18

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कार्यालय प्राचार्य, शासकीय कमलाराजा कन्या स्नातकोत्तर स्वशासी महाविद्यालय, ग्वालियर

GOVT. KAMLA RAJA GIRLS P.G. AUTO. COLLEGE, GWALIOR (M.P.) INDIA

(Affiliated to Jiwaji University, Gwalior under 2(f) & 12(b) NAAC – 'A' Grade Accredited Institute)

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ग्वालियर, दिनांक 18 अगस्त, 2018

वनस्पति शास्त्र विभाग

अध्ययन मंडल की बैठक का कार्यवाही विवरण

नवीन सत्र 2018–19 हेतु वनस्पति शास्त्र विषय से सम्बंधित अध्ययन मण्डल की बैठक आज दिनांक 18 अगस्त, 2018 को प्रातः 11:00 बजे वनस्पति शास्त्र विभाग में आयोजित की गई, जिसमें निम्नानुसार उपस्थिति रही –

1. डॉ. मधुलक्ष्मी शर्मा श्रेणी - 1 18.8.18
2. डॉ. साधना पाण्डे श्रेणी - 2 18/8
3. डॉ. प्रीति कुलश्रेष्ठ श्रेणी - 2 P. Kulshrestha 18/8/18
4. डॉ. एस. एच कुरैशी श्रेणी - 3
5. डॉ. टीकम ओम शर्मा श्रेणी - 3
6. डॉ. अविनाश तिवारी श्रेणी - 4 18/8/18
7. डॉ. कु. किरण बघेल श्रेणी - 5 Kiran
8. डॉ. विशाल कदम श्रेणी - 6
9. डॉ. परमजीत मेहता श्रेणी - 6 18.8.18
10. डॉ. दीप आजाद श्रेणी - 6 अनुपस्थित
11. डॉ. एच. के. गोस्वामी श्रेणी - 6
12. डॉ.

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अध्ययनमंडल की बैठक की कार्यवाही निम्नानुसार रही –

1. ~~वनस्पति शास्त्र~~ ——विषय के स्नातक स्तर के प्रथम एवं द्वितीय वर्ष का पाठ्यक्रम अंक योजना सहित सत्र 2018–2019 हेतु अध्ययनमंडल द्वारा मान्य किया जाता है।

2. ~~वनस्पति शास्त्र~~ ——विषय के स्नातक स्तर के पंचम एवं षष्ठ सेमेस्टर के पाठ्यक्रम अंक योजना सहित सत्र 2018–2019 हेतु अध्ययनमंडल द्वारा मान्य किया जाता है।

3. ~~वनस्पति शास्त्र~~ ——विषय की सत्र 2018–2019 में होने वाली परीक्षाओं हेतु संलग्न परीक्षकों की सूची को अध्ययनमंडल द्वारा मान्य किया जाता है।

4. विभाग में सत्र 2018–2019 में यदि कोई शोध संगोष्ठी / कार्यशाला / अधिवेशन / अध्ययन भ्रमण आदि के आयोजन का प्रस्ताव है तो उसका विवरण एवं अनुमोदन— Proposal for workshop cum seminar/ Training in tools & techniques in Botany practicals & Training in tools & techniques in microbiology practicals, Extension lectures, Field Studies/tour program. Lectures are attached.

5. यदि अन्य कोई विषय हो तो उसका विवरण एवं अनुमोदन।

हस्ताक्षर अध्ययन मंडल अध्यक्ष एवं समस्त सदस्य

18/8/18 18/08/18 18/8/18 18/08/18 18.8.18 P. Kumar 18/8/18 18/8

Department of Higher Education, Govt. of M.P.
Under Graduate Annual Pattern Syllabus
As recommended by Central Board of Studies and approved by Governor of M.P.

उच्च शिक्षा विभाग, म.प्र. शासन
स्नातक कक्षाओं के लिये वार्षिक पद्धति अनुसार पाठ्यक्रम
केन्द्रीय अध्ययन मण्डल द्वारा अनुशंसित तथा म0प्र0 के राज्यपाल द्वारा अनुमोदित

Syllabus For Degree (B.Sc) Course
Subject – Botany
Year – 2017 Onwards

S.NO.	Class	Paper	Title of the Paper	Marks Theory	Marks CCE	Total Marks	Year
1	B.Sc Ist Year	Ist	Diversity of Lower Plants	40	10	50	2017-18
	B.Sc Ist Year	IInd	Diversity of Higher Plants	40	10	50	
	B.Sc Ist Year	PRACTICAL (Based on Paper I & II)				50	
2	B.Sc IInd Year	Ist	Structure Development & Reproduction of Flowering Plants	40	10	50	2018-19
	B.Sc IInd Year	IInd	Plant Ecology Biodiversity and Phytogeography	40	10	50	
	B.Sc IInd Year	PRACTICAL (Based on Paper I & II)				50	
3	B.Sc IIIrd Year	Ist	Plant Physiology & Biochemistry	40	10	50	2019-20
	B.Sc IIIrd Year	IInd	Cell Biology Genetics & Biotechnology	40	10	50	
	B.Sc IIIrd Year	PRACTICAL (Based on Paper I & II)				50	

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उच्च शिक्षा विभाग म0प्र0 शासन
स्नातक कक्षाओं के लिए वार्षिक पद्धति अनुसार पाठ्यक्रम
केंद्रीय अध्ययन मण्डल द्वारा अनुशंसित तथा म0प्र0 के राज्यपाल द्वारा अनुमोदित
सत्र 2018–19

Class / कक्षा	:	**B.Sc. प्रथम वर्ष**
Paper / प्रश्न पत्र	:	**First/प्रथम**
Subject / विषय	:	**Botany**
Title of Subject Group	:	**Diversity of Lower Plants**
विषय समूह का शीर्षक	:	निम्न श्रेणी के पादपों की विविधता
Compulsory / अनिवार्य	:	**Compulsory**
Max. Marks अधिकतम	:	40 + 10 = 50

Particulars/विवरण

Unit-1	**Viruses and Prokaryotes :** Characteristics of Viruses, general account of TMV and T4 bacteriophage. Bacterial structure, nutrition, reproduction and economic importance. General account of Mycoplasma, Cynobacteria and Actinomycetes. **वायरस एवं प्रोकेरियोट :** विषाणुओं के सामान्य लक्षण, टीएमवी एवं टी फोर बैक्टिरियोफेज का सामान्य विवरण। जीवाणु की संरचना पोषण, प्रजनन एवं आर्थिक महत्व, मायकोप्लाज्मा, सायनो–बेक्टीरिया एवं एक्टीनोमाइसीटीज का सामान्य विवरण।
Unit-2	**Algae :** General characters, classification and economic importance. Important features and life history of Chlorophyceae-*Volvox, Oedogonium,* Charophyceae-*Chara*, Xanthophyceae, *Vaucheria*, Phaeophyceae-*Ectocarpus*. Rhodophyceae–*Polysiphonia*. **शैवाल :** शैवालों के सामान्य लक्षण, वर्गीकरण एवं आर्थिक महत्व। मुख्य लक्षण, एवं जीवन चक्र: क्लोरोफायसी–वॉल्वॉक्स, ऊडोगोनियम, कारोफायसी–कारा, जैन्थोफायसी– वाउचेरिया फियोफायसी–एक्टोकार्पस, रोडोफायसी–पोलीसाइफोनिया।
Unit-3	**Fungi :** General characters, classification and economic importance. Important features and life history of Oomycetes-*Albugo*, Zygomycetes : *Mucor*, Ascomycetes : *Yeast, Peziza*. Basidiomycetes : *Puccinia*, Deuteromycetes : *Alternaria*. General account of Lichens. **कवक :** कवकों के सामान्य लक्षण एवं वर्गीकरण एवं आर्थिक महत्व। प्रमुख लक्षणों एवं जीवन इतिहास का अध्ययन : उमाइसिटीज–एल्ब्यूगो, जायगोमायसिटीज–म्यूकर। एस्कोमायसिटीज–यीस्ट, पेजाइजा, बेसिडियोमायसिटीज–पक्सीनिया, डयूटेरोमायसिटीज–आल्टरनेरिया, लाइकेन्स का सामान्य विवरण।
Unit-4	**Bryophyta :** General Characters and Classification, study of morphology, anatomy and reproduction of Hepaticopsida: *Riccia, Marchantia*; Anthocerotopsida: *Anthoceros*, Bryopsida: *Polytrichum*. **ब्रायाफोइटा :** सामान्य लक्षण एवं वर्गीकरण, बाह्य आकारिकी, आंतरिक संरचना एवं प्रजनन : हेपेटीकोप्सिडा–रिक्सिया मारकेन्शिया, एन्थोसिरोटोप्सिडा–एन्थोसिरोस: ब्रायोप्सिडा–पोलीट्रायकम।

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Unit-5	**Pteridophyta :** Important characters and Classification. Stelar organization. Morphology and anatomy of *Rhynia*. Structure; anatomy and reproduction in *Lycopodium*. *Selaginella*, *Equisetum* and *Marsilea*. टेरिडोफाइटा : प्रमुख लक्षण एवं वर्गीकरण। स्टीलर संगठन, राहिनिया की बाह्य एवं आंतरिक सरंचना। लाइकोपोडियम, सिलेजिनेला, इक्वीसिटम एवं मारसीलिया की बाह्य तथा आंतरिक संरचना एवं प्रजनन।

Suggested Books :

1. G.M. Smith 1971 Cryptogamic Botany. Vol - I Algae & Fungi Tata McGrraw Hill pub. Co. New Delhi.
2. G.M. Smith 1971 Cryptogamic Botany. Vol – II Bryophytes & pteridophytes. Tata McGrraw Hill pub. Co. New Delhi.
3. O.P. Sharma, 1992. Text book of thallophyta McGrraw Hill pub. Co.
4. O.P. Sharma, 1990. Text book of Pteridophyta Mcmillan indai Ltd.
5. P.D. Sharma, 1991. The Fungi. Rastogi & co. Meerut.
6. H.C. Dubey, 1990. An introducation of Fungi. Vikas pub. House pvt. Ltd.
7. P. Puri, 1980. Bryophyta Atma ram & sons, Delhi.
8. A. Clifton, 1995. Introduction to the Bacteria. Mcgrew Hillpub. Co. New delhi.

