

Part A : Introduction

Programme: Certificate		Class B.Sc.-II	Year: 2022	Session: 2022-23
1.	Course Code	BOT-2P		
2.	Course Title	Plant Identification and Embryology		
3.	Course Type	Practical		
4.	Pre-requisite (if any)	No		
5.	Course outcomes:	Course outcomes: After the completion of the course the students will be able: <ul style="list-style-type: none"> • To learn how plant specimens are collected, documented, and curated for a permanent record. • To observe, record, and employ plant morphological variation and the accompanying descriptive terminology. • To gain experience with the various tools and means available to identify plants. • To develop observational skills and field experience. • To identify a taxonomically diverse array of native plants. • To recognize common and major plant families. • Comprehend the concepts of plant taxonomy and classification of Angiosperms. 		
6.	Credit Value	2		
7.	Total Marks	Max. Marks: 50	Min. Passing Marks:17	

Part B : Content of the Course

Total No. of Periods - 30

Tentative Practical List	Topic*
	*(Topic * (Minimum Any three from each unit depending on facilities and syllabus. 20% for spotting, 10% each for viva and sessional and rest 60 % marks equally in each unit.)
	Herbarium: Plant collection, Preservation and Documentation: Stepwise Practicing Herbarium techniques: 1. FIELD EQUIPMENTS, Collection of any wild 25 plant specimens 2. Learn to handle Herbarium making tools 3. Pressing and Drying of collected plant specimens 4. Special treatments for all varied groups of plants 5. Mount on standard herbarium sheets 6. Label them using Standard methods
	Arrange the prepared herbarium according to Bentham and Hookers system of classification- 1. herb, shrub and trees 2. annual, biannual and perennial 3. cereals, pulses, vegetables and medicinal 4. ethnobotanical importance

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	<p>Taxonomic Identification of angiospermic plants: Description of plants belonging to following families in semitechnical language and identification up to family level: Brassicaceae, Malvaceae, Fabaceae, Cucurbitaceae, Asteraceae, Apocyanaceae, Asclepiadaceae, Solanaceae, Euphorbiaceae, Papaveraceae, Apiaceae Acanthaceae, Labiatae (Lamiaceae), Rubiaceae. Liliaceae, Musaceae, Poaceae.</p> <p>Identification during field visits: Field identification of common wild plants from families included in the theory syllabus.</p>
	<p>a) Documentation of Ethnobotanical wisdom of area b) Study of economically valuable plants: Medicinal plants, oil yielding plants, cereals, sugarcane, beverages etc.</p>
	<p>1. Anatomy of: Dicot root, stem and leaf 2. Monocot root, stem and leaf 3. Plants showing primary anomaly and anomalous secondary growth a) Study of an angiospermic flower b) Dissection of Ladys finger /Tridax/citrus seeds for study of embryo</p>

Part C - Learning Resource	
Text Books, Reference Books, Other Resources	
	<p>Suggested Readings:</p> <ol style="list-style-type: none"> 1. Bole, P. V. and Vaghani, Y. (1986) Field guide to the common trees of India. Oxford University Press; Bombay. 2. Womersley, J. S. 1981. Plant collecting and herbarium development: A manual.S.K. Pandey (2012). Quick Concept of Botany. Publisher LAP LAMBERT Academic Publishing GmbH & Co. KG, Germany (ISBN: 978-3-8484-3104-5). 3. Pandey S.K. (2012). Quick Concept of Botany. Publisher LAP LAMBERT Academic Publishing GmbH & Co. KG, Germany (ISBN: 978-3-8484-3104-5). 4. Manilal, K. S. and M. S. Muktesh Kumar (ed.) (1998) A Hand book of Taxonomy Training, DST,N. Delhi 5. Dhopte, A.M. (2003) Principles and Techniques for Plant Scientists. - Agrobios,Jodhpur, India. 6. Jain, S.K. & R.R. Rao. 1977. A handbook of field and herbarium methods. Today & Tomorrow's Printers and Publishers, New Delhi. <p>E-learning Resources:</p> <ol style="list-style-type: none"> 1. http://egyankosh.ac.in/bitstream/123456789/13096/1/Unit-5.pdf 2. https://www.for.gov.bc.ca/hfd/pubs/docs/wp/wp18.pdf 3. https://www.researchgate.net/publication/267510854_The_Flowering_Plants_Handbook

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Part D – Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 50

Continuous Comprehensive Evaluation (CCE): Not Applicable

University Exam(UE): 50 Marks

Internal Assessment:

Continuous Comprehensive
Evaluation (CCE)






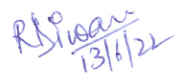


Class Test/Assignment/Presentation


Not Applicable

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Declaration

This is to certify that the syllabus is framed by the Central Board of Studies (Botany) as per the guidelines (TOR) of the Department of Higher Education, Raipur Chhattisgarh.

