

KOLHAN UNIVERSITY – CHAIBASA
JHARKHAND



POST GRADUATE PROGRAMME
CHOICE BASED CREDIT SYSTEM (CBCS)
(Session 2017- 2019)

SYLLABUS

M. Sc. BOTANY

PART I

Kolhan University, Chaibasa
M. Sc. Botany (Semester Wise Distribution of Courses)
Part – I

Semester – I

Course Code	Name Of Paper	Credit	Hrs./ Week	Full Marks	ESUE*	SIA *(For Theory) /Viva - Voce (For Practical)
FC BOT101	Computer Science	5	5(L) +1(T)	100	70	30
CCBOT101	Microbiology & Cryptogames	5	5(L) +1(T)	100	70	30
CCBOT102	Gymnosperm & Taxonomy	5	5(L) +1(T)	100	70	30
CC(P)BOT103	Practical Based on CCBOT101 & CCBOT102	5	10	100	80	20

Semester – II

Course Code	Name Of Paper	Credit	Hrs./ Week	Full Marks	ESUE*	SIA *(For Theory) /Viva - Voce (For Practical)
ECBOT201	Research Methodology	5	5(L) +1(T)	100	70	30
CCBOT204	Embryology, Anatomy & Economic Botany	5	5(L) +1(T)	100	70	30
CCBOT205	Plant Physiology, Biochemistry	5	5(L) +1(T)	100	70	30
CC(P)BOT206	Practical based on CCBOT204 &CCBOT205	5	10	100	80	20

*ESUE - End Semester University Examination

*SIA - Sessional Internal Assessment

Group A Cytogenetics & Molecular Genetics

Group B Microbiology & Plant Pathology

SEMESTER I

CCBOT101

MICROBIOLOGY & CRYPTOGRAMS

Full Marks: 70

Credits: 5

Time:03 Hours

In all **nine** question of equal value will be set, out of which a student shall have to answer five questions. Q1 will be compulsory, consisting of 10 questions of one marks each. Any four questions shall have to be answered by the examinees out of the remaining eight questions carrying 15 marks each.

MICROBIOLOGY

1. Cell Structure and Reproduction in Bacteria.
2. Mechanism of Conjugation, transformation and transduction.
3. Bacteriophage – Structure and its multiplication.
4. Methods of transmission of plant viruses.
5. General account of Mycoplasma and its role in causing plant disease

ALGAE (PHYCCOLOGY)

1. Silent feature of classification of Algae (Fritsch, 1935)
2. Range of thallus structure, Reproduction and economic Importance of Algae in Cyanophyta chlorophyta.
3. General Concept of life cycle pattern in Algae.
4. Brief account of following.
5. Evolution of sex in algae.
6. Algal bloom & algal fertilizers.
7. Algae as environmental indicator (Water pollution).
8. Algal Biotechnology.
9. Diatom and Dinoflagellates.
10. Parasitic and Terrestrial Algae.
11. Economic importance of Algae

FUNGI (MYCOLOGY)

1. Silent feature and classification of fungi(Aloxopolus)
2. Origin, Evolution and Reproduction of Fungi.
3. Heterothallism and parasexuality.
4. Micorrhiza: Ectomycorrhiza, endomycorrhiza & their significance
5. General account of Fungi, their role in Agriculture and Forestry.
6. Economic importance of Fungi.

PLANT PATHOLOGY

Symptoms, etiology and disease management of following diseases:

1. Late blight of potato
2. Powdery Mildews of pea
3. Black rust of wheat
4. Early blight of Potato
5. Citrus canker
6. Leaf curl of Papaya
7. Leaf curl of Tomato

BRYOPHYTES

1. General feature,origin and classification of bryophytes(smith,1955 parihar,1965.)
2. Range of thallus structure in Bryophytes.
3. Distribution of photosynthetic tissues in Bryophytes.
4. Evolutionary trend of progressive sterilization of sporogenous tissues
5. Bryophytic vegetation with special reference to Jharkhand.
6. Ecology and economic importance of Bryophytes with special mention of *Sphagnum*

PTERIDOPHYTE

1. Classification of Pteridophytes (Smith, 1955, Sporne 1975)
2. Heterospory and seed habit.
3. Stellar organization and Evolution of Stele in Pteridophytes.
4. Telome theory: its merits and demerits.
5. Pteridophytes of Jharkhand .

