

**A.S.D.GOVERNMENT DEGREE COLLEGE FOR WOMEN (AUTONOMOUS)
JAGANNAICKPUR, KAKINADA**

SEMESTER - I

HSC -101- BASIC NUTRITION

Theory: 4Hours/week
Practicals: 2 Hours/week

UNIT-I Introduction to Nutrition and Macro Nutrients

- Food, Nutrition, Nutrients, Health – Definition
- Dimensions of Health
- Classification of Nutrients
- Macro Nutrients – Classification, functions, digestion & absorption, dietary sources of Carbohydrates, Lipids, Proteins

UNIT – II Micro nutrients- Vitamins

- Vitamins – Classification,
- Functions, dietary sources of the following
 - Fat soluble vitamins – A, D, E and K
 - Water soluble vitamins – Thiamine (B₁), Riboflavin (B₂), Niacin (B₃), Folic acid and Vitamin C.
 - Deficiency of Vitamin A, Vitamin D, Thiamine and Riboflavin

UNIT - III Minerals

- Minerals – classification,
- Functions ,dietary sources of the following
 - Macro minerals – Calcium & Phosphorous, Sodium and Potassium
 - Micro minerals or Trace elements – Iron, Iodine and Zinc
 - Deficiency of Calcium, Iron, Iodine

UNIT - IV Energy

- Energy- definition, Physiological energy value of foods.
- Determination of gross energy value of foods using Bomb calorimeter,
- Differences between physiological and gross fuel value
- Basal Metabolic Rate – Definition, Factors affecting Basal Metabolic Rate,
- Thermic effect of food.

UNIT – V Water and Non Nutrient constituents of Food

- Water – Functions, regulation of water balance, Dehydration
- Non nutrient constituents of foods and their importance
 - Phytochemicals – Curcumin, Lycopene, Flavonoids
 - Antioxidants – Vitamin C, E and Carotenoids
 - Detoxifying agents – Anthocyanins, Chlorophylls

PRACTICALS

1. List out the common foods and to learn their names in Telugu, English, Hindi and Urdu.
2. Learn to identify the different food samples and to know their nutrient composition.
3. Market survey
4. Dietary sources, Recommended Dietary Allowances and planning of recipes of the following nutrients
 - Macronutrients: Carbohydrates, Proteins, Fats, Fiber
5. Micronutrients
 - Vitamins – Vitamin A , Vitamin C
 - Minerals – Calcium, Iron

SEMESTER - I
HSC-102 – GENERAL PSYCHOLOGY

Theory: 4Hours/week
Practicals: 2 Hours /week

THEORY

UNIT I Introduction to Science of Behaviour

- Psychology: Definition, scope of psychology ,
- **Branches of Psychology (Skill)**
 - a. **Pure Psychology –General, Abnormal, Social, Experimental, Physiological, Para psychology, Geo psychology, Developmental psychology,**
 - b. **Applied psychology: Clinical, Counselling psychology, Educational, Industrial, Legal, Military, Political and Sports Psychology.**
- **Behaviour: Definition, Methods of Studying Human Behaviour – Observation method , Experimental Method, Case Study method , Survey Method , Cross sectional and Longitudinal Methods**

UNIT II Basic Psychological Concepts

- Attention– Definition, Types -Voluntary and Involuntary; Determinants of attention.
- Perception – Definition, perceptual organization and perceptual Constancies and illusions.
- Memory – Definition, types and nature of memory. Methods of memorizing and factors influencing memory. Forgetting – types and causes. Ways of improving memory.

UNIT III Personality

- Personality: Definition, Concept and types of personality – Normal and abnormal personalities, Factors affecting development of personality
- **Assessment of personality – Projective Tests - Definition CAT, TAT, Rorschach inkblot test. (Employability)**
- Freud’s Psycho-analytic theory – Understanding the structures of Id, ego and super ego and their interaction, Erickson’s Theory – Eight stages of development.
- Trait Perspective – Type theory of Sheldon and Big Five Factor Theory.

UNIT IV Major Psychological Approaches - I

- Learning – Definition, Steps in learning process, Learning laws, Theories of learning-Classical Conditioning, Operant conditioning
- Motivation – Definition
- , Classification of needs, Classification of drives, classification of motives- Abraham Maslow’s theory of motivation.

UNIT V Major Psychological Approaches - II

- Intelligence: Definition of terms - Cognition, Meta cognition, Intelligence, Intelligence Quotient (IQ) and Emotional Intelligence. Assessment of Intelligence – Verbal and nonverbal tests, classification of children based on intelligence, extremities of intelligence - sub normal and the gifted.
- Gardner’s Multiple Intelligence theory.

PRACTICALS(Skill and Employability)

- 1. Methods of studying child / Human Behaviour – Observation / Interview schedules**
- 2. Assessment of Perception-Muller Iyer illusion Experiment**
- 3. Memory Recognition Test**
- 4. Assessment of Interest - Thurston’s Interest Schedule / Available tests**
- 5. Assessment of Intelligence - Raven’s progressive Matrices test/ Alexander pass-along test/ Available test**

6. Assessment of personality - Projective tests / Personality Inventory/ Available tests

SEMESTER - I

HSC-103–FUNDAMENTALS OF TEXTILES

Theory: 4 Hours/week

Practicals: 2Hours/week

THEORY

Unit-I Introduction to Textiles and Clothing(Skill and Employability)

- Introduction to textiles and clothing - Importance of study of textiles.
- General properties of a Textile Fiber - Primary and Secondary.(Skill)
- Classification of textile fibers – Natural and manmade; cellulose, protein, synthetic and mineral; staple and filament fibres

Unit-II Natural Fibers

- Cellulose fibres – Cotton and Linen - Production, properties, use and care
- Minor cellulose fibers
- Protein fibers – Silk and wool - Production, properties, use and care.

Unit-III Synthetic Fibers

- Nylon – Production, properties use and care
- Polyester – Production, properties use and care
- Acrylic fibres – Production, properties use and care

Unit – IV Mineral Fibers

- Mineral fibres – Fibre glass and Asbestos Production, properties and Uses
- Mixtures and Blends – Importance and advantages of Blending.
- Blends of Natural cellulose fibers, protein fibers and manmade fibers.

Unit – V Yarns

- Yarns – Types of Yarns - Staple and Filament
- Methods of spinning – Mechanical process
- Methods of spinning – Chemical process - Wet , Dry, Gel and Melt
- Classification of yarns – simple, novelty and textured yarns

PRACTICALS(Skill)

1. Identification and collection of Textile Fibres
 - Plant Fibres – Cotton, Linen, Jute
 - Animal Fibres – Silk, Wool
 - Synthetic Fibres – Polyester, Nylon, Acrylic
2. Identification and collection of Yarns
 - Simple Yarns
 - Novelty Yarns
3. Tests to identify textile fibers
 - Texture
 - Microscopic examination and
 - Burning test.

SEMESTER - II
HSC-201 – INTRODUCTION TO FOOD SCIENCE

Theory: 4Hours/week
Practicals: 2Hours/week

THEORY

Unit-I Introduction to Food Science(Skill)

- Foods – Definition and functions of foods, group classification
- Cooking – Objectives of cooking,
- Preliminary preparations (washing, peeling, cutting, grinding, soaking, roasting, kneeding, mixing etc)
- Advantages and disadvantages
- Methods of cooking (wet, dry and combination) – Advantages and disadvantages of each method.

Unit-II Plant Foods

- Cereals and Millets – Structure, Composition and nutritive value, use in cookery
- Pulses and Legumes – Composition and nutritive value, use in cookery
- Vegetables and Fruits – Classification, Nutritional aspects, Pigments, Enzymatic and non-enzymatic browning.
- Nuts and oil seeds – Nutritive value , use in cookery

Unit-III Animal Foods

- Milk and milk Products - nutritive value, use in cookery
- Egg - structure, nutritive value, methods to assess quality of eggs, changes during storage and use in cookery
- Meat, Poultry, Fish – Nutritive value, meat tenderization
- Spices and condiments –use in cookery

Unit-IV Food Processing(Skill and Employability)

- Food Preservation – Methods, principles and their applications - high temperature, low temperature, removal of moisture, irradiation and preservatives
- Food additives – Definition, Types
- Nutrient Enrichment – Germination, fermentation, fortification etc.
- Convenience foods –Advantages and disadvantages

Unit - V Food Microbiology(Employability)

- Food Spoilage – Microorganisms causing spoilage, Factors responsible for spoilage and changes brought about in food by microorganisms
- Microorganisms that bring about useful changes in food.

PRACTICALS(Skill)

1. Standardization of weights and measures of various food items.
2. Cereals, pulse and vegetable preparations and calculation of nutritive values of recipe .
3. Milk, meat, egg preparations and calculation of nutritive values of recipes.
4. Demonstration of Drying, Fermentation and germination processing techniques.

SEMESTER - II
HSC – 202 - HOUSING FOR BETTER LIVING

Theory: 4 Hours/Week
Practicals: 2 Hours/Week

THEORY

Unit I: Housing(Skill)

- Importance and functions of a house; Factors influencing the choice of house.
- Requirements for purchasing land for building a house - Selection of site, soil condition, locality, orientation, sanitary facilities, good neighbour-hood, legal characteristics etc.
- Principles of planning a house – aspect, prospect, privacy, flexibility, roominess, grouping, circulation, sanitation, practical considerations etc

Unit II: House Plans(Skill)

- Planning of different rooms in the house – Veranda, living room, bed room, kitchen etc.
- Kitchen plans – Planning of efficient work centres (L shape, U shape, single walled, peninsular shaped kitchens) and storage facilities in kitchen and other rooms.
- House plans for different income groups – High income, Middle income and Low income.
- Advantages and disadvantages of owning and renting a house.

Unit III: Building Materials and Flooring Materials

- Types and properties of Building Materials – Stone; Clay products; Cement; Mortar; Concrete; Timber; Plywood & related products; Plastics & related products; Paints & related products; Ferrous & nonferrous metals; Gypsum & related products.
- Flooring – Factors in selection of flooring material and Types of flooring

Unit IV: Building Protection

- Dampness Protection – Reasons, Preventive and curative methods of dampness
- Termite Protection – Sources, preventive and curative methods of termite attack
- Fire Protection – Causes of fire, preventive measures and fire resisting construction

Unit V: Household Equipment(Skill)

- Factors to be considered for the selection and purchase of household equipment.
- Construction principles and care of the following equipment
 - Small electrical appliances – mixers, toasters, beaters, iron etc.
 - Large electrical appliances – Refrigerator, washing machine, vacuum cleaner, dish washer, electric range etc.
 - Low cost non-electrical appliances for rural areas – hay box, low cost refrigerator, solar cooker etc.
- Points to be considered while operating electrical appliances and safety measures to avoid accidents

PRACTICALS(Skill)

1. House plan - symbols, site plan, floor plan, elevation, landscape
2. House plans for different income levels - low income, middle income and high income.
3. Kitchen plans- L shape, U shape, broken L, U Shape, peninsular, one walled.
4. Market study on building materials & identification of – floor finishes, wall finishes and ceiling finishes.
5. Care and cleaning of metals and Non-metal items.
6. Care and cleaning of different types of floors and walls using suitable cleaning equipment and cleaning agents

SEMESTER II
HSC- 203 –FUNDAMENTALS OF HOME SCIENCE EXTENSION

Theory: 4 Hours/week
Practicals: 2 Hours/week

THEORY

Unit-I Extension Education

- Meaning, Concept, Scope and objectives of extension
- Formal and Non formal Education
- Philosophy and principles of Extension Education
- Role and Qualities of an Extension worker

Unit-II Teaching and Learning Process(Skill)

- Teaching, Learning – Definitions, steps in Extension Teaching
- Learning Situation – Definition, Elements of Learning Situation
- Principles of learning and their Implications for Teaching
- Motivation – Principles of Motivation in Extension

Unit-III Teaching Methods/Techniques(Employability)

- Extension Teaching methods – Definition , Classification of Teaching methods – According to use and form
- Individual methods – Farm and home visits, Telephone calls, Personal letters, Result demonstrations.
- Group methods – Method demonstration, Group meetings/Discussions, Conferences, Field trips etc.
- Mass Methods – Print and electronic media , Internet and Exhibitions
- Factors to be considered in selection and combination of teaching methods

Unit-IV Audio - Visual Aids:

- Audio Visual Aids – Definition and Classification
- Factors Influencing selection of Audio-Visual Aids
- Principles of Preparing in Planning, Presentation and evaluating Audio-Visual Aids
- The cone of Experience

Unit-V Communication(Skill)

- Communication – Definition and scope of Communication
- Key Elements in the process of Communication – 1. Communicator 2. Messages, 3.Channel 4. Treatment of Messages 5. Audience 6. Audience Response.
- Models of communication- Leagan’s model & Berlo’s model
- Types of Communication – Verbal, Non Verbal, Small group and Mass Communication.
- Barriers to communication.

PRACTICALS(Skill)

1. Visit to a community/ village to find out the socio economic needs of the people
2. Preparation of Survey Schedule
3. Preparation and display of teaching aids – Posters, charts, flash cards etc.
4. Display of bulletin board

SEMESTER III
HSC-301 – COMMUNITY NUTRITION

Theory: 4Hours/Week
Practicals: 2Hours/Week

THEORY

Unit-I Meal Planning – Nutrition during Adulthood, Pregnancy and Lactation(Skill)

- Dietary guidelines for Indians, Principles of meal Planning, Balanced Diet.
- Nutrition for Adults – Food and Nutritional requirements for adult man and woman of different physical activities (Sedentary, Moderate and Heavy work).
- Pregnancy – Nutritional and Food requirements, Physiological changes and complications.
- Lactation – Food and Nutritional requirements

Unit-II Nutrition during Childhood(Employability)

- Infancy – Nutritional requirements – Breast feeding and its advantages; Artificial/bottle feeding; Supplementary foods (definition and types).
- Early childhood – Food and Nutritional requirements – healthy eating habits among pre-schoolers
- School going children – Food and Nutritional requirements, packed lunch.

Unit-III Nutrition during Adolescence and Old age(Skill)

- **Adolescence-** Food and Nutritional requirements, Nutritional problems and Eating Disorders- Anorexia and Bulimia.
- **Geriatric Nutrition-** Physiological changes in elderly, Food and Nutrient Requirements, Nutrition related problems

Unit-IV Nutritional Status Assessment(Employability)

- Importance of Nutritional Status Assessment of the Community
- Direct methods – Nutritional Anthropometry, Clinical and Biochemical Assessment
- Indirect methods – Diet Surveys, Vital Health Statistics (Infant mortality rate, Measurement of morbidity)

Unit –V Nutritional Programs

- Supplementary Feeding Programmes – ICDS, Mid Day Meal Programme (MDMP).
- Prophylactic Programmes to prevent Vitamin A, Iron, Iodine deficiencies
- Role of National and International Organizations in combating malnutrition –
(a)International Organizations - WHO, FAO and UNICEF
(b) National Organizations - NIN, CFTRI, NNMB.

PRACTICALS(Employability)

1. Planning and preparation of a balanced diet for Adult man and women.
2. Planning and preparation of a balanced diet for Pregnant and Nursing mother.
3. Planning and preparation of a balanced diet for a Pre School Child.
4. Planning and preparation of a balanced diet for School child and an Adolescent
5. Planning and preparation of low cost Nutritious recipes
6. Planning and preparation of diets for PEM and Anaemia
7. Use of Anthropometric measurements in assessing the Nutritional Status.
8. Visit to Anganwadi Center – Observation of feeding programme at Anganwadi Center.
9. Visit to government school – Observation of School Lunch Programme

SEMESTER - III
HSC – 302 - PRINCIPLES OF GARMENT CONSTRUCTION

Theory: 4 Hours/week
Practicals: 2Hours/week

THEORY

Unit-I Equipment in Garment Construction

- Equipment- Measuring, Drafting, marking, sewing and finishing equipment.
- Types of sewing machine- Mechanical , Electronic , Computerized or Automated , Embroidery Machine , Over lock Sewing Machine

Unit – II Body Measurements and Pattern Making (Entrepreneurship)

- Recording of body measurements- Importance- Types of measurements – vertical, Horizontal and Girth measurements. Care to be taken in body measurements.
- Pattern making- Methods of pattern making -Drafting, draping and flat pattern making,
- Drafting – Tools for drafting- Information to be recorded on the draft – Points to be kept in mind while drafting and advantage of drafting
- Paper Patterns – Advantages, and content of paper patterns

Unit – III Estimation and Preparation of the Fabric and Pattern Layout

- Estimation of fabric for different garments.
- Importance of grain in fabric for cutting and garment construction.
- Steps in Preparation of fabric for cutting
- Pattern Layout – Importance, precautions, guidelines and care to be taken in pattern lay out for asymmetric, bold, striped checked designs etc.,
- Fabric Cutting – Guidelines to cut out pattern pieces,

UNIT –IV Garment Components

- Necklines – Types of necklines.
- Collars-Factors in designing collar styles, shapes and kinds of collars.
- Sleeves – Categories and styles of sleeves.
- Yokes – Factors for selection of yokes design and types of yokes.

Unit-V Garment Fitting(Skill)

- Elements of fit – grain, set, line, balance and ease
- Characteristics of well finished garment
- Readymade garments – Selection and examination for quality, fitting and shape
- Tailor made and Homemade garments – examination for fitting and shape
- Comparison of readymade, tailor and homemade garments
- Common fitting problems and remedies for garments

PRACTICALS(Employability)

1. Basic Stitches – Temporary, permanent and neat ending finishes.
2. Seam and seam finishes.
3. Neckline finishes – Bias, Binding and shaped finishing.
4. Plackets – Continuous bound and two piece plackets.
5. Sleeves – Plain, Puff and bell sleeve.
6. Introducing fullness - Darts, tucks, gathers and pleats.
7. Fasteners – Hook and Eye, press buttons, button and button hole.
8. Drafting and construction of saree petti coat
9. Drafting and construction of frock

SEMESTER - III
HSC-303 CHILD DEVELOPMENT

Theory: 4Hours/week
Practicals: 2Hours/week

THEORY

Unit I Introduction to Growth and Development

- Understanding the terms Child, Growth, Development, Child Development, Human Development, and Developmental tasks
- Principles of Growth and Development and Factors influencing growth and Development of Children.
- Determinants of Development - Heredity Vs Environment - Maturation Vs Learning
- Stages of Development across life span

Unit II Pre-natal and Early Years of Development

- Stages of Pre-natal development - care during pregnancy-Discomforts and Complications during pregnancy.
- Stages of birth and Types of Birth
- Infancy and Babyhood: Developmental Tasks and Characteristics, Physical-motor development, Cognitive development – Piaget’s Sensory motor stage, Language, Socio-emotional development.

Unit III Development during Early and Late Childhood (Skill and Employability)

- Early Childhood Period –Characteristics -Physical, Emotional, Social and Cognitive development - Piaget’s Pre-operational stage - Social stages in play.
- Late Childhood Period – Characteristics, Physical, Emotional, Social and Cognitive development- Piaget’s Concrete-operational stage.

Unit IV Children with Special Needs(Skill and Employability)

- Childhood disabilities – General Causative factors
- Classification of childhood disabilities – Definition and characteristics of Auditory Challenged, Intellectual Challenged, Developmental Challenged and Learning Disability among children
- Gifted Children –Definition and characteristics
- Importance of Early Identification and special education

Unit V Child Rearing Practices and Behaviour Problems among Children

- Parenting Styles – Authoritarian, Authoritative and Permissive styles, Influence of child rearing practices on child’s personality.
- Behavioral Problems – Definition, Common Behaviour problems - Thumb sucking, enuresis, temper tantrums, destructiveness - Early identification.
- Juvenile delinquency – Definition and Causative factors

PRACTICALS

1. Observation of characteristics of an infant
2. Observation of different Developments of pre-school children – Physical, language, Concept development
3. Assessment of social Development among elementary school children (Skill)
4. Visit to local Special schools for children with disabilities - Taking Case studies
5. Identification of Children with Behaviour problems using a Check List

SEMESTER - IV
HSC-401 - THERAPEUTIC NUTRITION

Theory: 4Hours/week
Practicals: 2Hours/week

THEORY

Unit -I Introduction to Therapeutic Nutrition(Skill)

- Therapeutic Nutrition – Purpose of Diet Therapy, Therapeutic adaptation of normal diets – liquid, soft and special feeding methods
- Dietitian – Roles and responsibilities,
- Diet counselling,
- IDA – Indian Dietetic Association

Unit -II Malnutrition and Fevers(Employability and Entrepreneurship)

- Fevers – Acute and Chronic fevers – Typhoid, T.B. – Causes, symptoms and dietary management
- Under weight – Causes, assessment and dietary management
- Overweight and Obesity – Causes, assessment and dietary management and complications

Unit -III Gastrointestinal and Liver Diseases

- Gastrointestinal Diseases – Peptic ulcer, Diarrhoea, Constipation- causes, symptoms and dietary management
- Liver diseases – Hepatitis, Cirrhosis of liver - Causes, symptoms and dietary management

Unit -IV Cardio-vascular and Renal Diseases

- Cardio-Vascular Diseases – Dietary modifications, Role of fat in the development of Atherosclerosis,
- Hypertension - Causes, symptoms and dietary management
- Kidney disease – Glomerulonephritis, Nephrosis, Chronic Renal Failure - Causes, symptoms and dietary management

Unit -V Diabetes and Cancer

- a. Diabetes Mellitus – Classification, causes, symptoms, Diagnosis, Dietary management and complications
- b. Cancer – Classification, dietary modifications

PRACTICALS

Planning and preparation of the following diets(Employability)

1. Preparation of modified diets-Liquid and Soft diets.
2. Planning and preparation of diet in fevers – Typhoid and T.B.
3. Planning and preparation of diets for Underweight and Obesity.
2. Planning and preparation of diet in diseases of Gastrointestinal System – Peptic Ulcer, Viral Hepatitis
3. Planning and preparation of diet in Cardio-Vascular diseases – Atherosclerosis and Hypertension
4. Planning and preparation of diet in Kidney diseases – Nephritis
5. Planning and preparation of diet in Diabetes Mellitus

SEMESTER - IV
HSC - 402 FABRIC CONSTRUCTION AND APPAREL CARE

Theory: 4 Hours/week
Practicals: 2Hours/week

THEORY

Unit I Fabric Construction

- Weaving – Introduction, parts of the loom, Steps in weaving.
- Types of weaves – Basic and Decorative weaves.
- Concept of Grain, fabric count / Thread count, balance, selvedge.

Unit II Knitting and Non-woven fabrics(Skill)

- Knitting – Definition, classification (weft and warp) - Types of knitting,
- Comparison of Knitting with Weaving – Properties of Knits – Use and Care of Knits
- Non – woven Fabrics – Felting, Bonding, Braiding, Knotting and bonding. Properties of Non-woven fabrics. Applications of non woven fabrics.

Unit III Finishes - Chemical, Mechanical and functional finishes(Skill)

- Introduction to finishes – Importance, Kinds of finishing processes, Classification
- Chemical finishes. – Bleaching, mercerizing, shrinking, degumming, weighting.
- Mechanical finishes – Tentering, Decating, Calendering, Schreinerizing, Moireing, napping, flocking, Crepe and wrinkled effect, beetling and embossing
- Functional finishes – water repellence, flame proofing, mildew proofing, moth proofing, antiseptic and antistatic finishes

Unit IV Clothing Selection and Wardrobe Planning

- Factors affecting selection of clothing.
- Clothing selection – Clothing for specific groups – Infants, children and teenagers.
- Selection of common household linen – Towel, table linen and bed sheets.
- Wardrobe planning – Definition, Importance, Factors and Steps for planning wardrobe

Unit V Laundering(Entrepreneurship)

- Manual Laundry Equipment – Washing, Drying and Ironing.
- Machine Laundry – Procedure in use of washing machines – Precautions. Reagents/ supplies used in Laundry – Soap, detergent, bleaching agents etc.
- Laundering procedure for cotton and linen, woollens, silk and synthetics,
- Process of Dry cleaning
- Stain removal – Classification of stains and ways of stain removal

PRACTICALS(E)

1. Identification and preparation of different weaves
2. Identification of thread count of a fabrics
3. Samples of different knits
4. Classify stains and identify the methods of removing stains.
5. Drafting and stitching of salwar.
6. Drafting and stitching of Kameez.

HSC- 403 - HUMAN DEVELOPMENT AND FAMILY DYNAMICS

Theory: 4Hours/week

Practicals: 2Hours./week

THEORY

Unit I Human Development - Adolescence

- Adolescence – Definitions by WHO, UNICEF, NCERT, Characteristics.
- Physical and physiological Changes during puberty for Boys and girls
- Developments during adolescence – Cognitive- Piaget's Formal-operational stage, Emotional and Social development(Skill)
- Major concerns during adolescence – Substance abuse, Delinquency , Suicidal Ideation, Teen age pregnancy etc. Symptoms and warning signs - Use of Counselling.

Unit II Human Development -Young Adult Hood

- Definition, Development tasks, significance of the period, Changing responsibilities
- Adjustments during young adulthood period
- Preparation for Marriage – Factors to be considered in the choice of marriage partner. Modes of mate selection, Self-choice marriage and arranged marriage – Advantages and disadvantages.
- Pre-marital counselling – Meaning and Need for Pre-marital Counselling.(Employment)

Unit III Marriage and Adjustments

- Marriage –Definition and Functions, needs and goals. Criteria for successful marriage.
- Values and goals of marriage – Indian context. Different Marriage practices(Hindu, Muslim & Christian)
- Adjustments in marriage – In laws, sex adjustment to mate, adjustment to parenthood, and financial adjustments.
- Transition to Parenthood – Factors that influence Planned Parenthood.
- Factors responsible for an increase in the rate of legal marital dissolution – Post- marital counselling.

Unit IV Indian Family and Changing Trends

- Family – Meaning, Definition, functions of family, sociological significance of family.
- Types of Family – Definitions of Joint, Extended, Nuclear Families, Alternate family styles - Modern trends in family – Advantages and disadvantages.
- Changing Indian family structure – Factors responsible
- Problems faced by the modern family – Impact of modern family on children, Need for family counselling.

Unit V Human Development - Middle and Late Adulthood

- Middle adulthood – Definition, physical and physiological changes - health issues, Psychological changes during middle age, coping up strategies, preparation for retirement.
- Late adulthood – Sub groups and definitions, Late adulthood and Ageing (beyond 60 years) - Definitions, Characteristics of old age – Physical and physiological changes during old age, cognitive and memory changes.
- Problems of old age and coping up strategies
- Institutionalization of aged in Indian context

PRACTICALS(Employment)

1. Study of adolescent adjustment problems
2. Case study of adolescent boy and Girl
3. Identification of Mate selection criteria depicted in Mass media
4. Case study of Married couple-Marital adjustment
5. Case study of elderly man and woman.
6. Visit to counselling centre –Finding common problems of adolescents and married Couples

SEMESTER - IV

HSC -404- NUTRITIONAL BIOCHEMISTRY

Theory: 4Hours/week
Practicals: 2Hours/week

THEORY

UNIT I Introduction to Biochemistry and Carbohydrates

- Introduction to Biochemistry - Acids, Bases, PH, Buffers definitions
- Acid-base balance
- Chemistry of carbohydrates(Skill)
 - Structural classification, (Monosaccharides , Disaccharides and Polysaccharides)
 - Properties, Reactions of carbohydrates
 - Role of Fibre in human nutrition

UNIT II Lipids and Proteins

- Chemistry of Lipids
 - Classification of Fatty Acids
 - Properties of Lipids,
 - Structural Lipids – Phospholipids, Glycolipids, Lipoproteins and Cholesterol.
- Chemistry of Proteins
 - Nutritional classification of Amino Acids
 - Classification of protein
 - Properties of protein
 - Reactions of amino acids

UNIT III Enzymes and Co-Enzymes

- Enzymes – Definition, Properties, Classification, Enzyme Specificity, Enzyme Action, Inhibition and Factors effecting Enzyme Activity.
- Co enzymes – Vitamins as co enzymes

UNIT IV Metabolism of Carbohydrates

- Digestion and absorption of carbohydrates
- Homeostasis of blood glucose or Regulation of blood glucose
- Glucose Tolerance Test.
- Glycolysis
- Kreb's cycle.

UNIT V Metabolism of Lipids and Proteins

- Synthesis of triglycerides
- Beta oxidation and bio synthesis of fatty acids.
- Metabolism of Amino acids – Deamination, Transamination, Decarboxylation of amino acids.
- Integration of Carbohydrate, protein and Lipid metabolism

PRACTICALS

1. Preparation of acids, bases, buffers, measuring pH.
2. Qualitative analysis – Identification of carbohydrates
3. Qualitative analysis – Identification of proteins and amino acids
4. Qualitative analysis of Lipids.
5. Qualitative analysis of food enzymes – plant and animal.

SEMESTER - IV

HSC - 405 - RESOURCE MANAGEMENT & FAMILY ECONOMICS

Theory: 4Hours/week
Practicals: 2Hours/week

THEORY

UNIT I Management Process

- a. Management Process – Steps – Planning, Organizing, Controlling & Evaluating;
- b. Types of managerial situations in family- Elementary, Growth & Developmental and Preventive;
- c. Roles played by Home Maker, Role Overload, Role Conflict;
- d. Systems Approach to Management- Elements and Importance

UNIT II

- a. Factors motivating Management: Values, Goals & Standards – Types, Factors influencing, Inter-relationship
- b. Resources – classification, factors influencing
- c. Decision Making – Steps in Decision making, Types of Decisions, Factors influencing Decision making.(Skill)
- d. Conflict Resolution – Methods, Importance.

UNIT III

- a. Time Management – Importance, Tools of time management – Time Norm, Time Cost, Work Norm, Work Curve, Peak Load; Management Process applied to Time – Planning – Controlling & Evaluating.
- b. Energy Management – Importance, Management process applied to Energy; Fatigue – Types- Physiological & Psychological, Methods of Coping.
- c. Work Simplification – Techniques to study work simplification -Process Chart, Pathway Chart, Operation Chart; Mundell's Classes of Change – Three classes of Change

UNIT IV

- a. Family as an Economic Unit – Functions, Economic Goals of Families, Factors influencing Economic Goals

- b. Family Income – Definition, Classification, Methods of handling Family Income, Methods of Supplementing Family Income.

UNIT V

- a. Family Expenditure – Heads of expenditure;
- b. Budget – Steps in Budgeting, Budgets for Different Income Levels, Factors influencing Family Budget
- c. Savings – Importance, Benefits of Savings, Modes of saving in India – Advantages & Risks

PRACTICAL:

1. Decision making – technique of decision tree
2. Time norm – for any two activities
3. Work norm – for any two activities
4. Study of peak load of selected career women/full time home makers through personal interview
5. Study of work simplification by using a) process chart b) pathway chart
6. Study of fatigue experienced by women through personal interview
7. Study of economic goals of selected home makers from beginning, expanding and contracting stages of family life cycle.
8. Planning of budget for different income levels.
9. Study of different modes of savings – visit to post office/banks to know

SEMESTER IV

HSC - 406 HOME SCIENCE EXTENSION AND COMMUNITY DEVELOPMENT

Theory: 4Hours/Week
Practicals: 2 Hours/Week

THEORY

Unit 1 Program Planning

- Definition, Objectives and Principles of Program Planning in Extension
- Steps in Program Planning
- Evaluation – Principles, methods of evaluating individual and group performances.
- Methods to find out felt and unfelt needs of the community.

Unit-II Lesson Planning

- Characteristics of good lesson plan – Pre-requisites and components of lesson planning.
- Planning lessons for a specific groups – Women and Children
- Different topics for lesson plans – Swatcha Bharath, Nutrition and health education.

Unit-III Community Types and Their Characteristics

- Features of Rural community
- Features of Urban community
- Features of Tribal community

Unit-IV Community Development

- Community Development – Definition, Scope objectives – Role of Functionaries
 - Panchayat Raj Systems in India (brief) – Meaning, Definition, Democratic Decentralization
 - Five tier system of Panchayat Raj – Village Panchayath –Functions
- Mandal Parishath – Seven Committees (Planning, Production etc.,) Functions
- ZillaParishath – Committees, Functions- District, State and central level

- Extension organization in Panchayath raj set-up
- Concept of Welfare State, Directive Principles

Unit- V Government and Non-Governmental Organizations

- Government and Non- Governmental Organizations-Meaning and definition
- Role of organizations (Government and Voluntary) for the development of people
- International Agencies – WHO, CARE, UNICEF,
- National and Voluntary Agencies – ICDS, RASS, KVK, DWCRA, MEPMA
- Local Level Voluntary Agencies, people’s organizations at grass roots – PASS

PRACTICALS

1. Plan an activity to create awareness among women and children of community surveyed according to their needs and interests - Lecture cum group discussion
2. Field Visits – Mandal Office, ICDS, Mahila Pranganam, PASS organization
3. Community development – Need based group project work.

SEMESTER -V

Course 16 C: FOOD QUALITY CONTROL AND ASSURANCE

- Unit – I** Food Quality – Definition- Food Quality and its need in food industry - Food Quality control objectives- Importance – Functions of quality control – Stages of quality control in Food industry- Methods of quality control – Quality attributes- Classification of quality attributes.
- Unit – II** Food quality assurance: Theoretical and practical considerations, description of different systems: GAP, GMP, TQM, ISO, Indian Food Standards – Voluntary and Obligatory Standards (PFA, FPO, MMPO, BIS, AGMARK etc) Codex Alimentarius, WHO, Worldwide Food Safety issues. Fair Average Quality (FAQ) specification for food grains, ISO 9000 series.
- Unit – III** Sensory evaluation: Requirements and methods –Sensory parameters: Colour, flavour, texture, Taste, aroma, general and overall acceptability –Subjective and objective test of sensory parameters (Differential test, Rating test, Sensory threshold test)(Employability)
- Unit – IV** Quality assessment of Food materials i.e. Cereals, Pulses, Fruits, Vegetables products – selection method, Food Standards- Food packaging and labelling methods
- Unit – V** Quality assessment of Food materials i.e. Meat, Poultry, Egg, Processed food products- selection method, Food Standards- Food packaging and labelling methods

Practical Syllabus

1. Sensory and instrumental methods for measuring food sensory attributes.
2. Selection and training of sensory panel
3. Assessment of sensory evaluation of foods by Hedonic scale
4. Quality assessment of cereals
5. Quality assessment of fruits and vegetables
6. Quality assessment of meat, poultry and other processed products.

7. Quality assessment of dairy products.

8. Quality assessment of Processed food products

9. Visit to food testing lab and writing report on quality assessment of different foods

10. Visit to food processing industry to study the quality measures undertaken by them.

SEMESTER - V

Course 17 C: FOOD SAFETY, SANITATION AND HYGIENE

Theory Syllabus

Unit – I Food safety- Definition, Meaning - factors affecting food safety - importance of food safety - Risks and hazards - Food related hazards - microbial consideration in food safety- Food safety and standards bill 2005

Unit – II Basic principles of Food hygiene and Sanitation - Personal and environmental Hygiene – Hygiene aspects of Food handlers- Hygiene aspects in preparation and storage of food - dish washing and garbage disposal- Safety of leftover foods Methods of sanitation and hygiene

Unit – III Food Adulteration and Adulterants: Meaning, Methods to identify the presence of adulterants-Types of adulteration in various foods-Intentional, incidental and metallic contaminants - Consequences of adulteration

Unit – IV Safety in Food processing –Regulatory compliance requirement for establishment of food outlets - Frame work for enabling environment for serving safe and nutritious food at food establishment or outlets. Sterilization and disinfection using heat and chemicals – Solid and liquid waste management and disposal.

Unit –V Objectives of developing Food Safety and Standards- Enforcement of structure and procedure - Role of food analyst- good practices- statutory and regulatory requirements - Certification - HACCP, ISO-22000, FSSC-22000

Practical Syllabus

1. Detection of common adulterants in foods

2. Bacteriological analysis of water

3. Microbiological examination of different food samples.

4. Assessment of personal hygiene

5. Assessment of surface sanitation by swab/ rinse method

6. Scheme for detection of food borne pathogens

7. Market survey of preserved fruits and vegetable products.

8. Demonstration of safe food handling procedure

9. Visit to Food Service Centre-Hotel/Fast food centre to study the food safety measures and report writing

10. Visit to Food service Institution- Hostel /Hospital to study the food safety, hygiene & sanitation measures and report writing

SEMESTER-V

Course – 18 C: Guidance and Counselling

I. Syllabus -Theory

Unit 1- Guidance and Counselling

- Meaning and scope
- Need and Importance of Guidance and Counselling
- Principles of Guidance and counselling.
- Types of Guidance- Educational, Vocational, and Personal Guidance

Unit 2-Counselling Types and Techniques

- Goals of counselling
- Types of Counselling— Education, Vocation, Social, Health, Personal, Marital, Family.
- Different types of counselling Techniques - Directive, Non-directive, Eclectic
- Stages of Counselling- Beginning, Middle and Ending phase

Unit 3- Counselling Process and Skills(Employment & Entrepreneurship)

- Process of Counselling- physical setting – Establishing the relationship – conducting counselling interview – Problems involved – Termination of counselling.
- Skills in Counselling- (listening, questioning, responding)-Diagnostic, Exploration, Relationship, Understanding, Action, Attending/ Listening Skills, Group process and Evaluation skills

Unit 4- Counselor Role, characteristics and ethics

- Role of a Counsellor - As a communication expert, inhibitor, trainer, facilitator, an idol, a teacher, and a supporter.
- Characteristics of an effective counsellor
- Confidentiality and ethics in counselling

Unit V- Counselling children and adolescents(Employment & Entrepreneurship)

- Counselling children with behavioural and emotional problems
- Counselling Parent of children with special needs
- Counselling Adolescents with problems- delinquents and addicts

II. Practical Syllabus

1. Explore and lists out various interest inventory and aptitude tests used for personal, educational and vocational guidance.
2. Group discussion and listing of problems faced by them and categories the problems in following categories - Personal/ Social/ Academic, Health etc.
3. Collection of case study of children with special need and prepare a report.
4. Collection of case study of children with problem from electronic and print media.
5. Collection of case study of adolescents with problem from electronic and print media.
6. Simulation exercises/Mock session/ Role play as counsellor and counsellee by taking above case studies– children/adolescents
7. Simulation exercises/Mock session/ Role play as counsellor and counsellee by taking above case studies– Adult/ Parent
8. Visit to a guidance and counselling center

SEMESTER-V

Course- 19 C: Education and Counselling For Parents and Community

I. Syllabus -Theory

Unit-I Parent education –Need, aspects, Types of parent education. Parents as - stake holders, planners, advisers, volunteers, and resource persons.

Unit-II Community education – Fundamental principles of community. Community education with reference to education Health, rights of children, child rearing socialization in various socio-cultural settings.(Skill & Employment)

Unit-III Techniques of Parent and community Education- Informal meeting, group and individual meetings Use of audio visual aids. Organizing parent and community programmes –school, community centers, Recreation centers, Youth clubs and other NGO's.

Unit-IV Role of professional, Contribution of professionals in parent and community education, Training programmes for young parents. Evaluation of parent and community education programmes

Unit-V Methods of Parent Education and Counseling- Strategies and Management skills for parents to deal with normal children. Children of developmental delays and disabilities. Counselling parents of Children with Special Needs.

II. Practical Syllabus

1. Study various methods of parent and community education.
2. Visit to local community for identifying parents of normal and exceptional children,
3. Conducting case studies on parents of normal children.(Skill)
4. Conducting case studies on parents of exceptional children.
5. Identification of areas and issues for parent education.
6. Developing parent education programmes.
7. Planning, conducting and evaluating parent education programmes.
8. Conducting awareness among the community regarding counselling centres.

SEMESTER-V
Course 20 A: INTERIOR DESIGN AND DECORATION

I. Syllabus –Theory

- Unit - 1** Introduction to interior design -goals, Design – definition, classification, requirements, elements of design – line, form, texture, value, size, direction, color
- Unit - 2** Principles of Art – Harmony, Balance, Proportion, Rhythm, Emphasis – methods of obtaining in interiors, importance.
- Unit - 3** Color in interiors – Importance, Classification, Prang’s color system – hue, value and intensity, color harmonies – classification and application(Skill)
- Unit 4** Furniture and Furnishings
- A. Furniture – styles, selection and arrangements of furniture for interiors.
 - B. Furnishings – classification, selection of furnishings, window treatment – types of curtains/draperies.
- Unit 5**
- A. Accessories – Importance, classification
 - B. Flower Arrangement – Importance, styles, classification, care of cut flowers.
 - C. Plants as accessories – Bonsai, Indoor plants – selection and care.

II. Practical Syllabus

1. Elements of Design and types of design – naturalistic, stylized, geometric and abstract
2. Structural and decorative design – requirements and critical evaluation of art objects
3. Art principles – harmony, balance, proportion, rhythm and emphasis – sketching to illustrate application in interiors.
4. Color and color harmonies – application in interior
5. Introduction to AutoCAD
6. Setting up a drawing – tools, commands
7. Isometric drawings
8. Designing using AutoCAD – Furniture, Interiors, Floor plans/layouts/elevations
9. 3D drawing in AutoCAD.

Course 21 A : TEXTILE DESIGN

I. Syllabus- Theory

Unit- 1 Introduction to textile design

Elements of design, principles of design, classification of methods by which design is obtained in fabric – structural and surface designs

Unit - 2 Structural designs in fabrics

A. Basic weaves – plain weave and variations, twill weave and variations, satin weave and sateen weave – features, identification

B. Decorative weaves – jacquard weave, dobby weave, swivel weave, lappet weave, pile weave, leno weave – features, identification

Unit - 3 Surface design on fabrics(Entrepreneurship)

A. Dyeing – preparation of fabric, classification of dyes, mode of action and application for various fibres and fabrics

B. Printing – preparation of fabric, printing paste, printing on fabric, printing methods – block printing, screen printing, roller, stencil, spray, digital, tie & dye and batik printing

Unit- 4 Traditional textiles of India

Importance, traditional textiles and embroideries of India – origin, fabrics of different states of India – motifs used, typical colors and fabrics used for – Dacca Muslins, Benaras Brocades, Chanderi, Kanthas of Bengal, Kasuti of Karnataka, Chikankari of Lucknow, Kashida of Kashmir, Phulkari of Punjab, Pipli of Orissa.

Unit- 5 Traditional Textiles of India

Dyed, Printed and Painted Textiles – History, Significance, Typical designs & fabrics used for

- a. Bandini/Bandhej of Gujarat & Rajasthan, Patolas, Ikkats, Telia Rumal, Pochampalli
- b. Kalamkari of Andhra Pradesh
- c. Block Printing, Stencil printing, Batik.

Course 21 A: TEXTILE DESIGN Practical Syllabus

II. Practical Syllabus:

1. Design Modification to suit different surfaces/ uses
2. Preparation of Dye Paste/Dye Solution for Dyeing & Printing
 - a. Tie & Dye
 - b. Block Printing
 - c. Batik (Demonstration/Field Visit)
3. Preparation of Samples of Traditional Embroidery -Kanthas, Pipli, Chikankari
4. Study and practice of Typical Designs used in Traditional Embroidery and printing in India
5. Market Survey to know availability of Traditional Textiles in local market
6. Survey to know the Awareness about Traditional Textiles and Embroidery among youth and adults.

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DEPARTMENT OF ZOOLOGY & AQUACULTURE TECHNOLOGY

AQUACULTURE TECHNOLOGY

Skill Development, Employability and Entrepreneurship

2022-2023



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AQUACULTURE TECHNOLOGY SEMESTER: I PAPER-I (2022-2023)
BASIC PRINCIPLES OF AQUACULTURE

Credits: 4

Hrs/Wk:4

Course Outcomes: By the completion of the course the graduate should able to –

- Describe the concept of blue revolution and different aqua culture systems
- Explain the pond ecosystem
- Describe the different types of fish ponds
- Explain the steps of pond preparation
- Describe the pond management practices

Learning objectives:

- To understand the concept of blue revolution and different aqua culture systems.
- To understand the pond ecosystem.
- To understand the different types of fish ponds.
- To understand steps of pond preparation.
- To understand the pond management practices

UNIT I: INTRODUCTION:

1.1. Concept of Blue Revolution - History and definition of Aquaculture. Scope of Aquaculture at global Level, India and Andhra Pradesh

1.2. Different Aquaculture systems – Pond, Cage, Pen, Running water, Extensive, Intensive and & Semi-Intensive Systems and their significance.

1.3. Monoculture, Polyculture and Monosex culture systems

UNIT II: POND ECOSYSTEM

21 General Concepts of Ecology, Carrying Capacity and Food Chains

22 Lotic and lentic systems, streams and spring

23 Nutrient Cycles in Culture Ponds – Phosphorus, Carbon and Nitrogen

Importance of Plankton and Benthos in culture ponds, nutrient dynamics and algal blooms

24 Concepts of Productivity, estimation and improvement of productivity

UNIT III: TYPES OF FISH PONDS

- 3.1 Classification of ponds based on water resources – spring, rain water, flood water, well water and water course ponds
- 3.2 Functional classification of ponds – head pond, hatchery, nursery ponds
- 3.3 Functional classification of ponds -rearing, production, stocking and quarantine ponds
- 3.4 Fish Hatchery design

UNIT IV: POND PREPARATION

- 4.1 Important factors in the construction of an ideal fish pond – site selection, topography
- 4.2 Important factors in the construction of an ideal fish pond- nature of the soil, water resources
- 4.3 Lay out and arrangements of ponds in a fish farm
- 4.4 Construction of an ideal fish pond – space allocation, structure and components of barrage pond

UNIT V: POND MANAGEMENT FACTORS

- 5.1 Need of fertilizer and manure application in culture ponds
- 5.2 Role of nutrients; NPK contents of different fertilizers and manures used in aquaculture; and precautions in their application
- 5.3 Physico-chemical conditions of soil and water optimum for culture –temperature, depth, turbidity, light, water and shore currents, PH, DOD, CO₂ and nutrients; measures to increase oxygen and reduce ammonia & hydrogen sulphide in culture ponds; correction of PH
- 5.4 Eradication of predators and weed control – advantages and disadvantages of weed, weed plants in culture ponds, aquatic weeds, weed fish, toxins used for weed control and control of predators

ADDITIONAL INPUTS:

1. Status of aquaculture in Andhra Pradesh
2. Importance of Aquaculture
3. Awareness on entrepreneurship and employment opportunities in aquaculture sector

PRESCRIBED BOOKS:

1. Jhingran VG 1998. Fish and Fisheries of India. Hindusthan Publishing Corporation, New Delhi
2. Pillay TVR, 1996. Aquaculture Principles and Practices, Fishing News Books Ltd., London

REFERENCES BOOKS:

1. Pillay TVR & M.A.Dill, 1979. Advances in Aquaculture. Fishing News Books Ltd., London
2. Stickney RR 1979. Principles of Warm Water Aquaculture. John Wiley & Sons Inc. 1981
3. Boyd CE 1982. Water Quality Management for Pond Fish Culture. Elsevier Scientific Publishing Company.
4. Bose AN et.al., 1991. Coastal Aquaculture Engineering. Oxford & IBH Publishing Company Pvt.Ltd.

BASIC PRINCIPLES OF AQUACULTURE LAB

Credits: 1

Hrs/Wk:2

PRACTICALS:

- 1. Estimation of Carbonates, Bicarbonates in water samples**
- 2. Estimation of Chlorides in water samples**
- 3. Estimation of dissolved oxygen**
- 4. Estimation of ammonia in water**
- 5. Field visit to nursery, rearing and stocking ponds of aqua farms**
- 6. Field visit to hatchery**
- 7. Study of algal blooms and their control**
- 8. Collection & identification of zooplankton and phytoplankton**
- 9. Study of aeration devices**
- 10. Determination of soil nitrogen and phosphorus**
- 11. Collection and study of aquatic weeds**
- 12. Field survey of nearby habitat for dietary dependency on and requirement of aqua- products**

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AQUACULTURE TECHNOLOGY SEMESTER: II PAPER-II (2022-2023)
BIOLOGY OF FIN FISH & SHELL FISH
Credits: 4 Hrs/Wk:4

Course Outcomes: By the completion of the course the graduate should able to –

- Describe the general characters and classification of cultivable fishes.
- Explain the food, feeding and growth of fish.
- Describe the reproductive biology of fishes.
- Explain the parental care and development of fishes.
- Describe the parental care and development of fishes

Learning objectives:

- To understand the general characters and classification of cultivable fishes
- To understand the food, feeding and growth of fish.
- To understand the reproductive biology of fishes.
- To understand the parental care and development of fishes.
- To understand the parental care and development of fishes

UNIT I: General Characters & Classification of Cultivable Fin & Shell Fish:

1.1 General Characters and classification of fishes, crustaceans and molluscs up to the level of Class.

1.2 Fish, Crustaceans and Molluscs of commercial importance

1.3 Sense organs of fishes, crustaceans and molluscs

1.4 Buoyancy in fishes- swim bladder and mechanism of gas secretion

UNIT II: Food, Feeding and Growth:

2.1 Natural fish food, feeding habits, feeding intensity, stimuli for feeding, utilization of food gut content analysis, structural modifications in relation to feeding habits, forage ratio and food selectivity index

2.2 Principles of Age and growth determination; growth regulation, Growth rate measurement – scale method, otolith method, skeletal parts as age indicators

2.3 Genetic, biotic & ecological factors in determining the longevity of fishes, length-

frequency method, age composition, age-length keys, absolute and specific growth, back calculation of length and growth, annual survival rate, asymptomatic length, fitting of growth curve

2.4 Length-weight relationship, condition factor/Ponderal index, relative condition factor

UNIT III: Reproductive Biology:

3.1 Breeding in fishes, breeding places, breeding habits & places

3.2 Breeding in natural environment and in artificial ponds, courtship and reproductive cycles

3.3 Induced breeding in fishes

3-4 Breeding in shrimp, pearl oyster, pila, and cephalopods

UNIT IV: Development:

4.1 Parental care in fishes, ovo-viviparity, oviparity, viviparity, nest building and brooding

4.2 Embryonic and larval development of fishes

4.3 Embryonic and larval development of shrimp, crabs and molluscs of commercial importance

4.4 Environmental factors affecting reproduction and development of cultivable aquatic fin & shell fish

UNIT V: Hormones & Growth

5.1 Endocrine system in fishes

5.2 Neurosecretary cells, androgenic gland, ovary,

5.3 Y-organ, chromatophores, pericardial glands and cuticle.

5.4 Molting, molting stages, metamorphosis in crustacean shell fish

ADDITIONAL INPUTS:

1. Migration in fishes

3. Reproduction in fishes

PRESCRIBED BOOKS:

1. Bone Q et al., 1995. Biology of fishes, Blackie academic & professional, LONDON
2. Saxena AB 1996. Life of Crustaceans. Anmol Publications Pvt.Ltd., New Delhi

REFERENCES BOOKS:

1. Tandon KK & Johal MS 1996. Age and Growth in Indian Fresh Water Fishes. Narendra Publishing House, New Delhi.
2. Raymond T et al., 1990. Crustacean Sexual Biology, Columbia University Press, New York
3. Guiland J.A (ed) 1984. Penaeid shrimps- Their Biology and Management.
4. Barrington FJW 1971. Invertebrates: Structure and Function. ELBS
5. Parker F & Haswell 1992. The text book of Zoology, Vol I. Invertebrates (eds. Marshal AJ & Williams). ELBS & Mc Millan & Co.

BIOLOGY OF FIN FISH & SHELL FISH LAB

Credits: 1

Hrs/Wk:2

PRACTICALS:

- 1. Study of mouth parts in herbivorous and carnivorous fishes**
- 2. Comparative study of digestive system of herbivorous and carnivorous fishes**
- 3. Length-weight relationship of fishes**
- 4. Gut content analysis in fishes and shrimp**
- 5. Mouth parts and appendages of cultivable prawns, shrimps and other crustaceans**
- 6. Study of eggs of fishes, shrimps, prawns and other crustaceans**
- 7. Study of oyster eggs**
- 8. Embryonic and larval development of fish**
- 9. Study of gonadal maturity and fecundity in fishes and shellfish**
- 10. Observation of crustacean larvae**
- 11. Observation of molluscan larvae**
- 12. Study of nest building and brooding of fishes**

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AQUACULTURE TECHNOLOGY SEMESTER: III PAPER-III (2022-2023)
FISH NUTRITION & FEED TECHNOLOGY
Credits: 4 Hrs. /Wk.: 4

Course Outcomes: By the completion of the course the graduate should able to–

- Describe the nutritional requirements of cultivable fishes
- Explain the different types of feed and feeding methods of fish
- Describe the techniques of fish feed manufacturing and storage methods
- Explain the concept of fish feed additives, non-nutrient ingredients.
- Describe the different nutritional deficiency symptoms of fish

Learning objectives

- To understand the nutritional requirements of cultivable fishes.
- To understand the different types of feed and feeding methods of fish.
- To understand the techniques of fish feed manufacturing and storage methods.
- To understand the concept of fish feed additives, non-nutrient ingredients.
- To understand the different nutritional deficiency symptoms of fish.

UNIT I: Nutritional Requirements of Cultivable Fish:

- 1.1 Requirements for energy, proteins, carbohydrates, lipids, fiber, micronutrients for different stages of cultivable fish and prawns
- 1.2 Essential amino acids and fatty acids, protein to energy ratio, nutrient interactions and protein sparing effect
- 1.3 Dietary sources of energy, effect of ration on growth, determination of feeding rate, check tray
- 1.4 Factors affecting energy partitioning and feeding

UNIT II: Forms of Feeds & Feeding Methods:

- 2.1 Feed conversion efficiency, feed conversion ratio and protein efficiency ratio
- 2.2 Wet feeds, moist feeds, dry feeds, mashes, pelleted feeds, floating and sinking pellets, advantages of pelletization

2.3 Manual feeding, demand feeders, automatic feeders, surface spraying, bag feeding and tray feeding

2.4 Frequency of feeding

UNIT III: Feed Manufacture & Storage:

3.1 Feed ingredients and their selection, nutrient composition and nutrient availability of feed ingredients

3.2 Feed formulation – extrusion processing and steam pelleting, grinding, mixing and drying, pelletization, and packing

3.3 Water stability of feeds, farm made aqua feeds, micro-coated feeds, micro-encapsulated feeds and micro-bound diets

3.4 Microbial, insect and rodent damage of feed, chemical spoilage during storage period and proper storage methods

UNIT IV: Feed Additives & Non-Nutrient Ingredients:

4.1 Binders, anti-oxidants, probiotics

4.2 Feed attractants and feed stimulants

4.3 Enzymes, hormones, growth promoters and pigments 4.4 Anti-metabolites, aflatoxins and fiber

UNIT V: Nutritional Deficiency in Cultivable Fish:

5.1 Protein deficiency, vitamin and mineral deficiency symptoms

5.2 Nutritional pathology and ant-nutrients

5.3 Importance of natural and supplementary feeds,

5.4 Importance of balanced diet

Additional Inputs:

Nutritional Values of Different Prawn Feed Ingredients

PRESCRIBED BOOKS:

1. HALVER JE 1989. Fish nutrition. Academic press, San diego

REFERENCES:

1. Lovell rt 1998. Nutrition and feeding of fishes, Chapman & Hall, New York
2. Sena de silva, trevor a anderson 1995. Fish nutrition in aquaculture. Chapman & Hall, New York

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AQUACULTURE TECHNOLOGY SEMESTER: III PAPER-III (2022-2023)
FISH NUTRITION & FEED TECHNOLOGY LAB

Credits: 1

Hrs/Wk:2

PRACTICALS:

1. Estimation of protein content in aquaculture feeds
2. Estimation of carbohydrate content in aquaculture feeds
3. Estimation of lipid content in aquaculture feeds
4. Estimation of ash in aquaculture feed
5. Study of water stability of pellet feeds
6. Feed formulation and preparation in the lab
7. Study of binders used in aquaculture feeds
8. Study of feed packing materials
9. Study of physical and chemical change during storage
10. Study on physical characteristics of floating and sinking feeds
11. Visit to a aqua-feed production unit
12. Visit to a farm for studying feeding practices

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**AQUACULTURE TECHNOLOGY SEMESTER: XIII PAPER-III (2022-
FRESH WATER & BRACKISH WATER AQUACULTURE**

Credits: 4

Hrs. /Wk.: 4

Course Outcomes: By the completion of the course the graduate should able to –

- Describe the prospects and scope of fresh water aquaculture at various levels
- Explain the practices involved in carp culture
- Describe the culture of cold water and air breathing fish
- Explain the culture practices of prawn.
- Describe the culture of different brackish water species

Learning objectives:

- To understand the prospects and scope of fresh water aquaculture at various levels.
- To understand the practices involved in carp culture.
- To understand the culture of cold water and air breathing fish.
- To understand the culture practices of prawn.
- To understand the culture of different brackish water species

UNIT I: Introduction to Freshwater Aquaculture

1.1 Status, scope and prospects of fresh water aquaculture in the world, India and AP

1.2 Different fresh water aquaculture systems

UNIT II: CARP Culture:

2.1 Major cultivable Indian carps – *Labeo, Catla and Cirrhinus* & Minor carps

2.2 Exotic fish species introduced to India – *Tilapia, Pangassius and Clariussp.*

2.3 Composite fish culture system of Indian and exotic carps

2.4 Impact of exotic fish, Compatibility of Indian and exotic carps and competition among them

UNIT III: Culture of Air-Breathing and Cold Water Fish

3.1 Recent developments in the culture of *Clarius, Anabas, Murrels,*

3.2 Advantages and constraints in the culture of air-breathing and cold water fishes-

seed resources, feeding, management and production

3.3 Special systems of Aquaculture- brief study of culture in running water, recirculatory systems, cages and pens, sewage-fed fish culture

UNIT IV: Culture of Prawn

4.1 Fresh water prawns of India - commercial value

4.2 *Macrobrachium rosenbergii* and *M. Malcomsonii* – biology, seed production,

4.3 Pond preparation, stocking, management of nursery and grow-out ponds, feeding, and harvesting

UNIT V: Culture of Brackishwater Species

5.1 Culture of *P. mondon* – Hatchery technology and Culture practices including feed and disease management

5.2 Culture of *L. vannamei* – hatchery technology and culture practices including feed and disease management.

5.3 Mixed culture of fish and prawns

Additional Inputs: Minerals and Supplements in *Litopenaeus Vannamei* Culture

PRESCRIBED BOOKS:

1. Jhingran VG 1998. Fish and Fisheries of India. Hindusthan Publishing Corporation, New Delhi

REFERENCES BOOKS:

1. Santharam R, N Sukumaran and P Natarajan 1987. A manual of aquaculture, Oxford- IBH, New Delhi
2. Srivatsava 1993. Fresh water aquaculture in India, Oxford-IBH, New Delhi
3. Marcel H 1972. Text book of fish culture. Oxford fishing news books.

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AQUACULTURE TECHNOLOGY SEMESTER: IV PAPER-IV (2022-2023)

FRESH WATER & BRACKISH WATER AQUACULTURE LAB

Credits: 1

Hrs. /Wk.: 2

PRACTICALS:

1. Identification of important cultivable carps
2. Identification of important cultivable air-breathing fishes
3. Identification of important cultivable fresh water prawns
4. Identification of different life history stages of fish
5. Identification of different life history stages of fresh water prawn
6. Collection and study of weed fish
7. Identification of commercially viable crabs – *Scylla cerrata*, *Portunus pelagicus*, *P.sanguinolentus*, *Neptunus pelagicus*, *N. Sanguinolentus*
8. Identification of lobsters – *Panulirus polyphagus*, *P.ornatus*, *P.homarus*, *P.sewelli*, *P.penicillatus*
9. Identification of oysters of nutritional significance *Crossostrea madrasensis*, *C.gryphoides*, *C. cucullata*, *C.rivularis* , *Picnodonta*
10. Identification of mussels and clams
11. Identification of developmental stages of oysters
12. Field visit to aqua farm and study of different components like dykes etc.

ASD GOVT. DEGREE COLLEGE FOR WOMEN (A)
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Jagannaickpur, Kakinada, East Godavari, AP – 533002

AQUACULTURE TECHNOLOGY SEMESTER: IV PAPER-V (2022-2023)

FISH HEALTH MANGEMENT & FISHERIES ECONOMICS

Credits: 4

Hrs./Wk.: 4

Course Outcomes: By the completion of the course the graduate should able to –

- Describe the diseases of fin fish
- Explain the diseases of shell fish
- Describe the fish health management strategies
- Explain different fisheries economic policies
- Describe the various schemes for the welfare of fishermen community

Learning objectives:

- To understand the diseases of fin fish
- To understand the diseases of shell fish.
- To understand the fish health management strategies.
- 4. To understand the different fisheries economic policies .
- To understand the various schemes for the welfare of fishermen community

UNIT I: Diseases of Fin Fish

- 1.1 Fungal diseases– Saprolegniosis, brachiomyxosis, ichthyophorus diseases – Lagenidium diseases – Fusarium disease, prevention and therapy
- 1.2 Viral diseases – Emerging viral diseases in fish, haemorrhagic septicemia, spring viremia of carps, infectious hematopoietic necrosis in trout, infectious pancreatic necrosis in salmonids, swim-bladder inflammation in cyprinids, channel cat fish viral disease, prevention and therapy
- 1.3 Baterial diseases – Emerging bacterial diseases, Aermonas, Pseudomonas and vibrio infections, columnaris, furunculosis, epizootic ulcerative syndrome, infectious abdominal dropsy, bacterial gill disease, enteric red mouth, bacterial kidney disease, proliferative kidney disease, prevention and therapy

UNIT II: Diseases of Shell Fish

- 21 Major shrimp viral diseases – Baculovirus penaei, Monodon Baculovirus, Baculoviral midgut necrosis, Infectious hypodermal and haematopoietic necrosis virus, Hepatopancreatic parvo like virus, Yellow head baculovirus, white spot baculovirus.
- 22 Bacterial diseases of shell fish – Aeromonas, pseudomonas and vibrio infections, luminous bacterial disease, filamentous bacterial disease. Prevention and therapy
- 23 Protozoan diseases- Ichthyophthiriasis, Costiasis, whirling diseases, trypanosomiasis. Prevention and therapy

UNIT III: Fish Health Management

- 31 **Diagnostic tools – immune detection- DNA/RNA techniques**, General preventive methods and prophylaxis. Application and development of vaccines.
- 32 Quarantine – Significance, methods and regulations for transplants.
- 33 Good Feed management for healthy organisms, Zero water exchange, Probiotics in health management, Issues of biosecurity.

UNIT IV: Fisheries Economics- I

4.1 Methods of economic analysis of business organizations

4.2 Aquaculture economics- application of economics principles to aquaculture operations Various inputs and production function laws of variable proportions

4.3 Cost and earnings of aquaculture systems – carp culture, shrimp farming systems,

UNIT V: Fisheries Economics- II

5.1 Socio-economic conditions of fishermen in Andhra Pradesh

5.2 Role of Matsyafed and NABARD in uplifting fishermen's conditions, fishermen cooperatives
Contribution of fisheries to the national economy

5.3 Economic analysis preparation of project and project appraisal

ADDITIONAL INPUTS:

1. **Early Mortality Syndrome (EMS)**
2. **Enterocytozoon Hepatopenaei of Shrimp (EHP)**
3. **White Fees Syndrome (WFS)**

PRESCRIBED BOOKS:

1. Shaperclaus W. 1991 Fish Diseases- Vol.I & II. Oxonian Press Pvt.ltd
2. Roberts RJ 1989. Fish pathology. Bailliere Tindall, New York
3. Lydia Brown 1993. Aquaculture for veterinarians- fish husbandry and medicine. Pergamon Press. Oxford
4. Jayaraman R 1996. Fisheries Economics. Tamilnadu Veterinary and Animal Science University. Tuticorn
5. Subba Rao N 1986. Economics of Fisheries. Daya publishing house, Delhi

REFERENCES BOOKS:

1. Shankar KM & Mohan CV. 2002. Fish and Shellfish Health Management. UNESCO Publ. Sindermann CJ. 1990
2. Walker P & Subasinghe RP. (Eds.). 2005 Principal Diseases of Marine Fish and Shellfish. Vols. I, II. 2nd Ed. Academic Press
3. DNA Based Molecular Diagnostic Techniques: Research Needs for Standardization and Validation of the Detection of Aquatic Animal Pathogens and Diseases. FAO Publ. Wedmeyer G, Meyer FP & Smith L. 1999.
4. Bullock G et.al., 1972 Bacterial diseases of fishes. TFH publications, New Jersey
5. Post G 1987. Text book of Fish Health. TFH publications, New Jersey
6. Johnson SK 1995. Handbook of shrimp diseases. Texas A & M University, Texas
7. Dewwett KK and Varma JD 1993. Elementary economic theory. S.chand, NewDelhi
8. Korakandy R 1996. Economics of Fisheries Mangement. Daya Publishing House, Delhi
9. Tripathi SD 1992. Aquaculture Economics. Asian Fisheries Society, Mangalore

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Jagannaickpur, Kakinada, East Godavari, AP – 533002

AQUACULTURE TECHNOLOGY SEMESTER: IV PAPER-V (2022-2023)

FISH HEALTH MANGEMENT & FISHERIES ECONOMICS LAB

Credits: 1

Hrs. /Wk.: 2

PRACTICALS:

1. Enumeration of Bacteria by TPC Method
2. Enumeration of total Coliforms
3. Observation of gross pathology and external lesions of fish and prawn with reference to the common diseases in aquaculture
4. Examination of pathological changes in gills and gut lumen, lymphoid organ, muscles and nerves of fish
5. Examination of pathological changes in gut lumen, hepatopncreas, lymphoid organ, muscles and nerves of prawn and shrimp
6. Collection, processing and analysis of data for epedemeiological investigations of viral diseases
7. Bacterial pathogens – isolation, culture and characterization
8. Identification of parasites in fishes: Protozoan, Helmiths, Crustaceans
9. Antibigrams – preparation and evaluation
10. Molecular and immunological techniques; Biochemical tests; PCR; ELISA; Agglutination test; Challenge tests; Purification of virus for development of vaccines (Demonstration at institutes/labs)
11. Estimation of dose, calculation of concentration, methods of administration of various chemotherapeutics to fish and shell fish
12. Estimation of antibiotics used in aquaculture practices
13. Estimation of probiotics used in aquaculture
14. Field visit to farm for health monitoring and disease diagnosis
15. Cost benefit analysis calculations

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AQUACULTURE TECHNOLOGY SEMESTER: V PAPER-6A (2022-2023)

SOIL AND WATER QUALITY MANAGEMENT

Credits: 4

Hrs. /Wk.: 4

Learning Outcomes:

Students after successful completion of the course will be able to:

1. Know various types of soil and their properties
2. Monitor and manage optimum water quality parameters in fish/shrimp culture ponds
3. Maintain the soil and water quality by using required dose of lime, manures and fertilizers for optimum yields in culture ponds
4. Acquire knowledge on advanced technologies for improving water quality
5. Demonstrate skills related to chemical treatments for combating soil and water quality problems in aquaculture farms.

Syllabus: *(Total Hours: 90 including Teaching, Lab, Field Training and Unit tests, etc.)*

UNIT I: Soil quality

(10h)

1. Soil types and their distribution. Physical and chemical properties of soil: Soil colour, texture, structure, pore space, bulk density, and water holding capacity; Conductivity, pH, redox potential, soil salinity, calcium carbonate, organic carbon, available nitrogen, available phosphorus, Carbon-Nitrogen ratio, organic matter and soil fertility.
2. Properties of water logged soils, methane and hydrogen sulphide formation. Problem soils: Saline soils, Alkali soils, Acid sulphate soils (ASS), and their reclamation.
3. Pond Seepage and its control. Soil quality criteria/requirements for aquaculture.

UNIT II: Water quality

(10h)

1. Water quality parameters: Temperature, transparency, salinity, dissolved oxygen, carbon dioxide, pH, alkalinity, hardness, conductivity, ammonia, nitrites, nitrates, orthophosphates and hydrogen sulphide; phytoplankton, zooplankton and benthos.
2. Role of aquatic microorganisms in carbon, nitrogen, phosphorus and sulphur cycles.

3. Water quality criteria for freshwater and brackish water aquaculture.

UNIT III: Soil and Water amendments

(10h)

1. Liming: Liming materials, effects of liming on pond ecosystem, liming rates for ponds, calculation of lime requirements and application of liming materials to ponds.
2. Manures and Fertilizers: Types of manures and fertilizers, primary nutrients, micronutrients, fertilizer grades, quantity and method of application; Bio fertilizers.
3. Pond fertilization: Role of organic and inorganic fertilizers in aquaculture; Problems in ponds with indiscriminate fertilization.

UNIT IV: Pond water management

(10h)

1. Daily changes in dissolved oxygen concentration, oxygen depletion in ponds, Aeration, Water exchange, Bio-floc technology.
2. Water treatment, Water filtration devices, Waste water treatment practices, Waste discharge standards, Recirculatory aquaculture system (RAS).
3. Water quality management in freshwater carp culture; brackish water shrimp culture; and hatcheries.

UNIT V: Pond treatments

(10h)

1. Pond conditioners and Chemical treatments: Potassium permanganate, Hydrogen peroxide, Calcium hydroxide, Rotenone, Formalin and Malachite green. Methods of applying chemicals.
2. Reduction of pH; Control of turbidity, salinity, hardness and chlorides; Chlorine removal; Removal of toxic gases.
3. Control of algal blooms and aquatic weeds. Bioremediation: Soil and water probiotics for aquaculture ponds.

ADDITIONAL INPUTS: Classification of Aquatic weed plants

REFERENCES:

1. Boyd, C.E. (1982). Water Quality Management for Pond Fish Culture. Elsevier Sci. Publishing Co.
2. Boyd, C.E. and Tucker, C.S. (1992). Water Quality and Pond Soil Analyses for Aquaculture. Alabama Agricultural Experimental Station, Auburn University, USA.
3. Boyd, C.E. and Tucker, C.S. (2012). Pond aquaculture water quality management. Springer Science & Business Media.

4. ICAR. (2006). Hand Book of Fisheries and Aquaculture. ICAR.
5. MPEDA: Handbooks on culture of carp, shrimp, etc.
6. Training Manual on Recent advances in soil and water management in brackishwater aquaculture (2018). Saraswathy, R., Kumararaja, P., Lalitha, N., Suvana, S., SatheeshaAvunje, Muralidhar, M. (Eds.), CIBA-TM Series –No.8 (2nd Ed), ICAR–Central Institute of Brackishwater Aquaculture, Chennai, India pp.137.
7. Boyd, C.E. (1995). Soil and water quality management in aquaculture ponds. INFOFISH international, 5(95), 29-36.
8. Boyd, C.E. (1995). Bottom soils, sediment, and pond aquaculture. Springer Science & Business Media.
9. Pillay, T.V.R. and Kutty, M.N. (2005). Aquaculture- Principles and Practices. 2nd Ed. Blackwell
10. Dheendaran, K. (2008). *Aquatic Microbiology*, Daya Publ. House.
11. APHA, AWWA, WPCF. (1998). Standard Methods for the Examination of Water and Wastewater, 20th Ed. American Public Health Association, American Water Works Association and Water Pollution Control Federation, Washington, D.C.
12. Chattopadhyay, G.N. (1998). Chemical analysis of Fish Pond Soil and Water. Daya Publishing House, Delhi.
13. Ramadhas, V. and R. Santhanam (1996). A Manual of Methods of Seawater and Sediment analysis. Fisheries College & Research Institute, Tuticorin.
14. Adhikari, S and Chatterjee, D.K. (2008). Management of Tropical Freshwater Ponds. Daya Publication.
15. Boyd, C.E. (2003). Guidelines for aquaculture effluent management at the farm-level. Aquaculture, 226(1-4), 101-112.
16. Harry, O. Buckman and Nyle, C. Brady. (1963). The Nature and Properties of Soils. The Macmillan Company, New York.
17. Rajagopalsamy, C.B.T. and Ramadhas, V. 2002. Nutrient Dynamics in Freshwater Fish Culture System. Daya Publication.
18. Stickney, R.R. (1979). Principles of Warm water Aquaculture. John-Willey & sons Inc.
19. Sverdrup, H.V., Johnson, M.W. and Fleming, R.H. (1942). The Oceans: their physics, chemistry and general biology. Prentice Hall, Inc. New York.
20. *Web resources suggested by the teacher concerned and the college librarian including reading material.*

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AQUACULTURE TECHNOLOGY SEMESTER: V PAPER-6A (2022-2023)
Course 6A: SOIL AND WATER QUALITY MANAGEMENT LAB
Credits: 1 Hrs. /Wk.: 2

Practical Syllabus:

Skills Outcomes:

On successful completion of this practical course, student shall be able to:

1. Identify and handle various glassware, equipment and analytical instruments used for soil and water analyses.
2. Exhibit skills for preparing standard and working solutions for soil & water analyses.
3. Collect and analyze the physico-chemical and biological parameters of soil & water.
4. Calculate the dosages of lime and fertilizers required in ponds.
5. Apply the advanced techniques for quality improvement in ponds for better yields.

Practical Syllabus:

1. Demonstration of laboratory glassware and equipment used in water and soil analysis.
2. ePrinciples of Titrimetry, Gravimetry, Potentiometry, Conductometry, Refractometry, Colorimetry, Turbidimetry, Spectrophotometry (Vis, UV-Vis, Flame, Atomic Absorption Spectrophotometer (AAS)).
3. Solutions: Standard, and dilute solutions; units of concentration; standard curve.

Soil Analysis:

4. Collection and Processing of soil samples
5. Determination of Soil texture, pH, Redox potential and Conductivity.
6. Determination of Organic carbon, available nitrogen and available phosphorus.

Water Analysis:

7. Measurement of Temperature, Transparency, Turbidity, and Salinity of water.
8. Estimation of Dissolved oxygen, Free carbon dioxide, Total alkalinity and Total hardness in water.
9. Estimation of ammonia, nitrites, nitrates, and orthophosphates.
10. Collection and identification of phytoplankton, zooplankton and benthos

11. Calculation of doses of lime and fertilizers for ponds

12. Design and fabrication of different filters.

Co-Curricular Activities:

a) Mandatory:(Training of students by teacher on field related skills: 15 hours)

1. **For Teacher:** Training of students by teacher in laboratory and field for a total of 15 hours on handling and operation of glassware, equipment and instruments; preparation of standard and working solutions, and standard curves; collection and processing of soil and water samples in the field; estimation of physico-chemical parameters of soil and water; collection and identification of plankton and benthos; calculation of doses for pond liming and fertilization; and design and fabrication of water filtering devices.
2. **For Student:** Individual visit to a local fish/ shrimp farms and hatcheries or to a laboratory in college/university/research organization/private sector and study the soil and water quality. Submission of a hand-written Fieldwork Report not exceeding 10 pages in the given format.
3. Max marks for Field Work Report: 05.
4. Suggested Format for Field work: *Title page, student details, content page, introduction, work done, findings, conclusions and acknowledgements.*
5. Unit tests (IE).

b) Suggested Co-Curricular Activities:

1. Training of students by related industrial experts.
2. Assignments (including technical assignments like identifying tools /kits used for soil and water analyses and their handling, operational techniques with safety and security, IPR)
3. Seminars, Group discussions, Quiz, Debates etc. (on related topics).
4. Preparation of videos on tools and techniques in soil and water analyses.
5. Collection of material/figures/photos related to the topic, writing and organizing them in a systematic way in a file.
6. Visits to fish and shellfish culture farms, hatcheries, research organizations, etc.
7. Invited lectures and presentations on related topics by field/industrial experts.

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AQUACULTURE TECHNOLOGY SEMESTER: V PAPER-7A (2022-2023)
ORNAMENTAL FISH CULTURE
Credits: 4 Hrs. /Wk.: 4

Learning Outcomes:

Students after successful completion of the course will be able to:

1. Acquire knowledge on the status of world and Indian ornamental fish farming and trade
2. Identify various commercially important freshwater and marine ornamental fishes
3. Fabricate, set up and maintain the freshwater and marine aquaria
4. Demonstrate skills for breeding and larval rearing of ornamental fishes
5. Develop the commercial production units for large scale production of ornamental fishes and aquarium plants and their trade.

Syllabus: *(Total Hours: 90 including Teaching, Lab, Field Training and Unit tests, etc.)*

UNIT I: Status of Ornamental fish farming and trade (10h)

1. Global status of ornamental fish trade and export potential.
2. Present status and prospects of ornamental fish farming and trade in India. Indian ornamental fish diversity and its status. Major marine ornamental fish resources of India. Method of collection of live fish.
3. Types of aquaria – Home and Public aquaria (freshwater and marine), Oceanarium.

UNIT II: Ornamental fishes (10h)

1. Origin and Benefits of ornamental fish keeping as a hobby.
2. Freshwater ornamental fishes – their taxonomy and biology - varieties of Gold fish Koi, Barbs, Danios (cyprinids); Gourami, Betta (anabantids); Tetras (characins), Live bearers (Guppy, molly, sword tail, platy); Angel fish and other Cichlids, Catfishes, Loaches.
3. Marine ornamental fishes– varieties and their habitats. Other ornamental organisms– anemones, worms, lobsters, shrimps, octopus, starfish.