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स्नातक कक्षाओं के लिए वार्षिक पद्धति अनुसार पाठ्यक्रम
केन्द्रीय अध्ययन मण्डल द्वारा अनुशंसित तथा म0प्र0 के राज्यपाल द्वारा अनुमोदित
सत्र 2017–18

Class / कक्षा	:	B.Sc. प्रथम वर्ष
Paper / प्रश्न पत्र	:	Second/द्वितीय
Subject / विषय	:	Botany
Title of Subject Group	:	Diversity of Higher Plants
विषय समूह का शीर्षक	:	उच्च पादपों की विविधता
Compulsory / अनिवार्य	:	Compulsory
Max. Marks अधिकतम	:	40 +10 = 50

Particulars/विवरण

Unit-I	**Gymnosperm :** General characters and Classification of Gymnosperms. Heterospory and Origin of Seed Habit. Diversity of Gymnosperms. Geological Time Scale and Fossilization. Fossil Gymnosperms: *Lyginopteris* and *Williamsonia*. अनावृत्तबीजी : अनावृत्तबीजियों के सामान्य लक्षण एवं वर्गीकरण, विषमबीजाणुकता एवं बीज स्वभाव का उद्गम, अनावृत्तबीजियों की विविधताएं, भू–वैज्ञानिक समय सारणी एवं जीवश्मीभवन, अनावृत्तबीजी जीवाश्म : लाइजीनोप्टोरिस एवं विलियमसोनिया।
Unit-II	**Gymnosperm :** Morphology, Anatomy, Reproduction and life cycle Of *Cycas, Pinus* and *Ephedra*. अनावृत्तबीजी : आकारिकी, आन्तरिक सरंचना, प्रजनन तथा जीवन–चक्र: साइकस, पाइनस, एवं इफिड्रा।
Unit-III	**Taxonomy :** Origin and Evolution of Angiosperms: Principles and rules of Botanical Nomenclature, Museum, Herbarium and Botanical Gardens; Classification of Angiosperms: Bentham and Hooker, and Modern trends in Taxonomy including Molecular taxonomy. APG IV System. वर्गीकी : आवृतबीजियों का उद्गम एवं विकास। वानस्पतिक नामकरण के सिद्धांत एवं नियम, संग्रहालय हरबेरियम एवं वानस्पतिक उद्यान, आवृतबीजियों का वर्गीकरण : बेन्थम तथा हुकर की पद्धति। वर्गिकी में आधुनिक प्रवृत्तियाँ एवं आणविक वर्गीकी, एपीजी IV पद्धति।
Unit-IV	**Taxonomy :** Terminology for plant description in semi-technical language: Diagnostic characteristics and Economic Importance of Families – Ranunculaceae, Brassicaceae, Malvaceae, Rutaceae, Fabaceae, and Apiaceae. वर्गीकी : पौधों के वानस्पतिक विवरण की अर्ध तकनिकी शब्दावली। रेननकुलेसी, ब्रेसीकेसी, मालवेसी, रूटेसी, फेबेसी एवं एपिएसी कुलों के विशिष्टि लक्षण एवं आर्थिक महत्व।
Unit-V	**Taxonomy :** Diagnostic characteristies & Economic Importance to Families – Rubiaceae, Asteraceae, Apocynaceae, Solanaceae, Lamiaceae, Euphorbiaceae. Liliaceae, and Poaceae. वर्गीकी : रूबिएसी, ऐस्टेरेसी, ऐपासाइनेसी, सोलेनेसी, लेमिएसी, यूफोरबिएसी, लिलिएसी एवं पोएसी कुलों के विशिष्ट लक्षण एवं आर्थिक महत्व।

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SUGGESTED READINGS :-

- Agarwal, S.B. 2007. Unified Botany, Shivlal Agarwal & Company Indore.
- Bhatnagar, S.P. and Moitra 1996. Gymnosperms. New Age International Limited, New Delhi.
- Davis. P.H. and Heywood, V.H. 1963, Principles ot Angiosperm taxonomy. Oliver and Boyd, London.
- Gangulee, H.C. & kar, A.K. 2006. College Botany Voll. III, New Central Book Agency (P) Ltd. Kolkata, 700009.
- Heywood, V.H. and Moore, D.M. (eds) 1984. Current concepts in plant taxonomy. Academic press London.
- Jeffery, C. 1992. An Introduction of plant taxonomy. Cambridge University press Cambridge, London.
- Jones, S.B. Jr. And Luchsinere, A.E. 1996. Plant Systematic. Mc Graw Hill Book co. New York.
- Kaushik, M.P. 2003. Modern Textbook of Botany, Prakash Publication Muzaffer Nagar U.P.
- Mukherjee, S.K. 2006. College Botany Voll. II, New Central Book Agency (P) Ltd. Kolkata, 700009.
- Pandey, B.P. 2010. A Text book of Botany-Angiosperms, S. Chand & Company Ltd. Ramanagar New Delhi-110055.
- Radford, A.E. 1986. Fundamentals of Plant Systmatics, Happer and Raw, New York.
- Saxena and Sarabhai. 1989. Text book of Botany. Rastogi publication Meerut.
- Singh, G. 1999. Plant Systematics : Theroy and Practice. Oxford and IBH Pvt. Ltd. New Delhi.
- Vasishta, P.C. 2005. Botany for degree students Voll-V, Gymnosperms. S. Chand & Company Ltd. Ramanagar, New Delhi-110055.

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PRACTICAL SCHEME

B.sc. I Year (BOTANY)

(BASED ON PAPER I & II)

50 MARKS

1.	Algae/Fungi	-	05
2.	Bryophyta/pteridophyta	-	05
3.	Gymnosperms	-	10
4.	Taxonomy	-	10
5.	Spotting (01-05)	-	10
6.	Viva Voce	-	05
7.	Sessionals	-	05

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उच्च शिक्षा विभाग म0प्र0 शासन

स्नातक कक्षाओं के लिए वार्षिक पद्धति अनुसार पाठ्यक्रम

केन्द्रीय अध्ययन मण्डल द्वारा अनुशंसित तथा म0प्र0 के राज्यपाल द्वारा अनुमोदित

सत्र 2018–19

Class / कक्षा	:	B.Sc. द्वितीय वर्ष
Paper / प्रश्न पत्र	:	First/प्रथम
Subject / विषय	:	Botany
Title of Subject Group	:	Structure, Development & Reproduction of Flowering Plants
विषय समूह का शीर्षक	:	पुष्पीय पौधों की संरचना, विकास एवं प्रजनन
Compulsory / अनिवार्य	:	Compulsory
Max. Marks अधिकतम	:	40 + 10 = 50

Particulars/विवरण

Unit-I	**Tissue System.** Types of vascular bundles, apical meristem, Classification of meristem. The Root System : Root apical meristem. Differentiation of primary and secondary tissues and their role. Anatomy of Monocot and Dicot root. Secondary growth in root. Modification of root for Various Functions, Interaction of root with microbes. ऊतक तंत्र, संवहन पूल के प्रकार, शीर्षस्थ प्रविभाजी ऊतक, प्रविभाजी ऊतक का वर्गीकरण। जड़ तंत्र : जड का शीर्षस्थ प्रविभाजी ऊतकः प्राथमिक एवं द्वितीयक ऊतकों का विभेदन एवं उनके कार्य। एकबीजपत्री जड़ एवं द्विबीजपत्री जड़ की आन्तरिक संरचना, जड़ में द्वितीयक वृद्धि। विभिन्न कार्यों हेतु जड़ के रूपान्तरण। सूक्ष्मजीवों के साथ जड़ की पारस्परिक क्रिया।
Unit-II	**The Shoot System :** Shoot apical meristem and histological organization. Anatomy of Monocot and Dicot Stem. Vascular cambium and its functions. Secondary growth in stem, characteristics of growth rings: sapwood and heart wood. Secondary Phloem, Cork Cambium and Periderm. Anomalous Secondary growth in *Nyctanthus, Boerhhavia, Achyranthus, Leptadenia, Salvadora, Bignonia* and *Dracaena.* प्ररोह तंत्र : प्ररोह शीर्षस्थ विभज्योतक एवं ऊतकीय संगठन, एकबीजपत्री एवं द्विबीजपत्री के तने की आन्तरिक संरचना। संवहन एधा एवं उसके कार्य। तने में द्वितीयक वृद्धि, वलय की विशेषताएं, : रसदारू एवं कठोरदारू। द्वितीयक फ्लोएम, कार्क केम्बियम एवं परिचर्म। तने में असामान्य वृद्धि – निक्टेन्थस, बोरहाविया, एकाइरेन्थस, लेप्टाडीनिया, साल्वाडोरा, बिग्नोनिया, ड्रेसीना।
Unit-III	**The Leaf System:** Origin and development of leaf. Diversity in size, shape and arrangement. Internal structure of Dicot and Monocot leaf. Adaptations to photosynthesis and water stress, senescence and abscission. **पर्ण तंत्र :** पर्ण की उत्पत्ति एवं विकास, प्रमाप, आकार एवं विन्यास में विविधताएं, एकबीजपत्री एवं द्विबीजपत्री पर्ण की आंतरिक संरचना, प्रकाश संश्लेषण एवं जलीय प्रतिबल का अनुकूलन जीर्णता एवं विलगन।

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Unit-IV	**Embryology :** Concept of flower as a modified shoot. Structure of Anther, Microsporogenesis and Male Gametophyte. Structure of Pistil, Ovules, Megasporogenesis and Development of Female Geametophyte (Embryo Sac) and its types. Pollination – Mechanism and Agencies of Pollination, Pollen Pistil interactions and Self incompatibility. **भ्रूणिकी :** पुष्प एक रूपांतरित प्ररोह की अवधारणा। परागकोष की संरचना लघुबीजाणुजनन एवं नर युग्मकोद्भिद्। स्त्रीकेसर की संरचना, बीजाण्ड, गुरूबीजाणुजनन, मादा युग्मकोद्भिद् का विकास (भ्रूण कोष) एवं प्रकार। परागण–परागण की प्रक्रिया एवं एजेन्सी, पराग स्त्रीकेसर की पाररपरिक क्रिया एवं स्वअनिषेच्यता।
Unit-V	**Embryology :** Double Fertilization and triple fusion. Development and types of endosperm and its morphological nature, Development of Embryo in Monocot and Dicot plants, Fruit development and maturation, seed structure and dispersal. Mode of Vegetative Propagation. **भ्रूणिंकी :** द्विनिषेचन एवं त्रिसंयोजन। भ्रूणपोष का विकास, प्रकार एवं इसकी आकारिकीय प्रकृति। एकबीजपत्रीय और द्विबीजपत्रीय पौधों में भ्रूण का विकास। फल का परिवर्धन एवं परिपक्वता, बीज की संरचना एवं प्रकीर्णन। कायिक प्रवर्धन के प्रकार।

SUGGESTED READINGS :-

- Gangulee, H.C., Das, K.S. And Dutta, C. 2007 College Botany Voll. I, New Central Book Agency (P) Ltd. Kolkata, 70000
- Heywood, V.H. & Moore, D.M. (eds) 1984. Current Concepts in Plant Taxonomy. Academic press, London.
- Jones, S.B. Jr. And Luchisnger, A.E. 1986, Plant Taxonomy (III edition) Mc Graw Hill Book Co. New York.
- Maheshwari, P. 1978. Plant Embryology. Pandey, B.P. 2010. A Text book of Botany-Angiosperms, S. Chand & & Company Ltd. Ramnager, new Delhi-110055.
- Radford, A.E. 1986. Fundamentals of Plant Systematics, Harper and Row, New York.
- Shrivastava and Das, Modern text book of botnay vol.III & IV.
- Singh, V., Pande P.C. and Jain, D.K. Structure & Development in Angiosperms. Rastogi Publication, Meerut.

