

TURA GOVERNMENT COLLEGE, TURA
DEPARTMENT OF BOTANY

Allotment of Topics of Syllabus : Even Semester

1. **Shri Rajiv K Marak, Associate Professor.**

Semester – 2 : Paper – 2:

Unit – 4:

1. Organization of Apical Meristem
2. Types of Stomata in Angiosperms

Semester – 4 : Paper – 4:

Unit – 1:

1. Basic concept of Archaeobacteria, Cyanobacteria, Actinomycetes and Mycoplasmas.
2. Ultra structure of bacterial cell, gram positive and gram negative cell wall
3. Binary fission and endospore formation in bacteria.

Semester – 6: Paper – 6:

Unit – 3:

1. Principles of crop improvement: domestication, introduction, hybridization, and artificial selection.
2. Methods of crop improvement: Pure line and mass selection with examples.
3. Heterosis and Inbreeding depression.

Paper 7: Practical

(Genetics, Plant Breeding and Molecular Biology)

1. Preparation of temporary slides of root tips, and study of mitosis.
2. Study of cell division in flower buds and identification of meiotic stages
3. Study of Polytene chromosome through permanent slides.
4. Study of monohybrid and dihybrid ratios and their modifications by using Chi square test of significance.
5. Preparation of standard curve for estimation of.
 - (a) DNA by diphenylamine method
 - (b) RNA by orcinol method
6. Estimation of soluble proteins in plant materials by Bradford's method
7. Emasculation, bagging, tagging and pollination in self- pollinated plants.

2. Smt. Noda Merrie R Marak, Senior Lecturer

Semester – 2:

Paper - 2

Unit – 1:

1. Morphology , reproduction and life cycles of Cycas, Pinus and Gnetum

Unit – 2:

1. Growth and nutrition of microbes

Unit – 4:

1. Disease symptoms, disease cycle and control measures of Late and Early blight of potato, white rust of crucifers and citrus canker.

Paper 4: Practical

(Microbiology, Mycology and Plant Pathology)

1. Calibration of microscope and measurement of microbial spores (fungal and bacterial).
2. Demonstration of fungal or bacterial population density (spores) using haemocytometer.
3. Study of gram positive and gram negative bacteria (leguminous root nodules and curd).
4. Study of the vegetative and reproductive parts of the specimens prescribed in Unit 3 of Paper 4 with the help of temporary preparations, Sectioning, drawing, description and identification and classification of the specimens.
5. Study of diseased specimens prescribed in Unit 4 of Paper 4 by temporary preparations and Permanent slides,
6. Collection, identification and submission of at least 5 diseased plant specimens.

Semester - 6

Paper - 8

Unit – 4:

1. Concept of genetic engineering and its application
2. Vectors of gene delivery (Ti Plasmid and Lambda phage)
3. Tools and techniques of gene cloning.
4. Achievements in crop biotechnology (insect control and quality improvement) e.g. Golden rice and Bt cotton
5. Introductory bio-informatics

Paper - 8: Practical

(Plant Reproductive Biology and Plant Biotechnology)

1. Preparation of slides using acetolysis method and study of pollen morphology.
2. Excision of endosperm and embryo
3. Estimation of germination percentage of pollen grains using Brewbaker and Kwack'S medium.
4. Study of pollen development, microsporogenesis, megasporogenesis, fertilization, endosperm and embryo using permanent slides.
5. Pollen staining using acetocarmine.
6. Preparation of tissue culture medium and inoculation of explants.

3. Smt. Shabaree Yasmeen A Sangma, Senior Lecturer.

Semester – 2:

Paper 2: Theory

Unit - 4:

1. Components of xylem
2. Components of phloem.
3. Secondary growth in stem.
4. Anomalous secondary growth in *Mirabilis*,
5. Anomalous secondary growth in *Bignonia*
6. Anomalous secondary growth in *Dracaena*.

