

Courses Offered by the Department of Botany for the B.Sc. Degree

Course No. & Code	Course Title	Syllabus	Pre-request	Hours / Week		
				L	P/T	C
B100	General Botany	Cell structure – plant tissues – anatomy of primary plant organs – classification of plant kingdom – general aspects of virus, bacteria, algae & fungi – flower structure, inflorescences & fruits – selected families of Flowering plants.	-	2	2	3
B211	Economic botany	Plant products of economic values: [sugars, starch, fats, oils & vitamins] – fibers – paper industry – microbiological industries.	B100	1	-	1
B212	Molecular Biology	Introduction – structure and function of DNA & RNA – gene organization, cloning, structure, expression & regulation – amino acids and protein structure – expression of foreign proteins - methods for protein detection	B100	2	-	2
B221	Plant morphology and anatomy	Seeds & seed germination – morphological structures of plant organs – modification – meristematic & permanent tissues – anatomical structures of plant organs – secondary thickening – ecological groups.	B100	2	2	3
B232	Taxonomy of flowering plants	Introduction – flower structure – inflorescences – fruits – systems of classification - study of representative families of angiosperms.	B100	2	2	3
B241	Plant ecology	Ecosystems and energy flow – ecological factors: climatic, edaphic & biotic factors – ecological plant groups: Hydrophytes, Xerophytes, Halophytes & Mesophytes	B100	2	2	3
B251	Plant physiology	Solutions – plant water relations – enzymes – photosynthesis – respiration – fat metabolism – nitrogen metabolism – hormones	B100	2	2	3

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B261	Mycology	Characteristics of fungi – nutrition – mode of living – reproduction – phylogentic relationships of fungi – classification – Myxomycota – Mastigomycota (zoosporic fungi) – Zygomycota – Ascomycota – Basidiomycota – Deuteromycetes .	B100	2	2	3
B262	Systematic Mycology (1)	General Characters of fungi – Fungal classifications – characteristics, occurrence, somatic structure, reproduction, classification, economic importance, representatives species and life cycles of Divisions: Myxomycota, Mastigomycota and Zygomycota	B100	2	2	3
B271	Bacteriology	Dyes and bacterial staining – ultra structure of bacterial cell – bacterial nutrition, growth and population – control of bacterial growth – important groups of bacteria – genetic recombination in bacteria – regulatory mechanisms of Gene expression enzymes in bacteria – bacteria and environment .	B100	2	2	3
B273	Phycology	Introduction – taxonomic criteria of algae – representative examples of algae : [habitats, life cycles & evolutionary relationships].	B100	2	2	3
B281	Virology	Historic view – definition – origin – characteristics of viruses – nomenclature & classification – composition & structure - effects of Viruses on their hosts – transmission – pathogens confused with viruses – ways of control.	B100	2	2	3
B291	General microbiology	Taxonomy of Prokaryotes – benefit and harmful effect of bacteria – bacterial cell structure – growth of bacteria – general characters of fungi – Fungal classifications – Myxomycota, Mastigomycota and Zygomycota	B100	2	2	3
B312	Bryophyta, Pteridophyta & Gymnosperm	Bryophyta [Hepatophyta & Anthocerophyta] – Pteridophyta [Psilophyta, Lycopodiophyta, Equisetophyta & Filicophyta] – Gymnosperms [Cycadophyta, Coniferophyta, Ginkgophyta & Gnetophyta].	B100	2	2	3

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B321	Advanced plant anatomy	Classification & theories of meristems – permanent tissues – structure & evolution of steles – anatomical structures of primary plant organs – secondary thickening – cork – tyloses - sap & heart wood - leaf gaps & traces - healing of wounds.	B221	2	2	3
B323	Plant cytology	Cell wall – cell membrane – cytoplasm – Golgi apparatus – mitochondria & enzyme system – plastids – ribosomes – nucleus – chromosomes.	B232	1	2	2
B332	Advanced plant taxonomy	Plant nomenclature – basis of plant classification – comparative morphology, cellular, chemical & numerical systematic – pollen grains – studies of some families of angiosperms .	B221	2	2	3
B333	Medicinal plants	Historical notes – classification of medicinal plants – examples of medicinal plants – injurious plants – remedial plants – psychoactive plants – poisons plants – attarin plants - cultivation of medicinal plants.	B232	2	2	3
B334	Flora of Egypt	Historical view – phyto-geographical regions of Egypt – factors affecting the natural plant distribution – plants of Mediterranean & Red Sea coasts, desert vallies, Oasis, Sinai & Nile valley – cultivated plants (trees – crops- vegetables).	B232	2	2	3
B341	Phytogeography	Geographical distribution of plants – dispersal of seeds, fruits, propagules, spores – agents of dispersal – barriers of dispersal – types of plant distribution – endemism – center of origin – relic areas – habitat types.	B241	2	-	2
B342	Plant sociology	Plant grouping & populations – evolution & succession of vegetation – concepts of plant communities – vegetation analysis: analytic, quantitative & synthetic characteristics – dynamics of communities.	B241	2	2	3
B343	Water relations	Physical & chemical characteristics of water – plant organization – continuum theory of soil – root water relationships – shoot – atmosphere water relationships - shoot / root ratio - plant water deficits.	B241	2	-	2

