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शासकीय कमलाराजा कन्या स्नातकोत्तर स्वशासी महाविद्यालय ग्वालियर (म.प्र.)
स्नातकोत्तर स्तर पर सेमेस्टर पद्धति के अन्तर्गत वनस्पतिशास्त्र विषय के
अध्ययन मण्डल द्वारा अनुशंसित तथा अकादमिक परिषद द्वारा अनुमोदित

Syllabus for P.G. Classes of Botany Under Semester System as recommended by Board of Studies and approved by the Academic council of the college.
Effective from Session 2019-2020
M.Sc. Botany – I sem

BOT 101 :BACTERIOLOGY,VIROLOGY & GENERAL MICROBIOLOGY

UNIT 1 :
Bacterial taxonomy;
Identification of bacteria
General characters of *Rickettsia and Chlamydia.*
Diseases caused by *Rickettsia and Chlamydia.*
Mode of nutrition in bacteria; autotrophy, heterotrophy , symbiosis.

UNIT II :
General account of sterilization culture media, pure culture techniques;
A general idea about bacterial toxins and enzymes;
Bacteriophage;
Bacterial diseases ; caused by *Escherichia coli, shigella*

UNIT III :
General properties and evolution of viruses.
Cultivation of virus and viral assay ;
Transmission of plant viruses and control measures.
Oncogeneic viruses and tumorogenesis;
Viral diseases : Encephalitis, Hepatitis, AIDS and Rabies.

UNIT IV:
Biological nitrogen fixation: symbiotic and non- symbiotic nitrogen – fixation;
Fermentation technology ; principle and types of fermentation.
Microbial degradation of pesticides and hydrocarbons.
Mycoplasma; general account and important diseases caused by them.

UNIT V :
Microbial conversion of waster product with particular reference to alcohol and biogas.

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General account of Immunity , properties of antigens and antibodies.
Allergy and types of allergies
Mycotoxins and their harmful effects.

PRACTICALS 101 :

1. Preparation of culture media.
2. Isolation of *Bacillus and Rhizobium spp.* From soil and nodules.
3. Various methods of bacterial staining to study cell wall, endospore, capsule and flagella.
4. Identification of important genera by using biochemical tests: *Escherichia, Azotobacter, Staphylococcus, Bacillus, Pseudomonas, Rhizobium, Streptomyces, Xanthomonas.*
5. Construction of bacterial growth curve.
6. Quantitative estimation of bacteria in milk.
7. Isolation of streptomycin – resistant mutants of bacteria.
8. Sensitivity test of bacteria using different antibiotics.
9. Purification of TMV and study of thermal inactivation point and dilution point.
10. Virus concentration determination by local lesion on host.
11. Study of common vectors of plant virus: Nematodes, fungi and insects.
12. Bacteriophage isolation
13. Isolation and enumeration of bacteria : Actinomycetes and fungi from soil, rhizosphere and seed using different techniques.
14. Use of selective media for isolating micro-organisms.
15. Fermentation of alcohol and biogas from waste material (demonstration)

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BOT 102 : BIOLOGY AND DIVERSITY OF FUNGI AND PLANT PATHOLOGY

UNIT I :

Recent trends on the classification of fungi with reference to morphological and paramorphological criteria.
Comparative study of following sub-division
Mastigomycotina : Albugo, Peronospora, Plasmopora

UNIT II :

Comparative study of following sub – division ;
Zygomycotina : *Mucor, Rhizopus, Syncephalastrum.*
Ascomycotina : *Tapharina , Emericella, Penicillium , Chaetomium , Morchella.*

UNIT III :

Comparative study of following sub – division ;
Basidiomycotina : *Puccinia, Melampsora, Ustilago, Polyporus, Cyathus.*
Deuteromycotina : Fusarium , Cercospora, Colletotrichum.
Mushroom cultivation : Mycorrhizal application in agriculture and forestry.
Fungal cytology and genetics : Heterothallism, heterokaryosis, parasexual cycle, mutation.

UNIT IV:

Symptomatology in fungal , bacterial and viral infection of plants.
Etiology and control of the following crop diseases.