Paper 2: Practical

(Gymnosperms, Paleobotany, Morphology and Anatomy)

1. Study of vegetative and reproductive structures of all prescribed gymnosperms by preparing temporary stained slides (dissection, sectioning, drawing, description and identification up to genus).
2. Anatomical studies of anomalous secondary structures of *Mirabilis*,
3. Anatomical studies of anomalous secondary structures of *Bignonia*
4. Anatomical studies of anomalous secondary structures of *Dracaena*.
5. Study of fossils through specimens.
6. Spotting: Includes those groups and sections not covered in preparations.
7. Study of double staining technique (safranin and haemotoxylin or safranin and fast green).
8. Sectioning and observation of placentation types, ovule structure and anther through temporary preparations.

Paper 4: Theory

Unit 2:

1. Antibiotics: Types of antibiotics
2. History and Mode of action.

Unit 3:

1. Life cycles of *Erysiphe*,
2. Life cycles of *Puccinia* and
3. Life cycles of *Agaricus*.

Paper 8: Theory

Unit 3:

1. Cell and Tissue culture techniques.
2. Cellular differentiation and totipotency,
3. Organogenesis
4. Embryogenesis.

5. Protoplast isolation and culture
6. Somatic hybridization and
7. Clonal propagation of elite plants (Shoot tips, axillary buds and meristem culture).
8. Production of haploid plants from anther
9. Production of haploid plants from pollen
10. Production of haploid plants from ovule.
11. Cryopreservation: Vitrification
12. Artificial seeds.

Paper 8: Practical

1. Preparation of slides using acetolysis methods and study of pollen morphology.
2. Excision of endosperm and embryo.
3. Estimation of germination percentage of pollen grains using Brewbaker and Kwack's medium.
4. Study of pollen development, microsporogenesis, megasporogenesis, fertilization, endosperm and embryo using permanent slides.
5. Pollen staining using acetocarmine.
6. Preparation of tissue culture medium and inoculation of explants.

4. Shri Manman A Sangma, Lecturer

Semester - 2

Unit – 2:

1. Fossil formation and plant fossil types
2. General account of Dominant Jurassic flora

Unit - 3

1. Morphology and evolution of stamens and carpels

Paper – 2: Practical:

1. Study of vegetative and reproductive structures of all prescribed gymnosperms by preparing temporary stained slides (dissection, sectioning, drawing, description and identification up to genus.)
2. Anatomical studies of anomalous secondary structures of *Mirabilis*, *Bignonia* and *Dracaena*.
3. Study of fossils through slides and specimens.
4. Spotting includes those groups and sections not covered in the preparations.
5. Study of double staining techniques (Saffranin and Haemotxylin or Saffranin and fast green).
6. Sectioning and observation of placentation types, ovule structure and anther through temporary preparations.

Semester 4

Unit 3

1. Development of ascus and basidium
2. Range of vegetative structure and reproduction in fungi,

3. Economic importance of fungi
4. Growth forms, structure and economic importance of lichens

Semester 6

Unit - 4

1. Structure of B-DNA and RNA ; Secondary folding of tRNA
2. Mechanism of DNA replication; semi-conservative and semi-discontinuous replication.
3. Mechanism of transcription; Operon concept : inducible and repressible operons.
4. Recombination of bacteria (conjugation, transformation and transduction).
5. Mechanism of protein synthesis in prokaryotes.

5. Shri Debasish R Marak, Lecturer

Semester – 2

Paper 2: Theory

Unit – 1:

1. Gymnosperms, Paleobotany, Morphology and Anatomy

Unit – 2:

1. A general account of fossil gymnosperms cycadofilicales
2. Geological time scale

Unit – 3:

1. Types of bracts and inflorescence

Semester - 4

Paper 2: Theory

(Microbiology, Mycology and Plant Pathology)

Unit 4

1. Classification of plant diseases; Koch postulates.
2. Host parasite interaction and pathogenicity.
3. Histological and biochemical defence mechanism against infection.
4. Transmission and dissemination of diseases.

Semester - 6

Paper 8: Theory

Unit -1

1. Microsporogenesis and microgametogenesis, Pollen production and dispersion in time and space.
2. Pollen morphology and its role in taxonomy; Pollen allergy.

