



List of Revised Courses

Department : Department of Forestry, Wildlife and Environmental Sciences

Program Name : B. Sc. (Forestry)

Academic Year : 2023-24

List of Revised Courses

Sr. No.	Course Code	Name of the Course
01.	FOUCTL1/FOUCLL1	Forest Biometry
02.	FOUDTL3/FOUDLL3	Forest Ecology and Ecosystem Analysis
03.	FOUFTL1/FOUFLL1	Forest Protection
04.	FOUAVL1	Environmental Education-I
05.	FOUBVL1	Environmental Education-II



Minutes of Meetings (MoM) of Board of Studies (BoS)

Academic Year : 2023-24

School : Natural Resources

Department : Forestry, Wildlife and Environmental Sciences

Date and Time : July 03, 2023 - 11:30 AM

Venue : Smart Class Room

The Board of Studies (BoS) meeting of Department of Forestry, Wildlife and Environmental Sciences, School of Studies of Natural Resources, Guru Ghasidas Vishwavidyalaya, Bilaspur was held on dated 03.07.2023 at 11:30 am in the smart classroom to discuss and design the syllabus of B. Sc. (Forestry) 4 Years (8 semesters) scheme as per NEP 2020 guidelines, M.Sc. Forestry and Environmental Sciences and Ph. D. coursework curriculum and credit framework/ syllabus as per LOCF guidelines. External Expert has joined the meeting through online mode. The following members of BOS were present in the meeting:

The following members were present in the meeting:

1. Prof. Manmohan Dobriyal, External Expert Member, Rani Laxmi Bai Central Agricultural University, Jhansi
2. Prof. S C Tiwari (Member BoS, Dept. Forestry, Wildlife and Environmental Sciences)
3. Prof. K.K. Chandra (HOD, Associate Prof., Dept. Forestry, Wildlife and Environmental Sciences, Chairman, BOS)
4. Dr. Bhavana Dixit (Member BoS, Associate Professor, Dept. Forestry, Wildlife and Environmental Sciences)

Following points were discussed during the meeting

1. Revised LOCF ordinance of B. Sc. (Forestry) Four Years (8 Semester) degree program.
2. LOCF/ECS scheme is implemented in any of the program of B. Sc. (Forestry) Four Years (8 Semester) degree program.
3. The BoS has approved the CBCS Course curriculum and ordinance of B. Sc. (Forestry) Four Years (8 Semester) degree program with effect from academic session 2023-24.

विभागाध्यक्ष
Head

Department of Forestry, Wildlife and Environmental Science
गुरु घासीदास विश्वविद्यालय, बिलासपुर (छ.ग.)
Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.)

Signature & Seal of HoD



Scheme and Syllabus- UG

Curriculum and Credit Framework- NEP 2020

FOR

B.Sc. FORESTRY

(w.e.f. Academic session:2023-24)



“SCHOOL OF NATURAL RESOURCES”

DEPARTMENT OF FORESTRY, WILDLIFE & ENVIRONMENTAL SCIENCES

GURU GHASIDAS VISHWAVIDYALAYA

(A Central University established by the Central University Act.2009 No. 25 of 2009)

BILASPUR-495009, CHHATTISGARH

2/7/23



03/07/23



Course Structure and Credit Distribution

B.Sc. Forestry
(4 Year Course)

Semester	Course	Course Code	Name of the course	Credit	Hour/week	Marks
I	Major-01	FOUATL1	Silviculture	3	3	100
	Major-01 Practical	FOUATP1	Silviculture	1	2	100
	Minor-01		Drawn From the University pool	3	3	100
	Minor-01 Practical			1	2	100
	Multidisciplinary-01		Drawn From the University pool	3	3	100
	Ability Enhancement Course (AEC-01)		Drawn from the University Pool	2	2	100
	Skill Enhancement Course (SEC-01)		Drawn From the University pool	3	3	100
	Value added course-01		Drawn From the University pool	2	2	100
	Value added course-02		Drawn From the University pool	2	2	100
	TOTAL			20	22	900
II	Major -02	FOUBTL1	Fundamentals of Soil Science	3	3	100
	Major -02 Practical	FOUBTP1	Fundamentals of Soil Science	1	2	100
	Minor -02		Drawn From the University pool	3	3	100
	Minor -02 Practical			1	2	100
	Multidisciplinary-02		Drawn From the University pool	3	3	100
	Ability Enhancement Compulsory (AEC-02)		Drawn from the university pool	2	2	100

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	Skill Enhancement Course (SEC-02)		Drawn From the University pool	3	3	100
	Value added course-03		Drawn From the University pool	2	2	100
	Value added course-04		Drawn From the University pool	2	2	100
	TOTAL			20	22	900
	Summer Internship (Compulsory for 1 Year Certificate course)			4		100

