

B.Sc. BOTANY SEMESTER IV

Title of the Course: Ecology and Conservation Biology

Number of Theory Credits	Total Lecture Hours/Semester	Number of Practical Credits	Total Practical hours/Semester
04	56	02	56
	Contents of Theory Course		
Unit 1	Topics	Teaching Hours	
Unit I	Introduction to Ecology and Conservation Biology: Definitions, Principles of Ecology, Brief History, Major Indian Contributions, Scope and importance. Ecological levels of organisation. Ecological factors: Climatic factors: light, temperature, precipitation and humidity. Edaphic factors: Soil and its types, soil texture, soil profile, soil formation; physicochemical properties of soil - mineral particle, soil pH, soil aeration, organic matter, soil humus and soil microorganisms. Topographic Factors: Altitude Ecological groups of plants and their adaptations: Morphological and anatomical adaptations of hydrophytes, xerophytes, epiphytes and halophytes.	15 Hrs	
Unit II	Ecosystem Ecology: Introduction, types of ecosystems with examples -terrestrial and aquatic, natural and artificial. Structure of ecosystem: Biotic and Abiotic components, detailed structure of a pond ecosystem. Ecosystem functions and processes: Food chain-grazing and detritus; Food web. Ecological pyramids -Pyramids of energy, biomass and number. Principles of Energy flow in ecosystem. Bio-geo chemical cycles: Gaseous cycles -carbon and nitrogen, Sedimentary cycle Phosphorus. Ecological succession: Definition, types- primary and secondary. General stages of succession. Hydrosere and xerosere. Community Ecology: Community and its characteristics – frequency, density, Abundance, cover and basal area, phenology, stratifications, life-forms. Concept of Ecotone and Ecotypes. Intra-specific and Inter-specific interactions with examples. Ecological methods and techniques: Methods of sampling plant communities – transects and quadrates. Remote sensing as a tool for vegetation analysis, land use – land cover mapping. Population Ecology: Population and its characteristics – Population density, natality, mortality, age distribution,	15 Hrs	

	population growth curves and dispersal.	
Unit III	Phytogeography and Environmental issues: Theory of land bridge, theory of continental drift, polar oscillations and glaciations. Centre of origin of plant – Vavilov’s concept, types. Phytogeographical regions – concept, phytogeographical regions of India. Vegetation types of Karnataka – Composition and distribution of evergreen, semievergreen, deciduous, scrub, mangroves, shoal forests and grasslands. An account of the vegetation of the Western Ghats. Pollution: Water pollution: Causes, effect, types; water quality indicators, water quality standards in India, control of water pollution (Waste water treatment). Water pollution disasters – National mission on clean Ganga, Minamata, Pacific gyre garbage patch, Exxon Valdez oil spill. Air pollution: Causes, effect, air quality standards, acid rain, control. Soil pollution: Causes, effect, solid waste management, control measures of soil pollution.	11 Hrs
Unit IV	<i>Biodiversity and its conservation: Biodiversity: Definition, types of biodiversity - habitat diversity, species diversity and genetic diversity, Global and Indian species diversity. SDG’s in biodiversity conservation. Values of Biodiversity – Economic and aesthetic value, Medicinal and timber yielding plants. NTFP. Threats to biodiversity. Concept of Biodiversity Hotspots, Biodiversity hot spots of India. Concept of endemism and endemic species. IUCN plant categories with special reference to Karnataka/ Western Ghats. Biodiversity Conservation- Indian forest conservation act, Biodiversity bill (2002). Conservation methods – In-situ and ex-situ methods In-situ methods – Biosphere reserves, National parks, Sanctuaries, Sacred grooves. Ex-situ methods- Botanical gardens, Seed bank, Gene banks, Pollen banks, Culture collections, Cryopreservation.</i>	15 Hrs
	Total	56 Hrs

SUGGESTED REFERENCE BOOKS:

1. Sharma, P.D. 2018. Fundamentals of Ecology. Rastogi Publications.
2. Odum E.P. (1975): Ecology By Holt, Rinert& Winston.
3. Oosting, H.G. (1978): Plants and Ecosystem Wadworth Belmont.
4. Kochhar, P.L. (1975): Plant Ecology. (9th Edn.,) New Delhi, Bombay, Calcutta-226pp.,
5. Kumar, H.D. (1992): Modern Concepts of Ecology (7th Edn.,) Vikas Publishing Co., New Delhi.
6. Kumar H.D. (2000): Biodiversity & Sustainable Conservation. Oxford & IBH Publishing Co Ltd. New Delhi.
7. Newman, E.I. (2000): Applied Ecology, Blackwell Scientific Publisher, U.K.
8. Chapman, J.L&M.J. Reiss (1992): Ecology (Principles & Applications). Cambridge University Press, U.K.
9. Malcolm L. Hunter Jr., James P. Gibbs, Viorel D. Popescu, 2020. Fundamentals of Conservation Biology, 4th Edition. Wiley-Blackwel.
10. Saha T. K., 2017. Ecology and Environmental Biology. Books and Allied Publishers