1. Shri Prabhat Pandey
Asst. Prof.
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Govt. J.Y. Chhattisgarh College, Raipur - Member 
7. Dr. Rupinder Diwan
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Govt. Nagarjun P.G. College of Science, Raipur - Member 
8. Dr. Usha Chandel
Asst. Prof.
Govt. Dr. W.W. Patankar Girls P.G. College, Durg - Member 
9. Mr. Kaushal Kishor
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Govt. Pt. Shyamacharan Shukla College, Dharsiwa,
Raipur - Member 
10. ~~Manisha Gupta~~ - Member


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Part A : Introduction			
Programme: Certificate		Class B.Sc.-III	Year: 2022
		Session: 2022-23	
1.	Course Code	BOT-3P	
2.	Course Title	Experiments in physiology, Biochemistry & molecular biology	
3.	Course Type	Practical	
4.	Pre-requisite (if any)	No	
5.	Course outcomes:	<ul style="list-style-type: none"> • Course outcomes: • After the completion of the course the students will be able to: • Know and authentic the physiological processes undergoing in plants along with • their metabolism • Identify Mineral deficiencies based on visual symptoms • Understand and develop skill for conducting molecular experiments for genetic • engineering 	
6.	Credit Value	2	
7.	Total Marks	Max. Marks: 50	Min. Passing Marks:17
Part B : Content of the Course			
Total No. of Periods - 30			
Tentative Practical List	Topic* *(Topic * (Minimum Any three from each unit depending on facilities and syllabus. 20% for spotting, 10% each for viva and sessional and rest 60 % marks equally in each unit.))		
	Plant water relation, Mineral Nutrition and translocation in phloem <ol style="list-style-type: none"> 1. Determination of osmotic potential of plant cell sap by plasmolytic method using leaves of <i>Rhoeo / Tradescantia</i>. 2. Osmosis – by potato osmoscope experiment 3. Effect of temperature on absorption of water by storage tissue and determination of Q10. 4. Experiment to demonstrate the transpiration phenomenon with the bell jar method 5. Structure of stomata (dicot & monocot) 6. Experiment to measure the rate of transpiration by using Ganong's/ 		

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	<p>Farmer's potometer</p> <p>7. Study of mineral deficiency symptoms using plant material/photographs.</p> <p>Cell biology</p> <p>1. Study of plant cell structure with the help of epidermal peel mount of <i>Onion/Rhoeo/Crinum/ etc.</i></p> <p>2. Measurement of cell size by the technique of micrometry (Ocular and stage micrometer).</p> <p>3. Determination of mitotic index/ meiotic index and frequency of different mitotic / meiotic stages in pre-fixed root tips and flower buds respectively.</p>
	<p>Nitrogen Metabolism, Photosynthesis & Respiration : 1. A basic idea of chromatography: Principle, paper chromatography , column chromatography and TLC; demonstration of chromatography.</p> <p>2. Separation of photosynthetic pigments by paper chromatography.</p> <p>3. Effect of quality of light/concentration of Carbon dioxide on photosynthetic rate in aquatic plant</p> <p>4. Determination of the RQ starchy/ proteinaceous/ oily germinating seeds.</p> <p>Genetics: 1. Monohybrid cross (Dominance, codominance and incomplete dominance)</p> <p>2. Dihybrid cross (Dominance and incomplete dominance)</p> <p>3. Gene interactions (All types of gene interactions mentioned in the syllabus)</p> <p>a. Recessive epistasis 9: 3: 1.</p> <p>b. Dominant epistasis 12: 3: 1</p> <p>c. Complementary genes 9: 7</p> <p>d. Duplicate genes with cumulative effect 9: 6: 1</p> <p>e. Inhibitory genes 13: 3</p> <p>4. Observe the genetic variations among inter and intra specific plants.</p> <p>5. Demonstration of Breeding techniques-Hybridization, emasculation/ bagging/ tagging experiment.</p>
	<p>Genetic material: 1. Instruments and equipments used in molecular biology.</p> <p>2. Isolation of DNA from plants</p>
	<p>Techniques for biochemical analysis: 1. Weighing and Preparation of solutions -percentage, molar & normal solutions, dilution from stock solution etc.</p> <p>2. Separation of amino acids by paper chromatography.</p> <p>3. Detection of organic acids: citric, tartaric, oxalic and malic from laboratory samples.,</p> <p>4. Qualitative Analysis of carbohydrates,</p> <p>5. Estimation of reducing sugar by anthrone method,</p> <p>6. Qualitative Analysis of Lipids</p> <p>7. Qualitative analysis of Amino acids and Proteins</p>
	<p>Biostatistics: 1. Univariate analysis of statistical data: Statistical tables, Central</p>

