Netaji Subhas Open University

Bachelor's Degree Programme (BDP) in Botany (EBT)

SYLLABUS

Programme Objectives: The objective of the programme is to help the learners develop competency in the field of Botany. The Programme consists of foundation course elective courses and Application oriented course. The Bachelor Degree in Science is designed for the workforce of bioscience and industry who wants work in a research organization or to develop his/her own business. The fresher and existing workforce can take the advantage of ODL system to increase their skills and competency in this particular field without disturbing their work schedule.

Expected Programme Outcome: After successful completion the students may increase their knowledge in the domain of Science and Management which intern increase their employability.

COURSE STRUCTURE

1. **Compulsory Subjects: Foundation Course**

(a) Humanities and Social Science (FHS)	100 Marks/ 8 Credits
(b) Science and Technology (FST)	100 Marks/ 8 Credits
(c) Bengali (FBG)	50 Marks/ 4 Credits
(d) English (FEG)	50 Marks/ 4 Credits
	300 marks/ 24 Credits

2. **Elective Subjects : Honours Courses**

Course 01 : Microbiology and Algae	50 Marks/4 Credits
Course 02 : Fungi, Lichen & Plant Pathology	50 Marks/4 Credits
Course 03 : Plant Anatomy & Applied Botany	50 Marks/4 Credits
Course 04 : Practical Botany - I	100 Marks/ 8 Credits
Course 05 : Bryophyta & Pteridophyta, Gymnosperm & Palaeobotany	50 Marks/4 Credits
Course 06 : Morphology & Embryology, Taxonomy	50 Marks/4 Credits
Course 07 : Plant Physiology	50 Marks/4 Credits
Course 08 : Practical Botany-II	100 Marks/8 Credits
Course 09 : Genetics, Evolution	50 Marks/4 Credits
Course 10 : Environmental Botany, Plant Geography	50 Marks/4 Credits
Course 11 : Plant Bio-Chemistry, Plant Molecular Biology	50 Marks/4 Credits
Course 12 : Practical Botany-III	100 Marks/ 8 Credits
Course 13 : Cell Biology, Molecular Genetics	25 Marks/ 2 Credits
Course 14 : Biometry and Plant Breeding, Plant tissue culture	25 marks/ 2 Credits
	300 Marks/ 64 Credits

3. Subsidiary Course

One Subsidiary Course 24 Credits

4. Application Oriented Course

Household Chemistry (AOC-03) 100 Marks/ 8 Credits

5. Environmental Studies 50 Marks/ 4 Credits

Total Credits for the Course = (24+64+24+8+4) = 124 Credits or 1550 Marks.

Evaluation System:

Theoritical:

Internal assessment : 30%

Term-end Examinations : 70%

Practical :

Continuous Counselling for 11 days: 70%

Examination : 30%

Detailed Syllabus

Course Code : EBT 01

Course Title : Microbiology and Algae

Block I : Microbiology

Unit-1 : Virus–I .
Unit-2 : Virus–II .
Unit-3 : Cellular organisation of bacteria–I .
Unit-4 : Cellular organisation of bacteria–II .
Unit-5 : Classification of bacteria .
Unit-6 : Bacterial growth and reproduction .
Unit-7 : Genetic recombination in bacteria–I .
Unit-8 : Genetic recombination in bacteria–II .
Unit-9 : Microbial ecology .

Block II : Algae

Unit-10 : Introduction .
Unit-11 : Classification, morphology and economic importance .
Unit-12 : Reproduction .
Unit-13 : Cyanophycae .
Unit-14 : Chlorophycae .
Unit-15 : Xanthophycae and Bacillariophycae .
Unit-16 : Phyophycae and Rhodophycae .

Course Code : EBT 02

Course Title : Fungi, Lichen & Plant Pathology .

Block I : Fungi & Lichen

Unit-1 : Introduction to Fungi .
Unit-2 : Phycomycetes .
Unit-3 : Ascomycetes .
Unit-4 : Basidiomycetes .
Unit-5 : Fungi imperfecti .
Unit-6 : Life cycle of *Rhizopus* and *Penicilium* .
Unit-7 : Life cycle of *Agaricus* and *Helminthosporium* .
Unit-8 : Lichen .