SEMESTER - I

CCBOT102

GYMNOSPERM & TAXONOMY

Full Marks:70

Credits: 5

Time:03 Hours

In all **nine** question of equal value will be set, out of which a student shall have to answer five questions. Q1 will be compulsory, consisting of 10 questions of one marks each. Any four questions shall have to be answered by the examinees out of the remaining eight questions carrying 15 marks each.

GYMNOSPERM

1. Outline Classification of Gymnosperm and their distribution in India
2. Fossil Gymnosperm flora of Jharkhand
3. Telome theory: merits & weaknesses.
4. General account of Ginkgoales.
5. Economic importance and evolutionary trends of Gymnosperm.

TAXONOMY

1. The Species Concept

Taxonomic hierarchy, concept of Species, Genus and Family and other categories, Principles used in assessing relationship. Delimitation of Taxa and attribution of Rank, International Code of Botanical Nomenclature (ICBN).

2. **Recent trends in Taxonomy** with special reference to Numerical taxonomy, Palynotaxonomy, Chemotaxonomy, Cyto-taxonomy and Molecular taxonomy.
3. **Phytogeography**: Principal bio-geographical zones, Endemism
4. **Distinctive Taxonomic features and economic importance of following families:**

Magnoliaceae, Apocynaceae, Asclpiadaceae, Scrophulariaceae, Acanthaceae, Verbenaceae, Dipterocarpaceae, Lamiaceae, Euphorbiaceae, Rubiaceae, Orchedaceae, Cyperaceae & Poaceae.

Practical based on CCBOT101 & CCBOT102

CCBOT(P)103

Full Marks: 100

Credits: 5

Time:06 Hours

1. Staining of gram positive/gram negative bacteria
OR
Identification viral/bacterial / fungi disease.
2. Study of algal materials from the algal mixture (A) identification of at least one genera giving diagnostic features.
3. Identify the provided Bryophyte (B) to you after thorough investigation made through temporary mounts.
4. Write a monograph on provided Pteridophyte material (C) to you after thorough investigation made through temporary mounts
OR
Identify the Gymnosperm material (D) provided to you after thorough investigation made through temporary mounts.
5. Study and identification of two genera of fungi.
6. Sports 1 – 6.
7. Viva–voce.
8. Practical records, herbarium, field report, charts etc.

SEMESTER II

CCBOT204

EMBRYOLOGY, ANATOMY & ECONOMIC BOTANY

Full Marks:70

Credits: 5

Time:03 Hours

In all **nine** question of equal value will be set, out of which a student shall have to answer five questions. Q1 will be compulsory, consisting of 10 questions of one marks each. Any four questions shall have to be answered by the examinees out of the remaining eight questions carrying 15 marks each.

EMBRYOLOGY

1. Micro sporogenesis and micro gametogenesis, mega sporogenesis and mega gametogenesis.
2. Palynology: Pollen morphology and texture of pollen wall, Germination of pollen grain and double fertilization.
3. Pollen pistil interaction, male sterility and self & interspecific incompatibility.
4. Endosperm: types, Cytology and morphogenetic nature.
5. Apomixes: definition and causes and experimental induction and practical value of Polyembryony.

ANATOMY

1. Organization of shoot apical meristem (SAM) and root apical meristem (RAM).
2. Mechanical tissue and their distribution, cambium and their role in growth.
3. Anomalous secondary growth with reference *Dracaena* stem, *Tinospora* root, *Bignonia*..
4. Leaf and wood anatomy.
5. Periderm: Formation, function and healing of wounds.
6. Stomata: morphology, different types and ontogeny.