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	<p>tendency - mean, mode, median, standard deviation and standard error (using seedling population /leaflet size).</p> <p>2. Calculation of correlation coefficient values and finding out the probability.</p> <p>3. Determination of goodness of fit in Mendelian and modified mono-and dihybrid ratios (3:1, 1:1, 9:3:3:1, 1:1:1:1, 9:7, 13:3, 15:1) by Chi-square analysis and comment on the nature of inheritance.</p> <p>3. Computer application in biostatistics - MS Excel and SPSS</p>
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Part C - Learning Resource

Text Books, Reference Books, Other Resources

Suggested Readings:

1. A Laboratory Manual Of Plant, Physiology, Biochemistry And Ecology ISBN: 9788177544589 Edition: 01 Year: 2012 Author: Akhtar Inam Publisher : Agrobios (India).
2. Wilson and Walker. Practical Biochemistry: Principles and Techniques. Cambridge University Press. U.K.
3. Pandey S.K. (2012). Quick Concept of Botany. Publisher LAP LAMBERT Academic Publishing GmbH & Co. KG, Germany (ISBN: 978-3-8484-3104-5).
4. Karp, G. 2010. Cell and Molecular Biology: Concepts and Experiments. 6th Edition. John Wiley & Sons. Inc.

E-learning Resources:

1. <https://www.edx.org/learn/molecular-biology>
2. <https://krishikosh.egranth.ac.in/handle/1/5810039999>
3. <https://www.classcentral.com/course/swayam-genetic-engineering-theory-and-application-14090>
4. <https://www.coursera.org/courses?query=genetics>
5. <https://www.coursera.org/courses?query=molecular%20biology>
6. <https://www.edx.org/learn/genetic-engineering>
7. <https://www.mooc-list.com/tags/genetic-engineering>
8. <https://www.classcentral.com/course/edx-molecular-biology-part-1-dna-replication-and-repair-2907>

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Part D – Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 50

Continuous Comprehensive Evaluation (CCE): Not Applicable

University Exam(UE): 50 Marks

Internal Assessment:

Continuous Comprehensive
Evaluation (CCE)




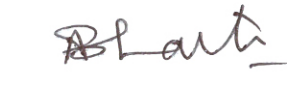
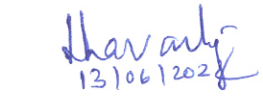
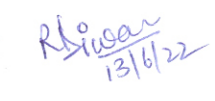
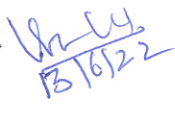


Class Test/Assignment/Presentation

Not Applicable

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| 10. Manisha Gupta | - | Member | |


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Part A: Introduction			
Program: Diploma in Plant Identification and plant preservation		Class: B. Sc. II Year	Year: 2023 Session:2023-2024
1.	Course Code	BOT-3T	
2.	Course Title	Plant Systematics, Economic Botany and Ethnobotany	
3.	Course Type	Theory	
4.	Pre-requisite (if any)	NO	
5.	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to <ul style="list-style-type: none"> • Understand the Plant Taxonomy • Learn the characteristics of families included • Learn economic importance of different plants of the concerned families • Understand the traditional knowledge about the plants and possible application of this knowledge 	
6.	Credit Value	Theory: 4	
7.	Total Marks	Max. Marks: 50	Min Passing Marks: 17