Semester	Course	Course Code	Name of the course	Credit	Hour/week	Marks
III	Major -03	FOUCTL1	Forest Biometry	3	3	100
	Major -03 Practical	FOUCTP1	Forest Biometry	1	2	100
	Major -04	FOUCTL2	Forest Genetics and Tree Improvement	3	3	100
	Major -04 Practical	FOUCTP2	Forest Genetics and Tree Improvement	1	2	100
	Minor -03		Drawn From the University pool	3	3	100
	Minor -03 Practical			1	2	100
	Multidisciplinary-03		Drawn From the University pool	3	3	100
	Ability Enhancement Course (AEC-03)		Drawn From the University Pool	2	2	100
	Skill Enhancement Course (SEC-03)		Drawn From the University Pool	3	3	100
	Total			20	23	900
IV	Major -05	FOUDTL1	Tree Seed and Nursery Technology	4	4	100
	Major -05 Practical	FOUDTP1	Tree Seed and Nursery Technology	1	2	100
	Major -06	FOUDTL2	Forest Management	4	4	100
	Major -06 Practical	FOUDTP2	Forest Management	1	2	100
	Major -07	FOUDTL3	Forest Ecology and Ecosystem Analysis	3	3	100



	Major -07 Practical	FOUDTP3	Forest Ecology and Ecosystem Analysis	1	2	100
	Minor -04		Drawn From the University Pool	3	3	100
	Minor -04 Practical			1	2	100
	Ability Enhancement Course (AEC- 04)		Drawn From the University Pool	2	2	100
	Summer Internship (Compulsory for all)	FOUDSI1	Attachment to Industries/Institutions/Vill ages	Non credit		100
	TOTAL			20	24	1000
	Summer Internship (Compulsory for 2 Year Diploma course)			4		100
V	Major -08	FOUETL1	Application of RS & GIS in Forest and Watershed Management	4	4	100
	Major -08 Practical	FOUETP1	Application of RS & GIS in Forest and Watershed Management	1	2	100
	Major -09	FOUETL2	Wood Science and Technology	4	4	100
	Major -09 Practical	FOUETP2	Wood Science and Technology	1	2	100
	Major -10	FOUETL3	Forest Resource Management and Economics	4	4	100
	Major -10 Practical	FOUETP3	Forest Resource Management and Economics	1	2	100
	Minor- 05		Drawn From the University pool	3	3	100
	Minor - 05 Practical			1	2	100
	Internship	FOUEI1		2	-	100
	TOTAL			21	23+	900
VI	Major -11	FOUFTL1	Forest Protection	4	4	100
	Major -11 Practical	FOUFTP1	Forest Protection	1	2	100
	Major -12	FOUFTL2	Agroforestry and Tree Outside Forests	4	4	100
	Major -12 Practical	FOUFTP2	Agroforestry and Tree Outside Forests	1	2	100
	Major -13	FOUFTL3	Forest Products and Forest Based Industries	4	4	100

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	Major -13 Practical	FOUFTP3	Forest Products and Forest Based Industries	1	2	100
	Minor- 06		Drawn From the University pool	3	3	100
	Minor- 06 Practical			1	2	100
	TOTAL			19	23	800
VII	Major -14	FOUGTL1	Wildlife Management and Eco development	4	4	100
	Major -14 Practical	FOUGTP1	Wildlife Management and Eco development	1	2	100
	Major -15	FOUGTL2	World Forestry, Urban Forestry and Community Forestry	4	4	100
	Major -15 Practical	FOUGTP2	World Forestry, Urban Forestry and Community Forestry	1	2	100
	Major -16	FOUGTL3	Forest Policies, Acts and Legislation	4	4	100
	Major -16 Practical	FOUGTP3	Forest Policies, Acts and Legislation	1	2	100
	Minor- 07		Drawn From the University pool	3	3	100
	Minor- 07 Practical			1	2	100
	TOTAL			19	23	800
	Seminar (only for 4 years Honours course)			1		100
VIII (4 Year Honours with Research)	Major -17	FOUHTL1	Biostatistics and Research Methodology	4	4	100
	Major -17 Practical	FOUHTP1	Biostatistics and Research Methodology	1	2	100
	Minor- 08		Drawn From the University pool	3	3	100
	Minor- 08 Practical			1	2	100
	Research Project/Dissert ation	FOUHDD1	Research Project/Dissertation	12	-	100
			Total	21		500

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	GRAND TOTAL CREDITS			160		
VIII (4 Year Honours course)	Major -17	FOUHTL1	Biostatistics and Research Methodology	4	4	100
	Major -17 Practical	FOUHTP1	Biostatistics and Research Methodology	1	2	100
	Major -18	FOUHTL2	Forest Business and Entrepreneurship Development	4	4	100
	Major -18 Practical	FOUHTP2	Forest Business and Entrepreneurship Development	1	2	100
	Minor- 08		Drawn From the University pool	3	3	100
	Minor- 08 Practical			1	2	100
	Minor- 09		Drawn From the University pool	3	3	100
	Minor- 09 Practical			1	2	100
	Seminar	FOUHSS1	Seminar	2	2	100
			Total	20		900
GRAND TOTAL CREDITS				160		

Minor Courses offered by Department of Forestry Wildlife and Environmental Sciences

