

शासकीय कमला राजा कन्या स्नातकोत्तर स्वशासी महाविद्यालय,
ग्वालियर (मध्य प्रदेश)



वनस्पतिशास्त्र विषय के अध्ययनमंडल
द्वारा अनुमोदित वनस्पतिशास्त्र विषय के
स्नातक (2016-2019) एवं स्नातकोत्तर (2016-2018) पाठ्यक्रम

अनुमोदन अकादमिक सत्र
2016-2017

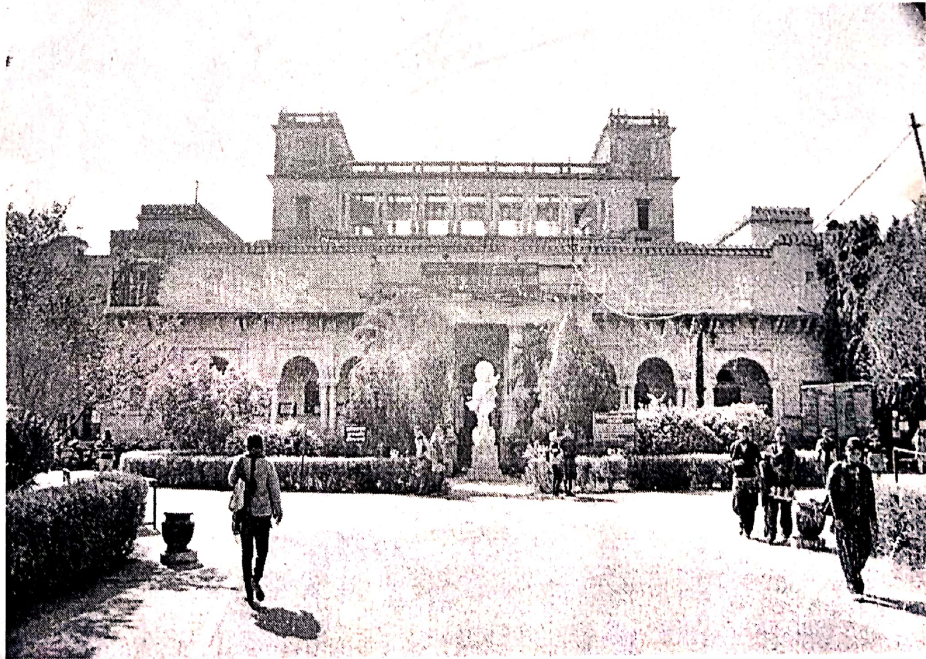
प्रस्तुतकर्ता

स्नातकोत्तर अध्ययन केन्द्र

वनस्पतिशास्त्र विभाग

प्राप्तकर्ता

अकादमिक प्रकोष्ठ



वेबसाइट : www.krgc.gwl.org ईमेल : krgc@rediffmail.com
दूरभाष : 0751 - 2625495, 0751 - 2438173, फ़ैक्स : 0751 - 2625495

5. यदि विभागा में स्ववित्तीय योजना के तहत कोई पाठ्यक्रम/अतिरिक्त विषय/डिप्लोमा कोर्स/सर्टिफिकेट कोर्स प्रारंभ करने की योजना हो तो उसका विवरण एवं अनुशंसा।

6. यदि अन्य कोई विषय हो तो उसका विवरण एवं अनुशंसा।

1. Field Excursion Trips for PG Students
 - (A) Local - One day trips = 03
 - (B) Outside Gwalior - 2/3 days trips = 02
2. U.G. Syllabus - Central Board, Bhopal में मध्य
3. P.G. Syllabus - J.U. Gwalior - मध्य
4. Training on Techniques in Botany for U.G. & P.G. Students - SI. मध्यप्रदेश शा. - आ.प्र. 2016 में
संलग्नित है।

हरिताक्षर अध्ययन मंडल अध्यक्ष एवं समस्त सदस्य

Dr. Jyoti
28.6.16

Dr. Jyoti
28.6.16.

Dr. Jyoti
28/6/16

Dr. Jyoti

P. Kulkarni

Dr. Jyoti

Dr. Jyoti

Dr. Jyoti

PROPOSAL FOR WORKSHOP

Dept. of Botany, Microbiology and Biotechnology

TITLE: TRAINING ON TECHNIQUES IN BOTANY PRACTICALS.

Introduction:

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

Objective:

The training given to the students will be very much helpful in the better performance of practicals.

Workshop Programme:

This will be a one-day workshop with the following programme

1. Registration of students
2. Inauguration
3. Technique of DNA isolation and separation of DNA by gel electrophoresis.
4. Practical exercise on angiosperm taxonomy.
5. Working and handling of apparatus and

instruments.
6. Validatory function.

Justification:

To provide understanding of the technique and solve problems and difficulties that come during the performance of practicals in laboratory

Eligible Participants:

Students of UG and PG classes from Botany, Microbiology and Biotechnology from local colleges.

AMJ
28.6.16
(Head, Deptt. of Botany)

Jhu
28.6.16
(Organizing Secretary)

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.

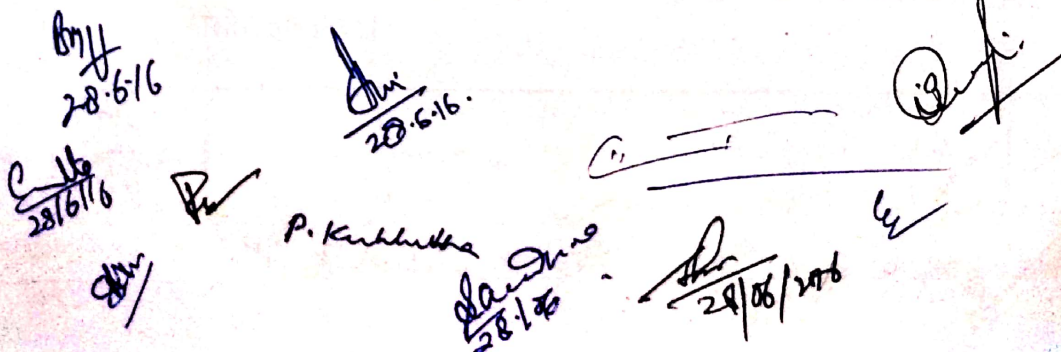
Syllabus for Degree (B.Sc.) course

Subject - BOTANY

Year - 2015 Onwards

Semester	Title of Paper	Maximum Marks	Year
B.Sc I	Diversity of Microbes and Cryptogams	85+15= 100	2014-15
B.Sc II	Diversity & Systematics of Seed Plants (Phanerogames)	85+15= 100	2014-15
B.Sc III	Structure, Development & Reproduction in Flowering Plants	85+15= 100	2015-16
B.Sc IV	Plant Ecology, Biodiversity and Phytogeography	85+15= 100	2015-16
B.Sc V	Plant Physiology and Biochemistry	85+15= 100	2016-17
B.Sc VI*	Cell Biology, Genetics and Biotechnology	85+15= 100	2016-17

* Job oriented Project/Internship will be carried out in VI Semester for 60 hrs as per policy of Department of Higher Education.



