



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

The scheduled meeting of member of Board of Studies (BoS) of Department Forestry, Wildlife and Environmental Sciences, School of Studies of Natural Resources, Guru Ghasidas Vishwavidyalaya, Bilaspur was held on dated 28.10.2021 at 11:30 am in smart class room to design and discuss the M. Sc. (Forestry and Environmental Sciences) scheme and syllabi.

The following members were present in the meeting:

1. Prof. A.K. Singh (External Expert Member BoS, Dept. of Genetics and Plant Breeding, College of Agriculture, Pant Nagar)
2. Prof. S S Singh (Member BoS, Dept. Forestry, Wildlife and Environmental Sciences)
3. Dr. Dr. S.C. Tiwari (HOD, Associate Prof., Dept. Forestry, Wildlife and Environmental Sciences, Chairman, BOS)
4. Dr. K.K. Chandra (Member BoS, Associate Professor, Dept. Forestry, Wildlife and Environmental Sciences)
5. Dr. Gunjan Patil (Member, Assistant Professor, Dept. Forestry, Wildlife and Environmental Sciences)

Following points were discussed during the meeting

1. Revised CBCS ordinance of M.Sc. Forestry & Environmental Sciences.
2. CBCS/ECS scheme is implemented in any of the program of M. Sc. (Forestry and Environmental Sciences).
3. The BoS has approved the CBCS Course curriculum and ordinance of M.Sc. Forestry & Environmental Sciences with effect from academic session 2021-22.

### **List of New Course(s) Introduced**

Sr. No.	Course Code	Name of the Course
1.	FOPBTT2	Forest Industries and Wood Technology
2.	FOPBTM1	Forest Statistics and Research Methodology
3.	FOPCLJ5	Sustainable Forest Management in Changing World
4.	FOPCTO1	Urban Forestry
5.	FOPDPJ1	ICT Tools and Techniques Application in Forestry
6.	FOPDPJ2	Student Project and Dissertation
7.	FOPDPR1	ICT Tools and Techniques Application in Forestry
8.	FOPDPR2	Student Project and Dissertation

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



**Guru Ghasidas Vishwavidyalaya**  
(A Central University Established by the Central Universities Act 2009 No. 25 of 2009)  
**Koni, Bilaspur - 495009 (C.G.)**

**विभागाध्यक्ष**  
**Head**

**यानिकी, 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**

गुरु घासीदास विश्वविद्यालय  
(केन्द्रीय विश्वविद्यालय अधिनियम 2009 क्र. 25 के अंतर्गत स्थापित केन्द्रीय विश्वविद्यालय)  
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COURSE SYLLABUS  
FOR

M.Sc. FORESTRY & ENVIRONMENTAL SCIENCES

Choice Based Credit System (CBCS)  
(w.e.f. Academic session:2021-22)



“SCHOOL OF NATURAL RESOURCES”

DEPARTMENT OF FORESTRY, WILDLIFE & ENVIRONMENTAL  
SCIENCES

GURU GHASIDAS VISHWAVIDYALAYA  
BILASPUR-495009, CHHATTISGARH

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

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**Course Structure**  
**M.Sc. Forestry (2 -Year / 4- Semester) CBCS Program**

Semester	Course Opted	Course Code	Name of the Course	Credit	Hour/week	Marks
I <sup>st</sup> SEM	Core-01	FOPATT1	Silviculture	3	3	100
	Core-01 Practical	FOPALT1		1	3	100
	Core-02	FOPATT2	Forest Biometry, Surveying & Engineering	3	3	100
	Core-02 Practical	FOPALT2		1	3	100
	Core-03	FOPATT3	Forest Management, Remote Sensing & GIS	3	3	100
	Core-03 Practical	FOPALT3		1	3	100
	Core-04	FOPATT4	Forest Protection	3	3	100
	Core-04 Practical	FOPALT4		1	3	100
	Core-05	FOPATT5	Forest Ecology and Biodiversity Conservation	3	3	100
	Core-05 Practical	FOPALT5		1	3	100
	Core -06	FOPATT6	Forest Policy, Law and Environmental Legislation	3	3	100
	Core -06 Practical	FOPALT6		1	3	100
	<b>TOTAL</b>				<b>24</b>	<b>36</b>

II <sup>nd</sup> SEM	Core -07	FOPBTT1	Forest Tree improvement and Biotechnology	3	3	100
	Core -07 Practical	FOPBLT1		1	3	100
	Core -08	FOPBTT2	Forest Industries and Wood Technology	3	3	100
	Core -08 Practical	FOPBLT2		1	3	100
	Core -09	FOPBTT3	Wildlife Biology and Conservation	3	3	100
	Core -09 Practical	FOPBLT3		1	3	100
	Core -10	FOPBTT4	Forest Soil and Watershed Management	3	3	100

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Core -10 Practical	FOPBLT4		1	3	100
Core -11	FOPBTT5	Global Environment and Climate Change	3	3	100
Core -11 Practical	FOPBLT5		1	3	100
RM -01	FOPBTM1	Forest Statistics and Research Methodology	3	3	100
RM-01 Practical	FOPBLM1		1	3	100
<b>TOTAL</b>			<b>24</b>	<b>36</b>	<b>1200</b>

