

GAUHATI UNIVERSITY

Department of Botany

B.Sc. Syllabus for Botany in Semester System

Major Course

<u>Examination Time :</u>	Theory	3 (Three) Hours
	Practical	3 (Three) Hours

FIRST SEMESTER

Allotment of Marks & Credit:

<u>Paper</u>	<u>Course work</u>	<u>Internal</u>	<u>Total</u>	<u>Class</u>
<u>Credit</u>		<u>Assessment</u>		<u>per week</u>
Paper: M 101 (Theory) 06	60	15	75	06
Paper: M 102 (Theory) 06	60	15	75	06
Paper: M 103 (Practical) 04	40	10	50	04
Total 16	160	40	200	16

SECOND SEMESTER

Allotment of Marks & Credit:

<u>Paper</u>	<u>Course work</u>	<u>Internal</u>	<u>Total</u>
<u>Class</u>	<u>Credit</u>	<u>Assessment</u>	<u>per</u>
<u>week</u>			

Paper: M 201 (Theory)	60	15	75	06
06				
Paper: M 202 (Theory)	60	15	75	06
06				
Paper: M 203 (Practical)	40	10	50	04
04				
Total	160	40	200	16
16				

COURSE CONTENT

Botany (Major)

FIRST SEMESTER

Paper: M 101 (Theory)

Examination Time : 3 (Three) Hours

Full Marks : 60

Plant Kingdom, Algae and Fungi

Class per week

Credit

A. Plant kingdom : 01

01

Classification of plant kingdom and criteria; diversity, form, life span, nutrition and ecological status

B. Algae : 03

03

General characters, classification, morphology, reproduction, phylogeny and economic importance.

Life history of main classes with special reference to the following genera :-

Chlorophyceae :- *Volvox*, *Coleochaete*, *Chara*

Xanthophyceae :- *Vaucheria*

Bacillariophyceae :- General account

Phaeophyceae :- *Ectocarpus*, *Fucus*

Rhodophyceae :- *Polysiphonia*

Cyanophyceae :- *Anabaena*, *Nostoc*

C. Fungi :

02

General characters, cell structure, nutrition, reproduction and sexuality; classification and economic importance; phylogeny and life history of main classes with special

reference to the following types :-

Phycomycetes :- *Phytophthora*, *Mucor*

Ascomycetes :- *Saccharomyces*, *Penicillium*

Basidiomycetes :- *Puccinia*, *Agaricus*

Deuteromycetes :- *Cercospora*, *Colletotrichum*

Paper: M 102 (Theory)

Examination Time : 3 (Three) Hours

Full Marks : 60

Bryophytes and Pteridophytes

Class per week
Credit

A. Bryophytes : 03

03

Classification and general account of structure, morphology, anatomy, reproduction, phylogenetic relationship among the different groups with special reference to the following types :-

Hepaticopsida :- *Riccia*, *Marchantia*

Anthocerotopsida :- *Anthoceros*

Bryiopsida :- *Sphagnum*, *Polytrichum*

Economic importance of Bryophytes

B. Pteridophytes : 03

03

Classification, comparative study of morphology, anatomy, reproduction, stellar diversity, heterospory and seed habit with special reference to the following types :-

Psilopsida :- *Psilotum*

Lycopsidea :- *Lycopodium*, *Selaginella*

Sphenopsida :- *Equisetum*

Pteropsida :- *Adiantum*, *Marsilea*

Paper: M 103 (Practical)

Examination Time : 3 (Three) Hours

Full Marks : 40

Class per week
Credit

1. Study of eukaryotic organisms (algae, fungi) through
03

03

permanent mounting and staining. Study of morphology
and reproductive structures of the following types :

- (i) Algae :- *Volvox*, *Chara*, *Ectocarpus*, *Fucus*, *Polysiphonia*, *Anabaena*
(ii) Fungi :- *Phytophthora*, *Mucor*, *Penicillium*, *Puccinia*, *Agaricus*, *Colletotrichum*
(iii) Bryophytes :- *Riccia*, *Marchantia*, *Anthoceros*, *Polytrichum*, *Sphagnum*
(iv) Pteridophytes :- *Lycopodium*, *Selaginella*, *Equisetum*, *Adiantum*, *Marsilea*

2. Techniques for permanent preparation of types studied (slides)
01
and herbarium

01

&

Field studies, submission of field report and collections

SECIOND SEMESTER

Paper: M 201 (Theory)

Examination Time : 3 (Three) Hours

Full Marks : 60

Gymnosperms, Paleobotany and Plant Anatomy

Class per week
Credit

A. Gymnosperms:

02

02

Classification and salient features; evolutionary significance of gymnosperms; comparative study of morphology, anatomy and reproduction of the following types :-

Cycadales :- *Cycas*

Coniferales :- *Pinus*, *Cryptomeria*, *Thuja*

Ginkgoales :- *Ginkgo*

Gnetales :- *Gnetum*

B. Paleobotany:

02

02

Process of fossilization; general account, anatomy and reproduction of the following types :-

Psilophyta :- *Rhynia*

Lepidodendrales :- *Lepidodendron*

Sphenophyllales :- *Sphenophyllum*

Cycadofilicales :- *Lyginopteris*

Bennettitales :- *Williamsonia*

Cordaitales :- *Cordaites*

C. Plant Anatomy:

02

02

Cell wall and cell membrane:- Origin, ultrastructure, chemical constituents and functions of cell wall, models of cell membrane and organization