 B.M.J. 28-6/16
 P. K. Kulkarni 28-6-16
 C. K. Kulkarni 28/6/16
 P. K. Kulkarni
 P. K. Kulkarni 28/6/16
 P. K. Kulkarni 28/06/2016
 P. K. Kulkarni

शासकीय कमलाराजा कन्या स्नातकोत्तर स्वशासी महाविद्यालय ग्वालियर (म.प्र.)
उच्च शिक्षा विभाग म.प्र. शासन
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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 2016-17

Class / कक्षा : B. Sc.
Semester / सेमेस्टर : I Semester
Subject / विषय : Botany
Title of Subject Group : **DIVERSITY OF MICROBES AND
CRYPTOGAMS**
विषय समूह का शीर्षक : सूक्ष्मजीवियों एवं क्रिप्टोगेम्स में विविधता
Max. Marks अधिकतम अंक : 85+15 CCE =100

Particulars / विवरण

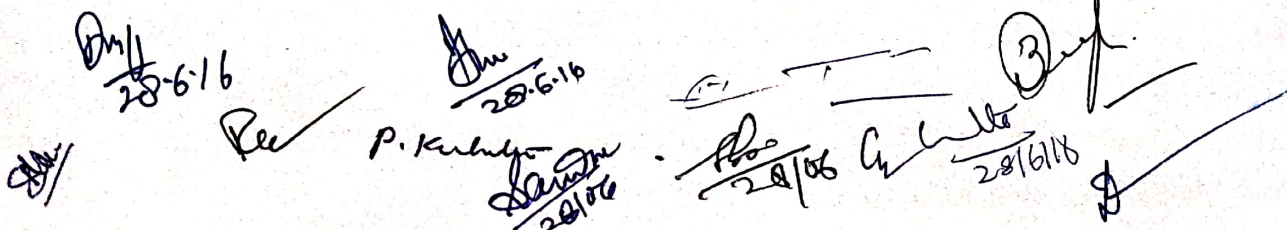
Unit-1	<p>Prokaryots: characteristics of Viruses, general account of TMV and T4 bacteriophage. Bacterial structure, nutrition, reproduction and economic importance; General account of Mycoplasma Cynobacteria and Actinomycetes.</p> <p>प्रोकैरियोट : विषाणुओं के सामान्य लक्षण, टी एम.वी विषाणु एवं टी फोर बैक्टीरियोफेज का सामान्य विवरण। जीवाणु की संरचना, पोषण, प्रजनन एवं आर्थिक महत्व, मायकोप्लाज्मा सायनो- बैक्टीरिया एवं एक्टिनोमाइसीटीज का सामान्य विवरण।</p>
Unit-2	<p>Algae : General characters, classification and economic importance. Important features and life history of Chlorophyceae- <i>Volvox</i>, <i>Oedogonium</i>, Charophyceae- <i>Chara</i> Xanthophyceae - <i>Vaucheria</i>, Phaeophyceae - <i>Ectocarpus</i>, Rhodophyceae - <i>Polysiphonia</i>.</p> <p>शैवाल : शैवालों के सामान्य लक्षण, वर्गीकरण एवं आर्थिक महत्व, मुख्य लक्षण, एवं जीवन चक्रक्लोरोफायसी - वॉल्वॉक्स, ऊडोगोनियम, कैरोफायसी-कारा, जैन्थोफायसी- वाउचेरिया: फियोफायसी - एक्टोकार्पस, रोडोफायसी- पोलीसाइफोनिया।</p>

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P. Kumar Jaiswal 28/6/16
28/6/2016
28/6/2016

<p>Unit-3</p>	<p>Fungi: General characters, classification and economic importance, Important features and life history of Mastigomycotina- <i>Phytophthora</i>, Zygomycotina <i>Mucor</i>, Ascomycotina : <i>Aspergillus</i>, <i>Peziza</i>, Basidiomycotina - <i>Puccinia</i>, Deuteromycotina <i>Cercospora</i>. General account of Lichens.</p> <p>कवकों के सामान्य लक्षण एवं वर्गीकरण एवं आर्थिक महत्व। प्रमुख लक्षणों एवं जीवन इतिहास का अध्ययन, मेस्टोगोमायकोटिना-फायटोपथोरा, जायगोमायकोटिना-म्यूकर। एस्कोमायकोटिना - एस्परजिलस, पेजाइजा, बेसिडियोमायकोटिना, पक्सीनिया, ड्यूटेरोमायकोटिना: सर्कोस्पोरा, लाइकेन्स का सामान्य विवरण।</p>
<p>Unit-4</p>	<p>Bryophyta : Classification, study of morphology, anatomy, reproduction of Hepaticopsida : <i>Riccia</i>, <i>Marchantia</i> ; Anthocerotopsida: <i>Anthoceros</i>, Bryopsida: <i>Polytrichum</i></p> <p>ब्रायोफाइटा : बाह्य आकारिकी, आंतरिक संरचना एवं प्रजनन : हेपेटिकोप्सिडा -रिक्सिया मारकेन्शिया, एन्थोसिरोटोप्सिडा-एन्थोसिरोस: ब्रायोप्सिडा-पॉलीट्राइकम</p>
<p>Unit-5</p>	<p>Pteridophyta : Important characters and classification. Stelar organization. Morphology and anatomy of <i>Rhynia</i>. Structure, anatomy and reproduction in <i>Lycopodium</i>, <i>Selaginella</i>, <i>Equisetum</i> and <i>Marsilea</i>.</p> <p>टोरिडोफाइटा : प्रमुख लक्षण एवं वर्गीकरण। स्टीलर संगठन, राहिनिया की बाह्य एवं आंतरिक संरचना। लाइकोपोडियम, सिलेजिनेला, इक्वीसिटम एवं मारसीलिया की बाह्य तथा आंतरिक संरचना एवं प्रजनन।</p>