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Department of Higher Education, Govt. of M.P.
Under Graduate Annual Pattern Syllabus
As recommended by Central Board of Studies and approved by the Governor of M.P.

उच्च शिक्षा विभाग म0प्र0 शासन
स्नातक कक्षाओं के लिए वार्षिक पद्धति अनुसार पाठ्यक्रम
केन्द्रीय अध्ययन मण्डल द्वारा अनुशंसित तथा म0प्र0 के राज्यपाल द्वारा अनुमोदित
सत्र 2018–19

Class / कक्षा	:	B.Sc. द्वितीय वर्ष
Paper / प्रश्न पत्र	:	Second/द्वितीय
Subject / विषय	:	Botany
Title of Subject Group	:	Plant Ecology, Biodiversity and Phytogeoraphy
विषय समूह का शीर्षक	:	पादप पारिस्थितिकी, जैव विविधता एवं पादप भौगोलिकी
Compulsory / अनिवार्य	:	Compulsory
Max. Marks अधिकतम	:	40 +10= 50

Particulars/विवरण

Unit-I	**Ecosystems :** Structure and types, Biotic and Abiotic components, Trophic levels, Food Chain, Food Web, Ecological Pyramids, Energy Flow, Concept of Biogeochemical Cycles: Gaseous Liquid and Sedimentary cycles: Carbon, Nitrogen, Water, Phosphorus and Sulphur cycle. **पारिस्थितिक तंत्र :** संरचना एवं प्रकार जैविक एवं अजैविक घटक, पोषण स्तर, खाद्यश्रृखला खाद्यजाल, पारिस्थितिक पिरामिड, ऊर्जा प्रवाह। जैव भू–रासायनिक चक्रः अवधारणा, गैसीय, द्रव तथा अवसादीय चक्रः कार्बन, नाइट्रोजन, जल, फासफोरस एवं सल्फर चक्र।
Unit-II	**Ecological adapations :** Morphological, Anatomical and physiological responses water adaptation (Hydrophytes and Xerophytes) Temperature adaptation (Thermoperiodism and Vernalization), Light adaptation (Heliophytes and Sciophytes), Photoperiodism, Plant Succession: causes, trends and processes, Types of succession – Hydrosere and Xerosere. **पारिस्थितिक अनुकूलन :** आकारिकी, आंतरिकी तथा कार्यिकी अनुक्रिया, जल अनुकूलन (जलोद्भिद् तथा मरूद्भिद), तापक्रम अनुकूलन (तापकालिता एवं वसतीकरण) प्रकाश अनुकूलन (प्रकाशरागी तथा छायारागी) प्रकाश दीप्तीकालिता। पादप अनुक्रमण : कारण, प्रवृत्ति एवं प्रक्रिया, अनुक्रमण के प्रकार हाइड्रोसियर (जलीय अनुक्रमण) जीरोसियर, (शुष्क अनुक्रमण)
Unit-III	**Biodiversity & Poputation Ecology :** Distribution patterns, Density, Natality, Mortality, Growth curves, Ecotypes and Ecads : Community Ecology: Frequency, Density, Abundance, Cover and Life forms. Biodiversity : Basic concept, definition, Importance, Biodiversity of India. Hotspots, in situ and ex-situ conservation. Biosphere reserves, Sancturies and National parks of Madhya Pradesh. Endangered and Threatened species, red data book. **जैवविविधता एवं जनसंख्या पारिस्थितिकी :** वितरण प्रणाली, घनत्व, जन्मदर, मृत्युदर, वृद्धिवक्र, इकोटाइप एवं इक्रेड्स, समुदाय पारिस्थतिकी : आवृत्ति, घनत्व, बहुलता, आच्छादन एवं जीवनरूप। जैवविविधता–आधारभूत परिकल्पना, परिभाषा, महत्व, भारत की जैवविविधता, तप्तस्थल, स्वस्थाने तथा बाह्य स्थाने संरक्षण। जैव मण्डल संचयत, म0प्र0 के अभयारण एवं राष्ट्रीय उद्यान, विलुप्तप्राय तथा खतरे में पड़ी प्रजातियॉं, रेड डाटाबुक।

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18/8/18 P. Kulshreshtha 18/8/18

Unit-IV	**Soil & Pollution :** Physical and chemical properties, soil formation, Development of Soil Profile, Soil classification, Soil composition, soil factors; Pollution: Definition, Types & Causes; Global Warming, Acid Rain, Climate Change and Ozone Layer & Ozone Hole. **मृदा एवं प्रदूषण :** भौतिक एवं रासायनिक गुण मृदा निर्माण, मृदा परिच्छेदिका का विकास, मृदा का वर्गीकरण, मृदा संगठन मृदा कारक। प्रदूषणः परिभाषा प्रकार एवं कारण, वैश्विक तपन, अम्लीय वर्षा जलवायु परिवर्तन, ओजन परत एवं ओजोन छिद्र।
Unit-V	**Phytogeography :** Phytogeographical regions of India. Vegetation types of Madhya Pradesh. Natural resources: definition and classification. Conservation and management of natural resources, Land resource management, Water and wet land resource management. **पादप भौगोलिकी :** भारत के पादप भौगोलिक क्षेत्र। म0प्र0 के वानस्पतिक प्रकार। प्राकृतिक स्त्रोत–परिभाषा एवं वर्गीकरण, सरक्षण एवं प्रवंधन। भू–स्रोत प्रवंधन। जल एवं आर्द्रभूमि स्त्रोत प्रवंधन।

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SUGGESTED READINGS : -

1. Benerjee., S. 1998. Bio Diversity conservation – Agrobotamica, Bikaner.
2. Kumar, U.K. 2006. Bio diversity principles and conservation, A grobios, Jodhpur.
3. Odum, E.P. 5th ed. 2004 Fundamentals of Ecology, Natraj Publisher, Dehradun.
4. Puri, G.S. 1960. Indian Forest Ecology.
5. Sharma. P.D. 7th ed. 1998. Ecology and Environment, Rastogi Publication, Shivaji Road, Meerut. 250002. India
6. Shukla, R.S. & Chandel, P.S. 2006. A Text Book of Plant Ecology.

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PRACTICAL SCHEME

B.sc. II Year (BOTANY)

(BASED ON PAPER I & II)

50 MARKS

1.	Section Cutting-Root/Stem/Leaf	-	10
2.	Embryology – Anther/Ovule/Placentation	-	05
3.	Exercise based on Ecology	-	10
4.	Exercise based on Phytogeography/National Parks	-	05
5.	Spotting (01-05)	-	10
6.	Viva voce	-	05
7.	Sessionals	-	05

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शासकीय कमलाराजा कन्या स्नातकोत्तर स्वशासी महाविद्यालय ग्वालियर (म.प्र.)
उच्च शिक्षा विभाग म.प्र. शासन
स्नातक स्तर पर सेमेस्टर पद्धति के अन्तर्गत एकल प्रश्न पत्र प्रणाली अनुसार पाठयक्रम
केन्द्रीय अध्ययन मण्डल द्वारा अनुशंसित तथा म.प्र. के महामहिम राज्यपाल द्वारा अनुमोदित

Department of Higher Education, Govt. of M.P.
Single Paper Pattern Syllabus for U.G. Classes Under Semester System
As recommended by Central Board of Studies and approved by the Governor of M.P.
Effective from Session 2017 -18 - 19

Class / कक्षा	: **B. Sc.**
Semester / सेमेस्टर	: **V Semester**
Subject / विषय	: **Botany**
Title of Subject Group	: **PLANT PHYSIOLOGYAND BIOCHEMISTRY**
विषय समूह का शीर्षक	: पादप कार्यिकी एवं जैव रसायन
Max. Marks अधिकतम अंक	: 85+15 CCE =100

Particulars / विवरण

Unit-1	**Plant Water Relations:** Properties of water, Importance of water in plant life, Diffusion, Osmosis & Osmotic relation to plant cell. Water Absorption, Ascent of Sap. Transpiration: Structure & Physiology of Stomata, Mechanism of Transpiration, Factors affecting the rate of transpiration. **पादप जल संबंध** : जल के गुण, पादप जीवन में जल का महत्व, विसरण, परासरण तथा पादप कोशिका के परासरण संबंध, जल अवशोषण, रसारोहण। वाष्पोत्सर्जन : रंध्र की संरचना एवं कार्यिकी, वाष्पोत्सर्जन की क्रियाविधि, वाष्पोत्सर्जन को प्रभावित करने वाले कारक।
Unit-2	**Plant Nutrition:** Mineral nutrition, Hydroponics, Absorption of mineral Nutrients, Translocation of organic solutes. **Biomolecules:** Structure Classification and functions of Carbohydrates, Amino Acids, Proteins and Lipids. **पादप पोषण:** खनिज पोषण, जल संवर्धन, खनिज लवणों का अवशोषण, कार्बनिक विलेय का स्थानांनतरण, जैविक अणु: कार्बोहाइड्रेट , अमीनो अम्ल, प्रोटीन और लिपिड की संरचना, वर्गीकरण और कार्य।

