विभागप्रभारी
वनस्पतिविज्ञानविभाग

Programme/Class: B.Sc	Year: First	Semester: I/II
Subject: Botany		
Course Code:	Course Title: **Ethnobotany and Medicinal botany**	
Course outcomes: It acquaint students with knowledge of ancient India and Modern India with reference to medicinal plants and their conservation.		
Credits: 4	**Minor Elective**	
Max. Marks: 25+50+25	Min. Passing Marks:	
Total No. of Lectures-Tutorials-Practical (in hours per week): L-T-P: 3-0-2 .		

Unit	Topics	No. of Lectures
I	**Ethnobotany** i. Ethnobotany as an interdisciplinary science. The relevance of ethnobotany in the present context. ii. Major and minor ethnic groups or Tribals of India, and their life styles. iii. Plants used by the tribal populations: a) Food plants, b) intoxicants and beverages, c) Resins and oils and miscellaneous uses	12
II	**History, Scope and Importance of Medicinal Plants. indigenous Medicinal Sciences** i. Definition and Scope-Ayurveda: History, origin, plants used in ayurvedic treatments. ii. Siddha: Origin of Siddha medicinal systems, Basis of Siddha system, plants used in Siddha medicine. iii. Unani: History, concept	12
III	**Ethnobotany as a tool to protect interests of ethnic groups** i. Sharing of wealth concept with few examples from India. ii. Biopiracy, Intellectual Property Rights and Traditional	12

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	Knowledge.	
IV	**Conservation of endangered and endemic medicinal plants:** i. Definition: endemic and endangered medicinal plants, ii. ii. Red list criteria iii. iii. In situ conservation: Biosphere reserves, sacred groves, National Parks iv. iv. Ex situ conservation: Botanical Gardens.	12
V	**Practical** 1. Ethnobotanical specimens as prescribed in theory syllabus 2. Detailed morphological and anatomical study of medicinally important part(s) of locally available plants (Minimum 8 plants) used in traditional medicine. 3. Field visits to identify and collect ethno medicinal plants used by local tribes/folklore.	12

Suggested Readings:

1) S.K. Jain, Manual of Ethnobotany, Scientific Publishers, Jodhpur, 1995.
2) Glimpses of Indian. Ethnobotny, Oxford and I B H, New Delhi – 1981.
3) S.K. Jain (ed.) 1989. Methods and approaches in ethnobotany. Society of ethnobotanists, Lucknow, India.
4) S.K. Jain, 1990. Contributions of Indian ethnobotny.Scientific publishers, Jodhpur.
5) Colton C.M. 1997. Ethnobotany – Principles and applications. John Wiley and sons – Chichester
6) Rama Ro, N and A.N. Henry (1996). The Ethnobotany of Eastern Ghats in Andhra Pradesh, India.Botanical Survey of India. Howrah.
7. Trivedi P C, 2006. Medicinal Plants: Ethnobotanical Approach, Agrobios, India.
8. Purohit and Vyas, 2008. Medicinal Plant Cultivation: A Scientific Approach, 2nd edn. Agrobios, India.
9. Pal, D.C. & Jain, S.K., 1998. Tribal Medicine. Naya Prakash Publishers, Calcutta
10. Raychudhuri, S.P., 1991. (Ed.) Recent advances in Medicinal aromatic and spice crops. Vol.1, Today& Tomorrow's printers and publishers, New Delhi

This course can be opted as an minor elective by the students of following subjects: Open for all

Suggested Continuous Evaluation Methods:

Continuous Internal Evaluation shall be based on allotted assignment and Class Test. The marks shall be as follows:

Internal Assessment	Marks
Class Interaction	5

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Quiz	5
Seminar	7
Minor Field Work/excursion/ Lab visit/ Technology Demonstration	8
Course prerequisites: To study this course, a student must have 10+2	

Practical Paper

I. Identify and write about the medicinal uses of B-and C- 2x5= 10 marks.

II. Comment on D and E. 2x 2.5=5 marks

III. Report on Field visit: 5 marks
(List to be prepared mentioning special features of plants used by tribal populations as Medicinal Plants & Spices. Write their botanical and common names, parts used and diseases/disorders for which they are prescribed)

IV. Viva-voce 5 marks

Total = 25 marks

KEY A-Plants given in unit II (i) B-Plants used in Ayurvedic preparations (Amla in Chyavanprash, Senna in Laxatives) C - - Do - D. Photographs of National parks, Biosphere reserves and Botanical gardens. E. Photograph of famous personalities in Ayurveda/Siddha medicine.