UNIT III: Aquarium Management

(10h)

1. Fabrication, setting up and maintenance of freshwater and marine aquarium - Lighting and aeration - Aquarium plants and their propagation methods - Aquarium accessories and decoratives. Selection of fishes and Species compatibility for aquarium keeping.
2. Water quality management for freshwater and marine aquariums. Water filtration systems – biological, mechanical and chemical. Types of filters.
3. Aquarium fish feeds – Live feeds, Dry and wet feeds. Pigmented feeds for color enhancement, larval feeds and feeding.
4. Common diseases of aquarium fish - diagnosis and treatment. Control of snail and algal growth. Medicines and chemicals used in aquaria.

UNIT IV: Breeding and Rearing of ornamental fishes

(10h)

1. Breeding of Live bearers and Egg layers – sex identification, conditioning of parent fish, stimulating spawning, parental care, hatching, and fry rearing.
2. Breeding of marine ornamental fishes (clown and damsel fishes) and larval rearing.
3. Application of genetics and biotechnology for quality strain production.

UNIT V: Commercial Production of Aquarium fish and Plants

(10h)

1. Commercial production units of ornamental fish - requirements and design
2. Commercial production of live bearers, goldfishes, gouramies, barbs, angels and tetras.
3. Mass production of aquarium plants
4. Fish conditioning, packing, transport and quarantine methods. Retail marketing and export of ornamental fish.

ADDITIONAL INPUTS

Aquatic weeds, Marine Plankton, Sea weed products.

REFERENCES:

1. Ramachandran, A. (2002). Manual on breeding, farming and management of ornamental fishes. School of Industrial Fisheries, Cochin, India.
2. Biswas, SP., Das, JN., Sarkar, UK and Lakra, WS (2007). Ornamental Fishes of North East India: An Atlas. ICAR, National Bureau of Fish Genetic Resources, Lucknow, India.
3. Dick Mills (1998). Aquarium Fishes, Dorling Kindersly Ltd., London.
4. Spotte, S. (1993). Marine Aquarium Keeping. John Wiley and Sons, USA.

5. Kurup, BM., Harikrishnan, M. and Renjithkumar, CR (2012). Breeding, farming and trade of ornamental fishes in India-Prospects and challenges. Souvenir- Ornamentals Kerala 2012.
6. Jameson, JD. and Santhanam, R. (1996). Manual of Ornamental Fishes and Farming Technologies, Fisheries College and Research Institute, Tuticorin.
7. Murthy, VS. (2002). Marine ornamental fish resources of Lakshadweep. CMFRI special publication, 72, 1-134.
8. Olivier, K. (2003). World trade in ornamental species (pp.49-63). Iowa State Press.
9. Van Ramshorst, JD. (1978). The complete aquarium encyclopedia, Elsevier publishers.
10. Zaidi, S.G.S. Training manual on Ornamental fish culture. CIFE-ICAR, Mumbai.
11. Cato, JC. And Brown, CL. (Eds.) (2008). Marine ornamental species: collection, culture and conservation. John Wiley & Sons.
12. Bunting, BW., Holthus, P. and Spalding, S. (2003). The marine aquarium industry and reef conservation. Marine Ornamental Species: Collection, Culture and Conservation, 109-124.
13. Santhanam, R., Sukumaran, N. and Natarajan, P. (1987). Manual of Freshwater Aquaculture. Oxford & IBH Publishing.
14. Sirajudheen, TK., Salim, SS., Bijukumar, A. and Antony, B. (2014). Problems and prospects of marine ornamental fish trade in Kerala, India. J. Fish. Eco. Dev., 1151:14-30.
15. *Web resources suggested by the teacher concerned and the college librarian including reading material.*

ASD GOVT. DEGREE COLLEGE FOR WOMEN (A)
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Jagannaickpur, Kakinada, East Godavari, AP – 533002

AQUACULTURE TECHNOLOGY SEMESTER: V PAPER-VIIA (2022-2023)
ORNAMENTAL FISH CULTURE LAB
Credits: 1 Hrs. /Wk.: 2

Skills Outcomes:

On successful completion of this practical course, student shall be able to:

1. Identify the common ornamental fishes and aquarium plants.
2. Fabricate a glass aquarium and set up with equipment and accessories
3. Maintain the fishes in aquarium with proper water quality, feeding and disease management.
4. Exhibit skills for breeding egg-layers and live-bearers and fry rearing.
5. Condition the fish for packing and transport.

Practical Syllabus:

1. Identification of common freshwater and marine aquarium fishes
2. Construction of a glass aquarium
3. Setting up and maintenance of aquarium (maintained by students can be evaluated after one month)
4. Water quality management in freshwater and marine aquariums
5. Identification of Aquarium plants and live food organisms, and decoratives
6. Aerators and Types of Filters
7. Breeding of egg layers (Gold fish), live bearers (Guppy) and bubble nest builder (Gourami)
8. Ornamental fish diseases and their diagnosis and treatment. Calculation of medicine/chemical treatment dosages.
9. Conditioning and packing of ornamental fishes.

Co-Curricular Activities:

a) **Mandatory:** (*Training of students by teacher on field related skills: 15 hours*)

1. **For Teacher:** Training of students by teacher in laboratory and field for a total of 15 hours on the biology of freshwater and marine ornamental fishes, setting up and maintenance of aquarium, breeding and commercial production of aquarium fishes and plants, and packing and transport of ornamental fishes.
2. **For Student:** Individual visit to public aquaria, oceanarium, and commercial ornamental

fish production farms, or to a university/research organization with ornamental fish production units and study the breeding, culture, marketing and export of ornamental fish. Submission of a hand written Field work Report not exceeding 10 pages in the given format.

3. Max marks for Field Work Report: 05
4. Suggested Format for Field Report: *Title page, student details, content page, introduction, work done, findings, conclusions and acknowledgements.*
5. Unit tests (IE).

b) Suggested Co-Curricular Activities:

1. Training of students by related industrial experts.
2. Assignments (including technical assignments like identifying biofilters, aerators, accessories and their maintenance).
3. Seminars, Group discussions, Quiz, Debates, etc. (on related topics).
4. Preparation of videos on aquarium keeping, breeding and larval rearing of ornamental fishes
5. Collection of material/figures/photos related to the topic, writing and organizing them in a systematic way in a file.
6. Visits to ornamental fish farms, public aquaria, oceanarium and aquarium fish production facilities in research organizations, etc.
7. Invited lectures and presentations on related topics by field/industrial experts.

Skill Development, Employability

and Entrepreneurship

Signature of the Lecturer in –Charge

Signature of the Principal

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**A.S.D. GOVT. DEGREE COLLEGE FOR WOMEN (A)
KAKINADA, EAST GODAVARI, A.P.**

**A.S.D. GOVT DEGREE COLLEGE FOR WOMEN (AUTONOMOUS)
KAKINADA**

English Syllabus-Semester-I 2022-23

English Praxis Course-I

A COURSE IN COMMUNICATION AND SOFT SKILL

Learning Outcomes

By the end of the course, the learner will be able to:

- Use grammar effectively in writing and speaking.
- Demonstrate the use of good vocabulary
- Demonstrate an understating of writing skills
- Acquire the ability to use Soft Skills in professional and daily life.
- Confidently use the tools of communication skills

I. UNIT: Listening Skills

Added topic: I. UNIT. Skill / Employability

- i. Communication
- ii. Importance of Listening
- iii. Types of Listening
- iv. Barriers to Listening
- v. Effective Listening

UNITII : Speaking Skills Skill / Employability

a. Sounds of English: Vowels and Consonants

- b. Word Accent
- c. Intonation

UNIT III : Grammar Skill

- a) Concord
- b) Modals
- c) Tenses (Present/Past/Future)
- d) Articles
- e) Prepositions
- f) Question Tags
- g) Sentence Transformation (Voice, Reported Speech & Degrees of Comparison)
- h) Error Correction

UNIT IV: Writing Skill / Employability/ ENTRPRENUER

- vi. Punctuation
- vii. Spelling
- viii. Paragraph Writing

UNIT V: Soft Skills Skill / Employability/ ENTRPRENUER

- a. SWOC
- b. Attitude
- c. Emotional Intelligence
- d. Telephone Etiquette
- e. Interpersonal Skills

A.S.D. GOVT DEGREE COLLEGE FOR WOMEN (AUTONOMOUS)

KAKINADA

English Syllabus-Semester-II

English Praxis Course-II

A COURSE IN READING & WRITING SKILLS

Learning Outcomes

By the end of the course, the learner will be able to:

- Use reading skills effectively
- Comprehend different texts
- Interpret different types of texts
- Analyse what is being read
- Build up a repository of active vocabulary
- Use good writing strategies
- Write well for any purpose
- Improve writing skills independently for future needs

I. UNIT SKILL

Prose : 1. How to Avoid Foolish Opinions Bertrand Russell

Poetry:2.The Road Not Taken

Skills : 3. Vocabulary: Conversion of Words

4. One Word Substitutes

5. Collocations

II. UNIT SKILL

Prose : 1. The Doll's House by Katherine Mansfield

Poetry: 2. Ode to the West Wind by P B Shelley

Non-Detailed Text: 3. Florence Nightingale by Abrar Mohsin

Skills 4. Skimming and Scanning

III. UNIT SKILL/ EMPLOYABILITY

Prose : 1. The Night Train at Deoli by Ruskin Bond

Poetry 2. Upagupta by Rabindranath Tagore

Skills : 3. Reading Comprehension

4. Note-Making/Taking

IV. UNIT SKILL/ EMPLOYABILITY

Poetry : 1. Coromandel Fishers Sarojini Naidu

Skills : 2. Expansion of Ideas

3. Notices, Agendas and Minutes

V. UNIT SKILL/ EMPLOYABILITY

Non-Detailed Text: 1. An Astrologer's Day by R K Narayan

Skills: 2. Curriculum Vitae and Resume

3. Letters

4. E-Correspondence

**A.S.D. GOVT DEGREE COLLEGE FOR WOMEN (AUTONOMOUS)
KAKINADA**

**English Syllabus-Semester-III English
Praxis Course-III
A COURSE IN CONVERSATIONAL SKILLS**

Learning Outcomes

By the end of the course, the learner will be able to:

- Speak fluently in English
- Participate confidently in any social interaction
- Face any professional discourse
- Demonstrate critical thinking
- Enhance conversational skills by observing the professional interviews

I. UNIT SKILL/ EMPLOYABILITY

Speech : 1. Tryst with Destiny by Jawaharlal Nehru

Skills : 2. Greetings
3. Introductions

II. UNIT SKILL/ EMPLOYABILITY

Speech : 1. Yes, We Can by Barack Obama

Interview: 2. A Leader Should Know How to Manage Failure by Dr. A.P.J.Abdul Kalam's Interview with India Knowledge at Wharton

Skills: 3. Requests IT COMES UNDER SKILL ALSO

III. UNIT SKILL

Interview: 1. Nelson Mandela's Interview with Larry King

Skills: 2. Asking and Giving Information
3. Agreeing and Disagreeing

IV. UNIT SKILL

Interview: 1. JRD Tata's Interview with T.N.Ninan

Skills: 2. Dialogue Building
3. Giving Instructions/Directions

V. UNIT SKILL/ EMPLOYABILITY

Speech : 1. You've Got to Find What You by Love Steve Jobs

Interview: Interview with Sudha Murthy

Skills : 2. Debates
3. Descriptions
4. Role Play

A.S.D.GOV'T DEGREE COLLEGE FOR WOMEN (AUTONOMOUS) KAKINADA

Skill Development Course

BUSINESS COMMUNICATION

(w.e.f. 2020-2021 A.Y.)

Semester II

Semester	Course Code (SD)	Group 'A'	Course Title	Hrs/Sem	Hrs/wk	Credits	Sem End Exam (2 Hrs)
II	Skill Development Course		Business Communication	30	2	2	50 Marks

Learning Outcomes:

After successful completion of this course, students will be able to;

- Understand the types of business communication and correspondence
- Comprehend the processes like receiving, filing and replying
- Acquire knowledge in preparing good business communications
- Acquaint with organizational communication requirements and presentations.

UNIT I:(06hrs) SKILL/ EMPLOYABILITY/ ENTREPRENEUR

Introduction and Importance of communication an overview - meaning and process of communication - organizational communication and its barriers.

UNIT II:(10hrs) SKILL/ EMPLOYABILITY/ ENTREPRENEUR

Types of Business Communications –Categories, methods and formats - Business vocabulary - Business idioms and collocations – Organisational Hierarchy - Various levels of communication in an organization – Top-down, Bottom-up and Horizontal- Business reports, presentations– Online communications.

UNIT III:(10hrs) SKILL/ EMPLOYABILITY/ ENTREPRENEUR

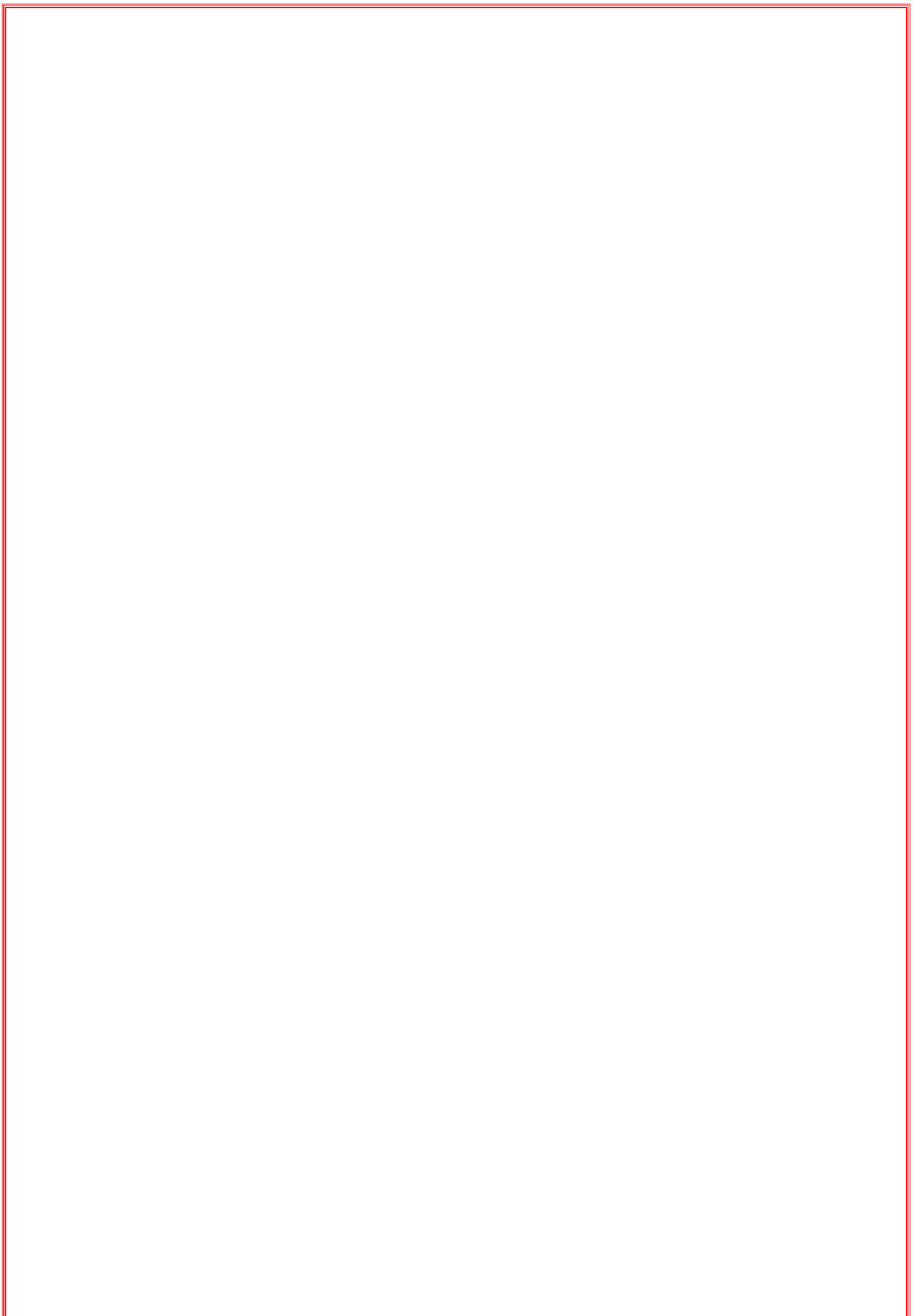
Receiving business communications -Filing and processing -Sending replies. Routine cycle of communications – Writing Communications - Characteristics of a good business communication - Preparation of business meeting agenda – agenda notes - minutes –circulation of minutes – Presentations of communication using various methods.

Recommended Co-curricular Activities (04hrs):

1. Collection of various model business letters
2. Invited lecture/field-level training by a local expert
3. Reading various business reports and minutes and their analysis
4. Presentations of reports, charts etc.
5. Assignments, Group discussions, field visits etc.

Reference books:

1. Chaturvedi. P.D.Chaturvedi.M - Business Communication concepts, Cases and applications- Pearsons Education.
2. Kaul Asha - Effective Business Communication - PHI Learning Pvt. Ltd.
3. www.swayam.gov.in
4. Websites on business communication



A.S.D GOVT DEGREE COLLEGE FOR WOMEN (A)

(Re-Accredited by NAAC with 'B')
KAKINADA 533002 EASTGODAVARI, ANDHRA PRADESH

I B.Sc BOTANY SYLLABUS Semester - I

For the Academic Year 2022-2023

Paper – I Fundamentals of Microbes and Non-Vascular Plants

(Viruses, Bacteria Fungi, Lichens, Algae and Bryophytes)

THEORY:

Unit – 1: Origin of life and Viruses

12Hrs.

1. Origin of life, concept of primary Abiogenesis; Miller and Urey experiment. Five kingdom classification of R.H. Whittaker
2. Discovery of microorganisms, Pasteur experiments, germ theory of diseases. (employability)
3. Shape and symmetry of viruses; structure of TMV and Gemini virus; multiplication of TMV; A brief account of Prions and Viroids.
4. A general account on symptoms of plant diseases caused by Viruses. Transmission of plant viruses and their control. (Skill)
5. Significance of viruses in vaccine production, bio-pesticides and as cloning vectors. (Entrepreneur)

Unit – 2: Special groups of Bacteria and Eubacteria

12 Hrs.

1. Brief account of Archaeobacteria, Actinomycetes and Cyanobacteria. (skill)
2. Cell structure and nutrition of Eubacteria.
3. Reproduction- Asexual (Binary fission and endospores) and bacterial recombination (Conjugation, Transformation, Transduction).
4. Economic importance of Bacteria with reference to their role in Agriculture and industry (fermentation and medicine). (skill)
5. A general account on symptoms of plant diseases caused by Bacteria; Citrus canker. (employability)

Unit – 3: Fungi & Lichens

12 Hrs.

1. General characteristics of fungi and Ainsworth classification (upto classes).
2. Structure, reproduction and life history of (a) *Rhizopus* (Zygomycota) and (b) *Puccinia* (Basidiomycota).
3. Economic uses of fungi in food industry, pharmacy and agriculture.
4. (Employability)

5. A general account on symptoms of plant diseases caused by Fungi; Blast of Rice. (Employability)

6. Lichens- structure and reproduction; ecological and economic importance.

Unit –4:Algae

12 Hrs.

1. General characteristics of Algae (pigments, flagella and reserve food material);Fritsch classification (upto classes).

2. Thallus organization and life cycles in Algae.

3. Occurrence, structure, reproduction and life cycle of (a)*Spirogyra* (Chlorophyceae) and (b) *Polysiphonia* (Rhodophyceae). (skill)

4. Economic importance of Algae; entrepreneurship

Unit–5:Bryophytes

12 Hrs.

1. General characteristics of Bryophytes; classification upto classes.

2. Occurrence, morphology, anatomy, reproduction (developmental details are not needed) and life cycle of (a) *Marchantia* (Hepaticopsida) and (b) *Funaria*(Bryopsida).

3. General account on evolution of sporophytes in Bryophytes.
(skill)

A.S.D GOVT DEGREE COLLEGE FOR WOMEN (A) (Re-Accredited by
NAAC with 'B')
KAKINADA 533002 EASTGODAVARI, ANDHRA PRADESH

I B.Sc., BOTANY SYLLABUS

Semester – II

For the Academic year 2022-2023

PAPER II BASICS OF VASCULAR PLANTS AND PHYTOGEOGRAPHY

(Pteridophytes, Gymnosperms, Taxonomy of Angiosperms and Phytogeography)

Total hours of Teaching 60hrs @4hrs/week

Total Credits:03

Unit–1:Pteridophytes

12 Hrs.

1. General characteristics of Pteridophyta; classification of Smith (1955) into divisions.
2. Occurrence, morphology, anatomy, reproduction (developmental details are not needed) and life history of (a) *Lycopodium* (Lycopsidea) and (b) *Marsilea* (Filicopsida).
3. **Stelar evolution in Pteridophytes**; skill
4. Heterospory and seed habit.

Unit–2:Gymnosperms

14 Hrs.

1. General characteristics of Gymnosperms; Sporne classification into classes.
2. Occurrence, morphology, anatomy, reproduction (developmental details are not needed) and life history of (a) *Cycas* (Cycadopsida) and (b) *Gnetum* (Gnetopsida).
3. Outlines of geological timescale.
4. **A brief account on Cycadeoidea**. entrepreneurship

Unit – 3:Basic aspects of Taxonomy

13Hrs.

1. Aim and scope of taxonomy; Species concept: Taxonomic hierarchy, species, genus and family.
2. **Plant nomenclature: Binomial system, ICBN- rules for nomenclature.** (skill)
3. Herbarium and its techniques, BSI herbarium and Kew herbarium; concept of digital herbaria.
4. **Bentham and Hooker system of classification**; (skill)

5. Systematic description and economic importance of the following families:

- (a) Annonaceae (b) Curcubitaceae

Unit – 4: Systematic Taxonomy

13 Hrs.

1. Systematic description and economic importance of the following families:

- (a) Asteraceae (b) Asclepiadaceae (c) Amaranthaceae

- (d) Euphorbiaceae (e) Arecaceae and (f) Poaceae

(Employability)

2. Outlines of Angiosperm Phylogeny Group (APGIV). (skill)

Unit–5: Phytogeography

08 Hrs.

1. Principles of Phytogeography, Distribution (wides, endemic, discontinuous species)

2. Endemism – types and causes.

3. Phytogeographic regions of World. entrepreneurship

4. Phytogeographic regions of India. entrepreneurship

5. Vegetation types in Andhra Pradesh. (Employability)

A.S.D GOVT DEGREE COLLEGE FOR WOMEN (A)

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KAKINADA 533002 EASTGODAVARI, ANDHRA PRADESH

II B.SC BOTANY SYLLABUS III Semester – Paper – III

For the Academic Year 2022-2023

Anatomy and Embryology of Angiosperms, Plant Ecology and Biodiversity

Theory:

UNIT – I: ANATOMY OF ANGIOSPERMS

(12 hrs)

1. Organization of apical meristems: Tunica-carpus theory and Histogen theory.
2. Tissue systems–Epidermal, ground and vascular.
3. Anomalous secondary growth in *Boerhaavia* and *Dracaena*.
4. Study of timbers of economic importance - Teak, Red sanders and Rosewood. (Employability)

UNIT – II: EMBRYOLOGY OF ANGIOSPERMS

(12 hrs)

1. Structure of anther, anther wall, types of tapetum. Microsporogenesis and development of male gametophyte.
2. Structure of ovule, megasporogenesis; monosporic (*Polygonum*), bisporic (*Allium*) and tetrasporic (*Peperomia*) types of embryo sacs.
3. Outlines of pollination, pollen – pistil interaction and fertilization. (skill)
4. Endosperm - Types and biological importance - Free nuclear, cellular, helobial and druminate. Development of Dicot (*Capsella bursa-pastoris*) embryo

UNIT –III: BASICS OF ECOLOGY

(12 hrs)

1. Ecology: definition, branches and significance of ecology.
2. Ecosystem: Concept and components, energy flow, food chain, food web, ecological pyramids.

(skill)

4. Plants and environment: Climatic (light and temperature), edaphic and biotic factors.
5. Ecological succession: Hydrosere and Xerosere

UNIT – IV: POPULATION, COMMUNITY AND PRODUCTION ECOLOGY (12hrs)

1. Population ecology: Natality, mortality, growth curves, ecotypes, ecads
2. Community ecology: Frequency, density, cover, life forms, biological spectrum
3. Concepts of productivity: GPP, NPP and Community Respiration (skill)
4. Secondary production, P/R ratio and Ecosystems.

UNIT – V: BASICS OF BIODIVERSITY (12hrs)

1. Biodiversity: Basic concepts, Convention on Biodiversity - Earth Summit.
2. Value of Biodiversity; types and levels of biodiversity and Threats to biodiversity (Employability)
3. Biodiversity Hot spots in India. Biodiversity in North Eastern Himalayas and Western Ghats.
4. Principles of conservation: IUCN threat-categories, RED data book (enterprenurship)
5. Role of NBPGR and NBA in the conservation of Biodiversity.
(Employability)

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II B.Sc. BOTANY SYLLABUS

IV Semester – For the Academic Year 2022-2023

PAPER –IV : PLANT PHYSIOLOGY AND METABOLISM

Unit – 1: Plant-Water relations 10 Hrs.

1. Importance of water to plant life, physical properties of water, diffusion, imbibition, osmosis. water potential, osmotic potential, pressure potential.
2. Absorption and lateral transport of water; Ascent of sap (skill)
3. Transpiration: stomata structure and mechanism of stomatal movements (K^+ ionflux).
4. Mechanism of phloem transport; source-sink relationships.

Unit – 2: Mineral nutrition, Enzymes and Respiration 14 Hrs.

1. Essential macro and micro mineral nutrients and their role in plants; symptoms of mineral deficiency (Employability)
2. Absorption of mineral ions; passive and active processes.
3. Characteristics, nomenclature and classification of Enzymes. Mechanism of enzyme action, enzyme kinetics (Employability)
4. Respiration: Aerobic and Anaerobic; Glycolysis, Krebs cycle; electron transport system, mechanism of oxidative phosphorylation, Pentose Phosphate Pathway (HMP shunt).

Unit – 3: Photosynthesis and Photorespiration 12 Hrs.

1. Photosynthesis: Photosynthetic pigments, absorption and action spectra; Red drop and Emerson enhancement effect

2. Concept of two photosystems; mechanism of photosynthetic electron transport and evolution of oxygen; photophosphorylation

3. Carbon assimilation pathways (C₃, C₄ and CAM); (skill)

4. Photorespiration - C₂ pathway

Unit – 4: Nitrogen and lipid metabolism

12 Hrs.

1. Nitrogen metabolism: Biological nitrogen fixation – asymbiotic and symbiotic nitrogen fixing organisms. Nitrogenase enzyme system

.(enterprenurship)

2. Lipid metabolism: Classification of Plant lipids, saturated and unsaturated fatty acids. (skill)

3. Anabolism of triglycerides, β -oxidation of fatty acids, Glyoxylate cycle (Employability)

Unit – 5: Plant growth - development and stress physiology

12 Hrs.

1. Growth and Development: Definition, phases and kinetics of growth.

2. Physiological effects of Plant Growth Regulators (PGRs) - auxins, gibberellins, cytokinins, ABA, ethylene and brassinosteroids. (Employability)

3. Physiology of flowering: Photoperiodism, role of phytochrome in flowering. (enterprenurship)

4. Seed germination and senescence; physiological changes

.(skill)

A.S.D GOVT DEGREE COLLEGE FOR WOMEN (A)

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KAKINADA 533002 EASTGODAVARI, ANDHRA PRADESH

II B.Sc. DEGREE EXAMINATION 2022-2023

(At the End of IV Semester)

Botany Syllabus Paper - V

CELL BIOLOGY, GENETICS AND PLANT BREEDING

Unit – 1: The Cell

12 Hrs.

1. Cell theory; prokaryotic vs eukaryotic cell; animal vs plant cell; a brief account on ultra-structure of a plant cell.
2. Ultra-structure of cell wall.
3. Ultra-structure of plasma membrane and various theories on its organization. (skill)
4. Polymorphic cell organelles (Plastids); ultra structure of chloroplast. Plastid DNA.

Unit – 2: Chromosomes

12 Hrs.

1. Prokaryotic vs eukaryotic chromosome. Morphology of a eukaryotic chromosome.
2. Euchromatin and Heterochromatin; Karyotype and ideogram.
3. Brief account of chromosomal aberrations - structural and numerical changes (enterprenurship)
4. Organization of DNA in a chromosome (solenoid and nucleosome models).

Unit – 3: Mendelian and Non-Mendelian genetics

14Hrs.

1. Mendel's laws of inheritance. Incomplete dominance and co-dominance; Multipleallelism.
2. Complementary, supplementary and duplicate gene interactions (plant based examples are to be dealt).
3. A brief account of linkage and crossing over; Chromosomal mapping - 2 point and 3 point test cross.
4. Concept of maternal inheritance (Corren's experiment on *Mirabilis jalapa*); Mitochondrial DNA. (Employability)

Unit – 4:Structure and functions of DNA

12 Hrs.

1. Watson and Crick model of DNA. Brief account on DNA Replication (Semi-conservative method).
2. Brief account on Transcription, types and functions of RNA. Gene concept and genetic code and Translation. (skill)
3. Regulation of gene expression in prokaryotes - Lac Operon.

Unit – 5:Plant Breeding

12 Hrs.

1. Plant Breeding and its scope; Genetic basis for plant breeding. Plant Introduction and acclimatization. (enterpreneurship)
2. Definition, procedure; applications and uses; advantages and limitations of : (a) Mass selection, (b) Pure line selection and (c) Clonal selection.
3. Hybridization – schemes, and technique; Heterosis (hybrid vigour). (Employability)
4. A brief account on Molecular breeding – DNA markers in plant breeding. RAPD, RFLP. (Employability)

A.S.D GOVT DEGREE COLLEGE FOR WOMEN (A)
(Re-Accredited by NAAC with 'B')
Kakinada 533002 EASTGODAVARI, ANDHRA PRADESH
III B.Sc. DEGREE EXAMINATION 2022-2023
(At the End of V Semester)

Botany Syllabus Paper - VI

Course 6A : PLANT PROPAGATION

Unit – 1: Basic concepts of propagation (10h)

1. Propagation: Definition, need and potentialities for plant multiplication; asexual and sexual methods of propagation - advantages and disadvantages.
2. Propagation facilities: Mist chamber, humidifiers, greenhouses, glasshouses, cold frames, hot beds, poly-houses, phytotrons nursery - tools and implements. (enterpreneurship)
3. Identification and propagation by division and separation: Bulbs, pseudobulbs, corms, tubers and rhizomes; runners, stolons, suckers and offsets. (skill)

Unit – 2: Apomictics in plant propagation (10h)

1. Apomixis: Definition, facultative and obligate; types – recurrent, non-recurrent, adventitious and vegetative; advantages and disadvantages.
2. Polyembryony: Definition, classification, horticultural significance; chimera and bud sport.
3. Propagation of mango, *Citrus* and *Allium* using apomictic embryos. (enterpreneurship)

Unit – 3: Propagation by cuttings (10h)

1. Cuttings: Definition, different methods of cuttings; root and leaf cutting
2. Stem cuttings: Definition of stem tip and section cuttings; plant propagation by herbaceous, soft wood, semi hard wood, hard wood and coniferous stem cuttings. (skill)
3. Physiological and bio chemical basis of rooting; factors influencing rooting of cuttings; Use of plant growth regulators in rooting of cuttings. (enterpreneurship)

Unit – 4: Propagation by layering (10h)

1. Layering: Definition, principle and factors influencing layering.
2. Plant propagation by layering: Ground layering – tip layering, simple layering, trench layering, mound (stool) layering and compound (serpentine layering). (skill)
3. Air layering technique – application in woody trees.

Unit – 5: Propagation by grafting and budding (10h)

1. Grafting: Definition, principle, types, graft incompatibility, collection of scion wood stick, scion-stock relationship, and their influences, bud wood certification; micrografting. (enterpreneurship)
2. Propagation by veneer, whip, cleft, side and bark grafting techniques. (Employability)

3. Budding: Definition; techniques of 'T', inverted 'T', patch and chip budding (skill)

A.S.D GOVT DEGREE COLLEGE FOR WOMEN (A)
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Kakinada 533002 EASTGODAVARI, ANDHRA PRADESH
III B.Sc. DEGREE EXAMINATION 2022-2023

(At the End of V Semester)

Botany Syllabus Paper - VI

Course-7A: Seed
Technology

I. Learning outcomes:

Students at the successful completion of the course will be able to:

1. Explain the causes for seed dormancy and methods to break dormancy.
2. Understand critical concepts of seed processing and seed storage procedures.
3. Acquire skills related to various seed testing methods.
4. Identify seed borne pathogens and prescribe methods to control them.
5. Understand the legislations on seed production and procedure of seed certification.

Unit - 1: Seed dormancy (10h)

1. Seed and grain: Definitions, importance of seed; structure of Dicot and Monocot seed.
2. Role and goals of seed technology; characteristics of quality seed material. (enterprenurship)
3. Dormancy: Definition, causes for seed dormancy; methods to break seed dormancy. (skill)

Unit – 2: Seed processing and storage (10h)

1. Principles of seed processing: seed pre-cleaning, precuring, drying, seed extraction; cleaning, grading, pre-storage treatments; bagging and labelling, safety precautions during processing. (Employability)
2. Seed storage; orthodox and recalcitrant seeds, natural longevity of seeds. (skill)
3. Factors affecting longevity in storage; storage conditions, methods and containers. (enterprenurship)

Unit – 3: Seed testing (10h)

1. Definition of seed vigour, viability and longevity; seed sampling and equipment; physical purity analysis. (Employability)
2. Seed moisture – importance – methods of moisture determination.
3. Seed germination tests using paper, sand or soil – standard germination test; TZ test to determine seed viability; seed health testing. (enterprenurship)

Unit – 4: Seed borne diseases (10h)

1. A brief account of different seed borne diseases and their transmission.
2. Different seed health testing methods for detecting microorganisms.

(Employability)

3. Management of seed borne diseases; seed treatment methods: spraying and dusting

(Employability)

Unit – 5: Seed certification

(10h)

1. Objectives - Indian seed Act; seed rules and seed order; new seed policy (1988).
2. Seed Inspector: Duties and responsibilities; classes of seeds, phases of certification standards (i.e., Land requirement, isolation distance) etc. (Employability)
3. Issue of certificates, tags and sealing; pre and post control check; Genetic purity verification, certification, records and reporting. (enterprenurship)

**A.S.D. GOVERNMENT DEGREE COLLEGE FOR WOMEN (A),
KAKINADA
DEPARTMENT OF CHEMISTRY
BOARD OF STUDIES: 2021-22**

Course with focus on employability / entrepreneurship / Skill Development modules

SEMESTER – I

Course I (Inorganic & Physical Chemistry) 60 hrs. (4h/w)

Skill Development		Employability		Entrepreneurship	
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Syllabus:

UNIT –I

Chemistry of p-block elements **8 h**

Group 13: Preparation & structure of diborane, borazine

Group 14: Preparation, classification and uses of silicones

Group 15: Preparation & structures of phosphonitrilic halides $\{(PNCl)_n\}$ where $n=3, 4$

Group 16: Oxides and oxoacids of sulphur (structural aspects only)

Group 17: Pseudo halogens, structures of Interhalogen compounds.

UNIT –II

1. Chemistry of d-block elements:

6 h

Characteristics of d-block elements with special reference to electronic configuration, variable valence, magnetic properties, catalytic properties and ability to form complexes. Stability of various oxidation states (explanation with Latimer diagrams & Frost diagrams).

2. Chemistry of f-block elements: **6 h**

Chemistry of lanthanides - electronic configuration, oxidation states, lanthanide contraction- definition, causes and consequences, magnetic properties.

Chemistry of actinides - electronic configuration, oxidation states, actinide contraction, comparison of lanthanides and actinides.

3. Theories of bonding in metals: **4 h**

Valence bond theory and free electron theory- explanation of thermal and electrical conductivity of metals based on these theories, Band theory- formation of bands, explanation of conductors, semiconductors and insulators.

UNIT –III: Solid State**10 h**

Symmetry in crystals. Law of constancy of interfacial angles. The law of rationality of indices. The law of symmetry. Miller indices, Definition of lattice point, space lattice, unit cell. Bravais lattices and crystal systems. X-ray diffraction - Bragg's equation. Determination of crystal structure by powder method. Defects in crystals. Stoichiometric-Schottky and Frenkel defects.

UNIT –IV:**1. Gaseous state:****7 h**

Vander Waals equation of state. Andrew's isotherms of carbon dioxide. Critical phenomena. Relationship between critical constants and Vander Waals constants. Law of corresponding states. Joule- Thomson effect.

2. Liquid state:**3 h**

Liquid crystals- the mesomorphic state. Classification of liquid crystals into Smectic, Nematic and cholesteric. Application of liquid crystals as LCD devices.

UNIT –V**1. Solutions:****6 h**

Azeotropes-HCl-H₂O system and ethanol-water system. Partially miscible liquids-phenol- water system. Critical solution temperature (CST), Effect of impurity on consolute temperature. Immiscible liquids and steam distillation. Nernst distribution law. Calculation of the partition coefficient. Applications of distribution law.

2. Ionic equilibrium:**3 h**

Ionic product, common ion effect, solubility and solubility product. Calculations based on solubility product.

3. Dilute Solutions:**7 h**

Colligative properties - Relative Lowering of Vapour Pressure (RLVP), Osmotic pressure, Elevation in boiling point and depression in freezing point. Experimental methods for the determination of molar mass of a non-volatile solute using osmotic pressure, Elevation in boiling point and depression in freezing point. Abnormal colligative properties. Van't Hoff factor.

LABORATORY COURSE -I**30hrs (2 h / w)****Practical-I:** Analysis of SALT MIXTURE (At the end of Semester-I)

Qualitative inorganic analysis (Minimum of Six mixtures should be analyzed) **50 M**

Analysis of SALT MIXTURE**50 M**

Analysis of mixture salt containing two anions and two cations (From two different groups) from the following:

Anions: Carbonate, Sulphate, Chloride, Bromide, Acetate, Nitrate, Borate,

Phosphate. **Cations:** Lead, Copper, Iron, Aluminium, Zinc, Nickel,

Manganese, Calcium, Strontium, Barium, Potassium and Ammonium.

SEMESTER – II

Course II – (Organic & General Chemistry) 60 h (4h/w)

UNIT-I

Carbon-Carbon sigma bonds (Alkanes and Cycloalkanes) 12h

General methods of preparation of alkanes- Wurtz and Wurtz Fittig reaction, Corey House synthesis, physical and chemical properties of alkanes, Isomerism and its effect on properties, Free radical substitutions; Halogenation, concept of relative reactivity v/s selectivity. Conformational analysis of alkanes (Conformations, relative stability and energy diagrams of Ethane, Propane and butane). General molecular formulae of cycloalkanes and relative stability, Baeyer strain theory, Cyclohexane conformations with energy diagram, Conformations of mono substituted cyclohexane.

UNIT-II

Carbon-Carbon pi Bonds (Alkenes and Alkynes) 12h

General methods of preparation, physical and chemical properties. Mechanism of E1, E2, reactions, Saytzeff and Hoffmann eliminations, Electrophilic Additions, mechanism (Markonikoff / Anti Markonikoff addition) with suitable examples, syn and anti-addition of H₂, HX, X₂. Oxymercuration, Hydroboration-Oxidation, Ozonolysis, Hydroxylation, Diels Alder reaction, 1,2-and 1,4-addition reactions in conjugated dienes. Reactions of alkynes, acidity, electrophilic and nucleophilic additions, Hydration to form carbonyl compounds. Alkylation of terminal alkynes.

UNIT-III

Benzene and its reactivity (12h)

Concept of aromaticity, Huckel's rule - application to Benzenoid (Benzene, Naphthalene) and Non - Benzenoid compounds (cyclopropenyl cation, cyclopentadienyl anion and tropylium cation) Reactions - General mechanism of electrophilic aromatic substitution, mechanism of nitration, Friedel- Craft's alkylation and acylation. Orientation of aromatic substitution - ortho, para and meta directing groups. Ring activating and deactivating groups with examples (Electronic interpretation of various groups like NO₂ and Phenolic).

Orientation of i) amino, methoxy and methyl groups ii) Carboxy, Nitro, carbonyl and sulphonic acid groups iii) halogens.

GENERAL CHEMISTRY (24 h)

UNIT-IV

Surface chemistry and chemical bonding

1. Surface chemistry (6h)

Colloids- Coagulation of colloids- Hardy-Schulze rule. **Stability of colloids,** Protection of Colloids, Gold number.

Adsorption-Physical and chemical adsorption, Langmuir adsorption isotherm, **applications of adsorption.**

2. Chemical Bonding (6h)

Valence bond theory, hybridization, VB theory as applied to ClF_3 , $\text{Ni}(\text{CO})_4$, **Molecular orbital theory - LCAO method, construction of M.O. diagrams** for homo-nuclear and hetero-nuclear diatomic molecules (N_2 , O_2 , CO and NO).

3. HSAB(2h)

Pearson's Concept, **HSAB principle and its importance,** bonding in hard-hard and soft-soft combinations.

UNIT-V

Stereochemistry of carbon compounds (10h)

Molecular representations- Wedge, Fischer, Newman and Saw-Horse formulae. **Optical isomerism: Optical activity-** wave nature of light, plane polarized light, optical rotation and specific rotation. Chiral molecules- definition and criteria (Symmetry elements)- Definition of enantiomers and diastereomers – Explanation of optical isomerism with examples- Glyceraldehyde, Lactic acid, Alanine, Tartaric acid. 2, 3 – dibromo pentane, D, L, R, S and E, Z- configuration with examples. Definition of racemic mixture- resolution of racemic mixtures.

TITLE OF THE COURSE
VOLUMETRIC ANALYSIS

Syllabus:

Volumetric Analysis

50 M

1. Estimation of sodium carbonate and sodium hydrogen carbonate present in a mixture.
2. Determination of Fe (II) using KMnO_4 with oxalic acid as primary standard.
3. Determination of Cu (II) using $\text{Na}_2\text{S}_2\text{O}_3$ with $\text{K}_2\text{Cr}_2\text{O}_7$ as primary standard.
4. Estimation of water of crystallization in Mohr's salt by titrating with KMnO_4
5. Determination of Zn(II) using EDTA

SECOND YEAR, SEMESTER– III
Paper III (ORGANIC CHEMISTRY & SPECTROSCOPY) 60 h (4 h / w)

ORGANIC CHEMISTRY 30 h (2h / w)

UNIT –I

Chemistry of Halogenated Hydrocarbons: Alkyl Halides: Methods of preparation and properties, nucleophilic substitution reactions– SN1, SN2 and SNi mechanisms with stereo chemical aspects and effect of solvent etc.; nucleophilic substitution vs. elimination, Williamson's synthesis. Aryl Halides: Preparation (including preparation from diazonium salts) and properties, nucleophilic aromatic substitution; **SN Ar, Benzyne mechanism.** Relative reactivity of alkyl, allyl, benzyl, vinyl and aryl halides towards nucleophilic substitution reactions.

1. Alcohols & Phenols

Alcohols: preparation, properties and relative reactivity of 1°, 2°, 3° alcohols, Bouvet Blanc Reduction; Oxidation Of Diols By Periodic Acid and lead Tetraacetate, Pinacol- Pinacolone Rearrangement;

Phenols: Preparation and Properties; Acidity and Factors Affecting It, Ring substitution reactions, Reimer–Tieman and Kolbe's–Schmidt Reactions, Fries and Claisen Rearrangement with mechanism.

UNIT II:

Carbonyl Compounds: Structure, reactivity, preparation and properties; Nucleophilic Addition, Nucleophilic Addition-elimination reactions with ammonia derivatives Mechanisms of **Aldol and Benzoin Condensation, Claisen-Schmidt, Perkin, Cannizzaro and Wittig reaction, Beckmann Haloform Reaction And Baeyer Villiger oxidation**, α - substitution reactions, oxidations and reductions (Clemmensen, wolf –kishner, with LiAlH₄ & NaBH₄). Addition Reactions Of α , β -unsaturated carbonyl compounds: Michael Addition. Active Methylene Compounds: Keto-enol tautomerism.

Preparation and Synthetic Applications Diethyl malonate and ethyl acetoacetate.

UNIT III:

Carboxylic Acids and their Derivatives: General methods of preparation, physical properties and reactions of monocarboxylic acids, effect of substituent acidic strength. Typical reactions of carboxylic acids, hydroxy acids and unsaturated acids. Preparation And Reactions Of Acid Chlorides, anhydrides, esters and amides; Comparative study of nucleophilic substitution at acyl group-**Mechanism of acidic and alkaline hydrolysis of esters, Claisen Condensation, Reformatsky reactions and Curtius Rearrangement Reactions** involving H, OH and COOH groups- salt formation, anhydride formation, acid chloride formation, amide formation and esterification (mechanism). Degradation of carboxylic acids by Huns-Diecker reaction, decarboxylation by Schmidt reaction, Arndt- Eistert synthesis, halogenation by Hell- Volhard- Zelensky reaction.

SPECTROSCOPY

30 h (2h / w)

UNIT –IV

Molecular Spectroscopy: Interaction of electromagnetic radiation with molecules and various types of spectra;

Rotation spectroscopy: Selection rules, intensities of spectral lines, determination of bond lengths of diatomic and linear triatomic molecules, isotopic substitution.

Vibrational Spectroscopy: Classical Equation of Vibration, computation of force constant, Harmonic and anharmonic oscillator, Morse Potential curve, vibrational degrees of freedom for polyatomic molecules, modes of vibration. Selection rules for vibrational transitions, Fundamental Frequencies, overtones and hot bands.

Electronic spectroscopy: Energy levels of molecular orbitals (σ , π , n). Selection rules for electronic spectra. Types of electronic transitions in molecules, effect of conjugation. Concept of chromophore. bathochromic and hypsochromic shifts. Beer-Lambert's law and its limitations.

Nuclear Magnetic Resonance (NMR) spectroscopy: Principles of nuclear magnetic resonance, equivalent and non-equivalent protons, position of signals. Chemical shift, NMR splitting of signals - spin-spin coupling, coupling constants. Applications of NMR with suitable examples - ethyl bromide, ethanol, acetaldehyde, 1,1,2-tribromo ethane, ethyl acetate, toluene and acetophenone.

UNIT-V

Application of Spectroscopy to Simple Organic Molecules

Application of visible, ultraviolet and Infrared spectroscopy in organic molecules. Application of electronic spectroscopy and Woodward rules for calculating λ_{max} of conjugated dienes and α , β – unsaturated compounds.

Infrared radiation and types of molecular vibrations, functional group and fingerprint region. IR spectra of alkanes, alkenes and simple alcohols (inter and intramolecular hydrogen bonding), aldehydes, ketones, carboxylic acids and their derivatives (effect of substitution on $>\text{C}=\text{O}$ stretching absorptions).

LABORATORY COURSE -III 30hrs (2 h / w)

Practical Paper-III (At the end of Semester-III)

Organic Preparations and IR Spectral Analysis Lab : 50 Marks

Organic preparations: 40M

- i. Acetylation of one of the following compounds:
amines (aniline, o-, m-, p- toluidine and o-, m-, p-anisidine) and phenols (β -naphthol, vanillin, salicylic acid) by any one method:
 - a. Using conventional method.
 - b. Using green approach
- ii. Benzoylation of one of the following amines
(aniline, o-, m-, p- toluidine and o-, m-, p-anisidine)
 - a. Nitration of any one of the following: Acetanilide/nitrobenzene by conventional method
 - b. Salicylic acid by green approach (using ceric ammonium nitrate).

IR Spectral Analysis: 10M

IR Spectral Analysis of the following functional groups with examples

a) Hydroxyl groups

b) Carbonyl groups

c) Amino groups

d) Aromatic groups

**A.S.D. GOVERNMENT DEGREE COLLEGE FOR WOMEN (A),
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DEPARTMENT OF CHEMISTRY

BOARD OF STUDIES: 2022-23

SECOND YEAR, SEMESTER- IV

**Paper IV (Course 4) INORGANIC, ORGANIC & PHYSICAL
CHEMISTRY**

60 h (4 h / w)

UNIT I:

Organometallic Compounds: Definition and classification of organometallic compounds on the basis of bond type, Concept of hapticity of organic ligands. Metal Carbonyls: 18electronrule, electron count of mononuclear, polynuclear and substituted metal carbonyls of 3d series. General methods of preparation of mono and binuclear carbonyls of 3d series. **P-acceptor behaviour of carbon monoxide. Synergic effects (VB approach)** - (MO diagram of CO can be referred to for synergic effect to IR frequencies).

UNIT II:

Carbohydrates: Occurrence, classification and their biological importance, Monosaccharides: Constitution and absolute configuration glucose and fructose, epimers and anomers, mutarotation, determination of ring size of glucose and fructose, Haworth Projection And Conformational Structures; **Interconversions of aldoses and ketoses; Killiani-Fischer synthesis and Ruff degradation;** Disaccharides- Elementary Treatment Of Maltose, lactose and sucrose. Polysaccharides-Elementary Treatment Of starch.

UNIT III:

Amino acids and proteins: Introduction: Definition of Amino acids, classification of Amino acids into alpha, beta, and gamma amino acids. Natural and essential amino acids - definition and examples, classification of alpha amino acids into acidic, basic and neutral amino acids with examples. **Methods of synthesis: General methods of synthesis of alpha amino acids (specific examples - Glycine, Alanine, valine and leucine)** by following methods: a) from halogenated carboxylic acid b) Gabriel Phthalimide synthesis c) strecker's synthesis.

Physical properties: Zwitter ion structure - salt like character - solubility, melting points, amphoteric character, definition of isoelectric point.

Chemical properties: General reactions due to amino and carboxyl groups - lactams from gamma and delta amino acids by heating- peptide bond (amide linkage). Structure and nomenclature of peptides and proteins.

Heterocyclic Compounds: Introduction and definition: Simple five membered ring compounds with one hetero atom Ex. Furan. Thiophene and pyrrole - Aromatic character – Preparation from 1, 4, -dicarbonyl compounds, Paul-Knorr synthesis. Properties: Acidic character of pyrrole - electrophilic substitution at 2 or 5 position, Halogenation, Nitration and Sulphonation under mild conditions - Diels Alder reaction in furan. **Pyridine – Structure - Basicity - Aromaticity-** Comparison with pyrrole- one method of preparation and properties - Reactivity towards Nucleophilic substitution reaction.

UNIT IV:

Nitrogen Containing Functional Groups: Preparation, properties and important reactions of nitro compounds, amines and diazonium salts.

1. Nitro hydrocarbons

Nomenclature and classification-nitro hydrocarbons, structure -Tautomerism of nitroalkanes leading to aci and keto form, Preparation of Nitroalkanes, reactivity -halogenation, reaction with HONO (Nitrous acid), **Nef reaction and Mannich reaction leading to Micheal addition and reduction.**

2.Amines:

Introduction, classification, chirality in amines (pyramidal inversion), importance and general methods of preparation.

Properties: Physical properties, Basicity of amines: Effect of substituent, solvent and steric effects. Distinction between Primary, secondary and tertiary amines using Heinsberg's Method and Nitrous Acid. Discussion of the following reactions with emphasis on the mechanistic pathway: Gabriel Phthalimide synthesis, Hoffmann- Bromamide Reaction, Carbylamine Reaction, **Mannich reaction, Hoffmann's exhaustive methylation, Hofmann-elimination reaction and Cope elimination.**

Diazonium Salts: Preparation and synthetic applications of diazonium salts including preparation of arenes, haloarenes, phenols, amino and nitro compounds. Coupling Reactions of Diazonium Salts (preparation of azo dyes).

UNIT V:

Photochemistry: Difference between thermal and photochemical processes, Laws of photochemistry- Grothus- Draper's law and Stark-Einstein's law of photochemical equivalence, Quantum yield- Photochemical reaction mechanism- hydrogen- chlorine and hydrogen- bromine reaction. Qualitative description of fluorescence, phosphorescence, Jablonski diagram, **Photosensitized reactions- energy transfer processes** (simple example).

Thermodynamics: The first law of thermodynamics-statement, definition of internal energy and enthalpy, Heat capacities and their relationship, **Joule-Thomson effect- coefficient**, Calculation of work for the expansion of perfect gas under isothermal and adiabatic conditions for reversible processes, State function. Temperature dependence of enthalpy of formation- Kirchoff's equation, Second law of thermodynamics Different Statements of the law, Carnot cycle and its efficiency, Carnot theorem, **Concept of entropy**, entropy as a state function, entropy changes in reversible and irreversible processes. Entropy changes in spontaneous and equilibrium processes. Third law of thermodynamics, Nernst heat theorem, Spontaneous and non- spontaneous processes, Helmholtz and Gibbs Energies-Criteria for spontaneity.

LABORATORY COURSE -IV 30hrs (2 h / w)

Practical Paper-IV (At the end of Semester-IV)

(Course-4L) Organic Qualitative analysis Lab: 50 Marks

Organic Qualitative analysis 50 M

Analysis of an organic compound through systematic qualitative procedure for functional group identification including the determination of melting point and boiling point with suitable derivatives.

Alcohols, Phenols, Aldehydes, Ketones, Carboxylic acids, Aromatic primary amines, amides and simple sugars

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DEPARTMENT OF CHEMISTRY
BOARD OF STUDIES: 2022-23
SECOND YEAR, SEMESTER- IV
Paper IV (Course 5) (INORGANIC & PHYSICAL CHEMISTRY) 60 h (4
h / w)**

INORGANIC CHEMISTRY

UNIT I:

Coordinator Chemistry: IUPAC nomenclature of coordination compounds, Structural and stereoisomerism in complexes with coordination numbers 4 and 6. Valence Bond Theory (VBT): Inner and outer orbital complexes. Limitations of VBT, Crystal field effect, octahedral symmetry. Crystal field stabilization energy (CFSE), Crystal field effects for weak and strong fields. Tetrahedral symmetry, Factors affecting the magnitude of crystal field splitting energy, Spectrochemical series, Comparison of CFSE for Octahedral and Tetrahedral complexes, Tetragonal distortion of octahedral geometry, Jahn-Teller distortion, square planar coordination.

UNIT II:

1. Inorganic Reaction Mechanism:

Introduction to inorganic reaction mechanisms. Concept of reaction pathways, transition state, intermediate and activated complex. Labile and inert complexes, ligand substitution reactions -SN1 and SN2, Substitution reactions in square planar complexes, Trans-effect, theories of trans effect and its applications

2. Stability of metal complexes:

Thermodynamic stability and kinetic stability, factors affecting the stability of metal complexes, chelate effect, determination of composition of complex by Job's method and mole ratio method.

Bioinorganic Chemistry:

Metal ions present in biological systems, classification of elements according to their action in biological system. Geochemical effect on the distribution of metals, Sodium / K - pump, carbonic anhydrase and carboxypeptidase. Excess

and deficiency of some trace metals. Toxicity of metal ions (Hg, Pb, Cd and As), reasons for toxicity, Use of chelating agents in medicine, Cis-platin as an anti-cancer drug. Iron and its application in bio-systems, Haemoglobin, Myoglobin. Storage and transfer of iron.

PHYSICAL CHEMISTRY

UNIT-III:

1 .Phase rule: Concept of phase, components, degrees of freedom. Thermodynamic derivation of Gibbs phase rule. Phase diagram of one component system - water system, Study of Phase diagrams of Simple eutectic systems i) Pb-Ag system, desilverisation of lead ii) NaCl-Water system, Congruent and incongruent melting point- Definition and examples for systems having congruent and incongruent melting point , **freezing mixtures.**

UNIT IV:

Electrochemistry: Specific conductance, equivalent conductance and molar conductance- Definition and effect of dilution. Cell constant. Strong and weak electrolytes, Kohlrausch's law and its applications, Definition of transport number, determination of transport number by Hittorf's method. Debye-Huckel-Onsager's equation for strong electrolytes (elementary treatment only), Application of conductivity measurements- **conductometric titrations.** Electrochemical Cells- Single electrode potential, Types of electrodes with examples: Metal- metal ion, Gas electrode, Inert electrode, Redox electrode, Metal-metal insoluble salt- salt anion. Determination of EMF of a cell, Nernst equation, Applications of EMF measurements - **Potentiometric titrations** Fuel cells- Basic concepts, examples and applications

UNIT V:

Chemical Kinetics:

The concept of reaction rates. Effect of temperature, pressure, catalyst and other factors on reaction rates. Order and molecularity of a reaction, Derivation of integrated rate equations for zero, first and second order reactions (both for equal and unequal concentrations of reactants). Half-life of a reaction. General methods for determination of order of a reaction. Concept of activation energy and its calculation from Arrhenius equation. Theories of

Reaction Rates: Collision theory and Activated Complex theory of bimolecular reactions. Comparison of the two theories (qualitative treatment only). Enzyme catalysis- Specificity, factors affecting enzyme catalysis, Inhibitors and Lock & key model. **Michaels- Menten equation**- derivation, significance of Michaelis-Menten constant.

LABORATORY COURSE -IV 30hrs (2 h / w)

Practical Paper-IV (At the end of Semester-IV)

(Course-5L) Conductometric and Potentiometric Titrimetry Lab : 50 Marks

Conductometric and Potentiometric Titrimetry 50 M

- 1. Conductometric titration-** Determination of concentration of HCl solution using standard NaOH solution.
- 2. Conductometric titration-** Determination of concentration of CH₃COOH Solution using standard NaOH solution.
- 3. Conductometric titration-** Determination of concentration of CH₃COOH and HCl in a mixture using standard NaOH solution.
- 4. Potentiometric titration-** Determination of Fe (II) using standard K₂Cr₂O₇ solution.
- 5. Determination of rate constant for acid catalyzed ester hydrolysis.**

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BOARD OF STUDIES: 2022-23

THIRD YEAR, SEMESTER- V

Paper 6 - D (ENVIRONMENTAL CHEMISTRY) 60 h (4 h / w)

Course6-D: Environmental Chemistry

(Skill Enhancement Course (Elective), Credits -05

Max Marks: 100+50

II Syllabus : (*Total Hours: 90, including Teaching, Lab, Field Skills Training, Unit tests etc.*)

UNIT-I: Introduction

10 h

Environment Definition – Concept of Environmental chemistry- Scope and importance of environment in nowadays – Nomenclature of environmental chemistry – Segments of environment– Effects of human activities on environment – Natural resources–Renewable Resources–Solar and biomass energy and Nonrenewable resources – **Thermal power and atomic energy – Reactions of atmospheric oxygen** and Hydro logical cycle.

UNIT-II:

Air

Pollution

10 h

Definition – Sources of air pollution – Classification of air pollution – Ambient air quality standards- Climate change – Global warming – Pollution from combustion systems- Acid rain – Photochemical smog – Greenhouse effect – Formation and depletion of ozone – Bhopal gas disaster–Instrumental techniques to monitor pollution – **Controlling methods of air pollution.**

UNIT-III:

Water

pollution

10 h

Unique physical and chemical properties of water – **Water quality standards and parameters – Turbidity- pH Dissolved oxygen – BOD, COD, Suspended solids, total dissolved solids, alkalinity–** Hardness of water–Methods to convert temporary hard water in to soft water – Methods to convert permanent hard water into soft water – eutrophication and its effects –**Industrial waste**

water treatment.

UNIT-IV: Chemical Toxicology

10 h

Toxic chemicals in the environment – effects of toxic chemicals – cyanide and its toxic effects – pesticides and its biochemical effects – toxicity of lead, mercury, arsenic and cadmium- Solid waste management.

UNIT-V: Ecosystem and biodiversity

10 h

Ecosystem

Concepts–structure–Functions and types of ecosystem–Abiotic and biotic components – Energy flow and Energy dynamics of ecosystem– Food chains – Food web– Tropic levels–Biogeochemical cycles (carbon, nitrogen and phosphorus)

Biodiversity

Definition – level and types of biodiversity – concept- significance – magnitude and distribution of biodiversity–trends-bio geographical classification of India–biodiversity at national, global and regional level.

Course 6-D: Environmental Chemistry – Practical syllabus

III. Practical (Laboratory) Syllabus: (30 h) (Max.50 M).

1. Identification of various equipment in the laboratory.
2. Determination of carbonate and bicarbonate in water samples by double titration method.
3. Determination of hardness of water using EDTA
 - a) Permanent hardness
 - b) Temporary hardness
4. Determination of Chlorides in water samples by Mohr's method.
5. Determination of pH, turbidity and total solids in water sample.
6. Determination of Ca^{+2} and Mg^{+2} in soil sample by flame photometry.
7. Determination of PH in soil samples using pH metry.

UNIT-IV Green catalysis and Green synthesis 10 hrs.

Heterogeneous catalysis, use of zeolites, silica, alumina, supported catalysis
- bio catalysis: Enzymes, microbes Phase transfer catalysis (micellar /surfactant)

1. Green synthesis of the following compounds: adipic acid, catechol, disodium menudo acetate(alternative Strecker's synthesis)
2. **Microwave assisted reaction in water –Hoffmann elimination** – methyl benzoate to benzoic acid – oxidation of toluene and alcohols–microwave assisted reactions in organic solvents. Diels-Alder reactions and decarboxylation reaction.
3. Ultrasound assisted reactions–sonochemical Simmons–Smith reaction (ultrasonic alternative to iodine)

UNIT – V Nanotechnology in Green chemistry 10 h

Basic concepts of Nano science and Nanotechnology – Bottom-up approach and Top down approaches with examples – Synthesis of Nano materials – Classification of Nanomaterial – Properties and Application of Nanomaterial. Chemical and Physical properties of Nanoparticles – Physical synthesis of nanoparticles – Inert gas condensation - aerosol method - Chemical Synthesis of nanoparticles – precipitation and co-precipitation method, sol-gel method.

Practical (Laboratory) Syllabus: (30 hrs.) (Max.50 Marks).

1. Identification of various equipment in the laboratory.
2. **Acetylation of 1⁰ amine by green method: Preparation of acetanilide**
3. **Rearrangement reaction in green conditions: Benzil - Benzilic acid rearrangement**
4. Radical coupling reaction: Preparation of 1,1-bis -2-naphthol
5. **Green oxidation reaction: Synthesis of adipicacid**
6. **Preparation and characterization of biodiesel from vegetable oil/ waste cooking oil**
7. **Preparation and characterization of Nanoparticles of gold using tea leaves.**
8. Benzoin condensation using Thiamine Hydrochloride as a catalyst instead of cyanide.
9. **Photo reduction of Benzophenone to Benzopinacol in the presence of sunlight.**

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**1.1.3 Details of courses offered by the institution that focus on
employability/ entrepreneurship/ skill development during the year.
2022-2023**



DEPARTMENT OF COMMERCE

Course1A: Fundamentals of Accounting

Unit-I – Introduction – skill and employability.

Need for Accounting – Definition – Objectives, – Accounting Concepts and Conventions – GAAP - Accounting Cycle - Classification of Accounts and its Rules – BookKeeping and Accounting - Double Entry Book-Keeping - Journalizing - Posting to Ledgers, Balancing of Ledger Accounts (including Problems).

Unit-II: Subsidiary Books: Types of Subsidiary Books - Cash Book, Three-column Cash Book-Petty Cash Book (including Problems).

Unit-III: Trial Balance and Rectification of Errors:

Preparation of Trial balance - Errors – Meaning – Types of Errors – Rectification of Errors – Suspense Account (including Problems)

Unit-IV: Bank Reconciliation Statement:

Need for Bank Reconciliation - Reasons for Difference between Cash Book and Pass Book Balances- Preparation of Bank Reconciliation Statement - Problems on both Favourable and Unfavourable Balance (including Problems).

Unit -V: Final Accounts: SKILL AND EMPLOYABILITY

Preparation of Final Accounts: Trading account – Profit and Loss account – Balance Sheet – Final Accounts with Adjustments (including Problems).

Course 1B: Business Organization and Management

Unit-I –Introduction Concepts of Business, Trade, Industry and Commerce: skill and employability.

Business – Meaning, Definition, Features and Functions of Business - Trade Classification – Aids to Trade – Industry Classification and Commerce - Factors Influencing the Choice of Suitable form of Organisation

Unit –II– Forms of Business Organizations: Features,Merits and Demerits of Sole Proprietor Ship and Partnership Business - Features Merits and Demits of Joint Stock Companies - Public Sector Enterprises (PSEs) - Multinational Corporations (MNCs)- Differences between Private Limited Public Limited Company.

Unit-III -Company Incorporation: Preparation of Important Documents for Incorporation of Company - Certificate of Incorporation and Certificate of Commencement of Business - Contents of Memorandum and Articles of Association - Contents ofProspectus

Unit-IV- Management: Meaning Characteristics - Fayol's 14 Principles of Management - Administration Vs Management - Levels of Management

Unit-V-Functions of Management: Different Functions of Management - Meaning – Definition – Characteristics Merits and Demits of Planning - Principles of Organisation – Line and staff of Organisation..

Course 1C: Business Environment Semester – I (Gen & CA)

Skill and employability

Unit-I: Overview of Business Environment:

Business Environment – Meaning – Characteristics – Scope -Macro and Micro Dimensions of Business Environment - Environmental Analysis.

Unit – II: Economic Environment: Economic Environment – Nature of the Economy – Structure of Economy – Economic Policies & Planning the Economic Condition – NITI Ayog – National Development Council – Five Year Plans

Unit-III: Economic Policies: Economic Reforms and New Economic Policy – New Industrial Policy – Competition Law – Fiscal Policy – Objectives and Limitations – Monetary Policy and RBI

Unit – IV: Social, Political and Legal Environment: Concept of Social Responsibility of Business towards Stakeholders - Demonetisation, GST and their Impact - Political Stability - Legal Changes.

Unit-V: Global Environment : Globalization – Meaning – Role of WTO – WTO Functions - IBRD– Trade Blocks, BRICS, SAARC, ASEAN in Globalisation

Course 2A: Financial Accounting: skills and employability

Unit-I: Depreciation: Meaning and Causes of Depreciation - Methods of Depreciation: Straight Line – Written Down Value – Annuity and Depletion Method (including Problems).

Unit-II: Provisions and Reserves: Meaning – Provision vs. Reserve – Preparation of Bad Debts Account – Provision for Bad and Doubtful Debts – Provision for Discount on Debtors – Provision for Discount on Creditors - Repairs and Renewals Reserve A/c (including Problems).

Unit-III: Bills of Exchange: Meaning of Bill – Features of Bill – Parties in the Bill – Discounting of Bill – Renewal of Bill – Entries in the Books of Drawer and Drawee (including Problems).

Unit-IV: Consignment Accounts: Consignment - Features - Proforma Invoice - Account Sales – Del-credere Commission - Accounting Treatment in the Books of Consigner and Consignee - Valuation of Closing Stock - Normal and Abnormal Losses (including Problems).

Unit-V: Joint Venture Accounts: Joint Venture - Features - Difference between Joint- Venture and Consignment – Accounting Procedure – Methods of Keeping Records – One Vendor Keeps the Accounts and Separate Set off Books Methods (including Problems).

Course 2B: Business Economics: Skill

Unit-I: Introduction: Meaning and Definitions of Business Economics - Nature and Scope of Business Economics - Micro and Macro Economics and their Interface.

Unit-II: Demand Analysis: Meaning and Definition of Demand – Determinants to Demand – Demand Function - Law of Demand – Demand Curve – Exceptions to Law of Demand - Elasticity of Demand – Measurements of Price Elasticity of Demand.

Unit – III: Production, Cost and Revenue Analysis: Concept of Production Function – Law of Variable Proportion -Law of Returns to Scale - Classification of Costs -Break Even Analysis –Advantages.

Unit-IV: Market Structure: Concept of Market – Classification of Markets -Perfect Competition – Characteristics – Equilibrium Price -Monopoly – Characteristics – Equilibrium Under Monopoly.

Unit-V: National Income: Meaning – Definition – Measurements of National Income - Concepts of National Income -Components of National Income-Problems in Measuring National Income

References:

Course 2C:Banking Theory and Practice: Skill and employability

Unit-I: Introduction:

Meaning & Definition of Bank – Functions of Commercial Banks – Credit Creation with Examples - Kinds of Banks – Central Banking Vs. Commercial Banking.

Unit-II: Banking Systems:

Unit Banking, Branch Banking, Investment Banking - Innovations in Banking – E banking - Online and Offshore Banking, Internet Banking - Anywhere Banking - ATMs – RTGS- NEFT – MobileBanking

Unit-III: Types of Banks:

Indigenous Banking - Cooperative Banks, Regional Rural Banks, SIDBI, NABARD - EXIM bank

Unit-IV: Banker and Customer:

Meaning and Definition of Banker and Customer – Types of Customers – General Relationship and Special Relationship between Banker and Customer - KYC Norms.

Unit-V: Collecting Banker and Paying Banker:

Concepts - Duties & Responsibilities of Collecting Banker – Holder for Value – Holder in Due Course – Statutory Protection to Collecting Banker - Responsibilities of Paying Banker - Payment Gateways.

Course 4B: cost and management accounting (Gen & CA): Skill and employability

Unit-I:Introduction: Distinguish between Financial Accounting, Cost Accounting and management accounting - Cost Concepts and Classification – Cost Centre and Cost Unit – Preparation of Cost Sheet.

Unit-II: Elements of Cost: Materials: Material control – Selective control, ABC technique – Methods of pricing issues – FIFO, LIFO, Weighted average, Base stock methods, choice of method (including problems).

Unit-III: Labour and Overheads: Labour: Control of labor costs – time keeping and time booking – Idle time –Methods of remuneration – labour incentives schemes - Overheads: Allocation and apportionment of overheads – Machine hour rate.

Unit-IV: Methods of Costing: Job costing – Process costing - treatment of normal and abnormal process losses – preparation of process cost accounts – treatment of waste and scrap, joint products and by products (including problems).

Unit -V: Costing Techniques: Marginal Costing – Standard costing – Variance Analysis (including problems).

Course 3A Advanced Accounting (Gen & CA): Skill and employability

UNIT I:

Accounting for Non Profit Organizations: Non Profit Entities-Meaning -Features of Non-Profit Entities-Provisions as per Sec 8- Accounting Process- Preparation of Accounting Records- Receipts and Payments Account- Income and Expenditure Account - Preparation of Balance Sheet (including simple problems).

UNIT II:

Single Entry System: Features – Differences between Single Entry and Double Entry – Disadvantages of Single Entry-Ascertainment of Profit and Preparation of Statement of Affairs (including Problems).

UNIT III:

Hire Purchase System: Features –Difference between Hire Purchase and Instalment Purchase Systems -Accounting Treatment in the Books of Hire Purchaser and Hire Vendor - Default and Repossession (including Problems).

UNIT IV:

Partnership Accounts-I: Meaning – Partnership Deed - Fixed and Fluctuating Capitals-Accounting Treatment of Goodwill-Admission and Retirement of Partner (including problems).

UNIT V:

Partnership Accounts-II: Dissolution of a Partnership Firm – Application of Garner v/s Murray Rule in India – Insolvency of one or more Partners (including).

Course 3B **BUSINESS STATISTICS** (General & Vocational): Skill and employability

Unit 1: Introduction to Statistics:

Definition, importance and limitations of statistics - Collection of data - Schedule and questionnaire – Frequency distribution – Tabulation -Diagrammatic and graphic presentation of data using Computers (Excel).

Unit 2: Measures of Central Tendency:

Characteristics of measures of Central Tendency-Types of Averages – Arithmetic Mean, Geometric Mean, Harmonic Mean, Median, Mode, Deciles, Percentiles, Properties of averages and their applications.

Unit 3: Measures of dispersion and Skewness:

Properties of dispersion – Range - Quartile Deviation –Mean Deviation-Standard Deviation- Coefficient of Variation-Skewness definition-Karl Pearson's and Bowley's Measures of skewness- Normal Distribution.

Unit 4: Measures of Relation:

Meaning and use of correlation – Types of correlation-Karl Pearson's correlation coefficient – Spearman's Rank correlation-probable error-Calculation of Correlation by Using Computers. Regression analysis comparison between correlation and Regression – Regression Equations- Interpretation of Regression Co-efficient. (Theory only)

Unit 5: Analysis of Time Series & Index Numbers:

Time Series: Components of Time series- Measurement of trend and Seasonal Variations (Time

Index Numbers: Methods of Construction of Index Numbers – Price Index Numbers – Quantity Index Numbers – Tests of Adequacy of Index Numbers – Cost of Index Numbers-Limitations of Index Numbers – Use of Computer Software.

Course 4A corporate Accounting: Skill and employability

Unit-I:

Accounting for Share Capital – division of share capital – equity share vs preferenceshares -Issue and forfeiture of shares (preparation of journals)- concept & process of book building - Issue of rights and bonus shares - Buyback of shares (only theory).

Unit-II:

Issue of Debentures – difference between share and debenture – types of debentures - Employee Stock Options – Accounting Treatment for Convertible and Non-Convertible debentures (preparation of Journal).

Unit –III:

Valuation of Goodwill and Shares: Need and methods - Normal Profit Method, Super Profits Method – Capitalization Method - Valuation of shares - Need for Valuation - Methods of Valuation - Net assets method, Yield basis method, Fair value method (including problems).

UNIT – IV:

Company Final Accounts: Preparation of Final Accounts – Adjustments relating to preparation of final accounts – Profit and loss account and balance sheet – (including problems).

Unit –V

Provisions of the Companies Act, 2013 relating to issues of shares and debentures - Book Building- Preparation of Balance Sheet and Profit and Loss Account – Schedule-III.

Course 4C: Income Tax (Gen & CA) : Skill and Employability

Unit-I: Introduction to Income Tax Law - Basic concepts: Income, Person, Assesse, Assessment year, Agricultural Income, Capital and revenue, Residential status, Income exempt from tax (theory only).

Unit-II: Income from salary: Allowances, perquisites, profits in lieu of salary, deductions from salary income, computation of salary income and qualified savings eligible for deduction u/s 80C (including problems).

Unit-III: Income from House Property: Annual value, let-out/self occupied/ deemed to be let-out house, deductions from annual value - computation of income from house property (including simple problems). - Profits and Gains from Business or Profession (theory only)

Unit-IV: Income from Capital Gains(including problems on long term capital gains)- Income from other sources - (from Individual point of view) - chargeability - and assessment (including simple problems).

Unit-V:Computation of total income of an individual - Deductions under section - 80 (including simple problems).

Course 4D Business Law (Gen & CA : Skill and employability

Unit-I: Contract

Meaning and Definition of Contract-Essential elements of valid Contract -Valid, Void and Voidable Contracts - Indian Contract Act, 1872.

Unit-II: Offer and Acceptance

Definition of Valid Offer, Acceptance and Consideration -Essential elements of a Valid Offer, Acceptance and Consideration.

Unit-III: Capacity of the Parties and Contingent Contract

Rules regarding to Minors contracts - Rules relating to contingent contracts - Different modes of discharge of contracts-Rules relating to remedies to breach of contract.

Unit-IV: Sale of Goods Act 1930

Contract of sale - Sale and agreement to sell - Implied conditions and warranties - Rights of unpaid vendor.

Unit-V: Cyber Law and Contract Procedures - Digital Signature - Safety Mechanisms.

Course 4E Auditing : **Employability** and **Entrepreneurship**

UNITI:

Introduction: Meaning – Objectives – Importance of Auditing – Characteristics - Book Keeping vs Auditing- Accounting vs Auditing –Role of Auditor in Checking Corporate Frauds.

UNITII:

Types of Audit: Based on Ownership, Time and Objective - Independent, Financial, Internal, Cost,Tax,Government,SecretarialAudits

UNITIII:

Planning of Audit: Steps to be taken at the Commencement of a New Audit – Audit Programme – Audit Note Book– Audit Working Courses - Audit Evidence - Internal Check, Internal Audit and Internal Control.

UNITIV:

Vouching and Investigation: Definition and Importance ofVouching–Objectives of Vouching-Vouching of Cash and Trading Transactions–Investigation-Auditingvs. Investigation

UNITV:

Company Audit and Auditors Report: Auditor's Qualifications – Appointment andReappointment–Rights,Duties,LiabilitiesandDisqualifications-AuditReport:Contents–Preparation-RelevantProvisionsofCompaniesAct, 2013.

Course 16-C: DIGITAL MARKETING(**Skill** ,**employability** and **entrepreneurship**)

Unit 1: Introduction

Digital marketing: Meaning – importance – traditional online marketing vs digital marketing –online market place analysis Micro Environment – Online Macro Environment - trends in digitalmarketing – competitive analysis.

Unit – II: Web site planning and creation

Web Site: meaning – objectives – components of website - website creation – incorporation of design and– adding content, installing and activating plugging.

Unit 3: Search Engine Optimization (SEO)

SEO: Meaning – History and growth of SEO –Importance of Search Engine - On page Optimization – off page optimization – Role of Search Engine Operation- google Ad words–Search Engine Marketing: Campaign Creation – Ad Creation, Approval and Extensions.