ECONOMIC BOTANY

1. Role of plants in relation to human welfare.
 - a. Importance of forestry, their utilization and commercial aspects.
 - b. Uses of Timber and Petro plants.
 - c. Avenue tree
 - d. Ornamental plant of India
 - e. Alcoholic beverage through ages.
 - f. Tannins, resins, fruit & nuts yielding plants.
 - g. Medicinal plants and aromatic plants.
2. IUCN (International Union For Conservation Of Nature & Natural Resources.)
3. Ethnobotany in plant conservation.

SEMESTER II

CCBOT205

PLANT PHYSIOLOGY, BIOCHEMISTRY

Full Marks:70

Credits: 5

Time:03 Hours

In all **nine** question of equal value will be set, out of which a student shall have to answer five questions. Q1 will be compulsory, consisting of 10 questions of one marks each. Any four questions shall have to be answered by the examinees out of the remaining eight questions carrying 15 marks each.

PLANT PHYSIOLOGY & BIOCHEMISTRY

1. Absorption of water, Ascent of sap, Transpiration: types, mechanism of transpiration, factors affecting transpiration, guttation.
2. Mineral nutrition of plants: deficiency symptoms and diseases. Micro and Macro-elements.
3. Photosynthesis: photophosphorylation, C₃, C₄, and CAM path way, photorespiration.
4. Respiration; glycolysis, fermentation, krebs cycle, etc.
5. Nitrogen metabolism :amino acid metabolism,
6. Protein synthesis in prokaryotes & eukaryotes.
7. Biological nitrogen fixation.
8. Phytohormones : Role of Auxin , Gibberelin, Cytokinins, ABA, Ethylene.
9. Seed enzymes: nature, properties, classification, mode and mechanism of action.
10. Germination, Seed dormancy, Photoperiodism, Vernalization, Senescence.
11. Lipid metabolism: biosynthesis of fatty acids, oxidation of fats, triglycerides, glyoxylate cycle , α and β -oxidation of lipids.

SEMESTER II

CC (P) BOT206

Practical based on CCBOT204 & CCBOT205

Full Marks: 80

Credits: 5

Time:06 Hours

1. Prepare temporary slides of the given material ecological anatomy.
 - a. Leaf of *casuarinas*
 - b. Stem of *hydrilla*
 - c. Stem of *calotropis*
 - d. Leaf of *nerium*.

2. Anomalous secondary growth
 - a. *Boerhaavia*
 - b. *Bougainvillea*
 - c. *Achyranthus*
 - d. *Amaranthus*
 - e. *Bignonia*
 - f. *Dracaena*

3. Stigma squashing/Pollen germination
4. Embryo dissection
5. To compare the rate of imbibitions of starchy and oily seeds.(Gram seeds, Mustard seed, wheat, ground nuts.)
6. To compare the rate of cuticular and non cuticular transpiration.(*Opuntia* stem).
7. To study the phenomenon of plasmolysis . (*Tradescantial Rhoeo discolour peel*)
8. Test for glucose or reducing sugar (sugar solution.)
9. Test for starch (potatao).

PART II

Kolhan University, Chaibasa

M. Sc. Botany (Semester Wise Distribution of Courses) Part – II

Semester – III

Course Code	Name Of Paper	Credit	Hrs./ Week	Full Marks	ESUE*	SIA *(For Theory) /Viva - Voce (For Practical)
CCBOT307	Cytology & Molecular Biology	5	5(L) +1(T)	100	70	30
CCBOT308	Genetic Engineering & Biotechnology	5	5(L) +1(T)	100	70	30
ECBOT302	Group A Cytogenetics & Molecular Genetics	5	5(L) +1(T)	100	70	30
	Group B Microbiology	5	5(L) +1(T)	100	70	30
EC(P)BOT303	Group A Practical based on Cytogenetics & Molecular Biology	5	10	100	80	20
		5				
	Group B Practical based on Microbiology					

