



गोविन्द गुरु जनजातीय विश्वविद्यालय बाँसवाड़ा

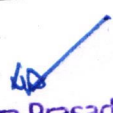
चयन आधारित क्रेडिट व्यवस्था की पाठ्यचर्या के अंतर्गत 'अधिसूतक पाठ्यक्रम
(Choice Based Credit System)

विषय नाम:.....

प्रश्न पत्र सूची


प्रथम सेमेस्टर

क्रम	पेपर कोड	प्रकार	प्रश्न पत्र निर्धारण	पेपर नाम	क्रेडिट
1		विषय केन्द्रित अनिवार्य कोर्स (DCC)	1	Biology and Diversity of Plants	4
2		विषय केन्द्रित अनिवार्य कोर्स (DCC)	1	Biology and Diversity of Archegoniate	4
3		विषय केन्द्रित अनिवार्य कोर्स (DCC)	1	Cell Biology and Biochemistry	4
4		विषय विशिष्ट ऐच्छिक कोर्स (DSE)	1	Plant Ecology and Biodiversity Conservation	4
5		सामान्य ऐच्छिक कोर्स (GE)	1	Genetics and Evolution	4
				Total	20


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द्वितीय सेमेस्टर

क्रम	पेपर कोड	प्रकार	प्रश्न पत्र निर्धारण	पेपर नाम	क्रेडिट
1		विषय केन्द्रित अनिवार्य कोर्स (DCC)	1	Fundamentals of Molecular Biology	4
2		विषय केन्द्रित अनिवार्य कोर्स (DCC)	1	Structural and Reproductive Plant Biology	4
3		विषय केन्द्रित अनिवार्य कोर्स (DCC)	1	Plant Growth and Development	4
4		विषय विशिष्ट ऐच्छिक कोर्स (DSE)	1	Plant Physiology	4
5		सामान्य ऐच्छिक कोर्स (GE)	1	Plant Systematics and Resources Utilization	4
				Total	20


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क्रम	पेपर कोड	प्रकार	प्रश्न पत्र निर्धारण	पेपर नाम	क्रेडिट
1		विषय केन्द्रित अनिवार्य कोर्स (DCC)	1		4
2		विषय केन्द्रित अनिवार्य कोर्स (DCC)	1		4
3		विषय विशिष्ट ऐच्छिक कोर्स (DSE)	1		4
4		सामान्य ऐच्छिक कोर्स (GE)	1		4
5		On-Job Experience (OJT) course or Community Engagement Experience (CEE)	1		4
				Total	20



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चतुर्थ सेमेस्टर

क्रम	पेपर कोड	प्रकार	प्रश्न पत्र निर्धारण	पेपर नाम	क्रेडिट
1		विषय केन्द्रित अनिवार्य कोर्स (DCC)	1		4
2		विषय केन्द्रित अनिवार्य कोर्स (DCC)	1		4
3		विषय विशिष्ट ऐच्छिक कोर्स (DSE)	1		4
4		सामान्य ऐच्छिक कोर्स (GE)	1		4
5		Dissertation/Project/Field Study (DPR) course, Internship or On-Job Experience (OJT) Or Course Seminar (SEM), Research Credit Courses (RCC).	1		4
				Total	20

Abbreviations

- ❖ DCC: Discipline Centric Compulsory
- ❖ DSE: Discipline-Specific Elective
- ❖ GE: Generic Elective
- ❖ OJT: On Job Training
- ❖ CEE: Community Enhancement Experience
- ❖ RCC: Research Centric Course
- ❖ DPR: Dissertation/Project/Field Report
- ❖ SEM: Course Seminar


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GOVIND GURU TRIBAL UNIVERSITY BANSWARA

M.Sc.

Two Year Post Graduate Course

Semester I

BOTANY

DCC

Biology and Diversity of Plants


(Microbes, Algae and Fungi)

Unit-I

- Archaeobacteria and Eubacteria: General characters, distribution, ultra-structure, nutrition, multiplication, biology, economic and evolutionary importance. Methods of genetic recombination and their significance.
- Viruses: Physical and chemical characteristics, ultra-structure, multiplication, Plant virus transmission. Mycoplasma, phytoplasma, viroids, rickettsias, sprioplasma and prions: A general account.