Semester	Course	Course Code	Name of the course	Credit	Hour/ week	Marks
I.	MINOR-1	FOUAML1	Introduction to Wildlife	3	5	100
	MINOR-1 (Practical)	FOUAMP1	Introduction to Wildlife	1		100
II.	MINOR-2	FOUBML1	Plantation Forestry	3	5	100
	MINOR-2 (Practical)	FOUBMP1	Plantation Forestry	1		100
III.	MINOR-3	FOUCML1	Earth Care Policy	3	5	100
	MINOR-3 (Practical)	FOUCMP1	Earth Care Policy	1		100

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Scheme and Syllabus- UG



IV.	MINOR-4	FOUDML1	Value Addition of NTFP	3	5	100
	MINOR-4 (Practical)	FOUDMP1	Value Addition of NTFP	1		100
V.	MINOR-5	FOUEML1	Commercial Nursery Production	3	5	100
	MINOR-5 (Practical)	FOUEMP1	Commercial Nursery Production	1		100
VI.	MINOR-6	FOUFML1	Industrial Plantation	3	5	100
	MINOR-6 (Practical)	FOUFMP1	Industrial Plantation	1		100
VII.	MINOR-7	FOUGML1	Environmental Audit	3	5	100
	MINOR-7 (Practical)	FOUGMP1	Environmental Audit	1		100
VIII.	MINOR-8	FOUHML1	Urban Forestry and Designing	3	5	100
	MINOR-8 (Practical)	FOUHMP1	Urban Forestry and Designing	1		100
	MINOR-9	FOUHML2	Ecotourism	3	5	100
	MINOR-9 (Practical)	FOUHMP2	Ecotourism	1		100

Multidisciplinary Courses offered by Department of Forestry Wildlife and Environmental Sciences

Sl. No.	Course	Course Code	Name of the course	Credit	Hour/week	Marks
1.	MULT-01	FOUAMD1	Know Your Forest	3	3	100

Skill Enhancement Courses offered by Department of Forestry Wildlife and Environmental Sciences

Sl. No.	Course	Course Code	Name of the course	Credit	Hour/week	Marks
I	SEC-01	FOUASL1	Nursery Technology	2	4	100
	SEC-01 (Practical)	FOUASP1	Nursery Technology	1		100

Value Added Courses offered by Department of Forestry Wildlife and Environmental Sciences

Semester	Course	Course Code	Name of the course	Credit	Hour/week	Marks
I	VAC-01	FOUAVL1	Environmental Education-I	2	2	100
II	VAC-03	FOUBVL1	Environmental Education-II	2	2	100

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SEMESTER – III

PAPER-I: FOREST BIOMETRY

(Major- 03)

CR: 3 + 1

Sub Code	L	T	P	Duration	IA	ESE	ESE(P)	Total	Credits
FOUCLT1 FOUCTP1	3	-	1	5 hours	30	70	100	200	4

Objectives:

1. To develop understanding of students about tree measurements, forest inventory, and yield concepts.
2. To apply biometric and dendrological measurement of individual trees and forests for forest stock and monetary estimation.
3. To design and implement comprehensive and appropriate forest resource inventories.
4. To enable skill job opportunities in forestry sectors.

Theory

Introduction, definition, objectives and scope of forest biometry. Units of measurement, standards of accuracy implied in their expression. Measurement of tree parameters- viz., diameter, height, volume. Stump and Stem analysis, Determination of tree age and dendrochronology for growth history and climate change studies. Estimation of growth and yield of individual tree and forest stands. Volume tables, yield and stand tables.

Forest inventory, sampling methods adopted in forestry. Measurement of crown density and crown ratios. Growth and yield prediction models – their preparation and applications.

Forest surveying tools and techniques

Practical

Height, diameter, volume measurements, Calculations of volume of felled as well as standing trees, Volume table preparation, Preparation of yield and stand table, Quantification of regeneration and stand establishment, Measurement of crown density and crown ratios, Dendrochronological studies and tree ring analysis. Site Survey tools and techniques, Application of different sampling methods,

Suggested Readings:

1. Agrawal, Praveen, (2008), Forest mensuration- Tree measurement, Bisen Singh Mahendra Pal Singh, 23 A Connaught Place Dehradun.
2. Avery, T.E. (1967). Forest Measurements. Mc Grand Hill Book Company, New York.
3. Chaturvedi, A.N. and L.S. Khanna (1982). A handbook on Forest Mensuration. International Book Distributors
4. Donald Bruce Francis Schumcher, (2015), Forest Mensuration, Agrihorti Press New Delhi.