Tissues and their classification :- Theories of structural development and differentiation of roots and shoots

Different tissue systems and their functions

Anatomy of primary monocot and dicot roots; secondary growth of stems and roots

Anomalous secondary growth in thickness in *Dracaena*, *Amaranthus*, *Boerhaavia* and *Mirabilis*

Paper: M 202 (Theory)

Examination Time : 3 (Three) Hours

Full Marks : 60

Cell Biology and Plant Biochemistry

Class per week
Credit

A. Cell Biology :

04

04

The Cell :- Historical background ,cell theory, cell size and structure, comparative account of prokaryotic and eukaryotic cell

Structures, functions and origin of cell organelles such as nucleus, ribosomes, nuclear matrix and nucleoplasm, mitochondria and chloroplast; types of plastids; golgi complex, endoplasmic reticulum, lysosomes, peroxisomes

Cell division:- Mitosis and meiosis and their significance

Physical and chemical composition of chromosomes

DNA and RNA:- structures and functions

**B. Plant Biochemistry :
02**

02

Nitrogen metabolism , biological nitrogen fixation

Classification and nomenclature of enzymes, enzymes as biocatalyst, physico-chemical properties of enzymes, functions and factors affecting enzyme activities.

Paper: M 203 (Practical)

Examination Time : 3 (Three) Hours

Full Marks : 40

**Class per week
Credit**

1. Gymnosperm :- Cycas, Pinus, Cryptomaria, Gnetum, Thuja
04
2. Paleobotany :- Specimen and slides of the types included in the theory
3. Study of various stages of mitosis and meiosis using appropriate stain and plant Materials
4. Plant Anatomy :- Study of gross anatomical details of cells ,tissues and various other organs of plants

Study of anomalous structure : primary and secondary growth in stems covered under theory syllabus.

GAUHATI UNIVERSITY

Department of Botany

B.Sc. Syllabus for Botany in Semester System

General Course

Examination Time : Theory 3 (Three) Hours

FIRST SEMESTER

Allotment of Marks & Credit:

<u>Paper</u> <u>Class</u>	<u>Credit</u>	<u>Course work</u>	<u>Internal</u> <u>Assessment</u>	<u>Total</u>	<u>per</u> <u>week</u>
Paper: E 101 (Theory) 06		60	15	75	06

SECOND SEMESTER

Allotment of Marks & Credit:

<u>Paper</u> <u>Class</u>	<u>Credit</u>	<u>Course work</u>	<u>Internal</u> <u>Assessment</u>	<u>Total</u>	<u>per</u> <u>week</u>
Paper: E 201 (Theory) 06		60	15	75	06

COURSE CONTENT

Botany (General)

FIRST SEMESTER

Paper: E 101 (Theory)

Examination Time : 3 (Three) Hours

Full Marks : 60

Class per week
Credit

Diversity of Microbes and Cryptogams

1. Introductory Botany:- Classification of plant Kingdom, importance of plants for human life system and support of life

01

2. Algae:- General characters ,classification and economic importance; **01**

life history and important features of the following:-

Cyanophyceae : *Anabaena*

Chlorophyceae : *Volvox* , *Oedogonium*

Pheophyceae : *Ectocarpus*

Rhodophyceae : *polysiphonia*

3. Viruses, Bacteria, Fungi, Lichen and Plant Pathology **02**

General account of Viruses, Bacteriophages, transmission of viruses

Classification of Bacteria; ultra structure of bacterial cell, reproduction and Economic importance of Bacteria.

Fungi and Plant Pathology: - General characters, cellular organizations, nutrition, reproduction, classification and economic importance

Plant disease symptoms, disease cycle and control measures

Life histories of the following :-

Phycomycetes : *Phytophthora*, *Mucor*

Ascomycetes : *Saccharomyces*, *Penicillium*, *Peziza*

Basidiomycetes : *Puccinia*

Deuteromycetes : *Helminthosporium*

Lichens :- General account and economic importance

4. Bryophytes :- Morphology, structural organization, reproduction, **01**

habitat, classification and life histories of the following :

Hepaticopsida :- *Marchantia*

Anthocerotopsida :- *Anthoceros*

Bryopsida :- *Funaria*

5. Pteridophytes: - Origin and evolutionary trends ; classification, **01**

morphological and anatomical characteristics with life cycles of the following types:-

Lycopsidea :- *Lycopodium*, *Selaginella*

Sphenopsida :- *Equisetum*

Pteropsida :- Pteris

SECOND SEMESTER

Paper: E 201 (Theory)

Examination Time : 3 (Three) Hours

Full Marks : 60

Cell Biology and Genetics

Class per week
Credit

1. Structure of prokaryotic and eukaryotic cell, ultra structure of nucleus, mitochondria and chloroplast

01

01

2. Chromosome organization: - Morphology of chromosome,

types of chromosomes; Structure and functions of DNA & RNA and their replication	01
3. Cell division :- Mitosis and meiosis and their significance	01
4. Gene expressions :- Structure of gene, protein synthesis, regulation of gene expression in prokaryotes and eukaryotes	01
5. Mendelian genetics:- Laws of segregation and independent assortment, allelic and non allelic interactions, incomplete dominance	01
6. Linkage and crossing over and their significance; Changes in chromosome structure and number and their role in evolution, mutations –spontaneous and induced	01