Semester – IV

Course Code	Name Of Paper	Credit	Hrs./ Week	Full Marks	ESUE*	SIA *(For Theory) /Viva - Voce (For Practical)
CCBOT409	Environmental Biology & Evolution	5	5(L) +1(T)	100	70	30
ECBOT404	Group A Plant Genetics Resources & Crop improvement	5	5(L) +1(T)	100	70	30
	Group B Plant pathology	5	5(L) +1(T)	100	70	30
EC(P)BOT405	Group A Practical based on Plant Genetics Resources & Crop improvement	5	10	100	80	20
		5				
	Group B Practical based on Plant pathology					
PROJECT	Based on Elective Group	5	10	100	80	20

*ESUE - End Semester University Examination

*SIA - Sessional Internal Assessment

Group A Cytogenetics & Molecular Genetics

Group B Microbiology & Plant Pathology

SEMESTER III
CCBOT307
CYTOLOGY & MOLECULAR BIOLOGY

Full Marks: 70

Credits: 5

Time:03 Hours

In all **nine** question of equal value will be set, out of which a student shall have to answer five questions. Q1 will be compulsory, consisting of 10 questions of one marks each. Any four questions shall have to be answered by the examinees out of the remaining eight questions carrying 15 marks each.

CYTOLOGY

1. Organization of plant cell, including structure and functions of cell organelles.
2. Cell wall: structure and function
3. Plasma membrane: structure, models and functions:sites of ATPases, ion carriers; channels and pumps; receptors.
4. Ribosome: site of protein synthesis, initiation, elongation, termination.
5. Chromatin organization, packaging of DNA, histones , euchromatin, heterochromatin.
6. Cell division and cell cycle:-mitosis, meiosis, cell cycle regulation, role of cyclin and cdk.
7. Structure and function of cell organelles: mitochondria, chloroplast, lysosome , ER.

MOLECULAR BIOLOGY

1. RNA- types, structure and function.
2. PROTEIN SORTING:-targeting of protein to organelles.
3. Karyotype analysis, chromosomal aberration: structural and numerical.
4. Robertsonian translocation, RNA splicing, site specific recombination.
5. C value paradox , proto oncogenes , oncogenes ,tumor suppressor genes ,cancer.
6. DNA replication and repair mechanism.

SEMESTER III
CCBOT308
GENETIC ENGINEERING & BIOTECHNOLOGY

Full Marks:70

Credits: 5

Time:03 Hour

In all **nine** question of equal value will be set, out of which a student shall have to answer five questions. Q1 will be compulsory, consisting of 10 questions of one marks each. Any four questions shall have to be answered by the examinees out of the remaining eight questions carrying 15 marks each.

GENETIC ENGINEERING

1. Tools Of Genetic Engineering: Restriction endonuclease, gel electrophoresis, ligases, probes ,cloning vectors: plasmids, cosmids, phage vectors, BAC, YAC vectors.
2. Nucleic Acid Hybridization:northern, southern, and westrn blotting techniques.
3. Gene Transformation In Plants: vector mediated gene transformation, Agrobacterium the natural genetic engineer, methods of direct gene transfer in plants ,transgenic plants, T DNA.

BIOTECHNOLOGY

1. Biotechnology basic concepts, principles and scopes.
2. Plant cell and tissue culture : Totipotency, somatic embryogenesis,artificial seeds and their advantages and limitations.
3. Anther and pollen culture: introduction ,protocol for anther and pollen culture, significance ,use of haploids in crop improvements
4. Protoplast culture: Introduction, isolation and culture of protoplasts, somatic hybridization, cybrid techniques, advantages and uses.
5. Somaclonal variations: Introduction, causes, method of selection and uses of somaclonal variation.
6. Intellectual property rights (IPR), possible ecological risks and ethical concerns.