PAPER-III: FOREST ECOLOGY AND ECOSYSTEM ANALYSIS (Major- 07) CR: 3+1

Sub Code	L	T	P	Duration	IA	ESE	ESE(P)	Total	Credits
FOUDTL3 FOUDTP3	3	-	1	5 hours	30	70	100	200	4

Objectives:

1. To develop knowledge about ecological aspects of forest resource and biodiversity conservation.
2. To develop skill on conducting biodiversity survey.
3. The student will be able to understand ecological principles and concepts including forest structure and function of ecosystem
4. To develop knowledge about biodiversity conservation (In-situ and ex-situ) approaches for high ecosystem service
5. To address the causes of land and forest degradation and deterioration and restorative technologies.
6. Development of ability to evaluate the site quality of different types of waste and degraded forest

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Theory

Concept of ecology, community and population ecology, ecosystem structure and function, types of ecosystems, energy flow in ecosystem, food chain, food web, ecological pyramids, forest biodiversity and its conservation, diversity indices (alpha, beta, gamma), Forest productivity, biomass of trees, concept of succession, Nutrient cycling and dynamics in forest ecosystem, organic matter decomposition, nutrient conservation strategies in forest.

Concept of global change ecology, major global change issues (increasing atmospheric CO₂ concentration, land use change), Climate change, carbon credit, carbon trading, fluxes and transformations, major impacts of global ecological changes on forests. CBD, IPCC, UNFCCC, COP, Kyoto Protocol, Paris agreement.

Practical

Determine the community structure of a forest stand, Biodiversity assessment- Frequency, density, IVI, Shannon-Weiner index, Simpson index, litter accumulation/decomposition determination in forest stand, Calculation of carbon sequestration, biomass of tree species, Use of online tools for Biodiversity/Carbon assessment.

Suggested Reading:



SEMESTER – VI

PAPER-I: FOREST PROTECTION

(Major- 11)

CR:4+1

Sub Code	L	T	P	Duration	IA	ESE	ESE(P)	Total	Credits
FOUFTL1 FOUFTP1	4	-	1	6 hours	30	70	100	200	5

Objectives:

1. To provide knowledge about forest protection, disease and insect pest of forest nursery, plantation and natural forests.
2. To guide students on integrated approaches of pest control and plant health.
3. To equip students on modern systems of forest protection and constituents of chemicals

Theory

Concept of forest protection, forest Pathology, Disease & Koch's postulates. Disease cycle, Biodegradation of wood; Heart rots; important fungal diseases of seedlings in forest nursery, forest dieback, Role of mycorrhiza in tree health. Factors affecting forest health; grazing & browsing, adverse climatic factors, weeds and other invasive species. Forest Entomology, Insect-plant relationship, population dynamics of forest insects, Major diseases of forest trees- Teak, Sal, Sissoo,

Bamboo etc., Insect classification groups, Insect pests of Commercially important tree species. Principles and Methods of Pest Management; Chemical control; Biological control of insect pests and diseases of forest trees. Integrated Pest Management. Forest fire (History, types, main causes, prevention and control), Evaluation of losses due to forest fire, Forest fire monitoring system.

PRACTICAL

Identification of diseases of forest nursery seedlings, Collection, identification and preservation of disease specimens of forest trees, Microscopic observations of pathogens, Culturing of major pathogens, Collection and preservation of forest insects, plant protection equipments, Preparation of herbarium of forest weeds, Laboratory tests for estimating decay resistance in wood, Extraction of spores of arbuscular mycorrhizal fungi from soil, Isolation and identification of fungal flora in decayed wood. Use of fungicides and pesticides for disease control

Suggested Readings:

1. Bakshi, B.K. (1976) Forest Pathology. Principles and Practices in Forestry. Controller of Publications, New Delhi.
2. Beeson, C.F.C. (1941) Forest Insects of India, The Ecology and Control of the diseases.

गुरु घासीदास विश्वविद्यालय
(केन्द्रीय विश्वविद्यालय अधिनियम 2009 क्र. 25 के अंतर्गत स्थापित केन्द्रीय विश्वविद्यालय)
कोनी, बिलासपुर - 495009 (छ.ग.)



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② Wildlife Biology
③ Afforestation Techniques

VALUE ADDED COURSES

VAC-I: Environmental Education-I

Credit- 2

Sub Code	L	T	P	Duration	IA	ESE (T)	Total	Credits
FOUAVL1	2	-		2 hours	30	70	100	2

Course objectives:

1. Develop a critical understanding of the environmental issues of concern
2. Understand the concept of natural resources; identify types of natural resources, their distribution and use with special reference to India.
3. Explain sustainable development, its goals, targets, challenges and global strategies for sustainable development.
4. Understand the concepts of ecosystems and its role in environment.

Unit I. Humans and the Environment-

The man-environment interaction: Humans as hunter-gatherers; Industrial revolution and its impact on the environment; Population growth and natural resource exploitation. The Club of Rome- Limits to Growth; UN Conference on Human Environment 1972; World Commission on Environment and Development and the concept of sustainable development; Rio Summit and subsequent international efforts.

Unit II. Natural Resources and Sustainable Development

Overview of natural resources: Classification of natural resources- biotic and abiotic, renewable and non-renewable. Biotic resources: forests, grasslands, wetlands, wildlife and aquatic. Water resources: Types of water resources- fresh water and marine resources. Renewable and non-renewable sources of energy; Conventional energy sources- coal, oil, natural gas, nuclear energy; Non-conventional energy sources- solar, wind, tidal, hydro, wave, ocean thermal, geothermal, biomass, hydrogen and fuel cells. Introduction to sustainable development: Sustainable Development Goals (SDGs).