Unit-II

- Algae: General account, thallus organisation, cell structure, reproduction, life cycle pattern, classification schemes. Salient features of Cyanophyta, Chlorophyta Charophyta, Xanthophyta, Bacillariophyta, Phaeophyta and Rhodophyta. Salient features of Prochlorophyceae, Glaucophyceae, Eustigmatophyceae.
- Fungi: General characters, ultra-structure, cell wall composition, nutrition (necrotrophs, biotrophs and symbionts), methods of reproduction. Recent trends in classification and phylogenetic relationship among fungal groups.



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Unit- III

- Fungi: General account of morphology, reproduction, life cycle and economic importance of Mastigomycotina, Zygomycotina, Ascomycotina, Basidiomycotina and Fungi imperfecti. Economic importance of fungi.
- Fungal associations: Mycorrhizae and Lichens; General account of morphology, reproduction, life cycle and significance.

Suggested Reading :

- Bold H. C and Wynne M.J (1975). Introduction to the Algae: Structure and Reproduction Prentice Hall Biological Science Series. Chapman V.J and Chapman D.J (1973). The Algae. Macmillan and company, New York.
- Fritsch F.E (1945). The Structure and Reproduction of the Algae Volume I and II, Cambridge University Press. New Delhi.
- Kumar H.D. 1988. Introductory Phycology. Affiliated East-West Press Ltd., Morries 1. 1986. An Introduction to the Algae. Cambridge University Press, U.K.
- Round F.E. 1986. The Biology of Algae. Cambridge University Press Cambridge.
- Vijayraghavan M.R and Bela Bhatia (1997)
- Brown Algae: Structure, Ultrastructure and Reproduction, APH publishing Corporations, New Delhi.
- Vijayraghavan M.R and Bela Bhatia (1997), Red Algae: Structure, Ultrastructure and Reproduction, APH publishing Corporations, New Delhi.
- Alexopoulos, C. J., Mims, C. W. and Blackwell, M., Introductory Mycology, John Wiley & Sons Inc.
- Mandahar, C. L. Introduction to Plant Viruses. Chand & Co. Ltd., Delhi.
- Mehrotra, R. S. and Aneja, R. S. An Introduction to Mycology. New Age Intermediate Press. New Delhi. 2007
- Manual of Microbiology: Tools and Techniques; Kanika Sharma. Ane books Textbook of Microbiology; Kanika Sharma. Ane books. New Delhi. 2011


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Semester I

BOTANY

DCC

Biology and Diversity of Archegoniate


Unit-I

- Bryophytes: Origin of Bryophytes. General characters and classification. Comparative study of structure, reproduction and life cycle of Hepatocopsida, Anthocerotopsida and Bryopsida.
- Bryophytes: General characters, structure, reproduction, interrelationships of Bryophytes with special reference, *Asterella*, *Notothylas*.

Unit-II

- Pteridophyta: General account, distribution with special reference to India. Study of structure, reproduction, evolution, classification and inter-relationships of the Pteridophyta with special reference to Rhyniophytosida, Psilotosida, Lycopsida, Sphenopsida, Pteropsida. Evolution of stelar system soral evolution; Heterospory and seed habit, Telome theory.
- Palaeobotany: Geological time scale, types and nomenclature of fossils, fossilization,

Unit-III


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- Gymnosperms: General account of present and past distribution of gymnosperms with special reference to India. Economic importance of gymnosperms, phylogeny and relationships of the main groups of gymnosperms.
- Gymnosperms: Study of structure, reproduction, evolution, classification, life history with special reference to Cycadopsida, Coniferopsida, Gnetopsida. Evolution of the female strobilus in Coniferales.

Reference books

- Chandrakant, Pathak (2003). Bryophyta, Dominant Publishers and Distributors, New Delhi.
- Parihar N.S. 1991. Bryophyta. Central Book Depot, Allahabad. 3. Puri P. 1980. Bryophytes. Atma Ram and Sons, Delhi.
- Rashid A (1998). An introduction to Bryophyta. Vikas Publishing House Pvt. Ltd, New Delhi. 4. Bhatnagar S.P and Moitra Alok 1996. Gymnosperms. New Age International Pvt.Ltd. Publishers, New Delhi,
- Bierhorst D.W. 1971. Morphology of Vascular Plants. New York and London.
- Biswas C and Johari B.M 2004. The Gymnosperms Narosa Publishing House, New Delhi.
- 8. Parihar N.S. 1996. Biology and Morphology of Pteridophytes. Central Book Depot, Allahabad.
- 9. Stewart W.N. and Rathwell G.W. 1993. Paleobotany and the Evolution of Plants. Cambridge University Press. Cambridge.