Unit-3	**Photosynthesis:** Chloroplast, Photosynthetic pigments, Red drop, Emerson' effect, Concept of two Photosystems, Light reaction, Dark reaction – Calvin cycle, Hatch & Slack cycle, CAM cycle, Factors affecting rate of photosynthesis & Photorespiration. **प्रकाश संश्लेषण** : क्लोरोप्लास्ट, प्रकाश संश्लेषीय वर्णक, रेड ड्राप तथा इमरसन प्रभाव, दो प्रकाश तंत्र की अवधारणा, प्रकाश अभिक्रिया, अंधकार अभिक्रिया, केलविन चक्र, हेच एवं स्लेक चक्र, सी ए एम चक्र, प्रकाश संश्लेषण को प्रभावित करने वाले कारक एवं प्रकाशीय श्वसन।
Unit-4	Respiration: Mitochondria, aerobic and anaerobic respiration, Respiratory coefficient, mechanism of respiration - Glycolysis, Kreb's cycle, Pentose Phosphate Pathway, Electron transport system, Factors affecting rate of respiration, Redox potential and theories of ATP synthesis. **श्वसन** : माइटोकॉन्ड्रिया, आक्सी एवं अनाक्सी श्वसन, श्वसन गुणांक , श्वसन की क्रियाविधि – ग्लाइकोलिसिस, क्रेब चक्र, पेन्टोस फास्फेट मार्ग, इलेक्ट्रान अभिगमन तंत्र, श्वसन की दर को प्रभावित करने वाले कारक, आक्सीकरण–अपचयन विभव, ए.टी.पी. संश्लेषण के सिद्धांत ।
Unit-5	**Enzymology:** Classification, nomenclature and characteristics of Enzymes, Concept of holoenzyme, apoenzyme, co-enzyme and co-factors. Mode & mechanism of enzyme action, Factors affecting enzyme activity. **Plant Harmones:** Discovery, Structure mode of action and role of Auxins, Gibberellins, Cytokinin ,Abscissic acid and Ethylene. **एंजाइमोलॉजी** : विकरो का वर्गीकरण, नामकरण एवं अभिलाक्षणिक गुण, होलोएन्जाइम, एपोएन्जाइम, कोएन्जाइम एवं कोफेक्टर्स की अवधारणा, एन्जाइम की कार्यप्रणाली एवं क्रियाविधि, एंजाइम क्रिया को प्रभावित करने वाले कारक पादप हार्मोन : आक्जिन, जिब्बरेलिन, सायटोकायनिन, एब्सीसिक अम्ल एवं इथीलीन की खोज , संरचना, कार्य प्रणाली एवं भूमिका।

SUGGESTED READINGS:-

- David, L. N. and Michael, M. C. 2000. Lehninger's Principle of Biochemistry, Macmillan worth Pub. New York, USA.
- Gangulee, H.C.,Das, K.S., Datta, C. and Sen, S. 2007. College Botany Voll.I, New Central Book Agency (P) Ltd. Kolkata, 700009.
- Hopkins, W.G. 1995. Introduction of Plant Physiology Pub. John wiley and Sons

शासकीय कमलाराजा कन्या स्नातकोत्तर स्वशासी महाविद्यालय ग्वालियर (म.प्र.)
उच्च शिक्षा विभाग म.प्र. शासन

स्नातक स्तर पर सेमेस्टर पद्धति के अन्तर्गत एकल प्रश्न पत्र प्रणाली अनुसार पाठ्यक्रम
केन्द्रीय अध्ययन मण्डल द्वारा अनुशंसित तथा म.प्र. के महामहिम राज्यपाल द्वारा अनुमोदित

Department of Higher Education, Govt. of M.P.
Single Paper Pattern Syllabus for U.G. Classes Under Semester System
As recommended by Central Board of Studies and approved by the Governor of M.P.
Effective from Session 2017 -18-19

Class / कक्षा	: **B. Sc.**
Semester / सेमेस्टर	: **VI Semester**
Subject / विषय	: **Botany**
Title of Subject Group विषय समूह का शीर्षक	:**Cell Biology,Genetics and Biotechnology** : कोशिका जैविकी, अनुवांशिकी एवं जैवप्रौद्योगिकी
Max. Marks अधिकतम अंक	: 85+15 CCE =100

Particulars / विवरण

Unit-1	**The cell envelops and cell organelles :** plasma membrane, lipid bilayer structure, functions of the cell wall. Structure and function of cell organelles Nucleus Chloroplast, Mitochondrion. Golgibodies, ER, Peroxisome and Vacuole. **कोशिका आवरण एवं कोशिकांग :** प्लाज्मा झिल्ली, द्विस्तरीय लिपिड संरचना कोशिका भित्ति के कार्य। कोशिकाअंगकों की संरचना एवं कार्य : केन्द्रक , हरित लवक, माइटोकॉण्ड्रिया, गॉल्जीकाय, अतःद्रव्यी जालिका, परऑक्सीसोम्स एवं रिक्तिकाएँ ।
Unit-2	**Chromosomal organization:** Structure and functions of Chromosome, centromere and telomere special types of chromosomes, Mitosis and Meiosis. Variations in chromosome structure : Deletion, Duplication ,Translocation and Inversion; Variation in chromosome number, Euploidy, Aneuploidy, DNA the genetic material, DNA structure and replication. Nucleosome model. **गुणसूत्र संगठन:** आकारिकी एवं कार्य सेन्ट्रोमियर एवं टीलोमियर। विशेष प्रकार के क्रोमोसोम्स, समसूत्री एवं अर्धसूत्री विभाजन। गुणसूत्र संरचना में विभिन्नताएँ : विलोपन, द्विगुणन, स्थानान्तरण एवं प्रतिलोमीकरण। गुणसूत्र

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	संख्या में विभिन्नताएँ। यूप्लायडी एन्यूप्लॉयडी। डी.एन.ए. : आनुवांशिक पदार्थ। डी.एन.ए. की संरचना एवं पुनरावृत्ति। न्यूक्लियोसोम माडल।
Unit-3	**Genetic inheritance:** Mendelism: laws of dominance, segregation and independent assortment; Linkage analysis; Interactions of genes. Cytoplasmic inheritance Mutations: spontaneous and induced: Transposable elements; DNA damage and repair. **आनुवांशिक वंशागति** : मेण्डलवाद : प्रभाविता, पृथ्क्करण एवं स्वतंत्र अपव्यूहन के नियम, सहलग्नता विश्लेषण , जीन की अनयोन्य क्रियाएँ। कोशिका द्रवीय वंशागति उत्परिवर्तन , प्राकृतिक, प्रेरित उत्परिवर्तन , स्थानान्तरणशील अवयव। डी.एन.ए. क्षति एवं सुधार।
Unit-4	**Gene:** Structure of gene, genetic code, transfer of genetic information; Transcription, translation, protein syntesis, tRNA, and ribosomes. Regulation of gene expression in prokaryotes and eukaryotes. **जीन:** जीन की संरचना, आनुवांशिक कोड , आनुवांशिक सूचना का स्थानान्तरण, अनुलेखन, अनुवाद, प्राटीन संश्लेषण, ट्रांसफर आर.एन.ए., राइबोसोम्स । प्रोकैरियोट्स एवं यूकैरियोट्स में जीन अभिव्यक्ति का नियमन।
Unit-5	**Biotechnology**: Functional definition; basic aspects of plant tissue culture; cellular totipotency, differentiation and morphogenesis biology of *Agrobacterium*; vectors for gene delivery and marker genes. Important achievements of biotechnology in agriculture. **Genetic engineering:** Tools and techniques of recombinant DNA technology; cloning vectors; genomic and cDNA library; transposable elements. Gene mapping and chromosome walking. **जैव प्रौद्योगिकी** : कार्यात्मक परिभाषा, पादप उतक संवर्धन के आधारभूत तत्व, कोशीय टोटीपोटेंसी, विभेदीकरण एवं मार्फोजेनेसिस, एग्रोबैक्टीरियम की जैविकी, जीन डिलिवरी के वाहक तथा मार्कर जीन, जैव प्रौद्योगिकी की कृषि में प्रमुख उपलब्धियॉ। **अनुवांशिक अभियांत्रिकी** : पुनर्योजक डी. एन. ए. तकनीकी के औजार एवं तकनीक, क्लोनल वाहक, जीनोमिक तथा सी.डी.एन.ए. लाइब्रेरी, ट्रान्सपोजेबल तत्व, जीन मैपिंग तथा गुणसूत्र वाकिंग ।

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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.
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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 sugarc
5. Ground nut : Tikka disease
6. Maize Smut

UNIT V :
Role of enzymes and toxins in Pathogenesis.

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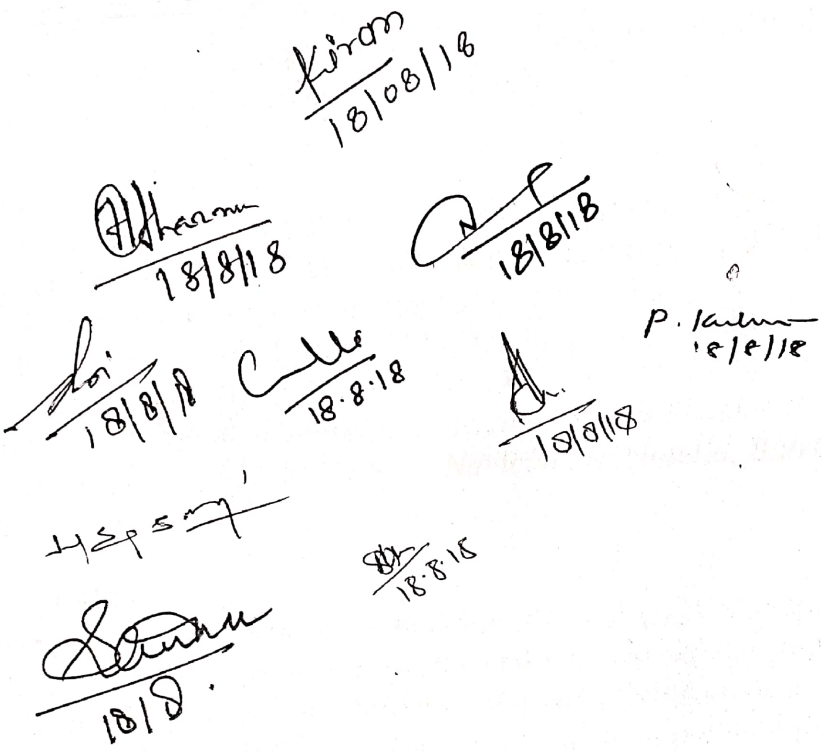
PRACTICAL 102 :

Study of the morphological characters and reproductive structures of the genera mentioned in the theory. Study of symptomatology of diseased species. Carbon and nitrogen utilization by fungi (in culture) vitamin requirement , staining techniques, induction and isolation of mutants.