Part B: Content of the Course		
Total Periods: 60		
Unit	Topics	No. of Period
I	Taxonomic Resources & Nomenclature: Components of taxonomy (identification, nomenclature, classification); Taxonomic resources: Herbarium- functions & important herbaria, Botanical gardens, Flora, Keys- single access and multi-access. Principles and rules of Botanical Nomenclature according to ICBN	12
II	Types of classification & Evidences: Artificial, natural and phylogenetic. Bentham and Hooker (upto series), Engler and Prantl (upto series) and Hutchinson classification. Introduction to taxonomic evidences from palynology, cytology and phytochemistry	12
III	Families: A study of the following families (Following Bentham & Hooker's system) with economic importance: Ranunculaceae, Brassicaceae, Malvaceae, Rutaceae, Fabaceae, Myrtaceae, Cucurbitaceae, Rubiaceae, Asteraceae, Apocynaceae, Acanthaceae, Asclepiadaceae, Solanaceae, Amaranthaceae, Euphorbiaceae, Papaveraceae, Apiaceae, Lamiaceae, Orchidaceae, Liliaceae, Musaceae and Poaceae.	12
IV	Economically valuable plants: Centre of origin and domestication of crop plants; Botanical name, family, part used and uses of oil yielding plants, fibre yielding plants, Rubber, Dyes, Timber, Sugar and beverages	12
V	Ethnobotany: Concept of Ethnobotany, Documentation, Conservation and application of Traditional Knowledge, Sacred grooves, Role of AYUSH, CIMAP and NMPB Role of important medicinal plants in Traditional therapeutic practices: <i>Aegle marmelos</i> , <i>Asparagus racemosus</i> , <i>Andrographis paniculata</i> , <i>Ocimum sanctum</i> , <i>Aloe vera</i> , <i>Nyctanthes arbor-tristis</i> etc. Conservation of medicinal plants and ethnomedicinal knowledge. Plants in primary healthcare: <i>Tinospora cordifolia</i> , <i>Ocimum sanctum</i> , <i>Aloe vera</i> , <i>Azadirachta indica</i> etc.	12

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Keywords: Taxonomy, classification, Families ,ethnobotany

Part C -Learning Resources

Suggested Readings:

1. Plant Systematics. Arun K. Pandey & Shruti Kansana. 2020. Jaya Publishing House.
2. Bole, P. V. and Vaghani, Y. (1986) Field guide to the common trees of India. Oxford University Press; Bombay.
3. Brandis, D. (1906) Indian Trees (London, 5th edition. 1971). International Book Distributors; Dehra Dun.
4. Dallwitz, M. J., Paine, T. A. and Zurcher, E. J. (2003). Principles of interactive keys. <http://delta-intkey.com>
5. <https://www.naace.co.uk/school-improvement/ict-mark/>
6. Pandey, B.P. 2007. Botany for Degree Students: Diversity of Seed Plants and their Systematics, Structure, Development and Reproduction in Flowering Plants. S. Chand & Company Ltd, New Delhi.
7. Singh, G. 1999. Plant Systematics: Theory and Practice. Oxford and IBH, New Delhi.
8. Dutta A.C. 2016. Botany for Degree Students. Oxford University Press.
9. Randhawa, G.S. and Mukhopadhyay, A. 1986. Floriculture in India. Allied Publishers
10. Kochhar, S.L. (2011). Economic Botany in the Tropics, MacMillan Publishers India Ltd., New Delhi. 4th edition.
11. Sambamurthy, AVSS & Subrahmanyam, NS (2000). Economic Botany of Crop Plants. Asiatech Publishers. New Delhi.
12. Singh, D.K and K.V. Peter. 2014. Protected cultivation of horticultural crops. New India Publishing Agency, India.
13. Reddy P. Parvatha. 2016. Sustainable crop protection under protected cultivation. Springer, Singapore.
14. Amit Deogirikar. 2019. A Text Book on Protected Cultivation and Secondary Agriculture. Rajlaxmi Prakashan, Aurangabad, India.
15. Singh, B., B. Singh, N. Sabir and M Hasan. 2014. Advances in protected cultivation. New India Publishing Agency, India.
16. Sharma, OP. 1996. Hill's Economic Botany (Late Dr. AF Hill, adopted by OP Sharma). Tata McGraw Hill Co. Ltd., New Delhi.