Unit III. Environmental Issues: Local, Regional and Global

Environmental issues and scales: Extents of local, regional, and global phenomena. Pollution: Impact of sectoral processes on Environment; Types of Pollution- air, noise, water, soil, thermal, radioactive; municipal solid waste, hazardous waste. Land use and Land cover change: land degradation, deforestation, desertification, urbanization. Biodiversity loss: past and current trends, impact. Global change: Ozone layer depletion; Climate change. Disasters – Natural and Man-made

Unit IV. Conservation of Biodiversity and Ecosystems

Biodiversity and its distribution: Biodiversity as a natural resource; Levels and types of biodiversity; Biodiversity in India and the world; Biodiversity hotspots. Ecosystems and ecosystem services: Major ecosystem types in India and their basic characteristics forests, wetlands, grasslands, agriculture, coastal and marine; Ecosystem services- classification and their significance. Threats to biodiversity and ecosystems. Major conservation policies: in-situ and ex-situ conservation approaches; Major protected areas; the role of traditional knowledge, community-based conservation; Gender and conservation.

Unit V. Environmental Pollution and Health

Understanding pollution: Definition of pollution; Point sources and non-point sources of pollution. Air pollution. Water pollution: Sources of water pollution; water quality. Soil pollution and solid waste: Soil

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1. Develop an understanding of pollution through experiential learning.
2. Acquire knowledge on major international institutions and programmes and their role in conservation of the environment.
3. To learn about the biodiversity management practices, plantation care activities and nature care methods.
4. Acquainted with the major international treaties and our country's stand on and responses to the major international agreements.

UNIT I. Environmental Management

Introduction to environmental laws and regulation: Constitutional provisions- Article 48A, Article 51A (g) and other derived environmental rights; Introduction to environmental legislations on the forest, wildlife and pollution control. Environmental management system: ISO 14001 Concept of Circular Economy. Waste Management- Concept of 3R (Reduce, Recycle and Reuse) and sustainability; Ecolabeling /Ecomark scheme

Unit II. Environmental Treaties and Legislation

An overview of instruments of international cooperation; bilateral and multilateral agreements; conventions and protocols; COP, Major International Environmental Agreements: CBD; UNCCD; Vienna Convention; Montreal Protocol; UNFCCC; Kyoto Protocol; Paris Agreement; Major Indian Environmental Legislations: The Wild Life (Protection) Act, 1972; The Water (Prevention and Control of Pollution) Act, 1974; The Forest (Conservation) Act, 1980; The Air (Prevention and Control of Pollution) Act, 1981; The Environment (Protection) Act, 1986; The Biological Diversity Act, 2002; The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006; National Green Tribunal; Major International organizations and initiatives: UNEP, IUCN, WCED, UNESCO, IPCC, MAB programme.

Unit III. Case Studies and Field Work

The students are expected to be engaged in some of the following or similar identified activities: Discussion on one national and one international case study related to the environment and sustainable development.

1. Field visits to identify local/regional environmental issues, make observations including data collection and prepare a brief report.
2. Participation in plantation drive and nature camps.
3. Documentation of campus biodiversity.
4. Campus environmental management activities such as solid waste disposal, water Management and sanitation, and sewage treatment.

Suggested Readings

1. Jørgensen, Sven Marques, Erik João Carlos and Nielsen, Søren Nors (2016) Integrated Environmental Management, A transdisciplinary Approach. CRC Press.
2. Theodore, M. K. and Theodore, Louis (2021) Introduction to Environmental Management, 2nd Edition. CRC Press.
3. Tiefenbacher, J (ed.) (2022), Environmental Management - Pollution, Habitat, Ecology, and Sustainability, Intech Open, London. 10.5772/
4. UNEP (2007) Multilateral Environmental Agreement Negotiator's Handbook, University of Joensuu, ISBN 978-952-458-992-5
5. Kanchi Kohli and Manju Menon (2021) Development of Environment Laws in India, Cambridge University Press.
6. India Code – Digital repository of all Central and State Acts: <https://www.indiacode.nic.in/>

21/12/23



municipal solid waste, hazardous waste. Land use and Land cover change: land degradation, deforestation, desertification, urbanization. Biodiversity loss: past and current trends, impact. Global change: Ozone layer depletion; Climate change. Disasters – Natural and Man-made

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Unit VI. Climate Change: Impacts, Adaptation and Mitigation

Understanding climate change: Natural variations in climate; Structure of atmosphere; Anthropogenic climate change from greenhouse gas emissions– past, present and future; Projections of global climate change with special reference to temperature, rainfall, climate variability and extreme events; Importance of 1.5 °C and 2.0 °C limits to global warming. Green House Gas (GHG) reduction vs. sink enhancement; Concept of carbon intensity, energy intensity and carbon neutrality; National and international policy instruments for mitigation, and net zero targets for the future; Energy efficiency measures; Renewable energy sources; Carbon capture and storage, National climate action plan and Intended Nationally Determined Contributions (INDCs); Climate justice.

