Programme Outcomes and Course Outcomes

B.Sc. Botany

Programme Outcome

This programme will produce competent plant biologists who can employ and implement their gained knowledge in basic and applied aspects that will profoundly influence the prevailing paradigm of agriculture, industry, healthcare and environment to provide sustainable development.

It will increase the ability of critical thinking, development of scientific attitude, handling of problems and generating solution, improve practical skills, enhance communication skill, social interaction, increase awareness in judicious use of plant resources by recognizing the ethical value systems.

The training provided to the students will make them competent enough for doing jobs in Govt. and private sectors of academia, research and industry along with graduate preparation for national as well as international competitive examinations, especially UGC-CSIR NET, UPSC Civil Services Examination, IFS, NSC, FCI, BSI, FRI etc.

New Syllabus Course Outcomes

B.Sc. Year-1: Semester-1:

Course Code: B040101T Course Title: Microbiology & Plant Pathology Course outcomes:

After the completion of the course the students will be able to:

1. Develop understanding about the classification and diversity of different microbes including viruses, Algae, Fungi & Lichens & their economic importance. 2. Develop conceptual skill about identifying microbes,pathogens,biofertilizers & lichens. 3. Gain knowledge about developing commercial enterprise of microbial products. 4. Learn host –pathogen relationship and disease management. 5. Learn Presentation skills (oral & writing) in life sciences by usage of computer of computer &multimedia 6. Gain Knowledge about uses of microbes in various fields. 7. Understand the structure and reproduction of certain selected bacteria algae, fungi and lichens 8. Gain Knowledge about the economic values of this lower group of plant community.

Course Code: B040102P Course Title: Techniques in Microbiology &Plant Pathology Course outcomes:

After the completion of the course the students will be able:

1. Understand the instruments, techniques ,lab etiquettes and good lab practices for working in a microbiology laboratory. 2. Develop skills for identifying microbes and using them for Industrial, Agriculture and Environment purposes. 3. Practical skills in the field and laboratory experiments in Microbiology &Pathology. 4. learn to identify Algae, Lichens and plant pathogens along with their Symbiotic and Parasitic associations. 5. Can initiate his own Plant & Seed Diagnostic Clinic 6. Can start own enterprise on microbial products.

B.Sc. Year-1: Semester-2:

Course Code: B040201T Course Title: Archegoniates and Plant Architecture Course outcomes:

After the completion of the course the students will be able to:

1. Develop critical understanding on morphology, anatomy and reproduction of Bryophytes, Pteridophytes and Gymnosperms 2. Understanding of plant evolution and their transition to land habitat. 3. Understand morphology, anatomy, reproduction and developmental changes therein through typological study and create a knowledge base in understanding the basis of plant diversity, economic values & taxonomy of plants 4. Understand the details of external and internal structures of flowering plants.

Course Code: B040202P Course Title: Land Plants Architecture

After the completion of the course the students will be able to:

1. The students will be made aware of the group of plants that have given rise to land habit and the flowering plants. Through field study they will be able to see these plants grow in nature and become familiar with the biodiversity. 2. Students would learn to create their small digital reports where they can capture the zoomed in and zoomed out pictures as well as videos in case they are able to find some rare structure or phenomenon related to these plants. 3. Develop an understanding by observation and table study of representative members of phylogenetically important groups to learn the process of evolution in a broad sense. 4. Understand morphology, anatomy, reproduction and developmental changes therein through typological study and create a knowledge base in understanding plant diversity, economic values & taxonomy of lower group of plants 5. Understand the composition, modifications, internal structure &architecture of flowering plants for becoming a Botanist.

B.Sc. Year-2: Semester-3:

Course Code: B040301T Course Title: Flowering Plants Identification & Aesthetic Characteristics

Course outcomes: After the completion of the course the students will be able to:

1. To gain an understanding of the history and concepts underlying various approaches to plant taxonomy and classification. 2. To learn the major patterns of diversity among plants, and the characters and types of data used to classify plants. 3. To compare the different approaches to classification with regard to the analysis of data. 4. To become familiar with major taxa and their identifying characteristics, and to develop in depth knowledge of the current taxonomy of a major plant family. 5. To discover and use diverse taxonomic resources, reference materials, herbarium collections, publications. 6. For the entrepreneur career in plants, one can establish a nursery, Start a landscaping business, Set up a farm Or Run a plantation consultancy firm.