Block II : Plant Pathology

Unit-9 : Some relevant terms and their definitions.
Unit-10 : General symptoms of plant diseases.
Unit-11 : Spread of disease and physiological effect of pathogens.
Unit-12 : Chemical and external features of infection.
Unit-13 : Defence system of plants.
Unit-14 : Control of plant diseases.

Unit-15 : Some common plant diseases.

Unit-16 : Diagnosis of some diseases affecting Indian crops.

Course Code: EBT 03

Course Title : Plant Anatomy & Applied Botany

Block I : Plant Anatomy

Unit-1 : Plant cell wall.

Unit-2 : Tissues.

Unit-3 : Structure of stem tip and root tip.

Unit-4 : Mechanical tissue system and its distribution.

Unit-5 : Stomata and its classification.

Unit-6 : Stelar structure and evolution; nodal positions.

Unit-7 : Cambium—primary and secondary structure, nature and function.

Unit-8 : Secondary growth of stem and root.

Unit-9 : Abnormal secondary growth.

Block II : Applied Botany

Unit-10 : Cash crops and their classification based on use.

Unit-11 : Some familiar plants : scientific name, family, characteristics and utility.

Unit-12 : Cultivation of paddy, wheat and jute.

Unit-13 : Tea and coffee cultivation and processing.

Unit-14 : Pharmacognosy : definition, object and importance.

Unit-15 : Some medicinal plants : name, family, active ingredients and use.

Unit-16 : Ethno botany : definition, different branches and importance.

Course Code : EBT 04

Course Title : Practical Botany–I

Block I :

Unit-1 : Microscopy.

Unit-2 : Micrometry.

Unit-3 : Preparation and identification, *Nostoc, Oedogonium, Ectocarpus.*

Unit-4 : Study of *Vaucheria, Polysiphonia.*

Unit-5 : Preparation and identification : *Rhizopus, Ascobolus.*

Unit-6 : Study of reproductive stages of *Penicillium, Agaricus, Puccinia.*

Unit-7 : Sterilization, inoculation techniques, preparation of slants and slabs.

Block-II :

Unit-8 : Diseased plant specimens - late blight of potato, stem rust of wheat, brown spot of rice.

Unit-9 : Slide preparation and identification of Marchantia.

Unit-10 : Study of permanent slides of vegetative and reproductive stages of *riccia, anthoceros* and *funaria.*

Unit-11 : Sampling and identification of *lycopodium* and *pteris.*

Unit-12 : Identification of *selaginella, equisetum* and *calamites.*

Unit-13 : Sample study, identification and description of cycas and pinus.

Unit-14 : Description of stem of lyginopteris and leaf of glossopteris.

Course Code : EBT 05

Course Title : Bryophyta & Pteridophyta, Gymnosperm & Paleobotany

Block I : Bryophyta & Pteridophyta

Unit-1 : Bryophyta : Introduction, characteristics, life cycle, classification

Unit-2 : Hepatocoposida : Classification, Riccia : dispersal and habitation, reproduction. Marcantia, Corella.

Unit-3 : *Anthocerotopsida, anthoceros, bryopsida, funaria* : classification, life cycle, dispersal and habitation, reproduction.

Unit-4 : Characteristics and classification of pteridophytes or ferns.

Unit-5 : Life cycle of *Psilotum, lycopodium, sellaginella.*

Unit-6 : Life cycle of *equisetum, marsilea, pteris.*

Unit-7 : Some extinct ferns.

Unit-8 : Heterospory and seed habit.

Unit-9 : Origin and evolution of ferns.

Block II : Gymnosperm & Palaeobotany

Unit-10 : Characteristics of Gymnosperm and their classification.

Unit-11 : Life cyele of Cycas, Pinus and Gnetum.

Unit-12 : Lyginopters, Williamsania & Cordaites.

Unit-13 : Evolution of gametophytes in Gymnosperm.

Unit-14 : Fossils, types, nomenclature, fossilization processes.

Unit-15 : Geological time scale, distribution of main fossil groups in different geological ages.

Unit-16 : Gondwana system in India.

Course Code : EBT 06

Course Title : Morphology & Embryology, Taxonomy

Block-I : Morphology & Embryology

Unit-1 : Inflorescence—different types.

Unit-2 : Flowers—types, aestivation, cohesion and adhesion of stamens : placentation, different types of ovules.

Unit-3: Pollination–Definition, types, contrivances, agents, advantages and disadvantages.

Unit-4: Development of male and female gametophytes.

Unit-5: Fertilization.

