

INTER DEPARTMENTAL : CLUSTER III

**LIST OF COURSES PROPOSED TO BE OFFERED AS CHOICE BASED INTER
DEPARTMENTAL COURSES TO M.Sc. LIFE SCIENCES STUDENTS WHO
HAVE APPEARED IN SEMESTER II**

(w.e.f Academic Year commencing from June 2010)

Faculty : Science
PG Department : Department of Life Sciences
Subject : M.Sc. Botany

Sr. No.	Paper No.	Semester	Course Title	Eligibility	Remarks
1	LSB (BPP) 301	III	Biochemistry and Physiology of Plants	M.Sc. Life Science student who have appeared in Sem II Examination	
2	LSB (PB) 302	IV	Plant Bionomics	M.Sc. Life Science student who have appeared in Sem II Examination	

Name of the Subject: M.Sc. Botany

Sr. No.	Paper No.	Semester	Name of the Paper	Total Marks (Ext + Int = Total)	Passing standard (Ext + Int = Total)	Total Teaching Hours	Exam Hours	Credits
1	LSB (BPP) 301	III	Biochemistry and Physiology of Plants	70 + 30 = 100	28 + 12 = 40	15 x 4 = 60	03	04
2	LSB (PB) 302	IV	Plant Bionomics	70 + 30 = 100	28 + 12 = 40	15 x 4 = 60	03	04

Internal**Marks**

Assignment / Study Tour	:	05
Attendance	:	05
Seminar	:	10
Test	:	10

Detailed Syllabus
(With effect from Academic Year 2010 – 2011)

SEMESTER III

M.Sc. Botany

Paper No: 301

Title of the Paper: Biochemistry and Physiology of Plants

Marks: 100

Credits : 04

Marks: Semester End Examination : 70

Continuous Internal Evaluation : 30

Unit	Detailed Syllabus	Teaching Hours	Marks / Weight
Unit 1	Membrane transport and translocation of water and solute: Plant – water relations, mechanism of water transport through xylem, transpiration, comparison of xylem and phloem transport, phloem loading and unloading, passive and active solute transport, membrane transport proteins. Mineral nutrition: Criteria of essentiality of elements, macro and Micro nutrients, role of essential elements, mineral deficiency symptoms and plant disorders	12	14 + 6 = 20
Unit 2	Photochemistry and photosynthesis: General concept and historical background, photosynthetic pigments and light harvesting complexes. Photooxidation of water, mechanism of electron and proton transport, carbon assimilation – the C4 cycle, the CAM pathway, biosynthesis of starch and sucrose, physiological and ecological considerations.	12	14 + 6 = 20
Unit 3	Respiration and lipid metabolism: Overview of plant Respiration. Glycolysis, the TCA cycle, electron transport and ATP synthesis. Pentose phosphate pathways, glyoxylate cycle, alternative oxidase system, structure and function of lipids, fatty acids biosynthesis. Synthesis of membrane lipids, structural lipids and storage lipids and their catabolism.	12	14 + 6 = 20
Unit 4	Nitrogen fixation, nitrogen and sulphur metabolism: overview of plant Respiration. Nodule formation and nod factors, mechanism of nitrate uptake and reduction, ammonium assimilation. Sulfate uptake, transport and assimilation.	12	14 + 6 = 20
Unit 5	The flowering process: Photoperiodism and its significance. Endogenous clock and its regulation, floral induction and development – genetic and molecular analysis, role of vernalization. Stress physiology: Plant response to biotic and abiotic stress. Mechanism of biotic and abiotic stress tolerance, HR and SAR, water deficit and drought resistance, oxidative stress.	12	14 + 6 = 20

Break up of Continuous Internal Evaluation:

- 1) Assignment / Study Tour : 05 Marks
- 2) Attendance : 05 Marks
- 3) Seminar : 10 Marks
- 4) Test : 10 Marks

Total Marks : 30

Detailed Syllabus
(With effect from Academic Year 2010 – 2011)

SEMESTER IV

M.Sc. Botany

Paper No: 302

Title of the Paper: Plant Bionomics

Marks: 100

Credits : 04

Marks: Semester End Examination : 70

Continuous Internal Evaluation : 30

Unit	Detailed Syllabus	Teaching Hours	Marks / Weight
Unit 1	Vegetation organization: Phytosociological characters of plant communities and methods of their study, biological spectrum, autecological approach and ecological indicators.	12	14 + 6 = 20
Unit 2	Edaphic factor: definition and composition of soils, origin and formation of soil, soil profile, soil classification, properties of soils, soil erosion, soil conservation.	12	14 + 6 = 20
Unit 3	Ecosystem organization : biosphere, biotic and abiotic components, ecological balance, food chain, ecological pyramids, energy flow and biogeochemical cycles.	12	14 + 6 = 20
Unit 4	Ecosystem: Types, terrestrial and fresh water ecosystems. Climate change: Greenhouse gasses (CO ₂ , CH ₄ , N ₂ O, CFCs), Ozone hole, consequences of climate change(global warming, sea level rises, acid rain, UV radiation)	12	14 + 6 = 20
Unit 5	Population ecology: Population growth curves, biotic potential, death rates, age structures, fluctuations and equilibrium.	12	14 + 6 = 20