Unit 4: Social Media Marketing:

Meaning of social media and Social Media Marketing – social Management tools-strategy and planning – social media network – Social Networking – video creation and sharing – use of different social media platforms - Content creation - Blogging – Guest Blogging.

Unit 5: Email marketing:

Meaning – Evolution of email – importance of email marketing – Development and Advancements in e mail marketing - email marketing platforms – creating and Tracking emailers –create forms – create opt-in lists – mapping industry trends

Course 17 C -Service Marketing (Skill and Employability and entrepreneurship)

Unit 1: Introduction: Nature and Scope of services

Introduction: Nature and Scope of services characteristics of services, classification of services – need for service marketing - reasons for the growth of services sector, Overview of marketing Different Service Sectors -Marketing of Banking Services - Marketing in Insurance Sector -Marketing of Education Services.

Unit-2: Consumer Behavior in Services Marketing

Customer Expectations on Services- Factors influencing customer expectation of services. - Service Costs experienced by Consumer, the Role of customer in Service Delivery, Conflict Handling in Services, Customer Responses in Services, Concept of Customer Delight

Unit-3: Customer Relationship marketing and Services Market Segmentation.

Customer Relationship marketing: Meaning -Importance of customer & customer's role in Service delivery, Benefits of customer relationship, retention strategies. Services Market Segmentation: - Market segmentation -Basis & Need for segmentation of services, bases of Segmentation services, segmentation strategies in service marketing.

UNIT 4: Customer Defined Service Standards.

Customer Defined Service Standards - Hard and Soft, Concept of Service Leadership and Service Vision -Meeting Customer Defined Service Standards -Service Flexibility Versus Standards - Strategies to Match Capacity and Demand - managing Demand and Supply of Service –applications of Waiting Line and Queuing Theories to Understand Pattern.

Unit 5: Service Development and Quality Improvement.

Service Development – need, importance and Types of New Services - stages in development of new services, service Quality Dimensions - Service Quality Measurement and Service Mapping, Improving Service Quality and Service Delivery, Service Failure and Recovery.

Course 18 A: MANAGEMENT ACCOUNTING AND PRACTICE

(Skill, Employability and entrepreneurship)

UNIT I: Introduction

Nature & Scope of Management Accounting – Management Accounting Principles – Significance of Management Accounting - Difference between management accounting, financial accounting and Cost accounting – Limitations of Management Accounting – Installation of Management Accounting – Tools of Management Accounting.

UNIT 2: Ratio Analysis Meaning - Advantages and Limitation of Ratio Analysis – Types of Ratios – Profitability Ratios-

Gross Profit Ratio (GPR) – Net Profit Ratio (NPR) – Operating Ratio – Solvency Ratios- Current Ratio – Liquidity Ratio – Debt-Equity Ratio-Turnover Ratios-Fixed Assets Turnover Ratio –

Working Capital Turnover Ratio – Debtors Turnover Ratio – Creditors Turnover Ratio - Stock

Turn Over Ratio - Return on Investment (ROI)-Calculation and interpretation.

UNIT 3: Fund Flow and Cash Flow Analysis as per AS3

Meaning and Concept of Working Capital (Fund) – Fund Flow Statement – Meaning and Uses of Funds Flow Statement – Preparation of Funds Flow Statement. Cash Flow Statement – Meaning and Uses of Cash Flow Statement – Preparation of Cash Flow Statement – Difference between Cash Flow Statement and Funds flow Statement.

UNIT 4: Budgeting and Budgetary Control

Meaning of Budget – Forecast and Budget - Elements of Budget – Features – objectives and budget procedure – Classification of Budgets - Meaning of Control – Meaning of Budgetary control – objectives of Budgetary control system – Advantages and Limitations of Budgetary control system. Prepare cash budget, fixed budget and flexible budget.

UNIT 5: Management Reporting:

Reports - Meaning – Modes of Reporting – Requisites of a good report – Kinds of Reports – General formats of Reports - Need for Management Reporting- financial reporting Vs. Management Reporting - Strategies for Writing Effective Reporting.

Course 19 A: COST CONTROL TECHNIQUES

(Skill, Employability and entrepreneurship)

Unit 1: Introduction-Nature and Scope

Introduction: Meaning of Cost Control – Cost Control Techniques – Requisites of effective Cost Control System – Cost Reduction – meaning – essentials for an effective cost Reduction Program– Scope of cost reduction - Difference between Cost Control and Cost Reduction – Meaning of cost audit – Types of Cost Audit – Auditing techniques.

Unit 2: Activity Based Costing

Concept of ABC – Characteristics of ABC – Categories of ABC – Allocation of Overheads Under ABC – Cost Reduction under ABC – advantages of implementing ABC – Application on overhead allocation on the basis of ABC

Unit 3: Cost Volume Profit Analysis (CVP Analysis)

Applications of Marginal Costing – profitplanning – Evaluation of Performance-fixing selling price – Key Factor –Make or Buy decision – Accept or Reject - closing down or suspending activities.

Unit 4: Standard Costing and Variance Analysis

Concept of Standard Cost and Standard Costing – Advantages and limitations – analysis of Variances -importance of Variance Analysis - computation and application of variances relating to material and labour.

Unit 5: Application of Modern Techniques

Kaizen Costing – Introduction – objectives – scope –Principles – 5 S (Sort, Set in Order, Shine, Standardize, and Sustain) in Kaizen Costing– Advantages and Disadvantages of Kaizen Costing .Learning Curve Analysis-concept and Application.

Course- 20-B. LIFE INSURANCE WITH PRACTICE

(Skill, Employability and entrepreneurship)

Unit-I: Features of Life insurance contract

Life Insurance- Features- Advantages - Group Insurance – Group Gratuity Schemes – Group Superannuation Schemes, Social Security Schemes- Life Insurance companies in India.

Unit-II: Plans of Life Insurance

Types of Plans: Basic - Popular Plans – Term Plans-Whole Life-Endowment-Money Back-Savings-Retirement-Convertible - Joint Life Policies - Children's Plans - Educational Annuity Plans - Variable Insurance Plans – Riders

Unit-III: Principles of Life Insurance

Utmost Good Faith- Insurable Interest- Medical Examination - Age proof, Special reports - Premium payment - Lapse and revival – Premium, Surrender Value, Non-Forfeiture Option -Assignment of Nomination- Loans – Surrenders – Foreclosure.

Unit-IV: Policy Claims

Maturity claims, Survival Benefits, Death Claims, Claim concession - Procedures Problems in claim settlement - Consumer Protection Act relating to life insurance and insurance claims.

Unit-V: Regulatory Framework and Middlemen

Role of IRDAI & other Agencies - Regulatory Framework - Mediators in Life Insurance – Agency services – Development Officers and other Officials.

Course 21- B. GENERAL INSURANCE PROCEDURE AND PRACTICE

(Skill and employability)

Unit-I: Introduction

General Insurance Corporation Act - General Insurance Companies in India - Areas of General Insurance- Regulatory Framework of Insurance- IRDA - Objectives -Powers and Functions -Role of IRDA- Insurance Advisory Committee.

Unit-II: Motor Insurance

Motor Vehicles Act 1988 - Requirements for compulsory third party insurance – Policy Documentation & Premium- Certificate of insurance – Liability without fault Compensation on structure formula basis - Hit and Run Accidents.

Unit-III: Fire & Marine Insurance

Kinds of policies – Policy conditions –Documentation- Calculation of premium- Calculation of Loss- Payment of claims.

Unit-IV: Agriculture Insurance

Types of agricultural insurances - Crop insurance - Problems of crop insurance - Crop Insurance Vs Agricultural relief - Considerations in Crop insurance - Live Stock Insurance.

Unit-V: Health & Medical Insurance

Types of Policies-Calculation of Premium- Riders-Comprehensive Plans-Payment of Claims.

**A.S.D. GOVERNMENT DEGREE COLLEGE FOR WOMEN
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**1.1.3 Details of courses offered by the institution that focus on employability/
entrepreneurship/ skill development during the year.**



DEPARTMENT OF COMPUTER APPLICATIONS

**A.S.D. GOVERNMENT DEGREE COLLEGE FOR WOMEN(A)
DEPARTMENT OF COMPUTER SCIENCE**

I B.Com(C.A.) – II Semester

Course:E-COMMERCE AND WEB DESIGNING

Course Code:

No. of Hours/Week: 3

Paper II

Learning Outcomes:

At the end of the course, the students is expected to demonstrate the following cognitive abilities (thinking skill) and psychomotor skills.

A.Remembers and states in a systematic way (Knowledge)

1. Understand the foundations and importance of E-commerce
2. Define Internet trading relationships including Business to Consumer, Business to Business, Intra-organizational
3. Describe the infrastructure for E-commerce
4. Discuss legal issues and privacy in E-Commerce
5. Understand the principles of creating an effective web page, including an in-depth consideration of information architecture

B. Explains (Understanding)

6. Recognize and discuss global E-commerce issues
7. Learn the language of the web: HTML and CSS.

C. Critically examines, using data and figures (Analysis and Evaluation)

8. Analyze the impact of E-commerce on business models and strategy
9. Assess electronic payment systems
10. Exploring a web development framework as an implementation example and create dynamically generated web site complete with user accounts, page level security, modular design using css

D. Working in 'Outside Syllabus Area' under a Co-curricular Activity(Creativity)

Use the Systems Design Approach to implement websites with the following steps:

- Define purpose of the site and subsections
- Identify the audience
- Design and/or collect site content
- Design the website theme and navigational structure
- Design & develop web pages including: CSS Style Rules, Typography, Hyperlinks, Lists, Tables, Frames, Forms, Images, Behaviours, CSS Layouts

E. Build a site based on the design decisions and progressively incorporate tools and techniques covered

Unit I: Introduction: (Skill)

Meaning, Nature, Concepts, Advantages, Disadvantages and reasons for Transacting Online, Types of E-Commerce, e-commerce Business Models (Introduction , Key Elements of a Business Model And Categorizing Major E-Commerce Business Models), Forces Behind e-commerce.

Technology used in E-commerce: The dynamics of World Wide Web and Internet (Meaning, Evolution and Features); Designing, Building and Launching e-commerce website (A systematic approach involving decisions regarding selection of hardware, software, outsourcing Vs. in-house development of a website)

Unit-II: E-payment System:

Models and methods of e-payments (Debit Card, Credit Card, Smart Cards, e-money), Digital Signatures (Procedure, Working And Legal Position), Payment Gateways, Online Banking (Meaning, Concepts, Importance, Electronic Fund Transfer, Automated Clearing House, Automated Ledger Posting), Risks Involved in e-payments.

Unit-III: On-line Business Transactions: (Skill)

Meaning, Purpose, Advantages and Disadvantages of Transacting Online, E Commerce Applications in Various Industries Like {Banking, Insurance, Payment of Utility Bills, Online Marketing, E-Tailing (Popularity, Benefits, Problems and Features), Online Services (Financial, Travel and Career)}, Auctions, Online Portal, Online Learning, Publishing and Entertainment} Online Shopping (Amazon, Snap Deal, Alibaba, Flipkart, etc.)

Unit-IV: Website designing (Skill & Employability)

Designing a home page, HTML document, Anchor tag Hyperlinks, Head and body section, Header Section, Title, Prologue, Links, Colorful Pages, Comment, Body Section, Heading Horizontal Ruler, Paragraph, Tabs, Images And Pictures, Lists and Their Types, Nested Lists, Table Handling.

Frames: Frameset Definition, Frame Definition, Nested Framesets, Forms and Form elements. DHTML and Style Sheets: Defining Styles, elements of Styles, linking a style sheet to a HTML Document, Inline Styles, External Style Sheets, Internal Style Sheets & Multiple Style Sheets.

Unit V: Security and Encryption: (Employability & Entrepreneurship)

Need and Concepts, E-Commerce Security Environment: (Dimension, Definition and Scope Of E-Security), Security Threats in The E-Commerce Environment (Security Intrusions and Breaches, Attacking Methods Like Hacking, Sniffing, Cyber Vandalism Etc.), Technology Solutions (Encryption, Security Channels Of Communication, Protecting Networks And Protecting Servers And Clients)

References:

1. E-commerce and E-business Himalaya publishers
2. E-Commerce by Kenneth C Laudon, PEARSON INDIA
3. Web Design: Introductory with MindTap Jennifer T Campbell, Cengage
4. HTML & WEB DESIGN:TIPS& TECHNIQUES JAMSA, KRIS, McGraw Hill
5. Fundamentals Of Web Development by Randy Connolly, Ricardo Hoar,Pearson
6. HTML & CSS: COMPLETE REFERENCE POWELL,THOMAS, McGrawHill

Online Resources:

<http://www.kartrocket.com>

<http://www.e-commerceceo.com>

<http://www.fastspring.com>

<https://teamtreehouse.com/tracks/web-design>

**A.S.D. GOVERNMENT DEGREE COLLEGE FOR WOMEN(A)
DEPARTMENT OF COMPUTER SCIENCE**

II B.Com(C.A.) – III Semester

Course: Programming with C & C++

Course Code:

No. of Hours/Week: 3

Paper : III

Course Objective:

To impart basic knowledge of C Programming language so that Students will be able to develop logics and applications to solve real time problems using C and To impart knowledge on fundamentals of Object Oriented Programming.

Course Outcomes:

At the end of the course, the student is expected to demonstrate the following abilities (thinking skill) and psychomotor skills.

A. Remembers and states in a systematic way (Knowledge)

1. Develop programming skills
2. Declaration of variables and constants use of operators and expressions
3. learn the syntax and semantics of programming language
4. Be familiar with programming environment of C and C++
5. Ability to work with textual information (characters and strings) & arrays

B. Explains (Understanding)

6. Understanding a functional hierarchical code organization
7. Understanding a concept of object thinking within the framework of functional model
8. Write program on a computer, edit, compile, debug, correct, recompile and run it
9. Choose the right data representation formats based on the requirements of the problem
10. Analyze how C++ improves C with object-oriented features
11. Evaluate comparisons and limitations of the various programming constructs and choose correct one for the task in hand.

C. Critically examines, using data and figures (Analysis and Evaluation)

D. Working in 'Outside Syllabus Area' under a Co-curricular Activity(Creativity)
Planning of structure and content, writing, updating and modifying computer programs for user solutions

E. Exploring C programming and Design C++ classes for code reuse (Practical skills***)

Unit I: Introduction and Control Structures

History of 'C' - Structure of C program – C character set, Tokens, Constants, Variables, Keywords, Identifiers – C data types - C operators - Standard I/O in C - Applying if and Switch Statements. (Skill)

Unit-II: Loops And Arrays (Skill)

Use of While, Do While and For Loops - Use of Break and Continue Statements -Array Notation and Representation - Manipulating Array Elements - Using Multi-Dimensional Arrays.

Unit-III: Strings and Functions (Skill)

Declaration and Initialization of String Variables - String Handling Functions - Defining Functions-

Function Call - Call By Value, Recursion

Unit-IV: Principles of Object Oriented Programming

Procedure Oriented Programming, Object Oriented Programming, Basic concepts of Object Oriented Programming, Applications of C++, A simple C++ Program, An example with Class, Structure of C++ Program, Creating source file, Compiling and Linking.

Unit V: Classes and Objects:

Tokens, Keywords, Declaration of Variables, Dynamic initialization of variables, Specifying a Class, Defining member functions, Function overloading, Operator Overloading, Constructors and Destructors, Inheritance and types of Inheritance. (Employability)

References:

1. E. Balagurusamy "Object oriented programming with C++"
2. R.Ravichandran "Programming with C++"
3. Mastering C by K R Venugopal and Sudeep R Prasad, McGraw Hill
4. Expert C Programming: Deep Secrets Kindle Edition [Peter van der Linden](#)
5. Let Us C [Yashavant Kanetkar](#)
6. The C++ Programming Language [Bjarne Stroustrup](#)
7. C++ Primer [Stanley B. Lippman](#), [Josée Lajoie](#), [Barbara E. Moo](#)

Online Resources:

<https://www.tutorialspoint.com/cprogramming/index.html>

<https://www.learn-c.org/>

<https://www.programiz.com/c-programming>

<https://www.w3schools.in/c-tutorial/>

<https://www.cprogramming.com/tutorial/c-tutorial.html>

<https://www.tutorialspoint.com/cplusplus/index.html>

<https://www.programiz.com/cpp-programming><http://www.cplusplus.com/doc/tutorial/>

<https://www.learn-cpp.org/>

<https://www.javatpoint.com/cpp-tutorial>

A.S.D. GOVERNMENT DEGREE COLLEGE FOR WOMEN(A)
DEPARTMENT OF COMPUTER SCIENCE
II B.Com(C.A.) – IV Semester

Course: Database Management Systems

Course Code:

No. of Hours/Week: 3

Paper : III

Course Objective:

To present an introduction to database management systems, with an emphasis on how to organize, maintain and retrieve - efficiently, and effectively - information from a DBMS.

Course Outcomes:

At the end of the course, the students is expected to demonstrate the following abilities (thinking skill) and psychomotor skills.

- A. Remembers and states in a systematic way (Knowledge)
 1. Understand the role of a database management system in an organization.
 2. Understand basic database concepts, including the structure and operation of the relational data model.
 3. Understand and successfully apply logical database design principles, including E-R diagrams and database normalization
 4. Understand Functional Dependency and Functional Decomposition
- B. Explains (Understanding)
 5. To design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS.
 6. Perform PL/SQL programming using concept of Cursor Management, Error Handling, Packages
- C. *Critically examines, using data and figures (Analysis and Evaluation)*
 7. Apply various Normalization techniques
 8. Model an application's data requirements using conceptual modeling tools like ER diagrams and design database schemas based on the conceptual model
- D. Working in 'Outside Syllabus Area' under a Co-curricular Activity(Creativity)
Design and implement a small database project
- E. Construct simple and moderately advanced database queries using Structured Query Language (SQL)(Practical skills)

Unit I: Overview of Database Management System

Introduction, Data and Information, Database, Database Management System, Objectives of DBMS, Evolution of Database Management System, Classification of Database Management System.

Unit-II: File-Based System (Skill)

File Based System. Drawbacks of File-Based System, DBMS Approach, Advantage of DBMS, Data Models, Components of Database System, Database Architecture, DBMS Vendors and their products.

Unit-III: Entity-Relationship Model

Introduction, The Building Blocks of an Entity-Relationship, Classification of Entity Set, Attribute Classification, Relationship Degree, Relationship Classification, Generalization and Specialization,

Aggregation and Composition CODD'S Rules, Relational Data Model, Concept of Relations Integrity. (Employability)

Unit-IV: Structured Query Language (Skill & Entrepreneurship)

Introduction, History of SQL Standards, Commands in SQL, Data types in SQL, Data Definition Language (DDL), Selection Operation Projection Operation, Aggregate Functions, Data Manipulation Language, Table Modification, Table Truncation, Imposition of Constraints, Set Operations

Unit V:PL/SQL

Introduction, Structure of PL/SQL, PL/SQL Language Elements, Data Types, Control Structure, Steps to Create a PL/SQL Program, Iterative Control Cursors, Steps to Create a Cursor, Exceptions Handling, Database Triggers, Types of triggers. (Employability)

References:

1. Paneerselvam: Database Management system, PHI.
2. David Kuklinski, Osborne, Data management system McGraw Hill Publication.
3. Shgirley Neal And Kenneth LC Trunik Database management system in Business- PHI.
4. Godeon C. EVEREST, Database Management- McGraw Hill Book Company.
5. MARTIN, Database Management- Prentice Hall of India, New Delhi.
6. Bipin C. Desai, 'An Introduction to Database System', Galgotia Publications
7. Korth, Database Management System.
8. Navathe, Database Management System.
9. S. Sumathi, S. Esakkirajan, Fundamentals of Relational Database Management System

Online resources:

[http:// www.onlinegdb.com/](http://www.onlinegdb.com/) <http://>

www.tutorialspoint.com/ <http://learnsql.com>

<https://www.codecademy.com/learn/learn-sql/>

<https://www.w3schools.com/sql/default.asp>

A.S.D. GOVERNMENT DEGREE COLLEGE FOR WOMEN(A)
DEPARTMENT OF COMPUTER SCIENCE
III B.Com(C.A.) – V Semester

Course: BIG DATA ANALYTICS USING R

Course Code:

No. of Hours/Week: 3

Paper : 6A

Course Outcomes:

Upon successful completion of the course, a student will be able to:

1. Understand data and classification of digital data.
2. Understand Big Data Analytics.
3. Load data in to R.
4. Organize data in the form of R objects and manipulate them as needed.
5. Perform analytics using R programming.

Unit I: Introduction to Big data (Skill)

Data, classification Of Digital Data--structured, unstructured, semi-structured data, characteristics of data, evaluation of big data, definition and challenges of big data, what is big data and why to use big data ?, business intelligence Vs big data.

Unit-II: Big data Analytics

What is and isn't big data analytics? Why hype around big data analytics? Classification of analytics, top challenges facing big data, importance of big data analytics, technologies needed to meet challenges of big data.

Unit-III: Introduction to R and getting started with R (Skill & Entrepreneurship)

What is R? Why R? , advantages of R over other programming languages, Data types in R-logical, numeric, integer, character, double, complex, raw, coercion, ls() command, expressions, variables and functions, control structures, Array, Matrix, Vectors, R packages.

Unit-IV: Exploring data in R (Skill,)

Data frames-data frame access, ordering data frames, R functions for data frames dim(), nrow(), ncol(), str(), summary(), names(), head(), tail(), edit() .Load data frames—reading from .CSV files, sub setting data frames, reading from tab separated value files, reading from tables.

Unit V: Data Visualization using R (Employability)

Reading and getting data into R (External Data): XML files, Web Data, JSON files, Databases, Excel files.

Working with R Charts and Graphs: Histograms, Bar Charts, Line Graphs, Scatterplots, Pie Charts

References:

1. Seema Acharya , Subhashini Chellappan --- Big Data And Analytics second edition, Wiley
2. Seema Acharya--Data Analytics using R, McGraw Hill education (India) Private Limited.
3. Big Data Analytics, Introduction to Hadoop, Spark, and Machine-Learning, Raj kamal, Preeti Saxena, McGraw Hill, 2018.
4. Big Data, Big Analytics: Emerging Business intelligence and Analytic trends for Today's Business, Michael Minelli, Michelle Chambers, and Ambiga Dhiraj, John Wiley & Sons,

A.S.D. GOVERNMENT DEGREE COLLEGE FOR WOMEN(A)
DEPARTMENT OF COMPUTER SCIENCE
III B.Com(C.A.) – V Semester

Course: DATA SCIENCE USING PYTHON

Course Code:

No. of Hours/Week: 3

Paper : 7A

Course Outcomes:

Upon successful completion of the course, a student will be able to:

1. Understand basic concepts of data science
2. Understand why python is a useful scripting language for developers.
3. Use standard programming constructs like selection and repetition.
4. Use aggregated data (list, tuple, and dictionary).
5. Implement functions and modules.

Unit I: Introduction to data science (Skill)

Data science and its importance, advantages of data science, the process of data science,

Responsibilities of a data scientist, qualifications of data scientists, would you be a good data scientist, why to use python for data science.

Unit-II: Introduction to python (Skill & Entrepreneurship)

What is python , features of python, history of python, writing and executing the python program, basic syntax, variables, keywords, data types ,operators ,indentation, Conditional statements-if, if-else, nested if-else, looping statements-for, while, break, continue, pass

Unit-III: Control structures and strings (Skill)

Strings - definition, accessing, slicing and basic operations

Lists - introduction, accessing list, operations, functions and methods,

Tuples - introduction, accessing tuple

Dictionaries - introduction, accessing values in dictionaries

Unit-IV: Functions and modules (Entrepreneurship)

Functions - defining a function, calling a function, types of functions, function arguments, local and global variables, lambda and recursive functions, Modules- math and random

Unit V: Classes & Objects (Employability)

Classes and Objects, Class method and self-argument, class variables and object variables, public and private data members, private methods, built-in class attributes, static methods.

References:

1. Steven cooper--- Data Science from Scratch, Kindle edition
Reemathareja—Python Programming using problem solving approach, Oxford Publication

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**1.1.3 Details of courses offered by the institution that focus on employability/
entrepreneurship/ skill development during the year.**



DEPARTMENT OF COMPUTER SCIENCE

A.S.D. GOVERNMENT DEGREE COLLEGE FOR WOMEN(A)
DEPARTMENT OF COMPUTER SCIENCE
I B.Sc. – II Semester

Course: DATA STRUCTURES USING C

Course Code:

No. of Hours/Week: 4

Paper : II

Course Objective:

To introduce the basic concepts of Data Structures and inculcate Knowledge on various types of Data Structures. Also to provide exposure on various Searching and Sorting Techniques.

Course Outcomes:

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

1. Understand fundamental concepts of Data structures and to design Linked lists.
2. Implement linear data structures stacks, queues.
3. Design non-linear data structures like trees, graphs and implement their operations.
4. Compare and Contrast different searching and sorting techniques.
5. Have knowledge on Data Structures basic operations like insert, delete, search, update and traversal
6. Design and develop programs using various data structures

UNIT I

Introduction to Data Structures: Introduction to the Theory of Data Structures, Data Representation, Abstract Data Types, Data Types, Primitive Data Types, Data Structure and Structured Type, Atomic Type, Difference between Abstract Data Types, Data Types, and Data Structures, Refinement Stages

Principles of Programming and Analysis of Algorithms: Software Engineering, Program Design, Algorithms, Different Approaches to Designing an Algorithm, Complexity, Big 'O' Notation, Algorithm Analysis.

UNIT II (Skill)

Arrays: Introduction to Linear and Non- Linear Data Structures, One- Dimensional Arrays, Array Operations, Two- Dimensional arrays, Multidimensional Arrays.

Linked Lists: Introduction to Lists and Linked Lists, Dynamic Memory Allocation, Basic Linked List Operations, Doubly Linked List, Circular Linked List, Atomic Linked List, Linked List in Arrays, Linked List versus Arrays

UNIT III (Employability)

Stacks: Introduction to Stacks, Stack as an Abstract Data Type, Representation of Stacks through Arrays, Representation of Stacks through Linked Lists, Applications of Stacks, Stacks and Recursion

Queues: Introduction, Queue as an Abstract data Type, Representation of Queues, Circular Queues, Double Ended Queues- Deques, Priority Queues, Application of Queues

UNIT IV(Skill)

Binary Trees: Introduction to Non- Linear Data Structures, Introduction Binary Trees, Types of Trees, Basic Definition of Binary Trees, Properties of Binary Trees, Representation of Binary Trees,

Operations on a Binary Search Tree, Binary Tree Traversal, Counting Number of Binary Trees, Applications of Binary Tree

UNIT V (Employability)

Searching and sorting: Sorting – An Introduction, Bubble Sort, Insertion Sort, Merge Sort, Quick Sort

Searching – An Introduction, Linear or Sequential Search, Binary Search.

Graphs: Introduction to Graphs, Terms Associated with Graphs, Sequential Representation of Graphs, Linked Representation of Graphs, Traversal of Graphs, Spanning Trees, Shortest Path, Application of Graphs.

Additional Inputs:

Polynomial Representation using Linked List, Drawback of Binary Search Trees, Right Skewed and Left Skewed Binary Search Trees, Balanced Trees: AVL Trees.

Note: Concepts from Additional inputs must be excluded from Examinations

Text Books:

1. “Data Structures using C”, ISRD group Second Edition, TMH
2. “Data Structures through C”, Yashavant Kanetkar, BPB Publications
3. “Data Structures Using C” Balagurusamy E. TMH

Reference Books:

1. Data Structures Using C++ by D S Malik, Thomson, India Edition 2006.
2. Data Structures, Algorithms and Applications in C++ by Sahni S, McGraw-Hill, 2002.
3. Classic Data Structures by Samanta.D, Prentice-Hall of India, 2001.
4. Data Structures and Algorithms with Object-Oriented Programming by Heilman G I, Tata McGraw-Hill. 2002. (Chapters I and 14).

Introduction to Data Structures with Applications by Tremblay P. and Sorenson P. G., Tata McGraw-Hill,

A.S.D. GOVERNMENT DEGREE COLLEGE FOR WOMEN(A)
DEPARTMENT OF COMPUTER SCIENCE
II B.Sc. – III Semester

Course: DATA BASE MANAGEMENT SYSTEM

Course Code :

No. of Hours/Week: 4

Paper : III

Course Objective:

To present an introduction to database management systems, with an emphasis on how to organize, maintain and retrieve - efficiently, and effectively - information from a DBMS.

Course Outcomes:

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

1. Understand DBMS concepts, data models and Architecture.
2. Understand ER concepts and ER mapping to relational model
3. Improve the database design by normalization.
4. Make use of SQL to retrieve and maintain relational database.
5. Illustrate various constructs in PL/SQL.

UNIT – I (Skill)

Overview of Database Management System: Introduction to data, information, database, database management systems, file-based system, Drawbacks of file-Based System, database approach, Classification of Database Management Systems, advantages of database approach, Various Data Models, Components of Database Management System, three schema architecture of data base, costs and risks of database approach.

UNIT - II

Entity-Relationship Model: Introduction, the building blocks of an entity relationship diagram, classification of entity sets, attribute classification, relationship degree, relationship classification, reducing ER diagram to tables, enhanced entity-relationship model (EER model), generalization and specialization, IS A relationship and attribute inheritance, multiple inheritance, constraints on specialization and generalization, advantages of ER modelling.

UNIT III (Skill & Employability)

Relational Model: Introduction, CODD Rules, relational data model, concept of key, relational integrity, relational algebra, relational algebra operations, advantages of relational algebra limitations of relational algebra, relational calculus, tuple relational calculus, domain relational Calculus (DRC), Functional dependencies and normal forms upto 3rd normal form.

UNIT IV (Skill)

Structured Query Language: Introduction, History of SQL Standard, Commands in SQL, Data Types in SQL, Data Definition Language, Selection Operation, Projection Operation, Aggregate functions, Data Manipulation Language, Table Modification Commands, Join Operation, Set Operations, View, Sub Query.

UNIT V (Employability)

PL/SQL: Introduction, Shortcomings of SQL, Structure of PL/SQL, PL/SQL Language Elements, Data Types, Operators Precedence, Control Structure, Steps to Create a PL/SQL, Program, Iterative Control, Procedure, Function, Database Triggers, Types of Triggers.

Additional Inputs:

Transaction Management and Concurrency Control: What is transaction, Concurrency control, Concurrency control with locking Methods, Concurrency control with time stamping methods.

Note: Concepts from Additional inputs must be excluded from Examinations

Text Books:

1. Database System Concepts by Abraham Silberschatz, Henry Korth, and S. Sudarshan, McGrawhill, 2010.
2. Database Management Systems by Raghu Ramakrishnan, McGrawhill, 2002.
3. Fundamentals of Relational Database Management Systems by S. Sumathi, S. Esakkirajan, Springer Publications.
4. SQL: The Ultimate Beginners Guide by Steve Tale.

Reference Books:

1. An Introduction to Database Systems by Bipin C Desai
2. Principles of Database Systems by J. D. Ullman
3. Fundamentals of Database System by R. Elmasri and S. Navathe
4. Database Systems Design, Implementation and Management by Peter Rob, Carlos Coronel Seventh Edition, Thomson , 2007.

A.S.D. GOVERNMENT DEGREE COLLEGE FOR WOMEN(A)
DEPARTMENT OF COMPUTER SCIENCE
II B.Sc. – IV Semester

Course: OBJECT ORIENTED PROGRAMMING THROUGH JAVA

Course Code:

No. of Hours/Week: 4

Paper : IV

Course Objective:

To impart knowledge on fundamentals of Object Oriented Programming, classes, inheritance, interfaces and packages and to make the students understand the concept of exception handling and multithreading.

Course Outcomes:

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

1. Understand and Apply Object Oriented features and understand the basics of Java.
2. Develop problem-solving and programming skills using OOP concepts.
3. Apply the concepts of inheritance and to create arrays, strings.
4. Able to demonstrate Exception Handling and Multithreading.
5. Develop efficient Java applets and applications using OOP concepts.

UNIT- I (Skill)

Introduction to Java: Features of Java, The Java virtual Machine, Parts of Java

Naming Conventions and Data Types: Naming Conventions in Java, Data Types in Java, Literals

Operators in Java: Operators, Priority of Operators

Control Statements in Java: if.. else Statement, do... while Statement, while Loop, for Loop, switch Statement, break Statement, continue Statement, return Statement

Input and Output: Accepting Input from the Keyboard, Reading Input with Java.util.Scanner Class, Displaying Output with System.out.printf(), Displaying Formatted Output with String.format()

Arrays: Types of Arrays, Three Dimensional Arrays (3D array), arrayname.length, Command Line Arguments

UNIT-II (Skill & Entrepreneurship)

Strings: Creating Strings, String Class Methods, String Comparison, Immutability of Strings

Introduction to OOPs: Problems in Procedure Oriented Approach, Features of Object-Oriented Programming System (OOPS)

Classes and Objects: Object Creation, Initializing the Instance Variables, Access Specifiers, Constructors

Methods in Java: Method Header or Method Prototype, Method Body, Understanding Methods, Static Methods, Static Block, The keyword 'this', Instance Methods, Passing Primitive Data

Types to Methods, Passing Objects to Methods, Passing Arrays to Methods, Recursion, Factory Methods

Inheritance: Inheritance, The keyword 'super', The Protected Specifier, Types of Inheritance

UNIT-III (Employability)

Polymorphism: Polymorphism with Variables, Polymorphism using Methods, Polymorphism with Static Methods, Polymorphism with Private Methods, Polymorphism with Final Methods, final Class

Type Casting: Types of Data Types, Casting Primitive Data Types, Casting Referenced Data Types, The Object Class , **Abstract Classes:** Abstract Method and Abstract Class

Interfaces: Interface, Multiple Inheritance using Interfaces

Packages: Package, Different Types of Packages, The JAR Files, Interfaces in a Package, Creating Sub Package in a Package, Access Specifiers in Java, Creating API Document

Exception Handling: Errors in Java Program, Exceptions, throws Clause, throw Clause, Types of Exceptions, Re – throwing an Exception

UNIT-IV

Streams: Stream, Creating a File using FileOutputStream, Reading Data from a File using FileInputStream, Creating a File using FileWriter, Reading a File using FileReader, **Threads:** Single Tasking, Multi Tasking, Uses of Threads, Creating a Thread and Running it, Terminating the Thread, Single Tasking Using a Thread, Multi Tasking Using Threads, Multiple Threads Acting on Single Object, Thread Class Methods, Deadlock of Threads, Thread Communication, Thread Priorities, thread Group, Daemon Threads, Applications of Threads, Thread Life Cycle

UNIT-V (Skill)

Applets: Creating an Applet, Uses of Applets, <APPLET> tag, A Simple Applet, An Applet with Swing Components, Animation in Applets, A Simple Game with an Applet, Applet Parameters

Java Database Connectivity: Database Servers, Database Clients, JDBC (Java Database Connectivity), Working with Oracle Database, Working with MySQL Database, Stages in a JDBC Program, Registering the Driver, Connecting to a Database, Preparing SQL Statements,

Text Books:

1. Java - The Complete Reference by Herbert Schildt, 9th Edition, Oreilly Publications.
2. Introduction to Java Programming, by Y Daniel Liang, Seventh Edition, Pearson, 2017.

Reference Books:

1. Programming with JAVA, A primer by E.Balaguruswamy, 3e, TATA McGraw-Hill Company.
2. Programming with Java by John R. Hubbard, Second Edition, Schaum's outline Series, TATA McGraw-Hill.
3. Java TM: How to Program by Deitel&Deitel, PHI (2007).
4. Java Programming: From Problem Analysis to Program Design by D.S Mallik.
5. Core Java: An Integrated Approach, Authored by Dr. R. Nageswara Rao & Kogent Learning Solutions Inc.

A.S.D. GOVERNMENT DEGREE COLLEGE FOR WOMEN(A)
DEPARTMENT OF COMPUTER SCIENCE
II B.Sc. – IV Semester

Course: OPERATING SYSTEMS

Course Code:

No. of Hours/Week: 4

Paper : V

Course Objective:

To provide knowledge about the services and functions rendered by operating systems and inculcate knowledge on Process Scheduling and Memory Management.

Course Outcomes:

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

1. Interpret the basic structure of OS and architectural components.
2. Compare and contrast various Process scheduling algorithms.
3. Analyze various mechanisms of Synchronization and the principles of deadlock.
4. Make use of paging and segmentation in Memory management.
5. Discuss the issues related to file system interface, implementation and disk management.

UNIT - I

What is Operating System? History and Evolution of OS, Basic OS functions, Resource Abstraction, Types of Operating Systems– Multiprogramming Systems, Batch Systems, Time Sharing Systems; Operating Systems for Personal Computers, Workstations and Hand-held Devices, Process Control & Real time Systems.

UNIT - II

Processor and User Modes, Kernels, System Calls and System Programs, System View of the Process and Resources, Process Abstraction, Process Hierarchy, Threads, Threading Issues, Thread Libraries; Process Scheduling, Non-Preemptive and Preemptive Scheduling Algorithms.

UNIT – III (Skill)

Process Management: Deadlock, Deadlock Characterization, Necessary and Sufficient Conditions for Deadlock, Deadlock Handling Approaches: Deadlock Prevention, Deadlock Avoidance and Deadlock Detection and Recovery.

Concurrent and Dependent Processes, Critical Section, Semaphores, Methods for Inter-process Communication; Process Synchronization, Classical Process Synchronization Problems: Producer-Consumer, Reader-Writer.

UNIT – IV (Skill & Entrepreneurship)

Memory Management: Physical and Virtual Address Space; Memory Allocation Strategies– Fixed and- Variable Partitions, Paging, Segmentation, Virtual Memory.

UNIT – V (Employability)

File and I/O Management, OS Security : Directory Structure, File Operations, File Allocation Methods, Disk Scheduling: SCAN and CSCAN, Pipes, Protection, Authentication and Internal Access

Text Books:

1. Operating System Concepts - Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, 9th Edition, John Wiley and Sons Inc., 2012.
2. Operating Systems - Internals and Design Principles, William Stallings, 7th Edition, Prentice Hall, 2011.

Reference Books:

1. Modern Operating Systems, Andrew S. Tanenbaum, Second Edition, Addison Wesley, 2001.
2. Operating Systems: A Design-Oriented Approach, Charles Crowley, Tata McGraw Hill Education", 1996.
3. Operating Systems: A Concept-Based Approach, D M Dhamdhere, Second Edition, Tata McGraw-Hill Education, 2007.
4. Operating Systems by J. Archer Harris (Author), Jyoti Singh (Author) (TMH)
5. Online Resources for UNIT V

A.S.D. GOVERNMENT DEGREE COLLEGE FOR WOMEN(A)
DEPARTMENT OF COMPUTER SCIENCE
III B.Sc. – V Semester

Course: WEB INTERFACE DESIGNING TECHNOLOGIES

Course Code:
Paper : VI-A

No. of Hours/Week: 4

Course Objective:

To provide knowledge about Web architecture and services and inculcate the competency of building a Website.

Course Outcomes:

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

1. Understand and appreciate the web architecture and services.
2. Gain knowledge about various components of a website.
3. Demonstrate skills regarding creation of a static website and an interface to dynamic website.
4. Learn how to install word press and gain the knowledge of installing various plugins to use in their websites.

Unit - I

HTML: Introduction to web designing, difference between web applications and desktop applications, introduction to HTML, HTML structure, elements, attributes, headings, paragraphs, styles, colours, HTML formatting, Quotations, Comments, images, tables, lists, blocks and classes, HTML CSS, HTML frames, file paths, layout, symbols, HTML responsive.

Unit – II (Skill, Employability, Entrepreneurship)

HTML forms: HTML form elements, input types, input attributes, HTML5, HTML graphics, HTML media – video, audio, plug INS, you tube.

HTML API'S: Geo location, Drag/drop, local storage, HTML SSE.

CSS: CSS home, introduction, syntax, colours, back ground, borders, margins, padding, height/width, text, fonts, icons, tables, lists, position, over flow, float, CSS combinators, pseudo class, pseudo elements, opacity, tool tips, image gallery, CSS forms, CSS counters, CSS responsive.

Unit – III (Employability)

Client side Validation: Introduction to JavaScript - What is DHTML, JavaScript, basics, variables, string manipulations, mathematical functions, statements, operators, arrays, functions. Objects in JavaScript - Data and objects in JavaScript, regular expressions, exception handling. **DHTML with JavaScript - Data validation, opening a new window, messages and confirmations, the status bar, different frames, rollover buttons, moving images.**

Unit – IV (Skill)

Word press: Introduction to word press, servers like wamp, bitnami etc, installing and configuring word press, understanding admin panel, working with posts and pages, using editor, text formatting with shortcuts, working with media-Adding, editing, deleting media elements, working with widgets, menus.

Unit – V (Enterprenership)

Working with themes-parent and child themes, using featured images, configuring settings, user and user roles and profiles, adding external links, extending word press with plug-ins. Customizing the site

Additional Inputs: Changing the appearance of site using css, protecting word press website from hackers.

Note: Concepts from Additional inputs must be excluded from Examinations

Text Books:

1. Chris Bates, Web Programming Building Internet Applications, Second Edition, Wiley (2007)
2. Paul S.WangSanda S. Katila, an Introduction to Web Design plus Programming, Thomson (2007).

Reference Books:

1. Head First HTML and CSS, Elisabeth Robson, Eric Freeman, O'Reilly Media Inc.
2. An Introduction to HTML and JavaScript: for Scientists and Engineers, David R. Brooks. Springer, 2007
3. Schaum's Easy Outline HTML, David Mercer, Mcgraw Hill Professional.
4. Word press for Beginners, Dr.Andy Williams.
5. Professional word press, Brad Williams, David damstra, Hanstern.
6. Web resources:
 - a. <http://www.codecademy.com/tracks/web>
 - b. <http://www.w3schools.com>
 - c. <https://www.w3schools.in/wordpress-tutorial/>
 - d. <http://www.homeandlearn.co.uk>

A.S.D. GOVERNMENT DEGREE COLLEGE FOR WOMEN(A)
DEPARTMENT OF COMPUTER SCIENCE
III B.Sc. – V Semester

Course: WEB APPLICATIONS DEVELOPMENT USING PHP & MYSQL

Course Code:

No. of Hours/Week: 4

Paper : VII-A

Course Objective:

To provide knowledge about development of Web Applications

Course Outcomes:

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

1. Write simple programs in PHP.
2. Understand how to use regular expressions, handle exceptions, and validate data using PHP.
3. Apply In-Built functions and Create User defined functions in PHP programming.
4. Write PHP scripts to handle HTML forms.
5. Write programs to create dynamic and interactive web based applications using PHP and MYSQL.
6. Know how to use PHP with a MySQL database and can write database driven web pages

Unit-I: (Skill & Entrepreneurship)

The Building blocks of PHP: Variables, Data Types, Operators and Expressions, Constants. Flow Control Functions in PHP: Switching Flow, Loops, Code Blocks and Browser Output. Working with Functions: What is function?, Calling functions, Defining Functions, Returning the values from User-Defined Functions, Variable Scope, Saving state between Function calls with the static statement, more about arguments.

Unit-II: (Employability & Entrepreneurship)

Working with Arrays: What are Arrays? Creating Arrays, Some Array-Related Functions. Working with Objects: Creating Objects, Object Instance Working with Strings, Dates and Time: Formatting strings with PHP, Investigating Strings with PHP, Manipulating Strings with PHP, Using Date and Time Functions in PHP.

Unit-III: (Employability)

Working with Forms: Creating Forms, Accessing Form Input with User defined Arrays, Combining HTML and PHP code on a single Page, Using Hidden Fields to save state, Redirecting the user, Sending Mail on Form Submission, and Working with File Uploads. Working with Cookies and User Sessions: Introducing Cookies, Setting a Cookie with PHP, Session Function Overview, Starting a Session, Working with session variables, passing session IDs in the Query String, Destroying Sessions and Unsetting Variables, Using Sessions in an Environment with Registered Users.

Unit-IV: (Skill)

Working with Files and Directories: Including Files with include(), Validating Files, Creating and Deleting Files, Opening a File for Writing, Reading or Appending, Reading from Files, Writing or Appending to a File, Working with Directories, Open Pipes to and from Process Using popen(), Running Commands with exec(), Running Commands with system() or passthru().

Unit-V: (Skill, Employability, Entrepreneurship)

Interacting with MySQL using PHP: MySQL Versus MySQLi Functions, Connecting to MySQL with PHP, Working with MySQL Data. **Creating an Online Address Book:** Planning and Creating Database Tables, Creating Menu, Creating Record Addition Mechanism, **Viewing Records**, Creating the Record Deletion Mechanism, Adding Sub-entities to a Record.

Additional Inputs: Working with Images: Understanding the Image-Creation Process, Necessary Modifications to PHP, Drawing a New Image, Getting Fancy with Pie Charts, Modifying Existing Images, Image Creation from User Input.

Note: Concepts from Additional inputs must be excluded from Examinations

Text Books:

1. Julie C. Meloni, SAMS Teach yourself PHP MySQL and Apache, Pearson Education (2007).
2. Steven Holzner , PHP: The Complete Reference, McGraw-Hill

Reference Books:

1. Robin Nixon, Learning PHP, MySQL, JavaScript, CSS & HTML5, Third Edition O'reilly, 2014
2. Xue Bai Michael Ekedahl, The web warrior guide to Web Programming, Thomson (2006).
3. Web resources:
 - a. <http://www.codecademy.com/tracks/php>
 - b. <http://www.w3schools.com/PHP>
 - c. <http://www.tutorialpoint.com>

**A.S.D. GOVERNMENT DEGREE COLLEGE FOR
WOMEN (AUTONOMOUS) KAKINADA**

**(Under the jurisdiction of Adikavi Nannaya University)
Reaccredited by NAAC with B Grade (3rd Cycle)**

1.1.3 Details of courses offered by the institution that focus on employability/ entrepreneurship/ skill development during the year 2022-23



DEPARTMENT OF ECONOMICS

ASD Government Degree College for Women (AUTONOMOUS)

(Accredited by NAAC with “B” in Cycle 3)

(Affiliated to Adikavi Nannayya University)

KAKINADA

BA PROGRAMME – Under CBCS, Syllabus 2022-23

I YEAR, SEMESTER-I, COURSE-I

I BA	Semester-I	Credits: 5
Paper I	MICRO ECONOMIC ANALYSIS	Hrs/Wk: 4

Unit	Syllabus	Employability/ Entrepreneurship / skill
Unit-I	Definitions of Economics-Scarcity and Choice as fundamental problems of economics –Opportunity Cost - Micro and Macro Analysis - Micro economic analysis – Scope and Importance -Principles of Microeconomics <i>Production Possibilities Curve: Allocation of Resources - Optimization, Equilibrium and Marginal analysis -Rationality Principle the concept of Welfare</i>	Skill
Unit-II	Concept of Demand -Factors determining demand - Law of Demand - reasons and exceptions - Elasticity of Demand -Cardinal and Ordinal utility - Indifference Curve analysis: Properties of Indifference curves, Indifference Curve Map -Marginal Rate of Substitution - Budget Line - Changes -Consumer Equilibrium under Indifference Curve Analysis – Consumers’ Surplus and Indifference Curve Analysis.	Entrepreneurship
Unit-III	Concept and Objectives of Firm - Production Function: Cobb- Douglas Production Function-Law of Variable Proportions -Laws of Returns to Scale - Economies of large scale - Concepts of Cost - Total, Average and Marginal Costs - Law of Supply - Concept of Revenue : Total, Average and Marginal Revenues - Relation between Average and Marginal Revenues and elasticity of Supply.	Skill
Unit-IV	Concepts of Market: Criteria for Classification of Markets - Perfect Competition– Conditions, Price and Output determination ; Monopoly :	Entrepreneurship

	Conditions, Price and Output Determination - Price Discrimination; Monopolistic Competition - Assumptions - Price and output determination - Selling Costs ; Oligopoly -Types- Kinky demand curve and Price rigidity.	
Unit- V	The concepts of Functional and Personal Distribution of Income - Marginal Productivity Theory of Distribution - Modern Theory of Distribution - Concept of Rent - Ricardian Theory of Rent – Marshall’s concepts of Economic Rent and Quasi Rent; Theories of Wage Determination: Subsistence Theory and Standard of Living Theory - Modern Theory of Wages; Classical Theory of Interest -Loanable Funds Theory of Interest - Liquidity Preference Theory of Interest; Theories of Profit: Risk and Uncertainty, Dynamic and Innovations Theories	Entrepreneurship

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KAKINADA
BA PROGRAMME – Under CBCS, Syllabus 2022-23
I YEAR, SEMESTER-II , COURSE-II

I BA	Semester-II	Credits: 5
Paper II	MACRO ECONOMIC ANALYSIS	Hrs/Wk: 4

Unit	Syllabus	Employability/ Entrepreneurship / skill
Unit-I	Macroeconomics - Definition, Scope and Importance - Difference between Micro economic and Macro economic Analyses – Circular Flow of Income -National Income: Definitions, Concepts, Measurement	Skill

	of National Income - Difficulties - Importance - Concept of Green Accounting	
Unit-II	Classical Theory of Employment - Say's Law of Markets - Criticism - Keynesian Theory of Employment - Consumption Function - Keynes' Psychological Law of Consumption - Average and Marginal Propensity to Consume - Factors determining Consumption Function–Brief Review of Relative, Life Cycle and Permanent Income Hypotheses - Investment Function: Marginal Efficiency of Capital -Multiplier and Accelerator - Keynesian Theory of Employment - Applicability to Developing countries	Entrepreneurship
Unit-III	Definitions of Money - Concepts of Money, Liquidity and Finance - Money Illusion - Gresham's Law - RBI classification of Money - Theories of Money: Fisher and Cambridge (Marshall, Pigou, Robertson and Keynes equations) - Banking - Definition and types of Banking - Commercial Banks - Functions -Recent Trends in Banking - Mergers and Acquisitions - Central Bank - Functions - Control of Credit by Central Bank - NBFCs- Factors contributing to their Growth and their Role	Skill Employability
Unit-IV	Inflation: Concepts of Inflation, deflation, reflation and stagflation - Phillip's Curve - Measurement of Inflation - CPI and WPI -Types of Inflation - Causes and Consequences of Inflation -Measures to Control Inflation. Trade Cycles: Phases of a Trade Cycle -Causes and Measures to control Trade Cycles.	Employability
Unit- V	Financial Assets and Financial Instruments - Financial Markets - Functions of Money Market - Functions of Capital Market - Stock Market - Exchanges – Indices:Sensex and Nifty - Concept of Insurance -Types and Importance of Insurance.	Entrepreneurship

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KAKINADA
BA PROGRAMME – Under CBCS, Syllabus 2022-23
II YEAR, SEMESTER-III, COURSE-III

II BA	Semester-III	Credits: 5
Paper III	DEVELOPMENT ECONOMICS	Hrs/Wk: 4

Unit	Syllabus	Employability/ Entrepreneurship / skill
Unit-I	Economic Development as a Branch of Study of Economics – Scope and Importance - Distinction between Economic Growth and Economic Development -Measures of Economic Development and their limitations - Relevance of Herd (Group) Immunity in the context of COVID 19 - three core values of economic development : Sustainability, Self-esteem and Freedom – Economy and Environment : Concepts of sustainable development and inclusive growth.	Employability Skill
Unit-II	Characteristics of Underdeveloped Countries - World Bank and IMF Classification of countries - Modern economic growth – Kuznets’ Six Characteristics - Obstacles to economic development - Vicious Circle of Poverty and cumulative causation - Factors of economic growth: Economic and Non-economic - Capital Formation – Foreign and Domestic capital, Debt and Disinvestment.	Employability
Unit-III	Classical Theory: Adam Smith, Ricardo and Malthus -Marxian Theory - Schumpeter Theory -Rostow’s Stages of Economic Growth - Harrod- Domar two sector model -Solow’s Model and Robinson’s Golden Age	Employability

Unit-IV	Strategies of Economic Development – Big Push - Balanced Growth -Unbalanced Growth - Mahalanobis Model - Agriculture vs Industry -Capital Intensive Technology vs Labour Intensive Technology -Role of Infrastructure in Economic Development,	Employability Skill
Unit- V	Role of State in Economic Development -Role of Markets - Market Failure and Regulation by State -Public sector vs Private sector - Economic Planning – concept, objectives and types -NITI Ayog - Economic Federalism -Financial Institutions and Economic Development -Role of International Institutions-IDBI, ADB, IMF - Foreign Trade - FIIs and FDIs.	Employability Skill

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KAKINADA

BA PROGRAMME – Under CBCS, Syllabus 2022-23

II YEAR, SEMESTER-III, COURSE-IV

II BA	Semester-IV	Credits: 5
Paper IV	ECONOMIC DEVELOPMENT-INDIA AND ANDHRA PRADESH	Hrs/Wk: 4

Unit	Syllabus	Employability/ Entrepreneurship / skill
Unit-I	Basic characteristics of Indian Economy as a developing economy – Economic development since independence - Objectives and achievements of planning – Planning Commission/NITI Ayog and their approaches to economic development - India’s Rank in Global Human Development Index	Employability
Unit-II	Trends in National income - Demographic trends - Poverty and Inequalities – Occupational Structure and Unemployment - Various Schemes of employment generation and eradication of poverty – Issues in Rural Development and Urban Development –Intra-state	Employability

	and Inter- state Labour Migration and unorganized sector Problems of Migrant Labour	
Unit-III	Indian Agriculture – Agricultural Strategy and Agricultural Policy – Agrarian Crisis and land reforms – Agricultural credit – Minimum Support Prices -Malnutrition and Food Security - Indian Industry - Recent Industrial Policy – Make-in India – Start-up and Stand-up programmes – SEZs and Industrial Corridors - Economic Reforms and their impact - Economic initiatives by government of India during COVID - Atmanirbhar Bharat package.	Entrepreneurship
Unit-IV	Fiscal policy- Indian Tax System and Recent changes – GST and its impact on Commerce and Industry – Centre, States financial relations- Recommendations of Recent Finance Commission – Public Expenditure and Public Debt –Concepts of Budget.	Employability Skill
Unit- V	The basic characteristics of Andhra Pradesh economy after bifurcation in 2014 – Impact of bifurcation on the endowment of natural resources and state revenue – new challenges to industry and commerce - the new initiatives to develop infrastructure – Power and Transport –Health and Education- Information Technology and e-governance – Urbanization and smart cities – Skill development and employment –Recent Social welfare programmes	Employability

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KAKINADA
BA PROGRAMME – Under CBCS, Syllabus 2022-23
II YEAR, SEMESTER-III, COURSE-V

II BA	Semester-IV	Credits: 5
Paper V	VSTATISTICALMETHODSF0RECONOMICS	Hrs/Wk: 4

Unit	Syllabus	Employability/ Entrepreneurship / skill
Unit-I	Introduction to Statistics – Definition, scope, importance and limitations of Statistics – Primary and Secondary data- Census and Sampling techniques and their merit sand demerits.	Skill
Unit-II	Collection of data - Schedule and questionnaire – Frequency distribution –Tabulation – diagram and graphic presentation of data – Histogram, Frequency Polygon, Cumulative Frequency Curves-Bar Diagrams and Pie Diagram.	Skill, Employability
Unit-III	Measures of Central Tendency and Dispersion –Types of averages- Arithmetic Mean, Geometric Mean, Harmonic Mean–Median–Mode– Dispersion - Range, Quartile Deviation, Mean Deviation, Standard Deviation- Coefficient of Variation.	Skill, Employability
Unit-IV	Correlation and Regression Meaning, Definition and uses of Correlation-Types of Correlation- KarlPearson’sCorrelationcoefficient-Spearman’sRankCorrelation – Regression Equations-utility of regression analysis–Demand forecasting.	Skill, Employability Entrepreneurship

Unit- V	Time Series and Index Numbers: Definition and components of Time Series – Measurement of Time Series – Moving Average and the Least Squares Method – Index Numbers - Concepts of Price and Quantity Relatives – Laspeyer’s, Paasche’s and Fisher’s Ideal Index Numbers– Uses and Limitations of Index Numbers.	Skill, Employability
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KAKINADA
BA PROGRAMME – Under CBCS, Syllabus 2022-23
III YEAR, SEMESTER-V, COURSE- VI

III BA	Semester-V	Credits: 5
Paper VI-C	Insurance Services	Hrs/Wk: 4

Unit	Syllabus	Employability/ Entrepreneurship / skill
Unit-I	Risk Management: Risk and Uncertainty, Risk Classification – Concept, Importance and Types of Insurance – Principles of Insurance – Insurance Regulations in India - Role of IRDA and Insurance Ombudsman – Scope for Insurance Business in India.	Employability/ Entrepreneurship / skill
Unit-II	Life Insurance: Nature and Features - Major Life Insurance Companies in India – Important Life Insurance Products/policies and their Features: Conventional, Unit Linked, Annuities, Group Policies – Medical Examiner.	Employability/ / skill
Unit-III	General Insurance: Nature, Features and Types - Major General Insurance Companies in India - Important General Insurance Products/Policies and their Features - Surveyor – Health Insurance: Nature and Features - Health Insurance Companies in India - Major Health Insurance	Employability/ skill

	Products/policies and their Features: Individual, Family, Group.	
Unit-IV	Insurance Contract and Terms of Insurance Policy - Registration of Insurance Agency with the Company — Procedure to issue a Policy: Application and Acceptance – Policy Lapse and Revival – Premium Payment, Assignment, Nomination and Surrender of Policy – Policy Claim - Important Websites and Apps of Insurance in India	Employability/ skill
Unit- V	Insurance Customer and Categories – Understanding Customer Mindset and Satisfaction -Addressing the Grievances of the Customer – Ethical Behavior in Insurance – Moral Hazard–Discussion of two different Case Studies related to Life or General or Health Insurance Services.	Employability/ skill

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KAKINADA
BA PROGRAMME – Under CBCS, Syllabus 2022-23
III YEAR, SEMESTER-V, COURSE- VII

III BA	Semester-V	Credits: 5
Paper VII-C	Banking and Financial Services	Hrs/Wk: 4

Unit	Syllabus	Employability/ Entrepreneurship / skill
Unit-I	Meaning of Banking – Principles of Banking – Functions of Banking – Structure of Indian Banking System – Regulations of Banking in India – Role of RBI in Banking – Anti-moneyLaundering - Basics of Financial literacy - Problems and Challenges of Banking in India.	Employability/ skill
Unit-II	Bank Deposit Account Types – Account Opening and Closing – Banking	Employability/

	<p>Customer types –KYC Norms – Negotiable Instruments: Cheque, Bill of Exchange, Promissory Note, Endorsement - Principles of Lending – Different categories of Loans – Mortgaging –Priority Sector Lending – E-Banking facilities: Debit Card, Credit Card, Net Banking, Mobile Banking, Tele-banking, Micro ATMs, Digital Currency – Core Banking Solutions.</p>	skill
Unit-III	<p>Banking Correspondent Model - Activities of Banking Correspondent: Deposit Mobilization. Identification of Borrowers, Collection and Recovery Loan, Other Banking Services – Common Services Centre (CSC) - Provision of Services by CSC – Requirement for Registering CSC and Telecentre - Case Study of Banking Correspondents with any Bank or CSC in Local Area.</p>	Entrepreneurship / skill
Unit-IV	<p>Non-Banking Financial Institutions (NBFIs): Types and Major Players of NBFIs in India – Important Financial Services offered by NBFIs and their Features – Concept of EMI – Micro Finance: Concept and Operation - Chit Funds: Concept and Operations– Payment Banks - Regulations of NBFIs in India – Problems and Challenges of NBFIs in India.</p>	Employability/ Entrepreneurship / skill
Unit- V	<p>Types of loans by Finance Service Company (FSC) – Customer of FSC: Types and Needs - Marketing of FSC’s Loans – Procedures and Requirements in FSC’s Loan Sanction - Collection and Recovery of FSC Loans - Case Study of a FSC’s services in Local Area.</p>	Employability/ Entrepreneurship / skill



Head of the Department
Department of Economics

**A.S.D. GOVERNMENT DEGREE COLLEGE FOR
WOMEN (AUTONOMOUS) KAKINADA**

(Under the jurisdiction of Adikavi Nannaya University)

Reaccredited by NAAC with B Grade (3rd Cycle)

1.1.3 Details of courses offered by the institution that focus on employability/ entrepreneurship/ skill development during the year.



DEPARTMENT OF MICROBIOLOGY

A.S.D Govt. Degree College for Women (A), Kakinada

Course-Wise Syllabus

BSc	MICROBIOLOGY (Semester: I)	Credits: 4
MBT: I	Introduction To Microbiology And Microbial Diversity	Hrs/Wk: 4

Aim and objectives of Course

To understand History & Development of Microbiology, Microscopy, staining and sterilization techniques, Ultra-structure of cell, Different methods of microbial characterization

To study nature of viruses, viral classification, cultivation of viruses and Type study of TMV & HIV

Learning outcomes of Course

Up on completion of the course students able to

1. Explain relationship and apply appropriate terminology relating to the structure, Genetics, metabolism and ecology of prokaryotic microorganisms, Algae, viruses and Fungi.
2. Students will get basics and importance of Microbiology.
3. Demonstrate appropriate laboratory skill and techniques related to isolation, staining, identification and control of microorganisms.

UNIT-I: History of Microbiology & Place of Microorganisms in the living world

History of Microbiology in the context of contributions of Anton von Leeuwenhoek, Edward Jenner, Louis Pasteur, Robert Koch, Ivanowsky, Martinus Beijerinck and Sergei Winogradsky
Importance and applications of microbiology

Place of Microorganisms in the Living World Haeckel's three Kingdom concept, Whittaker's five kingdom concept, three domain concept of Carl Woese

UNIT-II: Prokaryotic microorganisms

No. of hours: 12

Ultra-structure of Prokaryotic cell- Cell Wall, Cell Membrane, Cytoplasm, Nucleoid, Plasmid, Inclusion Bodies, Flagella Pili, Capsule, Endospore

General characteristics of Bacteria (Size, shape, arrangement, reproduction)

General characteristics of Rickettsia, Mycoplasmas, Cyanobacteria, Archaea

UNIT-III: Viruses and Eukaryotic microorganisms: Skill & Employability

No.

of hours: 12

General characteristics of viruses, Cultivation of Viruses (in brief)

Morphology, Structure and replication of TMV and Lambda Bacteriophage

Fungi - Habitat, nutrition, vegetative structure and modes of reproduction; outline classification

Algae - Habitat, thallus organization, photosynthetic pigments, storage forms of food, reproduction.

Protozoa – Habitat, cell structure, nutrition, locomotion, excretion, reproduction, encystment, outline classification

UNIT-IV: Isolation and Culture of Bacteria and Fungi : Skill & Employability

Growth media- Natural, synthetic and semi synthetic media. Selective, Enrichment, and Differential media

Pure culture techniques - dilution-plating, Streak-plate, Spread-plate, Pour-Plate and micromanipulator.

Preservation of microbial cultures - sub culturing, overlaying cultures with mineral oils, lyophilization, sand cultures, storage at low temperature.

UNIT-V: Principles of Microscopy, Sterilization and Disinfection: Skill & Employability

Principles of microscopy - Bright field and Electron microscopy (SEM and TEM).

Staining Techniques - Simple and Differential staining techniques (Gram staining, Spore staining).

Sterilization and disinfection techniques –

Physical methods - autoclave, hot- air oven, pressure cooker, laminar air flow, filter sterilization, Radiation methods - UV rays, Gamma rays.

Chemical methods - alcohols, aldehydes, fumigants, phenols, halogens and hypochlorites.

The following topics in UNIT -III are for Internal Assessment only:

- a. Fungi - Habitat, nutrition, vegetative structure and modes of reproduction; outline classification
- b. Algae - Habitat, thallus organization, photosynthetic pigments, storage forms of food, reproduction

MBP- I: Introduction To Microbiology And Microbial Diversity

Skill & Employability

1. Microbiology Good Laboratory Practices and Biosafety.
2. Preparation of culture media for cultivation of bacteria- Nutrient broth & Nutrient agar
3. Preparation of culture media for cultivation of fungi – Sabourauds agar
4. Sterilization of medium using Autoclave
5. Sterilization of glassware using Hot Air Oven
6. Light compound microscope and its handling
7. Microscopic observation of bacteria (Gram +ve bacilli and cocci, Gram -ve bacilli), Algae and Fungi.
8. Simple staining
9. Gram's staining
10. Hanging-drop method & temporary wet mount (TWM) for observation of living microorganisms.
11. Isolation of pure cultures of bacteria by serial dilution and Streak/Spread/Pour Plate Method.
12. Preservation of bacterial cultures by Serial subculturing & Slant Preparation with mineral oil overlay.
13. Observation of electron micrographs of bacterial cells

Recommended Text Books & Reference books:

- Pelczar, M.J., Chan, E.C.S. and Kreig, N.R. (1993). Microbiology. 5th Edition, Tata McGraw Hill Publishing Co., Ltd., New Delhi.
- Dube, R.C. and Maheswari, D.K. (2000) General Microbiology. S Chand, New Delhi. Edition), Himalaya Publishing House, Mumbai.
- Power, C.B. and Dagainawala, H.F. (1986). General Microbiology Vol I & II
- Prescott, M.J., Harley, J.P. and Klein, D.A. (2012). Microbiology. 5th Edition, WCB McGrawHill, New York.
- Reddy, S.M. and Reddy, S.R. (1998). Microbiology □ Practical Manual, 3 rd Edition, Sri Padmavathi Publications, Hyderabad.
- Singh, R.P. (2007). General Microbiology. Kalyani Publishers, New Delhi.
- Stanier, R.Y., Adelberg, E.A. and Ingram, J.L. (1991). General Microbiology, 5th Ed., Prentice Hall of India Pvt. Ltd., New Delhi.
- Microbiology Edited by Prescott
- Jaya Babu (2006). Practical Manual on Microbial Metabolisms and General Microbiology. Kalyani Publishers, New Delhi.
- Gopal Reddy *et al.*, Laboratory Experiments in Microbiology

BSc	MICROBIOLOGY (Semester: II)	Credits: 4
MBT: II	Microbial Physiology And Biochemistry	Hrs/Wk: 4

Aim and objectives of Course

To understand DNA, RNA, Protein structure and synthesis. DNA damage, mutations and repair. Gene transfer methods.

Learning outcomes of Course

1. This Course provides Understanding of biomolecular synthesis and control will help in further study
2. Develop knowledge on microbial genetics and molecular biology

UNIT-I: Biomolecules

No. of hours: 12

General characters and outline classification of Carbohydrates (Monosaccharides-Glucose, Fructose, Ribose, Disaccharides- Sucrose, Lactose, Polysaccharides- Starch, glycogen, Cellulose)

General characters and outline classification of fatty acids (Saturated & Unsaturated Fatty Acids) Lipids (Simple & complex lipids)

UNIT-II: Enzymes

No. of hours: 12

Properties and classification of Enzymes.

Biocatalysis- induced fit and lock and key models.

Coenzymes and Cofactors.

Inhibition of enzyme activity- competitive, non-competitive, uncompetitive and allosteric.

Factors effecting enzyme activity

UNIT – III: Analytical Techniques : Skill & Employability

No. of hours: 12

Principle and applications of -

Colorimetry

Chromatography (paper, thin-layer, and column),

Spectrophotometry (UV & visible),

Centrifugation and

Gel Electrophoresis (Agarose and SDS).

UNIT – IV: Microbial Nutrition and growth: Skill

No. of hours: 12

Nutritional requirements of Microorganisms

Nutritional groups of microorganisms- autotrophs, heterotrophs, lithotrophs, organotrophs, phototrophs, chemotrophs

Microbial Growth- different phases of growth in batch cultures; Synchronous, continuous, biphasic growth.

Factors influencing microbial growth

Methods for measuring microbial growth - Direct microscopy, viable count estimates, turbidometry and biomass.

UNIT- V : Microbial metabolism: Entrepreneurship

No. of hours: 12

Aerobic respiration - Glycolysis, TCA cycle, ED Pathway, Electron transport

Oxidative and substrate level phosphorylation.

Anaerobic respiration (Nitrate and sulphate respiration)

Fermentation- lactic acid and ethanol fermentations
Outlines of oxygenic and anoxygenic photosynthesis in bacteria

MBP – II: MICROBIAL PHYSIOLOGY AND BIOCHEMISTRY

Entrepreneurship Skill & Employability

1. Qualitative Analysis of Carbohydrates.
2. Qualitative Analysis of Aminoacids.
3. Colorimetric estimation of proteins by Biuret / Lowry method.
4. Separation of components of a given mixture using a laboratory scale centrifuge.
5. Separation of mixtures by paper / thin layer chromatography.
6. Demonstration of column packing in any form of column chromatography.
7. Effect of temperature/pH / Salt concentration on bacterial growth
8. Demonstration of electrophoretic technique
9. Study and plot the growth curve of E. coli by turbidimetric and Standard Plate Count methods

Recommended Text Books & Reference books:

Berg JM, Tymoczko JL and Stryer L (2011) Biochemistry, W.H. Freeman and Company
Caldwell, D.R. (1995). Microbial Physiology and Metabolism, W.C. Brown Publications, Iowa, USA.

Lehninger, A.L., Nelson, D.L. and Cox, M.M. (1993). Principles of Biochemistry, 2 nd Edition, CBS Publishers and Distributors, New Delhi.

Sashidhara Rao, B. and Deshpande, V. (2007). Experimental Biochemistry: A student Companion. I.K. International Pvt. Ltd.

Tymoczko JL, Berg JM and Stryer L (2012) Biochemistry: A short course, 2nd ed., W.H. Freeman

Voet, D. and Voet J.G (2004) Biochemistry 3rd edition, John Wiley and Sons

White, D. (1995). The Physiology and Biochemistry of Prokaryotes, Oxford University Press, New York.

BSc	MICROBIOLOGY (Semester: III)	Credits: 4
MBT: III	Molecular Biology And Microbial Genetics	Hrs/Wk: 4

Aim and objectives of Course

To understand different biomolecules, analytical techniques, bacterial nutrition, growth and metabolism

Learning outcomes of Course

Up on completion of this course students should be able to:

1. Explain working principle and applications of Colorimetry, Chromatography, Spectrophotometry, Centrifugation and Gel Electrophoresis.
2. Knowledge on Microbial nutrition, bacterial growth, metabolism and Respiration.
3. The student will get first-hand experience on separation methods

UNIT- I: Nucleic acids Skill & Employability

No. of hours: 12

DNA and RNA - Role in heredity-The central dogma

Watson and Crick model of DNA

Types of RNA, structure, and functions

Organization of DNA in prokaryotes

UNIT- II : Genetic material and replication Skill & Employability

Experiments which established DNA as genetic material

RNA as genetic material

Mechanism of DNA Replication in Prokaryotes

Proof of semi conservative mechanism of replication (Meselson - Stahl Experiment)

UNIT- III: Gene expression and regulation Skill & Employability

Concept of gene - Muton, recon and cistron.

Genetic code

Protein synthesis - Transcription and translation in Prokaryotes

Regulation of gene expression in bacteria - *lac* operon

UNIT- IV: Mutations, damage and repair Skill & Employability

Outlines of DNA damage and repair mechanism

Mutations - spontaneous and induced

Chromosomal aberrations - deletions, inversions, tandem duplications, insertions

Point mutations- base pair changes, frame shifts

Mutagens - Physical and Chemical mutagens

Bacterial recombination - Transformation, Conjugation, Transduction (Generalized and specialized transductions)

UNIT- V: Genetic engineering: Entrepreneurship Skill & Employability

Basic principles of genetic engineering.

Restriction endonucleases, DNA ligases.

Vectors – plasmids (pBR322), Cosmids, Phagemids, lambda phage vector, M 13 vectors.

Outlines of gene cloning methods.

Polymerase chain reaction. Genomic and cDNA libraries.
General account on application of genetic engineering in industry, agriculture, and medicine.

MBP – III: MOLECULAR BIOLOGY AND MICROBIAL GENETICS

Entrepreneurship Skill & Employability

1. Study of different types of DNA and RNA using micrographs and model / schematic representations.
2. Study of semi-conservative replication of DNA through micrographs / schematic representations
3. Isolation of genomic DNA from *E. coli*
4. Estimation of DNA using UV spectrophotometer.
5. Resolution and visualization of DNA by Agarose Gel Electrophoresis.
6. Resolution and visualization of proteins by Polyacrylamide Gel Electrophoresis (SDS - PAGE).
7. Problems related to DNA and RNA characteristics, Transcription and Translation.
8. Induction of mutations in bacteria by UV light.
9. Instrumentation in molecular biology - Ultra centrifuge, Transilluminator, PCR

Recommended Text Books & Reference books:

- Freifelder, D. (1990). Microbial Genetics. Narosa Publishing House, New Delhi.
- Freifelder, D. (1997). Essentials of Molecular Biology. Narosa Publishing House, New Delhi.
- Glick, B.P. and Pasternack, J. (1998). Molecular Biotechnology, ASM Press, Washington D.C., USA.
- Lewin, B. (2000). Genes VIII. Oxford University Press, England.
- Maloy, S.R., Cronan, J.E. and Freifelder, D. (1994). Microbial Genetics, Jones and Bartlett Publishers, London.
- Ram Reddy, S., Venkateshwarlu, K. and Krishna Reddy, V. (2007) A text Book of Molecular Biotechnology. Himalaya Publishers, Hyderabad.
- Sinnot E.W., L.C. Dunn and T. Dobzhansky. (1958). Principles of Genetics. 5 th Edition. McGraw Hill, New York.
- Smith, J.E. (1996). Biotechnology, Cambridge University Press.
- Snyder, L. and Champness, W. (1997). Molecular Genetics of Bacteria. ASM press,
- Strickberger, M.W. (1967). Genetics. Oxford & IBH, New Delhi.
- Verma, P.S. and Agarwal, V.K. (2004). Cell Biology, Genetics, Molecular Biology, Evolution and Ecology. S. Chand & Co. Ltd., New Delhi.

BSc	MICROBIOLOGY (Semester: IV)	Credits: 4
MBT: IV	Immunology And Medical Microbiology	Hrs/Wk: 4

Aim and objectives of Course

To study types of immunity, immune organs, cells, antibodies and antigen-antibody interactions.

To learn diagnostic and pathogenesis of various diseases. Antimicrobial defense and different toxins and vaccines.

Learning outcomes of Course

Up on completion of the course students able to

1. Explain No-specific body defence and the immune response
2. Develop knowledge on disease transmission and control
3. Demonstrate on collection and handling of laboratory specimens
4. Develop an information making personal health decision in regard to infectious diseases.
5. Student can safeguard himself & society and can work diagnostics and hospitals.

UNIT-I: Immune System No. of hours: 12

Concept of Innate and Adaptive immunity

Primary and secondary organs of immune system - thymus, bursa fabricus, bone marrow, spleen, lymph nodes.

Cells of immune system- Identification and function of B and T lymphocytes, null cells, monocytes, macrophages, neutrophils, basophils and eosinophils

Complement system (in brief)

UNIT-II : Immune response Skill oriented

Characteristics of antigen (Foreignness, Molecular size, Heterogeneity and solubility)
Haptens.

Antibodies - basic structure and types and functions (Immune complex formation and elimination - Agglutination, Precipitation, Neutralization, Complement fixation, Phagocytosis)

Generation of Humoral Immune Response (Plasma and Memory cells)

Generation of Cell Mediated Immune Response

MHC- Functions of MHC I & II molecules

Hypersensitivity- definition and types (in brief)

Autoimmunity (in brief)

UNIT- III: Microbes in Health and Disease Skill oriented & Employability

Normal flora of human body.

Definitions - Infection, Invasion, Pathogen, Pathogenicity, Virulence, Toxigenicity, Opportunistic infections, Nosocomial infections.
General account on microbial diseases – causal organism, pathogenesis, epidemiology, diagnosis, prevention, and control of the following
Bacterial diseases - Tuberculosis, Typhoid.
Fungal diseases - Candidiasis.
Protozoal diseases - Malaria.
Viral Diseases – Corona virus and AIDS

UNIT- IV: Principles of Diagnosis Skill oriented, Entrepreneurship & Employability

General principles of diagnostic microbiology- Collection, transport of clinical samples
Identification by Culturing & Biochemical characteristics (IMViC)
Identification by molecular assays (PCR, RT-PCR, DNA probes)
Identification by serological tests (ELISA, Immunofluorescence, Agglutination based tests, Complement fixation)

UNIT- V: Prevention and Treatment Skill oriented

Vaccines
Monoclonal antibodies- Production and application
Antimicrobial agents- General modes of action of antibacterial (Penicillin), antifungal (Amphotericin), antiviral (Amantadine) agents
Interferons
Tests for antimicrobial susceptibility (Disc diffusion)
Antibiotic resistance in bacteria

RECOMMENDED TEXT BOOKS:

1. Ananthanarayan R. and Paniker C.K.J. (2009) Textbook of Microbiology. 8th edition, University Press Publication.
2. Brooks G.F., Carroll K.C., Butel J.S., Morse S.A. and Mietzner, T.A. (2013) Jawetz, Melnick and Adelberg's Medical Microbiology. 26th edition. McGraw Hill Publication.
3. Delves P, Martin S, Burton D, Roitt IM. (2006). Roitt's Essential Immunology. 11th edition Wiley-Blackwell Scientific Publication, Oxford.
4. Goldsby RA, Kindt TJ, Osborne BA. (2007). Kuby's Immunology. 6th edition W.H. Freeman and Company, New York.