Suggested readings

1. Erach Bharucha (2021). Text Book OF ENVIRONMENTAL STUDIES FOR UG 3RD Edition. Orient Blackswan Pvt. Ltd. ISBN 9389211786

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List of Revised Courses

Department : Department of Forestry, Wildlife and Environmental Sciences

Program Name : M. Sc. (Forestry and Environmental Sciences)

Academic Year : 2023-24

List of Revised Courses

Sr. No.	Course Code	Name of the Course
01.	FOPATT1/FOPALT1	Advances in Silviculture
02.	FOPBTT3/FOPBLT3	Forest Product & Utilization
03.	FOPDTT1/FOPDLT1	Forest Statistics and Research Methodology



Minutes of Meetings (MoM) of Board of Studies (BoS)

Academic Year : 2023-24

School : Natural Resources

Department : Forestry, Wildlife and Environmental Sciences

Date and Time : July 03, 2023 - 11:30 AM

Venue : Smart Class Room

The Board of Studies (BoS) meeting of Department of Forestry, Wildlife and Environmental Sciences, School of Studies of Natural Resources, Guru Ghasidas Vishwavidyalaya, Bilaspur was held on dated 03.07.2023 at 11:30 am in the smart classroom to discuss and design the syllabus of B. Sc. (Forestry) 4 Years (8 semesters) scheme as per NEP 2020 guidelines, M.Sc. Forestry and Environmental Sciences and Ph. D. coursework curriculum and credit framework/ syllabus as per LOCF guidelines. External Expert has joined the meeting through online mode. The following members of BOS were present in the meeting:

The following members were present in the meeting:

5. Prof. Manmohan Dobriyal, External Expert Member, Rani Laxmi Bai Central Agricultural University, Jhansi
6. Prof. S C Tiwari (Member BoS, Dept. Forestry, Wildlife and Environmental Sciences)
7. Prof. K.K. Chandra (HOD, Associate Prof., Dept. Forestry, Wildlife and Environmental Sciences, Chairman, BOS)
8. Dr. Bhavana Dixit (Member BoS, Associate Professor, Dept. Forestry, Wildlife and Environmental Sciences)

Following points were discussed during the meeting

4. Revised LOCF ordinance of B. Sc. (Forestry) Four Years (8 Semester) degree program.
5. LOCF/ECS scheme is implemented in any of the program of B. Sc. (Forestry) Four Years (8 Semester) degree program.
6. The BoS has approved the CBCS Course curriculum and ordinance of B. Sc. (Forestry) Four Years (8 Semester) degree program with effect from academic session 2021-22.

विभागाध्यक्ष
Head

वनिकी, वन्यजीव एवं पर्यावरण विभाग
Department of Forestry, Wildlife and Environmental Science
गुरु घासीदास विश्वविद्यालय, बिलासपुर (छ.ग.)
Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.)

Signature & Seal of HoD



Scheme and Syllabus- PG

Curriculum and Credit Framework
FOR
M.Sc. FORESTRY & ENVIRONMENTAL SCIENCE

(w.e.f. Academic session:2023-24)



“SCHOOL OF NATURAL RESOURCES”

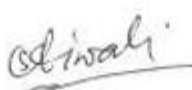

DEPARTMENT OF FORESTRY, WILDLIFE & ENVIRONMENTAL SCIENCES

GURU GHASIDAS VISHWAVIDYALAYA

(A Central University established by the Central University Act, 2009 No. 25 of 2009)

BILASPUR-495009, CHHATTISGARH


2.7.2023



Course Structure

M.Sc. Forestry and Environmental Science (2 -Years / 4- Semester)

Semester	Course Opted	Course Code	Name of the Course	Credit	Hour/ week	Marks
I st SEM	Core-01	FOPATT1	Advances in Silviculture	3	3	100
	Core-01 Practical	FOPALT1	Advances in Silviculture	1	3	100
	Core -02	FOPATT2	Forest Biotechnology & Tree Improvement	3	3	100
	Core -02 Practical	FOPALT2	Forest Biotechnology & Tree Improvement	1	3	100
	Core-03	FOPATT3	Forest Biometry, Surveying & Engineering	3	3	100
	Core-03 Practical	FOPALT3	Forest Biometry, Surveying & Engineering	1	3	100
	Core -04	FOPATT4	Forest Soil and Watershed Management	3	3	100
	Core -04 Practical	FOPALT4	Forest Soil and Watershed Management	1	3	100
	Core-05	FOPATT5	Wildlife Management and Conservation	3	3	100
	Core-05 Practical	FOPALT5	Wildlife Management and Conservation	1	3	100
TOTAL				20	30	1000

II nd SEM	Core -06	FOPBTT1	Forest Management, Remote Sensing & GIS	3	3	100
	Core -06 Practical	FOPALT1	Forest Management, Remote Sensing & GIS	1	3	100
	Core -07	FOPBTT2	Agro-Forestry and Farm Forestry	3	3	100
	Core -07 Practical	FOPBLT2	Agro Forestry and Farm Forestry	1	3	100
	Core-08	FOPBTT3	Forest Product & Utilization	3	3	100
	Core-08 Practical	FOPBLT3	Forest Product & Utilization	1	3	100
	Core -09	FOPBTT4	Policy, Acts and Legislation in Forestry, Wildlife and Environment	3	3	100