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M.Sc.

Two Year Post Graduate Course

Semester I

BOTANY

DCC


Cell Biology and Biochemistry

Unit-I

- Cell: Types, Signal hypothesis, protein sorting to mitochondria and chloroplasts. Structure and functions of: cellular membranes, cell wall and cell organelles (nucleus, mitochondria, chloroplasts, Golgi apparatus, lysosomes, endoplasmic reticulum, vacuoles, ribosomes, and cytoskeleton). Cell division: mitosis and meiosis.
- Chromosomes: Structure of chromatin and chromosomes, unique and repetitive DNA, heterochromatin, euchromatin, Nucleosome structure, DNA scaffolds and loops. Types, Structural and numerical alterations in chromosomes: duplication, deficiency, inversion, translocation heterozygotes, Haploids, aneuploids and euploids; C-value and C-value paradox, Cot curve and its significance.

Unit-II

- Bioenergetics: Principles of the thermodynamics, Gibb's free energy and chemical potential, redox potential. structure and functions of Energy carriers (ATP, GTP, NADP, FADH) Fats and Lipids: Fatty acids and fatty oils, Structure and function of lipids, classification of lipids, fatty acids and their biosynthesis.
- Carbohydrates: Classification, structure, properties.. Enzymes: General characters, nomenclature and classification, Mode of enzyme action, Michaelis Menton equation and its significance. Regulation of enzymes, allosteric modulation, enzyme inhibition, coenzymes, isoenzymes, abzymes. Factors effecting enzyme activity.



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Unit-III

- Amino acids: Structure, Types, Properties, Stereo-isomers, Functions, Amino Acids as Precursors of Biomolecules. General Biosynthetic pathways of amino acids: Reductive amination and transamination, GS-GOGAT pathway.
- Protein- types , properties, structure , function, reverse turn and Ramchandran plot

Suggested Reading :

- G. Karp, 2015. Cell and Molecular Biology, John Wiley & Sons, Inc.
- EDP De Robertis, 1987. Cell and Molecular Biology, Zea and Febiger.
- H. Lodish, A. Berk, P. Matsudaira, C.A. Kaiser etc., 2009. Molecular Cell Biology, Scientific American Books.
- Biochemistry; Voet and Voet, John Wiley & Sons, Inc., New York, USA. 1992.
- 5. Biochemistry & Molecular Biology of Plants; Eds: Bob Buchanan, Wilhelm Gruissem, Russell Jones (Editor) Wiley; 1st. edition. 2002.
- Biochemistry. Lubert Stryer, Jeremy M. Berg, John L. Tymoczko. W. H. Freeman and Co. 5th edition. 2002
- Biochemistry; The molecular basis of cell structure and function. A. L. Lehninger. Worth Publishers. 1982.


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M.Sc.

Two Year Post Graduate Course

Semester I

BOTANY

DSE / GE

Plant Ecology and Biodiversity Conservation

Unit-I


- Ecosystem: Ecosystem structure and function, Ecosystem stability, concept of resistance and resilience, Ecological energetic; energy flow through ecosystem. Global biogeochemical cycles of C, N, P and S, Principles of limiting factor.
- Community: biological and physical structure, organismal and individualistic model of community. Edges and ecotones. Succession; Concept, models and mechanisms. concept of niche, species coexistence.

Unit-II

- Pollution: Environmental pollutions, global environmental changes; green house gases, consequences of climate change, carbon foot print, carbon credits, carbon sequestration, Sustainability; global carrying capacity, phytoremediation, plant indicator.
- Phytogeography: Major biomes of the world with special reference to desert and grassland.

Unit-III


- Population: Properties of populations; birth rate, death rate, survivorship curves, population growth, Logistic model, carrying capacity, population pyramids, r- and k-


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- strategies, intraspecific population regulation, interspecific competition; Lotka- Volterra model, type of interactions, Concept of Population Genetics (Hardy- Weinberg principle)
- Plant biodiversity: concept, type and measurement of biodiversity. IUCN categories of threat. Hot spot. Strategies for conservation- *In situ* and *Ex situ*

Suggested Reading :