Suggested equivalent online courses:

1. <https://www.easybiologyclass.com/topic-botany/>
2. <http://egyankosh.ac.in/handle/123456789/53530>
3. <https://www.delta-intkey.com/www/desc.htm>
4. <https://milneorchid.weebly.com/plant-id-for-beginners.html>
5. <https://plants.usda.gov/classification.html>
6. https://www.senecaohs.org/pages/uploaded_files/Plant%20Classification.pdf
7. https://www.ladykeanecollege.edu.in/files/userfiles/file/Dr_%20S_%20Nongbri%20III%20Sem%20ppt.pdf
8. https://www.brainkart.com/article/Bentham-and-Hooker-s-classification-of-plants---Dicotyledonae,-Gymnospermae-and-Monocotyledonae_1000/
9. <https://libguides.rutgers.edu/c.php?g=336690&p=2267037>
<https://www.delta-intkey.com/>

Part D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 50






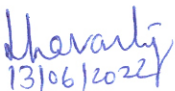
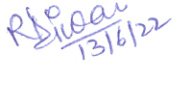
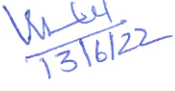

Continuous Comprehensive Evaluation (CCE): As per rule

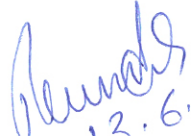
University Exam(UE): 50Marks

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10. ~~Manisha Gupta~~ - Member

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Part A: Introduction			
Program: Diploma in Plant Identification and plant preservation		Class: B.Sc. II Year	Year: 2023 Session:2023-2024
1.	Course Code	BOT-4 T	
2.	Course Title	Plant Anatomy, Embryology and Plant Breeding	
3.	Course Type	Theory	
4.	Pre-requisite (if any)	NO	
5.	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to <ol style="list-style-type: none"> 1. Understand the internal structure of root, stem and leaves 2. learn about the anomalous secondary growth of some plants 3. understand the life cycle of angiospermic plants with details of microsporogenesis, megasporogenesis, fertilization and other developmental details up to embryogenesis 4. understand concept of plant breeding and its application 	
6.	Credit Value	Theory: 4	
7.	Total Marks	Max. Marks: 50	Min Passing Marks: 17

Part B: Content of the Course		
Total Period: 60		
Unit	Topics	No. of Period
I	Meristems and related theories: Meristematic and permanent tissues, Root meristem, Stem meristem and Leaf meristem. Theories of apical organization: Apical Cell Theory, Histogen Theory and Tunica Carpus Theory	12
II	Anatomy and Secondary growth: Anatomy of Root, Stem and Leaves of both Dicots and Monocots. Secondary growth in Dicots, Anomalous secondary growth in <i>Bignonia</i> , <i>Boerhaavia</i> , <i>Dracaena</i> and <i>Nyctanthes</i>	12
III	Plant Embryology: Flower: Structure and types (Complete, Incomplete, Perfect and Imperfect flower), Microsporangium and Microsporogenesis, Ovule: Structure and types, Megasporogenesis, Development of female gametophyte (Embryo sac), Types of Embryo sac, Pollination, Pollen-pistil interaction, Fertilization, Double fertilization, Endosperm and its types, Embryogenesis, Apomixis and Polyembryony	12
IV	Plant Breeding: Plant Introduction, Agencies of plant introduction in India, Procedure of introduction- Acclimatization- Achievements, Selection- mass selection, pure line selection and clonal selection. Genetic basis of selection methods	12
V	Hybridization: Procedure of hybridization, inter-generic, inter-specific and inter-varietal hybridization. Composite and synthetic varieties, Heterosis, Mutation and Molecular breeding (use of DNA markers in plant breeding). Role of hybridization in agriculture, horticulture and forestry	12
Keywords: Meristems, Anomalous secondary growth. Pure line selection. Hybridization.		