Break up of Continuous Internal Evaluation:

- 1) Assignment / Study Tour : 05 Marks
- 2) Attendance : 05 Marks
- 3) Seminar : 10 Marks
- 4) Test : 10 Marks

Total Marks : 30

INTER DEPARTMENTAL : CLUSTER III

LIST OF COURSES PROPOSED TO BE OFFERED AS CHOICE BASED INTER DEPARTMENTAL COURSES TO M.Sc. LIFE SCIENCES STUDENTS WHO HAVE APPEARED IN SEMESTER II

(w.e.f Academic Year commencing from June 2010)

Faculty : Science
PG Department : Department of Life Sciences
Subject : M.Sc. Microbiology

1	LSM (MMB) 303	III	Microbial Molecular Biology	M.Sc. Life Science student who have appeared in Sem II Examination	
2	LSM (MDM) 304	IV	Microbial Diversity, Metabolism and its Regulation	M.Sc. Life Science student who have appeared in Sem II Examination	

Name of the Subject: M.Sc. Microbiology

1	LSM (MMB) 303	III	Microbial Molecular Biology	70 + 30 = 100	28 + 12 = 40	15 x 4 = 60	03	04
2	LSM (MDM) 304	IV	Microbial Diversity, Metabolism and its Regulation	70 + 30 = 100	28 + 12 = 40	15 x 4 = 60	03	04

Internal

Marks

Assignment / Study Tour	:	05
Attendance	:	05
Seminar	:	10
Test	:	10

Detailed Syllabus
(With effect from Academic Year 2010 – 2011)

SEMESTER III

M.Sc. Microbiology

Paper No: 303

Title of the Paper: Microbial Molecular Biology

Marks: 100

Credits : 04

Marks: Semester End Examination : 70

Continuous Internal Evaluation : 30

Unit	Detailed Syllabus	Teaching Hours	Marks / Weight
Unit 1	DNA structure, Central Dogma of Molecular Biology, DNA as genetic material, DNA replication, Mutation and its molecular basis, DNA repair systems, Superhelical density, C- value paradox, Cot curves, DNA polymerases, Endonucleases, Exonucleases, homing and retrohoming endonucleases, Topoisomerases, Gyrases.	12	14 + 6 = 20
Unit 2	Structure of rRNA, tRNA, mRNA, Transcription, RNA polymerases, RNA processing in bacteria and eukaryotes, Bacterial Promoters, Ribozymes. Reverse transcriptases, RNA footprinting, RNA replicases, methods for DNA sequencing.	12	14 + 6 = 20
Unit 3	Regulation of gene expression: control of enzyme activity and enzyme synthesis, <i>lac</i> operon, <i>ara</i> operon, <i>trp</i> operon, <i>his</i> operon, global regulation – stringent responses to starvation, RNAi, two component signal transduction system, Arc AB, Fnr system, lux operon.	12	14 + 6 = 20
Unit 4	Plasmid Biology: Properties, types, detection, transfer, replication, compatibility, control of copy number etc. Transposons, retrotransposons and insertion sequences. Genetic exchange in Bacteria: Transformation, Transduction, Conjugation, Lysogeny, Recombination and its molecular basis.	12	14 + 6 = 20
Unit 5	Recombinant DNA technology: Recombinant DNA, types of vectors, cloning vectors, expression vectors, techniques for DNA insertion into a vector, detection methods for recombinant molecule expression in host cell, Plant biotechnology and tissue culture techniques, Animal biotechnology, Applications of RDT.	12	14 + 6 = 20

Break up of Continuous Internal Evaluation:

- 1) Assignment / Study Tour : 05 Marks
- 2) Attendance : 05 Marks
- 3) Seminar : 10 Marks
- 4) Test : 10 Marks

Total Marks : 30

Detailed Syllabus
(With effect from Academic Year 2010 – 2011)