- Aery, N.C. 2010. Manual of Environmental Analysis, Ane Books Pvt. Ltd., New Delhi.
- Kormondy, E.J. 1996. Concepts of Ecology. Prentice Hall India Pvt.Ltd., New Delhi.
- Odum, 3.E.P. 1983. Basic Ecology. Saunders, Philadelphia, Smith, R.L. and Smith T.M. 1998.
- Elements of Ecology. Benjamin/Cummings Publication.
- Townsend, C.R., Begon, M., Harper, J.L. 2007. Essentials of Ecology. BlackwellPublishing.
- Heywood, V. (ed) 1995. Global Biodiversity Assessment. United Nations EnvironmentProgramme. Cambridge University Press, Cambridge, U.K.
- Katewa, S.S. & Jain Anita. Ethnobotany, Phytogeography, Plant Resources Utilization and conservation. Apex Publishing House, Jaipur. 2007.
- Swaminathan, M.N. & Jain, R.S. Biodiversity: Implications for global security, Macmillan, India, 1982.


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M.Sc.

Two Year Post Graduate Course

Semester I

BOTANY

DSE / GE

Genetics and Evolution

Unit-I

- Mendelism: Concept of gene, Mendel and his laws. Applications of laws and probability tests, Chi-square test and its application in the analysis of genetic data. Pattern of inheritance in haploid and diploid organisms. Extension of Mendelism: basis of dominant and recessive inheritance, Multiple alleles and allelic series, pseudoallele, complementation tests, lethal alleles, penetrance and expressivity.
- Chromosomal basis of inheritance: Sex determination; Sex linked, sex influenced and sex-limited traits; genetic marker, Linkage and crossing over, Linkage analysis and linkage map.

Unit-II

- Extra chromosomal inheritance: Maternal inheritance, Extra-nuclear inheritance in Paramecium, Yeast, Mitochondrial. Genomes, Chloroplast genomes, Cytoplasmic male sterility. Somatic cell genetics: Cell-cell hybridization, cell hybrids. Genetic recombination: Recombination and genetic mapping, Homologous and non-homologous recombination, site-specific recombination. Molecular markers and mapping. Physical mapping of genes.


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Unit-III

- Pedigree: Pedigree analysis, lode score for linkage testing, karyotypes, genetic disorders.
Quantitative genetics: Polygenic inheritance, heritability and its measurements
Mutations: Spontaneous and induced mutations, physical and chemical mutagens.
molecular basis of gene mutations, transposable elements in eukaryotes and prokaryotes.
- Evolution: Emergence of evolutionary thoughts: Lamarck; Darwin-concepts of variation, adaptation, struggle, fitness and natural selection; Origin of basic biological molecules; abiotic synthesis of organic monomers and polymers; concept of Oparin and Haldane; experiment of Miller, the first cell: origin and evolution in prokaryotes and eukaryotes.

Suggested Reading :

- Khush G. S. Cytogenetics of aneuploides. Academic Press New York USA.
- Burnham C. R. Discussions in Cytogenetics. Burgess Publishing Co. Minnesota.
- Hartl D. L. and Jones E. W. Genetics: Principles and Analysis Jones and Baww Publishers Massachusetts USA.
- Karp G. 2015. Cell and Molecular Biology: Concepts and Experiments, John Wiley and Sons Inc USA.
- Fikui K. and Nakayama S. Plant chromosomes; Laboratory Methods CRC Press Boca Ration Florida.
- Gupta P. K. Cytogenetics. Rastogi Publication Meerut.
- Prasad G. Introduction to Cytogenetics. Kalyani Publishers, New Delhi.
- Sinha U. and Sinha S. Cytogenetics, Plant Breeding and Evolution. Vikas Publishing house Pvt. Ltd. New Delhi
- Sumner A.T. Chromosome and organization. Blackwell publishing
- Swanson C. P., Merz T. and Young J. Cytogenetics. Prentice Hill of India Private Ltd. New Delhi.


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M.Sc.

Two Year Post Graduate Course

Semester II

BOTANY

DCC


Fundamentals of Molecular Biology

Unit-I

- Cell Cycle and DNA: Cell cycle regulation, role of cyclins and cyclin-dependent kinases. DNA structure and types (A-, B-, Z-, DNA). DNA replication, enzymes of DNA replication, DNA repair mechanisms.
- RNA: RNA synthesis and processing: Transcription factors and machinery, RNA polymerases, transcription initiation, elongation and termination, RNA processing: RNA editing, capping, polyadenylation, splicing.

Unit-II

- Protein: Protein synthesis and processing: Genetic code, Ribosome, Translation: formation of initiation complex, initiation factors and their regulation, elongation and elongation factors, termination, translational proof-reading, translational inhibitors, post-translational modification of proteins.
- Gene regulation: Regulation of gene expression in pro- and eukaryotes, the control sequences (operator, promoter, terminator, attenuator, enhancer), Operon model - lac, trp. operon, attenuation, role of chromatin in regulating gene expression and gene silencing.