SEMESTER III
ECBOT302
GROUP A - SPECIAL PAPER (THEORY)
CYTOGENETICS & MOLECULAR GENETICS

Full Marks:70

Credits: 5

Time:03 Hours

In all **nine** question of equal value will be set, out of which a student shall have to answer five questions. Q1 will be compulsory, consisting of 10 questions of one marks each. Any four questions shall have to be answered by the examinees out of the remaining eight questions carrying 15 marks each.

1. **Genetic fine structure:** Cistron Recon & Muton); transposons, plasmids, episomes, mitochondrial and chloroplast DNA.
2. **DNA damage and repair:** thymine dimer ,6-4 photoproducts, photoreactivation , excision repair
3. **Concept about molecular mutation:** physical mutagens: ionizing and non-ionizing radiations , radioactive and biological half-life. Effect of various kinds of radiations on plants, chromosomes and dna, ld_{50} . Chemical and environmental mutagenesis, site directed mutagenesis.
4. **Mendelian principle:** Dominance, Segregation, Independent Assortment, gene, allele, multiple allele, pseudo-alleles, co-dominance, incomplete dominance , Gene interaction, pleiotropy, phenocopy, linkage and crossing over.
5. **Gene mapping**
6. **Human genetics:** pedigree analysis, karyotypes, genetic disorders, quantitative genetics, heritability and its measurements.

SEMESTER III

EC(P)BOT303

GROUP A (SPECIAL PAPER) - PRACTICAL

PRACTICAL BASED ON CYTOGENETICS & MOLECULAR BIOLOGY

Full Marks: 80

Credits: 5

Time: 06 Hours

1. Onion root tip squashing + Me
2. iosis anther squashing (Onion root tip, Lentil root tip, *Vicia faba*)
3. Chi square test , work up to standard error (height, no of leaves, branches).
4. Permanent slides of mitosis , and meiosis.
5. Interaction of genes incomplete dominance or duplicate factors or complementary factors.
6. Karyotype analysis.

1. Prepare a temporary slide from a given material(A) nad draw any two stages of the cell division. 20
2. Prepare a temporary slides of a given material (B) and study the two stages of cell division. 20
3. Perform the chi square test for the given material(C_1 & C_2).. 10
4. Perform the hybridization technique of the given material(D).....10
5. Comment upon the sports :1-5.....10
6. Viva –voce.....10
7. Class record.....5
8. Herbarium.....5
9. Charts.....5
10. Model.....5

SEMESTER III
ECBOT302
GROUP B - SPECIAL PAPER (THEORY)
MICROBIOLOGY

Full Marks:70

Credits: 5

Time:03 Hours

In all **nine** question of equal value will be set, out of which a student shall have to answer five questions. Q1 will be compulsory, consisting of 10 questions of one marks each. Any four questions shall have to be answered by the examinees out of the remaining eight questions carrying 15 marks each.

1. Role of microbes in agriculture, industry and medicines.
2. Mycorrhiza: a general account and its role.
3. Microbes pathogenic to human beings with special reference to hiv & aids.
4. Symptoms caused by :-
 - a. Plant pathogenic bacteria
 - b. Plant viruse
 - c. Mycoplasma
5. General account of infection and immunology, antigen–antibody reaction, serology
6. Transmission of plant viruses.
7. Important plant diseases caused by plant pathogenic bacteria:-
 - a. Bacterial blight of Potato
 - b. Tundu diseases of Paddy
 - c. Citrus canker
 - d. Leaf spot of Tomato
8. Important plant diseases caused by plant viruses and mycoplasma
 - a. Leaf curl of Tomato
 - b. Leaf curl of Papaya
 - c. Yellow vein mosaic of Bhindi
 - d. Grassy shoot of Sugarcane

SEMESTER III
EC(P)BOT302
GROUP B - SPECIAL PAPER (PRACTICAL)
MICROBIOLOGY

Full Marks: 80

Credits: 5

Time: 06 Hours

1. Test for glucose or reducing sugar.
2. Test for starch
3. To stain & study bacteria.(curd).
4. Microscopic examination of curd. material-milk.
5. Identify the host plant pathogen. write symptoms and control measure of the following plant diseases.
 - a. Tobacco mosaic
 - b. Leaf curl of papaya
 - c. Little leaf of Brinjal
 - d. Red rot of sugarcane
 - e. Citrus canker
 - f. Tikka disease of groundnut.