REFERENCE BOOKS:

1. Kuby's Immunology. 6th edition W.H. Freeman and Company, New York.
2. Jawetz, Melnick and Adelberg's Medical Microbiology. 26th edition. McGraw Hill Microbiology. 4th edition. Elsevier Publication.

3. Willey JM, Sherwood LM, and Woolverton CJ. (2013) Prescott, Harley and Klein's Microbiology. 9th edition. McGraw Hill Higher Education.

MBP -V: IMMUNOLOGY AND MEDICAL MICROBIOLOGY

Skill & Employability

1. Identification of human blood groups.
2. Separate serum from the blood sample (demonstration).
3. Immunodiffusion by Ouchterlony method.
4. Identification of any of the bacteria (*E. coli*, *Pseudomonas*, *Staphylococcus*, *Bacillus*) using laboratory strains on the basis of cultural, morphological and biochemical characteristics: IMViC, urease production and catalase tests
5. Study of composition and use of important differential media for identification of bacteria: EMB Agar, McConkey agar, Mannitol salt agar
6. Antibacterial sensitivity by Kirby-Bauer method
6. Determination of Minimal Inhibitory Concentration (MIC) of an antibiotic
7. Study symptoms of the diseases with the help of photographs: Anthrax, Polio, Herpes, chicken pox, HPV warts, Dermatomycoses (ring worms)
8. Study of various stages of malarial parasite in RBCs using permanent mounts.
9. Phenol coefficient test
10. Isolation of Normal flora of human body (Hands, Feet, Nostrils, Teeth Surface) by swab method.
11. Evaluation of Hand Sanitizer Effectiveness by Filter Paper Disc Method & thumb impression method.

Recommended Text Books & Reference books:

- Ananthanarayan R. and Paniker C.K.J. (2009) Textbook of Microbiology. 8th edition, University Press Publication.
- Brooks G.F., Carroll K.C., Butel J.S., Morse S.A. and Mietzner, T.A. (2013) Jawetz, Melnick and Adelberg's Medical Microbiology. 26th edition. McGraw Hill Publication.
- Delves P, Martin S, Burton D, Roitt IM. (2006). Roitt's Essential Immunology. 11th edition Wiley-Blackwell Scientific Publication, Oxford.
- Goldsby RA, Kindt TJ, Osborne BA. (2007). Kuby's Immunology. 6th edition W.H. Freeman and Company, New York.
- Kuby's Immunology. 6th edition W.H. Freeman and Company, New York.
- Jawetz, Melnick and Adelberg's Medical Microbiology. 26th edition. McGraw Hill Microbiology. 4th edition. Elsevier Publication.
- Willey JM, Sherwood LM, and Woolverton CJ. (2013) Prescott, Harley and Klein's

BSc	MICROBIOLOGY (Semester: IV)	Credits: 4
MBT: V	Microbial Ecology And Industrial Microbiology	Hrs/Wk: 4

Aim and objectives of Course

1. To study role of microorganisms in nutrient cycling, microorganism in waste treatment and degradation of xenobiotics
2. To determine the potability of drinking water
3. To study concepts of screening and strain improvement, media, Fermentation, assays with examples of industrially important processes

Learning outcomes of Course

Up on completion of the course students able to

1. Understand fundamental concept in soil microbial diversity, basic concept of biogeochemical cycles and plant growth promotion and plant diseases
2. Understands the role of microorganisms in treatment of solid and liquid waste.
3. Acquire knowledge on application of microorganisms in agro – environmental fields.
4. Get basic information design of fermenter, fermentation processes and Single cell proteins.
5. Self-reliance in the industrial application of Microbiology in life and industry.
6. Entrepreneurship can be established with the gained knowledge.

UNIT - I: Microbial Ecology

Skill

No. of hours: 12

Role of microorganisms in Biogeochemical cycles (Carbon, nitrogen, phosphorus)

Microbe-microbe interactions - Synergism, mutualism, commensalism, antagonism, competition, parasitism, predation

Plant- Microbe interactions - Plant growth promoting Microorganisms, Plant pathogens

UNIT - II : Microorganisms in Environment **Employability, Skill oriented**

Microbes in waste management- solid and liquid waste (aerobic and anaerobic)

Microbes in degradation of Xenobiotics

Microbes in drinking water- detection of potability by (a) standard qualitative procedure: presumptive test/MPN test, confirmed and completed tests for faecal coliforms (b) Membrane filter technique

Microbes in food - intrinsic and extrinsic parameters that affect microbial growth in food

UNIT - III: Industrial Microbiology

No. of hours: 12

Industrial important Microorganisms- Yeasts & Moulds , Bacteria , Actinomycetes .

Screening techniques.

Strain improvement techniques.

UNIT -IV: Fermentation processes **Skill, Employability & Entrepreneurship**

Design of fermenter (for control of pH, temperature, dissolved oxygen, foaming and aeration)

Types of fermentation processes - solid state, liquid state, batch, fed-batch, continuous.

Fermentation media (Carbon source, nitrogen source, minerals, vitamins & growth factors, Buffers, Precursors, Antifoam agents, water, oxygen)

Examples of Crude media; molasses, corn- steep liquor, sulphite waste liquor, whey.

Downstream processing - filtration, centrifugation, cell disruption, solvent extraction.

UNIT - V: Microbial Productions

No. of hours: 12

Microbial production of Industrial products: Citric acid, Ethanol, Penicillin, Glutamic acid, vitamin B12, Amylase, Yogurt

Microbial cells as food- SCP

- a. **Additional Input:** Determination of quality of different water samples by MPN method and Mushroom cultivation

MBP - V: MICROBIAL ECOLOGY AND INDUSTRIAL MICROBIOLOGY

Skill, Employability & Entrepreneurship

1. Microbial fermentation for the production and estimation of ethanol
2. Isolation of amylase producing microorganisms from soil
3. Isolation of food spoilage microorganisms from spoiled food sample.
4. MPN test
5. Demonstration of fermenter
6. Production of wine from grapes
7. Growth curve and kinetics of any two industrially important microorganisms.
8. Microbial fermentation for the production and estimation of citric acid
9. Preparation of yoghurt.
10. Crowded plate technique
11. Isolation of microorganism from soil
12. Isolation of microorganism from different water samples

Recommended Text Books & Reference books:

- Atlas RM and Bartha R. (2000). **Microbial Ecology: Fundamentals & Applications**. 4th edition. Benjamin/Cummings Science Publishing, USA
- Barton LL & Northup DE (2011). **Microbial Ecology**. 1st edition, Wiley Blackwell, USA
- Campbell RE. (1983). **Microbial Ecology**. Blackwell Scientific Publication, Oxford, England.
- Coyne MS. (2001). **Soil Microbiology: An Exploratory Approach**. Delmar Thomson Learning.
- Lynch JM & Hobbie JE. (1988). **Microorganisms in Action: Concepts & Application in Microbial Ecology**. Blackwell Scientific Publication, U.K.
- Madigan MT, Martinko JM and Parker J. (2014). **Brock Biology of Microorganisms**. 14th edition. Pearson/ Benjamin Cummings
- Maier RM, Pepper IL and Gerba CP. (2009). **Environmental Microbiology**. 2nd edition, Academic Press
- Martin A. (1977). **An Introduction to Soil Microbiology**. 2nd edition. John Wiley & Sons Inc. New York & London. Adams MR and Moss MO. (1995). **Food Microbiology**. 4th edition, New Age International (P) Limited Publishers, New Delhi, India.
- Banwart JM. (1987). **Basic Food Microbiology**. 1st edition. CBS Publishers and Distributors, Delhi, India.
- Casida LE. (1991). **Industrial Microbiology**. 1st edition. Wiley Eastern Limited.
- Crueger W and Crueger A. (2000). **Biotechnology: A textbook of Industrial Microbiology**. 2nd Edition. Panima Publishing Company, New Delhi

- Frazier WC and Westhoff DC. (1992). **Food Microbiology**. 3rd edition. Tata McGraw-Hill Publishing Company Ltd, New Delhi, India.

A.S.D Govt. Degree College for Women (A), Kakinada

III BSc Microbiology Syllabus (w.e.f:2020-2021A.B)

BSc	Semester: V (Skill Enhancement Course- Elective)	Credits: 2
MB T A1 A- PAIR	Food, Agriculture And Environmental Microbiology	Total hours 40

Aim and objectives of Course

To provide knowledge on important microbes in food, Agriculture and Environmental Microbiology

Learning outcomes of Course

Up on completion of the course students able to

CO1: Demonstrate with the wide diversity of microbes and their spoilage food, food intoxication and food born infections

CO2: Able to understand principles of food preservation, fermented foods and microbes as food.

CO3: The student will acquire knowledge on application of microorganisms in agro – environmental fields

CO4: Get fundamental concepts in principles of plant disease control an industrial application of Microbiology

CO5: The student will have fundamental concepts in soil microbiology and soil water and aero microbial diversity and microbial interactions Basic concepts in treatment of drinking water. Understands the role of microorganisms in treatment of solid and liquid waste.

UNIT – 1 Skill, Employability

Intrinsic and extrinsic parameters that affect microbial growth in food

Microbial spoilage of food - fruits, vegetables, milk, meat, egg, bread and canned foods

Food intoxication (botulism).

Food-borne diseases (salmonellosis) and their detection.

UNIT – II Skill, Employability & Entrepreneurship

No. of Hours: 8

Principles of food preservation - Physical and chemical methods.

Fermented Dairy foods – cheese and yogurt.

Microorganisms as food – SCP, edible mushrooms (white button, oyster and paddy straw). Probiotics and their benefits.

UNIT – III Skill, Employability & Entrepreneurship

No. of Hours: 8

Soil Microbiology: Microbial groups in soil, microbial transformations of carbon, nitrogen, phosphorus and sulphur.

Biological nitrogen fixation.

Microflora of Rhizosphere and Philosopher microflora, microbes in composting.

Importance of mycorrhizal inoculums, types of mycorrhizae associated plants, mass inoculums. **Production of VAM, field applications** of Ectomycorrhizae.

UNIT - IV

No. of Hours: 8

Beneficial microorganisms in Agriculture: Biofertilizer (Bacterial Cyanobacterial and Fungal), microbial insecticides, Microbial agents for control of Plant diseases.

Plant – Microbe interactions.

Diseases caused by bacteria and fungi to various commercial crops: groundnut rust & Citrus canker and food crops: **Rice Blast** (*Pyriculariaoryzae*) Bacterial blight of rice (*Oryza sativa* and *O. glaberrima*)

UNIT – V Skill, Employability

No. of Hours: 12

Terrestrial Environment: Soil profile and soil microflora. Aquatic Environment: Microflora of fresh water and marine habitats. Atmosphere: Aeromicroflora and dispersal of microbes. Extremophiles.

Concept of single cell proteins, probiotics and their applications. Biodegradation, Biogas production, Biodegradable plastics.

MBP – FOOD, AGRICULTURE AND ENVIRONMENTAL MICROBIOLOGY

Skill, Employability & Entrepreneurship

1. Isolation of bacteria and fungi spoiled bread / fruits / vegetables
2. Preparation of yogurt / dahi
3. Determination of microbiological quality of milk sample by MBRT
4. Enumeration of bacteria, fungi and actinomycetes from soil
5. Enumeration and identification of rhizosphere micro flora
6. Isolation of rhizobium from root nodules.
7. Isolation of azatobacter from soil.
8. Observation description of any three bacterial and fungal plant diseases
9. Staining and observation of VAM.
10. Analysis of soil - pH, Moisture content and water holding capacity.
11. Study of air flora by petriplate exposure method.
12. Analysis of potable water: SPC, Presumptive, confirmed and completed test, determination of coli form count in water by MPN.
13. Determination of Biological Oxygen Demand (BOD) of waste water samples.

A.S.D Govt. Degree College for Women (A), Kakinada

III B.Sc Microbiology Syllabus

BSc	Semester: V (Skill Enhancement Course- Elective)	Credits: 4
MB T A2 A- PAIR: A2	Management Of Human Microbial Diseases And Diagnosis	Total hours 36

Aim and objectives of Course

To realize the principles of prevention and treatment of microbial diseases and to understand the concepts and development of microbial diseases in animals

Learning outcomes of Course

Up on completion of the course students able to

CO1: Develop knowledge and skills on microbiological laboratory skills for identification of pathogens

CO2: Students will demonstrate the collection of clinical samples

CO3: Students will get knowledge on staining techniques

CO4: Students able to perform diagnostic techniques

CO5: To understand drug resistance

UNIT – I Skill oriented

Definition and concept of health, disease, infection, and pathogen.

Bacterial Diseases: Cholera, Pneumonia, and Dysentery.

Viral Diseases: Poliomyelitis & Chicken pox

Fungal diseases: Dermatormycosis and Athletes foot.

UNIT- II Skill, Employability

Collection of clinical samples (oral cavity, throat, skin, blood, CSF, urine and faeces) and precautions required.

Method of transport of clinical samples to laboratory and storage.

UNIT- III Skill, Employability & Entrepreneurship

Mechanism of bacterial pathogenicity, colonization and growth, virulence, virulence factors, exotoxins, enterotoxins, endotoxins and neurotoxins.

Examination of sample by staining - Gram stain, Ziehl-Neelson staining for tuberculosis, Giemsa-stained thin blood film for malaria.

Preparation and use of culture media - Blood agar, Chocolate agar, Lowenstein-Jensen medium, Mac Conkey agar. Distinct colony properties of various bacterial pathogens.

UNIT- IV

No. of hours: 6

Serological Methods - Agglutination, ELISA, immunofluorescence, Nucleic acid based methods - PCR, Nucleic acid probes.

Diagnosis of Typhoid, Dengue and HIV, Swine flu.

UNIT- V

No. of hours: 6

Importance, Determination of resistance/sensitivity of bacteria using disc diffusion method, Determination of minimal inhibitory concentration (MIC) of an antibiotic by serial double dilution method. Problems of drug resistance and drug sensitivity.

Drug resistance in bacteria.

MB P A2: MANAGEMENT OF HUMAN MICROBIAL DISEASES AND DIAGNOSIS

Skill, Employability & Entrepreneurship

1. Collection transport and processing of clinical specimens (Blood, Urine, Stool and Sputum).

Receipts, Labelling, recording and dispatching clinical specimens.

2. Physical, Chemical & microscopic examination of clinical samples – urine, stool, puss, sputum.

3. Isolation and identification of following pathogens from clinical samples: *E.coli*, *Salmonella* and *Pseudomonas*.

4. Demonstration of permanent slides of the following parasites:

a) *Entamoeba histolytica*

b) *Ascaris* spp.

c) *Plasmodium* spp.

d) *Mycobacterium tuberculosis* & *Mycobacterium leprae*

5. Estimation of haemoglobin (Acid haematin and cyan methanoglobin method).

6. ESR and PCV determination.

7. Immuno hematology: Blood group typing by slide test & tube for ABO & Rh systems.

8. Isolation of bacteria in pure culture and Antibiotic sensitivity.

SUGGESTED READING

- Ananthanarayan R and Paniker CKJ (2009) Textbook of Microbiology, 8th edition, Universities Press Private Ltd.
- Brooks G.F., Carroll K.C., Butel J.S., Morse S.A. and Mietzner, T.A. (2013) Jawetz, Melnick and Adelberg's Medical Microbiology. 26th edition. McGraw Hill Publication.
- Collee JG, Fraser, AG, Marmion, BP, Simmons A (2007) Mackie and McCartney Practical Medical Microbiology, 14th edition, Elsevier.
- Randhawa, VS, Mehta G and Sharma KB (2009) Practicals and Viva in Medical Microbiology 2nd edition, Elsevier India Pvt Ltd.
- Tille P (2013) Bailey's and Scott's Diagnostic Microbiology, 13th edition, Mosby.

A.S.D Govt. Degree College for Women (A), Kakinada

BSc Microbiology Syllabus

BSc	Semester: V (Skill Enhancement Course- Elective)	Credits: 3
MB T B1 B- PAIR: B1	Microbial Biotechnology and r – DNA Technology	Total hours 36

Aim and objectives of Course

To study applications of microbial biotechnology and r DNA technology.

Learning outcomes of Course

Up on completion of the course students able to

CO1: Students should be able to demonstrate with the wide diversity of microbes and their potential use in medicine, agriculture and industry biotechnology regulation and ethics.

CO2: Students will get knowledge on restriction endonuclease in r DNA technology and selection of transformed cells

CO3: Students will get knowledge on cloning vehicles in r DNA technology

CO4: Student will able to understand gene sequencing methods

CO5: Students will get knowledge on of genetically modified crops. And role of microorganisms in creation of transgenic animals and plants.

UNIT – I Skill, Employability & Entrepreneurship

Introduction to microbial biotechnology, Bacterial genes, genomes and genetics. Recombinant microbial biotechnology products, biotechnology regulation and ethics. Biomass and bio fuels Microbial biomass (algal blooms, in fresh and sea water), fungal mushrooms, fermentation waters by yeasts, and bacterial biomass.

UNIT- II Skill, Employability & Entrepreneurship

Restriction and Modification: Classification of restriction endonucleases. Enzymes used in molecular cloning; Polymerases, ligases, phosphatases, kinases and nucleases; Advanced Molecular biology techniques: Electrophoresis and Blotting techniques.

Cutting and joining DNA: (cohesive end ligation, methods of blunt end ligation).

Transfection and transformation. Selection of transformed cells. Screening methods (Genetic marker and blue white screening).

UNIT- III Skill, Employability & Entrepreneurship

Cloning vehicles - Plasmid, Bacteriophage, Construction of genomic and cDNA libraries. Advantages of cDNA libraries. Expression of cloned genes in bacteria, yeast, plant and animal cells.

Basic principles and application of biosensors. Nucleic acid probe technology.

UNIT- IV Skill, Employability & Entrepreneurship

Methods of gene sequencing – Maxam - Gilberts and Sanger's dideoxy chain termination methods; Polymerase chain reaction technique (Components in PCR and PCR conditions).

Methods of gene transfer in fungi, yeast and higher plants using microinjection, microprojectile bombardment (gene gun method, Electroporation and *Agrobacterium* mediated transformation.

UNIT- V Skill, Employability & Entrepreneurship

Concept of genetically modified microorganisms. Bt cotton : production, advantages and limitations.

Probable advantages and disadvantages of genetically modified crops.

Role of microorganisms in creation of transgenic animals and plants.

MBT- BI :MICROBIAL BIOTECHNOLOGY AND r – DNA TECHNOLOGY

TOTALHOURS: 36

CREDITS: 2

1. Culturing of mushrooms
2. Isolation of yeast from grapes.
3. Production of wine
4. Production of ethyl alcohol
5. Isolation of Plasmid DNA from E.coli
6. Tissue culture: callus cultivation
7. Fermentative production of ethyl alcohol
8. Transformation in Bacteria using plasmid.
9. Restriction digestion of DNA and its electrophoretic separation.
10. Ligation of DNA molecules and their testing using electrophoresis.
11. Activity of DNAase and RNAase on DNA and RNA.
12. Isolation of Plasmid DNA.
13. Demonstration of PCR.

A.S.D Govt. Degree College for Women (A), Kakinada

BSc Microbiology Syllabus

BSc	Semester: V (Skill Enhancement Course- Elective)	Credits: 3
MB T B2 B- PAIR: B2	BIOSTATISTICS AND BIOINFORMATICS Skill, Employability	Total hours 36

Aim and objectives of Course

To understand Biostatistics and Bioinformatics

Learning outcomes of Course

Up on completion of the course students able to

CO1: Understand biological data bases

CO2: Summarize Searching sequence data bases

CO3: students able to use appropriate tests for bio variable analysis

CO4: Able to understand analytical tests and Construction of phylogenetic trees by clustering methods

CO5: Able to understand protein modelling methods

UNIT – I

No. of hours: 7

Definition, nature and scope of bioinformatics. Bioinformatics versus computational biology. Branches of bioinformatics. Basic concepts in bioinformatics. Introduction to Biological data bases: NCBI, EMBL, EXPASY, PIR, Pfam. Concept of World Wide Web: HTML, HTTP.

UNIT – II

No. of hours: 7

Searching sequence data bases using BLAST. Multiple sequence alignment– progressive alignment–profiles–multi dimensional dynamic programming. Biostatistics: Measures of Central tendency and distribution–mean, median, mode, range, standard deviation, variance.

UNIT – III

No. of hours: 7

Basic principles of probability theory, Bayes theorem, Normal distribution, statistical inference –Types of errors and levels of significance. Comparison of variance (F-test), small sample test, t-test for comparison of means, chi square test. Analysis of variance–one way and two way, multiple comprises.

UNIT – IV

No. of hours: 7

Correlation and Linear regression. Sequence Analysis: Introduction to hidden Markov models. Genomics and proteomics: Molecular phylogenetics: Construction of Phylogenetic trees using parsimony method and branch & bound method. Clustering methods– UPGMA & neighbour-joining. Fragment assembly, peptide sequencing using mass and spectroscopy data. Comparative genomics.

UNIT – V

No. of hours: 8

Modelling: Protein secondary structure prediction–Chou Fasmanrules– Neural networks–discriminate analysis. Prediction of transmembrane segments in Membrane proteins. Protein3D structure prediction– homology– threading – Potential energy functions–energy minimization–molecular dynamics–simulated annealing.

MBP B2 - BIOSTATISTICS AND BIOINFORMATICS

TOTALHOURS: 36

CREDITS: 2

1. Isolation of plasmid DNA from *E.coli* cells
2. Quantitative and qualitative analysis of proteins / DNA by using spectrophotometer.
3. Demonstration of Southern hybridization
4. Demonstration of amplification DNA by PCR.
5. Use of software for sequence analysis of nucleotides and proteins.
6. Problem related to t – test and χ^2 test.
7. Use of Internet/software for sequence analysis of nucleotides and proteins:
8. Studies of public domain data bases for nucleic acid and protein sequences.
9. Determination of protein structure (PDB).
10. Genome sequence analysis
11. Problems related to measures of central tendency, dispersion, t-test and chi Square test.

SUGGESTED READINGS:

1. Daniel, 2006, Biostatistics, Eighth Edition. John Wiley and sons.
2. Durbin, Eddy, Krogh, Mithison, Biological sequence analysis.
3. T.A.AttwoodandD.J.parry–smith, 2001, Introduction of Bioinformatics.
4. A.D.Baxevaris,1998, Bioinformatics:Apracticalguidetotheanalysisof Genes and proteins,(Edited) B.F.Publication.
5. David W, 2005, Bio-informatics;sequenceandGenomeAnalysis,2ndEdition By Mount CB Spublishers.

A.S.D Govt. Degree College for Women (A), Kakinada

BSc Microbiology Syllabus

BSc	Semester: V (Skill Enhancement Course- Elective)	Credits: 3
MB T C1 C- PAIR: C1	Microbial Quality Control, Instrumentation And Techniques Skill, Employability & Entrepreneurship	Total hours 36

Aim and objectives of Course

To study quality control in food and pharmaceutical industries and analytical techniques

Learning outcomes of Course

Up on completion of the course students able to

CO1: Develop skills on disinfection of instruments and equipment's in laboratory and Hospitals and documentation

CO2:To understand the working principle of basic laboratory equipments

CO3:To understand the techniques like MPN and direct microscopic methods

CO4:To understand and demonstrate Principles of Microscopy, handling and uses of microscopes

CO5:To understand and demonstrate the various analytical and separation techniques

UNIT – I

No. of hours: 7

Microbial quality control definition, history and introduction. Standard Methods involved in assessment of microbial quality control. Q.A and Q.C definitions and importance. Traditional Microbiological Quality Controlling methods: Sampling methods, TVC, APC and serial dilution techniques. Microbiological criteria. Laboratory facility design for quality control: Sterilization, disinfection and decontamination. Personnel training: Hygiene and handling techniques. Documentation. Good laboratory practices.

UNIT – II

No. of hours: 8

Culture media used in QC and QA: Design of specialized media for identification of pathogens. Good laboratory practices in culture media preparation: raw material, water, pH. Uses of media.

Selective and indicator media used in pharmaceutical and food industries. Instruments associated in QC and QA: Principle involved, working conditions, uses and precautions of

Laminar Air Flow (LAF), Autoclave, Incubator, pH meter, Colony counter, Hot air oven, Centrifuges and storage devices.

UNIT – III

No. of hours: 7

Techniques for enumeration of microorganisms: sample preparation from Aqueous, soluble, insoluble, medical and pasteurized materials. Counting methods: pour plate, spread plate, membrane filtration. Most Probable Number (MPN) and MIC. Turbidometric methods. Staining techniques for identification bacteria and Fungi.

UNIT – IV

No. of hours: 7

Microscopy – Principles of light, phase, fluorescent & electron microscopes; Microscopic techniques: Basic principles and applications of phase – contrast microscopy, fluorescent microscopy and electron microscopy, types of electron microscopy– scanning and transmission. Radio isotopes: radiometric analysis, stable and radioactive isotopes, preparation, labelling, detection and measurement of isotope.

UNIT - V

No. of hours: 7

Principles of Centrifugation – Centrifugation techniques – preparative and analytical methods, density gradient centrifugation. General principles and applications of chromatography – Paper, Column, Thin layer, Gas, Ion exchange, Affinity chromatography, HPLC, FPLC, GCMS and Gel filtration. Electrophoresis- moving boundary, zone (Paper Gel) electrophoresis. Immuno electrophoresis. Immunoblotting. Isoelectric focusing, 2-Delectrophoresis, Principles of colorimetry

MBP-C1: MICROBIAL INSTRUMENTATION AND BIOTECHNIQUES

Skill, Employability & Entrepreneurship

1. Isolation and enumeration of bacteria from food / pharmaceutical source.
2. Quality Assurance of water by MPN method.
3. Preparation of any two selective and indicator media commonly used Q.A & Q.C
4. Microbial quality of in and around laboratory conditions.
5. Isolation and Identification of fungi by using selective media and staining procedures.
6. Identification of MIC of any one antibiotic.
7. Colorimetric and spectroscopic estimation of nucleic acids.
8. Microscopic observations of examination of bacteria, fungi and actinomycetes.
9. Separation of cell components by centrifugation technique.
10. Demonstration of immune electrophoresis.
11. Demonstration of HPLC.

Suggested readings:

1. Hand book of Microbial Quality control by Rosamund. M, Baird Norman. A, Hodges and Stephen. P, Denyer. CRC press.
2. The Microbiological Quality of Food, 1st Edition, Editors: Antonio Bevilacqua Maria Rosaria Corbo Milena SinigagliaBook ISBN: 9780081005033 Imprint:Wood head Publishing.
3. Guide to Microbiological Control in Pharmaceuticals and Medical Devices, Second Edition, Stephen P. Denyer, Rosamund M. Baird, CRC Press.
4. WILSON & WALKER, Practical Biochemistry: Principles and techniques, Academic publishers.
5. UPADHYAY, UPADHYAY &NATH, Biophysical Chemistry: Principles and techniques, Himalaya Publishers.

A.S.D Govt. Degree College for Women (A), Kakinada

BSc Microbiology Syllabus

BSc	SEMESTER: V (SKILL ENHANCEMENT COURSE-ELECTIVE)	Credits: 3
MB T C2 C- PAIR	Drug Design, Discovery And Intellectual Property Rights (Ipr) Skill, Employability	Total hours 36

Aim and objectives of Course

To study drug design, discovery and IPR

Learning outcomes of Course

Up on completion of the course students able to

CO1:Students should be able to understand approaches for drug design, sources of drugs and molecular mechanism of drugs

CO2:Students should be able to understand drug development process

CO3:Get knowledge on vaccines, gene therapy and gene based vaccines

CO4:Students will get knowledge on outlines of intellectual property rights, ISI and Bio standards

CO5:Students will understand concepts Bio safety and ethics

Unit – I

No. of Hours: 7

Introduction- History of drug design, Current approaches and philosophies in drug design, Molecular mechanisms of diseases and drug action with examples. Pharmaceutical products of microbial origin (antibiotics) animal origin (sex hormones), plant origin (Alkaloids & Morphine).Sources of Drugs- Microbial drugs, Plants as a source of drugs, *E. coli* as a source of recombinant therapeutic proteins.

Unit – II

No. of Hours: 7

Expression of recombinant proteins in yeasts, animal cell culture systems. Rational drug design and Combinatorial approaches to drug discovery. Drug development process- Impact of genomics and related technologies upon drug discovery: Gene chips, Proteomics, Structural genomics and Pharmacogenetics. Drug manufacturing process- Guides to good manufacturing practice.

Unit – III

No. of Hours: 7

Vaccines and adjuvant- Traditional vaccine preparations, Attenuated and inactivated viral and bacterial vaccines, Toxoids.Peptide vaccines.Adjuvant technology. Nucleic acid as drugs- Gene therapy: Basic approach to gene therapy, Vectors used in gene therapy - Manufacture of

viral vectors, Non-viral vectors. Gene therapy and genetic disease, cancer, Gene therapy and AIDS. Gene based vaccines.

Unit – IV

No. of Hours: 8

Introduction: general introduction to IPR (parent, plant breeder's right). Trademarks, industrial design, trade secrets (or) undisclosed information integrated circuit designs.

Patenting principle, international – standards and patent validity (neem and relaxins), recent developments in patent system and patentability of biotechnology, invention IPR issues of the Indian context. Copy right and rights related to copy right, International standards as per WHO, ISI, bio safety and validation.

Unit – V

No. of Hours: 7

Biotechnology and hunger: challenges for the Indian biotechnological research and industries. Bio safety: the Cartagena protocol on bio safety.

Bio safety management: key to the environmentally responsible use of biotechnology, ethical implications of biotechnology product techniques, social and ethical implications of biological weapons

MBP – C2: DRUG DESIGN, DISCOVERY AND INTELLECTUAL PROPERTY RIGHTS (IPR)

TOTAL HOURS: 40

CREDITS: 3

1. Isolation of antibiotic producing bacteria from soil samples
2. Isolation of drug resistant plasmid from bacteria (E.coli).
3. Isolation of Actinomycetes from soil.
4. Identification of antibacterial activity of actinomycetes.
5. Identification of antibacterial activity of fungi
6. Identification of antagonistic activity of any two fungal species.
7. Assay of any one antibiotic (Penicillin).
8. Determination of MIC of any one antibiotic (penicillin / streptomycin).
9. Study of components and design of a BSL – III laboratory
10. Filing applications for approval from bio safety committee
11. Filing primary applications for patents
12. Study of steps of patenting process
13. A case study of patent.
14. Study of bio safety measures in pharmaceutical industry.
15. Study on QA & QC parameters followed in R&D laboratory.

SUGGESTED READINGS:

1. W.B.Hugo & A.D.Russell, Pharmaceutical Microbiology edited, 6th Edition, Black Well science.
2. Shanson D.C., Microbiology in clinical practice, 2nd edition, London; Wright.
3. T.Sammes Ellis Horwood, topics in Antibiotic chemistry Vol I to V.
4. Wulf Crueger, Biotechnology – A text book of Industrial Microbiology, 2nd Edition, Panima publishers
5. A.H.Patel, 1984, Industrial Microbiology, Macmillan India Limited.
6. Coulson C.J., London; Taylor and Francis, Molecular mechanisms of drug action.
7. Denyes S.P. & Baird R.M. Chichester, Ellis Horwood, Guide to microbiological Control in Pharmaceuticals.
8. Murray S. Cooper, Quality control in the Pharmaceutical Industry - Edt., Vol-II, Academic press, New York.
9. Sydney H. Willin, Murray M. Tuckerman, William S. Hitchings IV, Good Manufacturing practices of pharmaceuticals, second Edt., Marcel Dekker NC Nework.
10. Rajesh Bhatia, Rattan Lal Ithhpunjani, Quality assurance in Microbiology, CBS

Publisher&Distributors,NewDelhi.

**A.S.D.GOV. DEGREE COLLEGE FOR WOMEN (A)
KAKINADA**

I B.A., B. Com., B.Sc. Part-1- Second Language

I SEMESTER SYLLABUS-General Hindi

Prose, Short Stories, Grammar and Letter Writing. (w.e.f. 2022-23)

Unit-I - गद्य संदेश (PROSE) -

१. भारतीय साहित्य की एकता-नन्द दुलारे वाजपायी
२. आत्मनिर्भरता - पं. बालकृष्ण भट्ट
३. अन्दर की पवित्रता- डॉ. हजारी प्रसाद द्विवेदी

Unit-II - कथा लोक (SHORT STORIES)

१. ठाकुर का कुआँ - प्रेमचंद
२. वापसी - उषा प्रियंवदा
३. सदाचार का तावीज - हरिशंकर परसाई

Unit-III - व्याकरण (GRAMMAR)-

लिंग, वचन,

काल -

विलोम शब्द

अंग्रेजी - हिन्दी कार्यालयीन शब्दावली

पत्र लेखन-व्यक्तिगत पत्र

**A.S.D.GOV. DEGREE COLLEGE FOR WOMEN (AUTONOMOUS)
KAKINADA**

I B.A., B. Com., B.Sc. Part-1 (ii) Second Language

II SEMESTER SYLLABUS General Hindi

Prose, Short Stories, Grammar and Letter Writing. (w.e.f. 2022-23)

SYLLABUS

Unit-I - गद्य संदेश (PROSE)

१. भारत में संस्कृति संगम - रामधारी सिंह दिनकर
२. समय पर मिलाने वाले - हरिशंकर परसाई
३. **HIV /AIDS**

Unit-II - कथा लोक (SHORT STORIES)

१. हार की जीत - सुदर्शन
२. पुरस्कार - जयशंकर प्रसाद
३. सेवा - ममता कालिया

Unit-III - व्याकरण (GRAMMAR)- - Employability

हिन्दी - अंग्रेजी कार्यालयीन शब्दावली

हिन्दी - अंग्रेजी पदनाम

पत्र लेखन (आवेदन पत्र, शिकायती पत्र)

A.S.D.GOV. DEGREE COLLEGE FOR WOMEN (AUTONOMOUS)
KAKINADA

II B.A., B. Com., B.Sc. Second Language

III SEMESTER SYLLABUS General Hindi Paper –III

(Old & Modern Poetry, History of Hindi Literature, Essays, Translation and Official Lett

Unit-I

1. काव्यदीप : साखी – कबीर दास १-१०

सूरदास – विनय - बाल लीला वर्णन

आगे बढ़, आगे – मैथिलीशरण गुप्त

चरण चले, ईमान अचल हो ! - माखनलाल चतुर्वेदी

Unit-II- हिन्दी साहित्य का इतिहास :

भक्तिकाल : भक्तिकाल : स्वर्ण युग

ज्ञानाश्रयी शाखा- कबीर

प्रेमाश्रयी शाखा – जायसी

राम भक्ति शाखा – तुलसी दास

कृष्ण भक्ति शाखा – सूर दास

Unit-III - व्याकरण (GRAMMAR)

3. साधारण निबंध: विश्व भाषा के रूप में हिन्दी

मेरा प्रिय कवि / साहित्यकार

समाज में नारी की भूमिका

भारत की वर्तमान समस्याएँ

4. अनुवाद : अंग्रेजी से हिन्दी (3-4 lines)

तेलुगु से हिन्दी (3-4 lines)

5. प्रयोजन मूलक हिन्दी : सरकारी पत्र (Official letters) ज्ञापन, परिपत्र,

सूचना -

**A.S.D. GOVT. DEGREE COLLEGE FOR WOMEN (AUTONOMOUS),
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(Accredited by NAAC with 'B' in Cycle 3)

(AFFILIATED TO ADIKAVINANNAYA UNIVERSITY: RAJAMAHENDRAVARAM)

I YEAR I BA HISTORY COURSE, CBCS: PAPER I

SEMESTER-I Paper code: HIS201101(2)

SYLLABUS

B. A	Semester: I	Credits: 4
Course: 1	Ancient Indian History & Culture (From Indus Valley Civil. to 13 Century A.D)	Hrs/Wk: 5

UNIT - I:

Skill Development

Indus Valley Civilization - Salient Features; Vedic Age - Society, Polity, Economy, Culture during early and later Vedic period.

UNIT - II:

Skill Development

Ancient Indian History & Culture (6th Century BC to 2nd Century AD): Doctrines and Impact of Jainism and Buddhism; Mauryan Administration, Society, Economy & Culture - Ashoka's Dhamma; Kanishka's Contribution to Indian Culture.

UNIT - III:

Skill Development

History & Culture of South India (2nd Century BC to 8th Century AD): Sangam Literature; Administration, Society, Economy and Culture under Satavahanas; Cultural contribution of Pallavas.

UNIT-IV:

Employability

India from 3rd century AD to 8th century AD: Administration, Society, Economy, Religion, Art, Literature and Science & Technology under Guptas – Samudra Gupta; Cultural contribution of Harsha: Arab Conquest of Sind and its Impact.

UNIT -V:

Skill Development

History and Culture of South India (9th century AD to 13th century AD): Local Self Government of Cholas; Administration, Society, Economy and Culture under Kakatiyas – Rudrama Devi

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(AFFILIATED TO ADIKAVINANNAYA UNIVERSITY: RAJAMAHENDRAVARAM)
II YEAR BA HISTORY COURSE, CBCS PAPER II
SEMESTER-II Paper code: HIS 202101(2)
SYLLABUS

B.A	Semester: II	Credits: 4
Course: 2	Medieval Indian History & Culture (1206A.D To 1764 A.D)	Hrs/Wk: 5

UNIT-I:

Skill Development

Impact of Turkish Invasions – Balban, AllauddhinKhilji, Md. Bin Tughlaq - Administration, Society, Economy, Religion and Cultural developments under Delhi Sultanate (from 1206 to 1526 AD).

UNIT-II:

Skill Development

Impact of Islam on Indian Society and Culture – Bhakti Movement; Administration, Society, Economy, Religion and Cultural developments under Vijayanagara Rulers.

UNIT-III:

Skill Development

Emergence of Mughal Empire – Babur – Sur Interregnum - Expansion & Consolidation of Mughal Empire – Akbar, Jahangir, Shah Jahan, Aurangzeb.

UNIT-IV:

Employability

Administration, Economy, Society and Cultural Developments under the Mughals – Disintegration of Mughal Empire - Rise of Marathas under Shivaji.

UNIT-V:

Skill Development

India under Colonial Hegemony: Beginning of European Settlements - Anglo-French Struggle –Conquest of Bengal by EIC.

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II YEAR BA HISTORY COURSE, CBCS PAPER III

SEMESTER-III Paper code: HIS203101(1)

SYLLABUS

DEPARTMENT OF HISTORY

B.A	Semester: III	Credits: 4
Course: 3	Modern Indian History & Culture (1764-1947 A. D)	Hrs/Wk: 5

UNIT I:

Skill

Policies of Expansion –Warren Hastings, Cornwallis - Subsidiary Alliance & Doctrine of Lapse –
Causes & Results of 1857 Revolt – Lytton, Rippon, Curzon

UNIT II:

Employability

Social, Religious & Self-Respect Movements – Raja Rammohan Roy, Dayananda Saraswathi, Swami
Vivekananda, JyotibaPhule, Narayana Guru, Periyar, Dr. B. R. Ambedkar

UNIT III:

Employability

Causes for the growth of Nationalism - Freedom Struggle from 1885 to 1920, Moderate Phase —
Militant Phase: Vandemataram Movement - Home Rule Movement

UNIT IV:

Employability

Freedom Struggle from 1920 to 1947: Gandhiji's Role in the National Movement – Revolutionary
Movement – Subhas Chandra Bose

UNIT V:

Skill

Muslim League & the Growth of Communalism – Partition of India – Advent of Freedom - Integration
of Princely States into Indian Union – Sardar Vallabhai Patel

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II YEAR BA HISTORY COURSE, CBCS

PAPER IV Paper code: HIS204101 (1)

SEMESTER-IV SYLLABUS

B.A	Semester: IV	Credits: 4
Course: 4	History & Culture of Andhra (from 1512 to 1956 AD)	Hrs/Wk: 5

UNIT I:

Skill

Andhra through 16th & 19th Centuries AD: Evolution of Composite culture- the Quatbshahi of Golkonda- Administration, Society & Economy - Literature & architecture: Advent of European and settlements in Andhra - Occupation of Northern Cricars and Ceded Districts - Early revolts again the British.

UNIT II:

Skill

Andhra Under British rule: Administration - Land revenue settlements - Society - Education - Religion - Impact of Industrial revolution on economy- peasantry & famines - contribution of sir Thomas Munroe & C.P. Brown - impact of 1857 revolts in Andhra.

UNIT III:

Employability

Social Reforms & New literary Movements: Kandukuri Vereeshalingam, Ragupathi Venkatarathnam Naidu, Guruzada Appa Rao, Kommaraju Venkata Laxman Rao; New literacy movements: Rayaprolu Subbarao, Viswanath Satyanarayana, Gurram Jashua, Boyi Bhimanna, Sri Sri.

UNIT IV:

Employability

Freedom Movement in Andhra (1885-1947): Vandemataram Movement - Home Rule Movement in Andhra - Non- Cooperation Movement - Alluri Seetarama Raju & Rampa Revolt (1922-24) - Civil Disobedience Movement - Quit India Movement.

UNIT V:

Skill

Movement for separate Andhra State (1953) and AP (1956): Causes - Andhra Maha Sabha - Conflict between Coastal Andhra & Rayalaseema - Sri Bagh Pact - work of various Committees - Martyrdom of Potti Sriramulu - Formation of separate Andhra State (1953); Movement for formation of Andhra Pradesh (1956): Visalandhra Mahasabha - Role of Communists - States Reorganization Committee - Gentlemen's Agreement - Formation of Andhra Pradesh

A.S.D. GOVT. DEGREE COLLEGE FOR WOMEN (A), KAKINADA

(Accredited by NAAC with 'B' in Cycle 3)

(AFFILIATED TO ADIKAVINANNAYA UNIVERSITY: RAJAMAHENDRAVARAM)

II YEAR BA HISTORY COURSE, CBCS PAPER V

SEMESTER-IV SYLLABUS Paper code: HIS204102 (1)

B.A	Semester: IV	Credits: 4
Course: 5	History Of Modern World (From 15th Cent. AD to 1945 AD)	Hrs/Wk : 5

UNIT I:

Skill

Transformation from Medieval to Modern Era – Chief Characteristics; Glorious Revolution (1688) Origin of Parliament Bill of Rights – Results

UNIT II:

Skill

American Revolution (1776); French Revolution (1789) – Causes, Course and Results

UNIT III:

Skill

Unification of Italy; Unification of Germany

UNIT IV:

Employability

Communist Revolution in Russia; World War I: Causes – Results of the War – Paris Peace Conference; League of Nations

UNIT V:

Employability

World War II: Causes, Fascism & Nazism – Results; The United Nations Organization: Structure, Functions and Challenges.

A.S.D. GOVT. DEGREE COLLEGE FOR WOMEN (A), KAKINADA
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(AFFILIATED TO ADIKAVINANNAYA UNIVERSITY: RAJAMAHENDRAVARAM)

B.A History Syllabus (w.e.f:2020-21A.B)

Paper code: HIS205101- 6B

B.A	Semester – V (Skill Enhancement Course- Elective)	Credits:4
Course:6B	Tourism and Hospitality Services	Hrs/Wk:5

Syllabus:(Hours:Teaching: 60,Skills Training:10, others including unit tests: 05.Total: 75)

Unit:1

Skill Development

Tourism–Definition–Nature and Scope–History of Tourism–Types of Tourism– Domestic and International Tourism– Causes of rapid growth of tourism– National Institute of Tourism and Hospitality Management

Unit:2

Skill Development

Relationship between history and tourism-Major tourist spots in AP– Gandikota, Nagarjuna Konda, Salihundam, Kona Seema

Unit:3

Employability

Characteristics of Hospitality Industry-Inflexibility, Intangibility, Perishability-Types of Hospitality jobs – Hotel Manager, Hotel Receptionist, Restaurant Manager, Catering Assistant, Executive Chef etc - Concepts of Atithi Devo Bhavah-Types of hotels in India

Unit:4

Skill Development

Duties, responsibilities &skills of front office staff– duties, responsibilities and skills of housekeeping staff- guest stay process in a hotel-major processes and stages associated with it

Unit:5

Entrepreneurship

Different types of services offered in selected Hotels/Motels/Restaurants Room Service, Catering Services -Different types of managerial issues -Service etiquettes

A.S.D. GOVT. DEGREE COLLEGE FOR WOMEN (A), KAKINADA
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(AFFILIATED TO ADIKAVINANNAYA UNIVERSITY: RAJAMAHENDRAVARAM)

B.A History Syllabus (w.e.f:2020-21A.B)

Paper code: HIS205102- 7B

B.A	Semester – V (Skill Enhancement Course- Elective)	Credits:4
Course:7B	Tourism Guidance and Operating Skills	Hrs/Wk:5

Syllabus: (Hours: Teaching: 60, Skills Training: 10, others including unit tests: 05 Total:75)

Unit:1

Skill Development

Meaning of tour guide - types of tour guide: heritage guide, nature guide, adventure guide, business guide, special interest guide etc – duties and responsibilities of guides -various roles of tour guide.

Unit:2

Skill Development

Guiding techniques: leadership skills, social skills, presentation skills, communication skills – Guide's personality skills: passion, empathy, enthusiasm, punctuality, humour etc Personal Hygiene and grooming– code of conduct.

Unit:3

Employability

Guest Relationship Management- Handling emergency situations- Medical, Personal, Official, VISA/Passport, Death, Handling Guest with special needs/Different Abilities/Different age groups.

Unit:4

Skill Development

Conducting Tours: Pre-Tour Planning, Route Chart, Modes of Transportation, Security Measures, and Check list etc.-Conducting various types of tours- Relationship with Fellow Guides Coordination with hospitality institutions.

Unit:5

Skill Development

Travel Agency and Tour operations – Difference between Travel Agent and Tour operator – Functions of Tour Operator – Types of Tour Operations and of Tour Operators - A brief study of tour operating agencies like APTDC, Southern Travels etc.

A.S.D. GOVT. DEGREE COLLEGE FOR WOMEN (A), KAKINADA

(Accredited by NAAC with 'B' in Cycle 3)

(AFFILIATED TO ADIKAVINANNAYA UNIVERSITY: RAJAMAHENDRAVARAM)

**B.A (HETT Group) Tourism and Travel Management Syllabus
(w.e.f:2020-21A.B)**

Semester – V (Skill Enhancement Course- Elective)

Course:6C Tourism Destination Marketing

Paper code: TT205109 – 6C

Unit I

Skill

Destination development: Introduction, types of destinations Characteristics, destination selection process 5 A's in Destination management Destination Mapping - Destinations Analysis.-Tourism Vs Attractions.

Unit II

Skill

Destination Planning & Development: Importance of Destination Planning, Destination Planning Process Destination Planning Guidelines – National, State, & Regional Tourism Planning Economic, Social, Cultural, and Environmental considerations in Tourism planning Destination Development.

Unit III

Employability

Destination Marketing– Introduction of Destination Marketing, Marketing environment Destination Marketing Mix: Product, Price, Place, and Promotion Product Strategies, Managing existing Tourism Products, New Product development in Tourism. Pricing Strategies–Tourists Perception on Pricing – Doxey's irritation index.

Unit IV

Skill

Destination Distribution and Image of Destination – Destination Distribution: Strategies, Channels Developing a Destination Promotional strategies Destination Image: Image Formation Process-Image strategies Tourism Destination Cycle – Destination competitiveness.

Unit V

Employability

Destination Publicity: Advertising - Sales Promotion, sales promotion techniques Publicity: Role of AP Tourism & Ministry of Tourism, GOI, for the promotion of destinations Tourism Marketing Communication: Importance, techniques, Barriers, the process of communication – Trends in the Communication

A.S.D. GOVT. DEGREE COLLEGE FOR WOMEN (A), KAKINADA

(Accredited by NAAC with 'B' in Cycle 3)

(AFFILIATED TO ADIKAVINANNAYA UNIVERSITY: RAJAMAHENDRAVARAM)

B.A (HETT Group) Tourism and Travel Management Syllabus

(w.e.f:2020-21A.B)

Semester – V (Skill Enhancement Course- Elective)

Course: 7C Itinerary Preparation and Tour Packaging

Paper code: TT205110 – 7C

Unit I

Skill

Itinerary Planning & Development: Meaning, Importance, Concept of Itinerary Planning Resources and Steps for Itinerary Planning -Types of Itinerary Do's and Don'ts of Itinerary Preparation components of Itinerary, Relevance & scope

Unit II

Skill

Developing & Innovating Package Tour: Formulation and Designing Process of Tour: Free Independent Tours (FITs) Group-Special Interest Tours (SITs), Tour Packaging: Importance of Tour Packaging – Classifications of Tour Packages, Components of Package tour- Pre designed & Tailor-made packages.

Unit III

Employability

The concept of Costing: Types of Costs, Components of Tour Cost - Preparation of Cost Sheet Tour Pricing - estimation of Tour Price – Pricing Strategies Negotiations & contract with the suppliers Tour Packages of Thomas Cook, SOTC, Cox & Kings and TCI.

Unit IV

Employability

Operation of Package Tour: Confirmation of Tour, Issue of Tour Vouchers Reconfirmation with Airlines, Hotel & Ground Service Providers Distributing Customized Itinerary to Tour Leader, Tour Escort, Tour Guide, Transportation, Standard Procedures for Pickup and Drop Crisis Management in tour, Preparation of Feedback or Guest Comment Sheet.

Unit V

Skill

Travel Documentation: Familiarization with TIM (Travel Information Manual) Passport & VISA- Meaning, Types, Procedures, Validity Necessary Information to fill the Passport and VISA Form for Issuance Health Certificates, Currency, Travel Insurance Types of payment methods: credit card, debit card, UPI, e-wallet, net- banking, mobile banking etc.

A.S.D GOVT DEGREE COLLEGE FOR WOMEN(A)

(Re-Accredited by NAAC with 'B')

KAKINADA 533002, EASTGODAVARI, ANDHRA PRADESH



DEPARTMENT OF HORTICULTURE

2022-2023

A.S.D GOVT. DEGREE COLLEGE FOR WOMEN (A)

(Re-Accredited by NAAC with 'B')
KAKINADA 533002 EASTGODAVARI, ANDHRA PRADESH

I B.Sc HORTICULTURE THEORY SYLLABUS for the Academic Year 2022- 2023

SEMESTER - I, COURSE – I

FUNDAMENTALS OF HORTICULTURE AND SOIL SCIENCE

Unit I : Introduction to Horticulture: Skill & Employability 12 Hrs.

1. Horticulture: Definition, importance of horticulture in terms of economy, production, employment generation, environmental protection and human resource development.
2. Divisions of horticulture with suitable examples and their importance.
3. Area, production of Horticultural crops in A.P. and India.
4. Fruit and vegetable zones of India and Andhra Pradesh.
5. Export scenario and scope for Horticulture in India.

Unit II : Classification Horticulture Crops Skill 12 Hrs.

1. Classification of horticultural crops based on soil and climatic requirements.
2. Vegetable crop gardens – Nutrition and kitchen garden – tracer garden – vegetable forcing –market garden – roof garden.
3. Gardens in floriculture – flower gardens – soil and mixed gardens; land scape Horticulture.

Unit III : Characteristics of Orchards Skill 12 Hrs.

1. Orchard: Definition, different systems of planting orchards – square, rectangular Quincunx, hexagonal and contour.
2. Calculation of planting densities in different systems of planting.
3. Different types and methods of pruning.
4. Training: Definition, principles and objectives; merits and demerits of open and closecentered, and modified leader systems.

Unit IV : Physico-chemical characteristics of Soil Skill

12 Hrs.

1. Soil: Definition, minerals and weathering to form soils; factors of soil formation.
2. Soil taxonomy; soil color, texture and structure; other physical properties and stability.
3. Soil colloids and charges; ion adsorption and exchange; soil temperature and soil air.
4. Soil pH and acidity; soil alkalinity and salinity.

Unit V :Soil as a living matter

12 Hrs.

1. Soil organic matter – composition and decomposability.
2. Humus – fractionation of organic matter.
3. Soil biology: Soil microorganisms and fauna –beneficial and harmful roles.
4. Integrated nutrient management and soil tests.

A.S.D GOVT. DEGREE COLLEGE FOR WOMEN (A)

(Re-Accredited by NAAC with 'B')

KAKINADA 533002 EASTGODAVARI, ANDHRA PRADESH

I B.Sc HORTICULTURE THEORY SYLLABUS for the Academic Year 2022-2023
SEMESTER - II, COURSE – II

PLANT PROPAGATION AND NURSERY MANAGEMENT

Unit -1: Sexual Propagation **Skill** 12 Hrs.

1. Sexual propagation – advantages and disadvantages.
2. Seed germination, process of seed germination; factors affecting seed germination;
3. Pre-germination treatments and viability tests; sowing methods of seeds.
4. Polyembryony in propagation of *Opuntia*, trifoliate orange, mango and *Citrus*.

Unit -2: Asexual Propagation **Employability** 12 Hrs.

1. Asexual propagation – advantages and disadvantages.
2. Using bulbs, corms, tubers and rhizomes to raise nursery.
3. Stolons, runners and offsets in raising nursery.
4. Apomixis : Definition; role of apomictics in propagation of apple, mangosteen and *Citrus*.

Unit- 3 : Vegetative Propagation Techniques **Entrepreneurship** 12 Hrs.

1. Cuttings: Definition, propagation by root, leaf and stem cuttings.
2. Layering : Definition, techniques of simple, serpentine, mound, trench and air layering.
3. Grafting : Definition; approach and detached scion (Veneer, whip, cleft, side and bark) grafting techniques.
4. Budding : Definition; techniques of T- , patch and chip budding.

Unit – 4 : Basic requirements of a Nursery **Skill** 12 Hrs.

1. Plant nursery: Definition, importance; Basic facilities for a nursery; layout and components of a good nursery.
2. Nursery beds – types, their merits and demerits; precautions to be taken during preparation.
3. Brief account of growing media; nursery tools and implements.
4. Containers for plant nursery.
5. Brief account of plant propagation structures.

Unit -5: Nursery Management 12 Hrs.

1. Bureau of Indian Standards (BIS-2008) related to nursery; guidelines for nursery raising.
2. Nursery accreditation and Certification.
3. Seasonal activities and routine operations in a nursery; watering, weeding and control of pests and diseases.
4. Common possible errors in nursery activities.
5. Economics of nursery development and record maintenance; online nursery information and sales systems.

A.S.D GOVT. DEGREE COLLEGE FOR WOMEN

(A)

(Re-Accredited by NAAC with 'B')

KAKINADA 533002 EASTGODAVARI, ANDHRA PRADESH

II B.Sc HORTICULTURE THEORY SYLLABUS for the Academic Year 2023-2024

SEMESTER - III, COURSE – III

BASICS OF VEGETABLE SCIENCE (OLERICULTURE)

Unit – 1 : Introduction to Vegetable Crops Skill 12 Hrs.

1. Importance of vegetable cultivation in India and Andhra Pradesh.
2. Classification and Nutritive value of vegetables.
3. Area and production of vegetables in India and Andhra Pradesh.
4. Export and import potential of vegetables in India. Constraints in vegetable production and remedies to overcome them.

Unit – 2 : Solanaceous and Leafy Vegetables Employability 12 Hrs.

Importance, morphology and taxonomy, varieties, climate and soil, seeds and sowing, manuring, irrigation, intercultural operations, diseases and their control, harvesting and yield of following crops:

Cultivation of (a) Brinjal (b) Tomato (c) *Capsicum* (d) Spinach (e) Coriander and (d) *Mentha*

Unit – 3 : Root and Tuber Crops Employability 16 Hrs.

Importance, morphology and taxonomy, varieties, climate and soil, seeds and sowing, manuring, irrigation, intercultural operations, diseases and their control, harvesting and yield of following crops:

Cultivation of (a) Carrot (b) Beet root (c) Tapioca and (d) *Colocasia*

Unit – 4 : Cole Crops Employability 08 Hrs.

Importance, morphology and taxonomy, varieties, climate and soil, seeds and sowing, manuring, irrigation, intercultural operations, diseases and their control, harvesting and yield of following crops:

Cultivation of (a) Cabbage and (b) Cauliflower

Unit – 5 : Leguminous Vegetables **Employability**

12 Hrs.

Importance, morphology and taxonomy, varieties, climate and soil, seeds and sowing, manuring, irrigation, intercultural operations, diseases and their control, harvesting and yield of following crops:

Cultivation of (a) Cluster bean (b) Cow pea and (d) *Dolichos*

A.S.D GOVT. DEGREE COLLEGE FOR WOMEN (A)

(Re-Accredited by NAAC with 'B')

KAKINADA 533002 EASTGODAVARI, ANDHRA PRADESH

II B.Sc HORTICULTURE THEORY SYLLABUS for the Academic Year 2023-2024
SEMESTER - IV, COURSE – IV

BASICS OF FRUIT SCIENCE (POMOLOGY)

Unit – 1 : Introduction to Fruit crops **12 Hrs.**

1. Importance of fruit growing in India and Andhra Pradesh.
2. **Nutritive value of fruits.**
3. Area and production of India and Andhra Pradesh.
4. Export and import potential of fruits in India. Constraints in fruit production and remediesto overcome them.

Unit – 2 : Tropical Fruit Crops **Skill** **12 Hrs.**

Origin, history, distribution, area and production, uses and composition, varieties, soil and climatic requirements, propagation, planting, training and pruning, manuring and fertilizer application, irrigation, intercropping, harvesting and yield, diseases and pests of the following tropical fruit crops:

(a) Mango (b) Guava and (c) Papaya

Unit – 3 : Sub-tropical and Temperate Fruit Crops **Skill & Entrepreneurship** **12 Hrs.**

Origin, history, distribution, area and production, uses and composition, varieties, soil and climatic requirements, propagation, planting, training and pruning, manuring and fertilizer application, **irrigation, intercropping, harvesting and yield, diseases and pests of** the following sub-tropical and temperate fruit crops:

(a) Grapes (b) Pomegranate (c) Citrus and (d) Apple

Unit – 4 : Arid and Minor Fruit crops Skill

12 Hrs.

Origin, history, distribution, area and production, uses and composition, varieties, soil and climatic requirements, propagation, planting, training and pruning, manuring and fertilizer application, irrigation, inter cropping, harvesting and yield, diseases and pests of the following arid fruit crops:

(a) Amla (b) Dates and (c) Wood apple

Unit – 5 : Management Practices for Fruit Crops

12 Hrs.

1. Sustainable Production Practices for Local Fruit Production.
2. Integrated Orchard Management/Principles of IPM.
3. Harvesting and Labor Concerns
4. Grading, packing, storage and marketing of fruits.

A.S.D GOVT. DEGREE COLLEGE FOR WOMEN

(A)

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KAKINADA 533002 EASTGODAVARI, ANDHRA PRADESH

II B.Sc HORTICULTURE THEORY SYLLABUS for the Academic Year 2023-2024 SEMESTER - IV, COURSE – V

PESTS AND DISEASES OF HORTICULTURE PLANTS AND THEIR MANAGEMENT

Unit – 1 : Basics of Entomology and Plant Pathology

12 Hrs.

1. Classification of Insects up to orders and families of economic importance; Study of insect pests (Distribution, host range, biology, nature of damage and management) in horticultural crops.
2. Disease triangle and disease pyramid; Plant Pathology : Definition
3. A general account on symptoms of plant diseases caused by Viruses and Bacteria.
4. A general account on symptoms of plant diseases caused by Fungi.

Unit – 2 : Pests and diseases of Vegetables Crops

12 Hrs.

1. Bhendi : Spotted boll worms, Red cotton bug, Yellow vein mosaic.
2. Cucurbits : Fruit flies, Pumpkin beetles; Downy and powdery mildews.
3. Potato : Potato tuber moth, Golden cyst nematode; Late blight.
4. Sweet Potato : Sweet potato weevil, Vine borer; Mottled necrosis.

Unit – 3 : Pests and diseases of Fruit crops

12 Hrs.

1. Coconut : Rhinoceros beetle, Burrowing nematode; Ganoderma root rot, Grey blight
2. Banana : Banana weevil, banana aphids; Panama wilt. Bunchy top
3. Cashew : Tea mosquito bug. Cashew stem borer; Anthracnose, 2. Pink disease
4. Custard apple : Mealy bug, Fruit boring caterpillar; Anthracnose, Glomerella fruit rots.

Unit – 4 : Pests and diseases of Commercial Flower Crops

12 Hrs.

1. Rose : Rose aphid, Dieback, and black spot
2. Marigold : Aphids, leaf spot, and bud rot
3. Gerbera : Thrips, white flies and Blossom blight
4. Gladiolus : Cut worms, leaf eating caterpillar and corm rot.

Unit – 5 : Management of Pests and Diseases

12 Hrs.

1. Principles and methods of plant disease management.
2. Integrated Plant disease management.
3. Fungicides classification based on chemical nature; commonly used insecticides, fungicides, bactericides and nematicides.
4. Preparation of fungicidal solutions, slurries, pastes and their application.

A.S.D GOVT. DEGREE COLLEGE FOR WOMEN (A)

(Re-Accredited by NAAC with 'B')

KAKINADA 533002 EASTGODAVARI, ANDHRA PRADESH

III Year B.Sc Degree Examinations at the end of V Semester 2023-2024

HORTICULTURE SEMESTER - V, COURSE – 6A Theory Syllabus

ORNAMENTAL HORTICULTURE

(Skill Enhancement Course (Elective))

Unit -1: Introduction to Ornamental Horticulture (10h)

1. History, Definition, scope of gardening, aesthetic values; types of gardens in India.
2. Landscaping, basic principles and basic components.
3. Principles of gardening, garden components and adornments.
4. Lawn types, establishment and maintenance; methods of designing rockery and water garden.

Unit -2: Types of Ornamental gardens Skill (10h)

1. Special types of gardens, trees, their design, their walk-paths, bridges, constructed features.
2. Garden structures – greenhouse, glass house, net house.
3. Values in landscaping; propagation-planting of shrubs and herbaceous perennials.

Unit-3: Plants in Ornamental gardens (10h)

1. Importance, design values, propagation, planting of following annuals, biennials and perennials:
(a) Climbers (b) Creepers (c) Palms (d) Ferns (e) Grasses (f) Cacti (g) Succulents

Unit-4: Ornamental gardening – public utility (10h)

1. Cultural operations in ornamental gardens.
2. Bio-aesthetic planning, definition, need; round country planning; urban planning and planting - avenues, educational institutions, villages.
3. Beautifying railway stations, dam sites, hydroelectric stations, colonies, river banks, Planting material for play grounds.

Unit-5: Ornamental gardening in residences Skill (10h)

1. Bottle garden, terrariums.
2. Vertical gardens, roof gardens.
3. Culture of bonsai, art of making bonsai

A.S.D GOVT. DEGREE COLLEGE FOR WOMEN (A)

(Re-Accredited by NAAC with 'B')

KAKINADA 533002 EASTGODAVARI, ANDHRA PRADESH

III Year B.Sc Degree Examinations at the end of V Semester 2023-2024

HORTICULTURE SEMESTER - V, COURSE – 7A Theory Syllabus

COURSE 7A: COMMERCIAL FLORICULTURE

(Skill Enhancement Course (Elective))

Unit-1: Basic concepts of floriculture (10h)

1. Aesthetic, cultural and industrial importance of flowers; domestic and export marketing of flowers.
2. Floriculture - Importance, area and production in Andhra Pradesh and India.
3. Scope and importance of commercial floriculture in A.P., and India.

Unit-2: Production technology-1 Entrepreneurship (10h)

1. Production techniques of following flowering plants for domestic and export market:
(a) Rose (b) *Chrysanthemum* (c) Marigold (d) Tuberose (e) *Crossandra* (f) Jasmine

Unit-3: Production technology-2 (10h)

1. Production techniques of following flowering plants for domestic and export market:
(a) *Anthurium* (b) *Gerbera* (c) *Gladiolus* (d) *Dahlia* (e) *Heliconia* (f) Orchid

Unit-4: Plant breeding of flowering ornamentals Skill (10h)

1. Objectives and techniques in ornamental plant breeding.
2. Introduction, selection, hybridization, mutation and biotechnological technique for improvement of following ornamental and flower crops.
(a) Carnation (b) *Petunia* (c) *Geranium* (d) *Cosmos* (e) *Hibiscus* (f) Snapdragon

Unit-5: Post-harvest practices in floriculture (10h)

1. Growing of flowering plants under protected environments such as glass house, plastic house, net house, etc.
2. Importance of flower arrangement; Ikebana - techniques, types, suitable flowers and cut foliage.
3. Post-harvest technology of cut and loose flowers in respect of commercial flower crops.
4. Dehydration techniques for drying of flowers, scope importance and status.

A.S.D.GOVERNMENT DEGREE COLLEGE FOR WOMEN (A), KAKINADA
DEPARTMENT OF MATHEMATICS

The Board of Studies meeting for Mathematics subject during the academic year 2022-2023 is conducted at the Dept. of Mathematics on 14-9-2022 at 10.00 am with Sri K. Venateswara Rao, Lecturer in charge in the chair along with the following members:

- | | |
|--|--------------------------|
| 1.Sri.K.Venkateswara Rao,M.Sc. B.Ed.,
Lecturer In-charge of the Department of
PhysicsA.S.D.Govt.Degreecollegeforwomen(A)
Kakinada.9948454928 | Chairperson |
| 2.Dr.Ch.Srinivasulu.,MSc,M.Phil,Ph.D
Govt Arts College
Rajamahendravaram.
7780288561 | UniversityNominee |
| 3.Dr,P.Subhashani,M.Sc.,M.Phil.,Ph.D.
Principal,
Government Degree
CollegePithapuram.9666391
910 | SubjectExpert |
| 4.Ms.Y.Padmaja, M.Sc,M.Phil,
LecturerinMathematics
G.D.C Ramachandrapuram
9951773314 | Subject Expert |
| 5.Kum.G.Sridevi,M.Sc.,
Guest Faculty in
Mathemtics,A.S.D.Govt.Degree college
for women(A)Kakinada. | Member |
| 6.Kum.V.GeethaM.Sc,B.Ed.
Guest Faculty in
Mathemtics,A.S.D.Govt.Degree college
for women(A)Kakinada. | |
| 7.Kum. P.Padma
V.S.LakshmiP.G.College,Kakinada
9553951615 | Alumnus |
| 8.Kum.E.Ooha
IIB.sc.(M.P.Cs.)
A.S.D.Govt.DegreeCollegeforwomen(A) | Student |
| 9.Kum.B.Manasa
IB.Sc.(M.P.C)
A.S.D.Govt.DegreeCollegeforwomen(A) | Student |

A.S.D.Govt.Degree College for Women(A),Kakinada

Department of Mathematics

Agenda for the Board of Studies Meeting Held On 14-09-2022 for 2022-2023

- 1.To discuss and approve the syllabus, blue print and model question papers of I,II,III,IV semesters.
- 2 .To discuss the skill enhancement courses in semester V
3. Revamping of syllabus for Mathematics courses in 5th semester and to prepare blue print and model question papers.
4. To discuss and approve the syllabus, blue print and model question paper for the Life Skill Course “Analytical Skills”.
5. To discuss and approve the Continuous Internal Assessment Pattern for 25 marks.
6. To choose introduce some topics as additional inputs in each course.
7. To discuss and approve the panel of Question Paper Setters and Examiners.
8. To discuss and approve the action plan for the academic year 2022 – 23.
- 9.To discuss about the initiation of career guidance program to final year students to appear for competitive examinations with mathematics.
10. Any other proposal with the permission of the chair.

Blue Print of C.B.C.S. Model Curriculum in B. Sc. Mathematics

Sem	Course Code.	Course Name	Course type (T/P)	Hrs./Week	Credits	Max. Marks Cont/Intern al/Mid Assessment	Max. Marks Sem-end Exam	Total marks
I	MAT203101	Differential Equations	T&P	6	5	25	75 50	100 50
II	MAT203201	Three dimensional Analytical Solid Geometry	T&P	6	5	25	75 50	100 50
III	MAT203301	Abstract Algebra	T	6	5	25	75	100
III	AS303	Analytical Skills	T	2	2	Nil	50	50
IV	MAT204301	Real Analysis	T	6	5	25	75	100
IV	MAT204302	Linear Algebra	T	6	5	25	75	100
V	MAT205301 A/B/C		T	6	5	25	75	100
V	MAT205302 A/B/C		T	6	5	25	75	100

Note: *Course type code: T: Theory, P: Problem Solving

The details of Skill Enhancement Courses in Sem V are given in detailed below.

Skill Enhancement Courses (SECs) for Semester V, from 2022-23

Structure of SECs for Semester-V

(To choose One pair from the Three alternative pairs of SECs)

Course code	Name of Course	Hours/Week	Credits	Marks	
				IA-20 Field Work 05	Sem End
MAT 205301 A	Numerical Methods	6	5	25	75
MAT 205302 A	Mathematical Special Functions	6	5	25	75

OR

Course code	Name of Course	Hours/Week	Credits	Marks	
				IA-20 Field Work 05	Sem End
MAT 205301 B	Multiple integrals and Applications of Vector Calculus	6	5	25	75
MAT 205302 B	Integral transforms with Applications	6	5	25	75

OR

Course code	Name of Course	Hours/Week	Credits	Marks	
				IA-20 Field Work 05	Sem End
MAT 205301 C	Partial Differential Equations and Fourier Series	6	5	25	75
MAT 205302 C	Number theory	6	5	25	75

Note-1: For Semester-V, for the domain subject Mathematics, any one of the three pairs of SECs shall be chosen as courses 6 and 7, i.e., (6A & 7A) or (6B & 7B) or (6C & 7C).

Note-2: One of the main objectives of Skill Enhancement Courses (SEC) is to inculcate skills related to the domain subject in students. The syllabus of SEC will be partially skill oriented. Hence, teachers shall also impart practical training to students on the skills embedded in the syllabus citing related real field situations. So a project is to be assigned to students for encouraging them to work practically.

Course Offered: Mathematics, Physics, Chemistry, Mathematics, Physics, Computer Science and Mathematics, Statistics and Computer Science

Continuous Internal Assessment:

For V semester:

Mid Examination	15 marks
Assignment	5 marks
Seminar	5 marks

Total	25 marks

Two Internal Examinations for each semester with weight age of 15 marks. The average of the two internals will be considered. The student has to write the internal exams without fail for attending the external examinations .There is no minimum pass mark for internal examination.

For I to IV semester:

I Mid Examination	20 marks
II Mid Examination	15 marks
Assignment	5 marks
Clean & Green	5 marks
Seminar/Field work	5 marks

Total	50 marks

Reduced to 25 marks.

Two Internal Examinations for each semester with weight age of 30 marks. From the first mid consider the marks for 20 and for the second mid consider the marks for 15. The student has to write the internal exams without fail for attending the external examinations .There is no minimum pass mark for internal examination.

First semester syllabus and blue print for question paper

SEM	Course Title	Course Code	Credits	Hrs/Wk
I	Differential Equations	MAT201301	5	6

Learning outcomes of Course(in consonance with the Bloom's Taxonomy):

Course Outcomes: After successful completion of this course, the student will be able to;

1. Solve linear differential equations
2. Convert non-exact homogeneous equation to exact differential equations by using integrating factors
3. Know the methods of finding solutions of differential equations of the first order but not of the first Degree.
4. Solve higher-order linear differential equations, both homogeneous and non-homogeneous, with constant coefficients.
5. Understand the concept and apply appropriate methods for solving differential equations.

Skill development

employability

Entrepreneurship

Detailed Syllabus: (Five units with each unit having 12 hours of class work)

UNIT– I

(12 Hours)

Differential Equations of first order and first degree:

Linear Differential Equations; Differential equations reducible to linear form; Exact differential equations; Integrating factors;

UNIT– II

(12 Hours)

I) Differential Equations of first order but not of the first degree:

Equations solvable for p ; Equations solvable for q ; Equations solvable for x ; Equations homogeneous in x and y ; Equations of the first degree in x and y – Clairaut's Equation.

UNIT – III (12 Hours)

Higher order linear differential equations-I:

Solution of homogeneous linear differential equations of order n with constant coefficients; Solution of the non-homogeneous linear differential equations with constant coefficients by means of polynomial operators. General Solution of $f(D)y=0$.

General Solution of $(D)y=Q$ when Q is a function of x ,

- i) P.I. of $f(D)y= Q(x)$ where $Q(x)=be^{ax}$; ii) P.I. of $f(D)y= Q(x)$ where $Q(x)$ is $b\sin ax$ or $b\cos ax$

UNIT– IV (12 Hours)

Higher order linear differential equations-II:

Solution of the non-homogeneous linear differential equations with constant coefficients.

P.I. of $f(D)y=Q$ when $Q=bx^k$

P.I. of $f(D)y=Q$ when $Q=e^{ax}v(x)$

P.I. of $f(D)y=Q$ when $Q=xv(x)$

P.I. of $f(D)y=Q$ when $Q=x^m v(x)$

UNIT –V(12Hours)

Higher order linear differential equations-III:

Method of variation of parameters; Linear differential Equations with non-constant coefficients; The Cauchy-Euler Equation, Legendre's linear equations, miscellaneous differential equations.

Additional Inputs :Orthogonal Trajectories

*No questions to be set from additional inputs for the examination.

Co-Curricular Activities(15Hours)

Seminar/Quiz/Assignments/Applications of Differential Equations to Real life Problem

For Problem Solving Session ($15 \times 2 = 30$) hours.

Text Books :

Differential Equations and Their Applications by Zafar Ahsan, published by Prentice-Hall of India Pvt.Ltd, New Delhi-Second edition.

Reference Books:

1. A text book of Mathematics for B.A/B.Sc, Vol 1, by N. Krishna Murthy & others, published by S.Chand & Company, New Delhi.
2. Ordinary and Partial Differential Equations by Dr. M.D,Raisinghania, published by S. Chand & Company, New Delhi.
3. Differential Equations with applications and programs – S. Balachandra Rao & HR Anuradha- Universities Press.
4. Differential Equations -Srinivas Vangala & Madhu Rajesh, published by Spectrum University Press.

Differential Equations
Semester–I Course **CourseCode:MAT203201**
BLUE PRINT FOR QUESTION PAPER

Units	Course Content	Essay questions(with internal choice)(10M)	Short answer questions(with choice)(5M)	Total
UNIT	Course Content	Essay Questions	Short answer questions	Marks
I	Differential Equations of First order and first degree	2	2	30
II	Differential equations of first Order but not of the first degree,	2	1	25
III	Higher order linear differential equations–I	2	2	30
IV	Higher order linear Differential equations–II	2	2	30
V	Higher order linear Differential equations–III	2	1	25
	TOTAL	10	8	140

A.S.D.GOVERNMENTDEGREECOLLEGE FORWOMEN(A),KAKINADA

Semester End Examinations (Model Question Paper)

Year:I Sem:I Course :Differential Equations

Course Code MAT203101

Time : 3 hour

Max Marks :75

SECTION-A

Answer any Five Questions.

Each question carries TEN Marks.

5x10=50M

1. (a) Solve $y^2 dx = (x^2 - xy - y^2) dy$

(OR)

(b) Solve _____

2. Solve $x^2(y - px) = p^2 y$

(OR)

Solve $y^2 \log y = xyp + p^2$

3..Solve $(D^2 - 4D + 3) = \sin 3x \cos 2x$

(OR)

Solve $(D^2 - 3D + 2)y = \cosh x$

4..Solve $(D^2 - 4D + 3)y = 2xe^{3x} + 3e^x \cos 2x$

(OR)

Solve $(D^4 + 2D^2 + 1)y = x^2 \cos x$

5.. Solve $(D^2 + a^2)y = \tan ax$ by using variation of parameters

(OR)

Solve $(x^2 D^2 - xD - 3)y = x^2 \log x$

Section B

Answer any five questions.

5X5=25M

Each question carries FIVE marks

6.Solve $(y^4 + 2y)dx + (xy^3 + 2y^4 - 4x)dy = 0$

7.Solve $(y \cos 2x - 2x)dx + (\sin x + \cos y)dy = 0$, it being given that $y=0$ when $x=0$.

8.Solve $p^2 + 2p \cot x = y^2$

9.Solve $(D^2 - 6D + 13)y = 8e^{3x}$

10.Solve $(D^2 - (a+b)D + ab)y = e^{ax} + e^{bx}$.

11.Solve $(D^2 - 6D + 13)y = 8e^{3x} \sin 2x$

12.Solve $(D^2 + 2D + 1)y = x \cos x$

13.Solve $(D^2 - 2D)y = e^x \sin x$ by method of variations of parameters.