SEMESTER IV

M.Sc. Microbiology

Paper No: 304

Title of the Paper: Microbial Diversity, Metabolism and its Regulation

Marks: 100

Credits : 04

Marks: Semester End Examination : 70

Continuous Internal Evaluation : 30

Unit	Detailed Syllabus	Teaching Hours	Marks / Weight
Unit 1	Classification of Microorganisms: Introduction-Haeckel's 3 kingdom concept, four kingdom classification by Margulis and Copeland. Whittaker's 5 kingdom classification, 3 domain concept by Carl Woese. Differences between the 3 domains. Classification and salient features of bacteria according to Bergey's manual of systematic bacteriology 2 nd ed (2002).	12	14 + 6 = 20
Unit 2	Taxonomic Ranks and Bacterial Diversity: Concept of species and hierarchical taxa, biological nomenclature, classical and quantitative methods of taxonomy of microorganisms, Bacterial diversity. Unculturable and culturable bacterial diversity, conventional and molecular methods of studying bacterial diversity, diversity indices, Polyphasic approach for analysis of microbial diversity, Metagenomics. Multicellular organization of selected microbes.	12	14 + 6 = 20
Unit 3	Growth and Bioenergetics: Growth curve, growth kinetics and measurement of growth, cell divisions and cell cycles in eukaryotes and bacteria, steps in cell cycle and control of cell cycle. Basic principles; Equilibria and concepts of free energy, Glycolytic pathway, Pentose phosphate pathway, Entner-Doudoroff pathway, Krebs cycle; Glyoxylate pathway, Oxidative phosphorylation	12	14 + 6 = 20
Unit 4	Bacterial photosynthesis: Oxygenic and anoxygenic photosynthesis, CO ₂ fixation reactions. Aerobic and Anaerobic respirations, fermentation of carbohydrates and proteins, Electron transport system in bacteria and eukaryotes, rotational mechanism of ATP synthesis.	12	14 + 6 = 20
Unit 5	Secondary metabolites and secondary metabolism: Antibiotics, multiple drug resistance, biochemical mechanisms of drug resistance, plasmids and transposons in drug resistance, bacteriocins.	12	14 + 6 = 20

Break up of Continuous Internal Evaluation:

- 1) Assignment / Study Tour : 05 Marks
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- 3) Seminar : 10 Marks
- 4) Test : 10 Marks

Total Marks : 30

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(w.e.f Academic Year commencing from June 2010)

Faculty : Science
PG Department : Department of Life Sciences
Subject : M.Sc. Zoology

1	LSZ (I) 305	III	Insectology	M.Sc. Life Science student who have appeared in Sem II Examination	
2	LSZ (ETA) 306	IV	Ecology and Transgenic Animals	M.Sc. Life Science student who have appeared in Sem II Examination	

Detailed Syllabus
(With effect from Academic Year 2010 – 2011)

SEMESTER III

M.Sc. Zoology

Paper No: 305

Title of the Paper: Insectology

Marks: 100

Credits : 04

Marks: Semester End Examination : 70

Continuous Internal Evaluation : 30

Unit	Detailed Syllabus	Teaching Hours	Marks / Weight
Unit 1	Taxonomy: Basic concept, Historical resume of systematics, Taxonomy of animals and its application, Insect classification and its characteristic.	12	14 + 6 = 20
Unit 2	Important Pests: Effects on crops, animals and human beings, chemical and biological control of insect pest.	12	14 + 6 = 20
Unit 3	Insect physiology : Physiology of digestion, blood, excretion, respiration and photoreception.	12	14 + 6 = 20
Unit 4	Reproduction: Fertilization, growth and metamorphosis. Insect embryo development up to germ layers. Insect endocrine organs.	12	14 + 6 = 20
Unit 5	Pheromones, sonification, bioluminescence, Insect preservation and identification, Economic importance of insects, Behavioral study of certain insects.	12	14 + 6 = 20

Break up of Continuous Internal Evaluation:

- 1) Assignment / Study Tour : 05 Marks
- 2) Attendance : 05 Marks
- 3) Seminar : 10 Marks
- 4) Test : 10 Marks

Total Marks : 30

Detailed Syllabus
(With effect from Academic Year 2010 – 2011)

SEMESTER IV

M.Sc. Zoology

Paper No: 306

Title of the Paper: Ecology and Transgenic animals

Marks: 100

Credits : 04

Marks: Semester End Examination : 70

Continuous Internal Evaluation : 30

Unit	Detailed Syllabus	Teaching Hours	Marks / Weight
Unit 1	Ecosystem: Definition, types and composition, Biochemical cycles. Inter relationship: Mutualism, Commensalisms, protozo – operation.	12	14 + 6 = 20
Unit 2	Population ecology: population attributes, the role of prey – predators relation in nature, parasitism, competition (inter and intra specific), niche concept, food chain. Adaptation: aquatic, terrestrial and parasitic.	12	14 + 6 = 20
Unit 3	Wild life : Conservation, sanctuaries and national parks. Animal Biotechnology: An overview, definition, genetic engineering, animal tissue culture, application of animal biotechnology, gene banking and conservation.	12	14 + 6 = 20
Unit 4	Animal tissue culture: Gene controlling differentiation in animals (organ regeneration in animals), transformation of animal cells characteristics, establishment of cell line, animal tissue culture media, culture procedures.	12	14 + 6 = 20
Unit 5	Transgenic animal, artificial animal breeding, Acquired Immune deficiency syndrome (AIDS), Production of drugs from animals.	12	14 + 6 = 20

Break up of Continuous Internal Evaluation:

- 1) Assignment / Study Tour : 05 Marks
- 2) Attendance : 05 Marks
- 3) Seminar : 10 Marks
- 4) Test : 10 Marks
- Total Marks : 30**