Course Code: B040302P Course Title: Plant Identification technology Course outcomes:

After the completion of the course the students will be able: 1. To learn how plant specimens are collected, documented, and curated for a permanent record. 2. To observe, record, and employ plant morphological variation and the accompanying descriptive terminology. 3. To gain experience with the various tools and means available to identify plants. 4. To develop observational skills and field experience. 5. To identify a taxonomically diverse array of native plants. 6. To recognize common and major plant families. 7. To Understand aesthetic characters of flowering plants by

making-landscapes,gardens,bonsai,miniatures 8. Comprehend the concepts of plant taxonomy and classification of Angiosperms.

B.Sc. Year-2: Semester-4:

Course Code: B040401T Course Title: Economic Botany, Ethnomedicine and Phytochemistry

Course outcomes: After the completion of the course the students will be able to:

1. Understand about the uses of plants –will know one plant-one employment 2. Understand phytochemical analysis related to medicinally important plants and economic products produced by the plants 3. know about the importance of Medicinal plants and its useful parts, economically important plants in our daily life and also about the traditional medicines and herbs, and its relevance in modern times.

Course Code: B040402P Course Title: Commercial Botany & Phytochemical Analysis

Course outcomes: After the completion of the course the students will be able to:

1. Know about the commercial products produced from plants. 2. Gain the knowledge about cultivation practices of some economic crops. 3. Understand about the ethnobotanical details of plants. 4. Learn about the chemistry of plants &herbal preparations 5. Can become a protected cultivator, aromatic oil producer, Pharmacologist or quality analyst in drug company.

B.Sc. Year-3: Semester-5:

Course Code: B040501T Course Title: Plant Physiology, Metabolism & Biochemistry

Course outcomes: After the completion of the course the students will be able to: 1. Understand the role of Physiological and metabolic processes for plant growth and development. 2. Learn the symptoms of Mineral Deficiency in crops and their management. 3. Assimilate Knowledge about Biochemical constitution of plant diversity. 4.Know the role of plants in development of natural products, nutraceuticals, dietary supplements, antioxidants.

Course Code: B040502T Course Title: Molecular Biology & Bioinformatics

Course outcomes: After the completion of the course the students will be able to: 1. Understand nucleic acids, organization of DNA in prokaryotes and Eukaryotes, DNA replication mechanism, genetic code and transcription process. 2. Know about Processing and modification of RNA and translation process, function and regulation of expression. 3. Gain working knowledge of the practical and theoretical concepts of bioinformatics.

Course Code: B040503P Course Title: Experiments in physiology, Biochemistry & molecular biology

Course outcomes: After the completion of the course the students will be able to:

1. Know and authentic the physiological processes undergoing in plants along with their metabolism 2. Identify Mineral deficiencies based on visual symptoms 3. Understand and develop skill for conducting molecular experiments for genetic engineering.

Course Code: - B040504R Course Title: Project in Botany for Pre-graduation

Course outcomes: Project work will supplement field experimental learning and deviations from classroom and laboratory• transactions. project work will enhance the capability to apply gained knowledge and understanding for selecting, solving and• decision-making processes. It will promote creativity and the spirit of enquiry in learners.• They will learn to consult Scientists, libraries, laboratories and herbariums and learn importance of discussions,• Botanical & field trips, print and electronic media, internet etc. along with data documentation, compilation, analysis & representation in form of dissertation writing. It will enhance their abilities, enthusiasm, and interest.•

B.Sc. Year-3: Semester-6:

Course Code: B040601T Course Title: Cytogenetics, Plant Breeding & Nanotechnology

Course outcomes: After the completion of the course the students will be able:

1.Acquire knowledge on ultrastructure of cell. 2. Understand the structure and chemical composition of chromatin and concept of cell division. 3. Interpret the Mendel's principles, acquire knowledge on cytoplasmic inheritance and sex linked inheritance. 4. Understand the concept of 'one gene one enzyme hypothesis' along with molecular mechanism of mutation. 5.Interpret the concept of Lemarkism, Neo Lamarkism, Darwinism and also understand the concept of natural selection.