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Part C -Learning Resources

Text Books, Reference Books, Other Resources

1. M K Raxdan An Introduction to Plant Tissue Culture –; Oxfird& IBH Publishing Co.Pvt. Ltd.,New Delhi
2. Allard RW (1960) Principles of Plant Breeding. John Willey and Sons. Inc. New York
3. BD Singh (2003) Plant Breeding. Kalyani Publishers
4. Sharma JR (1994) Principles and Practices of Plant Breeding. Tata McGraw-Hill Pub. Co. New Delhi
5. Pandey BP (2010) College Botany Vol II, S. Chand and Company, New Delhi.
6. Maheshwari P (1971). An Introduction to Embryology of Angiosperms, McGraw Hill Book Co., London
7. Bhojwani SS and Bhatnagar SP (2000). The Embryology of Angiosperms (4th Ed.), Vikas Publishing House
8. Evert RF (2006). Esau's Plant Anatomy: Meristems, Cells and Tissues of the Plant body: Their Structure, Function and Development, John Willey and Sons, Inc
9. Pandey BP .Plant Anatomy, S. Chand Publishers, New Delhi
10. Srivastava HN (2006). Plant Anatomy, Pradeep Publications, Jalandhar

Suggested equivalent online resources:

1. https://www.pnas.org/content/104/suppl_1/8641
2. <https://www.journals.uchicago.edu/doi/pdfplus/10.1086/659998>
3. <https://bsi.gov.in/page/en/ethnobotany>
4. <http://www.legalserviceindia.com/article/I98-Intellectual-Property-and-Traditional-knowledge.html>
5. https://www.brainkart.com/article/Economic-importance-Plants---Food,-Rice,-Oil,-Fibre,-Timber-yielding-plant_1095/
6. <https://www.loc.gov/rr/scitech/tracer-bullets/economic-botanytb.html>
7. <http://nsdl.niscair.res.in/bitstream/123456789/127/1/Fibre%20crops%2C%20bamboo%2C%20timber%20-%20Final.pdf>
8. <https://www2.palomar.edu/users/warmstrong/econpls.htm>
9. <https://www.longdom.org/proceedings/phytochemistry-and-phytoconstituents-of-herbal-drugs-and-formulations-1668.html>

Part D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 50





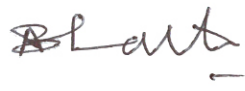


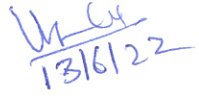

Continuous Comprehensive Evaluation (CCE):As per rule

University Exam(UE): 50Marks

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Declaration

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1. Shri Prabhat Pandey
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Gramya Bharti Vidyapith, Hardibazar - Chairman 
2. Dr. A.N. Bahadur
Professor - Member 
3. Dr. Prashant Kumar Singh
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4. Dr. Awadhesh Kumar Shrivastava
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5. Dr. Ashok Kumar Bharti
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6. Dr. Smriti Chakravarty
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7. Dr. Rupinder Diwan
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8. Dr. Usha Chandel
Asst. Prof. - Member 
9. Mr. Kaushal Kishor
Asst. Prof. - Member 
10. ~~Manisha Gupta~~ - Member

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Part A: Introduction			
Program: B.Sc.		Class: B.Sc. III Year	Year: 2024 Session: 2024-2025
1.	Course Code	BOT-6T	
2.	Course Title	Cytogenetics, plant tissue culture and biometry	
3.	Course Type	Theory	
4.	Pre-requisite (if any)	NO	
5.	Course Learning Outcomes (CLO)	After the completion of the course the students will be able to: <ul style="list-style-type: none"> • Acquire knowledge on cell ultrastructure. • Understand the structure and chemical composition of chromatin and concept of cell division. • Interpret the Mendel's principles, acquire knowledge on cytoplasmic inheritance and sex-linked inheritance • Understand the concept of 'one gene one enzyme hypothesis' along with the molecular mechanism of mutation. • students will be familiar with data handling. 	
6.	Credit Value	Theory: 4	
7.	Total Marks	Max. Marks: 50	Min Passing Marks: 17