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Unit-III

- Genomics and Proteomics: Introduction to Structural, functional genomics and its application to health and agriculture, including gene therapy. Brief account of Proteomics.
- Cancer: Molecular genetics of Cancer: oncogenes, tumor suppressor genes, metastasis, therapeutic interventions of uncontrolled cell growth, apoptosis.

Reference Books:

- J.D. Watson, T.A. Baker, S.P. Bell etc., Molecular Biology of the Gene, Pearson Education, India.
- J.W. Dale and My Schantz, From Genes to Genomes, John Wiley & Sons.
- B.D. Singh, Biotechnology, Kalyani Publishers.
- An Introduction to Molecular Biotechnology by M. Wink, Wiley-VCH.
- Introduction to Molecular Biology, Genomics & Proteomics for Biomedical Engineers by M.R. Neuman, CRC Press.


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Two Year Post Graduate Course

Semester II

BOTANY

DCC

Structural and Reproductive Plant Biology

Unit-I

- Meristems: Introduction, organization of meristems, shoot development- organization of the shoot apical meristems (SAM), wood development in relation to environmental factors. Organization of root apical meristem (RAM). Floral meristems and floral development in Arabidopsis. Tissue and tissue systems; Parenchyma, Collenchyma, Sclerenchyma, Xylem, Phloem, Secretory structures and periderm. Plant anatomy: Primary and secondary structure of root and stem of angiosperms.

Unit-II

- Anomalous secondary growth in stem and roots of angiosperms. Leaf anatomy. Leaf development and phyllotaxy. Flower: Evolution of flower, genetics of floral organ differentiation; foliar stamens; open carpels; primitive living angiosperms.
- Male gametophyte: Structure of anthers, microsporogenesis, role of tapetum, pollen germination, pollen tube growth and guidance, pollen embryos. Female gametophyte: Ovule development and types, placentation types and its evolution. Megasporogenesis


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Unit- III

- Embryo sacs: organization of the embryo sac, types of embryo sacs. Pollination and Fertilization: pollen-pistil interaction; pollination mechanisms and vectors; sporophytic and gametophytic self-incompatibility. Double fertilization, in vitro fertilization.
- Endosperm: Types, ultrastructure, endosperm haustoria, their extension, persistence and function. Embryogenic types, organogenesis of mono and dicot embryos. Polyembryony (types and significance). Apomixis. Seed development and fruit growth.

Suggested Reading :

- Bhojwani, S.S. and Bhatnagar, S.P. Embryology of Angiosperms (4th Revised and enlarged edition), 2000.
- Burgess, J. 1985. An Introduction to Plant Cell Development, Cambridge University Press, Oxford.
- Fahn, A. 1982. Plant Anatomy (3 Ed.), Pergamon Press, Oxford.
- Johri, B.M., Ambegaokar, K.B. and Srivastava, P.S. Comparative Embryology of Angiosperms, Vol. I & II, Springer Verlag.
- Lyndon, R.F. 1990. Plant Development - The Cellular basis, Unwin Hyman, London.
- Maheshwari, P. An Introduction to Embryology of Angiosperms, 1950.
- Raghavan, V. 1999. Developmental Biology of Flowering Plants, Springer Verlag, New York.
- Shivanna, K.R. and Johri, B.M. The Angiosperm Pollen structure and Function, Wiley Eastern Ltd., Publications, 1989.


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Semester II

BOTANY

DCC

Plant Growth and Development

Unit-I

- Water relations: Chemical and Water potential. Absorption of water. Ascent of Sap, Transpiration, Factors affecting the rate of transpiration, Physiology of stomatal movement and regulation of transpiration. Guttation. Membrane transport: transport proteins, passive and active mechanisms.
- Plant nutrition: Nutrient requirement of plants. Essential nutrients: macro and micronutrients, Chelating agents, Nutrient deficiency (Symptoms and disorders). Seed: Seed development, germination and dormancy, bud dormancy, Ageing, Senescence and death.

Unit-II

- Plant growth and Regulation: Over view, Historical account, Measurement of growth and growth kinetics. Plant growth regulators: Biosynthesis, chemical nature, physiological effects and mode of action of auxins, gibberellins, cytokinins, ethylene, abscisic acid, brassinosteroids, jasmonic acid and salicylic acid.
- Photomorphogenesis: Over view, Historical account, Photoreceptors: structure, function, properties (Phytochrome and cryptochrome), molecular mechanism of action and role in

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photomorphogenesis. Photoperiodism: significance, Florigen, floral induction and development, Vernalization.