Course Code: B040602T Course Title: Ecology & Environment

Course outcomes: 1. acquaint the students with complex interrelationship between organisms and environment; 2. make them understand methods for studying vegetation, community patterns and processes, ecosystem functions, and principles of phytogeography. 3. This knowledge is critical in evolving strategies for sustainable natural resource management and biodiversity conservation.

Course Code: B040602T Course Title: Ecology & Environment

Course outcomes:

1. acquaint the students with complex interrelationship between organisms and environment; 2. make them understand methods for studying vegetation, community patterns and processes, ecosystem functions, and principles of phytogeography. 3. This knowledge is critical in evolving strategies for sustainable natural resource management and biodiversity conservation.

Course Code: - B040604R Course Title: Project in Botany for Graduation

Course outcomes: After completing this course a student will have:

Project work will supplement field experimental learning and deviations from classroom and laboratory• transactions. project work will enhance the capability to apply gained knowledge and understanding for selecting, solving and• decision-making processes It will promote creativity and the spirit of enquiry in learners.• They will learn to consult Scientists, libraries, laboratories and herbariums and learn importance of discussions,• Botanical & field trips, print and electronic media, internet etc. along with data documentation, compilation, analysis & representation in form of dissertation writing It will enhance their abilities, enthusiasm, and interest.•

COURSE OUTCOME OF OLD COURSE

B.Sc. Part I: Paper I (B-101) Diversity Viruses, Bacteria and Fungi

After completing this paper students will be able to understand and explain:

- History, nature and classification of Viruses
- Genome organization and replication of TMV, Bacteriophages and viroids
- Techniques in plant viruses - purification, serology and electron microscopy
- Economic importance of viruses
- History, nature and classification, bacterial genome and plasmids of Bacteria
- Bacterial reproduction, techniques of sterilization and staining
- Economic importance of Bacteria
- History, nature and classification, thallus organization and reproduction of fungi
- Economic importance of fungi.
- The life cycles of *Albugo, Pythium,; Saccharomyces, Aspergillus; Ascobolus; Ustilago, Puccinia, Polyporus, Agaricus; Fusarium, Cercospora.*

B.Sc. Part I: Paper II (B-102) Diversity of Algae, Lichens and Bryophytes

After completing this paper students will be able to understand and explain:

- General characters and range of thallus organization of Algae
- Classification and ultrastructure of eukaryotic algal cell and cyanobacterial cell
- Economic importance of Algae
- The characteristics and life cycles of *Oscillatoria Volvox, Hydrodictyon, Oedogonium, Chara, Navicula, Vaucheria, Ectocarpus, Saragassum* and *Polysiphonia.*
- Classification and thallus organization of Lichens
- Reproduction and physiology, ecological and economic importance of lichens.
- General characters, classification, reproduction and affinities of Bryophytes.
- Gametophytic and sporophytic organization of *Riccia, Marchantia,* A*nthoceros and Pogonatum.*

B.Sc. Part I: Paper III (B-103) Diversity of Pteridophytes, Gymnosperms and Elementary Palaeobotany

After completing this paper students will be able to understand and explain:

- General features, classification, stelar system (with its evolution) of Pteridophytes
- Heterospory and seed habit.
- Comparative study of morphology, anatomy, development, vegetative and reproductive systems of L*ycopodium, Selaginella; Rhynia Pteridium, Equisetum. Marsilea.*
- General characters, classification, affinities and relationship and evolutionary significance of Gymnosperms
- Comparative study of morphology, anatomy, development of vegetative and reproductive parts in: *Cycas, Pinus* and *Ephedra.*
- Elementary Palaeobotany: general account, types of fossils, methods of fossilization and geological time scale.

B.Sc. Part II: Paper I (B-201) Diversity of Angiosperms: Systematics, Development & Reproduction

After completing this paper students will be able to understand and explain:

- Principles of classification, Binomial nomenclature; comparative study of different classification systems, viz. Linnaeus, Bentham & Hooker, Engler & Prantl, Hutchinson, and Cronquist. Herbarium techniques and important Botanic Gardens.
- Taxonomic study of following families and their economic importance (Dicots): Ranunculaceae, Malvaceae, Brassicaceae, Cucurbitaceac, Rosaceae, Leguminosacae, Myrtaceae, Rutaceae, Apiaceae, Apocynaceae, Asclepiadaceous, Solanaceae, Convolvulaceae, Acanthaceae, Lamiaceae, Asteraceae, Rubiaceae, Verbenaceae, Euphorbiaceae, and Amaranthaceae.
- Monocots: Cyperaceae, Poaceae, Arecaceae. Liliaceae.
- External morphology of vegetative and floral parts; modifications – phyllodes, cladodes, and phylloclades.
- Meristems-kinds study of tissue system - epidermal, ground, and vascular.
- Anatomy of roots, stems, and leaves. Cambium - its function and anomalies in roots and stems; root - shoot transition.
- Structure and development of male and female gametophytes – microsporogenesis microgametogenesis, megasporogenesis, and megagametogenesis, embryo sac types.
- Double fertilization development of embryo, endosperm development and its morphological nature, apomixis and polyembryony.

B.Sc. Part II: Paper II (B-202) Cytology, Genetics, Evolution & Ecology

After completing this paper students will be able to understand and explain:

- Cell structure: cell organelles, nucleus, chromosome structure, nucleosome and solenoid model, salivary gland, lampbrush and B chromosomes.
- Cell division: mitosis, meiosis; their significance, chromosomal aberrations, cell cycle.
- Genetics: laws of inheritance; gene interaction; linkage and crossing over;
- Cytoplasmic inheritance; sex determination.
- Mutation: spontaneous, induced mutations, molecular mechanism and evolutionary significance;
- Polyploidy origin, kinds and role in evolution.
- Evidences and theories of evolution.
- Ecology, relation with other disciplines.
- Plant types: Hydrophytes - *Hydrilla, Eichhornia, Nymphaea, Typha.*
- Xerophytes – *Nerium, Casuarina, Asparagus, Calotropis, Parkinsonia.*
- Plant succession – xeroseres, hydroseres.
- Ecosystems - concept, basic types, components, & functioning.
- Food chain, food web, energy flow and productivity.

B.Sc. Part II: Paper III (B-203) Plant Physiology and Biochemistry

After completing this paper students will be able to understand and explain:

- Plant and water relationship, colligative properties of water.
- Water uptake, conduction, transpiration, mechanism and its regulation by environmental variables.

- Mineral Nutrition : Macro, and micronutrients, their role, deficiency and toxicity symptoms, plant culture practices, mechanism of ion uptake and translocation.
- Photosynthesis and Chemosynthesis : photosynthetic pigments, O2 evolution, photophosphorylation, CO2 fixation – C-3, C-4 and CAM plants.
- Respiration : aerobic and anaerobic respiration, respiratory pathways glycolysis, krebs 'cycle, electron transport, oxidative phosphorylation, pentose phosphate pathway, photorespiration, cyanide resistant respiration.
- Lipid biosynthesis and its oxidation.
- Nitrogen metabolism : atmospheric nitrogen fixation, nitrogen cycle, nitrogen assimilation,
- Growth: general aspects of phytohormones, inhibitors-auxins. kinetin, gibberellins, and ethylene: action and their application; photoperiodisin and vernalization.
- Germination, growth movements, abscission and senescence.
- Biomolecules : Classification, properties and biological role of carbohydrates, Protein and lipids
- Chemistry of nucleic acids, vitamins.
- Discovery and nomenclature. Characteristics of enzymes, concepts of holoenzyme, apoenzyme, coenzyme and cofactors.
- Regulation of enzyme activity, Mechanism of action.
- Bioenergetics: Laws of thermodynamics, concept of Gibb's free energy and high energy compounds.

B.Sc. Part III: Paper I (B-301) Plant Resource utilization, Palynology, Plant Pathology and Biostatistics

After completing this paper students will be able to understand and explain:

- Centres of diversity of plants, origin of crop plants.
- Domestication and introduction of crop plants.
- Basic concepts of Plant Breeding, hybridization, heterosis.
- Concepts of sustainable development; cultivation, production and uses of - wheat, rice, legumes, sugarcane
- A general account of plants yielding oils, spices, beverages.
- An account of major fiber, medicinal, petro plants of Uttar Pradesh.
- Etiology of viral, bacterial, fungal and insect-pest diseases: mosaic diseases on tobacco, and cucumber, yellow vein mosaic of bhindi; citrus canker, potato scab, little leaf of brinjal; damping off of seedlings late blight of potato, red rot of sugarcane
- Integrated pest disease management
- An introductory knowledge of palynology, morphology, viability and germination of pollens.
- Classification of data, mean, median and mode. Standard deviation, standard error, variance, co-relation, $\chi 2$ test and experimental designs

B.Sc. Part III: Paper II (B-302) Molecular biology and biotechnology

After completing this paper students will be able to understand and explain:

- Nucleic acid as genetic material, nucleotides, structure of nucleic acids
- Properties of genetic code, codons assignments, chain initiation of codons
- Mechanism of protein synthesis and its regulation
- Replication of DNA in prokaryotes and eukaryotes
- Gene expression and regulation
- Hormonal control and second messengers Ca2+, Cyclic AMP, IP3 etc.