Unit 2

1. Megasporogenesis and megagametogenesis (monosporic, bisporic and tetrasporic)
2. Fertilization, structure and function of synergids.
3. Development, structure and function of endosperm and its haustoria
3. Dicot embryogeny and suspensor, polyembryony

Paper 2: Practical

(Gymnosperms, Paleobotany, Morphology and Anatomy)

1. Study of vegetative and reproductive structures of all prescribed gymnosperms by preparing Temporary stained slides (dissection, sectioning, drawing, description and identification up to Genus)
2. Anatomical studies of anomalous secondary structures of *Mirabilis*, *Bignonia* and *Dracaena*.
3. Study of fossils through slides or specimens.
4. Spotting: Includes those groups and sections not covered in the preparations.
5. Study of double staining techniques {Safranin and Haematoxylin or Safranin and fast green}.
6. Sectioning and observation of placentation types, ovule structure and anther through temporary preparations.

6. Shri Aloster Nongrum, Assistant Professor.**Semester – 2**

Paper 2: Theory

Unit 1

1. Classification of gymnosperms according to Coulter and Chamberlain.
2. Phylogenetic relationship and affinities of gymnosperm
4. Economic importance of gymnosperms.

Semester – 4

Paper 4: Theory

Unit - 1

1. Viruses: Classification, characters; Structure of TMV and Bacteriophage T4
2. Lytic and Lysogenic cycles of viruses

Unit - 3

1. Life cycles of *Pythium*

Semester – 4

Paper – 4 : Practical

(MICROBIOLOGY, MYCOLOGY AND PLANT PATHOLOGY)

1. Calibration of microscope and measurement of microbial spores (fungal and bacterial).
2. Demonstration of fungal or bacterial population density (spores) using haemocytometer.
3. Study of gram positive and gram negative bacteria (leguminous root nodules and curd).
4. Study of vegetative and reproductive parts of the specimens prescribed in Unit 3 of Paper 4 with the help of temporary preparations. Sectioning, drawing, description and identification and classification of the specimens.
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6. Collection, identification and submission of at least 5 diseased plant specimens.

Semester – 6

Paper – 7 : Theory

Unit 1

1. Linkage and crossing over.

Unit 2

1. Extra-nuclear inheritance (cytoplasmic male sterility and variegated leaves in *Mirabilis*)
2. Sex chromosomes and mechanisms of sex determination.
3. Structural and numerical aberration of chromosomes in plants.

Unit 3

1. Gene mutation and its role in crop improvement and evolution.

Semester – 6

Paper – 7 : Practical

GENETICS, PLANT BREEDING AND MOLECULAR BIOLOGY

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2. Study of cell division in flower buds and identification of meiotic stages.
3. Study of Polytene chromosomes through permanent slides.
4. Study of monohybrid and dihybrid ratios and their modifications by using Chi square test of significance.
5. Preparation of standard curve for estimation of
 - a. DNA by diphenylamine method
 - b. RNA by orcinol method
6. Estimation of soluble proteins in plant materials by Bradford's method.
7. Emasculation, bagging, tagging and pollination in self pollinated plants.

7. Smt. Stilchi M Sangma, Lecturer**Semester - 2**

Paper - 2: Theory

(Gymnosperms, Paleobotany, Morphology and Anatomy)

Unit - 3

1. Floral Morphology: Forms of calyx, Forms of corolla, Aestivation, Types of stamens, Types of carpels, Ovule forms, Placentation.
2. Leaf Morphology: Phyllotaxy, Venation, Types of stipules.

Semester - 4

(Microbiology, Mycology and Plant Pathology)

1. Different groups of microorganisms in soil
2. Role of different groups of microorganisms in decomposition of organic matter
3. Role of different groups of microorganisms in nitrogen fixation
4. Sewage treatment
5. Basic concept of food spoilage, Basic concept of food poisoning, Microbes in milk and milk products.

Semester - 6

Paper 7: Theory

(Genetics, Plant Breeding and Molecular Biology)

Unit -1

1. Mitosis, Significance of Mitosis
2. Meiosis, Significance of Meiosis
3. General account of structure of chromosomes, Role of chromosomes in inheritance
Chromosomal theory of inheritance.
4. Mendel's laws of Inheritance, Alleles and Multiple alleles
5. Gene interaction (Epitasis, Supplementary gene interaction, Complementary gene interaction, Duplicate genes)

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