Unit-III

- Signal transduction: Basic concept and principles, Receptors and Second messengers (types, function), Signal transduction and gene expression, Signaling involving calcium, inositol phospholipids and G proteins, Two component sensor regulator system. Plant movements and taxis; Types, role of signal transduction.

Reference Books:

- Introductory Plant Physiology, 2nd Edition G. Ray Noggle (Emeritus), George J. Fritz. Prentice Hall of India. 2002.
- Plant Physiology; Sebanek J. Sebanek. Elsevier Science & Technology. 1992.
- Plants Under Stress: Biochemistry, Physiology and Ecology and Their Application to Plant Improvement; Hamlyn G. Jones, T. J. Flowers, M. B. Jones. Cambridge University Press. 2008.
- Biochemistry & Molecular Biology of Plants; Eds: Bob Buchanan, Wilhelm Gruissem, Russell Jones (Editor) Wiley; 1st. edition, 2002.
- Physiology and Biochemistry of Metal Toxicity and Tolerance in Plants. M. N. V. Prasad, Kazimierz Strzalka, M. N. V. Prasad. Springer. 2002.
- Plant Hormones: Physiology, Biochemistry and Molecular Biology: P. J. Davies Peter J. Davies. Kluwer Academic Publishers. 1995.
- The Physiology of Flowering Plants; Opik, Helgi. Cambridge University Press.
- Text book of Plant Physiology. V. Verma. Ane Books. New Delhi. 2007 9. Plant Physiology; R.M. Devlin & Witham. Reinhold publications. 1969.

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M.Sc.

Two Year Post Graduate Course

Semester II

BOTANY

DSE / GE


Plant Physiology

Unit-I

- Photosynthesis: Historical account, Evolution of photosynthetic apparatus, physiological and ecological significance, Factors effecting photosynthesis. Photo pigments; types, structure, Photosystems; types, structure and function. Photophosphorylation. Photo-protective mechanisms. Carbon assimilation; C₃, C₄ and CAM pathways, Photorespiration and its significance.

Unit-II

- Respiration: Over view, Historical account, Evolution of anaerobic and aerobic metabolism, Aerobic respiration: glycolysis, TCA cycle, Pentose phosphate pathway, Oxidative electron transport and chemiosmotic hypothesis of ATP synthesis, alternative oxidase system, Anaerobic respiration. Fermentation: Alcohol and Lactic acid fermentations.
- Lipid and Nitrogen metabolism: Oxidation of Fatty acids, β -oxidation, Ketone Bodies, ammonium assimilation (reductive amination, GS-GOGAT system, transamination). Biological nitrogen fixation: Non symbiotic and Symbiotic, nitrification and denitrification. Structure of nodule and heterocyst, Role and structure of Nitrogenase, Leghemoglobin, Genetics of Nitrogen fixation.



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Unit-III Credit hours: 12

- Secondary metabolism: Function and uses of Terpene, Phenolic compound and Nitrogen containing compound- alkaloid, glycosides and glucosinolates.
- Stress physiology: Types of stress and physiological consequences, Response and resistance mechanisms, Molecular mechanism of tolerance. Heat stress and heat shock proteins, Osmotic adjustments, Reactive oxygen species and oxidative stress, Metal toxicity. Biotic stress and response, HR and SAR mechanisms.

Suggested Reading :

- Plant Physiology; Lincoln Taiz and Eduardo Zeiger, Sinauer Associates; 3rd ed. 2002.
- Introduction to Plant Physiology; William G. Hopkins and Norman P. Wily; 3 Ed., 2003
- Plant Physiology; Frank B. Salisbury and Cleon Ross. Brooks Cole; 4th edition 1992.
- Water Relations of Plants, Paul Jackson Kramer. Academic Press. May 1983.
- Plant Stress Biology: From Genomics to Systems Biology. Wiley-VCH, 2009.
- Plant Abiotic Stress (Biological Sciences Series); Eds: Matthew A. Jenks and Paul M. Hasegawa. Wiley-Blackwell, 2005.
- Plant Physiology; Eds; Meirion Thomas. Prentice Hall Press; 5th edition. 1973.
- Physiology and Molecular Biology of Stress Tolerance in Plants; Eds; K.V. Madhava Rao, A.S. Raghavendra and K. Janardhan Reddy. Springer; 1st edition, 2006.
- Oxidative Stress in Plants; Dirk Inze and Marc Van Montagu. CRC Press; 1st edition, 2001. Antioxidants and Reactive Oxygen Species in Plants (Biological Sciences Series). Ed; Nicholas Smirnoff. Wiley-Blackwell. 2005.
- Plant Physiology; Hans Mohr, Dr Hans Mohr, Hans Mohr. Springer. 1995.