- Introduction to biotechnology, recombinant DNA technology
- Biotechnology and healthcare, IPR issues
- Plant tissue culture, methods of gene transfer, transgenic plants
- Microbial and environmental biotechnology.

B.Sc. Part III: Paper III (B-303) Environmental Botany

After completing this paper students will be able to understand and explain:

- Mineral resources of planet earth and conservation of mineral resources.
- Soils: types, properties and various problem soils;
- Water: the source of water, physico-chemical and biological properties of water.
- Sustainable management of water;
- Energy resources in India;
- Forests: global forest wealth, importance of forests, deforestation.
- Environmental pollution: air, water, soil, radioactive, thermal and noise pollutions, their sources, effects and control.
- Greenhouse effect, ozone depletion and acid rain.
- CO2 enrichment and climate change.
- Biodiversity: biotic communities and populations, their characteristics and population dynamics.
- Phytogeography: Natural vegetation of India, static and dynamic plant geography, basic principles governing geographical distribution of plants, endemism.
- Conservation of plants resources for agriculture and forestry.
- *In situ* conservation sanctuaries, national parks, biosphere reserves, wetlands, mangroves.
- *Ex situ conservation; botanical gardens, field gene banks, seed banks, cryobanks.*

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COURSE OUTCOME OF STATISTICS

Programme Outcomes (POs)-

Students having Degree in B.Sc. (with Statistics) should have knowledge of different concepts and fundamentals of Statistics and ability to apply this knowledge in various fields of industry. They may pursue their future career in the field of Statistics and Research.

Programme Specific Outcomes (PSOs)-

After completing B.Sc. (with Statistics) the student should have

- Knowledge of different concepts, principles, methodologies and tools (skills) of statistics.
- Ability to collect, tabulate, represent graphically, analyze and interpret data/information by using appropriate statistical tools.
- Ability to identify and solve a wide range of problems in real life/industry related to Statistics.
- Familiarity with computational techniques and statistical software including programming language (e.g. R) for mathematical and statistical computation.
- Capability to use appropriate statistical skills in interdisciplinary areas such as finance, health, agriculture, government, business, industry, telecommunication and bio-statistics.
- Ability to compete with industrial/private sector demand in the field of data analysis, marketing survey, etc. in professional manner and pursue their future career in the field of Statistics.
- Ability to develop original thinking for formulating new problems and providing their solutions. As a result, they will be able to pursue higher studies or research in the field of Statistics.

Course outcomes:

Course Code: -B060101T Year: First Semester: First
Course Title: Descriptive Statistics (Univariate) and Theory of Probability

After completing this course a student will have:

- Knowledge of Statistics, its scope and importance in various fields.
- Ability to understand concepts of sample vs. population and difference between different types of data.
- Knowledge of methods for summarising data sets, including common graphical tools (such as boxplots, histograms and stem plots). Interpret histograms and boxplots.
- Ability to describe data with measures of central tendency and measures of dispersion.
- Ability to understand measures of skewness and kurtosis and their utility and significance.
- Ability to understand the concept of probability along with basic laws and axioms of probability.
- Ability to understand the terms mutually exclusive and independence and their relevance.

- Ability to identify the appropriate method (i.e. union, intersection, conditional, etc.) for solving a problem.
- Ability to apply basic probability principles to solve real life problems.
- Ability to understand the concept of random variable (discrete and continuous), concept of probability distribution.