Suggested Books :

1. G.M. Smith 1971 Cryptogamic Botany. Vol - I Algae & Fungi Tata McGraw Hill Pub. Co. New Delhi.
2. G.M. Smith 1971 Cryptogamic Botany. Vol -II Bryophytes & Pteridophytes. Tata McGraw Hill Pub. Co. New Delhi.
3. O.P.Sharma,1992. Text book of Thallophyta McGraw Hill Pub. Co.
4. O.P.Sharma,1990. Text book of Pteridophyta McMillan india Ltd .
5. P.D.Sharma 1991. The Fungi. rastogi & Co. Meerut.
6. H.C. Dubey.1990. an introduction of Fungi.Vikas Pub. house pvt.ltd.
7. P.Puri 1980. Bryophyta Atma ram & Sons, Delhi.
8. A.Clifton.1958. Introduction to the Bacteria. McGraw Hillpub. Co.New delhi.



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Practical

Objectives :

- i) To develop the skills of staining and observation of lower organism.
- ii) To impart the skills of temporary and permanent slide preparations.
- iii) To enhance ability to identify the lower organisms using microscope.
- iv) To familiarize the students with diseases and their causative agents.

Scheme of practical examination Semester I

Time: 4 hrs

Marks: 50

Algae / Fungi	05
Bryophyta	10
Pteridophyta	10
Plant disease	05
Spotting (1-5)	10
Viva	05
Sessional	05
Total :	50

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	<p>Hutchinson, Modern trends in Taxonomy.</p> <p>वर्गीकी : आवृतबीजियों का उद्गम एवं विकास। पौधों के वानास्पतिक विवरण की शब्दावली वानस्पतिक नामकरण के सिद्धांत एवं नियम, हरबेरियम एवं वानस्पतिक उद्यान; आवृतबीजियों का वर्गीकरण; बेन्थम तथा हुकर एवं हचिन्सन, वर्गीकी में आधुनिक प्रवृत्तियाँ।</p>
Unit-4	<p>Taxonomy: Diagnostic characteristics and Economic Importance of Families – Ranunculaceae, Brassicaceae, Malvaceae, Rutaceae, Fabaceae, and Apiaceae.</p> <p>वर्गीकी : रेननकुलेसी, ब्रेसीकेसी, मालवेसी, रूटेसी, फेबेसी एवं एपिएसी कुलों के विशिष्ट लक्षण एवं आर्थिक महत्व।</p>
Unit-5	<p>Taxonomy: Diagnostic characteristics & Economic Importance of Families – Asteraceae, Asclepiadaceae, Solanaceae, Lamiaceae, Euphorbiaceae, Liliaceae and Poaceae.</p> <p>वर्गीकी : ऐस्टेरेसी, एस्कलेपिएडेसी, सोलेनेसी, लेमिएसी, यूफोरबिएसी, लिलिएसी एवं पोएसी कुलों के विशिष्ट लक्षण एवं आर्थिक महत्व।</p>

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 of 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. 1982. An Introduction of plant taxonomy. Cambridge University Press Cambridge, London.
- Jones, S.B. Jr. and Luchsinger, A.E. 1986. Plant Systematic. Mc Graw Hill Book Co. New York.
- Kaushik, M.P. 2003. Modern Textbook of Botany, Prakash Publication Muzaffar 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. Ramnagar, 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 : Theory and Practice. Oxford and IBH Pvt. Ltd. New Delhi.
- Vasishta, P.C. 2005. Botany for degree students Voll. V, Gymnosperms. S. Chand & Company Ltd. Ramnagar, New Delhi- 110055.

Practical

Objectives

- To develop the skills of section cutting and double staining of vascular plants.
- To familiarize the students with technical terms and methods of describing the plant.
- To impart the skills for identification of plant and assigning to its family.
- To provide the field experiences for Identification of different plants of the families given in the syllabus.

Scheme of Practical Examination Semester II

Time: 4 hrs

Marks- 50

1. Gymnosperms

10

Exercise based on Morphological and Anatomical study of *Cycas*, *Pinus*, and *Ephedra*.

2. Angiosperms

10

3. Technical description of common flowering plant and its identification up to family level identification of inflorescence and flower types.

5

4. Spotting (1-5)

10

5. Viva- voce

5

6. Sessional

10

Total :

50

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Department of Higher Education, Govt. of M.P.
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Effective from Session 2016 -17

Class / कक्षा : B. Sc.
Semester / सेमेस्टर : III Semester
Subject / विषय : Botany
Title of Subject Group : **STRUCTURE, DEVELOPMENT & REPRODUCTION IN FLOWERING PLANTS**
विषय समूह का शीर्षक : पुष्पीय पौधों की संरचना, विकास एवं प्रजनन
Max. Marks अधिकतम अंक : 85+15 CCE =100

Particulars /विवरण

Unit-1	<p>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. Morphological modification of root for storage, respiration and reproduction. Interaction of root with microbes.</p> <p>जड़ तंत्र : जड़ का शीर्ष विभज्योतक, प्राथमिक एवं द्वितीयक ऊतकों का विभेदन एवं उनके कार्य, एकबीजपत्री एवं द्विवीजपत्री जड़ की आन्तरिक संरचना, जड़ में द्वितीयक वृद्धि के आकारिकीय रूपान्तरण : संचयन, श्वसन एवं प्रजनन। सूक्ष्मजीवों के साथ जड़ की पारस्परिक क्रिया।</p>
Unit-2	<p>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.</p> <p>प्ररोह तंत्र : प्ररोह शीर्षस्थ विभज्योतक एवं ऊतकीय संगठन, एकबीजपत्री एवं द्विवीजपत्री के तने की आन्तरिक संरचना, - संवहन एधा एवं उसके कार्य तने में द्वितीयक वृद्धि: वलय की विशेषताएं, : रसदारु एवं कठोरदारु द्वितीयक</p>