List of Practical's in Ecology and Conservation Biology

Practical No.	Experiments
1	Determination of pH of different types of Soils, Estimation of salinity of soil/water samples.
2	Study of Ecological instruments – Wet and Dry thermometer, Altimeter, Hygrometer, Soil thermometer, Rain Gauge, Barometer, etc
3	Hydrophytes: Morphological adaptations in Pistia, Eichhornia, Hydrilla, Nymphaea. Anatomical adaptations in Hydrilla(stem) and Nymphaea (petiole).
4	Xerophytes: Morphological adaptations in Asparagus, Casuarina, Acacia, Aloe vera, Euphorbia tirucalli. Anatomical adaptations in phylloclade of Casuarina .
5	Epiphytes: Morphological adaptations in Acampe, Bulbophyllum, Drynaria. Anatomical adaptations in epiphytic root of Acampe/ Vanda. Halophytes: study of Vivipary in mangroves, Morphology and anatomy of Pneumatophores.
6	Study of a pond/forest ecosystem and recording the different biotic and abiotic components
7	Demonstration of different types of vegetation sampling methods – transects and quadrats. Determination of Density and frequency.
8	Application of remote sensing to vegetation analysis using satellite imageries
9	Field visits to study different types of local vegetations/ecosystems and the report to be written in practical record book.
10	Determination of water holding capacity of soil samples
11	Determination of Biological oxygen demand (BOD)
12	Determination of Chemical oxygen demand (COD)
13	Determination of soil texture of different soil samples.

RANI CHANNAMMA UNIVERSITY BELGAVI

B.Sc IV SEMESTER OPEN ELECTIVE COURSE (OEC-4)

PAPER: MEDICINAL PLANTS IN HEALTH CARE

SUBJECT: BOTANY (OEC CODE:-004 BOT 051)

Cou rse No.	Type of Cou rse	Theory / Practica l	Credit s	Instructi o n hour per week	Total No. of Lectures / Hours / Semester	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
004 BOT 051	OE C	Theory	03	03	42 Hrs	2 Hrs	40	60	100

OEC-4 (OEC for other students): 004 BOT 051

Title of the Paper: MEDICINAL PLANTS IN HEALTH CARE

Learning outcomes:

On completion of this course, the students will be able to: Recognize the basic medicinal plants

- **Apply techniques of conservation and propagation of medicinal plants.**
- **Setup process of harvesting, drying and storage of medicinal herbs**
- **Propose new strategies to enhance growth of medicinal herbs considering**
- **thepractical issues pertinent to India**

Keywords:

Medicinal plants, Traditional systems, endangered medicinal plants, Ethnobotany, Folk medicines, Ethnic communities