1. Study of diseased specimens of plants with reference to symptomatology.
2. Isolation , purification and single spore culture of pathogens
3. Measurement of the activity of enzymes of fungal pathogens : Cellulose , Pectinases.
4. Laboratory testing of fungicides (systemic and non- systemic) against pathogenic fungi.
5. Demonstration of biological control of pathogenic fungi *in vitro*.



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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.

UNIT V:

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Unit - V

Experimental studies in Bryophytes
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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PRACTICALS 104 :

1. Study of morphology and anatomy of vegetative and reproductive tissues and organs using cleared whole mounts, dissections, sections, macerations and permanent preparations of living and fossil forms covered under theory.
2. Experiments on spore germination of prothallus, induction of sporophytes.
3. Preparation of models (Plasticine/ thermocol) to demonstrate stealer evolution.
4. Study of pteridophytes in their natural habitats.
5. Comparative study of the anatomy of vegetative and reproductive parts of *Ginkgo, Cedrus, Abies, Pices, Cupressus, Cryptomeria, Taxodium, Podocarpus, Cephalotaxus, Araucaria, Agathis, Taxus, Ephedra and Gnetum.*
6. Study of the important reproductive stages through specimens and permanent slides.
7. Preparation of models (Plasticine/ thermocol) to demonstrate the position and structure of microsporangia of *Cycas, Pinus, Taxus, Ephedra, Gnetum,* seed –scale complex in female cone of *Pinus,* embryo of *Pinus.*

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BOT 201: ECOLOGY-I CLIMATOLOGY, SOIL SCIENCE AND AUTECOLOGY

UNIT I

Definition, scope and concept of plant ecology.
History of ecology and relation of ecology with other disciplines. Principles of ecology.
Concept of environment, habitat and ecological niche.
The environment we live in.

UNIT II

Light and temperature as ecological factors.
Precipitation and Relative Humidity as ecological factors.
Measurement and analysis of light, temperature, precipitation and relative humidity.
Importance of water as an important factor on the life of plants.

UNIT III

Origin, development and formation of soil. Soil profile.
Classification of soil.
Effects of soil environment of plants.
Chief soil types of India.

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Unit-IV

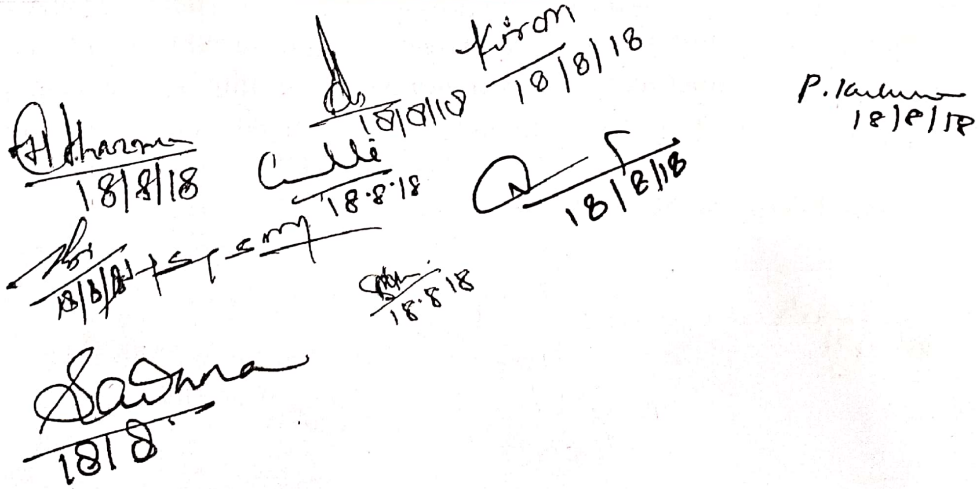
Biotic components of an ecosystem.
Interrelation of various organisms.
Population ecology, Natality, Mortality, Age distribution.
Concept of carrying capacity.

UNIT V

Morphological, anatomical and physiological relation of plants with their environment.
Plant indicators.
Ecotypic and Ecadic differentiation
Physical and physiological dryness.
Genecology

PRACTICALS 201

1. Study of physical and chemical characteristics of soil by rapid field test.
2. Determination of moisture constant of soil.
3. Determination of pH of water.
4. Determination of dissolved oxygen in water
5. Determination of following data.
a. Solar energy
b. Atmospheric temperature
c. Relative Humidity
6. Determination of soil profile.
7. Determination of soil texture, colour, consistence.
8. Determination of height of the tree.
9. Determination of light penetration under water by Sechii dish.



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BOT 202: ANGIOSPERM ANATOMY, EMBRYOLOGY AND PALYNOLOGY

UNIT I

Origin, growth, differentiation and ultra structure of cell and tissue, fine structure of plasmodesmata, microtubules, microfibrils and secondary structure.

Apical, lateral and intercalary meristems- their ultra structure and histochemistry, organogenesis. Ontogeny, phylogeny, ultra structure and function of primary and secondary xylem; wood anatomy. Ontogeny, phylogeny, ultra structure and function of primary and secondary phloem.

Structure variability in leaves, leaf histogenesis, leaf meristem, origin, development ultra structure of trichomes and stomata.

UNIT II

Nodal anatomy-nodal types and evolutionary consideration

Vascular cambium vs. cork cambium factors controlling their activity, periderm, lenticles, abscission, wound healing.

Anatomy of monocotyledons and dicotyledonous seed and fruits, seed appendages, their anatomy structure and function. Anatomy in relation to taxonomy.

Contemporary plant anatomy: current trends and prospects

UNIT III

Microsporangium- structure and function of wall layers, ultra structure change in tapetum and meiocytes during Microsporogenesis, role of tapetum, pollen development, anther culture and haploid plants. Pollen wall morphogenesis- microspore pollen mitosis; division of generative cell; pollen fertility and sterility; pollen storage viability and germination.

Megasporogensis, various types of embryosacs, their development and fertilization.

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Unit IV

Embryology and taxonomy; diagnostic embryological characters, primitive and advanced characters, comparative embryology of hybrids dysfunction of endosperm, arrested development of embryo.

UNIT V

Development and evolution of pollen types; stereo and ultrastructure of exine, apertures, furrow. Palynology and taxonomy.

Aerobiology and its application. Aeropalynology, methods of aerospora survey and analysis, pollen allergy and pollen calendars system approach for allergy.

Mellitopalyonolgy: general account Paleopalynolgy: role in coal and oilgenesis.

PRACTICALS 202:

1. Use of paraffin method of microtechnique .
2. Acquaintance with ultratomy: use of wood microtomy and common and anatomy and histochemical methods.
3. Learning techniques of making temporary and permanent microscopic preparation.
4. Knowledge and use of photomicrography in anatomical studies.
5. Knowledge and use of the principles and working of electron microscopes.
6. Learning to use simple experimental method in anatomical studies.
7. Laboratory work planned on the basis of topic listed under theory.
8. Preparation of dissected whole mount of endothecium, tapetum, ovule, endosperm and embryo, squash preparation of tapetum, microspore mother cell, dyads, tetrads, pollinia, massulae.
9. Study of seed appendages from dissection, structure of seed coat from section and macerations.

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BOT 203: WATER RELATIONS, GROWTH AND DEVELOPMENT

UNIT I
Water relations of plants: Unique physio-chemical properties of water, chemical potential , water potential. Apparent free space, bulk movement of water, soil plant atmosphere, contuum (SPAC), stomatal regulation of transpiration, hormonal and energy dependent hypothesis. Inorganic nutrition, physicochemical aspects of solute transport, diffusion and facilitated diffusion, passive and active transport. Nernst equation and Donnan's potential. Role of ATPase as a carrier, co-transport (symport) and counter transport (antiport). Ion channels, role of calmodulin Importance of foliar nutrition and use of chelates.

UNIT II
Photosynthesis: Energy pathway in photosynthesis, chloroplast as an energy transducing organelle. Composition and characterization of photo systems, I and II , electron flow through cyclic, non cyclic and pseudo cyclic photophosphorylation. Pathways of CO2 fixation. Differences between C3 and C4 fixation and different kinds of C4 pathways.

UNIT III
CAM pathway: Occurrence, biological events and adaptive advantage.
Photorespiration : Mechanism and regulation of photorespiration.
Introductory studies on water stress and its tolerance mechanisms.

UNIT IV
Enzymes: Classification, mode of action, Km value.
Industrial application, immobilized enzymes, their preparation and application.
Enzyme regulation : Competitive and non-competitive , allosteric enzymes

UNIT V
Chemical control of growth and morphogenesis.

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Hormonal effects on growth and development.
Bioassay of plant growth regulators and mode of action with reference to auxins.
Gibberellins, cytokinins, abscisic acid and ethylene.
Phytochrome: Chemistry and photo morphogenetic effects and role in flowering.
Genetic study of secondary metabolites such as alkaloids (only types of wide occurrence.)
Dormancy: Seed and bud dormancy; hormonal regulation.

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BOT 204: PLANT BIOCHEMISTRY AND METABOLISM

UNIT I
Carbohydrates: classification, occurrence and structure of monosaccharide, oligosaccharides, polysaccharides (starch, cellulose and pectin).
Proteins: Amino acid, structure and characteristics, peptides and protein structure, function of proteins Conjugate proteins, Account of Lactins their function.

UNIT II
Lipids: classification, occurrence, structure and importance of acryl lipids and phosphates. Concept of free energy and entropy, high energy compound, Gibb's free energy concept in biochemical reaction.
Synthesis of ATP through oxidative electron transfer chain, chemiosmotic regeneration of ATP.

UNIT III
Gluconeogenesis vs glycolysis
Biosynthesis of fatty acids.
Degradation of fatty acids.
Lipid as high energy molecules.
Role of Kreb's Cycle.

UNIT IV
Nitrogen fixation by free living and symbiotic organisms, mechanism of nitrogen fixation, soil nitrogen sources, nitrogen uptake by plants and assimilation.

UNIT V
Nitrate reductase system, substrate controlled induction, interrelation between photosynthesis and nitrogen metabolism.
Brief account of amino acid synthesis by reductive amination, GS-GOGAT system, transmission. Basic structure of important phenolics and alkaloids: a general view of their synthesis.