Handwritten signatures and dates: 28-6-16, P. Kishan, 28/6/2016, 28/6/2016, 28/6/2016, 28/6/2016

	प्लोएम, कार्क कैम्बियम एवं परिचर्म।
Unit-3	<p>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.</p> <p>पत्ती तंत्र : उत्पत्ति एवं विकास, प्रमाप, आकार एवं विन्यास में विविधताएं, एकबीजपत्री एवं द्विबीजपत्री पर्ण की आंतरिक संरचना, प्रकाश संश्लेषण एवं जलीय प्रतिबल का अनुकुलन, जीर्णता एवं विलगन।</p>
Unit-4	<p>Embryology: Concept of flower as a modified shoot. Structure of Anther, Microsporogenesis and Male Gametophyte. Structure of Pistil, Ovules, Megasporogenesis and Development of Female Gametophyte (Embryo Sac) and its types. Pollination – Mechanism and Agencies of Pollination, Pollen Pistil interactions and Self incompatibility.</p> <p>भ्रूणिकी : पुष्प एक रूपांतरित प्ररोह की अवधारणा। परागकोश की संरचना, लघुबीजाणुजनन एवं नर युग्मकोदभिद्। स्त्रीकेसर की संरचना, बीजाण्ड, गुरुबीजाणुजनन, मादा युग्मकोदभिद् का विकास (भ्रूण कोश) एवं प्रकार। परागण – परागण की प्रक्रिया एवं एजेन्सी, पराग स्त्रीकेसर की पारस्परिक क्रिया एवं स्व अनिषेच्यता।</p>
Unit-5	<p>Embryology: Double Fertilization and triple fusion. Development and types of endosperm and its morphological nature, Development of Embryo in Monocot and Dicot. Fruit development and maturation. Seed structure and dispersal. Mode of Vegetative Propagation.</p> <p>भ्रूणिकी : द्विनिषेचन एवं त्रिसंयोजन। भ्रूणपोश का विकास, प्रकार एवं इसकी आकारिकीय प्रकृति। एकबीजपत्रीय और द्विबीजपत्रीय भ्रूण का विकास। फल का परिवर्धन एवं परिपक्वता, बीज की संरचना एवं प्रकीर्णन। कायिक प्रवर्धन के प्रकार।</p>

SUGGESTED READINGS:-

- Gangulee, H.C., Das, K. S. And Dutta, C. 2007. College Botany Voll.I, New Central Book Agency (P) Ltd. Kolkata, 7000
- Hywood, V.H. & Moore, D.M. (eds) 1984. Current concepts in plant taxonomy. Academic press London.

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- Jones, S.B. Jr. and Luchsinger, 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. Ramnagar, New Delhi- 110055.
- Radford, A.E. 1986. Fundamentals of Plant Systematics, Harper and Row, New York.
- Shrivastava and Das. Modern text book of Botany Vol-III & IV.
- Singh, V., Pande P.C. and Jain, D. K. Structure & Development in Angiosperms. Rastogi Publication, Meerut.

Practical

Objectives

To provide knowledge about structure, development and reproduction in flowering plants.

- To provide skills of section cutting of angiosperms.
- To provide field experiences for studying sources of fire woods, timber yielding and medicinal plants.
- To familiarize the students with morphology and anatomy of flowers.
- To provide the knowledge of sexual reproduction.

Scheme of Practical Examination Semester III

Time: 4 hrs

Marks: 50

1- Exercise based on anatomy of root/stem.	10
2- Exercise based on anatomy of leaf.	10
3- Study of shoot apex/root apex/Ovules and Anthers .	5
4-Spotting- (1-5)	10
5-Viva- voce	5
6-Sessional	10
Total	50

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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 पाठ्यक्रम
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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 2016 -17

Class / कक्षा : B. Sc.
Semester / सेमेस्टर : IV Semester
Subject / विषय : Botany
Title of Subject Group : **PLANT ECOLOGY, BIODIVERSITY AND PHYTOGEOGRAPHY**
विषय समूह का शीर्षक : पादप पारिस्थितिकी, जैव विविधता एवं पादप भौगोलिकी
Max. Marks / अधिकतम अंक : 85+15 CCE =100

Particulars / विवरण

Unit-1	Ecosystems: Structure and types, Biotic and Abiotic components, Trophic levels, Food chain, Food web, Ecological pyramids, Energy flow; Biogeochemical cycles: Concept, Gaseous and Sedimentary cycles, Carbon, Nitrogen, Phosphorus and Sulphur cycle. पारिस्थितिक तंत्र : संरचना एवं प्रकार, जैविक एवं अजैविक घटक, पोषी स्तर, खाद्यश्रृंखला खाद्यजाल, पारिस्थितिक पिरामिड, ऊर्जा प्रवाह; जैवभू रासायनिक चक्र : अवधारणा, गैसीय तथा अवसादीय चक्र, कार्बन, नाइट्रोजन फास्फोरस चक्र।
Unit-2	Ecological adaptations: Morphological, Anatomical and Physiological responses Water adaptation (Hydrophytes and Xerophytes Temperature adaptation (Thermoperiodism and Vernalization), Light adaptation (Heliophytes and Sciophytes), Plant Succession: causes, trends and processes, Types of succession - Hydrosere and Xerosere. पारिस्थितिक अनुकूलन : आकारिकी, आंतरिकी तथा कार्यिकी अनुक्रिया, जल अनुकूलन (जलोदभिद तथा मरुदभिद), तापक्रम अनुकूलन(तापकालिता एवं वसंतीकरण) प्रकाश अनुकूलन (प्रकाशरागी तथा छायारागी) पादप अनुक्रमण :