Unit-6: Seed.

Unit-7: Fruit.

Block-II : Taxonomy

Unit-8 : Taxonomy, systematics, classification, identification and nomenclature — terms and definitions only. Types of classification–artificial, natural and phylogenetic, definition, examples.

Unit-9: Nomenclature–name, elementary knowledge of ICBN–Important rules of nomenclature (validity, effectiveness and priority), author's citation.

Unit-10: Broad features of the system of classification (Linnaeus, Bentham and Hooker and Hutchinson).

Unit-11: Herbaria and gardens–Importance and functions: Important herbaria in India; collection of specimens, preparations, preservation and maintenace of herbaria.

Unit-12: Diagnostic features and systematic position of the following families: Magnoliaceae and Nymphaeceae; casuarinaceae, malvaceae, and cruciferae.

Unit-13: Diagnostic features and systematic position of the following families: Polygonaceae, Cucurbitaceae and leguminosae and euphorbiaceae, umbelliferae.

Unit-14: Diagnostic features and systematic position of the following families: apoynacae, solanaceae, labiatae, verbenaceae, rubiaceae and compositae.

Unit-15: Diagnostic features and systematic positions of Alismataceae, palmae, zingiberaceae, graminae and orchidaceae.

Unit-16: Alpha taxonomy and omega taxonomy, role of palynology, cytology and phytochemistry in taxonomy.

Course Code : EBT 07

Course Title : Plant Physiology

Block I : Plant Physiology - I

Unit 1: Cell Physiology: Introduction, cell membrane, water potential, imbibition, diffusion, osmosis, plasmolysis, osmotic relation of a plant cell.

Unit 2 : Water relation in plants : Introduction, molecular structure and physical properties of water, types of water in the soil, availability and usefulness of water to the plants absorption of water by land plants, fructoses effecting absorption of water.

Unit 3 : Ascent of Sap : Introduction, different theories, experiments on conduction of water.

Unit 4 : Transpiration : Definition, types of sites of transpiration, mechanism of stomatal transpiration, factors affecting transpiration, anti transpirants, Iuttation.

Unit 5 : Mineral nutrition of plants : Introduction, essential and nonessential elements, criteria of essentiality of elements, general and specific roles of macro of micro elements in plants, deficiency symptoms.

Unit 6 : Translocation of solutes : Definition, translocation of organic materials, direction and mechanism of Phloem transport, translocation of inorganic materials.

Unit 7 : Growth Physiology : Definition of growth of development, sites of plant growth, phases of growth, factors affecting growth, measurement of growth.

Unit 8 : Plant growth substances : Definitions of phytohormones, natural, synthetic and postulated hormones, physiological roles and biosynthesis of following hormones :

(a) auxins, (b) gibberelins, (c) cytokinin, (d) ethylene and (e) abscisic acid. Bioassay of auxin and gibberelins.

Unit 9 : Plant Pigments : Introduction, plastidial and unplastidial pigments, absorption of light energy by plant pigments, chemistry & biosynthesis of chlorophylls, factors affecting chlorophyll biosynthesis.

Block II : Plant Physiology - II

Unit 10 : Photosynthesis : Light reaction – photophos phorylation, calvin cycle, photosynthesis efficiency, HSK & CAM Pathway, bacterial Photosynthesis, law of limiting factor.

Unit 11 : Respiration : Types of respiration, Glycolysis, Kreb's cycle, ETS & oxidative Phosphorylation, Pentose Phosphate Pathway, Glyoxylate Pathway, RQ.

Unit 12 : Photorespiration : Definition, mechanism, differences between dark respiration & photorespiration, significance.

Unit 13 : Nitrogen fixation : Sources of nitrogen, biological N_2 fixation - mechanism, nodulins, basic concept of 'nif' and nod genes.

Unit 14 : Plant movements : Different types of movements, movements of cromotion, movements of curvature, tropic movements, nastic movements, nutation - furgour movements.

Unit 15 : Physiology of flowering : Photoperiodism, Vernalization, devernalization, SDP, LDP, DNP & other types, critical day length, site of perception of photoperiodic stimulus, role of phytochrome in flowering.

Unit 16 : Seed Physiology : Definition of propagules, germination and dormancy of seeds, morphological and biochemical changes during seed germination, types, causes of methods of breaking seed dormancy.