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PRACTICALS : 203 & 204

1. Determination of water potential in different tissues.
2. Estimation of the Hill reaction activity.
3. Estimation of total nitrogen by kjaldahl method.
4. Principles of colorimetry, spectrophotometry and fluorimetry.
5. Determination of chlorophyll-a chlorophyll-b, total chlorophyll (Arnon's method).
6. Determination of chlorophyll-a chlorophyll-b, ratio in C_3 and C_4 plants.
7. Estimation of titrable and total acidity.
8. Estimation of protein by Biuret and Lowry's method.
9. Estimation of seed germination as affected by red and Infrared radiation.
10. Determination of gibberellic acid by half seed (cereal) method. Demonstration of effects of auxin on abscission, cytokinin on senescence and abscissic acid on stomatal regulation.
11. Determination of carotenoids.
12. Radioisotope methodology, auto-radiography, rule pulse and double labeling, isotope dilution method. Instrumentation and principles of counters.
13. Extraction and estimation of starch.
14. Determination of reducing sugars in fruits.
15. Identification of different kinds of sugars (spot tests).
16. Estimation of amino acids by ninhydrin.
17. Identification of proline, sulphur-containing amino acids with aromatic ring (spot test).
18. Separation and identification of sugars by paper chromatography.
19. Determination of Isoelectric point of proteins.
20. Separation of soluble protein by gel electrophoresis.
21. Extraction of amylase and determination of its activity.
22. Determination of Km and Vmax of Amylase or phosphorylase

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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 2017-2019
M.Sc. Botany – III sem

BOT 301 : ANGIOSPERM , MORPHOLOGY AND TAXONOMY

UNIT I
General concept of morphology, origin and evolution of flower. Co-evolution of flower vis a vis pollinators.
Origin and evolution of polypetaly, sympetaly, apetaly : monocy, diocy. Monocot flower.

UNIT II
Stamens origin and evolution from foliar to reduced condition, extension of connective beyond anthers : monodi and poladelphy : nectaries and nectar.
Carpels evolution, conduplicate, involute and other types. Validity of the concept of foliar origin of carpel alternative concepts and approaches: specialized carpels : poly and syncarpy : superior, semi- inferior and inferior ovary: appendicular and receptaclar concepts: evolution of types of placenations.

UNIT III
Role of floral anatomy in interpreting the origin and evolution of a flower and floral parts. Floral anatomy and taxonomy.
Experimental study on flower.

UNIT IV
Botanical exploration – historical perspective , brief account of botanical exploration in south east Asia with special reference to India. Botanical survey of India. Its organization and role.
Principles of plant classification with emphasis on modern tools of taxonomy : molecular systematics. Utility of taxonomy : biosystematics.
Phylogenetic systems of classification : Cronquist ,Takhtajan AGP III

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UNIT V

Botanical nomenclature, ICNB, principles, articles, recommendation and amendments of code.

Familiarity with botanical literature , monographs, icons and floras, important periodicals with emphasis on Indian floristics methods of literature consultation.

Threat assessment , different categories of threat. IUCN, Red Data Book.

Important threatened plants of India.

PRACTICALS 301

1. Preparation of cleared whole mounts of floral parts of polypetalae, sympetalae and monocots for vasculature.
2. With the help hand section and dissection prepare longitudinal and transverse sections of flower. Examination of :
   a. Transmitting tissue/ canal in stigma and style
   b. Various types of ovaries and placentations
   c. Special types of flowers with emphasis on vasculature of androecium and gynoecium.
3. Preparation of models (plasticine/thermocol) of vascular skeleton of flower and placentation.
4. Any other laboratory work based on theory syllabus.
5. Description of specimen.
6. Description of species based on various specimens, collective exercise
7. Description of various species of a genus.
8. Location of key characters, use of keys at generic levels, after the description a collective exercise.
9. Location of key characters, use of keys at family levels.
10. Identification of diagnostic characters and use of key (provided) at level of various families after the description have been made.
11. Preparation of key (using specimens from three four species).

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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 2018-2019

M.Sc. Botany – III sem

BOT 302 : CYTOLOGY AND MOLECULAR BIOLOGY OF PLANTS

UNIT I

The plant cell: structure, organization , cell cycle mechanism and its molecular basis , cytokinesis.

Nuclear : Structure, nucleolus organization.

Generalized structure of plant cell organelles.

UNIT II

Chromosome : Structure, molecular basis of chromosome structure. Eukaryotic genome, organization, Prokaryotic genome organization, variations in chromosome and its significance.

UNIT III

DNA packaging of DNA, nucleosome, nuclear membranes. C –value paradox, cot curves , chemical structure , genetic code.

DNA replication in prokaryotes and eukaryotes.

Transcription , RNA splicing

Translation : Prokaryotic and Eukaryotic gene regulation (Operon concept).

UNIT IV

Meiosis origin and molecular events during meiosis.

Mitosis origin and molecular events during mitosis.

Chromosomal aberrations : Heteroploidy, structural changes in chromosomes.

UNIT V

Transposable elements and its molecular basis.

Membrane structure and function , ATPase sites.

Membrane transport with reference to transport protein.

Signal transduction on overview.

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PRACTICALS 302 :

1. Staining
2. Study of the microscope
3. Study of the size and shape of the cell
4. Staining and study of flagellum
5. Vital staining
6. Staining of mitochondria
7. Study of chloroplast
8. Cytoplasmic streaming
9. Study of mitosis by squash and smear.
10. Study of meiosis
11. Measurement of meiosis and chromosomes and comparison of their sizes.
12. Study of salivary gland and meiotic chromosome.
13. Study of chromosome aberration like ring, anaphase bridges etc.
14. Camera –lucida diagrams of chromosome.
15. Preparation of diagram
16. Study of ultra structure of various cell organelles from electron micrographs.
17. Collection , fixation and preparation of paraffin blocks of materials.
18. Microtomy and staining of the slides by various methods.

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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 2017-2019
M.Sc. Botany – III sem

BOT 303 : BIOMETRY , BIOINFORMATICS AND INETRUMENTATION

UNIT I

Measurement of central tendency : mean , median , mode and standard deviation.
Chi square test.
Analysis of variance (ANOVA)
Application of probability distribution : binomial and normal.

UNIT II

Test of significance.
Correlation and regression
Growth curve : exponential and logarithmic.
Principle of experimental design : randomization , Replication and local control.

UNIT III

A general idea of chromatographic techniques theories and applications
High performance liquid chromatography (HPLC) basic study.
Electrophoresis techniques and applications : basic study.
Centrifugation : general theory instrumentation and application.

UNIT IV

Microscopy : Light and electron microscopy
Spectrophotometry : a general study of instrumentation and application of colorimetry.
UV – visible Spectrophotometry NMR and ESR Spectrophotometry, Polarimetry.

UNIT V

Brief overview of information technology and science. Computerized database and DBMS.
Introduction of bioinformatics and sequence analysis.
BLAST and FASTA
Data types and database in molecular biology
Sequence databases and sequence alignment
All computer graphic and information retrieval

PRACTICALS!
Practicals related to theory topics will be conducted.

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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 2018-2019

M.Sc. Botany – III sem

BOT 304 : ECOLOGY – II SYNECOLOGY, ECOSYSTEMATOLOGY & PHYTOGEOGRAPHY

UNIT I
Concept and characteristics of plant community
Methods of studying vegetation
Raunkiers Life Forms
Biological spectrum
Seasonal aspect of vegetation

UNIT II
Plant succession .
Concept of climax and climax communities
Energy flow.
Trophic dynamics aspect of ecology
Food chain, food web, pyramid of number, biomass and energy.

UNIT III
System transfer function
Agroeecosystem.
Biologeochemical cycles.
Forest ecosystem.
Rangeland management.

UNIT IV
Vegetation types of India
Floristics regions of India.
Production and productity of various ecosystems.

UNIT V
Phytogeography as a border line science.
Principles of interpretation Phytogeograpl
Age and Area Hypothesis.
Discontinuous distribution , endemics and

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Satpura hypothesis.
Gates of angiospermy.

PRACTICALS 304 :

1. Determination of minimum size of quadrat by species area curve method.
2. Determination of minimum number of quadrat by species area curve method.
3. Determination of frequency of various species by quadrat method and preparation of frequency diagram.
4. Determination of density of quadrat method.
5. Determination of abundance of species by quadrat method.
6. Determination of relative frequency by quadrat method.
7. Determination of relative density by quadrat method.
8. Determination of basal area by quadrat method.
9. Determination of relative dominance by quadrat method.
10. Determination of IVI by quadrat method.
11. Determination of community coefficient of two sites by quadrat method.
12. Preparation of biological spectrum of a locality.

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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 2018-2019

M.Sc. Botany – IV sem

BOT 401: GENETICS, PLANT BREEDING AND EVOLUTION

UNIT I

A brief history, scope and significance of genetics.
Mendel's law of inheritance.
Lethality and Interaction of genes.
Quantitative inheritance: polygenic inheritance.
Nature and concept of chemical basis of heredity.

UNIT II

Multiple alleles.
Self sterility.
Linkage and its measurement.
Crossing over: theories of crossing over.
Mapping of genes on chromosomes.

UNIT III

Genetic recombination in bacteria: conjugation, transformation and transduction.
Cytoplasmic inheritance.
Mutations : types, methods of artificial induction, method of detection of mutants.
Biochemical genetics of *Neurospora*.

UNIT IV

Origin of life.
Mutation and evolution.
Genetics and evolution.
Genetic drift.
Speciation.

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UNIT V

Method of plant breeding, plant introduction, mass, pure line and clonal selection.
Aims and objectives of hybridization types: inter specific and intergeneric; back crossing.
Grafts hybrids, chimeras and bud spot.
Heterosis: theories and applications with reference to maize.
Plant breeding work done in India with reference to wheat and rice.

PRACTICAL 401:

1. Determination of probability of tossing for one coin.
2. Determination of probability for the throw of dice.
3. Determination of probability for tossing of two coins.
4. X^2 test as applied to the result of above three experiments.
5. Determination of size of the leaves on a specific size of two population of a species and calculation of standard deviation and standard error.
6. Permutation and combination.
7. Correlation analysis.
8. Determination of genotype from the data provided.
9. Determination of linkage values from the data provided and preparation of chromosome map.
10. Determination of various mendelian ratio by cheker board as well as by binomial equation.
11. Study of gene frequency in the populations.
12. Use of Anderson's scatter diagrams in the differentiation of the genetic population.
13. Emasculation of flower.
14. The working of the instruments used in various experiments must also explained./ At least 60% of the above mentioned exercises be performed and must be handed over to the external examiner who will select out the exercise to be distributed among at the time examination.

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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 2018-2019

M.Sc. Botany – IV sem

BOT 402: PLANT BIOTECHNOLOGY: IN VITRO CULTURE, GENETIC ENGINEERING AND IPR ISSUE

UNIT I

Concept and scope of Biotechnology.
Techniques of tissue culture, cell culture and organ culture.
Sterilization ,culture media.
In-vitro auxotrophs, disease resistance, salt and drought resistance, nutritional quality and herbicide resistance.