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	कारण, प्रवृत्ति एवं प्रक्रिया, अनुक्रमण के प्रकार हाइड्रोसियर (जलीय अनुक्रमण) जीरोसियर, (शुष्क अनुक्रमण)
Unit-3	<p>Population 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, <i>in situ</i> and <i>ex situ</i> conservation. , Biosphere reserves, Sancturies and National parks of Madhya Pradesh. Endangered and Threatended species, red data book.</p> <p>जनसंख्या पारिस्थितिकी : वितरण प्रणाली, घनत्व, जन्मदर, मृत्युदर, वृद्धिवक्र, इकोटाइप एवं इकेड्स; समुदाय पारिस्थितिकी : आवृत्ति, घनत्व बहुलता, आच्छादन एवं जीवनरूप/जैवविविधता – आधारभूत परिकल्पना, परिभाषा, महत्व, भारत की जैवविविधता, तप्तस्थल स्वस्थाने तथा बाह्य स्थाने संरक्षण। जैव मण्डल संचयन, म.प्र. के अभयारण एवं राष्ट्रीय उद्यान, विलुप्तप्राय तथा खतरे में पड़ी प्रजातियाँ, रेड डाटाबुक।</p>
Unit-4	<p>Soil: Physico-chemical properties, Soil formation, Development of Soil Profile, Soil classification, Soil composition, Soil factors; Pollution: Definition, Types & Causes; Global warming, Climate change and Ozone hole.</p> <p>मृदा : भौतिक – रासायनिक गुण मृदा निर्माण, मृदा परिच्छेदिका का विकास, मृदा कारक मृदा का वर्गीकरण, मृदा संगठन प्रदूषण: परिभाषा, प्रकार एवं कारण; वैश्विक तपन, जलवायु परिवर्तन एवं ओजोन छिद्र।</p>
Unit-5	<p>Phytogeography: Phytogeographical regions of India, Vegetation types of Madhya Pradesh. Natural resources – definition and classification . Conservation and management of natural resources. Land resources management, Water and Wet land resource management.</p> <p>पादप भौगोलिकी : भारत के पादप भौगोलिक क्षेत्र, म.प्र. के वानस्पतिक प्रकार, प्राकृतिक स्रोत- प्राकृतिक स्रोतों की परिभाषा एवं वर्गीकरण, प्रबंधन एवं संरक्षण। भू – स्रोत प्रबंधन। जल आर्द्रभूमि स्रोत प्रबंधन।</p>

SUGGESTED READINGS:-

- Banerjee, S.1998. Bio diversity conservation- Agrobotamica, Bikaner.
- Kumar, U.K 2006. Bio diversity principles and conservation, Agrobios, Jodhpur.

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- Odum, E.P. 5Th ed. 2004 .Fundamentals of Ecology. Natraj Publisher, Dehradun.
- Puri, G.S. 1960. Indian Forest Ecology.
- Sharma, P.D. 7th ed. 1998.Ecology and Environment, Rastogi Publication, Shivaji Road. Meerut, 250002. India.
- Shukla, R. S. & Chandel, P.S. 2006. A Text book of Plant Ecology.

Practical

Objectives :

- To enable the students to understand the plant in relation to environment.
- To develop the knowledge of different types of vegetation.
- To familiarize the students with conservation practices.

Semester- IV

Scheme of practical examination

Time: 4 hrs

Marks: 50

1-Exercise based on Ecology	10
2- Soil Test	5
3- Exercise based on Ecological adaptation	5
4-To comment upon Phytogeographic region (model/ charts) and National Parks(Photographs).	5
5-Spotting (1-5)	10
6-Viva- voce	5
7-Sessional	10
Total:	50

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शासकीय कमलाराजा कन्या स्नातकोत्तर स्वशासी महाविद्यालय ग्वालियर (म.प्र.)
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Department of Higher Education, Govt. of M.P.
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As recommended by Central Board of Studies and approved by
the Governor of M.P.
Effective from Session 2016-17

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

Particulars / विवरण

<p>Unit-1</p>	<p>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.</p> <p>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।</p>
<p>Unit-2</p>	<p>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.</p> <p>पादप पोषण: खनिज पोषण, जल संवर्धन, खनिज लवणों का अवशोषण, कार्बनिक विलेय का स्थानान्तरण, जैविक अणु: कार्बोहाइड्रेट, अमीनो अम्ल, प्रोटीन और लिपिड की संरचना, वर्गीकरण और कार्य।</p>

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Unit-3	<p>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.</p> <p>प्रकाश संश्लेषण : क्लोरोप्लास्ट, प्रकाश संश्लेषण वर्णक, रेड ड्रॉप 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।</p>
Unit-4	<p>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.</p> <p>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।</p>
Unit-5	<p>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.</p> <p>Plant Hormones: Discovery, Structure mode of action and role of Auxins, Gibberellins, Cytokinin, Abscissic acid and Ethylene.</p> <p>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 : आकिजन, जिब्रेलिन, सायटोकायनिन, एब्सिसिक अम्ल एवं इथीलीन की खोज , संरचना, कार्य प्रणाली एवं भूमिका।</p>

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

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

Particulars / विवरण

Unit-1	<p>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.</p> <p>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 ।</p>
Unit-2	<p>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.</p> <p>गुणसूत्र संगठन: आकारिकी एवं कार्य सेन्ट्रोमियर एवं टेलोमियर। विशेष प्रकार के क्रोमोसोम्स, समसूत्री एवं अर्धसूत्री विभाजन। गुणसूत्र संरचना में विभिन्नताएँ : विलोपन, द्विगुणन, स्थानान्तरण एवं प्रतिलोमीकरण। गुणसूत्र संख्या में</p>

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	विभिन्नताएँ। यूप्लायडी एन्प्लॉयडी। डी.एन.ए. : आनुवांशिक पदार्थ। डी.एन.ए. की संरचना एवं पुनरावृत्ति। न्यूक्लियोसोम माडल।
Unit-3	<p>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.</p> <p>आनुवांशिक वंशागति : मेण्डलवाद : प्रभाविता, पृथक्करण एवं स्वतंत्र अपव्यहन के नियम, सहलग्नता विश्लेषण, जीन की अनयोन्य क्रियाएँ। कोशिका द्रवीय वंशागति उत्परिवर्तन, प्राकृतिक, प्रेरित उत्परिवर्तन, स्थानान्तरणशील अवयव। डी.एन.ए. क्षति एवं सुधार।</p>
Unit-4	<p>Gene: Structure of gene, genetic code, transfer of genetic information; Transcription, translation, protein synthesis, tRNA, and ribosomes. Regulation of gene expression in prokaryotes and eukaryotes.</p> <p>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।</p>
Unit-5	<p>Biotechnology: Functional definition; basic aspects of plant tissue culture; cellular totipotency, differentiation and morphogenesis biology of <i>Agrobacterium</i>; vectors for gene delivery and marker genes. Important achievements of biotechnology in agriculture.</p> <p>Genetic engineering: Tools and techniques of recombinant DNA technology; cloning vectors; genomic and cDNA library; transposable elements. Gene mapping and chromosome walking.</p> <p>जैव प्रौद्योगिकी : कार्यात्मक परिभाषा, पादप उत्क संवर्धन के आधारभूत तत्व, कोशीय टोटीपोटेन्सी, विभेदीकरण एवं मार्फोजेनेसिस, एग्रोबैक्टीरियम की जैविकी, जीन डिलिवरी के वाहक तथा मार्कर जीन, जैव प्रौद्योगिकी की कृषि में प्रमुख उपलब्धियाँ।</p> <p>आनुवांशिक 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।</p>