Unit-I	History and Traditional System of Medicine History, Scope and Importance of Medicinal Plants; Traditional systems of medicine;Definition and Scope. Ayurveda: History, origin, panchamahabhutas, saptadhatu and tridosha concepts, Rasayana,plants used in ayurvedic treatments, Siddha: Origin of Siddha medicinal systems, Basis of Siddha system, plants used in Siddha medicine. Unani: History, concept: Umoor-e-tabiya, tumors treatments / therapy, polyherbal formulations.	14 Hrs
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Unit II	Conservation, Augmentation and Ethnobotany and Folk Medicine Conservation of Endemic and endangered medicinal plants, Red list criteria; In situ conservation: Biosphere reserves, sacred groves, National Parks; Ex situ conservation: Botanic Gardens, Ethnomedicinal plant Gardens. Propagation of Medicinal Plants: Objectives of the nursery, its classification, important	14 Hrs
Unit III	Medicinal Plants Brief description of selected plants and derived drugs, namely Guggul (Commiphora) for hypercholesterolemia, Boswellia for inflammatory disorders, Arjuna (Terminalia arjuna) for cardioprotection, turmeric (Curcuma longa) for wound healing, antioxidant and anticancer properties, Kutaki (Picrorhiza kurroa) for hepatoprotection, Opium Poppy for analgesic and antitussive, Salix for analgesic, Cincona and Artemisia for Malaria, Rauwolfia as tranquilizer, Belladonna as anticholinergic, Digitalis as cardiotonic, Podophyllum as antitumor	14 Hrs
	Suggested Readings: <ol style="list-style-type: none"> 1. Akerele, O., Heywood, V. and Synge, H. (1991). The Conservation of Medicinal Plants. Cambridge University Press. 2. AYUSH (www.indianmedicine.nic.in). About the systems—An overview of Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homeopathy. New Delhi: Department of Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homoeopathy (AYUSH), Ministry and Family Welfare, Government of India. 3. CSIR- Central Institute of Medicinal and Aromatic Plants, Lucknow (2016). Aush Gyanya: Handbook of Medicinal and Aromatic Plant Cultivation. 4. Dev, S. (1997). Ethno-therapeutics and modern drug development: The potential of Ayurveda. Current Science 73:909–928. 5. Evans, W.C. (2009). Trease and Evans Pharmacognosy, 16th edn. Philadelphia, PA: Elsevier Saunders Ltd. 6. Jain, S.K. and Jain, Vartika. (eds.) (2017). Methods and Approaches in Ethnobotany: Concepts, Practices and Prospects. Deep Publications, Delhi 7. Kapoor, L.D. (2001). Handbook of Ayurvedic medicinal plants. Boca Raton, FL: CRC Press. 8. Saroya, A.S. (2017). Ethnobotany. ICAR publication. 9. Sharma, R. (2003). Medicinal Plants of India-An Encyclopaedia. Delhi: Daya Publishing House. 10. Sharma, R. (2013) Agro Techniques of Medicinal Plants. Daya Publishing House, Delhi. 11. Thakur, R.S., H.S. Puri, and Husain, A. (1989). Major medicinal plants of India. Central Institute of Medicinal and Aromatic Plants, Lucknow, India. 	

Details of Formative Assessment (IA) For DSCC theory/OEC: 40% weightage for Total Marks

Type of Asesment	Weightage	Duration	Comment
Written Test -1	10%	1 Hrs	8th Week
Written Test-2	10%	1 Hrs	12th Week
Seminar	10%	10 minutes	-----
Case Study/Assignment/Field Work/Project Work/Activity	10%	-----	-----
Total	40% of the Maximum Marks allotted for the paper.		

Faculty of Science

04- Year UG Honors Programme: 2022-23

General Pattern of Theory Question paper for OEC

(60 Marks for semester end Examination with 2 hrs duration)

1	Part-A	Question number 1-6 carries 2 marks each. Answer any 5 questions.	10 Marks
2	Part-B	Question number 7-11 carries 5 marks each. Answer any 4 questions.	20 Marks
3	Part-C	Question number 12- 15 carries 10 marks each. Answer any 3 question.	30 Marks
(Minimum 1 question from each unit and 10 marks question may have sub questions for 7+3 or 6+4 or 5+5 if necessary)			
Total -60 Marks			

Practical Question Paper Pattern

RANI CHANNAMMA UNIVERSITY BELGAVI

B.Sc Botany IV Semester
(NEP) Ecology and
Conservation Biology

Time: 04 Hrs

Max Marks: 25

Q No I	Give the External and Internal features of Ecological adaptations with neat labeled diagram of specimen 'A'	05 Marks
Q No II	Determination of PH different types of Soils/Water samples 'B'	05 Marks
Q No III	Identify and describe the features of Ecological interest in slides C and D	06 Marks
Q No IV	Describe the use and mechanism of Ecological Instrument 'E'	04 Marks
Q No V	Submission of Field Visit Report	05 Marks
	Total	25

Instruction to Examiners

Q No I- Ecological Adaptations- Hydrophytes/Xerophytes/Epiphytes 'A' Preparation

-03

Diagram -02

(05)

Q No II-Determination of PH Soil/ Water 'B'

(05)

Q No III- Ecological slides – Hydrophytes/Xerophytes/Epiphytes

(06)

(Not repeat the Q No I)

Q No IV- Any one Ecological Instrument 'E'

(04)

Submission of Field Visit Report

(05)

Question Paper Pattern

RANI CHANNAMMA UNIVERSITY BELGAVI

B.Sc Botany IV Semester (NEP)

Subject:

Code:

Maximum Marks: 60

Answer any Six Questions from Question no I

Answer any Three each Questions from Question no II, III, IV and V

QNO I	Answer any Six Questions (At least Two questions from each unit) 1 2 3 4 5 6 7 8	2X6=12
QNO II	Should cover Entire unit I 1 2 3 4	4X3=12
QNO III	Should cover Entire unit II 1 2 3 4	4X3=12
QNO IV	Should cover Entire unit III 1 2 3 4	4X3=12
QNO V	Should cover Entire unit IV 1 2 3 4	4X3=12