UNIT II

Micropropagation.
Production of haploids: anther culture and pollen culture
Somatic embryogenesis, somaclonal variation.
Protoplast culture: isolation, culture and fusion of protoplast.
IPR-general idea about patents. Copyright, trademark and geographical indication.

UNIT III

Biotransformation: production of useful compounds through cell culture; factors affecting yield: bioreactors.
Strategies of microbial strain improvement.
The recombinant DNA concept and principle of cloning.
Isolation and purification of DNA.

UNIT IV

Restriction endonuclease : properties and types.
Blotting southern, northern and western
Selection and screening of recombinant clone.
Cloning vehicles salient features: plasmid , cosmid & Tiplasmid.

UNIT V

Single stranded DNA viruses CaMV Lambda phage vectors M13 vectors.
Expression vectors.

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Cloning construction of genomic and DNA libraries
Application of r- DNA technology in plant improvement.

PRACTICAL 402:

1. Selection of salt tolerance / amino acid analogue resistance through cell culture.
2. Isolation and culture of protoplast.
3. Isolation and screening of industrially important microorganism.
4. Isolation of plant DNA, plasmid DNA, bacteriophage DNA.
5. Genetics colonization and tumour induction Agrobacterium Tiplasmid.
6. Restriction analysis and molecular weight DNA.
7. Sequencing and polymerase Chain Reaction.

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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 2017-2019
M.Sc. Botany – IV sem

ELECTIVE PAPERS (OPTIONAL)

BOT E01: INDUSTRIAL MICROBIOLOGY

UNIT I
Development and scope of Industrial Microbiology. Use of Fermentation equipments: Design and construction of fermenters, Batch and Continuous fermenters. Computer control of fermentation process. Characteristics of fermentation media, Raw materials (substrates).

UNIT II
Use of microorganisms in industries through ages.
Strategies for isolation and screening of industrially important microorganism.
Strategies for improvement of industrially important microbial strains.

UNIT III
Industrial product of vinegar.
Industrial product of citric acid.
Industrial product of antibiotics; penicillin and streptomycin.
Industrial product of amino acids; glutamic acid and lysine.

UNIT IV
Microbes as a source of Single Cell protein (SCP).
Mushrooms and food value of mushrooms.
Dairy product from microorganisms; butter, yogurt and cheese.
Hygine and safety in fermentation industries.

UNIT V
Biopesticides: bacterial, fungal and viral control of insect pests.
Biofertilizer: production and method of application.
Bioremediation

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PRACTICALS E01:

1. Isolation and identification of bacteria, yeast and fungi from bakeries and fermenters of distilleries.
2. Inoculation of fungi and bacteria on sterilized glucose and sucrose solutions and identification of the different types of amino acids and organic acids in filterate during different incubation periods. (Chromatography)
3. Isolation and identification of different types of fungi and bacteria from curd, rotten fruits and vegetables.
4. Collection of different types of mushrooms from local area/ region: inventory and analysis of their amino acid contents. (Chromatography)
5. Preparation of spawn for cultivation of edible mushrooms.
6. Observation of the antagonism of three antibiotics against common plant pathogens in Petri plates (disc methods).

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MAJOR ELECTIVE II

BOT 404: PLANT PATHOLOGY

UNIT I

The concept of Diseases in Plants; History of plant pathology
Parasitism and Disease developments : Parasitism and Pathogenecity, Development of Diseases in Plants : How Pathogens attack plants?
Factors influencing infection, colonization and development of symptoms

UNIT II

Effect of pathogens on plant pathological functions
Enzymes and toxins in relation to plant disease
Mechanism of resistance, Phytoalexins
Environmental effects on the development of infectious plant disease

UNIT III

Symptomatology, Etiology and control of the plant disease caused by fungi
Characteristics of Plant pathogenic fungi
Diseases caused by Omycetes
Diseases caused by Zygomycetes
Diseases caused by Ascomycetes & Fungi Imperfecti
Diseases caused by Basidiomycetes

UNIT IV

Symptomatology, Etiology and control of the plant disease caused by Bacteria.
Characteristics of Plant pathogenic Bacteria
Symptomatology, Etiology and control of the plant disease caused by Mollicutes
Pyhtoplasma and Spiroplasmas
Symptomatology, Etiology and control of the plant disease caused Nematodes

UNIT V

Symptomatology, Etiology and control of the plant disease caused by Viruses
Characteristics of Plant Viruses and Diseases caused by Viruses
Control – Management of plant diseases – General principles of plant quarantine :
Cultural, Biological, Physical and Chemical methods; Disease control by Immunizing or Improving Resistance of the Host
Integrated disease management

PRACTICALS

1. Preparation of different types of media: solid, liquid, synthetic, semi synthetic
2. Isolation of fungi from infected plant material and stored material
3. Identification of fungi, and micrometry
4. Pathogenesis: Koch's Postulates
5. Collection of diseases plants and preparation of Herbarium.
6. Pathological studies : study of morphological symptoms of host palnt
7. Section cutting of Infected parts of plants and preparation of slides
8. Isolation and identification of Plant pathogenic fumgi
9. Pathological studies of Viral diseases of plants
10. Pathological studies of Bacterial diseases of plant

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BOT E03: ETHNOBOTANY AND ISOLATION OF NATURAL PRODUCTS

UNIT I

Ethnobotany, its scope, interdisciplinary approaches.
Ethnic groups of India : major and minor tribes, life styles of ethnic tribes, conservation practices of biodiversity, taboos and totems.
World centers of Ethnobotany with special reference to India.

UNIT II

Role of Ethnobotany in national priorities, health care and development of cottage industries in India. History and principles of ayurveda, Homeopathy, Allopathy, Unani and Siddha system of medicines.
A general idea of active principles of plants and plant parts their extraction and preparation of medicines in different systems.

UNIT III

Scope and uses of essential oil from plants as perfumes, cosmetics and as flavoring agents. Preparation of perfumes from aromatic plants with special reference to the following Lemon grass, Palm-rosa, Mint, Lavender, Rose, Eucalyptus and Vetiver.

UNIT IV

Plants used in medicine with special reference to following.
Adhatoda vasica, Asparagus racemosus, Hollarhina antidysenterica, Tinospora cordifolia Terminalia arjuna, Terminalia bellerica, Terminalia chebula, Pterocarpus marsupium, Commiphora wightii.
Regional relevance and credibility of medicinal plants used by tribals of M. P.

UNIT V

Plants used in medicine with special reference to following.
Argemone mexicana, Boerhaavia diffusa, Eclipta prostrata, Psoralia coralifolia, Withania sominifera, Tylophora indica, Rauwolfia serpentina, Dioscorea deltoids.
Plants used in scarcity, emergency and as supplementary foods by tribals of India.

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PRACTICAL E03:

1. Visit to tribal area and study of plant material used tribals.
2. Identification and description of important plants of ethno botanical importance.
3. Identification of important aromatic plants of the locality.
4. Extraction of active ingredients of plant and plant parts.
5. Extraction of perfumes of aromatic plants.
6. Pharmacognostic method of identification of drugs.
7. Methods of preparation of Kwath, Churra, Ark, Saiva Asav.
8. Diseases of some common medicinal plant of the locality.
9. Identification and description of 10 plants used by tribal for household purpose.

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BOT E04: STRESS PHYSIOLOGY

UNIT I

Plants and water: Chemical and water potential gradients. Determination of water potential of plants and tissues by Chardakov's, pressure chamber and psychrometric methods. Diffusion, osmosis, absorption, and conduction of water . Tranpiration its role and measurement during water stress. Stomatal size, frequency and measurements of stomatal aperture, porometry, Mechanism of stomatal opening and closing. Physiological principles of dry land farming. Wilting coefficient, water use efficiency, stress - degree - day concept, plant water - stress index and their relationship to several plant physiological processes. Availability of soil water and determination of soil water potential.

UNIT II

C_4 photosynthesis as CO_2 concentrating mechanism and its comparison with C_3 fixation . Drought and drought tolerance mechanisms:

UNIT III

Antitranspirants : Different types, mode of action and their use in alleviation of water stress. Nitrogen fixation and drought. Effect of water stress on accumulation of proline and betaines and its possible role in osmotic adjustment under such conditions. Screening method for water stress tolerant varieties.

UNIT IV

Ultra structural consequences of drought
Elementary idea about chilling and temperature stresses.
Introductory idea about Ultra violet radiations stresses.

UNIT V

Salinity and plant growth. Mechanism of ion uptake,
Salt tolerance: Halophytes; physiological aspects of salt tolerance,
Screening methods for salt tolerant varieties.

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PRACTICALS E04

1. Estimation of free proline in leaves subjected to water stress.
2. Estimation of protein using Lowry's Method.
3. NR assay.
4. Determination of relative water content (RWC).
5. Determination of potassium and sodium using flame photometer.
6. To determine soil water potential using Tensiometer.
7. Determination of leaf water potential by using Chardakov's method.
8. Determination of water potential using pressure chamber.
9. Discussion on the working of colorimeter, flame photometer tensiometer and pressure chamber.
10. Separation of amino acid by TLC method.
11. Estimation of free sugars using anthrone method.

BOT EO6: AGROECOSYSTEM

UNIT I

Introduction and concept of agroecosystem.
Agroclimatic zones of India.
Various types of Indian field and plantation crops.
Various types of Indian commercial and horticultural crops.

UNIT II

Various agronomic practices, adapted in cropland ecosystem.
Weed control-normal, Mechanical and biological.
Insects and pests of cropland ecosystem-any five forms.
Green evolution.

UNIT III

Structure of biotic and abiotic community of a cropland ecosystem-a case study.
Herbicide degradation and accumulation in a cropland ecosystem.
Sink source relationship.

UNIT IV

Influence of irrigation cycling on cropland ecosystem.
Crop geometry.
Influence of mineral cycling on cropland ecosystem.
Phytoallelopathy in croplands.

UNIT V

Input-output ratio in agroecosystem.
Energy flow in a cropland ecosystem.
Biofertilizers.
Farm management.