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B351	Mineral nutrition	Detection of plant elements – source of mineral salts – absorption & translocation – function of some elements – plant water relationship – factors affecting plant growth – plant hormones – movement in plants.	B251	2	2	3
B352	Plant biochemistry	Secondary plant metabolites – types of 2ry metabolites – biosynthetic pathways of 2ry metabolites – role of 2ry compounds in growth and developments of plants – biological functions of 2ry compounds.	B251	2	2	3
B361	Biology of aquatic Fungi	Aquatic microbial communities – aquatic habitats – biotic & abiotic factors, populations and periodicity – pollution – role, identity and properties of aquatic fungi associated with fish & shellfish – improvement of water quality – biodegradation of pollutants in aquatic environments – symbioses.	B262	2	2	3
B362	Systematic Mycology (2)	General characteristics, occurrence, somatic structure, reproduction, economic importance, representative species & life cycles of Ascomycota, Basidiomycota and Deuteromycota	B262	2	2	3
B363	Physiology of Fungi	Chemical composition of fungal cell – cultivation and preservation of fungi – phases and measuring fungal growth – factors affecting fungal growth – primary & secondary metabolism in fungi – metabolites .	B262	2	2	3

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B364	Plant Pathogenic Fungi	Symptoms of plant diseases – blights of seedlings, rots of the roots, vascular wilt diseases, fungal spots and blights of foliage – Downy mildew, Powdery mildews, rusts diseases and smuts fungi and plant diseases they cause.	B262	2	2	3
B366	Host-parasite relationships	Disease cycle – phenomenon of infection – penetration of pathogen – effect of infection on physiology of the host - defence mechanisms in plants.	B262	1	-	1
B374	Ecology of Algae	Algal distribution – types of algae – effect of grazing on algae –factors affecting algal growth – nutrition of algae – Phytoplankton – harmful effects of Algae – role of algae in purification of waste water – economic importance of algae.	B273	2	2	3
B381	Advanced Virology	Host-virus relationship – ecology and Epidemiology – Virus replication strategy – resistance to viral infection – techniques in virology.	B281	1	2	2
B392	Microbial Metabolism	Fungal metabolism (carbon, nitrogen & sulfur metabolism – macromolecular synthesis) – Bacterial metabolism (energy-generating metabolism – respiration – autotrophic metabolism – energy-yielding pathways and biosynthesis – Prokaryotic metabolism – macromolecular synthesis in bacteria).	B271 / B262	2	2	3
B393	Microbial toxins	Bacterial toxins (proteinaceous and non-proteinaceous toxins) – Phycotoxins (freshwater & marine algal toxins) – Mycotoxins (fungal toxins, factors affecting production, effect on health, biosynthesis & control of mycotoxins)	B271 / B262	2	2	3
B394	Microbial enzymes	Enzymes as biological catalysts – chemical nature, classification and nomenclature of enzymes – factors affecting enzyme activities – enzymes and metabolic regulation - applications of enzymes - enzymes production, purification and detection.	B271 / B262	2	-	2
B396	Industrial Microbiology	Regulation of microbial growth – screening techniques – fermentation –yeast, alcohols, glycerol & organic acids bioproduction – steroids biotransformations – antibiotics .	B363	2	2	3