Submitted by: Dr. Rashmi Singh

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Programme/Class: B.Sc	Year: Second	Semester: III/IV
Subject: Botany		
Course Code:	Course Title: **Intellectual Property Right**	
Course outcomes: The course is designed to provide comprehensive knowledge to the students regarding the general principles of IPR, Concept and Theories, Criticisms of Intellectual Property Rights, International Regime Relating to IPR		
Credits: 4	Minor Elective	
Max. Marks: 25+75	Min. Passing Marks:	
Total No. of Lectures-Tutorials-Practical (in hours per week): L-T-P: 4-0-0 .		

Unit	Topics	No. of Lectures
I	**Introduction to intellectual property right (IPR)** Concept and kinds. Economic importance. IPR in India and world: Genesis and scope, some important examples. IPR and WTO (TRIPS, WIPO). **Patents** Objectives, Rights, Patent Act 1970 and its amendments. Procedure of obtaining patents, Working of patents. Infringement.	12
II	**Copyrights** Introduction, Works protected under copyright law, Rights, Transfer of Copyright, Infringement **Trademarks** Objectives, Types, Rights, Protection of goodwill, Infringement, Passing off, Defences, Domain name. **Geographical Indications** Objectives, Justification, International Position, Multilateral Treaties, National Level, Indian Position	12
III	**Protection of Traditional Knowledge**	12

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	Objective, Concept of Traditional Knowledge, Holders, Issues concerning, Bio-Prospecting and Bio-Piracy, Alternative ways, Protectability, needfor a Sui-Generis regime, Traditional Knowledge on the International Arena, at WTO, at National level, Traditional Knowledge Digital Library	
IV	Industrial Designs Objectives, Rights, Assignments, Infringements, Defences of Design Infringement **Protection of Plant Varieties** Plant Varieties Protection-Objectives, Justification, International Position, Plant varieties protection in India. Rights of farmers, Breeders and Researchers.National gene bank, Benefit sharing.Protection of Plant Varieties and Farmers' Rights Act, 2001.	12
V	**Information Technology Related Intellectual Property Rights** Computer Software and Intellectual Property, Database and Data Protection, Protection of Semi-conductor chips, Domain Name Protection **Biotechnology and Intellectual Property Rights.** Patenting Biotech Inventions: Objective, Applications, Concept of Novelty, Concept of inventive step, Microorganisms, Moral Issues	12

1. D.P. Mittal (Taxman Publication), Indian Patents Law and Procedure
2. B.L. Wadera, Patents, trademarks, copyright, Designs and Geographical Judications
3. P. Narayanan (Eastern Law House), Intellectual Property Law
4. N.S. Gopalakrishnan & T.G. Agitha, Principles of Intellectual Property (2009), Eastern Book Company, Lucknow
5. Ganguli (Tata Megraw), Intellectual Property Rights

This course can be opted as an minor elective by the students of following subjects: Open for all

Suggested Continuous Evaluation Methods:
Continuous Internal Evaluation shall be based on allotted assignment and Class Test. The marks shall be as follows:

Internal Assessment	Marks
Class Interaction	5
Quiz	10
Seminar	10

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Course prerequisites: To study this course, a student must have 10+2

Submitted by: Dr. Rashmi Singh

Programme/Class: B.Sc	Year: First/Second	Semester: I/II/III/IV
Subject: Botany		
Course Code:	Course Title:**Mushroom Production Technology**	
Course outcomes: The course is designed to develop the skills in Mushroom Production so the students can opt it for Start-up and Agri-preneurship.		
Credits: 3	**Skill Development**	
Max. Marks: 25+75	Min. Passing Marks:	
Total No. of Lectures-Tutorials-Practical (in hours per week): L-T-P: 2-0-2 .		