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	Core -09 Practical	FOPBLT4	Policy, Acts and Legislation in Forestry, Wildlife and Environment	1	3	100
	Core -10	FOPBTT5	Environment Management and Sustainability	3	3	100
	Core -10 Practical	FOPBLT5	Environment Management and Sustainability	1	3	100
	TOTAL			20	30	1000
	Summer Internship (Forest/ industry/ Institution)			Non- credit		

IIIrd SEM	Core -11	FOPCTT1	Forest Protection	3	3	100
	Core -11 Practical	FOPCLT1	Forest Protection	1	3	100
	Core 12	FOPCTT2	Wood Science and Technology	3	3	100
	Core 12 Practical	FOPCLT2	Wood Science and Technology	1	3	100
	Core-13	FOPCTT3	Forest Ecology and Biodiversity Conservation	3	3	100
	Core-13 Practical	FOPCLT3	Forest Ecology and Biodiversity Conservation	1	3	100
	Core 14	FOPCTT4	Industrial Safety, Health and Environment	3	3	100
	Core-14 Practical	FOPCLT4	Industrial Safety, Health and Environment	1	3	100
	Core 15	FOPCTT5	Forest and People	3	3	100
	Core-15 Practical	FOPCLT5	Forest and People	1	3	100
	TOTAL			20	30	1000

IV th SEM	Core - 16	FOPDTT1	Forest Statistics and Research Methodology	3	3	100
	Core - 16 Practical	FOPDLT1	Forest Statistics and Research Methodology	1	3	100
		FOPDPJ1	Dissertation	20	64	400
	TOTAL			24	70	600
Grand total				84	160	3600

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SEMESTER-I

PAPER I. ADVANCES IN SILVICULTURE

CR.4 (3+1)

Course Objectives:

1. To develop understanding of student on the characteristics of various tree species and Forest classification of India.
2. To perform the regeneration survey, production techniques of tree species and their adaptations to different type of environments.
3. To acquire knowledge on forest operations required for sustainable forest management

Theory

Principles of Silviculture, objective and scope, relationship with the other branch, Forest ecosystem-structure and functioning, community development, competitive interactions in forest communities, forest succession. Eco-physiology of tree growth, factors of the locality, bioclimate and microclimate effect, stand dynamics-forest succession, major forest formations- classification, distribution, composition and structure. Vegetation dynamics- species richness-diversity indices. Vegetation forms of India and their productivity. Classification of world's forest vegetation, forest types and their distribution, Forest stand development – stand development, even- aged and uneven-aged stands and site quality. Introduction and importance of nursery. Types of nurseries-temporary and permanent, component of modern nursery, bare root, containerized and clonal nursery. Pre-sowing seed treatments, seed sowing and intermediate operations, viz., pricking, watering, fertilization, weeding and hoeing. Natural and artificial regeneration. Tending operation. Regeneration of important forest tree species (*Shorea robusta*, *Tectona grandis*, *Gmelina arborea*, *Eucalyptus* spps. *Dalbergia sissoo*, *Bamboo* spps. *Cedrus deodara* and *pinus roxburghii*), regeneration survey and techniques.

Practical

Acquaintance with various technical terms of silviculture. Study the forest composition. Recording the observations on shoot development, growth rings, crown development, leafing, flowering, and fruiting in (*Shorea robusta*, *Tectona grandis*, *Gmelina arborea*, *Eucalyptus* spps. *Bamboo* spps. *Cedrus deodara*, *Dalbergia sissoo*). Study of site factors like climatic, edaphic, physiographic and biotic. Study of natural regeneration, Afforestation and Reforestation success. Layout of nursery bed for sowing. Classification of world's forest vegetation. Visit to forest areas to study forest composition, classification, factors of locality, site quality, form and growth of forest trees- study plant succession- study stand density, changes on productivity- thinning effects;

Suggested Readings

Shriwast *Shriwast* *Shriwast*



PAPER III: FOREST PRODUCT AND UTILIZATION

Course Objectives

1. To equip students on the status of forest products of Indian forests
2. To aware learners on economy status of different non wood products
3. To acquainted students on the processing, value addition and marketing procedures of forest products and its utilization pattern.

