understanding of economic development and External Sector

CO4: an understanding of detailed relation between environment, ecology and pollution

Department of SociologyUGDepartment of Sociology

Program Specific Outcomes

Students of B.A. Sociology after completion of B.A. will be able to -

PSO1:- Gain Sociological Knowledge.

PSO 2:- Develop thinking skills.

PSO3:- Learn that how we will achieve our goal.

PSO4:- Have broader and clear perspective of issues related to Social Problems.

PSO5:- Gain cultural knowledge about different societies.

PSO6:-understand that society is greater than individual.

PSO7:- Understand about primitive people as well as developed people.

COURSE OUTCOMES

Subject – Sociology

B. A. Semester I

Students after completion of the course will be able to:

CO1:- Gain the knowledge & introduction of society.

CO2:- Understand Sociology is not only general subject but also useful subject for life.

CO3:-Learn how socialization is needful for our personality development.

CO4:-Understand how concepts are created by sociologist.

CO5:- learn that Marriage, Family and Religion like social institution are very important for our life.

CO6:- Understand that we are to become a social animal and not animal.

CO7:- Understand the meaning of culture.

B.A. Semester II

On completion of this course Students will be able to:

CO1:- Understand that good social behavior is important for everyone.

CO2:- Understand the causes of deviation.

CO3:- Understand the necessities of social control and agencies that can control us.

CO4:- Understand how stratifications are created in our country and Function and dysfunction of stratification

CO5:- Social mobility is good for society health.

CO6:- Understand how social changes occur in society and factors responsible for change.

B.A. Semester III

On completion of this course Students will be able to:

CO1:- Understand that what is meant by social problems and causes of social problems.

CO2:- Gain knowledge of types of approaches held for social problems.

CO3:- Learn the difference between individual problem & social problems.

CO4:- Understand the caste inequality and discrimination.

CO5:- Learn about problems of S.C., S.T. & O.B.C. and how constitutional provision help to solve these problems.

CO6:- Gain awareness about bad practices in the society like Dowry

CO7:- Gain awareness about problems of old people and understand the importance of taking care of elderly people

CO8:- understand that why migrations are held, how unemployment occurs and causes of farmer's suicide.

B.A.II Semester – IV

On completion of this course students will be able to:

CO1:- Gain the knowledge of displacement and rehabilitation.

CO2:- Understand that how caste, religions and cultural Intolerance occurs in our country as well as in the world.

CO3:- learn that how crime happens against women and the Marginalized people.

CO4:- learn about corruption and its effects on every person.

CO5:- Gain the knowledge for remedies about corruption as well as riots.

CO6:- Gain the knowledge about population explosion.

CO7:- learn about population control and the effects of population explosion as well as population control.

B.A. Semester – V

On completion of the course students will be able to:-

CO1:- Understand the society of tribe.

CO2:- Gain knowledge about caste and tribe, as well as Demographic profile.

CO3:- Understand about tribal family, tribal marriage, & way of acquiring mates and kinship.

CO4:-Understand status and role of women in Matriarchal and Patriarchal tribal society.

CO5:- understand that how Hinduization and Sanskritization takes place.

CO6:- Gain knowledge about creation of tribal states.

CO7:- understand the tribal economy.

B. A. Semester – VI

On completion of this course students will be able to:-

CO1:- Understand the tribal laws and justice; and how they live peacefully.

CO2:- Gain the knowledge about tribal religion and also the role of Shaman.

CO3:- Understand that how the social movement occurs. Why tribal people did the social movements. And gain knowledge about the details of Santhal and BirsaMunda movements.

CO4:- Learn the major problems of tribal's and their effects on the tribal society.

CO5:- Gain the knowledge about Vidarbha region's tribals' i.e. Gond, kolams, Karkoos and Banjaras.

B.A. Semester – V (2019-2020)

On completion of the course students will be able to:-

CO1:- Understand the society of tribe.

CO2:- Gain knowledge about caste and tribe, as well as Demographic profile.

CO3:- Understand about tribal family, tribal marriage, & way of acquiring mates and kinship.

CO4:-Understand status and role of women in Matriarchal and Patriarchal tribal society.

CO5:- understand that how Hinduization and Sanskritization takes place.

CO6:- Gain knowledge about creation of tribal states.

CO7:- understand the tribal economy

B. A. Semester – VI (2019-2020)

On completion of this course students will be able to:-

CO1:- Understand the tribal laws and justice; and how they live peacefully.

CO2:- Gain the knowledge about tribal religion and also the role of Shaman.

CO3:- Understand that how the social movement occurs. Why tribal people did the social movements. And gain knowledge about the details of Santhal and BirsaMunda movements.