Year: First Semester: First

Course Code: -B060102P Course Title: Descriptive Data Analysis Lab (Univariate)

Course outcomes:

After completing this course a student will have:

- Ability to represent/summarise the data/information using appropriate Graphical methods including common graphical tools (such as boxplots, histograms and stem plots) and also to draw inferences from these graphs
- Acquire the knowledge to identify the situation to apply appropriate measure of central tendency as per the nature and need of the data and draw meaningful conclusions regarding behavior of the data.
- Acquire the knowledge to identify the situation to apply appropriate measure of dispersion as per the nature and need of the data and draw meaningful conclusions regarding heterogeneity of the data.
- Ability to measure skewness and kurtosis of data and define their significance.
- Acquire the knowledge to compute conditional probabilities based on Bayes Theorem.

Year: First Semester: Second

Course Code: -B060201T Course Title: Descriptive Statistics (Bivariate) and Probability Distributions

Course outcomes:

After completing this course a student will have:

- Knowledge of the method of least squares for curve fitting to theoretically describe experimental data with a function or equation and to find the parameter s associated with the model.
- Knowledge of the concepts of correlation and simple linear regression and Perform correlation and regression analysis.
- Ability to interpret results from correlation and regression.
- Ability to compute and interpret rank correlation. .
- Ability to understand concept of qualitative data and its analysis.
- Knowledge of discrete distributions. Discuss appropriate distribution negative binomial, Poisson, etc. with their properties and application of discrete distribution models to solve problems.
- Knowledge of continuous distributions. Discuss the appropriate distribution (i.e. uniform, exponential, normal, etc.) with their properties and application of continuous distribution models to solve problems.

- Knowledge of the formal definition of order statistics.
- Ability to identify the application of theory of order statistics in real life problems.

Year: First Semester: Second

Course Code: -B060202P Course Title: Descriptive Data Analysis Lab (Bivariate)

Course outcomes:

After completing this course a student will have:

- Ability to deal with the problems based on fitting of curves by Method of least squares e.g. fitting of straight line, second degree polynomial, power curve, exponential curve etc.
- Ability to deal with problems based on determination of Regression lines and calculation of Correlation coefficient – grouped and ungrouped data.
- Ability to deal with the problems based on determination of Rank correlation.
- Ability to fit Binomial and Poisson distribution for given data.

Year: Second Semester: Third

Course Code: -B060301T Course Title: Theory of Estimation and Sampling Survey

Course outcomes:
After completing this course a student will have:

- Knowledge of the concept of Sampling distributions.
- Ability to understand the difference between parameter & statistic and standard error & standard deviation.
- Knowledge of the sampling distribution of the sum and mean.
- Ability to understand the t, f and chi-square distribution and to identify the main characteristics of these distributions.
- Knowledge of the concept of Point and Interval Estimation and discuss characteristics of a good estimator.
- Ability to understand and practice various methods of estimations of parameters.
- Ability to understand the concept of sampling and how it is different from complete enumeration.
- Knowledge of various probability and non-probability sampling methods along with estimates of population parameters
- Ability to identify the situations where the various sampling techniques shall be used.
- Knowledge of sampling and non-sampling errors.

Year: Second Semester: Third

Course Code: -B060302P Course Title: Sampling Techniques Lab

Course outcomes:
After completing this course a student will have:

- Ability to draw a simple random sample with the help of table of random numbers.

- Ability to estimate population means and variance in simple random sampling.
- Ability to deal with problems based on Stratified random sampling for population means (proportional and optimum allocation).
- Ability to deal with problems based on Systematic random sampling

Year: Second Semester: Fourth

Course Code: -B060401T Course Title: Testing of Hypothesis and Applied Statistics

Course outcomes:
After completing this course a student will have:

- Knowledge of the terms like null and alternative hypotheses, two-tailed and onetailed alternative hypotheses, significant and insignificant, level of significance and confidence, p value etc.
- Ability to understand the concept of MP, UMP and UMPU tests
- Ability to understand under what situations one would conduct the small sample and large sample tests (in case of one sample and two sample tests).
- Familiarity with different aspects of Applied Statistics and their use in real life situations.
- Ability to understand the concept of Time series along with its different components.
- Knowledge of Index numbers and their applications along with different types of Index numbers.
- Familiarity with various demographic methods and different measures of mortality and fertility.
- Ability to understand the concept of life table and its construction.
- Knowledge to understand the concept of statistical quality control and different control charts for variables and attributes.