Course Code : EBT 08

Course Title : Practical Botany–II

Unit-1 : Aestivation, study of cohesion and adhesion of stamen and carpel. Types of inflorescence, placentation.

Unit-2 : Taxonomic study of angiospermic plants : *Brassica nigra, Sida cordifolia, Cassia sophera, Coccinia cordifolia, Solanum nigrum, Leonurus sibiricus.*

Unit-3 : Study of community structure by quadrat method, Preparation of herbarium specimens.

Unit-4 : Identification of anatomical structures with reasons (from permanent slide).
(a) Parenchyma (b) Collenchyma (c) Sclerenchyma (d) Selereids (e) trachieds (f) trachea (g) sieve tube (h) different types of vascular bundles (i) different types of stomata (j) periderm (k) lenticel.

Unit-5 : Study of secondary growth (permanent slides should be prepared by the students)
(a) Helianthus annuus (b) Bignonia (c) Tinospora (d) Tecoma.

Unit-6: Ecological anatomy—Study of anatomical features of *Hydrilla* (hydrophytes), *Nerium* (xerophytes) and *Vanda* (epiphytes).

Unit-7 : (a) Preparation of solutions, (b) Demonstration of osmotic pressure (by rhoco leaf)

(c) Determination of osmotic pressure by plasmolytic method (using potato tuber).

Unit-8 : (a) Determination of rate of transpiration per unit area by weighing method, (b) Inhibition of water by dry seeds (starchy, proteinaceous and fatty seed), (c) Determination of viability of seed (using tetrazolium chloride).

Unit-9 : (a) Effect of CO_2 on photosynthesis (using bicarbonate), (b) Determination of rate of aerobic respiration (from germinating seeds using round-bottomed flask), (c) Comparison of rate of transpiration with that of absorption (by single leaf method).

Unit-10 : (a) Determination of dissolved O_2 from water, (b) Determination of Q_{10} for imbibition of water (using dry gram seeds).

Course Code: EBT 09

Course Title: Genetics, Evolution

Block I: Genetics - I

Unit-1: Mendelism.

Unit-2: Chromosomal theory of inheritance.

Unit-3: Dominance, incomplete dominance, codominance, overdominance, complementary gene action epistasis, inhibitory gene action.

Unit-4: Multiple allele and pseudoallele.

Unit-5 : Linkage, types of linkage, crossing over, cytological proof of crossing over in maize.

Unit-6 : Linkage maps and linkage groups intereference and coefficient of coincidence.

Unit-7 : Chromosomal aberrations : deletion, duplication, inversion and translocation.

Unit-8 : Numerical changes in chromosome : different types of euploidy

Unit-9 : Different types of aneuploids.

Block II : Genetics – II (10–14), Evolution (15–16)

Unit-10 : Gene action, one gene – one enzyme and one gene–one polypeptide hypothesis, modern concept of gene.

Unit-11 : Properties of genetic code.

Unit-12 : Gene regulation.

Unit-13 : Cytoplasmic inheritance.

Unit-14 : Sex chromosome and Sex linked inheritance.

Unit-15 : Evolution – Definition, evidences of organic evolution.

Unit-16 : Theories of evolution with special reference to synthetic theories.

Course Code : EBT 10

Course Title : Environmental Botany, Plant Geography

Block I : Environmental Botany – I

Unit-1 : Plant ecology–relevance to human civilization, sub-divisions, development.

Unit-2 : Ecosystem–Concept and types of ecosystem : components–biotic and abiotic; energy flow, nutrient cycle; biotic interrelationships, symbiosis, parasitisms, epiphytism, insectivorous plants, amensalism and allelopathy (only definitions).

Unit-3 : Plant communities–definition, classification, community dynamics and plant succession.

Unit-4 : Climatic responses factors : light factors, temperature factor, water factors : soil moisture, surface water, atmospheric water, rainfall, atmospheric components, wind.

Unit-5 : Atmosphere and plant responses–I. Hydrophytes : Fresh-water environments, classification of hydrophytes, morphological, anatomical and physiological adaptations.

Unit-6 : Atmospheric and plant responses–II. Xerophytes, Psammophytes, lithophytes, psychrophytes, succulents, ecological adaptations.

Unit-7 : Atmospheric and plant responses III. Halophytes–distribution, mangrove vegetations, ecological adaptations.

Unit-8 : Marine ecology : marine environment, marine biota, zonation in sea phytoplanktons–marine vegetation.