Second semester syllabus and blue print for question paper

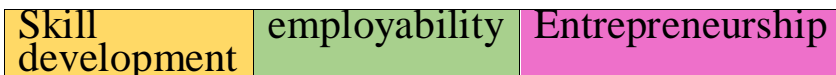
SEM	Course Title	Course Code	Credits	Hrs/Wk
II	Three dimensional Analytical Solid Geometry	MAT202301	5	6

Course Out comes:

After successful completion of this course ,the student twill be able to;

1. Understand the concept of planes.
2. Analyze the right lines ,sphere and cones.
3. Understand the properties of planes, lines, spheres and cones.
4. Express the problems geometrically and then toget the solution.

Analytical Solid Geometry



UNIT– I(12 Hours)

The Plane :Equation of plane in terms of its intercepts on the axis, Equations of the plane through the given points, Length of the perpendicular from a given point to a given plane, Bisectors of angles between two planes, Combined equation of two planes, Orthogonal projection on a plane

.UNIT– II(12 hrs)

The Line ::Equation of a line; Angle between a line and a plane; The condition that a given line may lie in a given plane; The condition that two given lines are coplanar; Number of arbitrary constants in the equations of straight line; Sets of conditions which determine a line; The shortest distancebetweentwolines;Thelength andequationsofthelineofshortestdistancebetweentwostraightlines;Length of the perpendicular from a given point to a given line.

UNIT–III(12hrs)

The Sphere:

Definition and equation of the sphere; Equation of the sphere through four given points; Plane sections of a sphere; Intersection of two spheres; Equation of a circle; Sphere through a given circle ;Intersection of a sphere and a line; Power of a point; Tangent plane; Plane of contact; Polar plane ;Pole of a Plane; Conjugate points; Conjugate planes;

UNIT–IV(12hrs)

The Sphere and Cones:

Angle of intersection of two spheres; Conditions for two spheres to be orthogonal; Radical plane ;Coaxial system of spheres. Limiting Points. Definitions of a cone; vertex; guiding curve ;generators; Equation of the cone with a given vertex and guiding curve; equations of cones with vertex at origin are homogenous; Condition that the general equation of the second degree should represent a cone;

UNIT– V (12 hrs)

Cones:

Enveloping cone of a sphere; right circular cone: equation of the right circular cone with a given vertex, axis and semi vertical angle: Condition that a cone may have three mutually perpendicular generators; intersection of a line and a quadric cone; Tangent lines and tangent plane at a point ;Condition that a plane may touch a cone; Reciprocal cones; Intersection of two cones with a common vertex.

Additional Inputs : Right Circular Cylinder

- No question to be set from Additional Inputs for question paper setting.

Co-Curricular Activities(15Hours)

Seminar/Quiz/Assignments/ThreedimensionalanalyticalSolidgeometryanditsapplications

Problem Solving (15 x 2 = 30 Hours)

Text Book:

AnalyticalSolidGeometrybyShantiNarayanandP.K.Mittal,publishedbyS.Chand&CompanyLtd. 7th Edition.

Reference Books:

1. A text book of Mathematics for BA/ B.Sc Vol 1, by V Krishna Murthy & Others, published by S.Chand&Company, New Delhi.
2. A text Book of Analytical Geometry of Three Dimensions, by P.K. Jain and Khaleel Ahmed, published by Wiley Eastern Ltd., 1999.
3. Co-ordinate Geometry of two and three dimensions by P. Balasubrahmanyam,

K.Y.Subrahmanyam, G.R. Venkataraman published by Tata-MC Gran-Hill Publishers Company Ltd.,NewDelhi.

4. SolidGeometrybyB.RamaBhupal Reddy, publishedbySpectrum UniversityPress.

**RecommendedCo-curricularactivities:(Co-

curricularActivitiesshouldnotpromotecopyingfromtextbookor from others'work and shall encourage self/independent and group learning)

Recommended Continuous Assessment methods :Thorough Assignments and seminars on different areas of the course and problem solving sessions in various unit of the course.

Three Dimensional Analytical Solid Geometry

Semester:II CourseCode:MAT203201

BLUE PRINT FOR QUESTION PAPER

Units	Course Content	Essay questions (with choice)(10M)	Short answer questions (with choice)(5M)	Total
I	The Plane	2	2	30
II	The Line	2	2	30
III	The Sphere	2	2	30
IV	Sphere and Cone	2	1	25
V	Cone	2	1	25
	TOTAL	10	8	140

A.S.D. GOVERNMENT DEGREE COLLEGE FOR WOMEN (AUTONOMOUS), KAKINADA

Semester End Examinations (Modal Question Paper)

Year: I Sem: II

Course: Three Dimensional Analytical Geometry

Course Code: MAT203101

Time : 3 hours

Max Marks: 75

Section – A

Answer all the Questions.

5X10=50M

All Question scarry equal marks.

1.(a) A variable plane is at a constant distance p from the origin and meets the axes in A, B, C .

Show that the locus of the centroid of the tetra hedron $OABC$ is $x^{-2}+y^{-2}+z^{-2}=16p^{-2}$

(OR)

(b) Find the equation of the plane passing through the points $(2, 2, -1), (3, 4, 2), (7, 0, 6)$.

2. (a) The plane $lx + my + nz = p$, $l^2 + m^2 + n^2 = 1$, $p > 0$ meets the axes in P, Q, R and G is the centroid of ΔPQR . If the perpendicular line to the plane at G meets the coordinate planes

in $, B, C$ then Prove That— $\frac{1}{GA} = \frac{1}{GB} = \frac{1}{GC} = \frac{1}{P}$

(OR)

(b) Find the length and equations of S.D. line between the lines $\frac{x}{1} = \frac{y}{1} = \frac{z}{1}$ and

$$x + y + 2z - 3 = 0 = 2x + 3y + 3z - 4.$$

3.(a) Find the radius and centre of the circle of inter section of the sphere circle $x^2 + y^2 + z^2 - 2y - 4z = 11$ and the plane $x + 2y + 2z = 15$.

(OR)

(b) Show that the two circles $x^2 + y^2 + z^2 - y + 2z = 0$, $x - y + z - 2 = 0$ and $x^2 + y^2 + z^2 - 3$

$y + x + z - 5 = 0, 2x - y + 4z - 1 = 0$ Lie on the same sphere and find its equation.

4.(a) Find the limiting point of the coaxial system of spheres determined by the spheres

$$x^2 + y^2 + z^2 + 4x - 2y + 2z + 6 = 0, x^2 + y^2 + z^2 + 2x - 4y - 2z + 6 = 0$$

(OR)

(b) Find whether the following circle is a great or small circle $x^2+y^2+z^2$

$$-4x+6y-8z+4=0, x+y+z=3$$

5.(a) Find the equation of reciprocal cone to the cone $3x^2+4y^2+5z^2 +2yz+4zx+6xy=0$

(OR)

(b) Find the vertex of the cone $7x^2 + 2y^2 + 2z^2 - 10zx + 10xy + 26x - 2y + 2z - 17 = 0$

Section –B

Answer any five questions.

5X5=25M

Each question carries equal marks.

6. Find the equation of the plane passing through the point (2,3,-4) and parallel to the plane

$$x + 2y + 3z - 7 = 0$$

7. Find the value of k, for which the line $\frac{x-1}{-3} = \frac{y-2}{2k} = \frac{z-3}{2}$ and $\frac{x-1}{3k} = \frac{y-5}{1} = \frac{z-6}{-5}$ are perpendicular

8. Show that the shortest distance between any two opposite edges of the tetrahedron formed

by the planes $y+z=0, z+x=0, x+y=0, x+y+z=a$ is $2a$ and that the three lines of shortest distance intersect at the point $x=y=z=-a$.

9. Find the equation of the sphere passing through (0,0,0), (a,0,0), (0,b,0) and (0,0,c).

10. Show that the planes $5x - y - 6z + 25 = 0, x - 2y - 3z + 25 = 0$ are conjugate w.r.t. the sphere

$$x^2 + y^2 + z^2 = 25.$$

11. Find the limiting points of the coaxial system of spheres $x^2 + y^2 + z^2 - 20x + 30y - 40z + (2x - 3y + 4z) = 0$.

12. Find the equation of the cone whose vertex is (1,2,3) and base curve is $y^2 = 4ax, z = 0$.

13. Find the equation of the enveloping cone of the sphere $x^2 + y^2 + z^2 + 2x - 2y = 2$ with its vertex at (1,1,1)

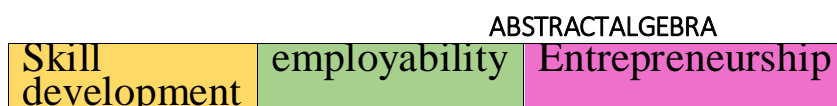
Third Semester syllabus and blue print for question paper

SEM	Course Title	Course Code	Credits	Hrs/Wk
III	ABSTRACTALGEBRA	MAT203301	5	6

Course Outcomes:

After successful completion of this course, the student will be able to;

1. Acquire the basic knowledge and structure of groups, subgroups and cyclic groups.
2. Get the significance of the notation of a normal subgroups.
3. Get the behavior of permutations and operations on them.
4. Study the homomorphism and isomorphism with applications.
5. Understand the ring theory concepts with the help of knowledge in group theory and to prove the theorems.
6. Understand the applications of ring theory in various fields.



UNIT- I(12 Hours)

GROUPS : Binary Operation – Algebraic structure – semi group-monoid – Group definition and elementary properties Finite and Infinite groups – examples – order of a group, Composition tables with examples.

UNIT-II(12 Hours)

SUBGROUPS

Complex Definition – Multiplication of two complexes Inverse of a complex-Subgroup definition- examples, criterion for a complex to be a subgroups. Criterion for the product of two subgroups to be a subgroup-union and Intersection of subgroups.

Co-sets and Lagrange's Theorem:

Cosets Definition – properties of Cosets–Index of a subgroups of a finite groups–Lagrange's Theorem.

UNIT-III(12Hours)

NORMAL SUBGROUPS: Definition of normal subgroup – proper and improper normal subgroup–Hamilton group – criterion for a subgroup to be a normal subgroup – intersection of two normal subgroups – Sub group of index 2 is a normal sub group –quotient group – criteria

for the existence of a quotient group.

UNIT–IV(12Hours)

HOMOMORPHISM :Definition of homomorphism – Image of homomorphism elementary properties of homomorphism – Isomorphism – automorphism definitions and elementary properties–kernel of a homomorphism– fundamental theorem on Homomorphism and applications.

PERMUTATIONS:

Definition of permutation – permutation multiplication – Inverse of a permutation – cyclic permutations–transposition –even and odd permutations– Cayley’s theorem.

UNIT– V (12 Hours)

RINGS Definition of Ring and basic properties, Boolean Rings, divisors of zero and cancellation laws Rings, Integral Domains, Division Ring and Fields, The characteristic of a ring – The characteristic of an Integral Domain,The characteristic of a Field.Sub Rings.

Additional Inputs: Ideal of a Ring and Principal Ideal Ring.

- No question to be set from Additional Inputs for question paper setting.

Co-Curricular Activities(15Hours)

Seminar/Quiz/Assignments/Grouptheoryanditsapplications/ProblemSolving.

Text Book:

A text book of Mathematics for B.A. / B.Sc. by B.V.S.S. SARMA and others, published byS.Chand&Company, NewDelhi.

ReferenceBooks:

1. AbstractAlgebrabyJ.B. Fraleigh,PublishedbyNarosa publishinghouse.
2. ModernAlgebra byM.L. Khanna.
3. RingsandLinear AlgebrabyPundir&Pundir,published byPragathiPrakashan

Abstract algebra

Semester–III

CourseCode:MAT203301

BLUE PRINT FOR QUESTION PAPER

Units	Course Content	Essay questions(with choice)(10M)	Short answer questions(wit hchoice)(5M)	Total
I	Groups	2	2	30
II	Subgroups ,Cosets ,& Lagrange's theorem	2	1	25
III	Normal Subgroups	2	1	25
IV	Homomorphism and Permutations	2	2	30
V	Rings	2	2	30
	TOTAL	10	8	140

SECTION-A

Answer ALL Questions.

Each question carries TEN Marks.

5x10=50M

1.a) Show that n^{th} roots of unity forms an Abelian group w.r.to multiplication.

(OR)

b)A finite semi group $(G,.)$ satisfying the cancellation laws is a group

2.a)The union of two subgroups of a group is a subgroup iff one is contained in the other.

(OR)

b.)State and prove Langrage's theorem.

3.a)Prove that a subgroup H of a group G is a normal subgroup of G iff product of two right (left) cosets of H in G is a right(left) cosets of H in G .

(OR)

b)Prove that a subgroup H of a group G is normal iff $xHx^{-1}=H\forall x\in G$.

4..a)State and prove Fundamental Theorem of homomorphism of groups.

(OR)

b)Let S_n is a symmetric group of n symbols and let A_n is a group of even permutations then show that A_n is normal in S_n and $O(A_n) = \frac{n!}{2}$

5..a)Prove that every finite Integral Domain is a Field.

(OR)

b) Let S be a non-empty subset of a Ring R . Then prove that S is a subring of R iff $a-b\in S$

and $ab\in S$ for all $a,b\in S$.

SECTION-B

Answer any five questions.

5X5=25M

Each question carries equal marks.

6.. Show that the set $G = \{x/x = 2^a 3^b \text{ and } a, b \in \mathbb{Z}\}$ is a group under multiplication

7. Define order of an element. In a group G , prove that if $a \in G$ then $o(a) = o(a^{-1})$.

8. If H and K are two subgroups of a group G then prove that HK is a sub group of G iff $HK = KH$

9. If G is a group and H is a sub group of index 2 in G then prove that H is a normal sub group of G .

10. Examine whether the following Permutations are even or

odd. (i) $\begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 \\ 6 & 1 & 4 & 3 & 2 & 5 & 7 & 8 & 9 \end{pmatrix}$ (ii) $\begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 \\ 3 & 2 & 4 & 5 & 6 & 7 & 1 \end{pmatrix}$

11. If f is a homomorphism of a group G into G' then prove that kernel f is a normal subgroup of G .

12. Prove that the characteristic of an integral domain is either prime or zero.

13. Define a Boolean Ring and Prove that the Characteristic of a Boolean Ring is 2.

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Analytical Skills syllabus, blue print and model paper:

SEM	Course Title	Course Code(LS)	Hrs/Sem	Credits	Hrs/Wk	Sem End Exam(2 Hrs)
III	ANALYTICAL SKILLS(AS)	Life skill course	30	2	2	50marks

ANALYTICALSKILLS

CourseObjective:Intended toinculcatequantitativeanalyticalskillsandreasoningasaninherentabilityin students.

CourseOutcomes:After successful completionof thiscourse,the studentwillbeableto;

- Understandthebasicconceptsof arithmeticability,quantitativeability,logicalreasoning,busines computationsanddata interpretationandobtaintheassociatedskills.
- Acquirecompetencyintheuseof verbalreasoning.
- Applytheskillsand competenciesacquired intherelatedareas
- Solveproblemspertainingto quantitativeability,logicalreasoningandverbalabilityinsideandoutsidethe campus.

4. Skill development	employability	Entrepreneurship
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UNIT – 1: (10Hrs)

Arithmetic ability: Algebraic operations BODMAS, Fractions, Divisibility rules, LCM &GCD(HCF).

VerbalReasoning: NumberSeries,Coding&Decoding,Bloodrelationship,Clocks,Calendars.

UNIT – 2: (10Hrs)

Quantitativeaptitude: Averages,Ratioandproportion,Problemsonages,Time-distance–speed.

Businesscomputations: Percentages,Profit&loss,Partnership,simplecompoundinterest.

UNIT – 3: (07Hrs)

DataInterpretation: Tabulation,BarGraphs,Pie Charts,lineGraphs.Venndiagrams.

RecommendedCo-CurricularActivities (03

Hrs)Surprisetests / Viva-Voice/ Problem solving/Group discussion.

Text Book: Quantitative Aptitude for Competitive Examination by R.S. Agrawal, S.ChandPublications.

ReferenceBooks:

1. AnalyticalskillsbyShowickThorpe, publishedbySChandAnd CompanyLimited,Ramnagar,New Delhi-110055.
2. QuantitativeAptitude and ReasoningbyR VPraveen, PHIpublishers.
3. QuantitativeAptitudeforCompetitiveExaminationbyAbhijitGuha,TataMcGraw HillPublications

A.S.D. GOVERNMENT DEGREE COLLEGE FOR WOMEN (A),

KAKINADA Semester End Examinations (Model

Question Paper)

Year:II

Sem:III

Course: Analytical Skills

Course

Code: AS303 Time: 2 hours

Max Marks : 50

Section-A

Answer all the questions. Each question carries 10 marks.

(3×10= 30M)

1. Evaluate (i) $784 \times \sqrt{256 \times 343} = 4^4 \times 7^?$

(ii) LCM of two numbers is 120 and their HCF is 10. What is the sum of those two numbers?

(OR)

2. What was the day of the week on 15th August 1947?

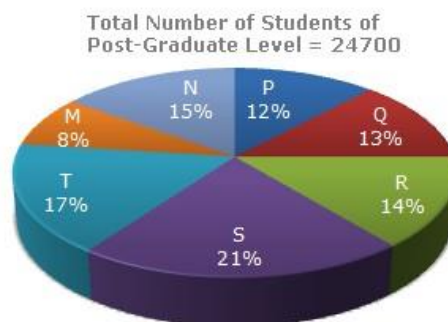
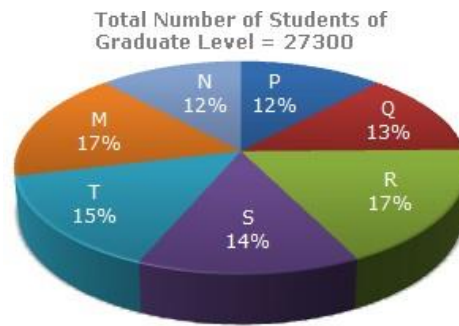
3. A car covers a distance of 540 km in 9 h. Speed of the train is double the speed of the car. Two – third of the speed of the train is equal to the speed of a bike. How much distance will the bike cover in 5 h ?

(OR)

4. The Simple interest accrued on an amount of Rs.2500 at the end of 6 yr is Rs.1875. What would be the simple interest accrued on the amount of Rs.6875 at the same rate and same time period?

5. The following pie-charts show the distribution of students of graduate and post-graduate levels in seven different institutes in a town.

Distribution of students at graduate and post-graduate levels in seven institutes:

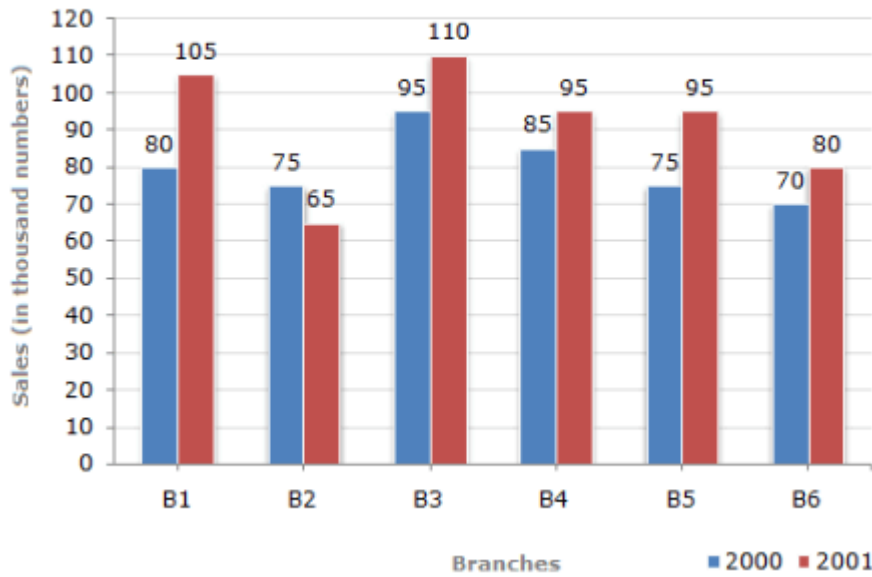


- What is the total number of graduate and post-graduate level students in institute R?
- What is the ratio between the number of students studying at post-graduate and graduate levels respectively from institute S?
- How many students of institutes M and S are studying at graduate level?
- What is the ratio between the number of students studying at post-graduate level from institutes S and the number of students studying at graduate level from institute Q?
- Total number of students studying at post-graduate level from institutes N and P is

(OR)

6. The bar graph given below shows the sales of books (in thousand number) from six branches of a publishing company during two consecutive years 2000 and 2001.

Sales of Books (in thousand numbers) from Six Branches - B1, B2, B3, B4, B5 and B6 of a publishing Company in 2000 and 2001.



- (i) What is the ratio of the total sales of branch B₂ for both years to the total sales of branch B₄ for both years?
- (ii) Total sales of branch B₆ for both the years is what percent of the total sales of branches B₃ for both the years?
- (iii) What percent of the average sales of branches B₁, B₂ and B₃ in 2001 is the average sales of branches B₁, B₃ and B₆ in 2000?
- (iv) What is the average sales of all the branches (in thousand numbers) for the year 2000?
- (v) Total sales of branches B₁, B₃ and B₅ together for both the years (in thousand numbers) is?

SECTION-B

Answer any 4 questions. Each question carries 5 marks

4×5=20M

6..Simplify (i) $36 \times 15 - 56 \times 784 \div 112 = ?$

(ii) $5163 - 4018 + 3209 = ?$

7. How many numbers between 11 and 90 are divisible by 7 ?

8. What was the day of the week on 16th April 2000 ?

9. Divide Rs. 1162 among A, B, C in the ratio 35:28:20.

10. The sum of the three consecutive odd numbers is 285. What is the ratio of the smallest and the largest numbers respectively?

11. One-fourth of two-fifth of 30% of a number is 15. What is 20% of that number?

12. Prasad sold his work tools for Rs. 1850 and earned a profit of 25%. At what price did Prasad buy the work tools ?

13. Population in Millions

City	Total Population	Male Population
A	12	6.5
B	15	7.2
C	17	9.0
D	19	9.8

E	22	10.8
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What is the average female population in million?

Fourth Semester paer IV and V Syllabus and blue prints and model papers:

SEM	CourseTitle	Course Code	Credits	Hrs/Wk
IV	REALANALYSIS	MAT204301	5	6

CourseOutcomes:

After successful completion of this course, the student will be able to

1. Get clear idea about the real numbers and real valued functions.
2. Obtain the skills of analyzing the concepts and applying appropriate methods for testing convergence of a sequence/ series.
3. Test the continuity and differentiability and Riemann integration of a function.
4. Know the geometrical interpretation of mean value theorems.

REALANALYSIS

UNIT – I (12 Hours)

Introduction of Real Numbers (No question is to be set from this portion)

Real Sequences:

Sequences and their limits, Range and Boundedness of Sequences, Limit of a sequence and Convergent sequence. The Cauchy’s criterion, properly divergent sequences, Monotone sequences, Necessary and Sufficient condition for Convergence of Monotone Sequence, Limit Point of Sequence, Subsequences, Cauchy Sequences – Cauchy’s general principle of convergence theorem.

UNIT – II (12 Hours) INFINITESERIES

Series: Introduction to series, convergence of series. Cauchy’s general principle of convergence for series tests for convergence of series, Series of Non-Negative Terms.

1. P-test
2. Cauchy’s nth root test or Root Test.
3. D’-Alembert’s Test or Ratio Test.
4. Alternating Series – Leibnitz Test.

UNIT – III (12 Hours) CONTINUITY:

Limits: Real valued Functions, Boundedness of a function, Limits of functions. Some extensions of the limit concept, Infinite Limits. Limits at infinity. (No question is to be set from this portion).

Continuous functions: Continuous functions, Combinations of continuous functions, Continuous Function on interval.

UNIT – IV (12 Hours)

Differentiation And Mean Value Theorems: The derivability of a function, on an interval, at a point, Derivability and continuity of a function, Graphical meaning of the

Derivative, Mean Value Theorems; Rolle's Theorem, Lagrange's Theorem, Cauchy's Mean Value Theorem

UNIT – V (12

Hours) RIEMANN INTEGRATION:

Riemann Integral, Riemann integral functions, Darboux theorem. Necessary and sufficient condition for R – integrability, Properties of integrable functions, Fundamental theorem of integral calculus, First mean value Theorem.

Additional Inputs: Maclaurin's expansions of $\sin x$, $\cos x$ and e^x .

- No question to be set from additional inputs.

Co-Curricular Activities (15 Hours)

Seminar/Quiz/Assignments/Real Analysis and its applications/Problem Solving.

Text Book:

Introduction to Real Analysis by Robert G. Bartle and Donald R. Sherbert, published by John Wiley.

Reference Books:

1. A Text Book of B.Sc Mathematics by B.V.S.S. Sarma and others, published by S. Chand & Company Pvt. Ltd., New Delhi.
2. Elements of Real Analysis as per UGC Syllabus by Shanthi Narayan and Dr. M.D. Raisinghania, published by S. Chand & Company Pvt. Ltd., New

RealAnalysis

Semester –IV

CourseCode:MAT203401

BLUE PRINT FOR QUESTION PAPER

Units	CourseContent	Essayquestion s(withchoice)(10M)	Short answerquesti ons(withchoi ce)(5M)	Total
UNIT	CourseContent	Essay Questions	Shortanswer questions	Marks
I	RealSequence	2	1	25
II	Infiniteseries	2	2	30
III	LimitsandContinuity	2	1	25
IV	DifferentiationandMean ValueTheorem	2	2	30
V	RiemannIntegration	2	2	30
	TOTAL	10	8	140

SECTION-A

AnsweranyFiveQuestions.

EachquestioncarriesTENMarks.

5x10=50M

1(a) If $s = 1 + \frac{1}{2^n} + \frac{1}{3^n} + \dots + \frac{1}{n^n}$ Then show that $\{s\}$ converges.

(OR)

(b) State and prove Cauchy's general principle of convergence

2. (a) State and ProveCauchy'snth root test.

(OR)

(b)Testtheconvergenceof $\sum x^n$

$\frac{1}{x^{n+a^n}} (x > 0, a > 0)$

3.(a)Let $f:R \rightarrow R$ besuchthat $f(x) = \frac{\sin(a+1)x + \sin x}{x}$ for $x < 0$, $f(x) = c$ for $x = 0$, and

$f(x) = \frac{(x+bx^2)^{1/2} - x^{3/2}}{bx^{3/2}}$ for $x > 0$. Determine the values of a, b, c for which f is continuous at $x=0$.

(OR)

(b) If $f: [a, b] \rightarrow \mathbb{R}$ is discontinuous on $[a, b]$ then prove that f is bounded on $[a, b]$

4. (a) Using Lagrange's theorem, show that $x > \log(1+x) > \frac{x}{1+x} \quad \forall x > 0$.

(OR)

(b) State and prove Cauchy's mean value theorem.

5. (a) State and prove Riemann's necessary and sufficient condition for R-integrability

SECTION-B

Answer any five questions.

—

5X5=25M

Each question carries equal marks.

6. Prove that every convergent sequence is bounded.

7. Examine the convergence of $\frac{1}{1.2} - \frac{1}{3.4} + \frac{1}{5.6} - \frac{1}{7.8} + \dots$

8. Test the convergence of the series $\sum_{n=1}^{\infty} \sqrt[3]{n^3 + 1} - n$

9. Examine for continuity of the function f defined by $f(x) = |x| + |x - 1|$ at $x=0$ and 1 .

10. Show that $f(x) = x \sin \frac{1}{x}$ if $x \neq 0$; $f(x) = 0$ if $x = 0$ is discontinuous but not derivable at $x=0$.

11. Verify Rolle's theorem for the function $f(x) = x^3 - 6x^2 + 11x - 6$ on $[1, 3]$.

12.. If $f(x) = x^2 \cdot x \in [0, 1]$ and $P = , 0, \frac{1}{4}, \frac{2}{4}, \frac{3}{4}, 1$ - then find $L(p, f)$ and $U(p, f)$.

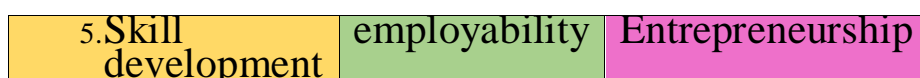
13. Prove that if $f: [a, b] \rightarrow \mathbb{R}$ is discontinuous on $[a, b]$ then f is R-integrable on $[a, b]$.

SEM	CourseTitle	Course Code	Credits	Hrs/Wk
IV	LINEARALGEBRA	MAT204302	5	6

CourseOutcomes:

After successful completion of this course, the student will be able to;

1. Understand the concepts of vector spaces, subspaces, bases, dimension and their properties
2. Understand the concepts of linear transformations and their properties
3. Apply Cayley- Hamilton theorem to problems for finding the inverse of a matrix and higher powers of matrices without using routine methods
4. Learn the properties of inner product spaces and determine orthogonality in inner product spaces.



LINEARALGEBRA

UNIT –I(12 Hours)

Vector Spaces-I:

Vector Spaces, General properties of vector spaces, n-dimensional Vectors, addition and scalar multiplication of Vectors, internal and external composition, Null space, Vector subspaces, Algebra of subspaces, Linear Sum of two subspaces, linear combination of Vectors, Linear span Linear independence and Linear dependence of Vectors.

UNIT –II(12 Hours)

Vector Spaces-II:

Basis of Vector space, Finite dimensional Vector spaces, basis extension, co-ordinates, Dimension of a Vector space, Dimension of a subspace, Quotient space and Dimension of Quotient space.

UNIT –III (12 Hours)

Linear Transformations:

Linear transformations, linear operators, Properties of L.T, sum and product of LTs, Range and null space of linear transformation, Rank and Nullity of linear transformations – Rank – Nullity Theorem.

UNIT –IV(12 Hours)

Matrix:

Linear Equations, Characteristic equations, Characteristic Values & Vectors of square matrix, Cayley–Hamilton Theorem.

UNIT –V(12Hours)

Inner product space:

Inner product spaces, Euclidean and unitary spaces, Norm or length of a Vector, Schwartz inequality, Triangle Inequality, Parallelogram law, Orthogonality, Orthonormal set, Gram– Schmidt orthogonalisation process. Bessel's inequality and Parseval's Identity

Co-Curricular Activities(15Hours)

Seminar/Quiz/Assignments/ Linear algebra and its applications/Problem Solving.

Text Book:

Linear Algebra by J.N. Sharma and A.R. Vasista, published by Krishna Prakashan Mandir, Meerut-250002.

Reference Books:

1. Matrices by Shanti Narayana, published by S.Chand Publications.
2. Linear Algebra by Kenneth Hoffman and Ray Kunze, published by Pearson Education (low priced edition), New Delhi.
3. Linear Algebra by Stephen H. Friedberg et al. published by Prentice Hall of India Pvt. Ltd. 4th Edition, 2007

Linear Algebra

Semester –IV

CourseCode:MAT203402

BLUE PRINT FOR QUESTION PAPER

Units	CourseContent	Essayquestions(withchoice)(10M)	Short answerquestions(withchoice)(5M)	Total
UNIT	CourseContent	Essay Questions	Shortanswer Questions	Marks
I	VectorSpaces –I	2	2	30
II	VectorSpaces-II	2	1	25
III	LinearTransformation	2	2	30
IV	Matrices	2	1	25
V	InnerProductspaces	2	2	30
	TOTAL	10	8	140

SECTION–A

AnsweranyFiveQuestions.

EachquestioncarriesTENMarks.

5x10=50M

- 1.(a) Definevector space.Let $V(F)$ be avectorspace.Let W be anonemptysubsetof V .Provethat theNecessaryandsufficient conditionfor W tobe asubspaceof V is $a,b \in \alpha, \beta cV \Rightarrow a\alpha + b\beta cW$.

(OR)

- (b) Prove that the four vectors $(1,0,0)$, $(0,1,0)$, $(0,0,1)$ and $(1,1,1)$ of form linearlydependentset, but anythreeof themarelinearlyindependent.

- 2.(a)Definedimensionofafinitedimensional vectorspace.If W isa subspace of afiniteDimensional vector space $V(F)$ then provethat W isfinite dimensional and $\dim W \leq n$.

(OR)

- (b)If W beasubspaceofafinite dimensionalvector space $V(F)$ thenProvethat $\dim \frac{V}{W} = \dim V - \dim W$

- 3..(a) Find $T(x,y,z)$ whereisdefined by $T(1, 1,1)=3$, $T(0, 1, -2)=1$, $T(0, 01) = -2$

(OR)

- (b)Stateand prove Rank Nullitytheorem.

- 4..(a) Findtheeigenvalues andthecorrespondingeigen vectorsofthematrix

$$A = \begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}$$

(OR)

- (b)StateandproveCayley-Hamiltontheorem.

- 5.(a)State and proveSchwarz' sinequalityin anInner product space $V(F)$.

(OR)

- (b)Given $\{(2,1,3),(1,2,3),(1,1,1)\}$ isabasisof $R^3(R)$.ConstructanorthonormalbasisusingGram-Schmidtorthogonalization process.

SECTION-B

Answer any five questions.

5X5=25M

Each question carries equal marks.

6. Let p, q, r be fixed elements of a field F . Show that the set W of all triads (x, y, z) of elements of F , such that $px + qy + rz = 0$ is a vector subspace of $V_3(R)$.
7. Define linearly independent & linearly dependent vectors in a vector space. If α, β, γ are linearly independent vectors of (R) then show that $\alpha + \beta, \beta + \gamma, \gamma + \alpha$ are also linearly independent.
8. Prove that every set of $(n+1)$ or more vectors in an n dimensional vector space is linearly dependent.
9. The mapping: $V_3(R) \rightarrow V_3(R)$ is defined by $T(x, y, z) = (x-y, x-z)$. Show that T is a linear transformation.
10. Let: $R^3 \rightarrow R^2$ and $H: R^2 \rightarrow R^3$ be defined by $T(x, y, z) = (3x, y+z)$ and $H(x, y, z) = (2x-z, y)$. Compute i) $T+H$ ii) $4T-5H$ iii) TH iv) HT .
11. If the matrix A is non-singular, show that the eigen values of A^{-1} are the reciprocal of the eigen values of A .
12. State and prove parallelogram law in an inner product space $V(F)$.
13. Prove that the set $S = \left\{ \begin{pmatrix} 1 \\ 2 \\ 2 \end{pmatrix}, \begin{pmatrix} 1 \\ -1 \\ 2 \end{pmatrix}, \begin{pmatrix} 2 \\ 2 \\ -1 \end{pmatrix} \right\}$ is an orthonormal set in the inner product space $R^3(R)$ with the standard inner product.

SEM	Course Title	Course Code	Credits	Hrs/Wk
V	Numerical Methods	MAT205301A	5	6

Fifth semester Papers VI and VII syllabus, blue prints and model papers:

Learning Outcomes:

Students after successful completion of the course will be able to

1. Understand various numerical methods that are used to obtain approximate solutions
2. Understand various finite difference operators and interpolation methods.
3. Work out numerical differentiation and integration whenever and wherever analytical methods are not applicable.
4. Find numerical solutions of ordinary differential equations by using various numerical methods.
5. Analyze and evaluate the accuracy of numerical methods.

Skill development	employability	Entrepreneurship
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Syllabus : (Hours: Teaching: 75 (incl. unit tests etc. 05), Training: 15)

Unit-1: Finite Differences and Interpolation with Equal Intervals (15h)

Introduction, Forward differences, Backward differences, Central Differences, Symbolic relations, n^{th} Differences of Some functions, 2. Advancing Difference formula, Differences of Factorial Polynomial, Summation of Series. 3. Newton's formulae for interpolation. Central Difference Interpolation Formulae.

Additional Input: Errors, types of errors

Unit-2: Interpolation with Equal and Unequal Intervals (15h)

1. Gauss's Forward interpolation formulae, Gauss's backward interpolation formulae, Stirling's formula, Bessel's formula. 2. Interpolation with unevenly spaced points, divided differences and properties, Newton's divided differences formula. 3. Lagrange's interpolation formula, Lagrange's Inverse interpolation formula.

Additional Input: Piece-wise Interpolation: Spline interpolation introduction

Unit-3: Numerical Differentiation (15h)

1. Derivatives using Newton's forward difference formula, Newton's backward difference formula, 2. Derivatives using central difference formula, Stirling's interpolation formula, 3. Newton's divided difference formula, Maximum and minimum values of a tabulated function.

Unit-4: Numerical Integration (15h)

General quadrature formula on errors, Trapezoidal rule, 2. Simpson's $1/3$ -rule, Simpson's $3/8$ -rule, and Weddle's rules, 3. Euler-McLaurin Formula of summation and quadrature, The Euler transformation.

Additional input: Gaussian quadrature

Unit-5: Numerical solution of ordinary differential equations (15h)

Introduction, Solution by Taylor's Series, 2. Picard's method of successive approximations, 3. Euler

'smethod,ModifiedEuler'smethod,Runge – Kuttamethods.

AdditionalInputs:Predictor-CorrectorMethods

References:

1. S.S.Sastry, Introductory Methods of Numerical Analysis, Prentice Hall of India Pvt. Ltd., New Delhi-110001, 2006.
2. P.Kandasamy, K.Thilagavathy, Calculus of Finite Differences and Numerical Analysis. S.Chand & Company, Pvt.Ltd., Ram Nagar, New Delhi-110055.
3. R.Gupta, Numerical Analysis, Laxmi Publications (P)Ltd., New Delhi.
4. H.CSaxena, Finite Differences and Numerical Analysis, S.Chand & Company Pvt.Ltd., Ram Nagar, New Delhi-110055.
5. S.Ranganatham, Dr.M.V.S.S.N.Prasad, Dr.V.Ramesh Babu, Numerical Analysis, S.Chand & Company Pvt.Ltd., Ram Nagar, New Delhi-110055.
6. Web resources suggested by the teacher and college librarian including reading material. 7. Ccelms.ap.gov.in/

Co-Curricular Activities: A) Mandatory:

For Teacher: Teachers shall train students in the following skills for 15 hours, by taking relevant outside data (Field/Web).

1. Applications of Newton's forward and backward difference formulae.
2. Applications of Gauss forward and Gauss backward, Stirling's and Bessel's formulae.
3. Applications of Newton's divided differences formula and Lagrange's interpolation formula.
4. Various methods to find the approximation of a definite integral.
5. Different methods to find solutions of Ordinary Differential Equations.

For Student: Fieldwork/Projectwork; Each student individually shall undertake Fieldwork/Project work and submit a report not exceeding 10 pages in the given format on the work done in the areas like the following, by choosing any one of the aspects.

1. Collecting the data from the identified sources like Census department or Electricity department, by applying the Newton's, Gauss and Lagrange's interpolation formula, making observations and drawing conclusions. (Or)
2. Selection of some region to find the area by applying Trapezoidal rule, Simpson's 1/3-rule, Simpson's 3/8-rule, and Weddle's rules. Comparing the solutions with analytical solution and concluding which one is the best method. (Or)
3. Finding solution of the ODE by Taylor's Series, Picard's method of successive approximations, Euler's method, Modified Euler's method, Runge-Kutta methods. Comparing the solutions with analytical solution, selecting the best method.

Max. Marks for Fieldwork/Projectwork Report: 05.

Suggested Format for Fieldwork/Projectwork Report: Title page, Student Details, Index page, Stepwise work-done, Findings, Conclusions and Acknowledgements.

B) Suggested Co-Curricular Activities:

1. Assignments/collection of data, Seminar, Quiz, Group discussions/Debates
2. Visit to research organizations, Statistical Cells, Universities, ISI etc.
3. Invited lectures and presentations on related topics by experts in the specified area.

Numerical Methods

Semester – V

Course Code: MAT205301A

BLUE PRINT FOR QUESTION PAPER

Unit	Course Content	Essay questions (with choice) (10M)	Short answer questions (with choice) (5M)	Total
I	Finite Differences and Interpolation with Equal intervals	2	2	30
II	Interpolation with Equal and Unequal intervals	2	1	25
III	Numerical differentiation	2	1	25
IV	Numerical Integration	2	2	30
V	Numerical solutions of ODE	2	2	30
	Total	10	8	140

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SemesterEndExaminations (Model Question Paper)

Year:III

Sem:V

Course:NumericalMethods

CourseCode:MAT205301A

Time: 3hours

MaxMarks:75

SECTION-A

Answerallthefollowingquestions.Eachquestion carries TENmarks. 5 x 10 = 50 M

1. If $f(x) = a_0x^n + a_1x^{n-1} + a_2x^{n-2} + \dots + a_n$, then prove that $\Delta^n f(x) = a_0 h^n n!$
2. P.T. $(\Delta + 1)(1 - A) = 1$ II) P.T. $\Delta A \equiv A \Delta$ III) Prove that $A = 1 - E^{-1}$
3. Apply Gauss forward formula to find the value of $f(9)$ if $f(0) = 14, f(4) = 24, f(8) = 32, f(12) = 35, f(16) = 40$
4. By means of Newton's divided difference formula, find the value of $f(8)$ and $f(15)$ from the following table :

x	10.4	11.5	12.7	13.10	14.11	15.13
F(x)	16.48	17.100	18.294	19.900	20.1210	21.2028

5. From the following table of values of x & y given find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ at $x = 3$.

x	0	1	2	3	4	5	6
y	6.9897	7.4036	7.7815	8.1291	8.4510	8.7506	9.0309

6. Find $f'(6)$ from the following data using Newton's divided difference formula

x	0	2	3	4	7	9
y	4	26	58	112	466	922

7. Evaluate $\int_0^1 dx$ using Simpson's 1/3rd rule and Simpson's 3/8th rule and

$$01+x$$

compare the result with actual value.

9. Obtain the values of y at $x=0.1, 0.2$ using Ruge-Kutta method of 4th order for the Differential equation $dy/dx=xy+y^2$ $y(0)=1$.

Answer Any questions. Each question carries FIVE marks

5 x 5 = 25 M

1. if $u_0=3, u_1=12, u_2=81, u_3=200, u_4=100, u_5=8$, find the value of $\Delta^5 u_0$
2. Using the inverse Lagrange's Interpolation Formula find the value of x if $y_1=4, y_3=12, y_4=19, y_x=7$.
3. Apply Gauss forward formula to find the value of $f'(10)$ if $f(0)=14, f(4)=24,$

$$f(8)=32, f(12)=35, f(16)=40$$

4. Evaluate $\int_0^1 x^3 dx$ with five sub-intervals by Trapezoidal rule.
5. Using Euler's method solve for y at $x=2$ from $\frac{dy}{dx} = 3x^2 + 1, y(1)=2$ with step size $h=0.5$
6. Using R-K method of second order compute $y(2.5)$ from $\frac{dy}{dx} = x+y, y(2)=2$ taking $h=0.5$.

7.

8.

$$5 \times 10 = 50M$$

1. If $f(x) = a_0 x^n + a_1 x^{n-1} + a_2 x^{n-2} + \dots + a_n$, then prove that $\Delta^n f(x) = a_0 h^n n!$
2. P.T. $(\Delta + 1)(1 - A) = 1$ II) P.T. $\Delta A \equiv A \Delta$ III) Prove that $A = 1 - E^{-1}$
10. Apply Gauss forward formula to find the value of $f(9)$ if $f(0)=14, f(4)=24, f(8)=32, f(12)=35, f(16)=40$
11. By means of Newton's divided difference formula, find the value of $f(8)$ and $f(15)$ from the following table :

x	10.4	11.5	12.7	13.10	14.11	15.13
F(x)	16.48	17.100	18.294	19.900	20.1210	21.2028

12. From the following table of values of $f(x)$ & y given find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ at $x=3$.

x	0	1	2	3	4	5	6
y	6.9897	7.4036	7.7815	8.1291	8.4510	8.7506	9.0309

13. Find $f'(6)$ from the following data using Newton's divided difference formula

x	0	2	3	4	7	9
y	4	26	58	112	466	922

14. Evaluate $\int_{0+1}^{61} dx$ using Simpson's 1/3rd rule and Simpson's 3/8th rule and

compare the result with actual value.

16. Obtain the values of y at $x=0.1, 0.2$ using Runge-Kutta method of 4th order for the Differential equation $dy/dx=xy+y^2$ $y(0)=1$.

Section-B

Answer all the following questions. Each question carries TEN marks. $5 \times 10 = 50$ M

9.

SEM	Course Title	Course Code	Credits	Hrs/Wk
V	Mathematical Special Functions	MAT205302B	5	6

Learning Outcomes:

Students after successful completion of the course will be able to:

1. Understand the Beta and Gamma functions, their properties and relation between these two functions, understand the orthogonal properties of Chebyshev polynomials and recurrence relations.
2. Find power series solutions of ordinary differential equations.
3. solve Hermite equation and write the Hermite Polynomial of order (degree) n , also find the generating function for Hermite Polynomials, study the orthogonal properties of Hermite Polynomials and recurrence relations.
4. Solve Legendre equation and write the Legendre equation of first kind, also find the generating function for Legendre Polynomials, understand the orthogonal properties of Legendre Polynomials.
5. Solve Bessel equation and write the Bessel equation of first kind of order n , also find the generating function for Bessel function, understand the orthogonal properties of Bessel function.

Skill development	employability	Entrepreneurship
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Syllabus: (Hours: Teaching: 75 (incl. unit tests etc. 05), Training: 15) Unit-1: Beta and Gamma functions, Chebyshev polynomials (15h)

Unit-1 Euler's Integrals-Beta and Gamma Functions, Elementary properties of Gamma Functions, Transformation of Gamma Functions. 2. Another form of Beta Function, Relation between Beta and Gamma Functions. 3. Chebyshev polynomials, orthogonal properties of Chebyshev polynomial of first kind, recurrence relations, generating functions for Chebyshev polynomials.

Unit – 2: Power series and Power series solutions of ordinary differential equations

(15h) Introduction, summary of useful results, power series, radius of convergence, theorem on Power series. 2. Introduction of power series solutions of ordinary differential equation. 3. Ordinary and singular points, regular and irregular singular points, power series solution.

Unit-3: Hermite polynomials (15h)

Hermite Differential Equations, Solution of Hermite Equation, Hermite polynomials, generating function for Hermite polynomials. 2. Other forms for Hermite Polynomials, Rodrigue's formula for Hermite Polynomials, to find first few Hermite Polynomials.

3. Orthogonal properties of Hermite Polynomials, Recurrence formulae for Hermite Polynomials.

Unit-4: Legendre polynomials (15h)

1. Definition, Solution of Legendre's equation, Legendre polynomial of degree n , generating function of Legendre polynomials. 2. Definition of $P_n(x)$ and $Q_n(x)$ General solution of Legendre's Equation (derivations not required) to show that $P_n(x)$ is the

coefficient of h^n , in the expansion of $(1-2xh-h^2)^{-1}$ 3. Orthogonal properties of

Legendre's polynomials, Recurrence formulas for Legendre's Polynomials.

Unit-5: Bessel's equation (15h)

1. Definition, Solution of Bessel's equation, Bessel's function of the first kind of order n , Bessel's function of the second kind of order n . 2. Integration of Bessel's equation in

series form, Definition of $J_n(x)$, recurrence formulae for $J_n(x)$. 3. Generating function for $J_n(x)$, orthogonality of Bessel functions.

Reference Books:

1. Dr. M. D. Raisinghania, Ordinary and Partial Differential Equations, S. Chand & Company Pvt. Ltd., Ram Nagar, New Delhi-110055.
2. J. N. Sharma and Dr. R. K. Gupta, Differential Equations with Special Functions, Krishna Prakashan Mandir.
3. Shanti Narayan and Dr. P. K. Mittal, Integral Calculus, S. Chand & Company Pvt. Ltd., Ram Nagar, New Delhi-110055.
4. George F. Simmons, Differential Equations with Applications and Historical Notes, Tata McGraw-Hill Edition, 1994.
5. Shepley L. Ross, Differential Equations, Second Edition, John Wiley & Sons, New York, 1974.
6. Web resource suggested by the teacher and college librarian including reading material.
7. [Ccelms.ap.gov.in/](http://ccelms.ap.gov.in/)

1. Co-Curricular Activities: A) Mandatory:

1. **For Teacher:** Teacher shall train students in the following skills for 15 hours, by taking relevant outside data (Field/Web). 1. Beta and Gamma functions, Chebyshev polynomials. 2. Power series, power series solutions of ordinary differential equations. 3. Procedures of finding series solutions of Hermite equation, Legendre equation and Bessel equation. 4. Procedures of finding generating functions for Hermite polynomials, Legendre Polynomials and Bessel's function.

2. **For Student:** Fieldwork/Projectwork; Each student individually shall undertake Fieldwork/Project work, make observations and conclusions and submit a report not exceeding 10 pages in the given format on the work done in the areas like the following, by choosing any one of the aspects. 1. Going through the web sources like Open Educational Resources on the properties of Beta and Gamma functions, Chebyshev polynomials, power series solutions of ordinary differential equations. (or) 2. Going through the web sources like Open Educational Resources on the properties of series solutions of Hermite equation, Legendre equation and Bessel equation.

3. **Max. Marks for Fieldwork/Projectwork Report:** 05.

4. **Suggested Format for Fieldwork/Project work Report:** Title page, Student Details, Index page, Stepwise work-done, Findings, Conclusions and Acknowledgements.

5. Unit tests (IE).

B) Suggested Co-Curricular Activities: 1. Assignments/collection of data, Seminar, Quiz, Group discussions/Debates 2. Visits to research organizations, Statistical Cells, Universities, ISI etc. 3. Invited lectures and presentations on related topics by experts in

SemesterEndExaminations (Model Paper)

Year:III

Sem:V

Course: Mathematical Special

FunctionsCourseCode:MAT205302A Time: 3hours

MaxMarks:75 **SECTION-A**

a. Answer All following questions

b. Each question carries TEN marks.

5X10=50M

1. Prove that $(m, n) = \frac{(m)(n)}{(m+n)}$
2. Prove that $(m, n) = \frac{1}{2} \frac{\sqrt{\pi}}{2^{2m-1}}$ (2m)
3. Find the series solution about $x=0$ of the equation $xy'' + y' - xy = 0$
4. Find the series solution about the origin of the D.E. $x^2y'' + 6xy' + (6+x^2)y = 0$
5. Prove that $H_n(x) = (-1)^n e^{x^2} \frac{d^n}{dx^n} (e^{-x^2})$
6. Prove that $\int_{-\infty}^{\infty} e^{-x^2} H_n(x) H_m(x) dx = \begin{cases} 0 & m \neq n \\ \sqrt{\pi} 2^n n! & m = n \end{cases}$
7. Prove that $P_n(x) = \frac{1}{n!} \frac{d^n}{dx^n} \{(x^2-1)^n\}$
8. Prove that $J_n'(x) = -J_{n-1}(x) - x J_{n+1}(x)$

SECTION-B

I) Answer any four of the following

II) Each Question Carries Five Marks

4X5=20M

9. Evaluate $\int_0^a x^4 \sqrt{a^2 - x^2} dx$

10. Define singular point, ordinary point, regular singular point, irregular singular point

11. Prove that $H_n'(x) = 2n H_{n-1}(x)$ $(n \geq 1)$

12. Express $(x) = 2x^2 - x - 3$ in terms of Legendre's polynomials.

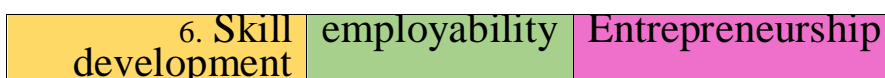
13. Prove that $(1) = 1, (-x) = (-1)^n (x)$

14. Show that $J_{-n}(x) = (-1)^n J_n(x)$; n is a positive integer.

SEM	CourseTitle	CourseCode	Credits	Hrs/Wk
V	Multiple integrals and applications of Vector calculus	MAT205301B	5	6

Learning Outcomes: Students after successful completion of the course will be able to

1. Learn multiple integrals as a natural extension of definite integral to a function of two variables in the case of double integral / three variables in the case of triple integral.
2. Learn applications in terms of finding surface area by double integral and volume by triple integral.
3. Determine the gradient, divergence and curl of a vector and vector identities.
4. Evaluate line, surface and volume integrals.
5. Understand relation between surface and volume integrals (Gauss divergence theorem), relation between line integral and volume integral (Green's theorem), relation between line and surface integral (Stokes theorem)



II. Syllabus: (Hours: Teaching: 75 (incl. unit tests etc.05), Training: 15) Unit–1: Multiple integrals-I (15h)

Introduction, Double integrals, Evaluation of double integrals, Properties of double integrals. 2. Region of integration, double integration in Polar Co-ordinates, 3. Change of variables in double integrals, change of order of integration.

Unit–2: Multiple integrals-II (15h)

Triple integral, region of integration, change of variables. 2. Plane areas by double integrals, surface area by double integral. 3. Volume as a double integral, volume as a triple integral.

Unit–3: Vector differentiation (15h)

Vector differentiation, ordinary derivatives of vectors. 2. Differentiability, Gradient, Divergence, Curl operators, 3. Formulae involving the operators.

Unit – 4: Vector integration (15h)

Line Integrals with examples. 2. Surface Integral with examples. 3. Volume integral with examples.

Unit–5: Vector integral Theorems (15h)

Gauss theorem and applications of Gauss theorem. 2. Green's theorem in plane and applications of Green's theorem. 3. Stokes' theorem and applications of Stokes theorem.

III. Reference Books:

1. Dr. M. Anitha, Linear Algebra and Vector Calculus for Engineer, Spectrum University Press, SR Nagar, Hyderabad-500038, INDIA.
2. Dr. M. Babu Prasad, Dr. K. Krishna Rao, D. Srinivasulu, Y. Adi Narayana, Engineering Mathematics-II, Spectrum University Press, SR Nagar, Hyderabad-500038, INDIA.
3. V. Venkateswararao, N. Krishnamurthy, B. V. S. S. Sarma and S. Anjaneya Sastry, A text Book of B.Sc., Mathematics Volume-III, S. Chand & Company, Pvt. Ltd., Ram Nagar, New Delhi-110055.

4. R.Gupta, Vector Calculus, Laxmi Publications.
5. P.C. Matthews, Vector Calculus, Springer Verlag publications.
6. Web resources suggested by the teacher and college librarian including reading material.

IV. Co-Curricular Activities: A) Mandatory:

1. For Teacher: Teacher shall train students in the following skills for 15 hours, by taking Relevant outside data (Field/Web). 1. The methods of evaluating double integrals and triple integrals in the class room and train to evaluate These integrals of different functions over different regions. 2. Applications of line integral, surface integral and volume integral. 3. Applications of Gauss divergence theorem, Green's theorem and Stokes' theorem.

2. For Student: Fieldwork/Project work Each student individually shall undertake Fieldwork/Project work and submit a report not exceeding 10 pages in the given format on the work-done in the areas like the following, by choosing any one of the following aspects. 1. Going through the web sources like Open Educational Resources to find the values of double and triple integrals of specific functions in a given region and make conclusions. (or) 2. Going through the web sources like Open Educational Resources to evaluate line integral, surface integral and volume integral and apply Gauss divergence theorem, Green's theorem and Stokes theorem and make conclusions.

3. Max. Marks for Fieldwork/Project work Report: 05.

4. Suggested Format for Fieldwork/Project work Report: Title page, Student Details, Index page, Stepwise work-done, Findings, Conclusions and Acknowledgements.

4. Unit tests (IE).

B) Suggested Co-Curricular Activities:

1. Assignments/collection of data, Seminar, Quiz, Group discussions/Debates 2. Visits to research organizations, Statistical Cells, Universities, ISI etc. 3. Invited lectures and presentations on related topics by experts in the specified area.

Multiple integrals and applications of Vector calculus

Semester – V

Course Code: MAT205301B

BLUE PRINT FOR QUESTION PAPERS

Unit	Course Content	Essay questions (with choice) (10M)	Short answer questions (with choice) (5M)	Total
I	Multiple Integrals-I	2	1	25
II	Multiple Integrals-II	2	2	30
III	Vector differentiation	2	1	25
IV	Vector Integration	2	2	30
V	Vector integral theorems	2	2	30
	Total	10	8	140

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SemesterEndExaminations

Year:III Sem:V Course: Multiple integrals and Applications of
VectorCalculus CourseCode:MAT205301B
Time : 3hours
MaxMarks:75

SECTION-A

I) Answer All following questions

II) Each question carries TEN marks.

5X10=50M

1. By changing the order of the integration, evaluate $\int_0^1 \int_0^{1-x} (x+y) dx dy$
2. By using the transformations $x+y=u, y=uv$. T.1 $\int_0^1 \int_0^{1-x} e^{y/(x+y)} dx dy = \frac{1}{2}(e-1)$
3. Find the area enclosed by the parabolas $x^2=y$ & $y^2=x$
4. Evaluate $\int_0^1 \int_0^{\sqrt{1-x^2}} \int_0^{\sqrt{1-x^2-y^2}} \frac{dx dy dz}{\sqrt{1-x^2-y^2-z^2}}$
5. Prove that $A = nr^{n-2}$
6. If $a = x + y + z, b = x^2 + y^2 + z^2, c = xy + yz + zx$ then show that $[grad a, grad b, grad c] = 0$
7. Evaluate $\int_A F dv$ where $F = (2x^2 - 4z) \mathbf{i} - 2xy \mathbf{j} - 8x^2 \mathbf{k}$ and V is bounded by the planes $x=0, y=0, z=0$ and $x + y + z = 1$
8. Verify Green's theorem for $(x^2 - xy^3) dx + (y - 2xy) dy$ where C is the square with vertices $(0,0), (2,0), (2,2), (0,2)$

SECTION-B

I) Answer any four of the following

II) Each Question Carries Five Marks

4X5=20M

9. Evaluate $\int_3^4 \int_1^{2x} \frac{dx dy}{(x+y)^2}$
10. Using double integration find the area of the cardioid $r = a(1 - \cos \theta)$
11. Find the directional derivative of $\phi = xy^2 + yz^2 + x^2$ along the tangent to the curve $x=t, y=t^2, z=t^3$ at the point $(1,1,1)$
12. Evaluate $\int_C \mathbf{F} \cdot d\mathbf{r}$ where $\mathbf{F} = xi + yj - zk$ and C is the circle $x^2 + y^2 = 9, z = 0$ in the anti clockwise sense
13. If $\mathbf{r} = (x+y^2) \mathbf{i} - 2xz \mathbf{j} + 2yz \mathbf{k}$ then find $\mathbf{F} \cdot \mathbf{n} dS$ where S is the surface of the plane $2x + y + 2z = 6$ in the first octant. $(ax \mathbf{i} + by \mathbf{j} + cz \mathbf{k}) \cdot \mathbf{n} dS = 4^\pi (a \pm b + c)$ where S is the surface of

SEM	Course Title	Course Code	Credits	Hrs/Wk
V	Integral transforms with applications	MAT205302B	5	6

I. Learning Outcomes: Students after successful completion of the course will be able to

1. Evaluate Laplace transforms of certain functions, find Laplace transforms of derivatives and of integrals.
2. Determine properties of Laplace transform which may be solved by application of special functions namely Dirac delta function, error function, Bessel function and periodic function.
3. Understand properties of inverse Laplace transforms, find inverse Laplace transforms of derivatives and of integrals.
4. Solve ordinary differential equations with constant/variable coefficients by using Laplace transform method.
5. Comprehend the properties of Fourier transforms and solve problems related to finite Fourier transforms.

Skill development	employability	Entrepreneurship
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II. Syllabus : (Hours: Teaching: 75 (incl. unit tests etc.05), Training: 15) Unit–

1:Laplace transforms-I (15h)

1. Definition of Laplace transform, linearity property-piecewise continuous function.
2. Existence of Laplace transform, functions of exponential order and of class A.
3. First shifting theorem, second shifting theorem and change of scale property.

Unit–2:Laplace transforms-II(15h)

1. Laplace Transform of the derivatives, initial value theorem and final value theorem. Laplace transforms of integrals.
2. Laplace transform of $t^n f(t)$, division by t , evolution of integrals by Laplace transforms.
3. Laplace transform of some special functions- namely Dirac delta function, error function, Bessel function and Laplace transform of periodic function.

Unit–3:Inverse Laplace transforms(15h)

1. Definition of Inverse Laplace transform, linear property, first shifting theorem, second shifting theorem, change of scale property, use of partial fractions.
2. Inverse Laplace transforms of derivatives, inverse Laplace transforms of integrals, multiplication by powers of p , division by p .
3. Convolution, convolution theorem proof and applications.

Unit–4:Application of Laplace transforms(15h)

1. Solutions of differential equations with constant coefficients, solutions of differential equations with variable coefficients.
2. Applications of Laplace transforms to integral equations- Abel's integral equation.
3. Converting the differential equations into integral equations, converting the integral equations into differential equations.

Unit–5:Fourier transforms(15h)

1. Integral transforms, Fourier integral theorem (without proof), Fourier sine and cosine integrals.
2. Properties of Fourier transforms, change of scale property, shifting property, modulation theorem. Convolution.
3. Convolution theorem for Fourier transform, Parseval's Identify, finite Fourier transforms.

II. Reference Books:

1. Dr. S.Sreenadh, S.Ranganatham, Dr.M.V.S.S.N.Prasad, Dr. V.Ramesh Babu, Fourier series and Integral Transforms, S. Chand & Company, Pvt. Ltd., Ram Nagar, New Delhi-110055.
2. A.R. Vasistha, Dr. R.K. Gupta, Laplace Transforms, Krishna Prakashan Media Pvt. Ltd.Meerut.
3. M.D.Raisinghania,H.C.Saxsena,H.K.Dass,IntegralTransforms,S.Chand&CompanyPvt.Ltd., RamNagar,New Delhi-110055.
4. Dr.J.K.Goyal,K.P.Gupta,LaplaceandFourierTransforms,PragathiPrakashan,Meerut.
5. ShanthiNarayana,P.K.Mittal,ACourseofMathematicalAnalysis,S.Chand&CompanyPvt.Ltd. RamNagar,New Delhi-110055.
6. Webresourcessuggested bytheteacher andcollegelibrarianincludingreadingmaterial.

III. Co-Curricular Activities:A)Mandatory:

1. **For Teacher:** Teacher shall train students in the following skills for 15 hours, by taking Relevant outside data (Field/Web). 1. Demonstrate on sufficient conditions for the existence of the Laplace transform of a function. 2. Evaluation of Laplace transforms and methods of finding Laplace transforms. 3. Evaluations of Inverse Laplace transforms and methods of finding Inverse Laplace transforms. 4. Fourier transforms and solutions of integral equations.
2. **For Student:** Fieldwork/Projectwork; Each student individually shall undertake Fieldwork/Project work and submit a report not exceeding 10 pages in the given format on the work-done in the areas like the following, by choosing any one of the aspects. 1. Going through the web sources like Open Educational Resources on Applications of Laplace transforms and Inverse Laplace transforms to find solutions of ordinary differential equations with constant /variable coefficients and make conclusions. (or) 2. Going through the web sources like Open Educational Resources on Applications of convolution theorem to solve integral equations and make conclusions. (or) 3. Going through the web source like Open Educational Resources on Applications of Fourier transforms to solve integral equations and make conclusions.

IV. Max.Marks for Fieldwork/Projectwork Report:05.

- V. **Suggested Format for Fieldwork/Project work Report:** Title page, Student Details, Index page, Stepwise work-done, Findings, Conclusions and Acknowledgements.

VI. Unit tests (IE).

- VII. **B) Suggested Co-Curricular Activities:** 1. Assignments/collection of data, Seminar, Quiz, Group discussions/Debates 2. Visit to research organizations, Statistical Cells, Universities, ISI etc. 3. Invited lectures and presentations on related topics by experts in the specified area.

Integral Transforms with applications

Semester – V

Course Code: MAT205302B

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Unit	Course Content	Essay questions (with choice) (10M)	Short answer questions (with choice) (5M)	Total
I	Laplace Transforms-I	2	2	30
II	Laplace Transforms-II	2	1	25
III	Inverse Laplace Transforms	2	2	30
IV	Applications of Laplace Transforms	2	1	15
V	Fourier Transforms	2	2	30
	Total	10	8	140

SECTION-A

I) Answer All following questions

II) Each question carries TEN marks.

5X10=50M

1. Find the Laplace transforms of the following function

$$e^{3t} - 2e^{-2t} + \sin 2t + \cos 3t + \sinh 3t - 2\cosh 4t + 9$$

2. Evaluate $(e^{3t} \sin^2(t))$

3. Evaluate the Laplace transformation of the following function $t^3 e^{2t} \sin t$

4. Using Laplace Transform evaluate $\int_0^\infty t e^{-t} \sin t dt$

5. State and prove convolution theorem Using convolution theorem

6. Find the Inverse Laplace Transform of the following function

$$\frac{2s+3}{s^3-6s^2+11s-6}$$

7. Solve $\frac{d^2y}{dx^2} + 2\frac{dy}{dt} - 3y = \sin t, y = \frac{dy}{dt} = 0 \text{ when } t = 0$

8. State and prove Parseval's identity

SECTION-B

I) Answer any four of the following

II) Each Question Carries Five Marks

4X5=20M

9. Evaluate $(3\cos 3t \cos 4t)$

10. Derive Laplace transform of Dirac delta function

11. Find the inverse Laplace Transformation $\frac{2s-5}{s^2-4}$

12. Solve $y'' = t \cos 2t, y(0) = 0, y'(0) = 0$

13. Find the Fourier cosine integral of $f(x) =$

Find the Fourier sine and cosine transformation of $f(x) = x(\pi - x)$ in $0 < x < \pi$ $\sin x$ if $0 \leq x \leq \pi$
 $\left\{ \begin{array}{l} 0 \quad \text{if } x > \pi \end{array} \right.$

14.

13. Find the Fourier sine and cosine transformation of $f(x) = x(\pi - x)$ in $0 < x < \pi$

SEM	Course Title	Course Code	Credits	Hrs/Wk
V	Partial differential equations and Fourier series	MAT205301C	5	6

- 1. Learning Outcomes:** Students after successful completion of the course will be able to:
 1. Classify partial differential equations, formation of partial differential equations and solve Cauchy's problem for first order equations.
 2. Solve Lagrange's equations by various methods, find integral Surface passing through a given curve and Surfaces orthogonal to a given system of Surfaces.
 3. Find solutions of nonlinear partial differential equations of order one by using Charpit's method.
 4. Find solutions of nonlinear partial differential equations of order one by using Jacobi's method.
 5. Understand Fourier series expansion of a function $f(x)$ and Parseval's theorem.

Skill development	employability	Entrepreneurship
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II. Syllabus: (Hours: Teaching: 75 (incl. unit tests etc.05), Training: 15) Unit–

1: Introduction of partial differential equations (15h)

Partial Differential Equations, classification of first order partial differential equations, Rule I, derivation of a partial differential equations by the elimination of arbitrary constants
 2. Rule II, derivation of a partial differential equation by the elimination of arbitrary function ϕ from the equations $\phi(u, v) = 0$ where u and v are functions of x, y and z .
 3. Cauchy's problem for first order equations

Unit–2: Linear partial differential equations of order one (15h)

Lagrange's equations, Lagrange's method of solving $Pp + Qq = R$, where P, Q and R are functions of x, y and z , type 1 based on Rule I for solving $dx/p = dy/Q = dz/R$, type 2 based on Rule II for solving $dx/p = dy/Q = dz/R$.
 2. Type 3 based on Rule III for solving $dx/p = dy/Q = dz/R$, type 4 based on Rule IV for solving $dx/p = dy/Q = dz/R$.
 3. Integral Surface passing through a given curve, the Cauchy problem, Surfaces orthogonal to a given system of Surfaces.

Unit–3: Non-linear partial differential equations of order one-I (15h)

Complete integral, particular integral, singular integral and general integral, geometrical interpretation of integrals of $f(x, y, z, p, q) = 0$, method of getting singular integral from the PDE of first order, compatible system of first order equations.
 2. Charpit's method, Standard form I, only p and q present.
 3. Standard form II, Clairaut equations.

Unit–4: Non-linear partial differential equations of order one-II (15h)

1. Standard Form III, only p, q and z present.
 2. Standard Form IV, equation of the form $f_1(x, p) = f_2(y, q)$.
 3. Jacobi's method, Jacobi's method for solving partial differential equations with three or more independent variables, Jacobi's method for solving a non-linear first order partial differential equations in two independent variables.

Unit–5: Fourier series (15h)

1. Introduction, Euler's formulae for Fourier series expansion of a function $f(x)$, Dirichlet's

conditions for Fourier series, convergence of Fourier series. 2. Functions having arbitrary periods. Change of interval, Half range series. 3. Parseval's theorem, illustrative examples based on Parseval's theorem, some particular series.

III. Reference Books:

1. Dr.M.D.Raisinghania, Ordinary and Partial Differential Equations, S.Chand & Company Pvt.Ltd., Ram Nagar, New Delhi-110055.
2. Dr.S.Sreenadh, S.Ranganatham, Dr.M.V.S.S.N.Prasad, Dr.V.Ramesh Babu, Fourier Series and Integral Transforms, S. Chand & Company Pvt.Ltd., Ram Nagar, New Delhi-110055.
3. Prof T.Amaranath, An Elementary Course in Partial Differential Equations Second Edition, Narosa Publishing House, New Delhi.
4. Fritz John, Partial Differential Equations, Narosa Publishing House, New Delhi, 1979.
5. I.N.Sneddon, Elements of Partial Differential Equations by McGraw Hill, International Edition, Mathematics series.
6. Web resources suggested by the teacher and college librarian including reading material.

IV. Co-Curricular Activities: A) Mandatory:

1. For Teacher: Teacher shall train students in the following skills for 15 hours, by taking Relevant outside data (Field/Web). 1. On classification of first order partial differential equations, formation of partial differential equations. 2. Various methods of finding solutions of partial differential equations. 3. Integral Surface passing through a given curve and Surfaces orthogonal to a given system of Surfaces.

2) **For Student:** Fieldwork/Projectwork; Each student individually shall undertake Fieldwork/Project work and submit a report not exceeding 10 pages in the given format on the work done in the areas like the following, by choosing any one of the aspects. 1. Going through the web source like Open Educational Resources to find solutions of partial differential equations by using Lagrange's method, Charpit's method and Jacobi's method and make conclusions. (or) 2. Going through the web source like Open Educational Resources to find Integral Surface passing through a given curve and Surfaces orthogonal to a given system of Surfaces and make conclusions. (or) 3. Going through the web source like Open Educational Resources to find Fourier series expansion of some functions and applications of Parseval's theorem and make conclusions.

3. **Max.Marks for Fieldwork/Projectwork Report: 05.**

4. Suggested Format for Fieldwork/Project work Report: Title page, Student Details, Index page, Stepwise work-done, Findings, Conclusions and Acknowledgements.

5. Unit tests (IE).

B) Suggested Co-Curricular Activities 1. Assignments/collection of data, Seminar, Quiz, Group discussions/Debates 2. Visits to research organizations, Statistical Cells, Universities, ISI etc. 3. Invited lectures and presentations on related topics by experts in the specified area

Partial differential Equations and Fourier Series

Semester – V

Course Code: MAT205301C

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Unit	Course Content	Essay questions (with choice) (10M)	Short answer questions (with choice) (5M)	Total
I	Introduction	2	1	25
II	Linear PDE	2	2	30
III	Non-Linear PDE-I	2	2	30
IV	Non-Linear PDE-II	2	1	25
V	Fourier Series	2	2	30
	Total	10	8	140

SECTION-A

I) Answer All following questions

II) Each question carries TEN marks.

5X10=50M

1. Obtain form Partial Differential Equations by eliminating the arbitrary constants

$$z = ax^2 + by^2; \text{ where } a, b \text{ are constants}$$

2. Form a Partial Differential equation by eliminating arbitrary functions

$$z = (x+y)\phi(x^2-y^2)$$

3. Solve the P.D.E. $(z^2+y)(px-xy) = x^4$

4. Solve the P.D.E. $(x^2-y^2-zy) + (x^2-y^2-2x) = (x-y)$

5. Solve the P.D.E. $pqz = p^2(xq+p^2) + q^2(yp+q^2)$

6. Solve the P.D.E. $(p-q)(z-px-xy) = 1$

7. Solve the P.D.E. $zpy^2 = (y^2+z^2q^2)$

8. Find the Fourier series of $f(x) = \begin{cases} 0 & -\pi \leq x \leq 0 \\ x^2 & 0 \leq x \leq \pi \end{cases}$

SECTION-B

I) Answer any four of the following

II) Each Question Carries Five Marks

4X5=20M

9. Find the Differential Equation of all spheres whose centers lie on the Z-axis.

10. Solve $xp + yp = 3z$

11. Solve $(z-y) + (x-z) = y-x$

12. Solve $z = ax + by \left(\frac{a^3}{x} + \frac{b^3}{y} \right)$

12. If $f(x) = 1 - \frac{x}{L}$ in $0 < x < L$, find Fourier cosine series $f(x)$

13. If $f(x) = 1 - \frac{x}{L}$ in $0 < x < L$, find Fourier cosine series

SEM	Course Title	Course Code	Credits	Hrs/Wk
V	Number theory	MAT205302C	5	6

Course-7C: Number theory (Skill Enhancement Course (Elective), 5 credits)

1. Learning Outcomes: Students after successful completion of the course will be able to

1. Find quotients and remainders from integer division, study divisibility properties of integers and the distribution of primes.
2. Understand Dirichlet multiplication which helps to clarify interrelationship between various arithmetical functions.
3. Comprehend the behaviour of some arithmetical functions for large n .
4. Understand the concepts of congruencies, residue classes and complete residue systems.
5. Comprehend the concept of quadratic residues $\text{mod } p$ and quadratic non-residues $\text{mod } p$.

Skill development	employability	Entrepreneurship
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Syllabus: (Hours: Teaching: 75 (incl. unit tests etc. 05), Training: 15) Unit-1: Divisibility (15h)

1. Introduction, Divisibility, Greatest Common Divisor. 2. Prime numbers, The fundamental theorem of arithmetic, The series of reciprocals of the primes. 3. The Euclidean algorithm, The greatest common divisor of more than two numbers.

Unit-2: Arithmetical Functions and Dirichlet Multiplication (15h)

1. Introduction, The Mobius function $\mu(n)$, The Euler totient function $\varphi(n)$, A relation connecting φ and μ , A product formula for $\varphi(n)$. 2. The Dirichlet product of arithmetical functions, Dirichlet inverses and Mobius inversion formula, The Mangoldt function $V(n)$. 3. Multiplicative functions, Multiplicative functions and Dirichlet multiplication, The inverse of a completely multiplicative function, Liouville's function $\lambda(n)$, The divisor functions $\sigma_\alpha(n)$.

Unit-3: Averages of Arithmetical Functions (15h)

1. Introduction, The big oh notation. Asymptotic equality of functions, Euler's summation formula, some elementary asymptotic formulas. 2. The average order of (n) , The average order of the divisor functions (n) , The average order of $\varphi(n)$. 3. The average order of (n) and $V(n)$, The partial sum of a Dirichlet product, Applications of $\mu(n)$ and $V(n)$.

Unit-4: Congruences (15h)

1. Definition and basic properties of congruences, Residue classes and complete residue systems. 2. Linear congruences, reduced residue systems and the Euler-Fermat theorem. Polynomial congruences modulo p . Lagrange's theorem. 3. Applications of Lagrange's theorem, Simultaneous linear congruences. The Chinese remainder theorem. Application of the Chinese remainder theorem.

Unit-5: Quadratic Residues and the Quadratic Reciprocity Law (15h)

1. Quadratic Residues, Legendre's symbol and its properties, Evaluation of $(-1/p)$

and $(2/p)$, Gauss lemma, 2. The Quadratic reciprocity law, Applications of the reciprocity law, The Jacobi Symbol. 3. Gauss sums and the quadratic reciprocity law, the reciprocity law for quadratic Gauss sums. Another proof of the quadratic reciprocity law.

Reference Books:

1. Tom M. Apostol, Introduction to Analytic Number Theory, Springer International Student Edition.
2. David, M. Burton, Elementary Number Theory, 2nd Edition UBS Publishers.
3. Hardy & Wright, Number Theory, Oxford Univ, Press.
4. Dence, J.B & Dence T.P, Elements of the Theory of Numbers, Academic Press.
5. Niven, Zuckerman & Montgomery, Introduction to the Theory of Numbers.
6. Web resources suggested by the teacher and college librarian including reading material.

Co-Curricular Activities: A) Mandatory:

1. For Teacher: Teachers shall train students in the following skills for 15 hours, by taking Relevant outside data (Field/Web). 1. Finding quotient and numbers from integer division and the method of solving congruences. Further problems related to the theory of quadratic residues. 2. Applications of Lagrange's theorem. 3. Applications of the Chinese remainder theorem. 4. Applications of the reciprocity law.

For Student: Fieldwork/Project work; Each student individually shall undertake Fieldwork/Project work and submit a report not exceeding 10 pages in the given format on the work done in the areas like the following, by choosing any one of the aspects. 1. Going through the web sources like

Open Educational Resources and list out Applications of Lagrange's theorem, and make conclusions. (or)

2. Going through the web sources like Open Educational Resources and list out Applications of the Chinese remainder theorem and make conclusions. (or) 3. Going through the web sources like Open Educational Resource and list out Applications of the reciprocity law and make conclusions.