Part B: Content of the Course		
Total Periods: 60		
Unit	Topics	No. of Period
I	Cell biology: Structure and function of cell wall, plasma membrane, ribosomes, Endoplasmic reticulum, Golgi apparatus, mitochondria, chloroplast, lysosomes, peroxisomes and cell inclusions. Organization of nucleus: nuclear envelope, nucleoplasm and nucleolus. Chromosomal nomenclature- chromatids, centromere, telomere, satellite, secondary constriction. Organization of chromosomes- Nucleic acid and histones- types and classification. Lampbrush chromosomes and polytene chromosomes- Karyotype and idiogram. Cell cycle: G ₀ , G ₁ , S and G ₂ phases –mitosis: open and closed mitosis –amitosis and meiosis. Chromosomal aberrations (Structural and Numerical)	12
II	Genetics: History of Genetics and Mendelian inheritance, Chromosome theory of inheritance, crossing over and linkage; Incomplete dominance and codominance; Interaction of Genes; Multiple alleles, Lethal alleles, Epistasis, Pleiotropy, Polygenic inheritance; Extra-nuclear Inheritance, Linkage, crossing over, Concept of sex determination and Sex chromosomes; Patterns of Sex determination in plants Sex linked inheritance.	12
III	Genetic material: Miescher to Watson and Crick- historic perspective, Griffith's and Avery's transformation experiments, Hershey-Chase, bacteriophage experiment, DNA structure, types of DNA, types of genetic material. DNA replication (Prokaryotes and eukaryotes): semi- conservative. DNA replication (Prokaryotes and eukaryotes): bidirectional replication, semi- conservative, semi discontinuous RNA priming, θ (theta) mode of replication, replication of linear, dsDNA, replicating the 5' end of linear chromosome including replication enzymes.	12

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IV	<p>Gene mutation and mutagens – substitution- transition and transversion, DNA damage and repairs, physical (ionizing and non- ionising) and chemical mutagens</p> <p>Transcription & Regulation of gene expression Types of structures of RNA (mRNA, tRNA, rRNA), RNA polymerase- various types; Translation, (Prokaryotes and eukaryotes), genetic code-. deciphering and properties. Regulation of gene expression in Prokaryotes: Lac operon</p> <p>Plant tissue culture: Principles, components and techniques (preparation of culture media: liquid and solid medium, basal and supplemented media) and culturing of protoplast- principle and application, regeneration of protoplasts, protoplast fusion and somatic hybridization- selection of hybrid cells, Somaclonal variation, Plant secondary metabolites production. Artificial seeds</p>	12
V	<p>Biostatistics: Definition, statistical methods, basic principles, variables- measurements, functions, limitations and uses of statistics. Biometry: Data, Sample, Population, random sampling, Frequency distribution- definition only, Central tendency–Arithmetic Mean, Mode and Median; Measurement of dispersion–Coefficient of variation, Standard Deviation, Standard error of Mean; Test of significance: chi- square test for goodness of fit. Computer application in biostatistics - MS Excel and SPSS</p>	12
<p>Keywords: Mineral nutrition, Carbon assimilation, Nitrogen and lipid metabolism, Natural resource management, Ecological succession, biodiversity conservation</p>		

Part C -Learning Resources

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Suggested Readings:

1. Cell Biology And Genetics (Hindi) 2/e PB...Gupta P K (Hindi) Rastogi Publications
2. PLANT BIOTECHNOLOGY (HINDI) October 2019 Publisher: Kindle DirectPublishing ISBN: ISBN: 9781698665283 Authors:H. R. Dagla Jai Narain Vyas University
3. Biotechnology: Fundamentals And Application (hindi) (hb) ISBN : 9788177544732Edition :03Year : 2018Author : Dr. Purohit SS , Mathur S
4. Biotechnology (Hindi) (Hindi, Paperback, B.D.Singh) Hindi Publisher: Kalyani Publishers ISBN: 9789327246070, 9327246071
5. Cytogenetics, Plant Breeding, Evolution and Biostatistics ISBN #: 978-81-301-0066-1 Sunil D Purohit & Gotam K Kukda, Apex Publishing House
6. Genetics and Biotechnology Sunil D Purohit, K. Ahmed & Gotam K Kukda Apex Publishing House
7. Padaprajanan (Hindi)
8. G.M. Cooper. (2015). The cell: A Molecular Approach. 7th Edition. Sinauer Associates.
9. Alberts, B., Johnson, A.D., Lewis, J., Morgan, D., Raff, M., Roberts, K., Walter, P. (2014). Molecular Biology of Cell. 6th Edition. W.W. Norton & Co.
10. Campbell, M.K. (2012) Biochemistry, 7th ed., Published by Cengage Learning.
11. Campbell, P.N. and Smith, A.D. (2011). Biochemistry Illustrated, 4th ed., Published by Churchill Livingstone
12. Tymoczko, J.L., Berg, J.M. and Stryer, L. (2012). Biochemistry: A short course, 2nd ed., W.H. Freeman.
13. Berg, J.M., Tymoczko, J.L. and Stryer, L. (2011) Biochemistry, W.H. Freeman and Company
14. Nelson, D.L. and Cox, M.M. (2008). Lehninger Principles of Biochemistry, 5th Ed., W.H. Freeman and Company.
15. Karp, G. (2010). Cell Biology, John Wiley & Sons, U.S.A. 6th edition.
16. Hardin, J., Becker, G., Skliensmith, L.J. (2012). Becker's World of the Cell. 8th edition. Pearson Education Inc. U.S.A.)
17. Gardner, E.J., Simmons, M.J., Snustad, D.P. (1991). Principles of Genetics, John Wiley & sons, India. 8th e
18. Snustad, D.P. and Simmons, M.J. (2010). Principles of Genetics, John Wiley & Sons Inc., India. 5th edition.
19. Klug, W.S., Cummings, M.R., Spencer, C.A. (2009). Concepts of Genetics. Benjamin Cummings, U.S.A..
20. Griffiths, A.J.F., Wessler, S.R., Carroll, S.B., Doebley, J. (2010). Introduction to Genetic Analysis. W. H. Freeman and Co., U.S.A. 10th edition.
21. M K Raxdan An Introduction to Plant Tissue Culture –; Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi
22. Aggarwal SK (2009) Foundation Course in Biology, 2nd Edition, Ane Books Pvt. Ltd
23. Allard RW (1960) Principles of Plant Breeding. John Willey and Sons. Inc. New York
24. BD Singh (2003) Plant Breeding. Kalyani Publishers
25. Cohn, N.S. (1964) Elements of Cytology. Brace and World Inc, New Delhi
26. Darnel, J. Lodish, Hand Baltimore, D. (1991) Cell and molecular biology. Lea and Fibiger, Washington.
27. De Robertis, E.D.P and Robertis, E.M.P (1991) Cell and molecular biology Scientific American books.
28. Dobzhansky, B (1961) Genetic and origin of species, Columbia university Press New York
29. Durbin (2007) Biological Sequence Analysis. Cambridge University Press India Pvt. Ltd
30. Gerald Karp (1985) Cell biology, Mc Graw Hill company..
31. Lewin, B, (1994) Genes, Oxford University Press, New York.
32. Lewis, W.H (1980) Polyploidy. Plenum Press, New York.
33. Nicholl T (2007) An Introduction to Genetic Engineering, Cambridge University Press India Pvt. Ltd
34. Roy S.C. and Kalayan Kumar De (1997) Cell biology. New central Books, Calcutta

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Part D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 50





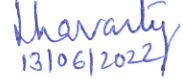




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*For
Review
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- | | | | |
|--|---|----------|---|
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Govt. D.T. P.G. College, Utai, Durg | - | Member |  |
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Govt. Dr. W.W. Patankar Girls P.G. College, Durg | - | Member |  |
| 9. Mr. Kaushal Kishor
Asst. Prof.
Govt. Pt. Shyamacharan Shukla College, Dharsiwa,
Raipur | - | Member |  |
| 10. Mamisha Gupta | - | Member | |


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Scheme of B.Sc. Botany

Year	Course Code	Subject Name	Theory/ Practical	Total Credit	Total Marks	
					Max	Min
First year	BOT-1T	Microbial Diversity and Plant Pathology	Theory	4	50	17
	BOT--2T	Archegoniateae and Plant Architecture	Theory	4	50	17
	BOT--1P	LAB 1 : Microbial Techniques and Archegoniate identification	Practical	2	50	17
Second year	BOT--3T	Plant Systematics, Economic Botany and Ethnobotany	Theory	4	50	17
	BOT--4T	Plant Anatomy, Embryology and Plant Breeding	Theory	4	50	17
	BOT--2P	LAB 2 : Plant Identification and Embryology	Practical	2	50	17
Third year	BOT -5T	Plant Physiology and Ecology	Theory	4	50	17
	BOT -6T	Cytogenetics, plant tissue culture and biometry	Theory	4	50	17
	BOT -3P	LAB 3 : Experiments in Physiology, Biochemistry & Molecular biology	Practical	2	50	17

Note: There shall be four extra credits in each year for internship/apprenticeship. The certificate of extra credits for this would be provided by the concern university and it is not mandatory.