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Suggested Books :

1. Alberts B.D. Lewis, J.Raff, M.Rubers, K. and Watson I.D. 1999 molecular Biology of Cell Garland Pub. Co. Inc. New York, U.S.A.
2. P.K. Gupta 1999 A text Book of Cell and Molecular Biology, Rastogi Pub. Meerut India.
3. Kleinsmith L.J. and Molecular Biology (2nd edition) Harper Collins College pub. New York USA.
4. P.K. Gupta Genetics Rastogi Pub. Meerut.
5. Sinha & Sinha Cytogenetics & Plant Breeding Vikas Pub.

Practical Work

Objectives

- i) To impart understanding of internal cell structures and their organization.
- ii) To develop the skills for the preparation of smear for study of cell division.
- iii) To develop the skills for the understanding of mendel's law.
- iv) To impart the skills of isolation of DNA.
- v) To familiarize the students with the technique of micro propagation and isolation of protoplast.

Semester-VI

Scheme of practical examination

Time: 4 Hrs

Marks:50

Exercise Based on cell division (Mitosis/Meiosis)

10

Exercise Based on Genetic problem

5

Study of Cell and Cell inclusions

5

Exercise based on Biotechnology

5

Spotting (1-5)

10

Viva – Voce

5

Sessional

10

Total

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

PRACTICALS 101 :

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

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BOT 102 : BIOLOGY AND DIVERSITY OF FUNGI AND PLANT PATHOLOGY

UNIT I :

Recent trends on the classification of fungi with reference to morphological and paramorphological criteria.

Comparative study of following sub-division

Mastigomycotina : Albugo, Peronospora, Plasmopora

UNIT II :

Comparative study of following sub – division ;

Zygomycotina : *Mucor*, *Rhizopus*, *Syncephalastrum*.

Ascomycotina : *Tapharina* , *Emericella*, *Penicillium* , *Chaetomium* , *Morchella*.

UNIT III :

Comparative study of following sub – division ;

Basidiomycotina : *Puccinia*, *Melampsora*, *Ustilago*, *Polyporus*, *Cyathus*.

Deuteromycotina : *Fusarium* , *Cercospora*, *Colletotrichum*.

Mushroom cultivation : Mycorrhizal application in agriculture and forestry.

Fungal cytology and genetics : Heterothallism, heterokaryosis, parasexual cycle, mutation.

UNIT IV:

Symptomatology in fungal , bacterial and viral infection of plants.

Etiology and control of the following crop diseases.

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

UNIT V :

Role of enzymes and toxins in Pathogenesis.

Disease control by physical , chemical and biological methods, resistant varieties.

Crop rotation, plant quarantines, seed certification

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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, Sphaerocarps, Marchantiales , Takakiales, Sphagnales, Andreales and Bryales.

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.

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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.

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Anabaena, Gonium , Chlorella, Enteromorpha, Bulbochaete, Clostridium, Acetabularia, Nitella, Botrydium, Navicula, Cyclotella, Batrachospermum and Gracillaria.

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Parthenogenesis, apogamy, apospory and regeneration.
Bryogeographical regions of India with reference to central India.
Lichens : General account, structure and reproduction.

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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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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 2016-17
M.Sc. Botany – I sem**

**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.

UNIT IV

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

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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.

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

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.

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Aerobiology and its application. Aeropalynology, methods of aerospora survey and analysis, pollen allergy and pollen calendars system approach for allergy.
Mellitopalyonlogy: 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, continuum (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, K_m 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. 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 kjeldahl 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 C₃ and C₄ 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 abscisic 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 K_m and V_{max} 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 2015-2017
M.Sc. Botany – I 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 polypetal, sympetal, apetal : monoc, dioc. Monocot flower.

UNIT II

Stamens origin and evolution from foliar to reduced condition, extension of connective beyond anthers : monodi and poladelph : 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 receptacular concepts: evolution of types of placentations.

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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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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BOT 303 : BIOMETRY , BIOINFORMATICS AND INSTRUMENTATION

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

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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
Agroecosystem.
Biogeochemical cycles.
Forest ecosystem.
Rangeland management.

UNIT IV

Vegetation types of India
Floristics regions of India.
Production and productivity of various ecosystems.

UNIT V

Phytogeography as a border line science.
Principles of interpretation Phytogeography
Age and Area Hypothesis.
Discontinuous distribution , endemics and endemism.
Satpura hypothesis.
Gates of angiospermy.

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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.)
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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.

UNIT V

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U. Kulkarni 28/6/16
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X. Kulkarni 28/6/16
Y. Kulkarni 28/6/16
Z. Kulkarni 28/6/16

UNIT I

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 checker 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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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 & Ti plasmid.

UNIT V

Single stranded DNA viruses CaMV Lambda phage vectors M13 vectors.

Expression vectors.

Cloning construction of genomic and DNA libraries

Application of r- DNA technology in plant improvement.

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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 Ti plasmid.
6. Restriction analysis and molecular weight DNA.
7. Sequencing and polymerase Chain Reaction.

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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.
Hygiene 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 filtrate 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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BOT E02: BIOCHEMISTRY AND METABOLISM IN PLANTS

UNIT I

Lipid: General structure, classification.

Synthesis of fatty acid.

β -Oxidation.

Synthesis of carbohydrates from fatty acids.

Protein: Amino acid structure and Biosynthesis; protein conformation, protein synthesis.