Max. Marks for Fieldwork/Project work Report: 05.

Suggested Format for Fieldwork/Project work Report: Title page, Student Details, Index page, Stepwise work-done, Findings, Conclusions and Acknowledgements.

5. Unit tests (IE).

B) Suggested Co-Curricular Activities

1. Assignments/collection of data, Seminar, Quiz, Group discussions/Debates
2. Visits to research organizations, Statistical Cells, Universities, ISI etc.
3. Invited lectures and presentations on related topics by experts in the specified area.

Number Theory

Semester – V

Course Code: MAT205302C

BLUE PRINT FOR QUESTION PAPER

Unit	Course Content	Essay questions (with choice) (10M)	Short answer questions (with choice) (5M)	Total
I	Divisibility	2	1	25
II	Arithmetical Functions and Dirichlet Multiplication	2	2	30
III	Averages of Arithmetical Functions	2	2	30
IV	Congruences	2	1	25
V	Quadratic Residues and the Quadratic Reciprocity Law	2	2	30
	Total	10	8	140

SECTION-A

I) Answer All following questions

II) Each question carries TEN marks.

5X10=50M

1. State and prove the fundamental theorem of arithmetic

2. State and Prove Euclidean Algorithm

3. If $n \geq 1$ $\sum_{d|n} \mu(d) = \begin{cases} 1 & \text{if } n=1 \\ 0 & \text{if } n>1 \end{cases}$

$$\sum_{d|n} \mu(d) = \begin{cases} 1 & \text{if } n=1 \\ 0 & \text{if } n>1 \end{cases}$$

4. State and prove Mobius Inversion formula

5. If f has a continuous derivative f' on the interval $[y, x]$ where $0 < y < x$ then

$$\sum_{y \leq n \leq x} f(n) = \int_y^x f(t) dt + \int_y^x (t - [t]) f'(t) dt + f(x)[x] - f(y)[y]$$

6. $[x]! = \prod_{p \leq x} p$ where the product is extended over all primes $\leq x$ &

$$a(p) = \sum_{m=1}^x \frac{1}{p^m}$$

7. State and Prove Chinese Remainder theorem

8. Define Legendre's symbol. Let p be an odd prime. Then for all

$$\left(\frac{n}{p}\right) \equiv n^{(p-1)/2} \pmod{p}$$

SECTION-B

I) Answer any four of the following

II) Each Question Carries Five Marks

4X5=20M

9. The infinite series $\sum_{n=1}^{\infty} \frac{1}{p_n}$ diverges

$$10. \sum_{n \leq x} \sigma_1(n) = \frac{1}{2} \pi^2 x^2 + O(x \log x) \quad * x \geq 1$$

11. Define bigoh notation and Asymptotic equality of function
12. If $c > 0$ $a \equiv b \pmod{m}$ iff $ac \equiv bc \pmod{m}$
13. If p is an odd positive integer, then $(-1/p) = (-1)^{(p-1)/2}$
14. Determine whether 219 is a quadratic residue or non residue mod 383

A.S.D.GOVERNMENTDEGREECOLLEGE FORWOMEN(A),KAKINADA

Department of mathematics

List of Examiners and Paper Setters in Mathematics:

Department of mathematics

ACTION PLAN FOR THE ACADEMIC YEAR 2022 – 2023

S. NO.	MONTH	WEEK	ACTIVITY	REMARKS
1	October	IV	Guest Lecture to I year students	
2	November	I	Guest Lecture to II year students	
3	November	III	Cocurricular activities	
4	November	IV	Cocurricular activities	
5	December	I	Guest Lecture to III year students	
6	December,22	III	Celebration of Mathematics Day	
7	January, 23	I	Co curricular activities	
8	January, 23	IV	Guest lecture	
9	February, 23	II	Cocurricular activities	
10	February, 23	IV	Science Day celebrations	
11	March, 23	II	PI day celebrations	
12	April, 23	I	Career guidance programme	
13	June, 23	IV	Statistics Day celebrations	
14	July, 23	II	Co curricular activities	
15	August, 23	I	Guest lecture to I year students	
16	September	I	Guest lecture to II year students	

Department of mathematics

Work load of the Department

S.No.	Programme	Intake	Work load in Sem I	Work load in Sem II	Work load in Sem III	Work load in Sem IV	Work load in Sem V	
1	MPC	50	$5+2+2 =9$	$5+2+2 =9$	6	12	12	
2	MPCs	60	$5+2+2 =9$	$5+2+2 =9$	6	12	12	
3	MSCs	30	$5+2 = 7$	$5+2 = 7$	--	---	----	
4	For Analytical Skills				2			
TOTAL			25	25	14	24	24	

Department of mathematics

Resolutions of Board of Studies:

The BOS Meeting is conducted on 14.09.2022 at 10:00 AM in the department of Mathematics ,A.S.D.Govt. Degree college for Women (a) Kakinada to discuss and finalize the syllabus of all semesters

1. The committee approved the new frame work w.e.f 2020-21 admitted batch onwards
2. The committee approved to offer any one set among the three of skill enhancement courses in V semester.
3. It is approved that the composition of CIA and SEE is 30:70 respectively W.E.F THE 2021-2022 admitted batch and the minimum qualifying mark in SEE is 35% the over all pass percentage is 40%
4. It is approved the question paper format of internal exam and semester end examination

SIGNATURES

1.K.Venkateswara Rao.,Chairperson

2.Dr.Ch.Srinivasulu, UniversityNominee

3.Dr.P.Subhashani, Subject Expert

4. Ms. Y. Padmaja,	Subject Expert
5. G. Sridevi,	Member
6. V. Geethasatyasri	Member
7. Padma	Alumns member
7. E. Ooha	III B.Sc.(M.P.CS)
8. Kum. B. Manasa	IIB.Sc.(M.P.CS)

**A.S.D. GOVERNMENT DEGREE COLLEGE FOR
WOMEN (AUTONOMOUS) KAKINADA**

(Under the jurisdiction of Adikavi Nannaya University)

Reaccredited by NAAC with B Grade (3rd Cycle)

1.1.3 Details of courses offered by the institution that focus on employability/ entrepreneurship/ skill development during the year.



DEPARTMENT OF MICROBIOLOGY

A.S.D Govt. Degree College for Women (A), Kakinada

Course-Wise Syllabus

BSc	MICROBIOLOGY (Semester: I)	Credits: 4
MBT: I	Introduction To Microbiology And Microbial Diversity	Hrs/Wk: 4

Aim and objectives of Course

To understand History & Development of Microbiology, Microscopy, staining and sterilization techniques, Ultra-structure of cell, Different methods of microbial characterization

To study nature of viruses, viral classification, cultivation of viruses and Type study of TMV & HIV

Learning outcomes of Course

Up on completion of the course students able to

1. Explain relationship and apply appropriate terminology relating to the structure, Genetics, metabolism and ecology of prokaryotic microorganisms, Algae, viruses and Fungi.
2. Students will get basics and importance of Microbiology.
3. Demonstrate appropriate laboratory skill and techniques related to isolation, staining, identification and control of microorganisms.

UNIT-I: History of Microbiology & Place of Microorganisms in the living world Skill

History of Microbiology in the context of contributions of Anton von Leeuwenhoek, Edward Jenner, Louis Pasteur, Robert Koch, Ivanowsky, Martinus Beijerinck and Sergei Winogradsky

Importance and applications of microbiology

Place of Microorganisms in the Living World Haeckel's three Kingdom concept, Whittaker's five kingdom concept, three domain concept of Carl Woese

UNIT-II: Prokaryotic microorganisms Skill No. of hours: 12

Ultra-structure of Prokaryotic cell- Cell Wall, Cell Membrane, Cytoplasm, Nucleoid,

Plasmid, Inclusion Bodies, Flagella Pili, Capsule, Endospore

General characteristics of Bacteria (Size, shape, arrangement, reproduction)

General characteristics of Rickettsia, Mycoplasmas, Cyanobacteria, Archaea

UNIT-III: Viruses and Eukaryotic microorganisms: Skill & Employability No. of hours: 12

General characteristics of viruses, Cultivation of Viruses (in brief)

Morphology, Structure and replication of **TMV and Lambda Bacteriophage**

Fungi - Habitat, nutrition, vegetative structure and modes of reproduction; outline classification

Algae - Habitat, thallus organization, photosynthetic pigments, storage forms of food, reproduction.

Protozoa – Habitat, cell structure, nutrition, locomotion, excretion, reproduction, encystment, outline classification

UNIT-IV: Isolation and Culture of Bacteria and Fungi : Skill & Employability

Growth media- Natural, synthetic and semi synthetic media. Selective, Enrichment, and Differential media

Pure culture techniques - dilution-plating, Streak-plate, Spread-plate, Pour-Plate and micromanipulator.

Preservation of microbial cultures - sub culturing, overlaying cultures with mineral oils, lyophilization, sand cultures, storage at low temperature.

UNIT-V: Principles of Microscopy, Sterilization and Disinfection: Skill & Employability

Principles of microscopy - Bright field and Electron microscopy (SEM and TEM).

Staining Techniques - Simple and Differential staining techniques (Gram staining, Spore staining).

Sterilization and disinfection techniques –

Physical methods - autoclave, hot- air oven, pressure cooker, laminar air flow, filter sterilization, Radiation methods - UV rays, Gamma rays.

Chemical methods - alcohols, aldehydes, fumigants, phenols, halogens and hypochlorites.

The following topics in UNIT -III are for Internal Assessment only:

- a. Fungi - Habitat, nutrition, vegetative structure and modes of reproduction; outline classification
- b. Algae - Habitat, thallus organization, photosynthetic pigments, storage forms of food, reproduction

MBP- I: Introduction To Microbiology And Microbial Diversity

Skill & Employability

1. Microbiology Good Laboratory Practices and Biosafety.
2. Preparation of culture media for cultivation of bacteria- Nutrient broth & Nutrient agar
3. Preparation of culture media for cultivation of fungi – Sabourauds agar
4. Sterilization of medium using Autoclave
5. Sterilization of glassware using Hot Air Oven
6. Light compound microscope and its handling
7. Microscopic observation of bacteria (Gram +ve bacilli and cocci, Gram -ve bacilli), Algae and Fungi.
8. Simple staining
9. Gram's staining
10. Hanging-drop method & temporary wet mount (TWM) for observation of living microorganisms.
11. Isolation of pure cultures of bacteria by serial dilution and Streak/Spread/Pour Plate Method.
12. Preservation of bacterial cultures by Serial subculturing & Slant Preparation with mineral oil overlay.
13. Observation of electron micrographs of bacterial cells

Recommended Text Books & Reference books:

- Pelczar, M.J., Chan, E.C.S. and Kreig, N.R. (1993). Microbiology. 5th Edition, Tata McGraw Hill Publishing Co., Ltd., New Delhi.
- Dube, R.C. and Maheswari, D.K. (2000) General Microbiology. S Chand, New Delhi. Edition), Himalaya Publishing House, Mumbai.
- Power, C.B. and Dagainawala, H.F. (1986). General Microbiology Vol I & II
- Prescott, M.J., Harley, J.P. and Klein, D.A. (2012). Microbiology. 5th Edition, WCB McGrawHill, New York.
- Reddy, S.M. and Reddy, S.R. (1998). Microbiology □ Practical Manual, 3 rd Edition, Sri Padmavathi Publications, Hyderabad.
- Singh, R.P. (2007). General Microbiology. Kalyani Publishers, New Delhi.
- Stanier, R.Y., Adelberg, E.A. and Ingram, J.L. (1991). General Microbiology, 5th Ed., Prentice Hall of India Pvt. Ltd., New Delhi.
- Microbiology Edited by Prescott
- Jaya Babu (2006). Practical Manual on Microbial Metabolisms and General Microbiology. Kalyani Publishers, New Delhi.
- Gopal Reddy *et al.*, Laboratory Experiments in Microbiology

BSc	MICROBIOLOGY (Semester: II)	Credits: 4
MBT: II	Microbial Physiology And Biochemistry	Hrs/Wk: 4

Aim and objectives of Course

To understand DNA, RNA, Protein structure and synthesis. DNA damage, mutations and repair. Gene transfer methods.

Learning outcomes of Course

1. This Course provides Understanding of biomolecular synthesis and control will help in further study
2. Develop knowledge on microbial genetics and molecular biology

UNIT-I: Biomolecules

No. of hours: 12

General characters and outline classification of Carbohydrates (Monosaccharides-Glucose, Fructose, Ribose, Disaccharides- Sucrose, Lactose, Polysaccharides- Starch, glycogen, Cellulose)

General characters and outline classification of fatty acids (Saturated & Unsaturated Fatty Acids) Lipids (Simple & complex lipids)

UNIT-II: Enzymes

No. of hours: 12

Properties and classification of Enzymes.

Biocatalysis- induced fit and lock and key models.

Coenzymes and Cofactors.

Inhibition of enzyme activity- competitive, non-competitive, uncompetitive and allosteric.

Factors effecting enzyme activity

UNIT – III: Analytical Techniques : Skill & Employability

No. of hours: 12

Principle and applications of -

Colorimetry

Chromatography (paper, thin-layer, and column),

Spectrophotometry (UV & visible),

Centrifugation and

Gel Electrophoresis (Agarose and SDS).

UNIT – IV: Microbial Nutrition and growth: Skill

No. of hours: 12

Nutritional requirements of Microorganisms

Nutritional groups of microorganisms- autotrophs, heterotrophs, lithotrophs, organotrophs, phototrophs, chemotrophs

Microbial Growth- different phases of growth in batch cultures; Synchronous, continuous, biphasic growth.

Factors influencing microbial growth

Methods for measuring microbial growth - Direct microscopy, viable count estimates, turbidometry and biomass.

UNIT- V : Microbial metabolism: Entrepreneurship

Aerobic respiration - Glycolysis, TCA cycle, ED Pathway, Electron transport

Oxidative and substrate level phosphorylation.

Anaerobic respiration (Nitrate and sulphate respiration)

Fermentation- lactic acid and ethanol fermentations

Outlines of oxygenic and anoxygenic photosynthesis in bacteria

MBP – II: MICROBIAL PHYSIOLOGY AND BIOCHEMISTRY

Skill & Employability

1. Qualitative Analysis of Carbohydrates.
2. Qualitative Analysis of Aminoacids.
3. Colorimetric estimation of proteins by Biuret / Lowry method.
4. Separation of components of a given mixture using a laboratory scale centrifuge.
5. Separation of mixtures by paper / thin layer chromatography.
6. Demonstration of column packing in any form of column chromatography.
7. Effect of temperature/pH / Salt concentration on bacterial growth
8. Demonstration of electrophoretic technique
9. Study and plot the growth curve of E. coli by turbidimetric and Standard Plate Count methods

Recommended Text Books & Reference books:

Berg JM, Tymoczko JL and Stryer L (2011) Biochemistry, W.H. Freeman and Company
Caldwell, D.R. (1995). Microbial Physiology and Metabolism, W.C. Brown Publications, Iowa, USA.

Lehninger, A.L., Nelson, D.L. and Cox, M.M. (1993). Principles of Biochemistry, 2nd Edition, CBS Publishers and Distributors, New Delhi.

Sashidhara Rao, B. and Deshpande, V. (2007). Experimental Biochemistry: A student Companion. I.K. International Pvt. Ltd.

Tymoczko JL, Berg JM and Stryer L (2012) Biochemistry: A short course, 2nd ed., W.H. Freeman

Voet, D. and Voet J.G (2004) Biochemistry 3rd edition, John Wiley and Sons

White, D. (1995). The Physiology and Biochemistry of Prokaryotes, Oxford University Press, New York.

BSc	MICROBIOLOGY (Semester: III)	Credits: 4
MBT: III	Molecular Biology And Microbial Genetics	Hrs/Wk: 4

Aim and objectives of Course

To understand different biomolecules, analytical techniques, bacterial nutrition, growth and metabolism

Learning outcomes of Course

Up on completion of this course students should be able to:

1. Explain working principle and applications of Colorimetry, Chromatography, Spectrophotometry, Centrifugation and Gel Electrophoresis.
2. Knowledge on Microbial nutrition, bacterial growth, metabolism and Respiration.
3. The student will get first-hand experience on separation methods

UNIT- I: Nucleic acids Skill & Employability

No. of hours: 12

DNA and RNA - Role in heredity-The central dogma

Watson and Crick model of DNA

Types of RNA, structure, and functions

Organization of DNA in prokaryotes

UNIT- II : Genetic material and replication Skill & Employability

Experiments which established DNA as genetic material

RNA as genetic material

Mechanism of DNA Replication in Prokaryotes

Proof of semi conservative mechanism of replication (Meselson - Stahl Experiment)

UNIT- III: Gene expression and regulation Skill & Employability

Concept of gene - Muton, recon and cistron.

Genetic code

Protein synthesis - Transcription and translation in Prokaryotes

Regulation of gene expression in bacteria - *lac* operon

UNIT- IV: Mutations, damage and repair Skill & Employability

Outlines of DNA damage and repair mechanism

Mutations - spontaneous and induced

Chromosomal aberrations - deletions, inversions, tandem duplications, insertions

Point mutations- base pair changes, frame shifts

Mutagens - Physical and Chemical mutagens

Bacterial recombination - Transformation, Conjugation, Transduction (Generalized and specialized transductions)

UNIT- V: Genetic engineering: Entrepreneurship Skill & Employability

Basic principles of genetic engineering.

Restriction endonucleases, DNA ligases.

Vectors – plasmids (pBR322), Cosmids, Phagemids, lambda phage vector, M 13 vectors.

Outlines of gene cloning methods.

Polymerase chain reaction. Genomic and cDNA libraries.

General account on application of genetic engineering in industry, agriculture, and

medicine.

MBP – III: MOLECULAR BIOLOGY AND MICROBIAL GENETICS

Entrepreneurship Skill & Employability

1. Study of different types of DNA and RNA using micrographs and model / schematic representations.
2. Study of semi-conservative replication of DNA through micrographs / schematic representations
3. Isolation of genomic DNA from *E. coli*
4. Estimation of DNA using UV spectrophotometer.
5. Resolution and visualization of DNA by Agarose Gel Electrophoresis.
6. Resolution and visualization of proteins by Polyacrylamide Gel Electrophoresis (SDS - PAGE).
7. Problems related to DNA and RNA characteristics, Transcription and Translation.
8. Induction of mutations in bacteria by UV light.
9. Instrumentation in molecular biology - Ultra centrifuge, Transilluminator, PCR

Recommended Text Books & Reference books:

- Freifelder, D. (1990). Microbial Genetics. Narosa Publishing House, New Delhi.
- Freifelder, D. (1997). Essentials of Molecular Biology. Narosa Publishing House, New Delhi.
- Glick, B.P. and Pasternack, J. (1998). Molecular Biotechnology, ASM Press, Washington D.C., USA.
- Lewin, B. (2000). Genes VIII. Oxford University Press, England.
- Maloy, S.R., Cronan, J.E. and Freifelder, D. (1994). Microbial Genetics, Jones and Bartlett Publishers, London.
- Ram Reddy, S., Venkateswarlu, K. and Krishna Reddy, V. (2007) A text Book of Molecular Biotechnology. Himalaya Publishers, Hyderabad.
- Sinnot E.W., L.C. Dunn and T. Dobzhansky. (1958). Principles of Genetics. 5 th Edition. McGraw Hill, New York.
- Smith, J.E. (1996). Biotechnology, Cambridge University Press.
- Snyder, L. and Champness, W. (1997). Molecular Genetics of Bacteria. ASM press,
- Strickberger, M.W. (1967). Genetics. Oxford & IBH, New Delhi.
- Verma, P.S. and Agarwal, V.K. (2004). Cell Biology, Genetics, Molecular Biology, Evolution and Ecology. S. Chand & Co. Ltd., New Delhi.

BSc	MICROBIOLOGY (Semester: IV)	Credits: 4
MBT: IV	Immunology And Medical Microbiology	Hrs/Wk: 4

Aim and objectives of Course

To study types of immunity, immune organs, cells, antibodies and antigen-antibody interactions.

To learn diagnostic and pathogenesis of various diseases. Antimicrobial defense and different toxins and vaccines.

Learning outcomes of Course

Up on completion of the course students able to

1. Explain No-specific body defence and the immune response
2. Develop knowledge on disease transmission and control
3. Demonstrate on collection and handling of laboratory specimens
4. Develop an information making personal health decision in regard to infectious diseases.
5. Student can safeguard himself & society and can work diagnostics and hospitals.

UNIT-I: Immune System Skill & Employability

Concept of Innate and Adaptive immunity

Primary and secondary organs of immune system - thymus, bursa fabricus, bone marrow, spleen, lymph nodes.

Cells of immune system- Identification and function of B and T lymphocytes, null cells, monocytes, macrophages, neutrophils, basophils and eosinophils
Complement system (in brief)

UNIT-II : Immune response Skill oriented

Characteristics of antigen (Foreignness, Molecular size, Heterogeneity and solubility)
Haptens.

Antibodies - basic structure and types and functions (Immune complex formation and elimination - Agglutination, Precipitation, Neutralization, Complement fixation, Phagocytosis)

Generation of Humoral Immune Response (Plasma and Memory cells)

Generation of Cell Mediated Immune Response

MHC- Functions of MHC I & II molecules

Hypersensitivity- definition and types (in brief)

Autoimmunity (in brief)

UNIT- III: Microbes in Health and Disease Skill & Employability

Normal flora of human body.

Definitions - Infection, Invasion, Pathogen, Pathogenicity, Virulence, Toxigenicity, Opportunistic infections, Nosocomial infections.

General account on microbial diseases – causal organism, pathogenesis, epidemiology, diagnosis, prevention, and control of the following

Bacterial diseases - Tuberculosis, Typhoid.

Fungal diseases - Candidiasis.

Protozoal diseases - Malaria.

Viral Diseases – Corona virus and AIDS

UNIT- IV: Principles of Diagnosis Entrepreneurship Skill & Employability

General principles of diagnostic microbiology- Collection, transport of clinical samples

Identification by Culturing & Biochemical characteristics (IMViC)

Identification by molecular assays (PCR, RT-PCR, DNA probes)

Identification by serological tests (ELISA, Immunofluorescence, Agglutination based tests, Complement fixation)

UNIT- V: Prevention and Treatment Skill oriented & Employability

Vaccines

Monoclonal antibodies- Production and application

Antimicrobial agents- General modes of action of antibacterial (Penicillin), antifungal (Amphotericin), antiviral (Amantadine) agents

Interferons

Tests for antimicrobial susceptibility (Disc diffusion)

Antibiotic resistance in bacteria

RECOMMENDED TEXT BOOKS:

1. Ananthanarayan R. and Paniker C.K.J. (2009) Textbook of Microbiology. 8th edition, University Press Publication.
2. Brooks G.F., Carroll K.C., Butel J.S., Morse S.A. and Mietzner, T.A. (2013) Jawetz, Melnick and Adelberg's Medical Microbiology. 26th edition. McGraw Hill Publication.
3. Delves P, Martin S, Burton D, Roitt IM. (2006). Roitt's Essential Immunology. 11th edition Wiley-Blackwell Scientific Publication, Oxford.
4. Goldsby RA, Kindt TJ, Osborne BA. (2007). Kuby's Immunology. 6th edition W.H. Freeman and Company, New York.

REFERENCE BOOKS:

1. Kuby's Immunology. 6th edition W.H. Freeman and Company, New York.
2. Jawetz, Melnick and Adelberg's Medical Microbiology. 26th edition. McGraw Hill Microbiology. 4th edition. Elsevier Publication.
3. Willey JM, Sherwood LM, and Woolverton CJ. (2013) Prescott, Harley and Klein's Microbiology. 9th edition. McGraw Hill Higher Education.

MBP -V: IMMUNOLOGY AND MEDICAL MICROBIOLOGY

Skill & Employability

1. Identification of human blood groups.
2. Separate serum from the blood sample (demonstration).
3. Immunodiffusion by Ouchterlony method.
4. Identification of any of the bacteria (*E. coli*, *Pseudomonas*, *Staphylococcus*, *Bacillus*) using laboratory strains on the basis of cultural, morphological and biochemical characteristics: IMViC, urease production and catalase tests
5. Study of composition and use of important differential media for identification of bacteria: EMB Agar, McConkey agar, Mannitol salt agar
6. Antibacterial sensitivity by Kirby-Bauer method
6. Determination of Minimal Inhibitory Concentration (MIC) of an antibiotic
7. Study symptoms of the diseases with the help of photographs: Anthrax, Polio, Herpes, chicken pox, HPV warts, Dermatomycoses (ring worms)
8. Study of various stages of malarial parasite in RBCs using permanent mounts.
9. Phenol coefficient test
10. Isolation of Normal flora of human body (Hands, Feet, Nostrils, Teeth Surface) by swab method.
11. Evaluation of Hand Sanitizer Effectiveness by Filter Paper Disc Method & thumb impression method.

Recommended Text Books & Reference books:

- Ananthanarayan R. and Paniker C.K.J. (2009) Textbook of Microbiology. 8th edition, University Press Publication.
- Brooks G.F., Carroll K.C., Butel J.S., Morse S.A. and Mietzner, T.A. (2013) Jawetz, Melnick and Adelberg's Medical Microbiology. 26th edition. McGraw Hill Publication.
- Delves P, Martin S, Burton D, Roitt IM. (2006). Roitt's Essential Immunology. 11th edition Wiley-Blackwell Scientific Publication, Oxford.
- Goldsby RA, Kindt TJ, Osborne BA. (2007). Kuby's Immunology. 6th edition W.H. Freeman and Company, New York.
- Kuby's Immunology. 6th edition W.H. Freeman and Company, New York.
- Jawetz, Melnick and Adelberg's Medical Microbiology. 26th edition. McGraw Hill Microbiology. 4th edition. Elsevier Publication.
- Willey JM, Sherwood LM, and Woolverton CJ. (2013) Prescott, Harley and Klein's Microbiology. 9th edition. McGraw Hill Higher Education.

BSc	MICROBIOLOGY (Semester: IV)	Credits: 4
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MBT: V	Microbial Ecology And Industrial Microbiology	Hrs/Wk: 4
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Aim and objectives of Course

1. To study role of microorganisms in nutrient cycling, microorganism in waste treatment and degradation of xenobiotics
2. To determine the potability of drinking water
3. To study concepts of screening and strain improvement, media, Fermentation, assays with examples of industrially important processes

Learning outcomes of Course

Up on completion of the course students able to

1. Understand fundamental concept in soil microbial diversity, basic concept of biogeochemical cycles and plant growth promotion and plant diseases
2. Understands the role of microorganisms in treatment of solid and liquid waste.
3. Acquire knowledge on application of microorganisms in agro – environmental fields.
4. Get basic information design of fermenter, fermentation processes and Single cell proteins.
5. Self-reliance in the industrial application of Microbiology in life and industry.
6. Entrepreneurship can be established with the gained knowledge.

UNIT - I: Microbial Ecology

Skill

No. of hours: 12

Role of microorganisms in Biogeochemical cycles (Carbon, nitrogen, phosphorus)

Microbe-microbe interactions - Synergism, mutualism, commensalism, antagonism, competition, parasitism, predation

Plant- Microbe interactions - Plant growth promoting Microorganisms, Plant pathogens

UNIT - II : Microorganisms in Environment **Employability, Skill oriented**

Microbes in waste management- solid and liquid waste (aerobic and anaerobic)

Microbes in degradation of Xenobiotics

Microbes in drinking water- detection of potability by (a) standard qualitative procedure: presumptive test/MPN test, confirmed and completed tests for faecal coliforms (b) Membrane filter technique

Microbes in food - intrinsic and extrinsic parameters that affect microbial growth in food

UNIT - III: Industrial Microbiology

No. of hours: 12

Industrial important Microorganisms- Yeasts & Moulds , Bacteria , Actinomycetes .

Screening techniques.

Strain improvement techniques.

UNIT -IV: Fermentation processes **Skill, Employability & Entrepreneurship**

Design of fermenter (for control of pH, temperature, dissolved oxygen, foaming and aeration)

Types of fermentation processes - solid state, liquid state, batch, fed-batch, continuous.

Fermentation media (Carbon source, nitrogen source, minerals, vitamins & growth factors, Buffers, Precursors, Antifoam agents, water, oxygen)

Examples of Crude media; molasses, corn- steep liquor, sulphite waste liquor, whey.

Downstream processing - filtration, centrifugation, cell disruption, solvent extraction.

UNIT-V:Microbialproductions:Entrepreneurship

Microbial production of Industrial products: Citric acid, Ethanol, Penicillin, Glutamic acid, vitamin B12, Amylase, Yogurt

Microbial cells as food- SCP

- a. **Additional Input:** Determination of quality of different water samples by MPN method and Mushroom cultivation

MBP - V: MICROBIAL ECOLOGY AND INDUSTRIAL MICROBIOLOGY

Skill, Employability & Entrepreneurship

1. Microbial fermentation for the production and estimation of ethanol
2. Isolation of amylase producing microorganisms from soil
3. Isolation of food spoilage microorganisms from spoiled food sample.
4. MPN test
5. Demonstration of fermenter
6. Production of wine from grapes
7. Growth curve and kinetics of any two industrially important microorganisms.
8. Microbial fermentation for the production and estimation of citric acid
9. Preparation of yoghurt.
10. Crowded plate technique
11. Isolation of microorganism from soil
12. Isolation of microorganism from different water samples

Recommended Text Books & Reference books:

- Atlas RM and Bartha R. (2000). **Microbial Ecology: Fundamentals & Applications**. 4th edition. Benjamin/Cummings Science Publishing, USA
- Barton LL & Northup DE (2011). **Microbial Ecology**. 1st edition, Wiley Blackwell, USA
- Campbell RE. (1983). **Microbial Ecology**. Blackwell Scientific Publication, Oxford, England.
- Coyne MS. (2001). **Soil Microbiology: An Exploratory Approach**. Delmar Thomson Learning.
- Lynch JM & Hobbie JE. (1988). **Microorganisms in Action: Concepts & Application in Microbial Ecology**. Blackwell Scientific Publication, U.K.
- Madigan MT, Martinko JM and Parker J. (2014). **Brock Biology of Microorganisms**. 14th edition. Pearson/ Benjamin Cummings
- Maier RM, Pepper IL and Gerba CP. (2009). **Environmental Microbiology**. 2nd edition, Academic Press
- Martin A. (1977). **An Introduction to Soil Microbiology**. 2nd edition. John Wiley & Sons Inc. New York & London. Adams MR and Moss MO. (1995). **Food Microbiology**. 4th edition, New Age International (P) Limited Publishers, New Delhi, India.
- Banwart JM. (1987). **Basic Food Microbiology**. 1st edition. CBS Publishers and Distributors, Delhi, India.
- Casida LE. (1991). **Industrial Microbiology**. 1st edition. Wiley Eastern Limited.
- Crueger W and Crueger A. (2000). **Biotechnology: A textbook of Industrial Microbiology**. 2nd Edition. Panima Publishing Company, New Delhi
- Frazier WC and Westhoff DC. (1992). **Food Microbiology**. 3rd edition. Tata McGraw-Hill Publishing Company Ltd, New Delhi, India.

A.S.D Govt. Degree College for Women (A), Kakinada

III BSc Microbiology Syllabus (*w.e.f*:2020-2021A.B)

BSc	Semester: V (Skill Enhancement Course- Elective)	Credits: 2
MB T A1 A- PAIR	Food, Agriculture And Environmental Microbiology	Total hours 40

Aim and objectives of Course

To provide knowledge on important microbes in food, Agriculture and Environmental Microbiology

Learning outcomes of Course

Up on completion of the course students able to

CO1: Demonstrate with the wide diversity of microbes and their spoilage food, food intoxication and food born infections

CO2: Able to understand principles of food preservation, fermented foods and microbes as food.

CO3: The student will acquire knowledge on application of microorganisms in agro – environmental fields

CO4: Get fundamental concepts in principles of plant disease control an industrial application of Microbiology

CO5: The student will have fundamental concepts in soil microbiology and soil water and aero microbial diversity and microbial interactions Basic concepts in treatment of drinking water. Understands the role of microorganisms in treatment of solid and liquid waste.

UNIT – 1 Skill, Employability

Intrinsic and extrinsic parameters that affect microbial growth in food

Microbial spoilage of food - fruits, vegetables, milk, meat, egg, bread and canned foods

Food intoxication (botulism).

Food-borne diseases (salmonellosis) and their detection.

UNIT – II Skill, Employability & Entrepreneurship

Principles of food preservation - Physical and chemical methods.

Fermented Dairy foods – cheese and yogurt.

Microorganisms as food – SCP, edible mushrooms (white button, oyster and paddy straw). Probiotics and their benefits.

UNIT – III Skill, Employability & Entrepreneurship

No. of Hours: 8

Soil Microbiology: Microbial groups in soil, microbial transformations of carbon, nitrogen, phosphorus and sulphur.

Biological nitrogen fixation.

Microflora of Rhizosphere and Philosopher microflora, microbes in composting.

Importance of mycorrhizal inoculums, types of mycorrhizae associated plants, mass inoculums. Production of VAM, field applications of Ectomycorrhizae.

UNIT - IV

No. of Hours: 8

Beneficial microorganisms in Agriculture: Biofertilizer (Bacterial Cyanobacterial and Fungal), microbial insecticides, Microbial agents for control of Plant diseases.

Plant – Microbe interactions.

Diseases caused by bacteria and fungi to various commercial crops: groundnut rust & Citrus canker and food crops: **Rice Blast** (*Pyriculariaoryzae*) Bacterial blight of rice (*Oryza sativa* and *O. glaberrima*)

UNIT – V Skill, Employability

No. of Hours: 12

Terrestrial Environment: Soil profile and soil microflora. Aquatic Environment: Microflora of fresh water and marine habitats. Atmosphere: Aeromicroflora and dispersal of microbes. Extremophiles.

Concept of single cell proteins, probiotics and their applications. Biodegradation, **Biogas production, Biodegradable plastics.**

MBP – FOOD, AGRICULTURE AND ENVIRONMENTAL MICROBIOLOGY

Skill, Employability & Entrepreneurship

1. Isolation of bacteria and fungi spoiled bread / fruits / vegetables
2. Preparation of yogurt / dahi
3. Determination of microbiological quality of milk sample by MBRT
4. Enumeration of bacteria, fungi and actinomycetes from soil
5. Enumeration and identification of rhizosphere micro flora
6. Isolation of rhizobium from root nodules.
7. Isolation of azatobacter from soil.
8. Observation description of any three bacterial and fungal plant diseases
9. Staining and observation of VAM.
10. Analysis of soil - pH, Moisture content and water holding capacity.
11. Study of air flora by petriplate exposure method.
12. Analysis of potable water: SPC, Presumptive, confirmed and completed test, determination of coli form count in water by MPN.
13. Determination of Biological Oxygen Demand (BOD) of waste water samples.

A.S.D Govt. Degree College for Women (A), Kakinada

III B.Sc Microbiology Syllabus

BSc	Semester: V (Skill Enhancement Course- Elective)	Credits: 4
MB T A2 A- PAIR: A2	Management Of Human Microbial Diseases And Diagnosis	Total hours 36

Aim and objectives of Course

To realize the principles of prevention and treatment of microbial diseases and to understand the concepts and development of microbial diseases in animals

Learning outcomes of Course

Up on completion of the course students able to

CO1: Develop knowledge and skills on microbiological laboratory skills for identification of pathogens

CO2: Students will demonstrate the collection of clinical samples

CO3: Students will get knowledge on staining techniques

CO4: Students able to perform diagnostic techniques

CO5: To understand drug resistance

UNIT – I Skill oriented

Definition and concept of health, disease, infection, and pathogen.

Bacterial Diseases: Cholera, Pneumonia, and Dysentery.

Viral Diseases: Poliomyelitis & Chicken pox

Fungal diseases: Dermatomycosis and Athletes foot.

UNIT- II Skill, Employability

Collection of clinical samples (oral cavity, throat, skin, blood, CSF, urine and faeces) and precautions required.

Method of transport of clinical samples to laboratory and storage.

UNIT- III: Skill, Employability

Mechanism of bacterial pathogenicity, colonization and growth, virulence, virulence factors, exotoxins, enterotoxins, endotoxins and neurotoxins.

Examination of sample by staining - Gram stain, Ziehl-Neelson staining for tuberculosis,

Giemsa-stained thin blood film for malaria.

Preparation and use of culture media - Blood agar, Chocolate agar, Lowenstein-Jensen medium, Mac Conkey agar. Distinct colony properties of various bacterial pathogens.

UNIT- IV

No. of hours: 6

Serological Methods - Agglutination, ELISA, immunofluorescence, Nucleic acid based methods - PCR, Nucleic acid probes.

Diagnosis of Typhoid, Dengue and HIV, Swine flu.

UNIT- V

No. of hours: 6

Importance, Determination of resistance/sensitivity of bacteria using disc diffusion method,

Determination of minimal inhibitory concentration (MIC) of an antibiotic by serial double dilution method. Problems of drug resistance and drug sensitivity.

Drug resistance in bacteria.

MB P A2: MANAGEMENT OF HUMAN MICROBIAL DISEASES AND DIAGNOSIS

Skill, Employability & Entrepreneurship

1. Collection transport and processing of clinical specimens (Blood, Urine, Stool and Sputum).

Receipts, Labelling, recording and dispatching clinical specimens.

2. Physical, Chemical & microscopic examination of clinical samples – urine, stool, puss, sputum.

3. Isolation and identification of following pathogens from clinical samples: *E.coli*, *Salmonella* and *Pseudomonas*.

4. Demonstration of permanent slides of the following parasites:

a) *Entamoeba histolytica*

b) *Ascaris* spp.

c) *Plasmodium* spp.

d) *Mycobacterium tuberculosis* & *Mycobacterium leprae*

5. Estimation of haemoglobin (Acid haematin and cyan methanoglobin method).

6. ESR and PCV determination.

7. Immuno hematology: Blood group typing by slide test & tube for ABO & Rh systems.

8. Isolation of bacteria in pure culture and Antibiotic sensitivity.

SUGGESTED READING

- Ananthanarayan R and Paniker CKJ (2009) Textbook of Microbiology, 8th edition, Universities Press Private Ltd.
- Brooks G.F., Carroll K.C., Butel J.S., Morse S.A. and Mietzner, T.A. (2013) Jawetz, Melnick and Adelberg's Medical Microbiology. 26th edition. McGraw Hill Publication.
- Collee JG, Fraser, AG, Marmion, BP, Simmons A (2007) Mackie and McCartney Practical Medical Microbiology, 14th edition, Elsevier.
- Randhawa, VS, Mehta G and Sharma KB (2009) Practicals and Viva in Medical Microbiology 2nd edition, Elsevier India Pvt Ltd.
- Tille P (2013) Bailey's and Scott's Diagnostic Microbiology, 13th edition, Mosby.

A.S.D Govt. Degree College for Women (A), Kakinada

BSc Microbiology Syllabus

BSc	Semester: V (Skill Enhancement Course- Elective)	Credits: 3
MB T B1 B- PAIR: B1	Microbial Biotechnology and r – DNA Technology	Total hours 36

Aim and objectives of Course

To study applications of microbial biotechnology and r DNA technology.

Learning outcomes of Course

Up on completion of the course students able to

CO1: Students should be able to demonstrate with the wide diversity of microbes and their potential use in medicine, agriculture and industry biotechnology regulation and ethics.

CO2: Students will get knowledge on restriction endonuclease in r DNA technology and selection of transformed cells

CO3: Students will get knowledge on cloning vehicles in r DNA technology

CO4: Student will able to understand gene sequencing methods

CO5: Students will get knowledge on of genetically modified crops. And role of microorganisms in creation of transgenic animals and plants.

UNIT – I Skill, Employability & Entrepreneurship

Introduction to microbial biotechnology, Bacterial genes, genomes and genetics.

Recombinant microbial biotechnology products, biotechnology regulation and ethics.

Biomass and bio fuels Microbial biomass (algal blooms, in fresh and sea water), fungal mushrooms, fermentation waters by yeasts, and bacterial biomass.

UNIT- II Skill, Employability

Restriction and Modification: Classification of restriction endonucleases. Enzymes used in molecular cloning; Polymerases, ligases, phosphatases, kinases and nucleases; Advanced Molecular biology techniques: Electrophoresis and Blotting techniques.

Cutting and joining DNA: (cohesive end ligation, methods of blunt end ligation).

Transfection and transformation. Selection of transformed cells. Screening methods (Genetic marker and blue white screening).

UNIT- III Skill, Employability & Entrepreneurship

Cloning vehicles - Plasmid, Bacteriophage, Construction of genomic and cDNA libraries.

Advantages of cDNA libraries. Expression of cloned genes in bacteria, yeast, plant and animal cells.

Basic principles and application of biosensors. Nucleic acid probe technology.

UNIT- IV Skill, Employability & Entrepreneurship

Methods of gene sequencing – Maxam - Gilberts and Sanger's dideoxy chain termination methods; Polymerase chain reaction technique (Components in PCR and PCR conditions).

Methods of gene transfer in fungi, yeast and higher plants using microinjection, microprojectile bombardment (gene gun method, Electroporation and *Agrobacterium* mediated transformation.

UNIT- V Skill, Employability & Entrepreneurship

Concept of genetically modified microorganisms. **Btcotton** : production, advantages and limitations.

Probable advantages and disadvantages of genetically modified crops.

Role of microorganisms in creation of transgenic animals and plants.

MBT- BI :MICROBIAL BIOTECHNOLOGY AND r – DNA TECHNOLOGY

TOTALHOURS: 36

CREDITS: 2

1. Culturing of mushrooms
2. Isolation of yeast from grapes.
3. Production of wine
4. Production of ethyl alcohol
5. Isolation of Plasmid DNA from E.coli
6. Tissue culture: callus cultivation
7. Fermentative production of ethyl alcohol
8. Transformation in Bacteria using plasmid.
9. Restriction digestion of DNA and its electrophoretic separation.
10. Ligation of DNA molecules and their testing using electrophoresis.
11. Activity of DNAase and RNAase on DNA and RNA.
12. Isolation of Plasmid DNA.
13. Demonstration of PCR.

A.S.D Govt. Degree College for Women (A), Kakinada

BSc Microbiology Syllabus

BSc	Semester: V (Skill Enhancement Course- Elective)	Credits: 3
MB T B2 B- PAIR: B2	BIOSTATISTICS AND BIOINFORMATICS Skill, Employability	Total hours 36

Aim and objectives of Course

To understand Biostatistics and Bioinformatics

Learning outcomes of Course

Up on completion of the course students able to

CO1: Understand biological data bases

CO2: Summarize Searching sequence data bases

CO3: students able to use appropriate tests for bio variable analysis

CO4: Able to understand analytical tests and Construction of phylogenetic trees by clustering methods

CO5: Able to understand protein modelling methods

UNIT – I

No. of hours: 7

Definition, nature and scope of bioinformatics. **Bioinformatics versus computational biology.**

Branches of bioinformatics. Basic concepts in bioinformatics. Introduction to Biological data bases: **NCBI, EMBL, EXPASY, PIR, Pfam. Concept of World Wide Web: HTML, HTTP.**

UNIT – II

No. of hours: 7

Searching sequence data bases using BLAST. Multiple sequence alignment– progressive alignment–profiles–multi dimensional dynamic programming. Biostatistics: Measures of Central tendency and distribution–mean, median, mode, range, standard deviation, variance.

UNIT – III

No. of hours: 7

Basic principles of probability theory, Bayes theorem, Normal distribution, statistical inference –Types of errors and levels of significance. Comparison of variance (F-test), small sample test, t-test for comparison of means, chi square test. Analysis of variance–one way and two way, multiple comprises.

UNIT – IV

No. of hours: 7

Correlation and Linear regression. Sequence Analysis: Introduction to hidden Markov models. **Genomics and proteomics: Molecular phylogenetics:** Construction of Phylogenetic trees using parsimony method and branch & bound method. Clustering methods– UPGMA & neighbour-joining. Fragment assembly, peptide sequencing using mass and spectroscopy data. Comparative genomics.

UNIT – V

No. of hours: 8

Modelling: Protein secondary structure prediction–Chou Fasmanrules– Neural networks–discriminate analysis. Prediction of transmembrane segments in Membrane proteins. Protein3D structure prediction– homology– threading – Potential energy functions–energy minimization–molecular dynamics–simulated annealing.

MBP B2 - BIOSTATISTICS AND BIOINFORMATICS

TOTALHOURS: 36

CREDITS: 2

1. Isolation of plasmid DNA from *E.coli* cells
2. Quantitative and qualitative analysis of proteins / DNA by using spectrophotometer.
3. Demonstration of Southern hybridization
4. Demonstration of amplification DNA by PCR.
5. Use of software for sequence analysis of nucleotides and proteins.
6. Problem related to t – test and χ^2 test.
7. Use of Internet/software for sequence analysis of nucleotides and proteins:
8. Studies of public domain data bases for nucleic acid and protein sequences.
9. Determination of protein structure (PDB).
10. Genome sequence analysis
11. Problems related to measures of central tendency, dispersion, t-test and chi Square test.

SUGGESTED READINGS:

1. Daniel, 2006, Biostatistics, Eighth Edition. John Wiley and sons.
2. Durbin, Eddy, Krogh, Mithison, Biological sequence analysis.
3. T.A.AttwoodandD.J.parry–smith, 2001, Introduction of Bioinformatics.
4. A.D.Baxevaris,1998, Bioinformatics:Apracticalguidetotheanalysisof Genes and proteins,(Edited) B.F.Publication.
5. David W, 2005, Bio-informatics;sequenceandGenomeAnalysis,2ndEdition By Mount CB Spublishers.

A.S.D Govt. Degree College for Women (A), Kakinada

BSc Microbiology Syllabus

BSc	Semester: V (Skill Enhancement Course- Elective)	Credits: 3
MB T C1 C- PAIR: C1	Microbial Quality Control, Instrumentation And Techniques Skill, Employability & Entrepreneurship	Total hours 36

Aim and objectives of Course

To study quality control in food and pharmaceutical industries and analytical techniques

Learning outcomes of Course

Up on completion of the course students able to

CO1: Develop skills on disinfection of instruments and equipment's in laboratory and Hospitals and documentation

CO2:To understand the working principle of basic laboratory equipments

CO3:To understand the techniques like MPN and direct microscopic methods

CO4:To understand and demonstrate Principles of Microscopy, handling and uses of microscopes

CO5:To understand and demonstrate the various analytical and separation techniques

UNIT – I

No. of hours: 7

Microbial quality control definition, history and introduction. Standard Methods involved in assessment of microbial quality control. Q.A and Q.C definitions and importance. Traditional Microbiological Quality Controlling methods: Sampling methods, TVC, APC and serial dilution techniques. Microbiological criteria. Laboratory facility design for quality control: Sterilization, disinfection and decontamination. Personnel training: Hygiene and handling techniques. Documentation. **Good laboratory practices.**

UNIT – II

No. of hours: 8

Culture media used in QC and QA: Design of specialized media for identification of pathogens. Good laboratory practices in culture media preparation: raw material, water, pH. Uses of media.

Selective and indicator media used in pharmaceutical and food industries. Instruments associated in QC and QA: Principle involved, working conditions, uses and precautions of Laminar Air Flow (LAF), Autoclave, Incubator, pH meter, Colony counter, Hot air oven, Centrifuges and storage devices.

UNIT – III

No. of hours: 7

Techniques for enumeration of microorganisms: sample preparation from Aqueous, soluble, insoluble, medical and pasteurized materials. Counting methods: pour plate, spread plate, membrane filtration. **Most Probable Number (MPN) and MIC.** Turbidometric methods. **Staining techniques for identification bacteria and Fungi.**

UNIT – IV

No .of hours:7

Microscopy – Principles of light, phase, fluorescent & electron microscopes; Microscopic techniques: Basic principles and applications of phase – contrast microscopy, fluorescent microscopy and electron microscopy, types of electron microscopy– scanning and transmission. Radio isotopes: radiometric analysis, stable and radioactive isotopes, preparation, labelling, detection and measurement of isotope.

UNIT - V

No. of hours: 7

Principles of Centrifugation – Centrifugation techniques – preparative and analytical methods, density gradient centrifugation. General principles and applications of **chromatography** – Paper, Column, Thin layer, Gas, Ion exchange, Affinity chromatography, HPLC, FPLC, GCMS and Gel filtration. Electrophoresis- moving boundary, zone (Paper Gel) electrophoresis. Immuno electrophoresis. Immunoblotting. Isoelectric focusing, 2-Delectrophoresis, Principles of colorimetry

MBP-C1: MICROBIAL INSTRUMENTATION AND BIOTECHNIQUES

Skill, Employability & Entrepreneurship

1. Isolation and enumeration of bacteria from food / pharmaceutical source.
2. Quality Assurance of water by MPN method.
3. Preparation of any two selective and indicator media commonly used Q.A & Q.C
4. Microbial quality of in and around laboratory conditions.
5. Isolation and Identification of fungi by using selective media and staining procedures.
6. Identification of MIC of any one antibiotic.
7. Colorimetric and spectroscopic estimation of nucleic acids.
8. Microscopic observations of examination of bacteria, fungi and actinomycetes.
9. Separation of cell components by centrifugation technique.
10. Demonstration of immune electrophoresis.
11. Demonstration of HPLC.

Suggested readings:

1. Hand book of Microbial Quality control by Rosamund. M, Baird Norman. A, Hodges and Stephen. P, Denyer. CRC press.
2. The Microbiological Quality of Food, 1st Edition, Editors: Antonio Bevilacqua Maria Rosaria Corbo Milena SinigagliaeBook ISBN: 9780081005033 Imprint:Wood head Publishing.
3. Guide to Microbiological Control in Pharmaceuticals and Medical Devices, Second Edition, Stephen P. Denyer, Rosamund M. Baird, CRC Press.
4. WILSON & WALKER, Practical Biochemistry: Principles and techniques, Academic publishers.
5. UPADHYAY, UPADHYAY &NATH, Biophysical Chemistry: Principles and techniques, Himalaya Publishers.

A.S.D Govt. Degree College for Women (A), Kakinada

BSc Microbiology Syllabus

BSc	SEMESTER: V (SKILL ENHANCEMENT COURSE-ELECTIVE)	Credits: 3
MB T C2 C- PAIR	Drug Design, Discovery And Intellectual Property Rights (Ipr) Skill, Employability	Total hours 36

Aim and objectives of Course

To study drug design, discovery and IPR

Learning outcomes of Course

Up on completion of the course students able to

CO1:Students should be able to understand approaches for drug design, sources of drugs and molecular mechanism of drugs

CO2:Students should be able to understand drug development process

CO3:Get knowledge on vaccines, gene therapy and gene based vaccines

CO4:Students will get knowledge on outlines of intellectual property rights, ISI and Bio standards

CO5:Students will understand concepts Bio safety and ethics

Unit – I

No. of Hours: 7

Introduction- History of drug design, Current approaches and philosophies in drug design, Molecular mechanisms of diseases and drug action with examples. Pharmaceutical products of microbial origin (antibiotics) animal origin (sex hormones), plant origin (Alkaloids & Morphine). Sources of Drugs- Microbial drugs, Plants as a source of drugs, *E. coli* as a source of recombinant therapeutic proteins.

Unit – II

No. of Hours: 7

Expression of recombinant proteins in yeasts, animal cell culture systems. Rational drug design and Combinatorial approaches to drug discovery. Drug development process- Impact of genomics and related technologies upon drug discovery: Gene chips, Proteomics, Structural genomics and Pharmacogenetics. Drug manufacturing process- Guides to good manufacturing practice.

Unit – III

No. of Hours: 7

Vaccines and adjuvant- Traditional vaccine preparations, Attenuated and inactivated viral and bacterial vaccines, Toxoids. Peptide vaccines. Adjuvant technology. Nucleic acid as drugs- Gene therapy: Basic approach to gene therapy, Vectors used in gene therapy - Manufacture of viral vectors, Non-viral vectors. Gene therapy and genetic disease, cancer, Gene therapy and AIDS. Gene based vaccines.

Unit – IV**No. of Hours: 8**

Introduction: general introduction to IPR (parent, plant breeder's right). Trademarks, industrial design, trade secrets (or) undisclosed information integrated circuit designs.

Patenting principle, international – standards and patent validity (neem and relaxins), recent developments in patent system and patentability of biotechnology, invention IPR issues of the Indian context. Copy right and rights related to copy right, International standards as per WHO, ISI, bio safety and validation.

Unit – V**No. of Hours: 7**

Biotechnology and hunger: challenges for the Indian biotechnological research and industries. **Bio safety:** the Cartagena protocol on bio safety.

Bio safety management: key to the environmentally responsible use of biotechnology, ethical implications of biotechnology product techniques, social and ethical implications of biological weapons

MBP – C2: DRUG DESIGN, DISCOVERY AND INTELLECTUAL PROPERTY RIGHTS (IPR)

TOTAL HOURS: 40

CREDITS: 3

1. Isolation of antibiotic producing bacteria from soil samples
2. Isolation of drug resistant plasmid from bacteria (E.coli).
3. Isolation of Actinomycetes from soil.
4. Identification of antibacterial activity of actinomycetes.
5. Identification of antibacterial activity of fungi
6. Identification of antagonistic activity of any two fungal species.
7. Assay of any one antibiotic (Penicillin).
8. Determination of MIC of any one antibiotic (penicillin / streptomycin).
9. Study of components and design of a BSL – III laboratory
10. Filing applications for approval from bio safety committee
11. Filing primary applications for patents
12. Study of steps of patenting process
13. A case study of patent.
14. Study of bio safety measures in pharmaceutical industry.
15. Study on QA & QC parameters followed in R&D laboratory.

SUGGESTED READINGS:

1. W.B. Hugo & A.D. Russell, Pharmaceutical Microbiology edited, 6th Edition, Black Well science.
2. Shanson D.C., Microbiology in clinical practice, 2nd edition, London; Wright.
3. T. Sammes Ellis Horwood, opicin Antibiotic chemistry Vol I to V.
4. Wulf Crueger, Biotechnology – A text book of Industrial Microbiology, 2nd Edition, Panima publishers
5. A.H. Patel, 1984, Industrial Microbiology, Macmilan India Limited.
6. Coulson C.J., London; Taylor and Francis, Molecular mechanisms of drug action.
7. Denyes S.P. & Baird R.M. Chichester, Ellis Horwood, Guide to microbiological Control in Pharmaceuticals.
8. Murray S. Cooper, Quality control in the Pharmaceutical Industry - Edt., Vol-II, Academic press, New York.
9. Sydney H. Willin, Murray M. Tuckerman, William S. Hitchings IV, Good Manufacturing practices of pharmaceuticals, second Edt., Merceel Dekker NC Nework.
10. Rajesh Bhatia, Rattan Lal Ihhpunjani, Quality assurance in Microbiology, CBS Publisher & Distributors, New Delhi.

**A.S.D. GOVERNMENT DEGREE COLLEGE FOR WOMEN
(AUTONOMOUS) KAKINADA**

(Under the jurisdiction of Adikavi Nannaya University)

Reaccredited by NAAC with B Grade (3rd Cycle)

**1.1.3 Details of courses offered by the institution that focus on employability/
entrepreneurship/ skill development during the year.**



DEPARTMENT OF PHYSICS

A.S.D Govt. Degree College for Women (A), Kakinada

Course-Wise Syllabus

BSc	MICROBIOLOGY (Semester: 3)	Credits: 4
MBT: 3	HEAT AND THERMODYNAMICS	Hrs/Wk: 4

Work load:60hrs per semester

4 hrs/week

Aim and objectives of Course

Understand the basic aspects of kinetic theory of gases, Maxwell-Boltzman distribution law, equipartition of energies, mean free path of molecular collisions and the transport phenomenon in ideal gases

Gain knowledge on the basic concepts of thermodynamics, the first and the second law of thermodynamics, the basic principles of refrigeration, the concept of entropy, the thermodynamic potentials and their physical interpretations.

Learning outcomes of Course

Develop critical understanding of concept of Thermodynamic Potentials, The formulation of Maxwell's equations and its applications.

Differentiate between principles and methods to produce low temperature and liquefy air and also understand the practical applications of substances at low temperatures.

Examine the nature of black body radiations and the basic theories.

UNIT-I: Kinetic Theory of gases:(12 hrs) Skill & Employability

Kinetic Theory of gases-Introduction, Maxwell's law of distribution of molecular velocities (qualitative treatment only) and its experimental verification, Mean free path, Degrees of freedom, Principle of equipartition of energy (Qualitative ideas only), Transport phenomenon in ideal gases: viscosity, Thermal conductivity and diffusion of gases.

UNIT-II: Thermodynamics: (12hrs) Skill oriented

Introduction- Isothermal and Adiabatic processes, Reversible and irreversible processes, Carnot's engine and its efficiency, Carnot's theorem, Thermodynamic scale of temperature and its identity with perfect gas scale, Second law of thermodynamics: Kelvin's and Clausius statements, Principle of refrigeration, Entropy, Physical significance, Change in entropy in reversible and irreversible processes; Entropy and disorder-Entropy of Universe; Temperature-Entropy (T-S) diagram and its uses ; change of entropy when ice changes into steam.

UNIT-III: Thermodynamic Potentials and Maxwell's equations:(12hrs) Skill oriented

Thermodynamic potentials-Internal Energy, Enthalpy, Helmholtz Free Energy, Gibb's Free Energy and their significance, Derivation of Maxwell's thermodynamic relations from thermodynamic potentials, Applications to (i) Clausius-Clayperon's equation (ii) Value of $C_P - C_V$ (iii) Value of C_P/C_V (iv) Joule-Kelvin coefficient for ideal gases.

UNIT-IV: Low temperature Physics:(12hrs)**Employability & Entrepreneurship**

Methods for producing very low temperatures, Joule Kelvin effect, Porous plug experiment, Joule expansion, Distinction between adiabatic and Joule Thomson expansion, Expression for Joule Thomson cooling, Liquefaction of air by Linde's method, Production of low temperatures by adiabatic demagnetization (qualitative), Practical applications of substances at low temperatures.

UNIT-V: Quantum theory of radiation:(12 hrs)**Skill & Employability**

Black body and its spectral energy distribution of black body radiation, Kirchoff's law, Wein's displacement law, Stefan-Boltzmann's law and Rayleigh-Jean's law (Derivations), Planck's law of black body radiation-Derivation, Deduction of Wein's law and Rayleigh- Jean's law from Planck's law, Solar constant and its determination using Angstrom Pyroheliometer, Estimation of surface temperature of Sun.

MBP- 3: HEAT & THERMODYNAMICS**Skill oriented**

1. Specific heat of a liquid –Joule's calorimeter –Barton's radiation correction
2. Thermal conductivity of bad conductor-Lee's method
3. Thermal conductivity of rubber.
4. Measurement of Stefan's constant.
5. Specific heat of a liquid by applying Newton's law of cooling correction.
6. Heating efficiency of electrical kettle with varying voltages.
7. Thermo emf- thermo couple - Potentiometer
8. Thermal behavior of an electric bulb (filament/torch light bulb)
9. Measurement of Stefan's constant- emissive method
10. Study of variation of resistance with temperature - Thermistor.

REFERENCE BOOKS:

- ❖ BSc Physics, Vol.2, Telugu Akademy, Hyderabad
- ❖ Thermodynamics, R.C.Srivastava, S.K.Saha& AbhayK.Jain, Eastern Economy Edition.
- ❖ Unified Physics Vol.2, Optics & Thermodynamics, Jai PrakashNath &Co.Ltd., Meerut
- ❖ Fundamentals of Physics. Halliday/Resnick/Walker.C. Wiley India Edition 2007
- ❖ Heat and Thermodynamics -N BrijLal, P Subrahmanyam, S.Chand & Co.,2012
- ❖ Heat and Thermodynamics- MS Yadav, Anmol Publications Pvt. Ltd, 2000
- ❖ University Physics, HD Young, MW Zemansky, FW Sears, Narosa Publishers, New Delhi

BSc	PHYSICS (Semester: IV)	Credits: 4
MBT: IV	ELECTRICITY, MAGNETISM AND ELECTRONICS	Hrs/Wk: 4

Aim and objectives of Course

Develop an understanding on the unification of electric and magnetic fields and Maxwell's equations governing electromagnetic waves.

Phenomenon of resonance in LCR AC-circuits, sharpness of resonance, Q- factor, Power factor

and the comparative study of series and parallel resonant circuits.

Understand the operation of basic logic gates and universal gates and their truth tables

Learning outcomes of Course

Understand the Gauss law and its application to obtain electric field in different cases and formulate the relationship between electric displacement vector, electric Polarization, Susceptibility, Permittivity and Dielectric constant.

Understanding the operation of p-n junction diodes, zener diodes, light emitting diodes and transistors

UNIT-I

1. Electrostatics: (6hrs) skill oriented

Gauss's law-Statement and its proof, Electric field intensity due to (i) uniformly charged solid sphere and (ii) an infinite conducting sheet of charge, Deduction of Coulomb's law from Gauss law, Electrical potential-Equipotential surfaces, Potential due to a (i) uniformly charged sphere

2. Dielectrics: (6 hrs) skill oriented

Dielectrics-Polar and Non-polar dielectrics- Effect of electric field on dielectrics, Dielectric strength, Capacitance of a parallel plate condenser with dielectric slab between the plates, Electric displacement D, electric polarization P, Relation between D, E and P, Dielectric constant and electric susceptibility.

2. UNIT-II (6 hrs) skill oriented

3. Magnetostatics:

Biot Savart's law and its applications: (i) circular loop and (ii) solenoid, Ampere's Circuital Law and its application to Solenoid, Hall effect, determination of Hall coefficient and applications.

4. Electromagnetic Induction: (6 hrs) skill oriented

Faraday's laws of electromagnetic induction, Lenz's law, Self induction and Mutual induction, Self inductance of a long solenoid, Mutual inductance of two coils, Energy stored in magnetic field, Eddy currents.

UNIT-III

3. Alternating currents: (6 hrs) skill oriented

Alternating current - Relation between current and voltage in LR and CR circuits, Phasor and Vector diagrams, LCR series and parallel resonant circuit, Q-factor, Power in ac circuits, Power factor.

4. Electromagnetic waves-Maxwell's equations: (6 hrs) skill oriented

Idea of displacement current, Maxwell's equations-Derivation, Maxwell's wave equation (with derivation), Transverse nature of electromagnetic waves, Poynting theorem (Statement and proof), velocity wave equation using Maxwell's relations in vacuum.

UNIT-IV

5. Basic Electronic devices: (12 hrs) Skill & Employability

PN junction diode, Zener diode and Light Emitting Diode (LED) and their I-V characteristics, Zener diode as a regulator- Transistors and its operation, CB, CE and CC configurations. Input and output characteristics, transistor in CE mode, Relation between α β γ Transistor as an amplifier.

UNIT-V:

6. Digital Electronics: (12 hrs) Skill & Employability

Number systems, Conversion of binary to decimal system and vice versa, Binary addition & Binary subtraction (1's and 2's complement methods), Laws of Boolean algebra, DeMorgan's laws-Statements and Proofs, Basic logic gates, NAND and NOR as universal gates, Exclusive-OR gate, Half adder and Full adder circuits.

MBP – IV: ELECTRICITY, MAGNETISM AND ELECTRONICS Skill & Employability

1. Figure of merit of a moving coil galvanometer.
2. LCR circuit series/parallel resonance, Q factor.
3. Determination of ac-frequency –Sonometer.
4. Verification of Kirchoff's laws and Maximum Power Transfer theorem.
5. Field along the axis of a circular coil carrying current-Stewart & Gee's apparatus.
6. PN Junction Diode Characteristics
7. Zener Diode –V-I Characteristics
8. Zener Diode as a voltage regulator
9. Transistor CE Characteristics- Determination of hybrid parameters
10. Logic Gates- OR,AND,NOT and NAND gates. Verification of Truth Tables.
11. Verification of De Morgan's Theorems.
12. Construction of Half adder and Full adders-Verification of truth tables

RECOMMENDED TEXT BOOKS & REFERENCE BOOKS

- ❖ BSc Physics, Vol.3, Telugu Akademy, Hyderabad.
- ❖ Electricity and Magnetism, D.N. Vasudeva. S. Chand & Co.
- ❖ Electricity and Magnetism, B.D.Duggal and C.L.Chhabra. Shobanlal & Co.

- ❖ Electricity, Magnetism with Electronics, K.K.Tewari, R.Chand& Co.,
- ❖ Electricity and Magnetism, R.Murugesan, S. Chand & Co.
- ❖ Principles of Electronics, V.K. Mehta, S.Chand& Co.,
- ❖ Digital Principles and Applications, A.P. Malvino and D.P.Leach, Mc GrawHill Edition.

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BSc	PHYSICS (Semester: IV)	Credits: 4
MBT: V	MODERN PHYSICS	Hrs/Wk: 4

Aim and objectives of Course

Develop an understanding on the concepts of Atomic and Modern Physics, basic elementary quantum mechanics and nuclear physics.

Develop critical understanding of concept of Matter waves and Uncertainty principle.

Get familiarized with the principles of quantum mechanics and the formulation of Schrodinger wave equation and its applications.

Learning outcomes of Course

Examine the basic properties of nuclei, characteristics of Nuclear forces, salient features of Nuclear models and different nuclear radiation detectors.

Classify Elementary particles based on their mass, charge, spin, half life and interaction.

Get familiarized with the nano materials, their unique properties and applications.

Increase the awareness and appreciation of superconductors and their practical applications

UNIT-I :

1. Atomic and Molecular Physics:(12 hrs) skill oriented

Vector atom model and Stern-Gerlach experiment, Quantum numbers associated with it, Angular momentum of the atom, Coupling schemes, Spectral terms and spectral notations, Selection rules, Intensity rules, Fine structure of Sodium D-lines, Zeeman effect, Experimental arrangement to study Zeeman effect; Raman effect, Characteristics of

Raman effect,

Experimental arrangement to study Raman effect, Quantum theory of Raman effect, Applications of Raman effect.

UNIT-II:

2. Matter waves&Uncertainty Principle:(12 hrs) skill oriented

Matter waves, de Broglie's hypothesis, Wave length of matter waves, Properties of matter waves, Davisson and Germer's experiment, Phase and group velocities, Heisenberg's uncertainty principle for position and momentum& energy and time, Illustration of uncertainty principle using diffraction of beam of electrons (Diffraction by a single slit)and photons(Gamma ray microscope),Bohr's principle of complementarity.

UNIT-III:

3. Quantum (Wave) Mechanics:(12 hrs) skill oriented

Basic postulates of quantum mechanics, Schrodinger time independent and time dependent wave equations-Derivations, Physical interpretation of wave function, Eigen functions, Eigen values, Application of Schrodinger wave equation to (i) one dimensional potential box of infinite height (Infinite Potential Well).

UNIT-IV:

4.Nuclear Physics: (12 hrs) Skill oriented, Entrepreneurship & Employability

Nuclear Structure:General Properties of Nuclei, Mass defect, Binding energy; *Nuclear forces*: Characteristics of nuclear forces- Yukawa's meson theory; *Nuclear Models*: Liquid drop model, The Shell model, Magic numbers; *Nuclear Radiation detectors*: G.M. Counter, Cloud chamber, Solid State detector; *Elementary Particles*: Elementary Particles and their classification.

UNIT-V:

4. Nano materials:(7hrs) Skill oriented & Employability

Nanomaterials – Introduction, Electron confinement, Size effect, Surface to volume ratio, Classification of nano materials– (0D, 1D, 2D); Quantum dots, Nano wires, Fullerene, CNT, Graphene(Mention of structures and properties),Distinct properties of nano materials (Mention-mechanical, optical, electrical, and magnetic properties); Mention of applications of nano materials: (Fuel cells, Phosphors for HD TV),

UNIT-5

Superconductivity: (5 hrs) Skill oriented, Entrepreneurship & Employability

Introduction to Superconductivity, Experimental results-critical temperature, critical magnetic field, Meissner effect, Isotope effect, Type I and Type II superconductors, BCS theory (elementary ideas only), Applications of superconductors

MBT:V MODERN PHYSICS Skill oriented, Entrepreneurship & Employability

1. e/m of an electron by Thomson method.
2. Determination of Planck's Constant (photocell).
3. Verification of inverse square law of light using photovoltaic cell.
4. Determination of the Planck's constant using LEDs of at least 4 different colours.
5. Determination of work function of material of filament of directly heated vacuum diode.
6. Study of absorption of α -rays.
7. Study of absorption of β -rays.
8. Determination of Range of β -particles.
9. Determination of M & H .
10. Analysis of powder X-ray diffraction pattern to determine properties of crystals.
11. Energy gap of a semiconductor using junction diode.
12. Energy gap of a semiconductor using thermistor
13. GM counter characteristics

REFERENCE BOOKS

- ❖ BSc Physics, Vol.4, Telugu Academy, Hyderabad
- ❖ Atomic Physics by J.B. Rajam; S.Chand & Co.,
- ❖ Modern Physics by R. Murugesan and Kiruthiga Siva Prasath. S. Chand & Co.
- ❖ Concepts of Modern Physics by Arthur Beiser. Tata McGraw-Hill Edition.
- ❖ Nuclear Physics, D.C.Tayal, Himalaya Publishing House.
- ❖ S.K. Kulkarni, Nanotechnology: Principles & Practices (Capital Publ.Co.)
- ❖ K.K.Chattopadhyay & A.N.Banerjee, Introd.to Nanoscience and Technology (PHI Learning Priv.Limited).
- ❖ Nano materials, A K Bandopadhyay. New Age International Pvt Ltd (2007)
- ❖ Textbook of Nanoscience and Nanotechnology, BS Murthy, P Shankar, BaldevRaj, BB Rath and J Murday-Universities Press-IIM

A.S.D Govt. Degree College for Women (A), Kakinada

III BSc PHYSICS Syllabus (w.e.f:2020-2021A.B)

BSc	Semester: V (Skill Enhancement Course- Elective)	Credits: 2
MB T A1PAIR COURSE-6A	Optical Instruments and Optometry	Total hours 40

Aim and objectives of Course

Understand the construction and working principles of various optical instruments used in daily life.

Acquire a critical knowledge on the various defects of eye and their correcting methods with suitable lenses

Learning outcomes of Course

Up on completion of the course students able to

Demonstrate skills of using biological microscope through hands on experience.

Understand the various techniques used in optometry and computer based eye testing.

Comprehend the various applications of microscopes and telescopes

Perform some techniques related to testing the blood and other biological samples.

Understand the technique of operation of Computer eye testing and evaluation

UNIT-I OPTICAL MICROSCOPES (10hrs)

Skill oriented, Entrepreneurship & Employability

Introduction to Microscopes, Need of a Microscope, Different types of microscopes and their uses, Simple microscope-Construction, Magnifying power, normal adjustment; Compound microscope-Construction, Magnifying power, normal adjustment, Phase contrast microscope-Operating principle, Travelling microscope-Construction, working and uses

UNIT-II TELESCOPES (10hrs)

Skill oriented, Entrepreneurship & Employability

Introduction to Telescopes, Different types of Telescopes and their uses, Refracting Telescopes and Reflecting telescopes, Construction, working and magnifying power of Astronomical Telescope and Terrestrial Telescopes, Binoculars – working principle and applications.

UNIT-III APPLICATIONS OF OPTICAL INSTRUMENTS (10hrs)

Skill oriented, Entrepreneurship & Employability

Introductory ideas and applications of various microscopes viz., (i) Optical microscopes (Compound microscope, Stereo microscope, Confocal microscope) (ii) Electron microscopes (TEM, SEM), (iii) Scanning Probe microscope (iv) Scanning Acoustic microscope and (v) X-ray microscope.

Introductory ideas and applications of various telescopes viz., (i) Optical telescopes (ii) Radio telescopes (iii) Solar telescopes (iv) Infrared telescope (v) Ultraviolet telescope (vi) X-ray telescope and (vii) Gamma ray telescope

UNIT-IV OPTICAL VISION (10hrs) Skill oriented, Entrepreneurship & Employability

Introduction to optical Vision, Eye as an optical instrument, Formation of image in the eye and the camera, Ophthalmic lenses, Power of the lenses, Far point and near points, Myopia and Hypermetropia defects, Removal of defects in vision using ophthalmic lenses, Contact lenses-Working principle, Different types of Contact lenses.

UNIT-V OPHTHALMIC TECHNIQUES AND OPTOMETRY (10hrs)

Skill oriented, Entrepreneurship & Employability

Ophthalmoscope and keratometer and their working principles, Evaluation of eye disorders, Guidelines for standardized eye chart preparation, Simple phoropter and its working principle and its uses, Checking the power of lenses, Principles of Computer based eye testing

MBT A1 PAIR-COURSE -6A Optical Instruments and Optometry

Skill oriented, Entrepreneurship & Employability

1. Evaluation of magnifying power of simple microscope.
2. Measurement of reflection and transmission coefficient of certain materials using amicroscope.
3. Resolving power of telescope
4. Determination of radii of different capillary tubes using travelling microscope.
5. Refractive index of a liquid (water) using (i) concave mirror and (ii) convex lens and a plane mirror.
6. Removal of refractive errors of eye using combination of lenses.
7. Determination of power of a convex lens by finding its focal length.

RECOMMENDED REFERENCES TEXT BOOKS:

1. Optics and Optical Instruments: An Introduction by B. K. Johnson, Dover Publications.
2. Modern Optical Instruments and their construction by or ford Henry-Publisher: BiblioLife, LLC.
3. A Text Book of Optics by Brj Lal and N.Subramanyam, S.Chand & Co.
4. Practical Optics by Menn Naftly, Elsevier Science Publishing.
5. Applications of Optics in daily life | CK-12 Foundation. <https://flexbooks.ck12.org> ›
Web sources suggested by the teacher concerned and the college librarian including Reading material

A.S.D Govt. Degree College for Women (A), Kakinada

III BSc PHYSICS Syllabus (w.e.f:2020-2021A.B)

BSc	Semester: V (Skill Enhancement Course- Elective)	Credits: 2
MB T A1 PAIR COURSE-7A	OPTICAL IMAGING AND PHOTOGRAPHY	Total hours 40

Aim and objectives of Course

Identify the different types of cameras and camera lenses according to different purposes.

Identify and understand the focal length of the different types of lenses

Acquire a critical knowledge on natural and artificial sources of light and their application in photography

List out, identify and understand various image formation techniques including Eye.

Learn the procedures of using Analog and Digital cameras.

Learning outcomes of Course

Up on completion of the course students able to

Demonstrate skills of camera usage especially Digital Cameras.

Understand the various Image development and editing techniques.

Comprehend the concept of different types of common shooting techniques.

Demonstrate the focusing techniques of Analog and Digital cameras.

Acquire skills in the editing and development of photos and videos.

Perform some experimental skills related to images, videos using the equipment available in the lab or in a local studio

Unit-I: INTRODUCTION TO PHOTOGRAPHY:(10 hrs)

Skill oriented, Entrepreneurship & Employability

Photography-Introduction, Working principle of a camera, Image formation in simple camera and human eye, Types of cameras, Pin-hole camera, Single Lens Reflex (SLR) camera, Twin Lens Reflex (TLR) camera, Digital Single-lens reflex camera (DSLR), Digital camera, Drone flying cameras, Care and maintenance of camera, Factors influencing choice of camera

Unit-II: DIGITAL PHOTOGRAPHY:(10 hrs)

Skill oriented, Entrepreneurship & Employability

Different types of Digital cameras and their parts, Working of DSLR camera, Types of lenses- Normal, Wide angle, telephoto, Zoom lenses, Digital Image formation, Digital camera image sensors, Size of the image, Depth of focus, Depth of field, Exposure time, Aperture, Shutter speed, ISO, filters, knowledge on pixels and their uses, resolution, Camera accessories

Unit-III: PHOTOGRAPHIC LIGHT SOURCES:(10 hrs)

Skill oriented, Entrepreneurship & Employability

Need for the light in photography, Light sources- Natural light, Sun light, Moon light, Ambient light, Artificial light sources-Flood light, Spot light, Halogen light, Halogen flash light, Digital lights, Exposure, Studio photography

Unit-IV: PHOTOGRAPHIC SHOOTING TECHNIQUES:(10 hrs)

Skill oriented, Entrepreneurship & Employability

Significance and role of Camera lens in photo shooting, Arrangement of lenses in a Camera-Positioning, Techniques involved in the use of DSLR cameras, Usage of Filters, Techniques of Photomicrography, High speed Photography with motor driven camera, Basic ideas on Underwater Photography, Medical Photography, Astronomical Photography, Infra-Red (IR) Photography, Ultra Violet (UV) Photography and Forensic Photography.