1. Paddy: paddy blast, paddy blight
2. Wheat : Black stem rust, Bunt of wheat
3. Bajara: green ear and Ergot
4. Sugarcane : Red rot disease of sugarcane
5. Ground nut : Tikka disease
6. Maize Smut

UNIT V :

Role of enzymes and toxins in Pathogenesis.
Disease control by physical, chemical and biological methods, resistant varieties.
Crop rotation, plant quarantines, seed certification.

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BOT 103 : BIOLOGY AND DIVERSITY OF ALGAE, BRYOPHYTES AND LICHENS

UNIT I:

Comparative survey of important systems of classification of algae;
Criteria for algal classification and modern trends;
Diagnostic features of algal phyla, range of thallus and reproductive diversity ; life history , patterns, Parallelism and evolution.

UNIT II :

Comparative account of algal pigments ; light microscopic structure, ultra structure and function of cell wall, flagella, chloroplast, pyrenoids and eyespots and their importance in taxonomy.
Study of Cyanophyta, Chlorophyta, Xanthophyta, Bacillariophyta, Phaeophyta and Rhodophyta up to the order level with reference to the following genera:
Anabaena, Gonium , Chlorella, Enteromorpha, Bulbochaete, Clostridium, Acetabularia, Nitella, Botrydium, Navicula, Cyclotella, Batrachospermum and Gracillaria.

UNIT III :

General characteristics of the division : Dihophyta, Chrysophyta and Cryptophyta.
Distribution of algae in soil, fresh water and marine environment , role of algae in soil fertility, productivity in fresh water and marine environment algae role in fisheries, algae in symbiotic association, algae in polluted habitats, algae as indicator of pollution, fossil algae, algae in biotechnology.

UNIT IV:

Origin of Bryophytes : Primitive vs. advanced characters, derived features: evolutionary lines. Classification.
Comparative morphological, anatomical and cytological studies of gametophyte and sporophytes of Calobryales, Jungermanniales, Sphaerocarples, Marchantiales , Takakiales, Sphagnales, Andreales and Bryales.

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Experimental studies in Bryophytes Unit I
Spore germination, Protonemal differentiation , bud formation
Parthenogenesis, apogamy, apospory and regeneration.
Bryogeographical regions of India with reference to central India.
Lichens : General account, structure and reproduction.

PRACTICAL 103 :

1. Collection and study of algae mentioned in theory, identification up to generic level using algal monographs.
2. Preparation of synthetic medium and cultivation of algae, unialgal and axenic culture and their maintenance.
3. Collection preservation of algal herbarium (10 specimens).
4. Preparation of pigments.
5. Staining techniques of cytology studies.
6. Study of electron microscopy of some algae.
7. Morphology and structural study of representative member of the following group using cleared whole mount preparation, dissection and section :
   Jungermanniales – *Pellia and Porella* (or any other leafy liverwort).
   Marchantiales – *Plagiochasma, Dumortiera, Fimbriaria, (Astiralla, Reboulia, Targionia, Conocephelum/ Weisnerella, Sphagnales / sphagnum/ Bryales.*
8. Experiments to study spore germination , formation of protonema and bud development.
9. Study of Bryophytes in their natural habitats.

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BOT 104 : BIOLOGY AND DIVERSITY OF PTERIDOPHYTES AND GYMNOSPERMS

UNIT I :

Evolution of pteridophytes ; Soral and Stealer evolution.
Classification of pteridophytes.

UNIT II :

Comparative organography, systematics ; reproduction and phylogeny of the following :
Psilophytales, Rhyniales, Zosterophyllophytales.
Psilotales.
Lycopdiales, Lepidodendrales
Sphenophyllales
Ophioglossates, Marattiales, Osmundales, Filicates, Marsileates, Salviniales.

UNIT III :

Speciation and evolutionary trends in ferns;
Cytology ;
Polyploidy and hybridization;
Pteridophytes life – cycle , apospory, vegetative apomixes.
Recent trends in the classification of Gymnosperms

UNIT IV :

Morphology and anatomy of vegetative and reproductive organs, fossil representative and interrelationship of cycadales , Ginkgoales, coniferales, Taxales, Ephedrales, Welwitschiales and Gnetales.

UNIT V :

Structure and evolution of archegonium in Bryophytes , pteridophytes and Gymnosperms
Distribution of living and fossil Gymnosperms in India.
Economic importance of Gymnosperms.

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