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GOVIND GURU TRIBAL UNIVERSITY BANSWARA

M.Sc.

Two Year Post Graduate Course

Semester II

BOTANY

DSE / GE


Plant Systematics and Resources Utilization

Unit- I

- Fundamentals of Systematics: Historical account of development of Taxonomy, Plant nomenclature, Taxonomic structure (concept of taxa, species, genus, family), numerical taxonomy, Botanical gardens, Herbarium, Taxonomic terminology; floral formula and floral diagram. Phylogeny; origin and evolution of angiosperms
- Systems of angiosperm classification broad outline and relative merits and demerits of major systems of classification (Bentham and Hooker, Engler and Prantl; Hutchinson; Takhtajan; Angiosperm Phylogeny Group). Taxonomic evidence - palynology, phytochemistry, molecular systematics.

Unit-II

- Angiosperm families: Diagnostic features of Ranunculaceae, Leguminosae (Subfamily; Papilionoideae, Caesalpinioideae, Mimosoideae), Solanaceae, Asteraceae, Cucurbitaceae, Lamiaceae, Euphorbiaceae, Orchidaceae, Liliaceae, Poaceae. Combretaceae, Loranthaceae, Lemnaceae, Cyperaceae.


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Unit-III


Ethnobotany: Introduction, History and development of ethnobotanical study, scope and potential applications; methods in ethnobotanical study. Applied Ethnobotany and intellectual property rights.

Economic Botany: Origin, evolution, Botany, cultivation and uses of fibre yielding plants, cereal crops, sugar yielding plants, pulses, dye plants, gum yielding plants, oil yielding plants.

Economic Botany: Origin, evolution, Botany, cultivation and uses of fruits and nuts, vegetables, spices, condiments, beverages, medicinal plant, rubber yielding plants and petrocrops. Centres of origin.

Suggested Reading :

- Cronquist, A, 1988. The Evolution and Classification of Flowering Plants (2nd ed.) Allen Press, U.S.A.
- Davis, P. H. and V. H. Heywood 1991. Principles of Angiosperm Taxonomy. Today and Tomorrow Publications, New Delhi Gurcharan Singh, 2004.
- Plant Systematics: Theory and Practice Oxford and IBHPublishing Co. Pvt. Ltd., New Delhi. 4. Heywood (ed.) Modern Methods in Plant Taxonomy.
- Jones, S.B., Luchsinger, A.L. 1987. Plant Systematics.
- Judd Walter S., Campbell C. S., Kollogg, E. A., Stevens P.F. and M. J. Donoghue 2008.
- Plant Systematics: A phylogenetic approach. Sinauer Associates, INC Publishers. Sunderland, Massachusetts, USA.
- Lawrence, George H. M. 1951. Taxonomy of Vascular Plants. Oxford and IBH Publ. Co. Pvt. Ltd., New Delhi
- Nordenstam, B., El Gazaly, G. and Kassas, M. 2000. Plant Systematics for 21st century.
- Quicke, Donald, L. J. 1993. Principles and Techniques of Commemorative Taxonomy. Blakie Academic and Professional, London
- Radford, A.E. 1986. Fundamentals of Plant Systematics, Harper & Row Publ. USA.
- Stace, C. A. 1980. Plant Taxonomy and Biosystematics Edward Arnold, London.
- Takhtajan, A.L. 1997. Diversity and Classification of Flowering Plants. Columbia Univ. Press, New York.


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- Tiagi, Y.D. and Acry, N.C. Flora of Rajasthan (South and South -cast Region). Himanshu Publications, New Delhi, Udaipur.
- Woodland, D.W. 1991. Contemporary Plant Systematics. Prentice Hall, New Jersey.
- Katewa, S.S. & Jain Anita. Ethnobotany, Phytogeography, Plant Resources Utilization and conservation. Apex Publishing House, Jaipur. 2007. 16. Kocchar, S.L. 1998. Economic Botany of the Tropics, 2nd edition, Macmillan India Ltd., Delhi.