UNIT II

Secondary plant products: General structure of important phenolic compound groups in plants.

Shikimic acid pathway and phenolic compound synthesis.

General structure and synthesis of alkaloids from amino acids.

Growth regulators: structure and biosynthesis of Ethylene, Jasmonates and Brassinolides.

UNIT III

Cell wall components.

Cellulose: structure and model for biosynthesis, structure and operation of the model for synthesis at plasma membrane level.

Lignin: structure and biosynthesis in plants.

Cyanogenesis: a general account of cyanogenic compounds as glycosides.

UNIT IV

DNA and RNA: structure

DNA replication.

Transcription in prokaryotes and eukaryotes, transcript modification.

Regulation of translation.

UNIT V

Nitrate metabolism in plants.

Nitrogen fixation, Nitrogenase system.

Ammonium assimilation.

GS-GOGAT system.

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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*, *Psoralea 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. Transpiration 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

C₄ photosynthesis as CO₂ concentrating mechanism and its comparison with C₃ fixation. Drought and drought tolerance mechanisms:

UNIT III

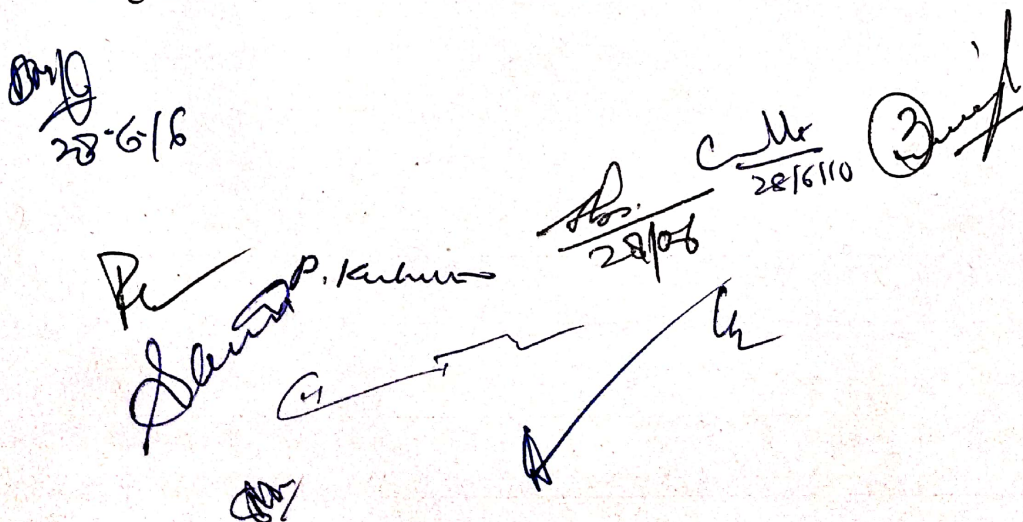
Antitranspirants: Different types, mode of action and their use in alleviation of water stress. Nitrogen fixation and drought. Effect of water stress on accumulation of proline and betaines and its possible role in osmotic adjustment under such conditions. Screening method for water stress tolerant varieties.

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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BOT E05: PLANT PATHOLOGY AND MYCOTOXICOLOGY

UNIT I

History and principles of plant pathology.
Milestones in phytopathology with particular reference to India.
Historical development of chemicals, legislative, culture and biological protection measures including classification of plant diseases.
Parasitism and Disease developments. Growth, reproduction, survival and dispersal of plant pathogens. Factors influencing infection, colonization and development of symptoms.

UNIT II

Physiological and molecular plant pathology.
Effect of pathogens on plant pathological functions. Molecular mechanisms of pathogenesis: recognition phenomenon, penetration, invasion, primary disease determinant. Enzymes and toxins in relation to plant disease. Mechanism of resistance. Phytoalexins. RP protein (pathogenesis related proteins). Antiviral proteins.

UNIT III

Management of plant Diseases: General principles of plant quarantine
Production of disease free seeds and planting materials. Seed certification. Fungicide and antibiotics. Important culture practices and their role in disease management, solarization, integrated disease management.

UNIT IV

History of Mycotoxins, mycotoxic fungi and related mycotoxins in food and feed, aflatoxins, factors influencing the production of aflatoxins, mycotoxicosis and aflatoxicosis. Detoxification and Regulatory aspects of control of Mycotoxins.

UNIT V

Phytopathogenic toxins : Helmithosporium toxin, Alternaria toxins, Fusarium toxins, Mushroom toxins, plant toxins and phycotoxins (Algal toxins).

PRACTICALS E05

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. Preparation of TLC plate.
6. Extraction of aflatoxin from stored seed samples.
7. Quantitative estimation of aflatoxins.
8. Demonstration of slides/photograph showing important histopathological changes in liver, kidney and intestine of affected animals/ birds.
9. Symptomatology: collection of diseases plants and preparation of Herbarium.

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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.

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Department of Botany, Govt. K.R.G. College, Awaror, M.P. ①

List of Examiners - 2016-2017

1. School of Studies in Botany, Jiwaji University, Gwalior

1. Dr. R.M. Agrawal
2. Dr. A.K. Jain
3. Dr. Rekha Bhedawari
4. Dr. Arinash Tiwari
5. Dr. Mahendra Kumar, Gupta
6. Dr. Shushil Manderia
7. Dr. Sapan Patel

2. Govt. Science College, Awaror

1. Dr. P.P. Deo
2. Dr. A.C. Raghuvanshi
3. Dr. H.O. Sharma
4. Dr. R.K. Khare
5. Dr. D.P. Sharma
6. Dr. V.K. Sewariya

3. Govt. K.R.G. College, Awaror

1. Dr. B.M. Kulshrestha
2. Dr. Madhulaxmi Sharma
3. Dr. Sadhana Pandey
4. Dr. D.S. Rathore
5. Dr. Preeti Kulshrestha

4. Govt. V.R.G. College, Awaror

1. Prof. C.J. Mehta
2. Dr. G.D. Vyas

28.6.16.