CO4:- Learn the major problems of tribal's and their effects on the tribal society.

CO5:- Gain the knowledge about Vidarbha region's tribals' i.e. Gond, kolams, Karkoos and Banjara

CO6:- learn about Tribal Integration and Identity, also gain knowledge about policies of tribal welfare.

Department of Political Science

UG Department of Political Science

PROGRAM SPECIFIC OUTCOMES

After completion of B.A. with political science, student will -

PSO1: get opportunities to understand the knowledge about political system and functions of the government at National state and local level.

PSO2: lead in research teaching and in the application of Political Science with reference to Indian political system, thus develop next generation leaders.

PSO3: Comprehend the structure and procession of government system.

PSO4: Analyze political problems arguments information and theories.

PSO5: Apply method appropriate for accumulating and interpreting data applicable to the discipline of political science.

PSO6: Understand the decisions human being make in political settings and understand the philosophical underpinnings of political system and political parties and their ideologies.

PSO7: become capable of participating in debates and public opinion polling in the context of democracy Indian politics and constitution of India.

PSO8: thorough in knowledge about the Indian politics ideologies theories and the laws amended by the constitution.

COURSE OUTCOMES

SEMESTER I:

Course: Indian Democracy

CO1: Students will become aware of Democracy, it's Meaning, Nature, Elements, Features and Types..They will also develop democratic thinking from Ancient Dimes to Modern times.

CO2: Students will thoroughly understand the Role of Parliament (Parliamentary Sovereignty).They will know about the Roles and Power held by the Chief Executives of Indian Democracy like the President and Prime Minister

CO3: Students will learn about the roles played by the Legislature in making Center-State relations and Sarkariya Commission and the role played by the

Executives like the Governor and Chief Minister in operating the State Government

CO4: Students will also understand in brief about the Role of Judiciary System in Indian Democracy, Supreme Court, High Court, Judicial Activism and its impact on Indian Parliamentary System.

SEMESTER ll

Course: Local Self Government

CO1: Students will be introduced to the Meaning, Definition and Structure of Local Self Government in India and the amendment of 73rd and 74th section for it.

CO2: Students will learn in detail about the Rural Local Self Government like the Grampanchayat, PanchayatSamiti, ZillaParishad, Gramsabha and their roles in Rural Development.

CO3: Students will learn in detail about the Rural Local Self Government like the Nagar panchayat, Nagar Parishad, Municipal Corporation and their roles in Urban Development.

CO4: Students will also know about the Meanings, Definitions, Structures, Scopes, and Impacts of the Right To information Act and Human Rights Commission Act on Indian political system.

SEMESTER III:

Course: Political Theory

CO1: Students will learn about the meaning definition nature scope and significance of Political Theory and also the Traditional and Modern approach to Political Theory.

CO2: Students will learn about the Meaning, Definition, Elements of State, they will also learn the Theories of Origin of State such as Divine Theory, Social Contract Theory, and Historical Theory.

CO3: Students will learn about the Meaning, Definition, Types, and Features of the Theories of Sovereignty such as the Austin Theory Pluralist Theory.

CO4: Students will learn about the Meaning, Definition, Forms and Factor

Responsible for Social Change and also the Theories of Social Change such as Cyclic Theory, Idealist Theory, and Martin Theory of Revolutionary Changes.

SEMESTER IV:

Course: Political Analysis

CO1: Students will learn the meaning, Definition, Types Nature and Subjects of Political Analysis.

CO2: Students will learn about Meaning, Definition, Nature, Elements, Forms and Bases of Power: Meaning, Definition, Nature, Forms of Authority, Difference

between power and authority And Meaning, Definition, Nature, Way of legitimacy, Importance of Legitimacy

CO3: Students will learn about the Meaning, Definition, Characteristic, Types, of Laws and Rights.

CO4: Students will learn about the Meaning, Definition, Characteristics, Types of Political Elite; Meaning, Definition, Elements of Leadership, Characteristics, Types of Political Leadership ; Meaning, Definition, Characteristics, Elements of formation of Ideology, Role of Ideology in Politics.

SEMESTER V:

Course: Indian Political Thoughts

CO1: Students will learn about B G Tilak's thoughts on Nationalism and his Four Point Formula and V D Savarkar's thoughts on Hinduism and his Revolutionary Approach.

CO2: Students will learn about Political thoughts of M K Gandhi such as the Concept of Truth, Non violence and Concept of Satyagraha and his thoughts on Sarvodaya.

CO3: Students will learn about VinobaBhave and state system.

CO4: Students will learn about JyotibaPhule's thoughts on Education and Equality B R Ambedkar’s thought on Democracy and Social Justice.