Theory

Supply and demand status of wood, export, and import of timber, its products, and channels. Brief status of solid wood, reconstituted, and handicraft industry; such as wood carving, basketry, executive desk accessories, furniture, joinery, cabinets, sports goods, sawmills, wood seasoning, flooring and paneling, automobile body building, wood treatment, wood preservation, building construction, packaging and boats. Industrial utilization of wood and bark. Classification of non-wood forest products like gums and resins, katha, dyes, tannins, oils, raw drugs, bamboo, canes and other products. Technologies for extraction of gums, resins, oleo-resin katha, dyes, tannins, oils, raw drugs and other products. Tendu leaves, Lac, and Sericulture. Utilization of various non wood forest products and their scientific management for processing, value addition, storage and marketing. **Quality assessment of important products and their methods for storage.**

Medicinal and aromatic plant wealth of India, Importance of medicinal and aromatic plants in human health, national economy and related industries. Need of cultivation of medicinal and aromatic plants as agricultural crops. **Quality concern in plant based drugs. National Medicinal plant development boards.** Cultivation techniques of important medicinal plants: Senna, *Gloriosa superba*, *Valeriana jatamansi*, *Swertia chirayita*, *Isabgol*, *Rauwolfia serpentina*, *Withania somnifera*, *Opium Poppy*, *Aloe vera*, *Satavar*, *Stevia rebaudiana*, *Safed Musli*, *Kalmegh* and



other important aromatic species of the region. Postharvest processing-drying, grading and storage. Essential oils and their quality analysis. Important industries based on non wood forest products and their management.

Practical

Estimation of extractives in a given wood-bark sample; Determination of specific gravity, F.S.P. from shrinkage and sorption; Measurement of thermal conductivity, dielectric constant, permeability of wood to air; Moisture content by oven-drying and distillation methods; Extraction of resins, gums, katha, dyes, tannins, oils raw drugs, bamboos, canes and other products; Estimation of tannins, essential oils in sandalwood, dyes and dyeing trials on different fabrics; Value addition techniques for these products; Visit to non wood forest products based industries. Morphological identification of listed plants and their economic parts, maturity indices; Preparation and layout of nursery and field, methods of seed sowing/ transplantation, cultural operations in MAP crops; Visit to government and private Pharmaceutical units/ Institutes in adjoining areas and MACP; Visit to nearby marketing/ trade centres.

Suggested Reading

- Linskens HF and Jackson JF. 1991. Essential Oils and Waxes (Ed.). Springer-Verlag Berlin Heidelberg.
- Mathe A. 2015. Medicinal and Aromatic Plants of the World-Scientific, Production, Commercial and Utilization Aspects. Springer Netherlands.
- Panda H. 2005. Hand Book on Specialty Gums, Adhesive, Oils, Rosin And Derivatives, Resins, Oleoresins, Katha, Chemicals with others Natural Products. Asia Pacific business press. Inc.
- Panshin AJ, Harrer ES and Bethel JS. Forest Products, their Sources, Production and Utilization.
- Shackleton S, Shackleton C and Shanley P. 2011. Non-Timber Forest Products in the Global Context (Ed.). Springer, Verlag Berlin Heidelberg.

PAPER IV: POLICY, ACTS AND LEGISLATION IN FORESTRY, WILDLIFE AND ENVIRONMENT

Cr.A (3+1)

Course Objectives:

1. To develop understanding about the forest policies and laws governing forest conservation
2. Awareness on the environmental legislations safeguarding the nature and its components.
3. To develop knowledge on biodiversity acts and forest rights to explore the forest resources.

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SEMESTER IV

PAPER I. FOREST STATISTICS & RESEARCH METHODOLOGY CR.4 (3+1)

Course Objectives:

1. To learn about bio statistics, experimental designs for the forest based experiment
2. To develop understanding of the data handling, tabulation and graphical representation
3. To learn the uses of different statistical software.

Theory

Basics of statistics: Scales of measurement, types of data: quantitative and qualitative data of forest tree species frequency arrangement, different series and its arrangement and representation methods, Central tendency: Mean, Median, Mode, Measures of Dispersion: Range, quartile deviation, Mean deviation and Standard deviation- variance, covariance, Basic concept of probability, Correlation: Concept, Karl Pearson's coefficient, Spearman rank correlation coefficient, Regression: Regression equations, linear and nonlinear regressions and regression coefficient. Tests of significance: t- test, paired t-test, Z- test and χ^2 -test

Analysis of Variance (ANOVA) - one way and two way analysis of variance, Experiments designs:

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Basic concept, Principles of experimental designs, Completely Randomized Design (CRD), Randomized Block Design (RBD), Latin Square Design (LSD), Split Plot and Strip Plot Designs, Comparisons of all experimental designs, SPSS, PAST and other online tools of statistical analysis.

Practical

Use of Excel sheet: To arrange forest based statistical data and represent in different diagram and graphical ways, Forest based measurements: arrangements and frequency distribution, Calculation of mean, median and mode of measured characteristics of different tree species, Finding out the relationship between the height and DBH of some forest tree species-correlations and regressions, Testing the hypothesis under t- test, z- test and χ^2 -test, ANOVA under the different types of designs: Completely Randomized Block Design, Randomized Block Design, Latin Square Design, application of SPSS, PAST and other online tools for statistical analysis

Suggested Readings

Forestry Statistics India-1996: Indian Council of Forestry Research and Education, 1999

Mead R & Relay J. 1987. *Statistical Tools for Agro-Forestry Research* - Bivariate Analysis for intercropping Experiments. ICRAF, Nairobi.

G. S. S. School RN & Paramathma M. *Statistical Methods for Agricultural*