Prof. C.J. Mehta

Prof. C.J. Mehta

28/06/2016

5. Govt. S.L.P. College, Morar, Gwalior

- 1. Dr. Deep Azad
- 2. Dr. B.B. Gupta

7. Govt. P.G. College, Morena

- 1. Dr. R.K.S. Kushwaha
- 2. Dr. R.P. Singh
- 3. Dr. R.L. Shukhwar

8. C.H.R.I., Gwalior

- 1. Dr. Archana Shrivastava
- 2. Dr. Madhu Gupta

9. P.G. College, Ambah, Distt. Morena

- 1. Dr. R.A.S. Chauhan

10. Govt. S.M.S. College, Shirdipuri

- 1. Dr. S.H. Oswari
- 2. Dr. Manjiv Verma

11. Govt. M.T.S. College, Bind

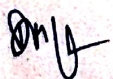


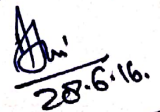
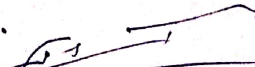

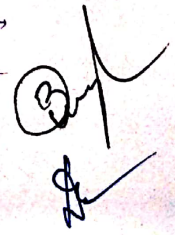
- 1. Dr. A.K. Shrivastava
- 2. Dr. N.S. Rathore
- 3. Dr. M.R. Kaushal, Principal

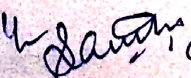




12. Govt. Girls College, Morena

- 1. Dr. J.K. Mishra

13. Govt. P.G. College, Dehig

- 1. Dr. G.K. Shrivastava
- 2. Dr. S.K. Pandey
- 3. Dr. Brajesh
- 4. Dr. V.K. Kaushal (Bhandar)
- 5. Dr. Seema Margret Singh

4. 





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

15. Govt P.G. College, Sheopurkalan.
1. Dr. Shubhush Chandra

16. Dr. V.S. College, Sabara
1. Dr. Vishal Kadam

17. Govt. P.G. College, Auna - ~~Auna~~
1. Dr. Archana Shrestriya *
2. Dr. Manoj Bhesoria *

18. Govt College, Aron
1. Dr. Nishinjan Shrestriya ✓

19. Govt. College, Pichhoge.
Dr. Keshav Singh

20. - J.C. Mills College Gwalior
Dr. Prachi Tilgani

DH

28.6.16.

Call 28/6/16

Sanjay

PV

AT

P. Lalwani

(3) [Signature]

CU

[Signature]

List of Examiners from Other University / Colleges
And Retired Professors.

1. Dr. R.K.S. Chauhan, Awalior, 203 Arati Apartment, Gorindpur, Awalior
2. Dr. Shashi Chauhan, 203, Arati Apartment, Gorindpur, Awalior
3. Dr. S.P. Bajpai, Dean, Faculty of Env. Science, Amity Univ.
4. Dr. P. Mehta, Dr. H.S. Gaur Univ. Sagar
5. Dr. Archana Mehta, Dr. H.S. Gaur Univ. Sagar
6. Dr. J.P. Kausik
7. Dr. S.K. Raina, Kaul Nursing Home, Kampos, Aul
8. Dr. K.K. Aubey, Saraswatinagar, Univ. Road, Aul
9. Dr. R.N. Chaturvedi, Karkhal Nagar, Gandhi Nagar, Aul
10. Dr. N.P. Saxena, Gayatri Vihar, Awalior
11. Dr. R.C. Bhatia, Haliped Colony, Aul
12. Dr. Ashok Agrawal, B.S.A. College, Mathura
13. Dr. Alka Pandey, P.G. College, Betul
14. Dr. Akhilesh Pandey, Bhopal
15. Dr. Karuna Verma, R.D. Univ. Jabalpur
16. Dr. P.K. Singhal, R.D. Univ. Jabalpur
17. Dr. Y.K. Benschel, R.D. Univ. Jabalpur
18. Dr. Anjana Sharma, R.D. Univ. Jabalpur
19. Dr. Divya Bagchi, R.D. Univ. Jabalpur
20. Dr. Ranjana Verma, Nutan College, Bhopal
21. Dr. Archana Bhatnagar, P.M.B. Gujarati College, Indore
22. Dr. Krishna Mendolia, Gujarati College, Indore

Dr. /
Aul

Dr. /
Aul

Dr. /
P. K. Kulkarni 28-6-16

Dr. /
28/16

Dr. /
Aul

Dr. /
Aul

Dr. /
Aul

23. Dr. T.R. Sahu, Dr. H.S. Gaur Univ. Sagar (5)
24. Dr. L.C. Chaurasia, Govt. Maharaja's College, Chhatarpur
25. Dr. M. Saxena, Govt. Maharaja's College, Chhatarpur
26. Dr. Amita Arjari, Govt. Maharaja's College, Chhatarpur
27. Dr. A.P. Parikal, Govt. Maharaja's College, Chhatarpur
28. Dr. R.L. Prajapati, Govt. Maharaja's College, Chhatarpur
29. Dr. P.K. Khare, Govt. Maharaja's College, Chhatarpur
30. Dr. Kusum Kashyap, Govt. Maharaja's College, Chhatarpur
31. Dr. A.S. Yadav, MVM College, Bhopal
32. Dr. Madhuri Modak, MVM College, Bhopal
33. Dr. Khujista Siddiqi, MVM College, Bhopal
34. Dr. Nasreen Siddiqi, Gitanjali College, Bhopal
35. Dr. S.P. Parmar, Govt. P.G. College, Tikangarh
36. Dr. Deepak Vyas, Dr. H.S. Gaur Univ. Sagar
37. Dr. Surendra Singh, R.D. Univ. Jabalpur
38. Dr. Rajbeer Singh, K.K. College, Etawah
39. Dr. K.P. Sahu, MVM College, Bhopal
40. Dr. A.K. Bharedwaj, Centre of Excellence, Bhopal
41. Dr. Nath, NBRU Lucknow
42. Dr. Pushpa Patel, Govt. P.G. College, Khargone
43. Dr. A.K. Girdi, Bundelkhand Univ. Jhansi
44. Dr. Bharti, Bundelkhand Univ. Jhansi
45. Dr. T.K. Sharma, Bipin Bihari College, Jhansi
46. Dr. Harish Vyas, Madhav College, Gijain

Dr. R.L.S. S. Kewer

Dr. P. K. Kewer

Dr. P. K. Kewer 20.6.16

Dr. P. K. Kewer

Dr. P. K. Kewer