Unit	Topics	No. of Lectures
I	**Introduction**: history. Systematics,Nutritional and medicinal value of edible mushrooms; Nutrition and nutraceuticals – Proteins, amino acids, mineral elements nutrition, carbohydrates, crude fibre content , vitamins; Poisonous mushrooms	4
II	**Mushroom Spawn Production Technology** : Infrastructure: substrates (locally available) Polythene bag,vessels, Inoculation hook, inoculation loop, low cost stove, sieves, culture rack, mushroom unit (Thatched house) water sprayer, tray, small polythene bag. Pure culture: Medium, Sterilization, Preparation of spawn, Multiplication	12
III	**Production:** practices of *Pleurotus* spp. *Calocybe indica, Agaricusbisporus,* and*Volvoriellavolvacea*. Substrate Preparation (Wheat Strawand Paddy Straw)for growing *Pleurotus* spp. and *Calocybe indica.* Composting technology for *Agaricusbisporus*. Low cost andControlled condition production technology. *Volvoriellavolvacea* bed preparation - paddy straw, sugarcane trash.	12
IV	**Processing and Value Addition Technology** : Sorting, Grading and Packaging, Storage (canning, pickels, papads), drying, storage in salt solutions,Types of foods prepared from mushroom. Research Centres -National level and Regional level. Cost benefit ratio - Marketing in India and abroad, Export Value	12
V	Diseases and Pests of Mushrooms	5

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Suggested Readings:

1. Biswas, S., Datta, M. and Ngachan, S.V. 2012. Mushrooms: A Manual for Cultivation. PHI Learning Private Limited, New Delhi.
2. Kapoor, J.N. 2010. Mushroom Cultivation. ICAR, New Delhi.
3. Nita Bahl (2000) Hand book of Mushrooms. Oxford & IBH Publishing Co. Pvt. Ltd.
4. Singh, M., Vijay, B., Kamal, S. and Wakchaure (Eds.) 2011. Mushrooms: Cultivation, Marketting and Consumption. Directi\orate of Mushroom Reseaerch (ICAR), Solan
5. Tewari, Pankaj and Kapoor, S.C., (1988). Mushroom cultivation, Mittal Publications, Delhi

This course can be opted as Skill by the students of following subjects: Open for all

Suggested Continuous Evaluation Methods:
Continuous Internal Evaluation shall be based on allotted assignment and Class Test. The marks shall be as follows:

Internal Assessment	Marks
Class Interaction	5
Quiz	10
Project /Dissertation Report	10

Course prerequisites: To study this course, a student must have 10+2.

Submitted by: Dr. Rashmi Singh

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Programme/Class: B.Sc	Year: First/Second	Semester: I/II/III/IV
Subject: Botany		
Course Code:	Course Title: **Biofertilizer : Production and Application**	
Course outcomes: The course is designed to provide comprehensive knowledge to the students regarding the general information, application and production technology of Biofertilizers.		
Credits: 3	Skill Development	
Max. Marks: 25+75	Min. Passing Marks:	
Total No. of Lectures-Tutorials-Practical (in hours per week): L-T-P: 2-0-2 .		

Unit	Topics	No. of Lectures
I	**Introduction**: General account about the microbes used as biofertilizer – Rhizobium – isolation, identification, mass multiplication, carrier based inoculants, Actinorrhizal symbiosis.	5
II	Azospirillum: isolation and mass multiplication – carrier based inoculant, associative effect of differentmicroorganisms.Azotobacter: classification, characteristics – crop response to Azotobacter inoculum, maintenance and mass multiplication	10
III	Cyanobacteria (blue green algae), Azolla and Anabaena azollae association, nitrogen fixation, factors affecting growth, blue green algae and Azolla in rice cultivation.	10
IV	Mycorrhizal association, types of mycorrhizal association, taxonomy, occurrence and distribution, phosphorus nutrition, growth and yield – colonization of VAM – isolation and inoculum production of VAM, and its influence on growth and yield of crop plants.	10
V	Organic farming – Green manuring and organic fertilizers, Recycling of biodegradable municipal, agricultural and Industrial wastes – biocompost making methods, types and	10

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	method of vermicomposting – field Application.	