SEMESTER IV
CCBOT409
ENVIRONMENTAL BIOLOGY & EVOLUTION (THEORY)

Full Marks:70

Credits: 5

Time:03 Hours

In all **nine** question of equal value will be set, out of which a student shall have to answer five questions. Q1 will be compulsory, consisting of 10 questions of one marks each. Any four questions shall have to be answered by the examinees out of the remaining eight questions carrying 15 marks each.

ENVIRONMENTAL BIOLOGY

THE ENVIRONMENT AND POPULATION:

1. Physical and biotic environment;
2. Biotic and Abiotic interaction,
3. concept of habitat and niche,
4. Population ecology, characteristics of a population; population growth curves.

Ecological Factors And Ecosystem Organization:

1. Climatic factors, Topographic factors, Edaphic factors, Biotic factors,
2. Trophic structure, Food chain and Energy flow in ecosystem, Ecological pyramids, Biogeochemical cycle in terrestrial and aquatic ecosystem,
3. types of soil ,Major biomes.
4. Water ecological adaptations (Hydrophytes, Xerophytes, Mesophytes , Halophytes),
5. Ecological Succession, concept of climax.
6. Community ecology, symbiosis, level of species diversity and its measurements.

Biological Diversity, Pollution & Its Conservation:

1. Concept of biodiversity (α , β , γ) diversity. , Mega diversity zones and hot spots.
2. Environmental pollution, global environmental change, Root cause of biodiversity loss, acid rain, ozone layer depletion, green house effect, global warming.

3. Principle for conservation, IUCN & Red data book, Remote sensing , national park, sanctuaries, biosphere reserves , coral reef ,BSI,CSIR,DBT, NBPGR (National bureau of plant genetic resources),
4. Convention on biological diversity(CBD), Kyoto protocol and carbon trading.
5. Forest managements:-forest types found in India, strategies for conservation and management of forest with special reference to deforestation, Chipko movement, Social forestry and biosphere reserve.

GROUP –B

EVOLUTION

1. ORIGIN OF LIFE AND EVOLUTIONARY THOUGHTS:-

- a. Lamarck; Darwin concepts of variation, Adaptation, origin of cells and unicellular
- b. Evolution, evolution of prokaryotes, origin of Eukaryotic cells, evolution of unicellular eukaryotes.
- c. Evolution: Methods of studying and mechanisms:-The Evolutionary Time scale; Eras, periods and epoch; Major Events in evolutionary Time scale, origin of new genes and proteins, population genetics population, speciation.

2. BEHAVIOUR AND EVOLUTION:-

- a. Biological clock.

SEMESTER IV

ECBOT404

GROUP A - SPECIAL PAPER (THEORY)

GROUP A-PLANT GENETICS RESOURCES & CROP IMPROVEMENTS

Full Marks:70

Credits: 5

Time:03 Hours

In all **nine** question of equal value will be set, out of which a student shall have to answer five questions. Q1 will be compulsory, consisting of 10 questions of one marks each. Any four questions shall have to be answered by the examinees out of the remaining eight questions carrying 15 marks each.

PLANT GENETIC RESOURCES

1. Plant Genetic Resources (PGR) : Defination and significance, Global and Indian Scenario.
2. Theory of Centres of Origin of crop Plants .Law of Homologous series of Genetic Variation.
3. Reproductive systems in crop plants.
4. Self incompatibility system in plants.
5. Male Sterility and its significance.
6. The Gene Bank: Basic Concept and Objectives. Role of Gene Banks in Plant Genetic Resource Conservation. Procedure of making cDNA library and its advantages. Chromosome specific library. Concept of Genomic Library.