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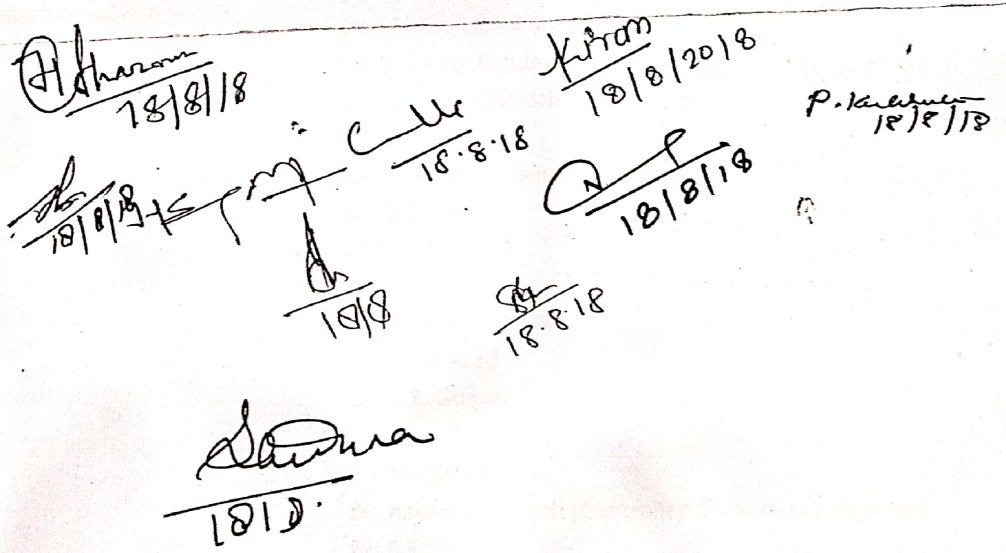
PRACTICALS E06:

1. To compare the density of a cropland with that of a natural ecosystem.
2. To compare the frequency of a cropland with that of a natural ecosystem.
3. To compare the Abundance of a cropland with that of a natural ecosystem
4. To compare the soil texture, colour and consistency of a cropland ecosystem with that of a natural ecosystem.
5. To compare a natural and cropland ecosystem by calculating community-coefficient.
6. To calculate and comment upon the following at three different levels of a cropland i.e. top of the crop, middle level of the crop and base of the crop.
    a. Solar intensity.
    b. Relative humidity.
    c. Atmosphere temperature.
7. To calculate the temperature of soil at two different depths i.e. 10cm. in cropland and compare it with a natural ecosystem.
8. To prepare a random design of an experiment to study the effects of three levels of fertilizer and three levels of irrigation in a cropland.
9. To determine the pH of cropland soil and compare with natural ecosystem.
10 To determine the nitrate, carbonate and base deficiency of a cropland soil and compare with natural ecosystem soil, using rapid test method.



Department of Botany, Govt. K.R.G. (P.G.) AUTO. College, Gwalior M.P.

List of Examiners- 2018-19

1. School of Studies in Botany , Jiwaji university , Gwalior
   - Dr. Avinash Tiwari
   - Dr. Mahendra Kumar Gupta
   - Dr. Shushil Mandalia
   - Dr. Sapan Patel

2. Govt Science College, Gwalior
   - Dr. H.O. Sharma
   - Dr. P.P. Deo
   - Dr. R.K. Khare
   - Dr. A.C. Raghuvanshi
   - Dr. D.P. Sharma
   - Dr. V.K. Sewariya

3. Govt. K.R.G. (P.G.) AUTO. College, Gwalior
   - Dr. B.M. Kulshrestha
   - Dr. Madhu Laxmi Sharma
   - Dr. Sadhana Pandey
   - Dr. Preeti Kulshrestha

4. Govt. V.R.G. College, Gwalior
   - Dr. G.D. Vyas
   - Smt. C.J. Mehta

5. Govt. S.L.P College, Gwalior
   - Dr. Deep Azad
   - Dr. B.B. Gupta

6. Govt. P.G. College, Morena
   - Dr. Rakesh Kushwah (Controller of exam J.U. Gwalior)
   - Dr. R.P. Singh
   - Dr. R.L. Shakhwar

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7. Govt. Girls College, Morena
   Dr. J.K. Mishra

8. Govt. P.G. College, Shivpuri
   Dr. S.H. Qureshi
   Dr. Manju Verma

9. Govt. M.J.S College, Bhind
   Dr. A.K. Shrivastava
   Dr. N.S. Rathore

10. Govt. P.G. College, Datia
    Dr. Seema Marget Singh
    Shri. S.K. Pandey
    Shri. Brajesh Kumar

11. Govt. P.G. College, Guna
    Dr. Archana Shrotriya

12. Govt. College, Arone
    Dr. Niranjan Shrotrya

13. Govt. P.G. College, Sheopurkalan
    Dr. Shubash Chandra

14. Govt. Nehru College, Ashoknagar
    Dr. Renu Rajesh

15. Govt. V.S. College, Dabra
    Dr. Vishal Kadam

16. Govt. College, Pichhore
    Dr. Keshav Singh

17. J.C. Mills College, Gwalior
    Dr. Preeti Barua

18. B.I.M.R. College, Gwalior
    Dr. Subhadra Prasad

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LIST OF EXAMINERS FROM OTHER UNIVERSITIES AND RETIRED PROFFESORS

1. Dr. R.K.S. Chauhan 203, Akkriti Apartment, Govindpuri, Gwalior
2. Dr. Shashi Chauhan 203, Akkriti Apartment, Govindpuri, Gwalior
3. Dr. J.P. Kaushik , Gandhi Nagar, Gwalior
4. Dr. Ashoke Jain , Balwant Nagar, Gwalior
5. Dr. Rekha Bhadoriya , Alakapuri, Gwalior
6. Dr. R.M. Agarawal, City Center , Gwalior
7. Dr. K.K. Kaul , Ramanuj Nagar, Gwalior
8. Dr. S.P. Vajpayi , Amity University, Gwalior
9. Dr. R.N. Chaturvedi, D18, Kushal Nagar, Gandhi Nagar, Gwalior
10. Dr. K.K. Dubey, Saraswasti Nagar, Uni. Road, Gwalior
11. Dr. S.K. Raina, Kaul Nursing Home, Gwalior
12. Dr. N.P. Saxena, 164 Gyatri Vihar, Thatipur, Gwalior
13. Dr. B.C. Agrawal, Gwalior
14. Dr. P.Mehta, Sagar
15. Dr. Archana Mehta, Sagar
16. Dr. T.R. Sahu,Sagar
17. Dr. Deepak Vyas,Sagar
18. Dr. Ashoke Agrawal, Mathura
19. Dr. Alka Pandey, Govt. P.G. College, Betul
20. Dr. Akhilesh Pandey, Bhopal
21. Dr. Ranjana Verma, Bhopal
22. Dr. A.S. Yadav, Bhopal
23. Dr. Madhuri Modak, Bhopal
24. Dr. Amita Arjaria, Govt. College, Chhatarpur
25. Dr. P.K. Khare Govt. College, Chhatarpur
26. Dr. Surendra Singh, R.D. Uni. Jabalpur
27. Dr. Karuna Verma, R.D. Uni. Jabalpur
28. Dr. Anjana Sharma, R.D. Uni. Jabalpur
29. Dr. Divya Bagch, R.D. Uni. Jabalpur
30. Dr. Surendra Singh, B.H.U. Varanasi
31. Dr. Nath NBRI, Lucknow
32. Dr. R.L.S. Sikarwar, Chitrakot

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33. Dr. T.K. Sharma, B.B. College, Jhansi
34. Dr. Harish Vyas, Madhav Science College, Ujjain
35. Dr. Alaka Chaturvedi, R.T.M. Univerity, Nagpur
36. Dr. Veena Pani Dubey, Bilaspur
37. Dr. G.K. Shrivastava, Civil Lines, Datia
38. Dr. M.L. Khan – Sagar University

Proposal for workshop cum seminar

Level: National

Title: Environmental concerns: Green Living and Sustainable Development

Organized by

Department of Botany

Introduction:

Environment is a matter of concern for one and all. With this view in mind a workshop cum seminar is proposed for faculty members and scholars with regard to above mentioned topic.

Objectives:

The workshop cum seminar is proposed to create awareness for the environmental issues and protective measures.

Workshop cum seminar programme:

Different aspects of environment with reference to current scenario will be discussed for 10 days through lectures of resource persons, research papers, poster presentations and field visits.

Justification:

Through this workshop cum seminar we are trying our best to cope up the problems arising due to environmental pollution, urbanization, population explosion, adulterations, contamination and unjustified use of natural resources etc.

Eligible participants:

Faculty members and research scholars of different universities and colleges of allied streams.

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PROPOSAL FOR WORKSHOP

DEPT.OF BOTANY

TRAINING IN TOOLS AND TECHNIQUES IN BOTANY PRACTICALS

INTRODUCTION

There has been a general observation that the students undergraduate and post graduate classes face many difficulties in understanding of techniques during the performance of practicals. With this view in mind the present workshop is proposed to provide a better understanding and knowledge about the techniques used in practical.

OBJECTIVE

The mentioned training to the students will be helpful in the better understanding and performance of practical.

WORKSHOP PROGRAMME

This will be one day workshop for B.Sc. and M.Sc. students.

JUSTIFICATION

To provide understanding of the techniques and solve problems and difficulties that comes during the performance of practical classes in laboratory.

ELIGIBLE PARTICIPANTS

Students of B.Sc. and M.Sc. from local colleges.

PROPOSAL FOR WORKSHOP IN MICROBIOLOGY PRACTICALS

TRAINING IN TOOLS AND TECHNIQUES IN MICROBIOLOGY

IN PRACTICALS

INTRODUCTION

There has been a general observation that the students post graduate classes face many difficulties in understanding of techniques during the performance of practical. With this view in mind the present workshop is proposed to provide a better understanding and knowledge about the techniques used in practical.

OBJECTIVE

The mentioned training to the students will be helpful in the better understanding and performance of practical.

WORKSHOP PROGRAMME

This will be one day workshop for B.Sc. and M.Sc. students.

JUSTIFICATION

To provide understanding of the techniques and solve problems and difficulties that comes during the performance of practical classes in laboratory.

ELIGIBLE PARTICIPANTS

Students of B.Sc. and M.Sc. from local colleges.

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PROPOSAL FOR EXTENSION LECTURES

DEPT.OF BOTANY

Total 8 extension lectures are proposed for P.G. students in session 2018-2019.

PROPOSAL FOR FIELD STUDIES/TOUR PROGRAM

DEPT.OF BOTANY

Two local Field studies are proposed for P.G. students in session 2018-2019.

One tour program is proposed for P.G. students in session 2018-2019 within M.P.

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PROPOSAL FOR LECTURES

DEPT.OF BOTANY

Theory lectures are proposed for P.G. students in session 2018-2019. These lectures will be given by M.Sc. /Net/Ph.D. qualified or by local college teachers.