Suggestive Readings:

1. Dubey, R.C., 2005 A Text book of Biotechnology S.Chand& Co, New Delhi.
2. Kumaresan, V. 2005, Biotechnology, Saras Publications, New Delhi.
3. John Jothi Prakash, E. 2004. Outlines of Plant Biotechnology. Emkay -Publication, New Delhi.
4. Sathe, T.V. 2004 Vermiculture and Organic Farming. Daya publishers.
5. Subha Rao, N.S. 2000, Soil Microbiology, Oxford & IBH Publishers, New _Delhi.
6. Vayas,S.C, Vayas, S. and Modi, H.A. 1998 Bio-fertilizers and organic _Farming AktaPrakashan, Nadiad

This course can be opted as Skill by the students of following subjects: Open for Science students.

Suggested Continuous Evaluation Methods:
Continuous Internal Evaluation shall be based on allotted assignment and Class Test. The marks shall be as follows:

Internal Assessment	Marks
Class Interaction	5
Quiz	10
Project /Dissertation Report	10

Course prerequisites: To study this course, a student must have 10+2 with Science Stream.

Submitted by: Dr. Suman Gupta

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Programme/Class :B.Sc.	Year:First/Second	Semester:I/II/III/IVs
Subject: Botany		
CourseCode:	CourseTitle:**Applied Wood Technology**	

Courseoutcomes:
The course is designed to develop the skills in wood technology and use of wood for daily life. The objective of the course is to impart into the students the knowledge of the manufacturing and supply of wood products.

Credits:3	SkillDevelopment
Max.Marks:25+75	Min.PassingMarks:

Total No. of Lectures-Tutorials-Practical (in hours per week) : L-T-P:2-0-2.

Unit	Topics	No. of Lectures
I	**Introduction**: The knowledge about basic botany, history of forestry in India and classification of wood based industries and their current status is important. The scope and opportunities in wood science.	4
II	**Basic Botany** · Importance of Forest Botany in wood science and technology. Bentham and Hooker system of plant classifications. Name changes nomenclature of commercial tree species and its significance in judicious of timber. Field characters morphology of 08 families.	12
III	**Basic Forestry:** Status of Indian Forestry, forest types, changing trends in social and agro forestry, National Forest Policy and its salient changing features. Historical background of forestry and forest product research.	12
IV	**Use of wood and wood products:** Supply and demand status of wood, export and import of timber, its products and channels. Growth of wood based industry in India, effect of globalization. Role of skilled manpower in this sector. Brief status of solid wood, reconstituted and handicraft industry; such as wood carving, basketry, executive desk accessories, furniture, joinery, cabinets, sport goods, saw mills, wood seasoning, flooring and paneling, building construction, packaging.	12
V	Use of Timber in daily life and Wood preservation	5

Suggestive Readings:

1. **An Elementary Manual on Indian Wood Technology** Hp Brown

2. **Sahni, K. C. *The book of Indian trees*. Oxford University Press, 1999.**

3. **Bowyer, J. L., Shmulsky, R., &Haygreen, J. G. (2003). Forest products and wood science: an introduction**

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4. Evert, R. F. (2006). Esau's plant anatomy: meristems, cells, and tissues of the plant body: their structure function, and development. John Wiley & Sons.

5. Sharma, O. P. Plant taxonomy. Tata McGraw-Hill Education, 1993.

6. Negi, Sharad Singh. *Forest policy and law*. International Book Distributors, 2001.

This course can be opted as Skill by the students of following subjects : Open for all

Suggested Continuous Evaluation Methods :
Continuous Internal Evaluation shall be based on allotted assignment and Class Test. The marks shall be as follows:

Internal Assessment	Marks
Class Interaction	5
Quiz	10
Project/ Dissertation Report	10

Course pre requisites: To study this course, a student must have10+2.

Submitted by: Mr. Ravi Kumar Yadav

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