Block-II : Environmental Botany–II, Plant Geography

Unit-9 : Flora and vegetation of India : Phytogeographical division of India, forest vegetation, grassland vegetation.

Unit-10 : Endemism – definition, types, endemic flora, causes of endemism, centre of origin of species, plant migration barrier.

Unit-11 : Environmental pollution : air pollution, water pollution - their impact on plants.

Unit-12 : Global environmental issues–green-house gases, global warming, ozone depletion, acid rain and El-nino.

Unit-13 : Soil and plant interrelationship–minerals, microorganisms, soil water, soil dynamics, soil nutrients.

Unit-14 : Ecology of agriculture : bad effects of chemical fertilizers, insecticides and herbicides, biofertilizers and their uses, transgenic plants for insect and herbicide resistance.

Unit-15 : Plant conservation : Rare and threatened plants of India, red data book, importance of conservation, *ex-situ* and *in-situ* conservation, afforestation, biosphere reserve, sanctuaries and national parks.

Course Code : EBT 11

Course Title : Plant Biochemistry, Plant Molecular Biology

Block I : Plant Biochemistry

Unit-1 : Introduction to biochemistry.

Unit-2 : Water, pH, buffer solutions.

Unit-3 : Amino acids and primary structure of proteins, general structure of amino acids–structure of the twenty common amino acids.

Unit-4 : Proteins–three dimensional structure.
Unit-5 : Enzymes–properties, enzyme inhibition, allosteric enzyme.
Unit-6 : Amino acid metabolism.
Unit-7 : Carbohydrates.
Unit-8 : Lipids.

Block II : Plant Molecular Biology

Unit-9 : DNA structure and types.
Unit-10 : DNA replication.
Unit-11 : DNA repair – repair of incorrect bases thymine dimmers, SOS repair.
Unit-12 : RNA structure and types.
Unit-13 : Translation and RNA processing.
Unit-14 : Translation-initiation, elongation and termination.
Unit-15 : Effect of antibiotics on protein synthesis.

Course, Code : EBT 12

Course Title : Practical Botany-III

Unit-1 : Determination of mean, standard deviation and standard error from samples. (leaflet size, etc.)
Unit-2 : Determination of Goodness of fit in normal and modified mono and dihybrid ratios (3:1, 1:1, 9:3:3:1, 9:7, 15:1 and 13:3).
Unit-3 : Study of mitotic chromosome : Metaphase chromosome preparation (a) Pretreatment, (b) Fixation, (c) Staining, (d) Temporary squash Preparation of *Allium cepa* and lens root tips.
Unit-4 : Determination of mitotic index and frequency of different mitotic stages in prefiexd root tips of *Allium cepa*. Identification of different mitotic stages from permanent slide.
Unit-5 : Study of meiotic chromosome : Temporary smear preparation from *Allium / Datura / Solanum* flower buds. Identification of different meiotic stages from permanent slide.
Unit-6 : Detection of organic acids : Citric, Tartaric, Oxalic and Malic. Detection of titrable acidity from plant sample.
Unit-7 : Detection of carbohydrate and protein.
Unit-8 : Detection of Ca, Mg, Fe and S from plant sample. Estimation of dissolved oxygen content from water samples.
Unit-9 : Estimation of catalase activity and amino nitrogen by tritemetric method.

Course Code : EBT 13

Course Title : Cell Biology, Molecular Genetics

Block I : Cell Biology

Unit-1 : Microscopy–light, phase contrast, fluorescence and electron microscopy.
Unit-2 : Eukaryotic Cell–organization and subcellular structures and chemical components.

Unit-3 : Nucleus–organization, ultrastructure of nuclear envelope, structure and function of nucleus.

Unit-4 : Structure and functions of ribosome and lysosome.

Unit-5 : Structure and functions of mitochondria.

Unit-6 : Structure and functions of chloroplast.

Unit-7 : Structure of the eukaryotic chromosome, its organisation.

Unit-8 : Chemical composition of eukaryotic chromosome—euchromatin and heterochromatin.

Block II : Molecular Genetics

Unit-9 : Cell cycle and its control.

Unit-10 : Detailed account of the phases and events of mitosis and meiosis and their significance.

Unit-11 : Chromosome banding techniques and their application.

Unit-12 : Antibodies and their use in cell biology.

Unit-13 : Gene mutation, molecular basis of gene mutation.

Unit-14 : Plasmids and Transposable elements.