CO5: Students will learn about **J** M Nehru's thoughts on Socialism and Foreign Policy R M Lohia’s Socialistic Approach and Chaukhamba State System..

SEMESTER VI:

Course: Western Political Thought

CO1: Plato's Concept of Ideal state and Theory of Justice Aristotle's concept of Ideal state and Slavery.

CO2: Thomas Hobbes Theory of Social Contract and thought on Pre social Stage John Locke's Theory of Social Contract and thoughts on Government Jean Jacques Rousseau Theory of Social Contract and Theory of Social Will

CO3: Jeremy Bentham theory of Utilitarianism and thoughts on Law and Justice John Stuart Mill's concept of Liberty and Theory of Utilitarianism

CO4: Karl Marx concept of Communism and the Theory of Class Struggle Union's concept of Communism and thoughts on Capitalism.

EDUCATIONAL OPPORTUNITIES:

BA Political Science degree serves as a basic for further studies in the field such as MA, M.Phil and Ph.D degrees in Political Science. With the successful completion of the course one can get opportunities for the post of Assistant Professor in any college or university. With BA Political Science degree one can become successful candidate in MPSC and UPSC and other competitive exams.

EMPLOYMENT OPPORTUNITIES:

1. With BA political science degree one can have a successful Political career in India at National, regional or local level
2. One can have a career in printing media of visual media on the basis of BA political science and can participate in national debates and discussions happening on national television
3. With BA political science degree one can have an opportunity to become an assistant professor in university all colleges or school teacher
4. other employment area

- all India services
- Maharashtra government services
- all the Ministries
- police force or Armed force
- HR departments
- non-profit government organization
- private companies .etc

Department of Home Economics

UG Department of Home Economics

Program Specific Outcomes

After completion of B.A. with Home Economics, students will be able to:

PSO1: Learn practical skills like cooking, food preservation, stitching and embroidery.

PSO2: Learn creative and artistic skills flower arrangement, bouquet arrangement, use of brush andcolor schemes and Color wheel.

PSO3: Learn about family resources and home decoration and to become interior decorator.

PSO4: Gain knowledge of computer application in developing artistic and fashion designing skills.

PSO5: Gain basic knowledge of importance of nutrients, during pregnancy and child care and old age.

PSO6: Employable and get jobs in college government, non – governmental and private factories, cloth industries boutiques, bakeries, small industries hotel management dress designing schools. Learn variety of employable skills which can make them successful entrepreneur.

COURSE OUTCOMES

B.A. SEMESTER I

On Completion of this course, students will be able to:

CO1: Develop variety of skills and Management and become good home maker

CO2: Learn about family resources and home decoration and gain an opportunity to become interior decorator.

CO3: Learn about employable skill like embroidery on dress materials, Sheets, table cloth & apron etc.

CO4: Develop skill of Aari&Jardozi work & also learn fancy embroidery.

B.A. SEMESTER II

On completion of this course students will be able to:

CO1: Demonstrate different type of skill such as knitting, Cable Pattern, Double color Pattern, Lace Pattern, Border Pattern.

CO2: Demonstrate different type of painting and printing skill such as Tie & dye, block printing, brush painting and spray painting.

B.A. SEMESTER III

On completion of the course students will be able to:

CO1: Understand importance of personal cleanliness & hygiene in daily life and demonstrate the same during practical in the lab.

CO2: Learn to distinguish between basic needs & wants.

CO3: Learn basic methods of cake preparation, cookies making & also learn to modify & create new designs of cake making according to dietary guidelines.

CO4: Learn to interpret accurately and use standard forms of measurements in recipes and choose the relevant equipments needed for measuring ingredients.

CO5: Learn about safety and care required for the use of electronic gadgets in the laboratory thus developing sense of responsibility.

CO6: Learn how to minimize food waste and make use of leftovers.

B.A. SEMESTER IV

On completion of the course students will be able to:

CO1: learn time management

CO2: Learn basic knowledge & importance of some of the nutrients and also understand their role in diet for good health.

CO3: Use knowledge of nutrients to achieve a healthy balanced diet.

CO4: Learn to give examples of their application during practical

B.A. SEMESTER V

On completion of the course students will be able to:

CO1: Gain basic knowledge on diet for pregnant women, Lactating women & Infants.

CO2: Gain basic knowledge on drafting & stitching.

B.A. SEMESTER VI

On completion of the course students will be able to:

CO1: Gain basic knowledge on diet for early childhood.

CO2: Gain basic knowledge on diet for school children

CO3: .learn various skills like pickle and jam making, variety of flower arrangements, cooking, baking, interior decoration, variety of embroidery stitches and become successful entrepreneurs.