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Govind Guru Tribal University, Banswara
Details of Discipline Centric Core and Elective Courses for
freshers who will be admitted in the session 2023-24
(Separate sheet to be used for each discipline/subject)

Name of University: Govind Guru Tribal University, Banswara

Name of Faculty(ies) : SCIENCE

Name of Discipline/Subject: BOTANY

Three- Year Bachelor Degree Program								
#	Level	Semester	Type	Title	Credits			Total
					L + T	P		
1	5	I	DCC	BIO DIVERSITY	5	1	0	6
2	6	II	DCC	PLANT ECOLOGY	5	1	0	6
3	6	III	DCC		5	1	0	6
4	6	IV	DCC		5	1	0	6
5	7	V	DSE / GE		5	1	0	6
6	7	VI	DSE / GE		5	1	0	6


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GOVIND GURU TRIBAL UNIVERSITY BANSWARA

B.Sc. Three Year Graduate Course Semester I BOTANY DCC Biodiversity

(Microbes, Algae, Fungi, Lichen and Mycorrhiza)

Unit1:Microbes

Viruses - Discovery, general structure, replication (general account), DNA virus (T-phage); Lytic and lysogenic cycle, RNA virus (TMV); Viroid and Prion;

Bacteria- Discovery, General characteristics and cell structure; Reproduction vegetative, a sexual and recombination (conjugation, transformation and transduction); Economic importance.

Mycoplasma -General characteristics and cell structure;


Unit2: Algae

General characteristics; Ecology and distribution; Range of thallus organization and reproduction; Classification of algae; Morphology and life-cycles of the following: *Nostoc*, *Chlamydomonas*, *Oedogonium*, *Vaucheria*, *Ectocarpus*, *Polysiphonia*. Economic importance of algae.

Unit3:Fungi

Introduction-General characteristics, ecology and significance, range of th all us organization, cell wall composition, nutrition, reproduction and classification; TrueFungi

General characteristics, ecology and significance, life cycle of *Rhizopus*(Zygomycota) *Penicillium* (Ascomycota), *Alternaria* (Deuteromycetes) *Puccinia*, *Agaricus* (Basidiomycota); Symbiotic Associations Lichens: General account, reproduction and significance; Mycorrhiza: ectomy corrhiza and endomy corrhiza and their significance


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Suggested Reading:

1. Kumar, H.D.(1999).Introductory Phycology. Affiliated East-West Press Pvt. Ltd. Delhi. 2nd Edition.
2. Tortora, G.J.Funke, B.R.,Case, C,L.(2010). Microbiology: An Introduction, Pearson Benjamin Cummings, U.S.A.10th edition.
3. Sethi, I.K.and Walia,S.K.(2011), Text book of Fungi & Their Allies, MacMillan Publishers Pvt. Ltd., Delhi.
4. Alexopoulos, C..1.,Mims, C.W.,Blackwell, M.(1996). Introductory Mycology, John Wiley and Sons(Asia), Singapore. 4th edition.

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GOVIND GURU TRIBAL UNIVERSITY BANSWARA

B.Sc. Three Year Graduate Course Semester II BOTANY DCC Plant Ecology

Unit 1: Introduction and Ecological Factors


- Definition, Scope and aims of ecological studies. Levels of organization hierarchy: from population to Biome. Biotic and Abiotic factors affecting plant growth and distribution.

Unit 2: Population and Communities Ecology

- Natality, Mortality, Age and Sex Ratio, Growth Rate, Biotic Potential, Deme, Ecotype, Biotype, Plant Community-Concept and Characters (Qualitative and Quantitative), Plant Succession-Processes and types-Hydrosere, Xerosere. Energy Partitioning: r and k selection. Concept of habitat, ecological niche and Guild.

Unit 3: Ecosystem Ecology

- Concept-Structure and Function: food Chain, Food Web, Trophic Level, Ecological Pyramid. Biomass production- primary and secondary productivity. Energy Flow and Biogeochemical Cycles-Phosphorus, Carbon and Nitrogen Cycle


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Suggested Reading:

- Kormondy, E.J.(1996).Concepts of Ecology.Prentice Hall,U.S.A.4th edition.
- Sharma, P.D.(2010)Ecology and Environment. Rastogi Publications, Meerut India. 8th edition.
- Smith, Thomas M. and Smith Robert Leo. (2015) Elements of Ecology. Pearson Edition, 9th edition

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