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B397	Plant pathogenic Microorganisms	Pathogenic fungi (terminology – detailed study of fungi causing plant diseases – symptoms – environmental conditions – control of fungal plant diseases). Pathogenic bacteria (phytopathogenic Prokaryotes – characteristics – dissemination, survival, invasion, mechanisms of pathogenesis – some bacterial diseases – fruit spot-control).	B271 / B262	2	2	3
B411	Seed biology	Seed structure, germination, types & dormancy – dispersal of seeds and fruits – seed bank – germination of seeds with specialized life cycles or habitats – geographical perspective on seed germination (tropical, subtropical, temperate and arctic zones).	B241	2	2	3
B431	Palynology	Pollen and spores morphology – production and dispersal of pollens – scope of palynology study – matrix containing pollen and spores – principles of pollen analysis – identification of pollen grains.	B232	2	2	3
B442	Ecology of drought & halophytic plants	Classifications – conditions prevailing in their habitats – mechanisms, adaptations and resistances - general characteristics.	B241	2	2	3
B451	Stress physiology	Physical and biological stresses – water stress – drought avoidance and tolerance – stresses of temperatures, visible light and U. V. – adaptation of plant to stresses – alterations in plants in response to these stresses.	B251	2	2	3
B452	Secondary plant metabolism	Isoprenoid compounds - Nitrogen containing secondary plant products - plant phenolics and their relatives	B251	2	2	3
B453	Biotechnical analysis	Bioassays – Immunoassays – Spectrophotometry – Chromatography –PCR	B251	2	2	3

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B 454	Tissue Culture	Introduction ,history, safety- media composition and culture environment-hormones – types of tissue cultures – mutagenesis- regeneration – transformation: a)agarobacterium – transformation b) Bioblstic – micropropagation – commercial applications – Ethics of transformation and GM	B251	2	2	3
B472	Actinomycetes	Description of actinomycetes – antibiotics produced by actinomycetes (types – isolation – assay – activities – mode of action – development of resistance – immunity to antibiotics and its mechanisms – utilization – medical actinomycetes.	B271	2	2	3
B491	Soil microbiology	*Introduction to the soil as a medium for microorganisms:(soil components; soil types; microorganisms living in soil *Carbon cycle in soil: (Decomposition of cellulose, hemicellulose, lignin, starch, pectic substances and chitin by microorganisms; transformation of hydrocarbons.) *Nitrogen cycle in soil (Mineralization and assimilation of nitrogen; nitrification; and denitrification; fixation of nitrogen asymbiotically) *Phosphorus and sulphur cyclesld in soil	B271 / B262	2	2	3
B494	Microbial ecology	Microbial communities and ecosystems – microbial habitats – microbes-environments interactions – microbial distribution – adaptations of microorganisms to their environments – microbial degradation of pollutants – biodegradation of Xenobiotic compounds – biogeochemical cycling.	B100	2	2	3

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B496	Symbioses microbiology	Introduction Mycorrhizal symbiosis I- Global perspective, Classification of Mycorrhizal fungi, Host plant Types of mycorrhizae Ectotrophic or ectomycorrhizae types A-Endotrophic, endom . or arbuscular mycorrhizae (AM) B-Orchidaceous mycorrhizas a-Arbuscular (Vesicular) mycorrhizae (VAM) b-Beneficial Effects of AM, Mycorrhizae and their significance Uptake and transfer of soil nutrients Interactions with other soil organisms, Application of mycorrhizae in agriculture, Mycorrhizal dependency (MD) of the host crop, Dual Organisms" The Lichens" II - The Morphology (Lichen thallus (the structure of lichens Growth, and development in lichens, Reproduction of lichens, Classification of lichens, Lichen conservation, Biology of lichens, Lichens as pollution indicators, Economic Relevance Other Significant Uses for lichens) III: NITROGEN FIXATION (The Nitrogen Cycle, Biological fixation, Rhizobia and their Classification, Nodule formation Nitrogenase, The mechanism of N ₂ fixation, Factors affecting of N ₂ fixation, Other symbiotic N ₂ fixers (Cyanobacteria) in roots, stems and ferns, Methods for estimation of N ₂ fixed, The Evolution of symbiosis)	B271 / B262	2	2	3
B497	Microbial secondary metabolites	Biosynthesis of secondary metabolites – antibiotics, mycotoxins and alkaloids pathway – pigments biosynthesis – plant growth regulators biosynthesis – regulation of secondary metabolism	B392	2	2	3
B498	Food microbiology	Environmental parameters governing food spoilage by fungi – isolation, enumeration and identification of food fungi – mycotoxins and mycotoxicosis – xerophiles – Yeasts – spoilage of foods – isolation, enumeration and characterization of food bacteria – taxonomy and toxins of food bacteria – food preservation – other control methods.	B261 / B271	2	2	3

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B499	Biological control	Microorganisms used in biological control and its mechanisms – selection of bioagent – application of microorganisms in biological control of plant diseases – fungi as biological control agents – commercialization of biological control agents - factors affecting success of biological control – safety of bioagents to the environment.	B271 / B262	2	2	3
B400	Research Project \ Article	An essay or research article in one of the different fields of Botany	Accomplishing of 100 C.H	2	-	2