Unit-V : PHOTO MANIPULATION :(10 hrs)

Skill oriented, Entrepreneurship & Employability

Developing and printing the photographs, equipment and materials used in developing and printing, image mixing and printing, Image editing through image editing software's like Adobe Photoshop – Adjustment of Brightness, Contrast, Tonal and Colour Values, Factors influencing quality of digital image, Methods of storing and processing, Image transportation through Pendrive, CD, HDD and CLOUD [Internet]

MBT A1 PAIR COURSE-7A

1. Construction of a simple pin hole Camera and study it's working.
2. Capture an image using a Digital Camera and apply editing techniques.
3. Understanding various image formats and convert one image format into another(For ex: JPEG to BMP)
4. Convert a video stream into image stream by using a suitable editing software.
5. Evaluate the number of pixels and size of digital Image.
6. Comparison of the quality of a 8-bit, 16-bit and 32 bit images.
7. Perform the reduction and enlargement of a given Digital Image.
8. Change the appearance of an image by applying the filters (For ex: from the IR image of the given digital Image by suitable IR filter)

RECOMMENDED REFERENCE BOOKS:

1. Object and image; An introduction to photography by George M Craven, PHI
2. An Introduction to Digital Photo Imaging Agfa, 1994
3. Advance Photography by M. Langford.
4. Digital Photography-A hands on Introduction by Phillip Krejcarek, Delmer Publishers
5. Multimedia – An Introduction by John Villamil, PHI
6. <https://www.adobe.com/in/creativecloud/photography/discover/dslr-camera.html>

Web sources suggested by the teacher concerned and the college librarian including reading material

A.S.D Govt. Degree College for Women (A), Kakinada

III BSc PHYSICS Syllabus (*w.e.f:2020-2021A.B*)

BSc	Semester: V (Skill Enhancement Course- Elective)	Credits: 2
MB T A2 PAIR COURSE-6B	LOW TEMPERATURE PHYSICS & REFRIGERATION	Total hours 40

Aim and objectives of Course

Identify various methods and techniques used to produce low temperatures in the Laboratory.

Acquire a critical knowledge on refrigeration and air conditioning.

Learning outcomes of Course

Up on completion of the course students able to

Demonstrate skills of Refrigerators through hands on experience and learns about refrigeration components and their accessories.

Understand the classification, properties of refrigerants and their effects on environment.

Comprehend the applications of Low Temperature Physics and refrigeration

UNIT-I PRODUCTION OF LOW TEMPERATURE (10 hrs)

Skill oriented, Entrepreneurship & Employability

Production of low temperatures-Introduction, Freezing mixtures, Joule-Thomson effect, Regenerative cooling, Different methods of liquefaction of gases, liquefaction of air, Production of liquid hydrogen and nitrogen, Adiabatic demagnetization, Properties of materials at low temperatures, Superconductivity

UNIT-II MEASUREMENT OF LOW TEMPERATURE (10 hrs)

Skill oriented, Entrepreneurship & Employability

Gas thermometer and its correction and calibration, Secondary thermometers, resistance thermometers, thermocouples, Vapour pressure thermometers, Magnetic thermometers, Advantages and drawbacks of each type of thermometer.

UNIT-III PRINCIPLES OF REFRIGERATION (10 hrs)

Skill oriented, Entrepreneurship & Employability

Introduction to Refrigeration- Natural and artificial refrigeration , Stages of refrigeration, Types of refrigeration - Vapor compression and vapor absorption refrigeration systems, Refrigeration cycle and explanation with a block diagram, Introductory ideas on air- conditioning.

Refrigerants-Introduction, Ideal refrigerant, Properties of refrigerant, Classification of refrigerants, commonly used refrigerants, Eco-friendly refrigerants

UNIT-IV COMPONENTS OF REFRIGERATOR (10 hrs)

Skill oriented, Entrepreneurship & Employability

Refrigerator and its working, Block diagram, Coefficient of Performance (COP), Tons of refrigeration (TR) and Energy Efficiency Ratio (EER), Refrigerator components: Types of compressors, evaporators and condensers and their functional aspects, defrosting in a refrigerator, Refrigerant leakage and detection.

UNIT-V APPLICATIONS OF LOW TEMPERATURE & REFRIGERATION

(10 hrs.) **Skill oriented, Entrepreneurship & Employability**

Applications of Low temperatures: Preservation of biological material, Food freezing, liquid nitrogen and liquid hydrogen in medical field, Superconducting magnets in MRI- Tissue ablation (cryosurgery) - Cryogenic rocket propulsion system.

Applications of refrigeration: Domestic refrigerators, Water coolers, Cold storages, Ice plants, Food preservation methods, Chemical and Process industries, Cold treatment of metals, Construction field, Desalination of water, Data centers

COURSE-6B LOW TEMPERATURE PHYSICS & REFRIGERATION

Skill, Employability & Entrepreneurship

1. Record the Principles and applications of Refrigerators and Freezers.
2. Measure the temperatures below Melting point of Ice using a thermometer available in the Lab.
3. Make a freezing mixture by adding different salts viz., Sodium chloride, Potassium Hydrate (KOH), Calcium chloride to ice in different proportions and observe the temperature changes.
4. Study the operation of a refrigerator and understand the working of different parts.
5. Study the properties of refrigerants like chlorofluorocarbons- hydrochlorofluoro- carbons and record the lowest temperatures obtained.
6. Consider a simple faulty refrigerator and try to troubleshoot the simple problems by understanding its working.
7. Understand the practical problem of filling the Freon Gas into the Refrigerator.
8. Get the Liquid Nitrogen or Liquid Helium from nearby Veterinary Hospital and measure their temperatures using chromel-alumel thermocouple or mercury thermometer and observe their physical properties like colour, smell etc and precautions to be taken for their safe handling.
9. Preparation of freeze drying food with Dry ice and liquid nitrogen
10. Preparation of freeze drying food with liquid nitrogen

RECOMMENDED REFERENCES:

1. Heat and Thermodynamics by Brij Lal & N. Subramanyam, S. Chand Publishers.
2. Thermal Physics by S C Garg, R M Bansal & C K Ghosh, McGrawHill Education, India
3. Heat and Thermodynamics by M Zemansky, McGrawHill Education (India).
4. Low-Temperature Physics by Christian E. & Siegfried H., Springer.
5. Thermal Engineering by S. Singh, S. Pati, Ch:18 Introduction to Refrigeration.
6. The Physics Hyper Text Book. Refrigerators. <https://physics.info/refrigerators/>
7. Refrigeration and Air Conditioning by Manohar Prasad, New age international (P) limited, New Delhi
8. A course in Refrigeration and Air Conditioning by S.C. Arora and S. Domkundwar, Dhanpatrai and sons, Delhi
9. https://trc.nist.gov/cryogenics/Papers/Review/2017-Low_Temperature_Applications_and_Challenges.pdf
10. <https://nptel.ac.in/content/storage2/courses/112105129/pdf/RAC%20Lecture%203.pdf>
11. Other Web sources suggested by the teacher concerned and the reading material. <https://nptel.ac.in>

A.S.D Govt. Degree College for Women (A), Kakinada

III B.SC PHYSICS Syllabus

BSc	Semester: V (Skill Enhancement Course- Elective)	Credits: 4
MB T A2PAIR COURSE-7B	Solar Energy and Applications	Total hours 36

Aim and objectives of Course

Understand Sun structure, forms of energy coming from the Sun and its measurement.
Acquire a critical knowledge on the working of thermal and photovoltaic collectors

Learning outcomes of Course

Up on completion of the course students able to

- Demonstrate skills related to **callus culture** through hands on experience
- Understand testing procedures and fault analysis of thermal collectors and PV modules.
- Comprehend applications of thermal collectors and PV modules.
- Demonstrate skills acquired in evaluating the performance of solar cell / module in connecting them appropriately to get required power output.
- Acquire skills in identification and elimination of the damaged panels without affecting the output power in a module / array.
- Perform procedures and techniques related to general maintenance of solar thermal and photovoltaic modules.

Unit - I: BASIC CONCEPTS OF SOLAR ENERGY

(10hrs) Skill, Employability & Entrepreneurship

Spectral distribution of solar radiation, Solar constant, zenith angle and Air-Mass, standard time, local apparent time, equation of time, direct, diffuse and total radiations. Pyrheliometer - working principle, direct radiation measurement, Pyrometer-working Principle, diffuse radiation measurement, Distinction between the two meters.

Unit - II: SOLAR THERMAL COLLECTORS

(10hrs) Skill, Employability & Entrepreneurship

Solar Thermal Collectors-Introduction, Types of Thermal collectors, Flat plate collector – liquid heating type, Energy balance equation and efficiency, Evacuated tube collector, collector overall heat loss coefficient, Definitions of collector efficiency factor, collector heat-removal factor and collector flow factor, Testing of flat-plate collector, solar water heating system, natural and forced circulation types, Concentrating collectors, Solar cookers, Solar dryers, Solar desalinators.

Unit - III: FUNDAMENTALS OF SOLAR CELLS (10hrs)

Skill, Employability & Entrepreneurship

Semiconductor interface, Types, homo junction, hetero junction and Schottky barrier, advantages and drawbacks, Photovoltaic cell, equivalent circuit, output parameters, conversion efficiency, quantum efficiency, Measurement of I-V characteristics, series and shunt resistance, their effect on efficiency, Effect of light intensity, inclination and temperature on efficiency

Unit -IV: TYPES OF SOLAR CELLS AND MODULES (10 hrs)

Skill, Employability & Entrepreneurship

Types of solar cells, Crystalline silicon solar cells, I-V characteristics, poly-Si cells, Amorphous silicon cells, Thin film solar cells-CdTe/CdS and CuInGaSe₂/CdS cell configurations, structures, advantages and limitations, Multi junction cells – Double and triple junction cells. Module fabrication steps, Modules in series and parallel, Bypass and blocking diodes

Unit – V: SOLAR PHOTOVOLTAIC SYSTEMS (10hrs)

Skill, Employability & Entrepreneurship

Energy storage in PV systems, Energy storage modes, electrochemical storage, Batteries, Primary and secondary, Solid-state battery, Molten solvent battery, lead acid battery and dry batteries, Mechanical storage – Flywheel, Electrical storage – Super capacitor

COURSE -7B Solar Energy and Applications

Skill, Employability & Entrepreneurship

1. Measurement of direct radiation using pyr heliometer.
2. Measurement of global and diffuse radiation using pyranometer.
3. Evaluation of performance of a flat plate collector
4. Evaluation of solar cell / module efficiency by studying the I – V measurements.
5. Determination of series and shunt resistance of a solar cell / module.
6. Determination of efficiency of two solar cells / modules connected in series.
7. Determination of efficiency of two solar cells / modules connected in parallel.
8. Study the effect of input intensity on the performance of solar cell / module.
9. Study the influence of cell / module temperature on the efficiency.
10. Study the effect of cell / module inclination on the efficiency.

Recommended References:

1. Solar Energy Utilization by G. D. Rai, Khanna Publishers
2. Solar Energy- Fundamentals, design, modelling and applications by G.N. Tiwari, Narosa Publications, 2005.
3. Solar Energy-Principles of thermal energy collection & storage by S.P. Sukhatme, TataMc-Graw Hill Publishers, 1999.
4. Science and Technology of Photovoltaics, P. Jayarama Reddy, CRC Press(Taylor & Francis Group), Leiden & BS Publications, Hyderabad, 2009.
5. Solar Photovoltaics- Fundamentals, technologies and applications, Chetan Singh Solanki, PHI Learning Pvt. Ltd.,
6. Web sources suggested by the teacher concerned and the college librarian including reading material.
 - (a) https://courses.edx.org/c4x/DelftX/ET.3034TU/asset/solar_energy_v1.1.pdf
 - (b) [https://www.sku.ac.ir/Datafiles/BookLibrary/45/John%20A.%20Duffie,%20William%20A.%20Beckman\(auth.\)-Solar%20Engineering%20of%20Thermal%20Processes,%20Fourth%20Edition%20\(2013\).pdf](https://www.sku.ac.ir/Datafiles/BookLibrary/45/John%20A.%20Duffie,%20William%20A.%20Beckman(auth.)-Solar%20Engineering%20of%20Thermal%20Processes,%20Fourth%20Edition%20(2013).pdf)

A.S.D Govt. Degree College for Women (A), Kakinada

BSc PHYSICS Syllabus

BSc	Semester: V (Skill Enhancement Course- Elective)	Credits: 3
MBT C1PAIR: COURSE-6C	APPLICATIONS OF ELECTRICITY &ELECTRONICS	Total hours 36

Aim and objectives of Course

Identify various components present in Electricity & Electronics Laboratory.

Acquire a critical knowledge of each component and its utility (like resistors, capacitors, inductors, power sources etc.).

Demonstrate skills of constructing simple electronic circuits consisting of basic circuit elements.

Learning outcomes of Course

Up on completion of the course students able to

CO1: Understand the need & Functionality of various DC & AC Power sources

CO2: Comprehend the design, applications and practices of various electrical & Electronic devices and also their trouble shooting.

CO3: List out, identify and handle various equipment in Electrical & Electronics laboratory

CO4: Demonstrate skills on the utility of different electrical components and devices.

CO5: Acquire the skills regarding the operation, maintenance and troubleshooting of various Devices in the lab.

Unit-I INTRODUCTION TO PASSIVE ELEMENTS (10 hrs.)

Skill, Employability & Entrepreneurship

Passive and Active elements-Examples, **Resistor**-Types of Resistors, Color coding - Applications of a Resistor as a heating element in heaters and as a fuse element.

Capacitor-Types of Capacitors, Color coding, Energy stored in a capacitor, Applications of Capacitor in power supplies, motors (Fans) etc., **Inductor**-Types of Inductors, EMF induced in an Inductor, Applications of Inductor, Application of choke in a fan and in a radio tuning circuit, Series resonance circuit as a Radio tuning circuit.

Un Skill, Employability & Entrepreneurship

it-II Power Sources (Batteries) (10 hrs.)

Types of power sources-DC & AC sources, Different types of batteries, Rechargeable batteries –Lead acid batteries, Ni-MH batteries, Li-ion batteries- Li-PO batteries, Series, Parallel & Series-Parallel configuration of batteries, Constant Voltage source-Constant Current Source-Applications of Current sources & Voltage sources, SMPS used in computers.

Unit-III Alternating Currents (10 hrs)

Skill, Employability & Entrepreneurship

A.C Power source-Generator, Construction and its working principle, Transformers-Construction and its working principle, Types of Transformers-Step-down and Step-up Transformers, Relation between primary turns and secondary turns of the transformer

withemf., Use of a Transformer in a regulated Power supplies, Single phase motor – working principle, Applications of motors(like water pump, fan etc.).

Unit-IV Power Supplies (Skill Based) (10 hrs.)

Skill, Employability & Entrepreneurship

Working of a DC regulated power supply, Construction of a 5 volts regulated power supply, Design of a step-down (ex: 220-12V) and step-up (ex: 120-240V) transformers- Simple Design of FM Radio circuit using LCR series resonance (tuning) circuit, Checking the output voltage of a battery eliminator using a MultiMate.(Trouble shooting), Design of a simple 5 volts DC charger, Power supply for computers(SMPS)

Unit-V Applications of Electromagnetic Induction (10 hrs.)

Skill, Employability & Entrepreneurship

DC motor –Construction and operating principle, Calculation of power, voltage and current in a DC motor, Design of a simple Motor (for example Fan) with suitable turns of coil-DC generator-Construction, operating principle and EMF equation, Construction of a simple DC generator, Difference between DC and AC generators

RECOMMENDED REFERENCES:

1. Grob's Basic Electronics by [Mitchel Schultz](#) , TMH or McGraw Hill
2. Electronic and Electrical Servicing by Ian Robertson Sinclair, John Dunton, Elsevier Publications
3. Troubleshooting Electronic Equipment by R.S.Khandapur , TMH
4. Web sources suggested by the teacher concerned and the college librarian including reading material.

MBT C1 PAIR-COURSE-6C

Skill, Employability & Entrepreneurship

1. Acquainting with the soldering techniques
2. Design and Construction of a 5 Volts DC unregulated power supply
3. Construction of a Step down Transformer and measurement of its output voltage. And to compare it with the calculated value.
4. Connect two or three resistors or capacitors or inductors and measure the Series, Parallel Combination values using a Multimeter and compare the values with the Calculated values.
5. Use the Digital Multimeter and Analog Multimeter to measure the output voltage of an AC & DC power supply and also the voltage and frequency of a AC signal using CRO.
6. Use the Multimeter to check the functionality of a Diode and Transistor. Also test whether the given transistor is PNP or NPN.
7. Construct a series electric circuit with R, L and C having an AC source and study the frequency response of this circuit. Find the Resonance Frequency.
8. Construct a Parallel electric circuit with R, L & C having an AC source and study the frequency response of this circuit. Find the resonant frequency.
9. Test whether a circuit is a Open circuit or Short Circuit by measuring continuity with a Multimeter and record your readings.

A.S.D Govt. Degree College for Women (A), Kakinada

BSC PHYSICS Syllabus

BSc	Semester: V (Skill Enhancement Course- Elective)	Credits: 3
MBT C2 PAIR: COURSE-7C	ELECTRONIC INSTRUMENTATION	Total hours 36

Aim and objectives of Course

Identify various facilities required to set up a basic Instrumentation Laboratory.
Acquire a critical knowledge of various Electrical Instruments used in the Laboratory.
Demonstrate skills of using instruments like CRO, Function Generator, Multimeter etc. through hands on experience.

Learning outcomes of Course

Up on completion of the course students able to

CO1: Understand the Principle and operation of different display devices used in the display systems and different transducers

CO2: Comprehend the applications of various biomedical instruments in daily life like B.P. meter, ECG, Pulse oxymeter etc. and know the handling procedures with safety and security.

CO3: Perform some techniques related to Biomedical Instrumentation and measurement of Certain physiological parameters like body temperature, B.P. and sugar levels etc.

UNIT-I INTRODUCTION TO INSTRUMENTS (10 hrs)

Skill, Employability & Entrepreneurship

Types of electronic Instruments- Analog instruments & Digital Instruments, DC Voltmeter and AC Voltmeter, Construction and working of an Analog Multimeter and Digital Multimeter (Block diagram approach), Sensitivity, $3\frac{1}{2}$ display and $4\frac{1}{2}$ display Digital multimeters, Basic ideas on Function generator

UNIT-II OSCILLOSCOPE (10 hrs) Skill, Employability & Entrepreneurship

Cathode Ray Oscilloscope-Introduction, Block diagram of basic CRO, Cathode ray tube, Electron gun assembly, Screen for CRT, Time base operation, Vertical deflection system, Horizontal deflection system, Use of CRO for the measurement of voltage (DC and DC), frequency, phase difference, Different types of oscilloscopes and their uses, Digital storage Oscilloscope

UNIT-III TRANSDUCERS (10 hrs) Skill, Employability & Entrepreneurship

Classification of transducers, Selection of transducers, Resistive, capacitive & inductive transducers, Resistive and capacitive touch screen transducer used in mobiles, Displacement transducer-LVDT, Piezoelectric transducer, Photo transducer, Digital transducer, Fibre optic sensors

UNIT-IV DISPLAY INSTRUMENTS (10 hrs) Skill, Employability & Entrepreneurship

Introduction to Display devices, LED Displays, Seven Segment Displays, Construction and operation (Display of numbers), Types of SSDs (Common Anode & Common Cathode type), Limitations of SSDs, Liquid Crystal Displays, Principle and working of 2x16 display and 4x16 LCD modules, Applications of LCD modules.

UNIT-V BIOMEDICAL INSTRUMENTS (10 hrs) Skill, Employability & Entrepreneurship

Basic operating principles and uses of (i) Clinical thermometer (ii) Stethoscope (iii) Sphygmomanometer (iv) ECG machine (v) Radiography (vi) Ophthalmoscope (vii) Ultrasound scanning (viii) Ventilator (ix) Pulse oxymeter (x) Glucometer, Basic ideas of CT scan and MRI scan

MBT A3 PAIR- COURSE -7C ELECTRONIC INSTRUMENTATION

Skill, Employability & Entrepreneurship

Familiarisation of digital multimeter and its usage in the measurements of (i) resistance (ii) current, (iii) AC & DC voltages and for (i) continuity test (ii) diode test and (iii) transistor test

1. Measure the AC and DC voltages, frequency using a CRO and compare the values Measured with other instruments like Digital multimeter.
2. Formation of Sine, Square wave signals on the CRO using Function Generator and measure their frequencies. Compare the measured values with actual values.
3. Display the numbers from 0 to 9 on a single Seven Segment Display module by Applying voltages.
4. Display the letters **a** to **h** on a single Seven Segment Display module by applying voltages.
5. Measurement of body temperature using a digital thermometer and list out the error and corrections.
6. Measurement of Blood Pressure of a person using a B.P. meter and record your values and analyze them.
7. Get acquainted with an available ECG machine and study the ECG pattern to understand the meaning of various peaks
8. Observe and understand the operation of a Digital Pulse oxymeter and measure the pulse rate of different people and understand the working of the meter.

RECOMMENDED REFERENCE BOOKS:

1. Electronic Instrumentation by H.S.Kalsi , TMH Publishers
2. Electronic Instrument Hand Book by Clyde F. Coombs , McGraw Hill
3. Introduction to Biomedical Instrumentation by Mandeep Singh, PHI Learning. Biomedical Instrumentation and Measurements by Leslie Cromwell , Prentice Hall India.
4. Electronic Measurements and Instrumentation by Kishor, K Lal, Pearson, New Delhi
5. Electrical and Electronic Measurements by Sahan, A.K., Dhanpat Rai, New Delhi
6. Electronic Instruments and Measurement Techniques by Cooper, W.D. Halfrick, A.B., PHI Learning, New Delhi
7. Web sources suggested by the teacher concerned and the college librarian including reading material.

A.S.D Government Degree College for Women (Autonomous): Kakinada

Department of Political Science

SEM – I – INTRODUCTION TO POLITICAL SCIENCE

UNIT-I: INTRODUCTION

Skill Development

1. Definition, Nature, Scope and Importance of Political Science – Relations

With allied disciplines (History, Economics, Philosophy and Sociology)

2. **Approaches to the study of Political Science:**

Traditional Approaches-Philosophical, Historical. Modern Approaches-

Behavioural and System Approach.

UNIT-II : STATE

Skill Development

1. Definition of the State, **Elements of the State**, Theories of Origin of the

State-(Divine Origin, Force, Evolutionary and Social Contract).

2. Concepts of Modern State and Welfare State.

UNIT-III : CONCEPTS OF POLITICAL SCIENCE

Skill Development

1. **Law, Liberty, Equality.**

2. **Power, Authority and Legitimacy.**

UNIT-IV: THEORIES OF RIGHTS

Skill Development

1. Meaning, Nature and **Classification of Rights**

2. Theories of Rights.

UNIT-V: POLITICAL IDEOLOGIES

Skill Development

1. **Liberalism**, Individualism, Anarchism.

2. **Socialism**, Marxism and Multiculturalism.

A.S.D Government Degree College for Women (Autonomous): Kakinada

Department of Political Science

SEM -2: BASIC ORGANS OF THE GOVERNMENT

UNIT-I: CONSTITUTION

Skill Development

1. Meaning, Definition, **Origin and Evolution of Constitution.**
2. **Classification of the Constitution**-Written and Unwritten; Rigid and Flexible.

UNIT-II: ORGANS OF THE GOVERNMENT

Skill Development

1. Theory of **Separation of Powers**-B.D.Montesquieu.
2. **Legislature-Unicameral** and **Bicameral**-Power and Functions, **Executive**-Types, Powers and Functions. **Judiciary**-Powers and Functions.

UNIT-III: FORMS OF GOVERNMENT

Skill Development

1. **Unitary** and **Federal** forms of Governments-Merits and Demerits.
2. **Parliamentary** and **Presidential forms of Governments**- Merits and Demerits.

UNIT-IV: DEMOCRACY

Skill Development

1. Meaning, Definition, Significance, Theories and Principles of **Democracy.**
2. **Types of Democracy:** Direct and Indirect Democracy-Methods, Merits and Demerits-Essential Conditions for Success of Democracy.

UNIT-V: POLITICAL PARTIES, PRESSURE GROUPS AND PUBLIC OPINION

Employability

1. Meaning, Definition and **Classification of Political Parties:** National and Regional-Functions of Political Parties.
2. **Pressure Groups (Interest Groups) -** Meaning, Definition, Types, Functions and Significance of Public Opinion.

A.S.D Government Degree College for Women (Autonomous): Kakinada

Department of Political Science

SEM -3: INDIAN GOVERNMENT AND POLITICS

UNIT-I: SOCIAL AND IDEOLOGICAL BASE OF THE INDIAN CONSTITUTION

Skill Development

1. Constitutional Development in India during British Rule-A Historical Perspective with reference to Government of India Acts, 1909, 1919 and 1935.
2. Constituent Assembly-Nature, Composition, Socio-Economic, Philosophical Dimensions and Salient Features of the Indian Constitution.

UNIT-II: INDIVIDUAL AND STATE

Skill Development

1. Fundamental Rights, Directive Principles of State Policy and Fundamental Duties-Differences between Fundamental Rights and Directive Principles of State Policy.
2. The 'Doctrine of Basic Structure of the Constitution' with reference to Judicial Interpretations and Socio-Political Realities.

UNIT-III: UNION EXECUTIVE

Skill Development

1. President of India-Mode of Election, Powers and Functions.
2. Parliament-Composition, Powers and Functions, Legislative Committees, Prime Minister and Council of Ministers-Powers and Functions, Role in Coalition Politics

UNIT-IV: STATE EXECUTIVE

Skill Development

1. Governor-Mode of Appointment, Powers and Functions.
2. Legislature-Composition, Powers and Functions, Chief Minister and Council of Ministers-Powers and Functions

UNIT-V: THE INDIAN JUDICIARY

Employability & Skill Development

1. Supreme Court-Composition and Appointments, Powers and Functions or Jurisdiction of the Supreme Court, Judicial Review, Judicial Activism.
2. High Court-Composition, Powers and Functions, Debates on the mode of appointment of Judges-National Judicial Appointments Commission and Judicial Reforms.

A.S.D Government Degree College for Women (Autonomous): Kakinada

Department of Political Science

SEM -4 Paper-4: INDIAN POLITICAL PROCESS

UNIT-I: FEDERAL PROCESSES

Skill Development

1. Features of **Indian Federal System**- Centre-State Relations- Legislative, Administrative and Financial
2. Emerging Trends in Centre-State Relations-Restructuring **Centre-State Relations**- Recommendations of Sarkaria Commission, M.M.Punchi Commission

UNIT-II: ELECTORAL PROCESSES

Skill Development

1. The **Election Commission** of India, Powers and Functions.
2. Issues of Electoral Reforms, Voting Behaviour-Determinants and Problems of Defections.

UNIT-III: GROSSROOT DEMOCRACY-DECENTRALISATION

Skill Development

1. **Panchayat Raj system**-Local and Urban Governments-Structure, Powers and Functions.
2. Democratic Decentralization-Rural Development and Poverty alleviation with reference to **73rd** and **74th Constitutional Amendment Acts**, Challenges and Prospects.

UNIT-IV: SOCIAL DYNAMICS AND EMERGING CHALLENGES TO INDIAN POLITICAL SYSTEM

SKILL development

1. Role of Caste, Religion, Language and Regionalism in India.
2. **Politics of Reservation**, Criminalization of Politics and Internal threats to Security.

UNIT-V: REGULATORY AND GOVERNANCE INSTITUTIONS

Employability & Skill Development

1. **NITI Ayog**, Finance Commission, **Comptroller and Auditor General of India**.
2. Central Vigilance Commission, Central Information Commission, Lokpal and Lokayukta.

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Department of Political Science

SEM -4 Paper- 5: WESTERN POLITICAL THOUGHT

UNIT-I: ANCIENT GREEK POLITICAL THOUGHT

Skill Development

1. Plato-Rule of Philosopher Kings-Theory of Justice-Ideal State and Education
2. Aristotle-Theory of State-Classification of Governments-Citizenship, Slavery and Theory of Revolutions.

UNIT-II: MEDIEVAL AND MODERN POLITICAL THOUGHT

Skill Development

1. St. Augustine-Theory of Two Cities.
2. Niccolò Machiavelli-State and Statecraft.

UNIT-III: CONTRACTUAL POLITICAL THOUGHT

Skill Development

1. Thomas Hobbes- Social Contract and Absolute Sovereignty.
2. John Locke- Human Nature, State of Nature, Social Contract, Natural Rights and Limited Government
3. Jean Jacques Rousseau- Human Nature, State of Nature, Social Contract, General Will and Popular Sovereignty

UNIT-IV: UTILITARIAN POLITICAL THOUGHT

Skill Development

1. Jeremy Bentham-Theory of Utility, Law and Reforms.
2. J.S.Mill-Theory of Liberty and Representative Government.

UNIT-V: MARXIST POLITICAL THOUGHT

Skill Development

1. Karl Marx-Dialectical Materialism, Theory of Surplus Value and Class Struggle.
2. Antonio Gramsci-Hegemony and Civil Society.

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Department of Political Science

SEM -5- Paper- 6 B: E GOVERNANCE

(Skill Enhancement Course (Elective), 4 credits)

Unit: 1

Skill Development

Brief Introduction to Governance-**E-Governance** –Meaning, Definition, Nature, Scope, Objectives and Significance-Domains of E-Governance- E-Governance and Good Governance-**Global trends** in the growth of E-Governance.

Unit: 2

Skill Development

E-Governance in India- - **National E-Governance Plan** (NeGP)-National Informatics Centre- Strategies for E-Governance-E-Governance Implementations: Required infrastructure of Network, Computing, Cloud Governance, Data system, Human resources, Legal and Technological infrastructure- Major E-Governance Projects and Initiatives: Gyandoot, E-choupal, E-Bhoomi, E-Seva, CARD, E-Panchayat, and Real Time Governance (RTG) etc.

Unit: 3

Skill Development

Role of Information and Communication Technology in Administration, Effective delivery of Services for public utilities through E-Governance-Online filing of complaints, application Registration, issuance of certificates, issuance of land records, online payments of fees, dues etc., e-tendering, easy access to information and E-Governance in Social security and welfare schemes: Direct transfer of benefits, Biometric authentication through Aadhar, etc.

Unit: 4

Skill Development

E-Governance under Information Technology Act-Legal status for digital transactions-**Public Private Partnership** and expansion of E-Governance.

Unit: 5

Skill Development

E-Governance-Transparency and Accountability at gross root level-Issues and Challenges: Digital Divide, Capacity Building, **Cyber Security in Cyber Crimes**, Socio-political implications, Issues of integration, networking with NGOs.

A.S.D Government Degree College for Women (Autonomous): Kakinada

Department of Political Science

SEM- 5 – Paper- 7B: LOCAL ADMINISTRATION

(Skill Enhancement Course (Elective), 4 credits)

Unit: 1

Skill Development

Local Government: Meaning, Nature and Importance, Thoughts on Local Governments by M.K.Gandhi, Jawaharlal Nehru and Dr.B.R.Ambedkar, Important Committees: **Balwant Rai Mehta** (1957), **Ashok Mehta** (1978), **L.M.Singhvi** (1986).

Unit: 2

Skill Development

Decentralization of powers (Political, Administrative and Economic) from the States to Local Institutions- **73rd and 74th Constitutional Amendment** Acts-Empowering Local Governments- Decision making powers during crisis and disasters-Relationship between local governments Authorities and Central and State Government service providers-Role of District Collector in Strengthening LGIs.

Unit: 3

Skill Development

Revenue raising avenues for Local Governments-Grants, Aid and support from Centre and State Governments-Public Private Partnerships-Concept of Local Development-Village as a unit, **SWOC** analysis of a village, existing conditions, expected developmental opportunities, the gap, natural, government and private resources, year-wise planning, finances required - Role of Local Governments in implementation of welfare and developmental programmes i.e., **(MGNREGS)**, **(SGSY)**, **(IAY)** and **(PURA)**.

Unit: 4

Skill Development

Challenges for Local Administration, Financial, administrative and Political Constraints- Public relations in Local Administration-Need for training for elected representatives and other stakeholders-**Audit training** and Participatory training.

Unit: 5

Skill Development

Preparation of Reports-Minutes and Documentation-Types of Reports, Content of Minutes-

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A.S.D.GOV.T. DEGREE COLLEGE FOR WOMEN (AUTONOMOUS)

KAKINADA

II B.A., B. Com., B.sc.

Part-1 (ii) Second Language
I SEMESTER SYLLABUS

PAPER – I: POETRY, PROSE & GRAMMAR. (w.e.f. 2020-21)

SKILL DEVELOPMENT

- UNIT – I OLD POETRY:**
1. "Arya Padukabhishekaha",
Valmiki Ramayanam- Ayodhya Kanda, Sarga-100
Geetha Press, Gorakhpur.
 2. "YakshaPrasnaha", Mahabharatam of Vedavyasa,
Vanaparva, Adhyaya -313, Geeta Press, Gorakhpur.

- UNIT – II MODERN POETRY:**
1. "Mevada Rajyastapanam" 4th Canto,
Srimat Pratapa Raayanam, Mahakavyam,
Pt.OgetiParikshitsarma, Published by,
Pt.OgetiParikshitsarma, 10/11, Sakal nagar, Pune, 1989
 2. "VivekanandaSuktayaha", Vivekanandasuktisudha
by Dr.SamudralaLakshmanaiah, Published by
Author, 18-1-84, Yasoda Nagar,
Tirupati. Selected Slokas 25.

- UNIT – III PROSE:**
1. "Atyutkataihi papapunyairihaiva phalamasnute",
Hitopadesaha-Mitralabha 2 & 3 stories, Pages 61-84.
 2. "Sudraka -Veeravarakatha", Hitopadesaha-Vigraham,
8th story, Pages 63-70, Chowkhamba krishadas
Academy, Varanasi, 2006.

EMPLOYABILITY

- UNIT - IV GRAMMAR:**
1. DECLENSIONS Nouns ending in vowels
Deva, Kavi, Bhanu, Dhatru, Pitru, Go, Ramaa, Mati.
 2. CONJUGATIONS EMPLOYABILITY
1st Conjugation - Bhoo, Gam, Shtha, Drusir, Labh, Mud.
2nd Conjugation - As. 10th Conjugation – Bhaash.

- UNIT – V GRAMMAR:**
1. SANDHI - Swara Sandhi : Savarnadeergha, ayavayava,
Guna, Vruddhi, yaanade
Halsandhi: Schutva, Stutva, Anunasika.
 2. SAMASA Dwandwa, Tatpurusha, Karmadharaya,, Dwigu

A.S.D.GOV.T. DEGREE COLLEGE FOR WOMEN (AUTONOMOUS) KAKINADA

II B.A., B. Com., B.sc.

Part-1 (ii) Second Language

II SEMESTER SYLLABUS

SANSKRIT Syllabus (w.e.f:2020-21 A.Y)

PAPER – II: POETRY, PROSE & GRAMMAR.

- UNIT – I OLD POETRY:**
- 1."Indumateeswayamvaram", Raghuvamsam of kalidasa, 6thcanto, Chowkhamba krishadas academy, Varanasi-2012.
 2. "Deekshaapradanam", Buddacharitam of Aswagosa, 16thcanto. Selected verses.

- UNIT – II MODERN POETRY:**
1. "Gangavataranam", Bhojas Champu Ramayanam, Balakanda.
 2. "Mohapanodaha", 4th cant. Dharma Souhrudam by P.Pattabhi Ramarao, Published by Author, Ramanth Nagar.
 3. "VandeKasmeerabharatam", by Doolypala Ramakrishna from Samskrita pratibha, sahitya academy , New Delhi -2018.

- UNIT – III PROSE:**
1. "Avantisundarikatha", 5th Chapter. DasakumaraCharitam, Purva peetika.
 2. "Charudattacharitam", Bhasakathasaraaha by Y.Mahalingasastry.

EMPLOYBILITY

- UNIT - IV GRAMMAR**
1. DECLENSIONS :Nouns ending in vowels Nadee, Janu, vadhoo, Matru, Phala, Vaari & Madhu.
 2. CONJUGATIONS III Conjugation- Yudh, IV .Conjugation- Ish, VIII Conjugation Likh, Kru, IX. Conjugation-Kreen X, Conjugation-Kath, Ram, Vand.

- UNIT – V GRAMMAR:** 1. SANDHI - Halsandhi : Latva, Jastva **EMPLOYBILITY**

- Visarga sandhi: Utva, Visargalopa, Rephadesa, Ooshma.
- 2.SAMASA Avyayeebhava, Bahruvrihi.

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KAKINADA

II Language – II B.A. B.com. B. SC Semester III

SANSKRIT Syllabus (w.e.f:2020-21 A.Y)

PAPER-III Drama, Upanishad, Alamkara and History of Literature.

(W.e.f.2020-2021)

UNIT – I : OLD DRAMA . SKILL DEVELOPMENT

1. "Madhyamavyayogaha". Bhasa Natakachakram. krishadas academy, Varanasi 1998.

UNIT – II : MODERN DRAMA . SKILL DEVELOPMENT

"Sankalpabalam" by Prof.G.S.R.Krishna Murthy, Published by Semushi, R.S.Vidyapeetam, Tirupati-2019.

UNIT – III : UPANISHAD . SKILL DEVELOPMENT

1. "Sishyanusasanam" – Sikshavalli of Taittireeyopanishad.

2. "Sraddatrayavibhagayoga", 17th Chapter, Bhagavadgita, Geetapress, Gorakhpur.

UNIT - IV : 1. ALANKARAS: EMPLOYBILTY

1. Upama 2. Ananvaya 3. Utpreksha 4. Deepakam

5. Aprastutaprasamsa 6.Drushtanta 7. Prateepa.

2. HISTORY OF SANSKRIT LITERATURE

1. Panini 2.Kautilya 3.Bharatamuni 4. Bharavi 5.Magha

6.Bhavabhuti 7. Sankaracharya, 8.Jagannatha. 9. Dandi.

UNIT – V : HALANT SABDAS EMPLOYBILTY

1. Jalamuch 2. Vaach 3.Marut 4.Bhagavat 5.Bhavat

6.Pachats 7. Naman 8.Rajan 9.Gunin 10.Vidwas 11. Manas.

II SEMESTER
GENERAL TELUGU

పాఠ్య ప్రణాళిక

యూనిట్-I: ఆధునిక కవిత్వం

SKILL DEVELOPMENT

1. ఆధునిక కవిత్వం- పరిచయం
2. కొండవీడు - దువ్వూరి రామిరెడ్డి
(‘కవికోకిల’ గ్రంథావళి-ఖండకావ్యాలు-నక్షత్రమాల సంపుటి నుండి)
3. మాతృసంగీతం - అనిసెట్టి సుబ్బారావు (‘అగ్నివీణ’ కవితాసంపుటి నుండి)
4. ‘తాతకో నూలుపోగు’ - బండారు ప్రసాదమూర్తి (‘కలనేత’ కవితాసంపుటి నుండి)

యూనిట్-II: కథానిక

5. తెలుగు కథానిక - పరిచయం

SKILL DEVELOPMENT

6. భయం (కథ) - కాశీపట్నం రామారావు
7. స్వేదం ఖరీదు....? - (కథ) - రెంటాల నాగేశ్వరరావు

యూనిట్-III: నవల

8. తెలుగు ‘నవల’ - పరిచయం

SKILL DEVELOPMENT

9. రథచక్రాలు (నవల) - మహీధర రామ్మోహన రావు (సంక్షిప్త ఇతివృత్తం మాత్రం)
10. రథచక్రాలు (సమీక్షా వ్యాసం) - డా॥ యల్లాప్రగడ మల్లికార్జునరావు

యూనిట్-IV: నాటకం

11. తెలుగు ‘నాటకం’ - పరిచయం

SKILL DEVELOPMENT

12. యక్షగానము (నాటిక) - ఎం.వి.ఎస్. హరనాథరావు.
13. “అపురూప కళారూపాల విధ్వంసదృశ్యం ‘యక్షగానము’ (సమీక్షా వ్యాసం)”-డా॥కందిమళ్ళ సాంబశివరావు

యూనిట్-V: విమర్శ

SKILL DEVELOPMENT

14. తెలుగు సాహిత్య విమర్శ - పరిచయం
15. విమర్శ-స్వరూప స్వభావాలు; ఉత్తమ విమర్శకుడు-లక్షణాలు

అన్నవరం సత్యవతీ దేవి ప్రభుత్వ మహిళా కళాశాల (స్వయం ప్రతిపత్తి), కాకినాడ.
 బి.ఏ., బి.కా., బి.యస్.సి. డిగ్రీ మొదటి సంవత్సరం-సి.బి.సి.యస్ పాఠ్య ప్రణాళిక

జనరల్ తెలుగు - ద్వితీయ భాష - 2022-2023

సెమిస్టర్ - 1 పేపర్ - 1

పీరియడ్ల సంఖ్య : 60

పాఠ్య ప్రణాళిక

యూనిట్ - 1 రాజనీతి	- నన్నయ ఆంధ్ర మహా భారతం-సభాపర్వం-ప్రథమాశ్వాసం - (26-57 పద్యాలు) “మీ వంశమున...” నుండి “నా యథాశక్తి జేసి...” వరకు	Skill Development
యూనిట్ - 2 పార్వతీకవచము సంవాదం	- నన్నెచోడుడు - కుమార సంభవం-సప్తమాశ్వాసం (20 - 31, 46, 53 - 61) “ఎట్టెట్టూ...” నుండి “కనక భూదరము వోలె...” వరకు	Skill Development
యూనిట్ - 3 ధౌమ్య ధర్మోపదేశము	- తిక్కన ఆంధ్ర మహా భారతం-విరాటపర్వం-ప్రథమాశ్వాసం - (116-146) “ఎఱిగెడి వారికి నైనను....” నుండి “తగ జపించుచుండె...” వరకు	Skill Development
యూనిట్ - 4 పలనాటి బెబ్బలి	- శ్రీనాథుడు పలనాటి వీర చరిత్ర - ద్విపదకావ్యం పుట (108 - 112) బాలచంద్రుడు భీమంబగు సంగ్రామం బొనర్చుట...’ నుండి ‘... వెఱగంది కుంది’ వరకు	Skill Development
యూనిట్ - 5 సీతారావణ సంవాదం	- మొల్ల రామాయణము సుందరకాండము (40 - 87 పద్యాలు) “ఆ రామం జూచి...” నుండి “మనకు దిక్కుగు మీదన్” వరకు	Skill Development
వ్యాకరణం సంధులు : సమాసాలు : అలంకారాలు అర్థాలంకారాలు : శబ్దాలంకారాలు :	ఉత్ప, త్రిక, ద్రుత ప్రకృతిక. నుగాగమ, ద్విరుక్తకారాదేశ, వృద్ధి, శ్చుత్వ, జశ్చ, అనునాసిక సంధులు అవ్యయాభావ, తత్పురుష, కర్మధారయ, ద్వంద్వ, ద్విగు, బహువ్రీహి ఉపమ, ఉత్తేక్ష, రూపక, స్వభావోక్తి, అర్థాంతరన్యాస, అతిశయోక్తి అనుప్రాస (వృత్త్యనుప్రాస, ఛేకానుప్రాస, లాటానుప్రాస, అంత్యానుప్రాస)	:
ఛందస్సు వృత్తాలు : జాతులు : ఉపజాతులు :	ఉత్పలమాల, చంపకమాల, శార్దూలము, మత్తేభము కందం, ద్విపద, ఆటవెలది, తేటగీతి, సీసం మరియు ముత్యాలసరాలు	

అన్నవరం సత్యవతీ దేవి ప్రభుత్వ మహిళా కళాశాల (స్వయం ప్రతిపత్తి), కాకినాడ.
బి.ఎ., బి.కాం., బి.యస్.సి. డిగ్రీ రెండవ సంవత్సరం-సి.బి.సి.యస్. పాఠ్య ప్రణాళిక

జనరల్ తెలుగు - ద్వితీయ భాష - 2022-23

కోర్సు - 3 సెమిస్టర్ - 3

సృజనాత్మక రచన

పీరియడ్ల సంఖ్య : 60

యూనిట్ 1 వ్యక్తికరణ నైపుణ్యాలు

Employability Skills

1. భాష-ప్రాథమికాంశాలు : భాష-నిర్వచనం, లక్షణాలు, ఆవశ్యకత, ప్రయోజనాలు
2. వర్ణం, పదం, వాక్యం, వాక్య లక్షణాలు, సామాన్య సంయుక్త, సంశ్లిష్ట వాక్యాలు
3. భాషా నిర్మాణంలో వర్ణం, పదం, వాక్యం ప్రాధాన్యం

యూనిట్ 2 సృజనాత్మక రచన

Employability Skills

4. కవితా రచన : ఉత్తమ కవిత - లక్షణాలు
5. కథా రచన : ఉత్తమ కథ - లక్షణాలు
6. వ్యాస రచన : ఉత్తమ వ్యాసం - లక్షణాలు

పరిశోధనా వ్యాసం (అదనపు పాఠ్యాంశం Added Syllabus)

యూనిట్ 3 అనువాద రచన

Employability Skills

7. అనువాదం-నిర్వచనం, అనువాద పద్ధతులు
8. అనువాద సమస్యలు-భౌగోళిక, భాషా సాంస్కృతిక సమస్యలు, పరిష్కారాలు
9. అభ్యాసము : ఆంగ్లం నుండి తెలుగుకు, తెలుగు నుండి ఆంగ్లానికి ఒక పేరాను అనువదించడం

యూనిట్ 4 మాధ్యమాలకు రచన - 1 ముద్రణా మాధ్యమం/ ప్రింట్ మీడియా)

10. ముద్రణా మాధ్యమం (అచ్చు మాధ్యమం) ; పరిచయం, పరిధి, వికాసం
11. వివిధ రకాల పత్రికలు - పరిశీలన; పత్రికా భాష, వైలి, వైవిధ్యం
12. పత్రికా రచన ; వార్తా రచన, సంపాదకీయాలు, సమీక్షలు - అవగాహన

Employability Skills

యూనిట్ 5 మాధ్యమాలకు రచన - 2 ప్రసార మాధ్యమం/ఎలక్ట్రానిక్ మీడియా)

13. ప్రసార మాధ్యమాలు : నిర్వచనం, రకాలు, విస్తృతి, ప్రయోజనాలు
14. శ్రవణ మాధ్యమాలు - రచన : రేడియో రచన, ప్రసంగాలు, నాటికలు, ప్రసార సమాచారం
15. దృశ్య మాధ్యమాలు - రచన : వ్యాఖ్యానం (యాంకరింగ్), టెలివిజన్ రచన

Employability Skills

అన్నవరం సత్యవతీదేవి ప్రభుత్వ మహిళా కళాశాల (స్వయం ప్రతిపత్తి) కాకినాడ

బి.ఏ. రెండవ సంవత్సరం - సి.బి.సి.యస్ పాఠ్య ప్రణాళిక - 2022-2023

స్పెషల్ తెలుగు

సెమిస్టర్ - 4 పేపర్ - 4

ఆధునిక తెలుగు సాహిత్య చరిత్ర

పాఠ్య ప్రణాళిక

యూనిట్ 1 : ఆధునిక కవిత్వం-ఆవిర్భావ వికాసాలు

Skill Development

1. ఆధునిక కవిత్వ లక్షణాలు : ఆధునిక కవిత్వంలో ఉద్యమాలు, వాదాలు, ధోరణులు
2. ఆధునిక కవిత్వ ప్రక్రియలు
3. ఆధునిక తెలుగు సాహిత్య దీపధారులు- కందుకూరి వీరేశలింగం, గిడుగు రామమూర్తి, గురజాడ అప్పారావు

యూనిట్ 2 : భావ కవిత్వం

Skill Development

4. భావ కవిత్వం - నిర్వచనం, లక్షణాలు, భావ కవితా శాఖలు
5. భావ కవులకు మార్గదర్శి - రాయప్రోలు సుబ్బారావు; భావ కవితా పితామహుడు దేవులపల్లి కృష్ణశాస్త్రి
6. ప్రసిద్ధ భావ కవులు, కృతులు- సమీక్ష

యూనిట్ 3 : అభ్యుదయ, విప్లవ కవిత్వాలు

Skill Development

7. అభ్యుదయ కవిత్వం, నిర్వచనం, అంతర్జాతీయ పరిణామాలు, నేపథ్యం; మార్క్సిజం ప్రభావం
8. శ్రీశ్రీ మహాప్రస్థానం; ప్రసిద్ధ అభ్యుదయ కవులు-కృతులు-సమీక్ష
9. తెలంగాణా పోరాట కవిత్వం, విప్లవ కవిత్వం

యూనిట్ 4 : వచన కవిత్వం

Skill Development

10. వచన కవిత్వం-ఆవిర్భావ వికాసాలు
11. నవ్య సంప్రదాయ కవిత్వం - స్వరూప స్వభావాలు, చరిత్ర
12. నయాగరా, చేతనావర్త, అనుభూతి కవులు-కృతులు-సమీక్ష

యూనిట్ 5 : సమకాలీన ఆధునిక కవితా ధోరణులు

Skill Development

13. స్త్రీవాద కవిత్వం-నేపథ్యం, ప్రధానాంశాలు, వస్తు వైవిధ్యం
14. ప్రసిద్ధ స్త్రీ వాద కవయిత్రులు-రచనలు
15. దళిత వాదం, మైనార్టీ వాదం, ప్రాంతీయవాదం

అన్నవరం సత్యవతీదేవి ప్రభుత్వ మహిళా కళాశాల (స్వయం ప్రతిపత్తి) కాకినాడ

బి.ఏ. రెండవ సంవత్సరం - సి.బి.సి.యస్. పాఠ్య ప్రణాళిక

స్పెషల్ తెలుగు - 2022-2023

సెమిస్టర్ - 3 పేపర్ - 3

ప్రాచీన తెలుగు సాహిత్య చరిత్ర

పాఠ్య ప్రణాళిక

యూనిట్ల సంఖ్య : 5

పీరియడ్ల సంఖ్య : 75

యూనిట్ 1 : ప్రాబ్లన్నయ యుగం

Skill Development

1. వాఙ్మయం - సారస్వతం - సాహిత్యం, సాహిత్య అధ్యయన పద్ధతులు
2. సాహిత్య చరిత్ర - యుగ విభజన, చరిత్ర - సంస్కృతి - సమాజం- సాహిత్యం సంబంధాలు.
3. ప్రాబ్లన్నయ యుగం - భాషా సాహిత్యాలు

యూనిట్ 2 : అనువాద యుగం

Skill Development

4. నన్నయ మహాభారత రచన, నన్నయ కవితా రీతులు; నన్నయ భారతాంధ్రీకరణ పద్ధతి
5. శివకవియుగంలోని దేవికవితోద్వయం- నన్నెచోడుడు, పండితారాధ్యుడు, పాల్కురికి సోమనాథుడు
6. మార్గ దేశిభేదాలు, దేశి కవితోద్వయం, పండిత త్రయం

యూనిట్ 3 : కావ్య-పురాణ యుగం

Skill Development

7. తిక్కన మహాభారత రచన; తిక్కన కవితాశిల్పం
8. ఎఱ్ఱన భారతారణ్యపర్వశేష రచన; ఎఱ్ఱన సూక్తి వైచిత్రి
9. నాచన సోమన-ఉత్తర హరివంశం; శ్రీనాథుని కృతులు-సమీక్ష;
పోతన భాగవత పురాణ రచన

యూనిట్ 4 : ప్రబంధయుగం

Skill Development

10. ప్రబంధ లక్షణాలు; శ్రీకృష్ణదేవరాయలు, అష్టదిగ్గజ కవులు-కృతులు-సమీక్ష
11. ఆముక్తమాల్యద-ప్రబంధలక్షణాలు-సమన్వయం
12. మనుచరిత్ర; వసుచరిత్ర - ప్రబంధ లక్షణాలు-సమన్వయం

యూనిట్ 5 : దక్షిణాంధ్ర యుగం

Skill Development

13. పద సాహిత్యం, శతక సాహిత్యం, వచన సాహిత్యం, యక్షగానాలు
14. దక్షిణాంధ్రయుగ వైశిష్ట్యం; రఘునాథ నాయకుడు-కృతులు సమీక్ష
15. దక్షిణాంధ్రయుగ ప్రసిద్ధ కవులు-కృతులు-సమీక్ష

ASD GOVT. DEGREE COLLEGE FOR WOMEN (A)

(Re- Accredited by NAAC with B Grade)

Jagannaickpur, Kakinada, East Godavari, AP – 533002

DEPARTMENT OF ZOOLOGY & AQUACULTURE TECHNOLOGY

ZOOLOGY

Skill Development, Employability and Entrepreneurship

2022-2023



ASD GOVT. DEGREE COLLEGE FOR WOMEN (A)
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Jagannaickpur, Kakinada, East Godavari, AP – 533002.

ZOOLOGY COURSE STRUCTURE

DETAILS OF PAPER TITLES, CREDITS AND MARKS

Sem	Course no.	Course Name	Course type (T/L/P)	Hrs./Week (Science:4+2)	Credits (Science:4+1)	Max. Marks Cont./ Internal/ Mid Assessment	Max. Marks Sem - end Exam
I	1	Animal Diversity – I Biology of Non- Chordates	T	4	4	25	75
		Animal Diversity – I Biology of Non- Chordates Lab	L	2	1	-	50
II	2	Animal Diversity –II Biology of Chordates	T	4	4	25	75
		Animal Diversity –II Biology of Chordates Lab	L	2	1	-	50
III	3	Cell Biology, Genetics, Molecular Biology & Evolution	T	4	4	25	75
		Cell Biology, Genetics, Molecular Biology & Evolution Lab	L	2	1	-	50
IV	4	Physiology, Cellular Metabolism & Embryology	T	4	4	25	75
		Physiology, Cellular Metabolism & Embryology Lab	L	2	1	-	50
	5	Immunology & Animal Biotechnology	T	4	4	25	75
		Immunology & Animal Biotechnology Lab	L	2	1	-	50
6A		Sustainable Aquaculture Management	T	4	4	25	75
		Sustainable Aquaculture Management Lab	L	2	1	-	50
		Post- Harvest Technology of Fish and Fisheries	T	4	4	25	75

V	7A	Postharvest Technology of Fish and Fisheries Lab	L	2	1	-	50	
	O R							
	6B	Live Stock Management-I (Biology of Dairy Animals)	T	4	4	25	75	
		Live Stock Management-I Lab (Biology of Dairy Animals)	L	2	1	-	50	
	7B	Live Stock Management -II (Dairy Production and Management)	T	4	4	25	75	
		Live Stock Management -II Lab (Dairy Production and Management)	L	2	1	-	50	
	O R							
	6C	Poultry Management- I (Poultry Farming)	T	4	4	25	75	
		Poultry Management- I Lab (Poultry Farming)	L	2	1	-	50	
	7C	Poultry Management- II (Poultry Production and Management)	T	4	4	25	75	
		Poultry Management- II Lab (Poultry Production and Management)	L	2	1	-	50	
	O R							
	6D	Seri Culture -I***	T	4	4	25	75	
		Seri Culture -I Lab	L	2	1	-	50	
	7D	Seri Culture -II	T	4	4	25	75	
		Seri Culture -II Lab	L	2	1	-	50	

ASD GOVT. DEGREE COLLEGE FOR WOMEN (A)
(Re-Accredited by NAAC with 'B' Grade)
Jagannaickpur, Kakinada, East Godavari, AP – 533002.
ANIMAL DIVERSITY - BIOLOGY OF NON- CHORDATES (2022-2023)
SEMESTER-I PAPER-I CREDITS: 4 HRS/WK: 4

Course Outcomes:

By the completion of the course the graduate should be able to –

- Describe general taxonomic rules on animal classification.
- Classify Protozoa to Coelenterata with taxonomic keys.
- Classify Phylum Platyhelminthes to Annelida phylum using examples from parasitic adaptation and vermin composting
- Describe Phylum Arthropoda to Mollusca using examples and importance of insects and Molluscs
- Describe Echinodermata to Hemichordata with suitable examples and larval stages in relation to the phylogeny.

Learning objectives

- To understand the taxonomic position of Protozoa to Helminths.
- To understand the general characteristics of animals belonging to Protozoa to Hemichordata.
- To understand the structural organization of animal phyla from Protozoa to Hemichordata.
- To understand the origin and evolutionary relationship of different phyla from Protozoa to Hemichordata.
- To understand the origin and evolutionary relationship of different phyla from Annelida to Hemichordata.

UNIT I

- 1.1 Principles of Taxonomy – Binomial nomenclature – Rules of nomenclature
- 1.2 Whittaker's five kingdom concept and classification of Animal Kingdom.

Additional Input: Branches of Biology, Scope of Zoology

Phylum Protozoa

- 1.3 General Characters and classification of protozoa up to classes with suitable examples

1.4 Locomotion, nutrition and reproduction in Protozoans

1.5 *Elphidium* (type study)

Additional Input: Common Parasitic Protozoans

UNIT –II

Phylum Porifera

2.1 General characters and classification up to classes with suitable examples

2.2 Skelton in Sponges

2.3 Canal system in sponges

Additional Input: Systematic Position of Porifera

Phylum Coelenterata

2.4 General characters and classification up to classes with suitable examples

2.5 Metagenesis in *Obelia*

2.6 Polymorphism in coelenterates

2.7 Corals and Coral reefs

Phylum Ctenophora:

2.8 General Characters and Evolutionary significance (affinities)

Unit – III

Phylum Platyhelminthes

3.1 General characters and classification up to classes with suitable examples

3.2 Life cycle and pathogenicity of *Fasciola hepatica*

3.3 Parasitic Adaptations in helminths

Phylum Nematelminths

3.4 General characters and classification up to classes with suitable examples.

3.5 Life cycle and pathogenicity of *Ascaris lumbricoides*

Additional Input: Wuchereria, Enterobius

Unit – IV

Phylum Annelida

4.1 General characters and classification up to classes with suitable examples

4.2 Evolution of Coelom and Coelomducts

4.3 Vermiculture - Scope, significance, earthworm species, processing,
Vermicompost, economic importance of vermicompost

Additional Input: Organic Farming

Phylum Arthropoda

4.4 General characters and classification up to classes with suitable examples

4.5 Vision and respiration in Arthropoda

4.6 Metamorphosis in Insects

4.7 *Peripatus* - Structure and affinities

4.8 Social Life in Bees and Termites

Additional Input: Beneficial Insects

Unit – V

Phylum Mollusca

5.1 General characters and classification up to classes with suitable examples

5.2 Pearl formation in Pelecypoda

5.3 Sense organs in Mollusca

Phylum Echinodermata

5.4 General characters and classification up to classes with suitable examples

5.5 Water vascular system in star fish

5.6 Larval forms of Echinodermata

Phylum Hemichordata

5.7 General characters and classification up to classes with suitable examples

5.8 *Balanoglossus* - Structure and affinities.

Co-curricular activities (suggested)

- Preparation of chart/model of phylogenic tree of life, 5-kingdom classification, *Elphidium* life cycle etc.
- Visit to Zoology Museum or Coral Island as part of Zoological tour.
- Charts on life cycle of *Obelia*, polymorphism, sponge spicules.

- Clay models of canal system in sponges.
- Preparation of charts on life cycles of *Fasciola* and *Ascaris*.
- Visit to adopted village and conducting awareness campaign on diseases, to people as part of Social Responsibility.
- Plaster-of-Paris or Pharmocol model of *Peripatus*
- Construction of a vermicompost in each college, manufacture of manure by students and donating to local farmers
- Models of compound eye, bee hive and termitarium (termitaria) by students
- Visit to Apiculture Centre and short-term training as part of apprenticeship programme of the govt. Of Andhra Pradesh.
- Chart on pearl forming layers using clay or Thermocol
- Visit to a pearl culture rearing industry/institute
- Live model of water vascular system
- Phylogeny chart on echinoderm larvae and their evolutionary significance
- Preparation of charts depicting the feeding mechanism, 3 coeloms, Tornaria larva etc., of *Balanoglossus*

REFERENCE BOOKS

1. **L.H. Hyman** „*The Invertebrates*’ Vol I, II and V. – M.C. Graw Hill Company Ltd.
2. **Kotpal, R.L. 1988 - 1992** Protozoa, Porifera, Coelenterata, Helminthes, Annelida, Arthropoda, Mollusca, Echinodermata. Rastogi Publications, Meerut.
3. **E.L. Jordan and P.S. Verma** *Invertebrate Zoology*’ S. Chand and Company.
4. **R.D. Barnes** ‘*Invertebrate Zoology*’ by W.B. Saunders CO., 1986.
5. **Barrington. E.J.W.**, „*Invertebrate structure and Function*’ by ELBS.
6. **P.S. Dhami and J.K. Dhami**. *Invertebrate Zoology*. S. Chand and Co. New Delhi.
7. **Parker, T.J. and Haswell** - *A text book of Zoology*’ by, W.A., Mac Millan Co.London.
8. **Barnes, R.D. (1982)**. *Invertebrate Zoology*, V Edition.

ASD GOVT. DEGREE COLLEGE FOR WOMEN (A)
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Jagannaickpur, Kakinada, East Godavari, AP – 533002.

ANIMAL DIVERSITY - BIOLOGY OF NON- CHORDATES PRACTICALS (2022-2023)

Semester-I Paper-I

Credits: 1

Hrs/Wk: 2

Learning Outcomes:

- To understand the importance of preservation of museum specimens
- To identify animals based on special identifying characters
- To understand different organ systems through demo or virtual dissections
- To maintain a neat, labeled record of identified museum specimens

Syllabus:

1. Study of museum slides / specimens / models (Classification of animals up to orders)

Protozoa: *Amoeba, Paramecium, Paramecium Binary fission and Conjugation, Vorticella, Entamoeba histolytica, Plasmodium vivax*

Porifera: *Sycon, Spongilla, Euspongia, Sycon- T.S & L.S, Spicules, Gemmule*

Coelenterata: *Obelia – Colony & Medusa, Aurelia, Physalia, Velella, Corallium, Gorgonia, Pennatula.*

Platyhelminthes: *Planaria, Fasciola hepatica, Fasciola larval forms – Miracidium, Redia, Cercaria, Echinococcus granulosus, Taenia solium, Schistosoma haematobium.*

Nemathelminths: *Ascaris (Male & Female), Dracunculus, Ancylostoma, Wuchereria* **Annelida:** *Nereis, Aphrodite, Chaetopterus, Hirudinaria, Trochophore larva*

Arthropoda: *Cancer, Palaemon, Scorpion, Scolopendra, Sacculina, Limulus, Peripatus, Larvae - Nauplius, Mysis, Zoea, Mouth parts of male & female Anopheles and Culex, Mouthparts of Housefly and Butterfly.*

Mollusca: *Chiton, Pila, Unio, Pteredo, Murex, Sepia, Loligo, Octopus, Nautilus, Glochidium larva*

Echinodermata: *Asterias, Ophiothrix, Echinus, Clypeaster, Cucumaria, Antedon, Bipinnaria larva*

Hemichordata: *Balanoglossus, Tornaria larva.*

2. Dissections:

Prawn: Appendages, Digestive system, Nervous system, Mounting of Statocyst

Insect Mouth Parts

Laboratory Record work shall be submitted at the time of practical examination

An “**Animal album**” containing photographs, cut outs, with appropriate write up about the above-mentioned taxa. Different taxa/ topics may be given to different sets of students for this purpose

Computer - aided techniques should be adopted or show virtual dissections

REFERENCE MANUALS:

1. Practical Zoology- Invertebrates S.S. Lal
2. Practical Zoology - Invertebrates P.S. Verma
3. Practical Zoology - Invertebrates K.P. Kurl
4. Ruppert and Barnes (2006) Invertebrate Zoology, 8th Edition, Holt Saunders International Edition.

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ANIMAL DIVERSITY – BIOLOGY OF CHORDATES (2022-2023)
Semester-II Paper-II Credits: 4 Hrs/Wk: 4

Course Outcomes: By the completion of the course the graduate should able to -

- Describe general taxonomic rules on animal classification of chordates
- Classify Protochordata to Mammalian with taxonomic keys
- Understand Mammals with specific structural adaptations
- Understand the significance of dentition and evolutionary significance
- Understand the origin and evolutionary relationship of different phyla from Prochordata to mammalian.

Learning objectives

- To understand the animal kingdom.
- To understand the taxonomic position of Protochordata to Mammalia.
- To understand the general characteristics of animals belonging to Fishes to Reptilians.
- To understand the body organization of Chordata.
- To understand the taxonomic position of Protherian mammals.

Unit I

- 1.1 General characters and classification of Chordata up to class level
- 1.2 Protochordata- Salient features of Cephalochordate,
- 1.3 Structure of *Branchiostoma*
- 1.4 Affinities of Cephalochordate.
- 1.5 Salient features of Urochordata
- 1.6 Structure and life history of *Herdmania*
- 1.7 Retrogressive metamorphosis –Process and Significance.

Unit II

- 2.1 Cyclostomata, General characters, Comparison of *Petromyzon* and *Myxine*
- 2.2 Pisces: General characters and classification of Fishes up to class level
- 2.3 *Scoliodon*: External features, Digestive system, Respiratory system, Structure and function of Heart, Structure and functions of the Brain.
- 2.4 Migration in Fishes

2.5 Types of Scales

2.6 Dipnoi.

Additional Input: Aortic arches, Vena Cavae, Cranial Nerves in *Scoliodon*

Unit - III

3.1 General characters of Amphibia

3.2 Classification of Amphibia up to orders with examples.

3.3 *Rana hexadactyla*: External features, Digestive system, Respiratory system, Structure and function of Heart, structure and functions of the Brain

3.4 Reptilia: General characters of Reptilia, Classification of Reptilia up to orders with examples

3.5 *Calotes*: External features, Digestive system, Respiratory system, Structure and function of Heart, structure and function of Brain

3.5. Identification of Poisonous snakes and Non poisonous snakes.

3.6. Skull in reptiles

Additional Input: Snake bite and first aid

Unit - IV

4.1 **Aves:** General characters of Aves

4.2 *Columba livia*: External features, Digestive system, Respiratory system, Structure and function of Heart, structure and function of Brain

4.3 Migration in Birds

4.4 Flight adaptation in birds

Additional Input: Types of feathers

Unit - V

5.1 General characters of Mammalia

5.2 Classification of Mammalia up to sub - classes with examples

5.3 Comparison of Prototherians, Metatherians and Eutherians

5.4 Dentition in mammals

Additional Input: Discontinuous distribution in Mammals

Co-curricular activities (suggested)

- Preparation of charts on Chordate classification (with representative animal photos) and retrogressive metamorphosis
- Thermocol or Clay models of Herdmania and Amphioxus
- Visit to local fish market and identification of local cartilaginous and bony fishes
- Maintaining of aquarium by students
- Thermocol model of fish heart and brain
- Preparation of slides of scales of fishes
- Visit to local/nearby river to identify migratory fishes and prepare study notes
- Preparation of Charts on above topics by students (Eg: comparative account of vertebrate heart/brain/lungs, identification of snakes etc.)
- Collecting and preparation of Museum specimens with dead frogs/snakes/lizards etc., and/or their skeletons
- Additional input on types of snake poisons and their antidotes (student activity).
- Collection of bird feathers and submission of report on Plumology
- Taxidermic preparation of dead birds for Zoology Museum
- Map pointing of prototherian and metatherian mammals
- Chart preparation for dentition in mammals

REFERENCE BOOKS

- J.Z. Young, 2006. The life of vertebrates. (The Oxford University Press, New Delhi). 646 pages. Reprinted
- Arumugam, N. Chordate Zoology, Vol. 2. Saras Publication. 278 pages. 200 figs.
- A.J. Marshall, 1995. Textbook of zoology, Vertebrates. (The McMillan Press Ltd., UK). 852 pages. (Revised edition of Parker & Haswell, 1961).
- M. Ekambaranatha Ayyar, 1973. A manual of zoology. Part II. (S. Viswanathan Pvt. Ltd., Madras).
- P.S. Dhama & J.K. Dhama, 1981. Chordate zoology. (R. Chand & Co.). 550 pages.

- Gurdarshan Singh & H. Bhaskar, 2002. Advanced Chordate Zoology. Campus Books, 6 Vols., 1573 pp., tables, figs.
- A.K. Sinha, S. Adhikari & B.B. Ganguly, 1978. Biology of animals. Vol. II. Chordates. (New Central Book Agency, Calcutta). 560 pages.
- R.L. Kotpal, 2000. Modern textbook of zoology, Vertebrates. (Rastogi Publ., Meerut). 632 pages.
- E.L. Jordan & P.S. Verma, 1998. Chordate zoology. (S. Chand & Co.). 1092 pages.
- G.S. Sandhu, 2005. Objective Chordate Zoology. Campus Books, vii, 169 pp.
- Sandhu, G.S. & H. Bhaskar, H. 2004. Textbook of Chordate Zoology. Campus Books, 2 vols., xx, 964 p., figs.
- Veena, 2008. Lower Chordata. (Sonali Publ.), 374 p., tables, 117 figs.

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PRACTICAL SYLLABUS FOR II SEMESTER -ZOOLOGY PAPER - II

ANIMAL DIVERSITY - BIOLOGY OF CHORDATES

Periods: 24

Credits:1 Hrs/Wk:2

Max. Marks: 50

Learning Outcomes:

- To understand the taxidermic and other methods of preservation of chordates.
- To identify chordates based on special identifying characters.
- To understand internal anatomy of animals through demo or virtual dissections, thus directing the student for “empathy towards the fellow living beings”
- To maintain a neat, labeled record of identified museum specimens.

Observation of the following Slides / Spotters / Models

1. Protochordata: *Herdmania, Amphioxus, Amphioxus* T.S through pharynx.
2. Cyclostomata: *Petromyzon and Myxine*.
3. Pisces: *Pristis, Torpedo, Hippocoampus, Exocoetus, Echeneis, Labeo, Catla, Clarius, Channa, Anguilla*.
4. Amphibia: *Ichthyophis, Amblystoma, Axolotl larva, Hyla*,
5. Reptilia: *Draco, Chamaeleon, Uromastix, Testudo, Trionyx, Russels viper, Naja, Krait, Hydrophis, Crocodile*.
6. Aves: *Psittacula, Eudynamis, Bubo, Alcedo*.
7. Mammalia: *Ornithorhynchus, Pteropus, Funambulus*.

Dissections-

1. *Scoliodon* IX and X, Cranial nerves
2. *Scoliodon* Brain
3. Mounting of fish scales

Note: 1. Dissections are to be demonstrated only by the faculty or virtual.

2. Laboratory Record work shall be submitted at the time of practical examination.

REFERENCE BOOKS:

1. S.S.Lal, Practical Zoology –Vertebrate

2. P.S.Verma, A manual of Practical Zoology – Chordata

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EAST GODAVARI, A.P, 533002.

ZOOLOGY SYLLABUS – SEMESTER III

**PAPER – III: CELL BIOLOGY, GENETICS, MOLECULAR BIOLOGY AND
EVOLUTION**

HOURS:60

Credits:4 Hrs/Wk:4

Max. Marks:100

Course Outcomes:

The overall course outcome is that the student shall develop deeper understanding of what life is and how it functions at cellular level. This course will provide students with a deep knowledge in Cell Biology, Animal Biotechnology and Evolution and by the completion of the course the graduate shall be able to –

CO1 To understand the basic unit of the living organisms and to differentiate the organisms by their cell structure.

CO2 Describe fine structure and function of plasma membrane and different cell organelles of eukaryotic cell.

CO3 To understand the history of origin of branch of genetics, gain knowledge on heredity, interaction of genes, various types of inheritance patterns existing in animals

CO4 Acquiring in-depth knowledge on various aspects of genetics involved in sex determination, human karyotyping and mutations of chromosomes resulting in various disorders

CO5 Understand the central dogma of molecular biology and flow of genetic information from DNA to proteins.

CO6 Understand the principles and forces of evolution of life on earth, the process of evolution of new species and apply the same to develop new and advanced varieties of animals for the benefit of the society.

Learning Objectives

- To understand the origin of cell and distinguish between prokaryotic and eukaryotic cell
- To understand the role of different cell organelles in maintenance of life activities
- To provide the history and basic concepts of heredity, variations and gene interaction
- To enable the students, distinguish between polygenic, sex-linked, and multiple allelic modes of inheritance.

- To acquaint student with basic concepts of molecular biology as to how characters are expressed with a coordinated functioning of replication, transcription and translation in all living beings
- To provide knowledge on origin of life, theories and forces of evolution To understand the role of variations and mutations in evolution.

Unit – I Cell Biology

- 1.1 Definition, history, prokaryotic and eukaryotic cells, virus, viroids, mycoplasma
- 1.2 Electron microscopic structure of animal cell.
- 1.3 Plasma membrane –Models and transport functions of plasma membrane.
- 1.4 Structure and functions of Golgi complex, Endoplasmic Reticulum and Lysosomes.
- 1.5 Structure and functions of Ribosomes, Mitochondria, Nucleus, Chromosomes

(Note: 1. General pattern of study of each cell organelle – Discovery, Occurrence, Number, Origin, Structure and Functions with suitable diagrams)
2. Need not study cellular respiration under mitochondrial functions)

Unit – II Genetics - I

- 2.1 Mendel's work on transmission of traits
- 2.2 Gene Interaction – Incomplete Dominance, Co-Dominance, Lethal Genes
- 2.3 Polygenes (General Characteristics & examples); Multiple Alleles (General Characteristics) and **Blood group inheritance.**
- 2.4 Sex determination (Chromosomal, Genic Balance, Hormonal, Environmental and Haplo-diploidy types of sex determination)
- 2.5 Sex linked inheritance (X-linked, Y-linked & XY-linked inheritance)

Additional Inputs: Role of Mendel's laws in the production of Hybrids, Bombay Blood Group.

Unit – III Genetics - II

- 3.1 Mutations & Mutagenesis
- 3.2 Chromosomal Disorders (Autosomal and Allosomal)
- 3.3 Human Genetics – Karyotyping, Pedigree Analysis (basics)
- 3.4 Basics on Genomics and Proteomics

Unit IV: Molecular Biology

4.1 Central Dogma of Molecular Biology

4.2 Basic concepts of -

- a. DNA replication – Overview (Semi-conservative mechanism, Semi-discontinuous mode, Origin & Propagation of replication fork)
- b. Transcription in prokaryotes – Initiation, Elongation and Termination, Post transcriptional modifications (basics)
- c. Translation – Initiation, Elongation and Termination

4.3 Gene Expression in prokaryotes (Lac Operon); Gene Expression in eukaryotes

Additional Inputs: Structure and types of DNA

Unit - V

5.1 Origin of life

5.2 Theories of Evolution: Lamarckism, Darwinism, Germ Plasm Theory, Mutation Theory

5.3 Neo-Darwinism: Modern Synthetic Theory of Evolution, Hardy-Weinberg Equilibrium

5.4 Forces of Evolution: Isolating mechanisms, Genetic Drift, Natural Selection, Speciation

Additional Inputs: Origin of Earth

Co-curricular activities (Suggested):

- Model of animal cell
- Working model of mitochondria to encourage creativity among students
- Photo album of scientists of cell biology
- Charts on plasma membrane models/cell organelles
- Observation of Mendelian / Non-Mendelian inheritance in the plants of college botanical garden or local village as a student study project activity
- Observation of blood group inheritance in students, from their parents and grand parents
- Karyotyping and preparation of pedigree charts for identifying diseases in family history
- Charts on chromosomal disorders
- Charts on central dogma/lac operon/genetic code
- Model of semi-conservative model of DNA replication
- Model of tRNA and translation mechanism
- Power point presentation of transcription or any other topic by students

- Draw geological time scale and highlight important events along the time
- Chart on industrial melanism to teach directed selection, Darwin's finches to teach genetic drift, collection of data on weight of children born in primary health centres to teach stabilizing selection etc.
- Chart on industrial melanism to teach directed selection, Darwin's finches to teach genetic drift, collection of data on weight of children born in primary health centres to teach stabilizing selection etc.

REFERENCES:

1. Lodish, Berk, Zipursky, Matsudaria, Baltimore, Darnell „Molecular Cell Biology” W.H.Freeman and company New York.
2. Cell Biology by De Robertis
3. Bruce Alberts, Molecular Biology of the Cell
4. Rastogi, Cytology
5. Varma & Aggarwal, Cell Biology
6. C.B. Pawar, Cell Biology
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8. Snustad, D.P., Simmons, M.J. (2009). Principles of Genetics. V Edition. John Wiley and Sons Inc.
9. Klug, W.S., Cummings, M.R., Spencer, C.A. (2012). Concepts of Genetics. X Edition. Benjamin Cummings.
10. Russell, P. J. (2009). Genetics- A Molecular Approach. III Edition. Benjamin Cummings.
11. Griffiths, A.J.F., Wessler, S.R., Lewontin, R.C. and Carroll, S.B. Introduction to Genetic Analysis. IX Edition. W. H. Freeman and Co.
12. Ridley, M. (2004). Evolution. III Edition. Blackwell Publishing
13. Molecular Biology by freifielder
14. Instant Notes in Molecular Biology by Bios scientific publishers and Viva Books Private Limited
15. Hall, B. K. and Hallgrimsson, B. (2008). Evolution. IV Edition. Jones and Bartlett Publishers
16. Campbell, N. A. and Reece J. B. (2011). Biology. IX Edition, Pearson, Benjamin, Cummings.
17. Douglas, J. Futuyma (1997). Evolutionary Biology. Sinauer Associates.
18. Minkoff, E. (1983). Evolutionary Biology. Addison-Wesley.