Year: Second Semester: Fourth

Course Code: -B060402P Course Title: Tests of Significance and Applied Statistics Lab

Course outcomes:
After completing this course a student will have:

- Ability to conduct test of significance based on t , F tests and Chi-square test.
- Ability to deal with problems based on large sample tests.
- Ability to deal with problems based on time series and calculation of its different components for forecasting.
- Ability to deal with problems based on Index number.
- Acquire knowledge about measurement of mortality and fertility.
- Ability to deal with problems based on life table.
- Ability to work with control charts for variables and attributes and draw inferences.

Year: Third, Semester: Fifth

Course Code:-B060501T Course Title: Multivariate Analysis and Non-parametric Methods

Course outcomes:
After completing this course a student will have:

- Ability to understand the basic concepts of matrices in order to study multivariate distribution.
- Ability to understand bivariate normal distribution and its applications
- Knowledge of the applications of multivariate normal distribution and Maximum Likelihood estimates of mean vector and dispersion matrix.
- Ability to apply distribution free tests (Non-parametric methods) for one and two sample cases.

Year: Third Semester: Fifth

Course Code: -B060502T Course Title: Analysis of Variance and Design of Experiment

Course outcomes:
After completing this course a student will have:

- Knowledge of the concept of Analysis of Variance (ANOVA).
- Ability to carry out the ANOVA for One way and Two way Classification.
- Ability to carry out the post-hoc analysis.
- Knowledge of the concept of Design of experiment and its basic principles.
- Ability to perform the basic symmetric designs CRD, RBD and LSD with and without missing observations.
- Knowledge of the concept of factorial experiments and their practical applications.

Year: Third Semester: Fifth

Course Code: -B060503P Course Title: Non-parametric Methods and DOE Lab

Course outcomes:
After completing this course a student will have:

- Ability to conduct test of significance based non-parametric tests.
- Ability to deal with multivariate data.
- Ability to perform ANOVA for one way and two classification.
- Ability to perform post-hoc analysis.
- Ability to conduct analysis of CRD, RBD and LSD with and without missing observations.

Year: Third Semester: Sixth

Course Code: -B060601T Course Title: Statistical Computing and Introduction to Statistical Software

Course outcomes:
After completing this course a student will have:

- Basic Knowledge of Excel and R programming with some basic notions for developing their own simple programs and visualizing graphics in R and Excel.
- Ability to perform data analysis for both univariate and multivariate data sets using R as well as Excel.

Year: Third Semester: Sixth

Course Code: -B060602T Course Title: Operations Research

Course outcomes:
After completing this course a student will have:

- An idea about the historical background and need of Operations research.
- Ability to identify and develop operational research models from the verbal description of the real life problems.
- Knowledge of the mathematical tools that are needed to solve optimization problems.
- Ability of solving Linear programming problem, Transportation and Assignment problems, Job sequencing, etc.
- Ability to solve the problems based on Game Theory.

Year: Third Semester: Sixth

Course Code: -B060603P Course Title: Operations Research and Statistical Computing Lab

Course outcomes:
After completing this course a student will have:

- Knowledge of mathematical formulation of L.P.P
- Ability of solving LPP using different methods.
- Ability to solve Allocation Problem based on Transportation and Assignment models.
- Ability to solve problems based on Game Theory.
- Ability to use programming language R as Calculator.
- Knowledge of using R in simple data analysis.
- Able to perform statistical functions, creating graphs and statistical analysis by using Excel.

Course outcome of B.Sc. I semester Physical Education (NEP)

(Course code - Q -10005)

Course- Health: Personal and Environment

(Theory)

This course will enable the students to:

1. Know the meaning and definition of health and health education.

2. Learn about the aims, objectives, scope, need and importance of health education.

3. Understand the meaning, definition and dimension of health.

4. Students can be able to understand various aspects of health with respect to personal and environment. In this subject students will study about personal health, environmental health. Personal health is the ability to take charge of your health by making conscious decisions to be healthy. Environment health focuses on the inter relationships between people and their environment, promotes human health and well being, and fosters healthy and safe communities.

5. Know the balance diet, its elements and sources, malnutrition and adulterations.

6. Know the meaning of communicable and non communicable diseases.

7. Learn about posture and postural deformities, first aid, psychological and mental health.

Course outcome of B.Sc. I semester physical education (NEP)

(Course code - Q -10005)

Course- Health: Personal and Environment (Practical)

Course outcome : students can be able to understand various aspects of health with respect to personal and environment in a practical manner.