Unit-15 : Restriction endonucleases and recombinant DNA technology.

Unit-16 : Construction of genomic libraries, map position based cloning of genes (RFLP).

Course Code : EBT 14

Course Title : Biometry and Plant Breeding, Plant Tissue Culture

Block I : Biometry and Plant Breeding

Unit-1 : Biometry–definition, scope and importance, data in biology–samples & population, variables, accuracy & precision of data, derived variables, frequency distribution and its pictorial representation, handling of data.

Unit-2 : Descriptive Statistics I–Statistics of location (central tendency) and dispersion, arithmatic mean, median and mode.

Unit-3 : Descriptive Statistics II–Range, variance, standard deviation, standard error of mean, co-efficient of variation.

Unit-4 : Probability, random sampling and hypothesis testing–preliminary idea ; test of significance, t-test and Chi-square test for goodness of fit.

Unit-5 : Plant breeding–goals, important achievements, recent trends and future prospects.

Unit-6 : Breeding in self-pollinated crops–mass and pure line selection, pedigree breeding, bulk and back cross methods. Breeding in cross pollinated crops— mass and progeny selection, their application and achievements, line-breeding and recurrent selection.

Unit-7 : Heterosis–features, genetical and physiobiochemical basis. Hybrids and synthetic varieties, production, multiplication, maintenance, merits, demerits, achievements.

Unit-8 : Mutation breeding – methods, directed mutagenesis, Gamma—garden, application, achievements and limitation.

Unit-9 : Polyploidy breeding – auto and allo-polyploids in crop improvement methods, applications, achievements and limitation.

Block II : Plant Tissue Culture

Unit-10 : Cellular totipotency, development of cell tissue culture, plant tissue culture technology.

Unit-11 : Embryogenesis, organogenesis, plant regeneration and micropropa-gation.

Unit-12 : Embryo culture ; pollen and their anther culture, endosperm culture

Unit-13 : Protoplast culture and its application.

Unit-14 : Application of plant tissue in agriculture, horticulture and forestry.

Unit-15 : Cryopreservation and germ plasm conservation, tissue culture in conservation of endangered plants.

Unit-16 : Genetic engineering and transgenic plants.

Suggested Reading

1. Studies in Botany (Vol. I) : Mitra J. N., Mitra D & Chaudhuri S. K. (Moulik Library).
2. Studies in Botany (Vol. II) : Mitra D, Guha J., Chaudhuri S. K. (Moulik Library).
3. College Botany (Vol. I) : Gangulee H. C., Das K. S, Datta C. T. (New Central Book Agency).
4. College Botany (Vol. II) : Gangulee H. C. & Kar A. K. (New Central Book Agency).
5. College Botany (Vol. III) : Mukherjee S (New Central Book Agency).
6. Plant Biotechnology : Ignamuthu S (Oxford–IBH).
7. A Text Book of Biotechnology : Dubey R. C. (S. Chand & Co.).
8. Molecular Biology and Biotechnology : Kumar H. D. (Vikash Publication).
9. Text Book of Algae : Sharma O. P. (Tata Mc Graw Hill).
10. A Text Book of Fungi : Chopra G. L. and Verma V. (Pradeep Publication).
11. An introduction of Fungi : Dubey H. C. (Vikas Publishing House).
12. The cell : D. Robertes.
13. Cell Biology : C. B. Power.
14. A Text Book of Plant ecology : Ambasht R. S. & Ambasht N. K. (CBS Publications).
15. Environmental Planet : Botkin and Keller (John willey).
16. Plant Physiology : Mukherjee S and Ghosh A. (CBS Pub. Dist.).
17. Microbiology : Pelzar M. J., Chan P. C. S. and Krieg N. R. (Mc Graw Hill).
18. Genetics – Gardner.
19. Genetics – P. K. Gupta.
20. An introduction to plant Taxonomy : Jefferey, C. (Allied Publisher Pvt. Ltd.).

Examination system (Subject to Change)

1st Semester - FBG, FEG, E-1 & E - 4*
2nd Semester - FHS, E - 2, E - 3 & E - 5
3rd Semester - FST, E - 6 & E - 8*
4th Semester - E - 7, E - 9, E - 10 & S - 1
5th Semester - E - 11, E - 12* & S - 2

6th Semester - E - (13 & 14), S - 3, AOC & ENVS

*** Practical Courses**