19. James D. Watson, Nancy H. Hopkins „Molecular Biology of the Gene“
20. Jan M. Savage. Evolution, 2nd ed, Oxford and IBH Publishing Co., New Delhi.
21. Gupta P.K.,Genetics

ASD GOVT. DEGREE COLLEGE FOR WOMEN (A)
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Jagannaickpur, Kakinada, East Godavari, AP – 533002
Semester-III, Paper-III

(CELL BIOLOGY, GENETICS, MOLECULAR BIOLOGY AND EVOLUTION)
PRACTICAL SYLLABUS (2022-2023)

Learning Objectives:

- Acquainting and skill enhancement in the usage of laboratory microscope Hands-on experience of different phases of cell division by experimentation
- Develop skills on human Karyotyping and identification of chromosomal disorders
- To apply the basic concept of inheritance for applied research
- To get familiar with phylogeny and geological history of origin & evolution of animals

I. Cell Biology

1. Preparation of temporary slides of Mitotic divisions with onion root tips
2. Observation of various stages of Mitosis and Meiosis with prepared slides
3. Mounting of salivary gland chromosomes of *Chironomus*

II. Genetics

1. Study of Mendelian inheritance using suitable examples and problems.
2. Problems on blood group inheritance and sex-linked inheritance.
3. Study of human Karyotypes (Down's syndrome, Edwards syndrome, Patau's Syndrome, Turner's syndrome and Klinefelter's syndrome).

III. Evolution

1. Study of fossil evidences.
2. Study of homology and analogy from suitable specimens and pictures.
3. Phylogeny of horse with pictures.
4. Study of Genetic Drift by using examples of Darwin's finches(pictures).
5. Visit to Natural History Museum and submission of report.

REFERENCE BOOKS:

1. Burns GW. 1972. *The Science of Genetics. An Introduction to Heredity*. Mac Millan Publ. Co. Inc.
2. Gardner EF. 1975. *Principles of Genetics*. John Wiley & Sons, Inc. New York.
3. Harth and Jones EW. 1998. *Genetics – Principles and Analysis*. Jones and BarHett Publ. Boston.
4. Levine L. 1969. *Biology of the Gene*. Toppan.
5. Pedder IJ. 1972. *Genetics as a Basic Guide*. W. Norton & Company, Inc.
6. Rastogi VB. 1991. *A Text Book of Genetics*. Kedar Nath Ram Nath Publications, Meerut, Uttar Pradesh, India.
7. Rastogi VB. 1991. *Organic Evolution*. Kedar Nath RamNath Publications, Meerut, Uttar Pradesh, India.
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Jagannaickpur, Kakinada, East Godavari, AP – 533002
ZOOLOGY-Semester-IV, Paper-IV (2022-2023)

ANIMAL PHYSIOLOGY, CELLULAR METABOLISM AND EMBRYOLOGY
Credits:4 Hrs/Wk:4

Course Outcomes:

This course will provide students with a deep knowledge in Physiology, Cellular metabolism and Molecular Biology and by the completion of the course the graduate shall able to –

- Understand the functions of important animal physiological systems including digestion, cardio- respiratory and renal systems.
- Understand the muscular system and the neuro-endocrine regulation of animal growth, development and metabolism with a special knowledge of hormonal control of human reproduction.
- Describe the structure, classification and chemistry of Biomolecules and enzymes responsible for sustenance of life in living organisms
- Develop broad understanding the basic metabolic activities pertaining to the catabolism and anabolism of various Biomolecules
- Describe the key events in early embryonic development starting from the formation of gametes up to gastrula ion and formation of primary germ layers.

Learning Objectives

- To achieve a thorough understanding of various aspects of physiological systems and their functioning in animals.
- To instill the concept of hormonal regulation of physiology, metabolism and reproduction in animals.
- To understand the disorders associated with the deficiency of hormones.
- To demonstrate a thorough knowledge of the intersection between the disciplines of Biology and Chemistry.
- To provide insightful knowledge on the structure and classification of carbohydrates, proteins, lipids and enzymes.
- To demonstrate an understanding of fundamental biochemical principles such as the function

of Biomolecules, metabolic pathways and the regulation of biochemical processes.

- To make students gain proficiency in laboratory techniques in biochemistry and orient them to apply the scientific method to the processes of experimentation and hypothesis testing.

UNIT I:

Animal Physiology -I: Process of digestion and assimilation, Respiration - Pulmonary ventilation, transport of oxygen and CO₂, (Note: Need not study cellular respiration here), Circulation - Structure and functioning of heart, Cardiac cycle, Excretion - Structure and functions of kidney urine formation, counter current Mechanism.

Additional Inputs: Classification of animals based on Feeding habits and Excretory Products.

UNIT II:

Animal Physiology -II: Nerve impulse transmission - Resting membrane potential, origin and propagation of action potentials along myelinated and non-myelinated nerve fibers. Muscle contraction - Ultra structure of muscle, molecular and chemical basis of muscle contraction. Endocrine glands - Structure, functions of hormones of pituitary, thyroid, parathyroid, adrenal glands and pancreas, Hormonal control of reproduction in a mammal.

Additional Inputs: Structure and types of Neurons, Types of muscles

UNIT III:

Cellular Metabolism –I(Biomolecules) Carbohydrates - Classification of carbohydrates. Structure of glucose Proteins - Classification of proteins. General properties of amino acids Lipids - Classification of lipids. Enzymes: Classification and Mechanism of Action.

Additional Inputs: Structure of Fructose, Sucrose

UNIT IV:

Cellular Metabolism –II: Carbohydrate Metabolism - Glycolysis, Krebs cycle, Electron Transport Chain, Glycogen metabolism, Gluconeogenesis, Lipid Metabolism – Synthesis of fatty acids, β -oxidation of palmitic acid Protein metabolism - Transamination, Deamination and Urea Cycle.

UNIT V:

Embryology: Gametogenesis, Fertilization, Types of eggs, Types of cleavages, Development of

Frog up to formation of primary germ layers

Co-curricular activities (Suggested)

- Chart on cardiac cycle, human lung, kidney/nephron structure etc.
- Working model of human / any mammalian heart.
- Chart of sarcomere/location of endocrine glands in human body
- Chart affixing of photos of people suffering from hormonal disorders
- Student study projects such as identification of incidence of hormonal disorders in the local primary health centre, studying the reasons thereof and measures to curb or any other as the lecturer feels good in nurturing health awareness among students
- Chart on structures of Biomolecules/types of amino acids (essential and non- essential)
Chart preparation by students on Glycolysis / Kerb's cycle/urea cycle etc.
- Model of electron transport chain
- Preparation of models of different types of eggs in animals
- Chart on frog embryonic development, fate map of frog blastula, cleavage etc.

REFERENCE BOOKS:

1. Eckert H. *Animal Physiology: Mechanisms and Adaptation*. W.H. Freeman & Company.
2. Flory E. *An Introduction to General and Comparative Animal Physiology*. W.B. Saunders Co., Philadelphia.
3. Goel KA and Satish KV. 1989. *A Text Book of Animal Physiology*, Rastogi Publications, Meerut, U.P.
4. Hoar WS. *General and Comparative Physiology*. Prentice Hall of India, New Delhi.
5. Lehninger AL. Nelson and Cox. *Principles of Biochemistry*. Lange Medical Publications, New Delhi.
6. Prosser CL and Brown FA. *Comparative Animal Physiology*. W.B. Saunders Company, Philadelphia.
7. *Developmental Biology* by Balinsky
8. *Developmental Biology* by Gerard Karp

9. Chordate embryology by Varma and Agarwal
10. Embryology by V. B. Rastogi
11. Austen CR and Short RV. 1980. *Reproduction in Mammals*. Cambridge University Press.
12. Gilbert SF. 2006. *Developmental Biology*, 8th Edition. Sinauer Associates Inc., Publishers, Sunderland, USA.
13. Longo FJ. 1987. *Fertilization*. Chapman & Hall, London.
14. Rastogi VB and Jaya raj MS. 1989. *Developmental Biology*. Kedar Nath Ram Nath Publishers, Meerut, Uttar Pradesh.
15. Schatten H and Schatten G. 1989. *Molecular Biology of Fertilization*. Academic Press, New York.

ASD GOVT. DEGREE COLLEGE FOR WOMEN (A)
(Re- Accredited by NAAC with 'B' Grade)
Jagannaickpur, Kakinada, East Godavari, AP – 533002

ZOOLOGY PAPER-IV, SEMESTER-IV

ANIMAL PHYSIOLOGY, CELLULAR METABOLISM AND EMBRYOLOGY PRACTICALS

Credits:1 Hrs./Wk:2 Max.Marks:50

Learning Objectives:

- Identification of an organ system with histological structure.
- Deducing human health based on the information of composition of blood cells.
- Demonstration of enzyme activity *in-vitro*.
- Identification of various Biomolecules of tissues by simple colorimetric methods and also quantitative methods.
- Identification of different stages of earl embryonic development in animals.

I. Animal Physiology

1. Qualitative tests for identification of carbohydrates, proteins and fats.
2. Study of activity of salivary amylase under optimum conditions.
3. T.S. of duodenum, liver, lung, kidney, spinal cord, bone and cartilage.
4. Differential count of human blood.

II. Cellular metabolism

1. Estimation of total proteins in given solutions by Lowry's method.
2. Estimation of total carbohydrate by Anthrone method.
3. Qualitative tests for identification of ammonia, urea and uric acid
4. Protocol for Isolation of DNA in animal cells

III. Embryology

1. Study of T.S. of testis, ovary of a mammal
2. Study of different stages of cleavages (2, 4, 8 cell stages)
3. Construction of fate map of frog blastula

REFERENCE BOOKS:

- Harper's Illustrated Biochemistry
- Cell and molecular biology: Concepts & experiments. VI Ed. John Wiley & sons. Inc.
- Lab Manual on Blood Analysis and Medical Diagnostics, S. Chand and Co. Ltd.
- Laboratory techniques by Plummer.

ASD GOVT. DEGREE COLLEGE FOR WOMEN (A)
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Jagannaickpur, Kakinada, East Godavari, AP – 533002
ZOOLOGY- PAPER-V SEMESTER-IV (2022-2023)
IMMUNOLOGY AND ANIMAL BIOTECHNOLOGY SYLLABUS
Credits:4 Hrs/Wk:4

Course Outcomes:

This course will provide students with a deep knowledge in immunology, genetics, embryology and ecology and by the completion of the course the graduate shall able to –

- To get knowledge of the organs of Immune system, types of immunity, cells and organs of immunity.
- To describe immunological response as to how it is triggered (antigens) and regulated(antibodies)
- Understand the applications of Biotechnology in the fields of industry and agriculture including animal cell/tissue culture, stem cell technology and genetic engineering.
- Get familiar with the tools and techniques of animal biotechnology.

Learning Objectives

- To trace the history and development of immunology
- To provide students with a foundation in immunological processes
- To be able to compare and contrast the innate versus adaptive immune systems and humoral versus cell-mediated immune responses
- Understand the significance of the Major His to compatibility Complex in terms of immune response and transplantation
- To provide knowledge on animal cell and tissue culture and their preservation
- To empower students with latest biotechnology techniques like stem cell technology, genetic engineering, Hybridoma technology, transgenic technology and their application in medicine and industry for the benefit of living organisms
- To explain *in vitro* fertilization, embryo transfer technology and other reproduction manipulation methodologies.
- To get insight in applications or recombinant DNA technology in agriculture,

production of therapeutic proteins.

- To understand principles of animal culture, media preparation.

UNIT I:

Immunology – I (Overview of Immune system): Introduction to basic concepts in Immunology, Innate and adaptive immunity, Vaccines and Immunization programme, Cells of immune system, Organs of immune system

UNIT II: Immunology – II (Antigens, Antibodies, MHC and Hypersensitivity)

Antigens: Basic properties of antigens, B and T cell epitopes, haptens and adjuvant; Factors influencing immunogenicity

Antibodies: Structure of antibody, Classes and functions of antibodies, Structure and functions of Major Histocompatibility Complexes, Exogenous and Endogenous pathways of antigen presentation and processing, Hypersensitivity – Classification and Types

Additional Input: Autoimmune disorders and Immunodeficiency disorders

UNIT III:

Techniques: Animal Cell, Tissue and Organ culture media: Natural and Synthetic media, Cell cultures: Establishment of cell culture (primary culture, secondary culture, types of cell lines; Protocols for Primary Cell Culture); Established Cell lines (common examples such as MRC, HeLa, CHO, BHK, Vero); Organ culture; Cryopreservation of cultures.

Stem cells: Types of stem cells and applications, Hybridoma Technology: Production & applications of Monoclonal antibodies (MAbs).

UNIT IV:

Applications of Animal Biotechnology: Genetic Engineering: Basic concept, Vectors, Restriction Endonucleases and Recombinant DNA technology.

Gene delivery: Microinjection, electroporation, biolistic method (gene gun), liposome and viral-mediated gene delivery.

Transgenic Animals: Strategies of Gene transfer; Transgenic - sheep, fish; applications Manipulation of reproduction in animals: Artificial Insemination, *In-vitro* fertilization, super ovulation, Embryo transfer, Embryo cloning.

UNIT V:

PCR: Basics of PCR.

DNA Sequencing: Sanger's method of DNA sequencing- traditional and automated sequencing (2hrs) **Hybridization techniques:** Southern, Northern and Western blotting DNA fingerprinting: Procedure and applications.

Applications in Industry and Agriculture: Fermentation: Different types of Fermentation and Downstream processing.

Agriculture: Monoculture in fishes, polyploidy in fishes.

Co-curricular activities (suggested)

- Organizing awareness on immunization importance in local village in association with NCC and NSS teams.
- Charts on types of cells and organs of immune system
- Student study projects on aspects such as – identification of allergies among students (hypersensitivity), blood groups in the class (antigens and antibodies duly reported) etc., as per the creativity and vision of the lecturer and students
- Visit to research laboratory in any University as part of Zoological tour and exposure and/ or hands- on training on animal cell culture.
- Visit to biotechnological laboratory in university or any central/state institutes and create awareness on PCR, DNA finger printing and blot techniques or Visit to a fermentation industry or Visit to a local culture pond and submit report on culture of fishes etc.

REFERENCE BOOKS:

1. Immunology by Ivan M. Riott
2. Immunology by Kubey
3. Sree krishna V. 2005. *Biotechnology –I*,
4. *Cell Biology and Genetics*. New Age International Publ. New Delhi, India.

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Jagannaickpur, Kakinada, East Godavari, AP – 533002

ZOOLOGY PAPER-V SEMESTER-IV

IMMUNOLOGY AND ANIMAL BIOTECHNOLOGY PRACTICALS (2022-2023)

Credits:4

Hrs /Wk:4 Max. Marks: 50

Learning Objectives:

- a. Acquainting student with immunological techniques vis-à-vis theory taught in the classroom
- b. Interconnect the theoretical and practical knowledge of immunity with the outer world for the development of a healthier life.
- c. Demonstrate basic laboratory skills necessary for Biotechnology research
- d. Promoting application of the lab techniques for taking up research in higher studies

I. Immunology

1. Demonstration of lymphoid organs (as per UGC guidelines)
2. Histological study of spleen, thymus and lymph nodes (through prepared slides)
3. Blood group determination
4. Demonstration of
 - a. ELISA
 - b. Immune electrophoresis

II. Animal biotechnology

1. DNA quantification using DPA Method.
2. Techniques: Western Blot, Southern Hybridization, DNA Fingerprinting
3. Separation, Purification of biological compounds by paper, Thin-layer and Column chromatography
4. Cleaning and sterilization of glass and plastic wares for cell culture.
5. Preparation of culture media.

REFERENCE BOOKS:

1. Immunology Lab Biology 477 Lab Manual; Spring 2016 Dr. Julie Jameson
2. Practical Immunology A Laboratory Manual; LAP LAMBERT Academic Publishing
3. Manual of laboratory experiments in cell biology by Edward
4. Laboratory Techniques by Plummer

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ZOOLOGY- SEMESTER-V PAPER-6A (2022-2023)
SUSTAINABLE AQUACULTURE MANAGEMENT

Credits: 4

Hrs/Wk: 4

Learning Outcomes:

Students at the successful completion of this course will be able to

- Evaluate the present status of aquaculture at the Global level and National level
- Classify different types of ponds used in aquaculture
- Demonstrate induced breeding of carps
- Acquire critical knowledge on commercial importance of shrimps
- Identify fin and shell fish diseases

Syllabus

UNIT I:

1.1 Present status of Aquaculture – Global and National scenario.

1.2 Major cultivable species for aquaculture: freshwater, brackish water and marine.

1.3 Traditional, extensive, modified extensive, semi-intensive and intensive cultures of fish and shrimp.

1.4 Design and construction of fish and shrimp farms.

UNIT II:

2.1 Functional classification of ponds – head pond, hatchery, nursery ponds

2.2 Functional classification of ponds -rearing, production, stocking and quarantine ponds

2.3 Need of fertilizer and manure application in culture ponds

2.4 Physio-chemical conditions of soil and water optimum for culture (Temperature, depth, turbidity, light, water, PH, BOD, CO₂ and nutrients)

UNIT III:

3.1. Induced breeding in fishes

3.2. Culture of Indian major carps: Pre-stocking management (Dewatering, drying, ploughing /desilting, predators, weeds and algal blooms and their control, Liming and

fertilization)

3.3. Culture of Indian major carps - Stocking management

3.4. Culture of Indian major carps - post-stocking management

UNIT IV:

4.1 Commercial importance of shrimp & prawn.

4.2 Macrobrachium rosenbergii- biology, seed production.

4.3 Culture of L. vannamei – hatchery technology and culture practices.

4.4 Mixed culture of fish and prawns.

UNIT V:

5.1 Viral diseases of Fin Fish & shell fish.

5.2 Fungal diseases of Fin & Shell fish..

5.3 Bacterial diseases of Finfish & Shell fish

5.4 Prophylaxis in aquaculture.

REFERENCES:

1. Pillay TVR & M.A. Dill, 1979. Advances in Aquaculture. Fishing News Books Ltd., London
2. Stickney RR 1979. Principles of Warm Water Aquaculture. John Wiley & Sons Inc.1981
3. Boyd CE 1982. Water Quality Management for Pond Fish Culture. Elsevier Scientific Publishing Company.
4. Bose AN et.al. 1991. Costal Aquaculture Engineering. Oxford & IBH Publishing Company Pvt. Ltd.

Web Links:

1. http://www.fao.org/fishery/docs/CDrom/FAO_Training/FAO_Training/General/x6708e/x6708e06.htm
2. http://aquaticcommons.org/1666/1/Better-Practice3_opt.pdf
3. <https://www.notesonzoology.com/india/fishery/fish-diseases-symptoms-and-control-fishery/871>

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ZOOLOGY- PAPER-6A SEMESTER-V (2022-2023)
SUSTAINABLE AQUACULTURE MANAGEMENT PRACTICAL SYLLABUS
Credits: 1 Hrs/Wk: 2 Max Marks: 50

Learning Outcomes:

On successful completion of this practical course, student shall be able to:

- Identify the characters of Fresh water cultivable species
- Estimate physico - chemical characteristics of water used for aquaculture
- Examine the diseases of fin and shell fish
- Suggest measures to prevent diseases in aquaculture

Syllabus:

1. Fresh water Cultivable species any (Fin & Shell Fish Specimens – Observation of morphological characters by observation and drawings)-5
2. Brackish water cultivable species (Fin & Shell fish- Specimens- Observation of Morphological Character by observing drawing) -5
3. Hands on training on the use of kits for determination of water quality in aquaculture (DO, Salinity, pH, Turbidity- Testing kits to be used for the estimation of various parameters/ Standard procedure can be demonstrated for the same)
4. Demonstration of Hypophysation (Procedure of hypophysation to be demonstrated in the practical lab with any edible fish as model)
5. Viral diseases of Fin & Shell Fish (Observation of his to pathological slides / Charts/ Models of viral pathogens in fin/ shell fish – one edible specimen can be used for observation of same in the laboratory)
6. Bacterial diseases of Fin & Shell Fish (Observation of his to pathological slides / Charts/

Models of Bacterial pathogens in fin/ shell fish – One edible specimen can be used for observation of same in the laboratory)

7. Fungal diseases of Fin & Shell Fish (Observation of his to pathological slides / Charts/ Models of Bacterial pathogens in fin/ shell fish – One edible specimen can be used for observation of same in the laboratory)

LAB REFERENCES

1. Boyd CE 1982. Water Quality Management for Pond Fish Culture. Elsevier Scientific Publishing Company
2. http://www.fao.org/fishery/docs/CDrom/FAO_Training/FAO_Training/General/x6708e/x67_08e06.htm
3. http://aquaticcommons.org/1666/1/Better-Practice3_opt.pdf
4. <https://www.notesonzoology.com/india/fishery/fish-diseases-symptoms-and-control-fishery/871>

Web resources suggested by the teacher concerned and the college librarian including reading material

Co-Curricular Activities

a) **Mandatory:**(Student training by teacher in field skills: Total 15 hrs., Lab:10 + field 05)

1. For Teacher: Training of students by the teacher in laboratory/field for not less than 15 hours on Breeding- Induced breeding in carps -hatchery technology of *L. vannamei*- Farming techniques- disease diagnostic techniques—concepts –Demonstration @ any aqua laboratory
2. For Student: Students shall (individually) visit a Hatchery/Farm/ Aqua diagnostic center and make careful observations of the process method and implements- protocols and report on the same in 10 pages hand written Fieldwork/Project work Report.
3. Max marks for Fieldwork/Project work Report: 05.
4. Suggested Format for Fieldwork/Project work: Title page, student details, index page, details of place visited, observations made, findings and acknowledgements.
5. (IE). Unit tests.

b) Suggested Co-Curricular Activities

1. Preparation of Model/Charts of Cultivable species of fin fish shell fish
2. Preparation of Model/Chart of Ideal fish Pond- with the standards prescribed.
3. Observation of aquaculture activities in their area (Observation of any activity related to aquaculture in the vicinity of the college/village).
4. Preparation of Model – charts of Fin /Shell fish Diseases with eco-friendly material.
5. Assignments, Group discussion, Seminar, Quiz, Collection of Material, Video preparation etc., Invited lecture.

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Semester: V (Skill Enhancement Course - Elective), Paper-7A (2022-2023)
POSTHARVEST TECHNOLOGY OF FISH AND FISHERIES
Credits: 4 Hrs/Wk: 4

Learning Outcomes:

Students at the successful completion of this course will be able to

- Identify the types of preservation methods employed in aquaculture
- Choose the suitable Processing methods in aquaculture
- Maintain the standard quality control protocols laid down in aqua industry
- Identify the best Seafood quality assurance system

SYLLABUS:

UNIT I: Handling and Principles of fish Preservation

- 1.1 Handling of fresh fish, storage and transport of fresh fish, post mortem changes (rigor mortis and spoilage), spoilage in marine fish and freshwater fish.
- 1.2 Principles of preservation – cleaning, lowering of temperature, rising of temperature, denudation, use of salt, use of fish preservatives, exposure to low radiation of gamma rays.

UNIT II: Methods of fish Preservation

- 2.1 Traditional methods - sun drying, salt curing, pickling and smoking.
- 2.2. Advanced methods – chilling or icing, refrigerated sea water, freezing, canning, irradiation and Accelerated Freeze drying (AFD).

UNIT III: Processing and preservation of fish and fish by-products

- 3.1 Fish products – fish minced meat, fish meal, fish oil, fish liquid (ensilage), fish protein concentrate, fish chowder, fish cake, fish sauce, fish salads, fish powder, pet food from trash fish, fish manure.
- 3.2 Fish by-products – fish glue, Using glass, chitosan, pearl essence, shark fins, fish Leather and fish maws.

UNIT IV: Sanitation and Quality control

4.1 Sanitation in processing plants - Environmental hygiene and Personal hygiene in processing plants.

4.2 Quality Control of fish and fishery products – pre-processing control, control during processing and control after processing.

UNIT V: Quality Assurance, Management and Certification

5.1. Seafood Quality Assurance and Systems: Good Manufacturing Practices (GMPs); Good Laboratory Practices (GLPs); Standard Operating Procedures (SOPs); Concept of Hazard Analysis and Critical Control Points (HACCP) in seafood safety.

5.2 National and International standards – ISO 9000: 2000 Series of Quality Assurance System, Codex Alimentarius.

REFERENCES:

1. Santharam R, N Sukumaran and P Natarajan 1987. A manual of aquaculture, Oxford- IBH, NewDelhi
2. Lakshmi Prasad's, Fish Processing Technology 2012, Arjun Publishing House
3. Dr Sunitha Rai, Fish Processing Technology, 2015, Random Publications
4. Safety and Quality Issues in Fish Processing (Woodhead Publishing Series in Food Science, Technology and Nutrition) by H A Bremner
5. K.A Mahanthy, Innovations in Fishing and Fish Processing Technologies, January 2021

Web Resources:

1. <http://ecoursesonline.iasri.res.in/mod/page/view.php?id=145743>
2. https://ecourses.icar.gov.in/e-Learningdownload3_new.aspx?Degree_Id=03

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Semester: V (Skill Enhancement Course - Elective), Paper-7A (2022-2023)
POSTHARVEST TECHNOLOGY OF FISH AND FISHERIES PRACTICALS
Credits: 1 Hrs/Wk: 2

Learning Outcomes: On successful completion of this practical course, student shall be able to:

- Identify the quality of aqua processed products.
- Determine the quality of fishery by products by observation
- Analyze the protocols of aqua processing methods

Practical (Laboratory) Syllabus:

1. Evaluation of fish/ fishery products for organoleptic, chemical and microbial quality.
2. Preparation of dried, cured and fermented fish products
3. Examination of salt, protein, moisture in dried / cured products
4. Examination of spoilage of dried / cured fish products, marinades, pickles, sauce.
5. Preparation of isinglass, collagen and chitosan from shrimp and crab shell.
6. Developing flow charts and exercises in identification of hazards – preparation of hazard analysis worksheet
7. Corrective action procedures in processing of fish- flow chart- work sheet preparation

(* Refer the following web sites for complete procedure method and estimations of above listed practicals)

REFERENCES:

1. Dr Sunitha Rai, Fish Processing Technology, 2015, Random Publications
2. https://ecourses.icar.gov.in/e-Learningdownload3_new.aspx?Degree_Id=03
3. <https://vikaspedia.in/agriculture/fisheries/post-harvest-and-marketing/processing-in-fisheries/fermented-products>
4. <https://krishi.icar.gov.in/jspui/bitstream/123456789/20500/1/Fermentation%20technology%20for%20fish.pdf>
5. <http://jebas.org/00200620122014/Abujam%20et%20al%20JEBAS.pdf>
6. https://krishi.icar.gov.in/jspui/bitstream/123456789/20770/1/Training%20Manual_Hygienic%20drying%20and%20packing%20of%20fish.pdf
7. [%20drying%20and%20packing%20of%20fish.pdf](#)

8. https://krishi.icar.gov.in/jspui/bitstream/123456789/20770/1/Training%20Manual_Hygienic%20drying%20and%20packing%20of%20fish.pdf
9. https://agritech.tnau.ac.in/fishery/fish_byproducts.html
10. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5352841/>
11. <http://www.fao.org/3/i1136e/i1136e.pdf>
12. <http://www.fao.org/3/x5989e/X5989e01.htm#What%20is%20sensory%20assessment>

Web resources suggested by the teacher concerned and the college librarian including reading material.

Co-Curricular Activities

a) Mandatory: (*Lab/field training of students by teacher (lab 10 + field 05):*)

1. For Teacher: Training of students by the teacher in laboratory/field for not less than 15 hours on various steps of post-harvest techniques of fishes, on the advanced techniques in post-harvest technology – Training of students on other employability skills in the Post-harvest sector of Aquaculture Industry- like Processing, Packing, marketing of processed aqua products.
2. For Student: Students shall (individually) visit - Any fish/shrimp Processing Plant/Packing industry and make observations on post harvesting techniques and submit a brief handwritten Fieldwork/Project work Report with pictures and data /survey in 10 pages.
3. Max marks for Fieldwork/Project work Report: 05.
4. Suggested Format for Fieldwork/Project work: *Title page, student details, index page, details of place visited, observations made, findings and acknowledgements*
5. (IE): Unit tests,

b) Suggested Co-Curricular Activities

1. Observation of fish/shrimp processing plants – visit web sites of processing companies and record the details of that Unit.
2. Interaction with local fishermen to know the method of preservation and details with the available traditional technology.
3. Collection of web resources on the Quality assurance, quality control measures in Aqua Industries- cross checking the standards during the visit to any processing units.
4. Assignments, Seminar, Group discussion. Quiz, Collection of Material, invited lecture, Video preparation etc.,

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Zoology Semester-V Paper-6B (2022-2023)
LIVE STOCK MANAGEMENT-I (BIOLOGY OF DAIRY ANIMALS)
Credits: 4 Hrs/Wk: 4

Learning Outcomes:

Students at the successful completion of the course will be able to

- Select the suitable breeds of livestock for rearing
- Relate the anatomy of udder with letdown of milk
- Identify and manipulate the reproductive behavior of cattle
- Inspect the economics of dairy farming
- Apprise the various breeding techniques employed in live stock

Syllabus: (Total Hours: 90 including Teaching, Lab, Field Skills Training, Unit tests etc.)

UNIT I: Livestock census; Breeds of Dairy cattle, Buffaloes and Goats. Indigenous, Exotic and Crossbred Cattle breeds.

UNIT II: Anatomy of Udder; Development of udder; Lactogenesis and Galactopoises; Letdown of milk.

UNIT III: Artificial insemination; Estrous cycle; Symptoms of heat in cows and buffaloes. Conception, Pregnancy diagnosis in cattle. Multi ovulation and embryo transfer technique. Cloning.

UNIT IV: Economic traits of Dairy cattle. Methods of selection of dairy animals.

UNIT V: Systems of Dairy cattle breeding. Inbreeding, out breeding, Cross breeding, Grading up. Breeding systems (Cross breeding of cattle and grading up of buffaloes).

REFERENCES:

1. Textbook of Animal Husbandry-GC Banerjee
2. Handbook of Animal Husbandry –ICAR Edition
3. Principles and practices of Dairy Farm–Jagdish Prasad

Web resources:

1. <http://ecoursesonline.iasri.res.in/course/index.php?categoryid=42>
2. <https://vetsebooks.blogspot.com/p/e-books.html>
3. <https://www.basu.org.in/study-materials/veterinary-science/>
4. <https://vikaspedia.in/agriculture/livestock/cattle-buffalo/breeds-of-cattle-buffalo>

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Zoology Semester-V Paper-6B (2022-2023)

LIVE STOCK MANAGEMENT-I (BIOLOGY OF DAIRY ANIMALS) PRACTICAL

Credits: 1 Hrs/Wk: 2 (Max.50Marks)

Learning Outcomes:

On successful completion of this practical course, student shall be able to

1. Examine the points of dairy cow
2. Understand the behavioral changes of cow during the reproductive period
3. Differentiate the merits and demerits of cross breeds in cattle

Practical (Laboratory) Syllabus:(30hrs)

1. Points dairy cow. (Explanation with observation of charts- Model evaluation to be performed by the student in the laboratory)
2. Identification of different breeds of dairy cattle and buffaloes. (Observation of Charts of breeds in the laboratory- at least 3 breeds should be identified by the students in their locality with video, photo)
3. Male and female reproductive systems of cow – Model/ Chart (Student has to draw a labeled diagram of the male and female reproductive systems of cow – acquire skill to identify the parts).
4. Symptoms of heat in cow (Study and Understanding the physiological symptoms during heat).
5. Artificial in semi nation (Flow chart of implements – Procedure- precautions)
6. Pregnancy diagnosis in cattle.
7. Study comparative merits of cows and buffaloes; zebu and cross bred cows (Examination of merits)

Lab References:

1. Principles and practices of Dairy Farm–Jadish Prasad
2. Dairy cow points: <https://www.icar.org/Guidelines/05-Conformation-Recording.pdf>
3. Pregnancy test protocol:
<https://cgspace.cgiar.org/bitstream/handle/10568/109408/Milk%20testing%20lab%20protoco%201.pdf?sequence=1&isAllowed=y>

Co-Curricular Activities

a) **Mandatory:** *(Lab/ field training of students by teacher :(lab:10 + filed: 05):*

1. For Teacher: Training of students by the teacher in laboratory/field for not less than 15 hours on principles and practices of dairy industry- breeds –artificial insemination- reproductive behavior of cows etc. as per the syllabus above.
2. For Student: Students shall individually visit to any of the nearby cattle rearing centers/ veterinary hospital/Raithu Bharosa Kendra and make observations of the procedure and quality enhancement activities and submit a handwritten Fieldwork/Project work Report in 10 pages.
3. Max marks for Fieldwork/Project work Report: 05.
4. Suggested Format for Fieldwork/Project work Report: *Title page, student details, index page, details of place visited, observations made, findings and acknowledgements*
5. (IE) Unit tests,

b) Suggested Co-Curricular Activities

1. Collection of various cattle breed images from the web to prepare a album
2. Visit the sites of Veterinary colleges in India and preparation of brief report on the videos and content/ employment details
3. Sketch a model dairy farm with details
4. Invited lecture and presentation on related topics by experts
Seminar, Assignment, Group discussion. Quiz, Collection of Material, invited lecture, Video preparation etc.

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Zoology Semester-V Paper-7B (2022-2023)

LIVE STOCK MANAGEMENT -II (DAIRY PRODUCTION AND MANAGEMENT)

Credits: 4

Hrs/Wk: 4

Learning Outcomes:

Students at the successful completion of the course will be able to

- Identify and suggest the suitable housing system for the dairy farming
- Understand management practices for the dairy farming
- Learn the process of milk pasteurization
- Prepare cream from milk

Syllabus: (Total Hours: 90 including Teaching, Lab, Field Skills Training, Unit tests etc.)

UNIT I:

Systems of Housing of Dairy cattle- Loose Housing and Conventional Dairy Barns. Drawing of layouts for dairy cattle dwellings; Criteria for selecting site for establishing Dairy farm buildings; Water requirement of dairy animals.

UNIT II:

Management of different classes of Dairy animals- Milk producing animals, pregnant animals dry animals, heifers and calves. Management practices for Dairy farm; Identification, Dehorning, Castration, Deworming, Vaccination, Disinfection, and Milking.

UNIT III:

- a. Pasteurization of milk: Definition, objects of pasteurization, objections to pasteurization, Principles of heat exchange. Methods of pasteurization: LTLT, HTST and Uperization.
- b) Sterilization of milk. Homogenization: Factors influencing homogenization

UNIT IV:

Market milk: Toned milk, double toned milk, Reconstituted milk, Standardized milk and full cream milk– Standards and methods of manufacture.

UNIT V:

Cream: Types of cream, composition, methods of cream separation, gravity and centrifugal methods, types of cream separators, factors affecting fat losses in skim milk and fat percentage in cream.

REFERENCES:

1. Textbook of Animal Husbandry-G C Benarjee
2. Handbook of Animal Husbandry –ICAR Edition
3. Principles and practices of Dairy Farm–Jagdish Prasad
4. <http://ecoursesonline.iasri.res.in/course/index.php?categoryid=42>
5. <https://vetsebooks.blogspot.com/p/e-books.html>
6. <https://www.basu.org.in/study-materials/veterinary-science/>
7. <https://vikaspedia.in/agriculture/livestock/cattle-buffalo/breeds-of-cattle-buffalo>

ASD GOVT. DEGREE COLLEGE FOR WOMEN (A)
(Re- Accredited by NAAC with B Grade)
Jagannaickpur, Kakinada, East Godavari, AP – 533002

Zoology Semester-V Paper-7B (2022-2023)

LIVE STOCK MANAGEMENT -II (DAIRY PRODUCTION AND MANAGEMENT) PRACTICAL

Credits: 1

Hrs/Wk: 2

Learning Outcomes:

On successful completion of this practical course, student shall be able to:

- Design a model dairy farm layout
- Understand procedure of milk pasteurization at milk processing centers
- Identify various important management practices in dairy farming

Practical (Laboratory) Syllabus :(30hrs)

(Max.50Marks)

1. Dairy Farm layout (In the laboratory student has to sketch a dairy farm with all its components)
2. Identification of cows (students have to identify the breeds of cows from the images/charts – have to identify any two breeds in the vicinity of the college/ their locality).
3. Dehorning of calves: (Method - protocol- precautions)
4. Castration of bulls (Method – Apparatus- Time-importance)
5. Deworming of dairy cattle: (Schedule – method- benefits)
6. Pasteurization of milk (Batch Method- procedure- Observation)
7. Sterilization of milk (In bottle sterilization- procedure – protocol)
8. Cream separation (By gravity method- procedure- hands on experiment)

Lab References

1. Handbook of Animal Husbandry –ICAR Edition
2. Dairy farm layout : <https://www.youtube.com/watch?v=dmukHUEUvKc>
3. Dehorning procedure : <http://www.omafra.gov.on.ca/english/livestock/dairy/facts/09-003.htm>
4. Castration of bulls: <https://vikaspedia.in/agriculture/livestock/general-management-practices-of-livestock/castration-of-ruminants>
5. Deworming: https://kvk.icar.gov.in/API/Content/PPupload/k0347_10.pdf
6. Pasteurization of milk : <http://www.jnkvv.org/PDF/08042020170652part%203.pdf>
7. <http://ecoursesonline.iasri.res.in/mod/page/view.php?id=1690>

8. Cream separation: <http://ecoursesonline.iasri.res.in/mod/page/view.php?id=147910>

Web resources suggested by the teacher concerned and the college librarian including reading material

Co-Curricular Activities

a) Mandatory: (Lab/field training of students by teacher; lab 10+ field :05)

1. For Teacher: Training of students by the teacher in laboratory and filed for not less than 15 hours on skills of dairy management – housing-management of dairy animals of various stages- procedure of preparation of marketable milk with procedures like sterilization, pasteurization and other techniques)
2. For Student: Student shall (individually) visit to nearby dairy farm- house hold cattle rearing – make observations on aspects like housing – management – feed- milk- revenue- breed selection- qualities of breed –etc. A handwritten Fieldwork/Project work Report to be submitted in the given format.
3. Max marks for Fieldwork/Project work Report: 05.
4. Suggested Format for Fieldwork/Project work Report: *Title page, student details, index page, details of place visited, observations made, findings and acknowledgements.*
5. (IE)Unit tests.

b) Suggested Co-Curricular Activities

1. Sketch model dairy house with details
2. Web resources on Protocols in the management of stages of cattle
3. Properties of varieties of milk from the market observation
4. Assignment, Seminar, invited lecture, Group discussion. Quiz, Collection of Material, Video preparation etc.

ASD GOVT. DEGREE COLLEGE FOR WOMEN (A)
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Jagannaickpur, Kakinada, East Godavari, AP – 533002
Zoology Semester-V Paper-6C (2022-2023)
POULTRY MANAGEMENT- I (POULTRY FARMING) SYLLABUS
Credits: 4 Hrs/Wk: 4

Learning Outcomes:

Students at the successful completion of the course will be able to

- Evaluate the status of Indian Poultry Industry
- Explain the Scientific Poultry keeping
- Compare the diversified Poultry practices
- Inspect the different breeds of chicken

Syllabus: (Total Hours: 90 including Teaching, Lab, Field Skills Training, Unit tests etc.)

UNIT I: Indian poultry Industry

- 1.1 Importance of poultry farming and poultry development in India.
- 1.2 Present status and future prospectus of poultry Industry
- 1.3 Classification of poultry based on genetics Utility

UNIT II: Scientific Poultry Keeping

- 2.1 Modern breeds of Chicken
- 2.2 Present day egg production lines- meat production lines
- 2.3 Mini breeds- dwarfism in mini-Leghorns

UNIT III: Diversified Poultry

- 3.1 Ducks and Geese-classification- rearing system-classification-advantages
- 3.2 Guinea fowls - guinea fowl farming in India-Production-varieties
- 3.3 Emu-rearing- Economical aspects-commercial products

UNIT IV: Desi Chickens:

- 4.1 Indigenous breeds and economical aspects of desi chicken
- 4.2 Indigenous breeds-Aseel-Chittagong-Kadakhnath-Bursa

4.3 Improved varieties in India – Giriraja-Vanaraja-Girirani-Kalinga brown, Gramapriya, Swarnandhra

UNIT V: Breeds from Central Avian Research Institute – Izatnagar

5.1 CARI Nirbheek - CARI- Shyama-HITCARI (Naked Neck Cross)

5.2 CARI- Priya Layer, CARI- Sonali Layer,

5.3 CARIBRO-VISHAL, CARI-RAINBRO,

5.4 Nandanam chicken-I, Nandanam Chicken-II, Nandanm-Quail

REFERENCES:

1. Text Book of Poultry Science, P V Sreenivasaiah, Write and Print Publications, ISBN No. 9788192970592, 8192970590
2. Poultry Science Practices, Nilothpal Ghosh, CBS Publication & Distributions, 2015
3. Principles of Poultry Science, 1996, CAB Publishers, ISBN 9780851991221
4. A Text Book of Animal Husbandry, C. C. Banerjee, Oxford and IBH, Publish Co, ISBN: 9788120412606

WEB SOURCES

1. <https://www.drvet.in/p/e-books.html>
2. <https://byjus.com/biology/animal-husbandry-poultry-farming/>
3. https://www.helpforag.app/2018/02/livestock-production-and-management- lpm_14.html?m=1

ASD GOVT. DEGREE COLLEGE FOR WOMEN (A)
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Jagannaickpur, Kakinada, East Godavari, AP – 533002
Zoology Semester-V Paper-6C (Skill Enhancement Course - Elective) (2022-2023)
POULTRY MANAGEMENT- I (POULTRY FARMING)

MODEL QUESTION PAPER

Time: 3hrs.

Max. Marks: 75

Section – A

Answer any FIVE of the following:

5x5=25M

1. Classify the poultry based on genetics Utility
2. Write a detail note on meat production lines
3. Explain about Present day egg production line
4. Describe in detail about rearing system of Ducks
5. Write a detail note on Nandanam chicken-I
6. Explain about Gramapriya, and Swarnandhra
7. Write an essay on poultry development in India
8. Discuss about Shyama-HITCARI (Naked Neck Cross)

Section – B

Answer ALL the following:

5x10=50M

9. a. Write an essay on Present status and future prospectus of poultry Industry in India

OR

- b. Write a detail note on Importance of poultry farming and poultry development in India.

10. a. Explain about Modern breeds of Chicken

OR

- b. Write an essay on Mini breeds of poultry farming

11. a. Discuss in detail about guinea fowl farming in India, and add a note on Production and varieties.

OR

- b. Discuss about Emu-rearing. Add a note on Economic aspects and commercial products of Emu.

12. a. What are Indigenous breeds? Explain about any two Indigenous breeds

OR

b. Write an essay on Improved varieties of poultry birds in India

13. a. Distinguish between CARIBRO-VISHAL and CARI-RAINBRO

OR

b. Discuss in detail about CARI- Priya Layer and CARI- Sonali Layer

ASD GOVT. DEGREE COLLEGE FOR WOMEN (A)
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Zoology Semester-V Paper-6C (Skill Enhancement Course - Elective) (2022-2023)

POULTRY MANAGEMENT- I (POULTRY FARMING) LAB SYLLABUS

Credits: 1

Hrs/Wk: 2

(Max.50Marks)

Learning Outcomes: On successful completion of this practical course, student shall be able to:

- Identify different types of Poultry rearing practices
- Evaluate the efficacy of different types of poultry practices in maximizing yield
- Understand the importance of different hybrid breeds in poultry

Practical (Laboratory) Syllabus :(30hrs)

1. Different types of Poultry rearing (Students has to observe and draw the different types of poultry rearing systems)
2. Different types of poultry Housing - Models / Images/charts
3. Different layer breeds images/charts/ Models (Observation of characters)
4. Types of broilers images/charts/ Models (Identification of important Characters)
5. CARI breeds characters –images/charts
6. Nandanam breeds- images/charts (Identification of characters)

*** (This practical is 70 % (Web based /virtual) 30% physical: student and teachers must browse the web for the specimen models – write down the important characters based on the web resources)

Lab references

1. A Text Book of Animal Husbandry, C. C. Banerjee, Oxford and IBH, Publish Co, ISBN:
9788120412606

Web resources suggested by the teacher concerned and the college librarian including reading material

Co-Curricular Activities:

a) **Mandatory:***(Student training by teacher in field skills: total15hours (lab:10, field 05)*

1. For Teacher: Training of students by the teacher in laboratory and field for notlessthan15hours on the techniques of identification of layers, broilers and management

practices in poultry.

2. For Student: Students shall Individually visit a Poultry farm, make observations and report on the Rearing, Housing, Brooding, Feeding and water management activities. The student shall submit a handwritten Fieldwork/Project work Report on the observations along with pictures in the given format not exceeding 10 pages to teacher.
3. Max marks for Fieldwork/Project work Report: 05.
4. Suggested Format for Fieldwork/Project work: *Title page, student details, index page, details of place visited, observations made, findings and acknowledgements.*
5. Unit tests. (IE)

b) Suggested Co-Curricular Activities

1. **Web resources**–visiting the web sites of CARI-IZATNAGAR-
<https://cari.icar.gov.in>procuring additional information on the poultry breeds
2. Web resources- visiting the web site of NANADANAM
http://www.tanuvas.ac.in/ippmmadhavaram_tech.html
3. Collection of additional data on different types of Poultry breeds
4. Seminar, Assignment, Group discussion. Quiz, Collection of Material, Invited Lecture, Video preparation etc.

**ASD GOVT. DEGREE COLLEGE FOR WOMEN (A)
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Jagannaickpur, Kakinada, East Godavari, AP – 533002

Zoology Paper-7C (Skill Enhancement Course - Elective) Semester-V (2022-2023)

POULTRY MANAGEMENT -II (POULTRY PRODUCTION AND MANAGEMENT)

Credits: 4

Hrs/Wk: 4

Learning Outcomes:

Students at the successful completion of the course will be able to

- Suggest measure for Health care in Poultry
- Evaluate the economics of poultry production
- Elaborate the poultry Breeder flock management
- Differentiate the poultry hatchery practices

Syllabus: (Total Hours: 90 including Teaching, Lab, Field Skills Training, Unit tests etc.)

UNIT I: HEALTH CARE

- 1.1 Common poultry diseases: bacterial, viral, fungal, parasitic and nutritional deficiencies.
- 1.2 Vaccination schedule for commercial layers and broilers: factors that govern vaccination schedule; vaccination principles type, methods, pre and post vaccination care.
- 1.3 Disinfection: Types of disinfectants; mode of action; recommended procedure; precaution and handling.

UNIT II: ECONOMICS

- 2.1 Economics of layer and broiler production
- 2.2 Projects reports in different systems of rearing for layer & broilers.
- 2.3 Feasibility studies on poultry rearing- in context of small units and their profitability.
- 2.4 Export/import of poultry and poultry products.

UNIT III: BREEDER FLOCK MANAGEMENT

- 3.1 Layer and broiler breeder flock management housing & space requirements.
- 3.2 Different stage of management during life cycle; Light management during growing and laying period, Artificial insemination.

3.3 Feeding: Feed restriction, separate male feeding. Nutrient requirement of layer and broiler breeders of different age groups.

UNIT IV: BREEDER HEALTHCARE

4.1 Vaccination of breeder flock; difference between vaccination schedule of broilers and commercial birds.

4.2 Common diseases of breeders (Infectious and metabolic disorders)-prevention.

4.3 Fertility disorder- etiology, diagnosis and corrective measures. Selection and culling of breeder flocks

UNIT V: HATCHERY PRACTICES

5.1 Management principles of incubation.

5.2 Factors affecting fertility and hatchability. Selection, care and incubation of hatching eggs.
Fumigation; sanitation and hatchery hygiene.

5.3 Importance of hatchery records, break even analysis of unhatched eggs.

5.4 Computer applications for hatchery management

REFERENCES:

1. HVS Chauhan, S. Roy, Poultry Diseases, Diagnosis and Treatment, New Age International Publishers-2018
2. <https://www.drvet.in/p/e-books.html>
3. <https://byjus.com/biology/animal-husbandry-poultry-farming/>
4. https://www.helpforag.app/2018/02/livestock-production-and-management-lpm_14.html?m=1

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Zoology Paper-7C (Skill Enhancement Course - Elective), Semester-V (2022-2023)

**POULTRY MANAGEMENT -II (POULTRY PRODUCTION AND
MANAGEMENT)**

MODEL QUESTION PAPER

Time: 3hrs.

Max. Marks:

75

Section – A

Answer any FIVE of the following:

5x5=25M

1. Fungal diseases in poultry
2. Broilers
3. Artificial insemination
4. Metabolic disorders
5. Fumigation
6. Sanitation and hatchery hygiene
7. Vaccination for commercial birds.
8. Feed restriction

Section – B

Answer ALL the following:

5x10=50M

9. A. Discuss in detail about any two viral and bacterial diseases in poultry

OR

B. Define Disinfection. Add a note on Types of disinfectants, and their mode of action

10. A. Write an essay on Economics of layer and broiler production

OR

B. Explain about Export and import of poultry and poultry products.

11. A. Discuss in detail about Nutrient requirement of layer and broiler breeders of different age groups.

OR

B. Write an essay on Layer and broiler breeder flock management housing & space requirements

12. A. Write a detail note on Fertility disorder- etiology, diagnosis and corrective measures

OR

B. Write an essay on Common Infectious diseases of breeders and their prevention.

13. A. Explain about hatchery Management principles of incubation.

OR

B. Write a detail note on Computer applications for hatchery management

**ASD GOVT. DEGREE COLLEGE FOR WOMEN (A)
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Zoology Paper-7C (Skill Enhancement Course - Elective), Semester-V (2022-2023)

POULTRY MANAGEMENT -II (POULTRY PRODUCTION AND MANAGEMENT) LAB

Credits: 1

Hrs/Wk: 2

Learning Outcomes:

On successful completion of this practical course, student shall be able to:

- Identify Poultry diseases by observation
- Analyze Poultry establishment feasibility
- Understand the Poultry Records

Practical (Laboratory) Syllabus: (30hrs) (Max.50Marks)

1. Poultry Viral diseases – Observation of histopathological slides
2. Poultry Fungal Diseases- Observation of histopathological slides
3. Poultry Bacterial Diseases-Observation of histopathological slides
4. Feasibility study of Poultry establishment: (Preparation of feasibility study report with given parameters)
5. Rearing of Layers – (Preparation of Flow chart
6. Rearing of broiler- Flow chart
7. Hatchery records- Model study/analysis- Report with modified data

Lab references:

1. HVS Chauhan, S. Roy, Poultry Diseases, Diagnosis and Treatment, New Age International Publishers-2018
2. Flow chart hatchery : <http://lms.tanuvas.ac.in/mod/resource/view.php?id=45106>
3. Feasibility report:
<https://www.manage.gov.in/stry&fcac/content/19.%20Project%20Report%20on%20Layer%20Poultry.pdf>

Web resources suggested by the teacher concerned and the college librarian including reading material

Co-Curricular Activities

a) Mandatory:(Lab/field training of students by teacher: (lab10+ field 05)

1. For Teacher: Training of students by the teacher laboratory and field for not less than 15 hours on skills in different practices employed in poultry with regard to the disease management – analysis of poultry project- preparation of flow chart – Observation of Poultry records – computerization activities
2. For Student: students shall (individually) visit a Layer/ Broiler Poultry farming place (small scale/corporate), make observations on practices- resources – management and marketing - analysis and submit a handwritten Fieldwork/Project work Report of 10 pages with necessary images.
3. Max marks for Fieldwork/Project work Report: 05.
4. Suggested Format for Fieldwork/Project work: *Title page, student details, index page, detail of place visited, observations made, findings and acknowledgements.*
5. (IE): Unit tests.

b) Suggested Co-Curricular Activities

1. Preparation of Poultry diseases charts
2. Preparation of feasibility report poultry establishment with different variables
3. Seminar, Assignment, Group discussion. Quiz, Collection of Material, Invited Lecture, Video preparation etc.

A.S.D. GOVT. DEGREE COLLEGE FOR WOMEN (A)

(Re-Accredited by NAAC with 'B' Grade)

KAKINADA – 533 002, EAST GODAVARI, A.P.

DEPARTMENT OF ZOOLOGY-SKILL DEVELOPMENT COURSES

To be offered for Semesters II & III

ZOOLOGY STREAM- DAIRY TECHNOLOGY & POULTRY FARMING

Resolutions:

1. It is resolved to offer Dairy Technology and Poultry Farming under skill development courses as per the guidelines of affiliating university ANUR and APSHE w.e.f 2020-2021 admitted batch in semester-II and semester III respectively based on students' choice.
2. Resolved to implement 100% external assessment for 50 Marks
3. Resolved to fix pass minimum of 18 marks.
4. It is resolved to adopt to model question paper consisting of two sections. In section-A students have to answer 4 questions and each question carries 5 marks. (i.e., $5 \times 4 = 20$ marks). In section -B students have to answer 3 questions and each question carries 10 marks. (i.e., $10 \times 3 = 30$ marks)

A.S.D. GOVT. DEGREE COLLEGE FOR WOMEN (A)

(Re-Accredited by NAAC with 'B' Grade)

KAKINADA – 533 002, EAST GODAVARI, A.P.

DEPARTMENT OF ZOOLOGY-SKILL DEVELOPMENT COURSES

To be Offered for Semesters II

ZOOLOGY STREAM-DAIRY TECHNOLOGY SYLLABUS

Total 30 hrs (02h/wk), 02 Credits & Max. Marks 50

Learning Outcomes:

After successful completion of the course, students will be able to;

1. Understand the pre-requisites for starting a Dairy farm
2. Recognize different breeds of Cows & buffaloes following safety precautions.
3. Prepare and give recommended feed and water for livestock
4. Maintain health of livestock along with productivity
5. Vaccination of cattle, nutrients requirements
6. Entrepreneurship i.e., Effectively market dairy products
7. Ensure safe and clean dairy farm and Standard safety measures to be taken in establishing an industry
8. Efficiently start and manage to establish or develop a Dairy Industry

SYLLABUS:

Section I (Introduction and Establishment of a Dairy Farm): 05 Hrs

1.1 Dairy development in India – Dairy Cooperatives (NDRI, NDDB, TCMPF) (1hr)

1.2 Constraints of Present Dairy Farming and Future Scope of Dairy Farmer. (1 hr)

1.3 Selection of site for dairy farm; Systems of housing – Loose housing system, Conventional Dairy Farm; Records to be maintained in a dairy farm. (2 hrs)

Section II (Livestock Identification and Management): 13 Hrs

2.1 Breeds of Dairy Cattle and Buffaloes – Identification of Indian cattle and buffalo breeds and Exotic breeds; Methods of selection of Dairy animals. (5 hrs)

2.2 Systems of inbreeding and crossbreeding. (2 hrs)

2.3 Weaning of calf, Castration, Dehorning, Deworming and Vaccination programme (3 hrs)

2.4 Care and management of calf, heifer, milk animal, dry and pregnant animal, bulls and bullocks. (3 hrs)

Section III (Feed Management, Dairy Management, Cleaning and Sanitation): 8 Hrs

3.1 Basic Principles of Feed, Important Feed Ingredients, Feed formulation and Feed Mixing (2 hrs)

3.2 Operation Flood –Definition of Milk and Nutritive value of milk and ICMR recommendation of nutrients –Per Capita Milk production and availability in India and Andhra Pradesh -Methods of Collection and Storage of Milk–Labelling and Storage of milk products (4 hrs)

3.3 Cleaning and sanitation of dairy farm – Safety precautions to prevent accidents in an industry. (2 hrs)

Co-curricular Activities Suggested: (4 hrs)

1. Group discussion & SWOT analysis
2. Visit to a Dairy Farm
3. Visit to Milk Cooperative Societies
4. Visit to Feed Milling Plants
5. Market Study and Identification of Government Schemes, Insurance and Bank Loans in relation to dairy farming

Reference books:

1. Dairy Science: Petersen (W.E.) Publisher – Lippincott & Company
2. Principles and practices of Dairy Farm –Jagdish Prasad
3. Text book of Animal Husbandry - G C Banerjee
4. Hand book of Animal Husbandry - ICAR Edition
5. Outlines of Dairy Technology – Sukumar (De) – Oxford University press
6. Indian Dairy Products – Rangappa (K.S.) & Acharya (KT) – Asia Publishing House.
7. The technology of milk Processing – Anantha Krishnan, C.P., Khan, A.Q. and Padmanabhan, P.N. – Shri Lakshmi Publications.
8. Dairy India 2007, Sixth edition
9. Economics of Milk Production – Bharati Pratima Acharya Publishers.
10. <http://www.asci-india.com/BooksPDF/Dairy%20Farmer%20or%20Entrepreneur.pdf>
11. <https://labour.gov.in/industrial-safety-health>

A.S.D. GOVT. DEGREE COLLEGE FOR WOMEN (A)

(Re-Accredited by NAAC with 'B' Grade)

KAKINADA – 533 002, EAST GODAVARI, A.P.

DEPARTMENT OF ZOOLOGY-SKILL DEVELOPMENT COURSES

Offered in Semesters II

ZOOLOGY STREAM - DAIRY TECHNOLOGY (BLUE PRINT)

Max. Marks: 50

Sl. No.	COURSE CONTENT	ESSAY QUESTIONS	SHORT ANSWER QUESTIONS
1	UNIT - I	2	2
2	UNIT - II	2	1
3	UNIT - III	1	2
Total		05	08

A.S.D. GOVT. DEGREE COLLEGE FOR WOMEN (A)

(Re-Accredited by NAAC with 'B' Grade)

KAKINADA – 533 002, EAST GODAVARI, A.P.

DEPARTMENT OF ZOOLOGY-SKILL DEVELOPMENT COURSES

To be Offered for Semesters II

ZOOLOGY STREAM- DAIRY TECHNOLOGY

MODEL QUESTION PAPER

Max. Marks: 50

Time: 1 1/2 hrs (90 Minutes)

SECTION A

(Answer any **four** questions.

4x5=20 Marks

1.	Conventional Dairy Farm
2.	Animal Inbreeding
3.	Sanitation of Dairy Farm
4.	Dairy development in India
5.	Feed Mixing
6.	Deworming
7.	Milk Storage Methods
8.	Identification of characters of any Two Dairy cattle

SECTION B

Answer any **three** questions

3x10 = 30 Marks)

9.	Write an essay on Dairy development in India, its current position and future scenario.
10.	List our different methods involved in selection of dairy animals and discuss briefly.
11.	Give an account of feed ingredients and feed management required for dairy animals.
12.	Explain different methods of collection of milk.
13.	Explain two methods of systems of housing of dairy animals.

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A.S.D. GOVT. DEGREE COLLEGE FOR WOMEN (A)

(Re-Accredited by NAAC with 'B' Grade)

KAKINADA – 533 002, EAST GODAVARI, A.P.

DEPARTMENT OF ZOOLOGY-SKILL DEVELOPMENT COURSES

Offered in III Semester

POULTRY FARMING SYLLABUS

Total 30 hrs (02h/wk), 02 Credits & Max 50 Marks

Learning Outcomes:

By successful completion of the course, students will be able to;

1. Understand the field level structure and functioning of insurance sector and its role in protecting the risks
2. Comprehend pertaining skills and their application for promoting insurance coverage
3. Prepare better for the Insurance Agent examination conducted by IRDA
4. Plan 'promoting insurance coverage practice' as one of the career options.

SYLLABUS:

Section I (Introduction to Poultry Farming): 10Hrs

1.1 General introduction to poultry farming -Definition of Poultry; Past and present scenario ofpoultry industry in India.

1.2 Principles of poultry housing. Poultry houses. Systems of poultry farming.

1.3 Management of chicks, growers and layers. Management of Broilers.

1.4 Preparation of project report for banking and insurance

Section II (Feed and Livestock Health Management): 10 Hrs

2.1 Poultry feed management – Principles of feeding, Nutrient requirements for different stagesoflayers and broilers. Feed formulation and Methods of feeding.

2.2 Poultry diseases – viral, bacterial, fungal and parasitic (two each); symptoms, control and management; Vaccination programme.

Section III (Harvesting of Eggs and Sanitation): 10 Hrs

3.1 Selection, care and handling of hatching eggs. Egg testing. Methods of hatching.

3.2 Brooding and rearing. Sexing of chicks.

3.3 Farm and Water Hygiene, Recycling of poultry waste.

Co-curricular Activities Suggested: (4 hrs)

1. Group discussion & SWOT analysis
2. Visit to a poultry farm
3. Invited Lectures by Concerned officers of government or private farms
4. Cheap and Healthy Feed preparation by students based on government standards
5. Market study and Survey (Monitoring of daily price hike in poultry market and analysis)
6. Online SwayamMoocs course on poultry farming (see reference 9 below)

Reference books:

1. Sreenivasaiah., P. V., 2015. Textbook of Poultry Science. 1st Edition. Write & Print Publications, New Delhi
2. Jull A. Morley, 2007. Successful Poultry Management. 2nd Edition. Biotech Books, New Delhi"
3. Hurd M. Louis, 2003. Modern Poultry Farming. 1st Edition. International Book Distributing Company, Lucknow."
4. Life and General Insurance Management, "
5. Financial services, Tata McGraw hill
6. <http://www.asci-india.com/BooksPDF/Small%20Poultry%20Farmer.pdf>
7. https://nsdcindia.org/sites/default/files/MC_AGR-Q4306_Small-poultry-farmer-.pdf
8. <http://ecoursesonline.iasri.res.in/course/view.php?id=335>
9. https://swayam.gov.in/nd2_nou19_ag09/preview

A.S.D. GOVT. DEGREE COLLEGE FOR WOMEN (A)

(Re-Accredited by NAAC with 'B' Grade)

KAKINADA – 533 002, EAST GODAVARI, A.P.

DEPARTMENT OF ZOOLOGY-SKILL DEVELOPMENT COURSES

POULTRY FARMING

MODEL QUESTION PAPER

Max. Marks: 50

Time: 1 1/2 hrs (90 Minutes)

SECTION A

Answer any **four** questions.

4x5=20 Marks

1. Poultry house
2. Broilers
3. Any two viral diseases of poultry
4. Any two bacterial diseases of poultry
5. Any two fungal diseases of poultry
6. Egg testing
7. Brooding
8. Sexing chicks

SECTION B

Answer any **three** questions.

3x10 = 30 Marks

9.	Discuss briefly the past, present and future scenario of poultry farming industry in India.
10.	Explain principles of poultry housing in detail, with examples.
11.	Write an essay on viral diseases of poultry.
12.	Give an account of fungal and bacterial diseases (any two each) of poultry
13.	Write an essay on selection, handling and hatching of eggs.

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KAKINADA – 533 002, EAST GODAVARI, A.P.

CERTIFICATE COURSE IN ZOOLOGY

Post-Harvest Technology - Preparation of value-added Fish Products.

Hours:45

Max. Marks: 50

Module- 1: Fish Processing

- a. Introduction to fish preservation methods.
- b. Preparation of cured products (Dried, freeze dried, salted, Fermented, smoked fish).
- c. Packing and storage of cured fish.

Module- 2: Preparation of value-added Fish Products

- a. Fish pickling
- b. Fish curry
- c. Fish Biryani
- d. Fish cutlets
- e. Fish balls
- f. Fish fingers
- g. Surimi
- h. Fish maws
- i. Fish sauce
- j. Fish Papads

Module- 3: Preparation of Fish By-Products

- a. Fish glue
- b. Fish oil
- c. Fish emulsion
- d. Fish hydrolysate
- e. Fish meal
- f. Isinglass
- g. Chitin and chitosan
- h. Fish protein concentrate
- i. Pearl essence

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(Re-Accredited by NAAC with 'B' Grade)
KAKINADA – 533 002, EAST GODAVARI, A.P.
DEPARTMENT OF ZOOLOGY- CERTIFICATE COURSE
POST-HARVEST TECHNOLOGY - PREPARATION OF VALUE-ADDED FISH PRODUCTS.
MODEL QUESTION PAPER

Max. Marks: 50.

Time: 1hr.30 min.

SECTION A

I. Answer any four questions.

4x5=20 Marks

1. Salting
2. Smoking
3. Fish cutlets
4. Fish sauce
5. Fish Papads
6. Fish glue
7. Pearl essence
8. Fish meal

SECTION B

II. Answer any three questions.

3x10 = 30 Marks

9. Write an essay on fish Preservation methods?
10. Explain in detail about packing and storage of cured fish?
11. Describe the Preparation of Surimi and fish pickling.
12. Explain the steps in preparation of fish biryani and fish maws.
13. Define fish by-products. Explain fish oil, Isinglass and Chitin- chitosan preparation.

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Skill

Employability

Entrepreneurship

A.S.D. GOVT. DEGREE COLLEGE FOR WOMEN (A)

(Re-Accredited by NAAC with 'B' Grade)

KAKINADA – 533 002, EAST GODAVARI, A.P.

DEPARTMENT OF ZOOLOGY

LIST OF EXAMINERS

S. No	Name of the Examiners	Subject	Name of the College
1.	Dr. N. Sreenivas	Zoology	PR Government College (A), Kakinada.
2.	B. Chakravarthi	Zoology	PR Government College (A), Kakinada.
3.	B. Ahmad Ali Baba	Zoology	PR Government College (A), Kakinada.
4.	Dr. P. Kiran Kumar	Zoology	PR Government College (A), Kakinada.
5.	P John Kiran	Zoology	GDC Perumallapuram
6.	M. Vijaya santhi	Zoology	Government College(A) Rajahmundry
7.	M. Vijaya Kumar	Zoology	SRR GDC Vijayawada
8.	P. Jaya Bharathi	Zoology	VSK College, Vizag
9.	K. Usha Rani	Zoology	Government College (A) Rajahmundry.
10.	N. Suneetha	Zoology	SRR GDC, Vijayawada
11.	R. Indira	Zoology	St. Theresa College, Eluru.
12..	V. Sandhya	Zoology	GDC, Kaikaluru
13.	V.V. Padmavathi	Zoology	St. Theresa College, Eluru
14.	K. Babu	Zoology	Government College (A) Rajahmundry.
15.	Dr R P Dattu	Zoology	GDC, Tiruvuru.
16.	Dr IS Chakrapani	Zoology	GDC, Vidavaluru
17.	Dr. G Srinivas	Zoology	GDC, Kurnool
18.	Madhavi Rani	Zoology	St. Theresa College, Eluru

19.	K Rama Rao	Zoology	VSK College, Vizag
20.	T Samuel David Raj	Zoology	VSK College, Vizag
21.	P R Vani	Zoology	VSK College, Vizag
22.	K. Durga Rao	Zoology	Government College (A) Rajahmundry.
23	Dr. D. Sailaja	Zoology	Government College (A) Rajahmundry.

A.S.D. GOVT. DEGREE COLLEGE FOR WOMEN (A)

(Re-Accredited by NAAC with 'B' Grade)

KAKINADA – 533 002, EAST GODAVARI, A.P.

DEPARTMENT OF ZOOLOGY

LIST OF QUESTION PAPER SETTERS

S.No	Name of the Examiners	Subject	Name of the College
1.	Dr. N. Sreenivas	Zoology	PR Government College (A), Kakinada.
2.	B. Chakravarthi	Zoology	PR Government College (A), Kakinada.
3.	B. Ahmad Ali Baba	Zoology	PR Government College (A), Kakinada.
4.	Dr. P. Kiran Kumar	Zoology	PR Government College (A), Kakinada.
5.	P John Kiran	Zoology	GDC Perumallapuram
6.	M. Vijaya Santhi	Zoology	Government College (A) Rajahmundry
7.	M. Vijaya Kumar	Zoology	SRR GDC Vijayawada
8.	P. Jaya Bharathi	Zoology	VSK College, Vizag
9.	K. Usha Rani	Zoology	Government College (A) Rajahmundry.
10.	N. Suneetha	Zoology	SRR GDC, Vijayawada
11.	R. Indira	Zoology	St. Theresa College, Eluru.
12..	V. Sandhya	Zoology	GDC, Kaikaluru
13.	V.V. Padmavathi	Zoology	St. Theresa College, Eluru
14.	K Babu	Zoology	Government College (A) Rajahmundry.
15.	Dr R P Dattu	Zoology	GDC, Tiruvuru.
16.	Dr IS Chakrapani	Zoology	GDC, Vidavaluru
17.	Dr. G Srinivas	Zoology	GDC, Kurnool
18.	Madhavi Rani	Zoology	St. Theresa College, Eluru

19.	K Rama Rao	Zoology	VSK College, Vizag
20.	T Samuel David Raj	Zoology	VSK College, Vizag
21.	P R Vani	Zoology	VSK College, Vizag
22.	K. Durga Rao	Zoology	Government College (A), Rajahmundry.
23	Dr. D. Sailaja	Zoology	Government College(A), Rajahmundry.

**ASD GOVERNMENT DEGREE COLLEGE FOR WOMEN (A), KAKINADA
ZOOLOGY AND AQUACULTURE TECHNOLOGY - ACTION PLAN 2022-2023.**

S. No	Month	Week	Name of the Activity	Class	Lecturer who planned the activity
1.	September 2022	I Week	Quiz	I,II CBZ, CZAqT	M. Vasantha Lakshmi S. Madhavi N. Veera Chanti
		II Week	Class seminar	I,II CBZ, CZAqT	M. Vasantha Lakshmi S. Madhavi N. Veera Chanti
		III Week	Board of studies meeting Remedial Coaching	I CBZ, CZAqT	M. Vasantha Lakshmi S. Madhavi N. Veera Chanti
		IV Week	Induction Programme Bridge Course	I CBZ, CZAqT I CBZ, CZAqT	M. Vasantha Lakshmi S. Madhavi N. Veera Chanti
2.	October 2022	I Week	Debate Gandhi Jayanthi (02-10-2022)	I, II CBZ, CZAqT All Departments	M. Vasantha Lakshmi S. Madhavi N. Veera Chanti
		II Week	Group Discussion International Girl Child Day (11-10-2022)	I, II CBZ, CZAqT All Departments	M. Vasantha Lakshmi S. Madhavi N. Veera Chanti
		III Week	Quiz World Food Day (16-10-2022)	I, II CBZ, CZAqT All Departments	M. Vasantha Lakshmi S. Madhavi N. Veera Chanti
		IV Week	Departmental Seminar Assignment -I Rastriya Ekta Divas (31-10-2022)	I, II CBZ, CZAqT All Departments	M. Vasantha Lakshmi S. Madhavi N. Veera Chanti
3.	November 2022	I Week	Group Discussion Internship Phase –I (CSP)	I, II CBZ, CZAqT At the End of Second semester.	M. Vasantha Lakshmi S. Madhavi N. Veera Chanti
		II Week	World Diabetes Day (14-11-2022) Freshers Day Assignment-II	All Departments I, II CBZ, CZAqT	M. Vasantha Lakshmi S. Madhavi N. Veera Chanti
		III Week	World Fisheries Day (21-11-2022)	All Departments I, II, III CBZ, CZAqT	M. Vasantha Lakshmi S. Madhavi N. Veera Chanti
		IV Week	Guest Lecture (Zoology)	I, II, III CBZ, CZAqT	M. Vasantha Lakshmi S. Madhavi N. Veera Chanti

4.	December 2022	I Week	World AIDS Day (01-12-2022) Extension Activity	All Departments I, II, III CBZ, CZAqT	M. Vasantha Lakshmi S. Madhavi N. Veera Chanti
		II Week	Human Rights Day (10-12-2022) Chemistry Day (10-12-2022) Assignment-III Blood Grouping	All Departments I, II,III CBZ, CZAqT III CBZ, CZAqT	M. Vasantha Lakshmi S. Madhavi N. Veera Chanti
		III Week	National Mathematics Day (22-12-2022) Work shop	All Departments I, II, III CBZ, CZAqT	M. Vasantha Lakshmi S. Madhavi N. Veera Chanti
		IV Week	Guest Lecture (Aquaculture Technology) National Consumers Day (24-12-2022)	I, II,III CBZ, CZAqT All Departments	M. Vasantha Lakshmi S. Madhavi N. Veera Chanti
5.	January 2023	I Week	Youth Day (12-01-2023) Assignment-IV Blood Grouping Staff Exchange Programme with P.R College	All Departments I, II,III CBZ, CZAqT III CBZ, CZAqT	M. Vasantha Lakshmi S. Madhavi N. Veera Chanti
		II Week	Pongal holidays	I, II,III CBZ, CZAqT	M. Vasantha Lakshmi S. Madhavi N. Veera Chanti
		III Week	Field trip Student-Scientist interaction	III CBZ & CZAqT I, II,III CBZ, CZAqT	M. Vasantha Lakshmi S. Madhavi N. Veera Chanti
		IV Week	Student seminar Blood Grouping India Tourism Day (25-01-2023) Republic Day (26-01-2023)	I, II,III CBZ, CZAqT III CBZ, CZAqT All Departments All Departments	M. Vasantha Lakshmi S. Madhavi N. Veera Chanti
6.	February 2023	I Week	World Wetland Day (02-02-2023)	All Departments	M. Vasantha Lakshmi

			Assignment-V Remedial Coaching Blood Grouping	I, II,III CBZ, CZAqT I, II,III CBZ, CZAqT III CBZ, CZAqT	S. Madhavi N. Veera Chanti
		II Week	Remedial Coaching	I, II,III CBZ, CZAqT	M. Vasantha Lakshmi S. Madhavi N. Veera Chanti
		III Week	Semester End Examinations	I, II,III CBZ, CZAqT	M. Vasantha Lakshmi S. Madhavi N. Veera Chanti
		IV Week	National Science Day (28-02-2023)	All Departments	M. Vasantha Lakshmi S. Madhavi N. Veera Chanti
7.	March 2023	I Week	International Women's Day (08-03-2023)	All Departments	M. Vasantha Lakshmi S. Madhavi N. Veera Chanti
		II Week	π Day (14-03-2023)	All Departments	M. Vasantha Lakshmi S. Madhavi N. Veera Chanti
		III Week	International Day of Happiness (20-03-2023)	All Departments	M. Vasantha Lakshmi S. Madhavi N. Veera Chanti
		IV Week	Departmental seminar Assignment-I	I, II,III CBZ, CZAqT I, II,III CBZ, CZAqT	M. Vasantha Lakshmi S. Madhavi N. Veera Chanti
8.	April 2023	I Week	Extension activity	I, II,III CBZ, CZAqT	M. Vasantha Lakshmi S. Madhavi N. Veera Chanti
		II Week	Quiz	I, II,III CBZ, CZAqT	M. Vasantha Lakshmi S. Madhavi N. Veera Chanti
		III Week	Assignment-II	I, II,III CBZ, CZAqT	M. Vasantha Lakshmi S. Madhavi N. Veera Chanti
		IV Week	World Intellectual Property Day (26-04-2023)	All Departments	M. Vasantha Lakshmi S. Madhavi N. Veera Chanti
9.	June 2023	I Week	World Environment Day (05-06-2023)	All Departments	M. Vasantha Lakshmi S. Madhavi N. Veera Chanti
		II Week	World Food Safety Day (07-06-2023)	All Departments	M. Vasantha Lakshmi S. Madhavi N. Veera Chanti
		III Week	National Statistics Day (29-06-2023) Assignment-III	All Departments I, II,III CBZ, CZAqT	M. Vasantha Lakshmi S. Madhavi N. Veera Chanti

		IV Week	Work shop	I, II,III CBZ, CZAqT	M. Vasantha Lakshmi S. Madhavi N. Veera Chanti
10.	July 2023	I Week	GST Day (01-07-2023)	All Departments	M. Vasantha Lakshmi S. Madhavi N. Veera Chanti
		II Week	World Population Day (11-07-2023)	All Departments	M. Vasantha Lakshmi S. Madhavi N. Veera Chanti
		III Week	Assignment-IV	I, II,III CBZ, CZAqT	M. Vasantha Lakshmi S. Madhavi N. Veera Chanti
		IV Week	Student seminar	I, II,III CBZ, CZAqT	M. Vasantha Lakshmi S. Madhavi N. Veera Chanti
11.	August 2023	I Week	World Breast Feeding Week (01-08-2023 to 07- 08-2023) Remedial Coaching	All Departments I, II,III CBZ, CZAqT	M. Vasantha Lakshmi S. Madhavi N. Veera Chanti
		II Week	Competitions for Independence Day (13- 08-2023 & 14- 08-2023)	All Departments	M. Vasantha Lakshmi S. Madhavi
			Independence Day (15- 08-2023) Remedial Coaching Assignment-V	All Departments I, II,III CBZ, CZAqT I, II,III CBZ, CZAqT	N. Veera Chanti
		III Week	World Mosquito Day (20- 08-2023) Remedial Coaching	All Departments I, II,III CBZ, CZAqT	M. Vasantha Lakshmi S. Madhavi N. Veera Chanti
IV Week	Remedial Coaching	I, II,III CBZ, CZAqT	M. Vasantha Lakshmi S. Madhavi N. Veera Chanti		

Signature of the HOD

Signature of the Principal