CROP IMPROVEMENTS

1. Principle and objectives of crop improvements
2. Plant Introduction and Acclimatization, Procedure and purpose Merit and Demerits.
3. Concept of inbreeding, Heterosis & Hybrid Vigour and their applications in crop Improvements.
4. Somatic Embryogenesis, Artificial seed &Hybrid seed Technology and their role in crop improvements.
5. Mutation Breeding: Use of chemical and physical mutagen, introduction of mutation. Limitation of Mutation Breeding, Achievements more through Mutation Breeding.
6. Application of Genetic Engineering Techniques in crop improvement.

SEMESTER IV
EC(P)BOT405
GROUP A - SPECIAL PAPER (PRACTICAL)
PLANT GENETICS RESOURCES & CROP IMPROVEMENTS

Full Marks: 80

Credits: 5

Time:06 Hours

SEMESTER IV
ECBOT404
GROUP B - SPECIAL PAPER (THEORY)
PLANT PATHOLOGY

Full Marks:70

Credits: 5

Time:03 Hours

In all **nine** question of equal value will be set, out of which a student shall have to answer five questions. Q1 will be compulsory, consisting of 10 questions of one marks each. Any four questions shall have to be answered by the examinees out of the remaining eight questions carrying 15 marks each.

1. History and modern approaches of pathology.
2. General symptoms of plant diseases caused by fungi.
3. Mechanism of Attack:-
 - a. Enzymes : Role of enzymes in pathogenesis.
 - b. Toxins: Types and their role in pathogenesis.
4. Physiology of Diseased Plants with special references to:
 - a. Osmo regulation
 - b. Respiration
 - c. Photosynthesis
 - d. Nitrogen and Phenol metabolism
5. Mechanism of Defence :
 - a. Structural Defence Mechanism
 - b. Biochemical Defence Mechanism
6. Control Measures of Plant Diseases:-
 - a. Cultural practices
 - b. Biological
 - c. Chemical control(fungicide)
 - d. Plant Quarantine
7. Important Plant Diseases caused by the Fungi (symptoms, Etiology and Control)
 - a. Late Blight of Potato
 - b. Powdery mildew of Pea & Cucurbits
 - c. Loose Smut of Wheat

- d. Whip smut of Sugarcane
- e. Linseed Rust
- f. Tikka disease of Groundnuts
- g. Wilt of *Cajanus*(Arhar)
- h. Blast of Rice
- i. False Smut of Rice
- j. Red Rot of Sugarcane
- k. Early Blight of Potato
- l. Covered Smut of Wheat

SEMESTER IV
EC(P)BOT405
GROUP B - SPECIAL PAPER (PRACTICAL)
PLANT PATHOLOGY

Full Marks: 80

Credits: 5

Time:06 Hours

1. Make suitable stained preparations of material 'A' study the symptoms: Investigate the etiology of the disease and comment upon the host parasite relationship. Identify the pathogen given suitable diagrams and reasons.
2. Determine the value of one small division of ocular micrometer in microns. measure ten spores of the given materials 'B'. Find out the average size of the material given.
3. Isolate the pathogen from the given materials 'C' in an agar plate.
4. comment upon the sports..1-5
5. Give the name of the disease and causal organism of the specimens 1-5.
6. Make suitably stained temporary preparations of materials E &F to exhibit the structure of the pathogen in it. Identify the pathogen giving suitable diagrams and reasons. Leave your preparation for examination .
7. Prepare slide of the bacterial specimen 'G'. Stain it with the gram stain to show whether it is gram positive or gram negative.
8. Viva Voce
9. Class records, slides, charts or models, herbaria and field reports.

SEMESTER IV

ECBOT405

PROJECT

(TO BE ASSIGNED ON ELECTIVE CORE PAPER)