<b>III<sup>rd</sup> SEM Forest Management (FM)</b>	Core -01	FOPCTJ1	Forest Resource Analysis	3	3	100
	Core-01 Practical	FOPCLJ1		1	3	100
	Core -02	FOPCTJ2	Production Management in Nursery and Plantation Forestry	3	3	100
	Core -02 Practical	FOPCLJ2		1	3	100
	Core -03	FOPCTJ3	Finance and Marketing Management of Forest Resources	3	3	100
	Core -03 Practical	FOPCLJ3		1	3	100
	Core -04	FOPCTJ4	Tree Business Management	3	3	100
	Core -04 Practical	FOPCLJ4		1	3	100
	Core -05	FOPCLJ5	Sustainable Forest Management in Changing World	3	3	100
	Core -05 Practical	FOPCLJ5		1	3	100
	OE-01	FOPCTO1	Urban Forestry	2	2	100
	<b>Total</b>			<b>22</b>	<b>32</b>	<b>1100</b>

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IV <sup>th</sup> SEM Forest Management (FM)					
Dissertation/Field work/ Internship/Project/Industry Visit/ Field Visit	FOPDDJ1	Field Training (Attachment with State Forest Department for understanding of Operations and Management / Practices currently used in Forest Management.	10	30	150
	FOPDEJ1	Forest Based Industrial Training	10	30	150
	FOPDPJ1	ICT Tools and Techniques Applications in Forestry.	03	09	50
	FOPDPJ2	Student Project Dissertations.	02	06	50
	<b>Total</b>		<b>25</b>	<b>75</b>	<b>400</b>
<b>GRAND TOTAL</b>			<b>95</b>	<b>179</b>	<b>3900</b>

III <sup>rd</sup> SEM Forest Genetic Resources (FGR)	Core -01	FOPCTR1	Breeding Methods in Forest Trees	3	3	100
	Core -01 Practical	FOPCLR1		1	3	100
	Core-02	FOPCTR2	Forest Tree Reproductive Biology and Seed Orchards	3	3	100
	Core -02 Practical	FOPCLR2		1	3	100
	Core-03	FOPCTR3	Molecular Genetics of Forest Trees	3	3	100
	Core -03 Practical	FOPCLR3		1	3	100
	Core-04	FOPCTR4	Quantitative Genetics of Forest Trees	3	3	100
	Core -04 Practical	FOPCLR4		1	3	100
	Core -05	FOPCLR5	Forest Genetic Diversity, Conservation and Environmental Impact	3	3	100
	Core -05 Practical	FOPCLR5		1	3	100

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OE-01	FOPCTO1	Urban Forestry	2	2	100
<b>Total</b>			<b>22</b>	<b>32</b>	<b>1100</b>

IV <sup>th</sup> SEM Forest Genetic Resources (FGR)					
Dissertation/Field work/Internship/Project/Industry Visit/ Field Visit	FOPDDR1	Field Training (Attachment with State Forest Department for understanding of analysis of FGR, Forest Operations and Management of Forest Genetic Resources)	10	30	150
	FOPDER1	Forest Based Industrial Training	10	30	150
	FOPDPR1	ICT Tools and Techniques Applications in Forestry	03	09	50
	FOPDPR2	Student Projects Dissertations.	02	06	50
	<b>Total</b>		<b>25</b>	<b>75</b>	<b>400</b>
<b>GRAND TOTAL</b>			<b>95</b>	<b>179</b>	<b>3900</b>

**Grand Total of Credits: 95**

- The student project will be allotted in III Semester and will be evaluated at the end of IV Semester. Students will be given a topic for the project related to the curriculum by the supervisor allotted for the project.
- **Visits:** Visits to forest operation sites, forest nursery, wildlife habitats and plantation sites will be conducted as per the requirement of the curriculum.

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PAPER II. FOREST INDUSTRIES AND WOOD TECHNOLOGY

CR.4 (3+1)

Theory

Wood formation, kinds of wood, wood properties: physical, mechanical, acoustic and electrical properties, Wood strength, Wood moisture, Wood seasoning, defects and wood preservation. Wood machining and wood working. Concept and principle of Smart furniture, application of nano-science in wood industries. Importance of forest based industries in Indian economy, resin, tannin, gums extraction, resources of essential oil, katha and cutch, dyes and pigments.

Wood based industries: paper and pulp, match, sport goods, plywood, matchwood industries, improved wood, engineered wood, composite wood. Wood certification.

Practical

Determination of wood density, wood bulking, wood moisture, identification of wood samples, wood defects, determination of wood strength, Effectiveness of wood preservatives, Grading of wood, wood based industries, improved wood and composite wood. Extraction of essential oil, tannin, gums and natural dyes. Grading of plywood, visit of forest based industries, sawmill, timber marts.

Suggested Reading:

Chauhan Laxmi and Vijendra Rao. 2003. Wood anatomy of Legumes of India: their identification, properties and uses. Bisen Singh and Mahendra Pal Singh, Dehradun.

Eiri Board 2011. Modern Technology of wood, veneer, plywood, particle board, fiberboard, bamboo and forest products. Engineers India Research Institute, India

Mehta T. 1981. A hand book of forest utilization. Periodical expert book agency Printer and publisher, New Delhi.

Murthy T.K. 2010. Minor forest products of India. Oxford and IBH Publication, India.

Negi SS. 1997. Wood Science and Technology. International book distributor, Dehradun.

Rao KR and Juneja KBS, 1992. Field identification of 50 important timbers of India, ICFRE Publication, Dehradun, India

Sharma LC. 1977. Development of Forests and forest based industries. Bisen Singh and Mahendra Pal Singh Dehradun, India

Terry Porter 2006. Wood: Identification and use. Guilds of Master Craftsman Publication.

Tewari, D.N. 2008. Management of non-timber forest resource of India. International Book Distributor Company, Lucknow, India

Trotter H. 1992. Manual of Indian Forest Utilization. Forest Research Institute, Dehradun.

Tsoumis G. 2009. Science and Technology of Wood. Verlag Kessel

Troup RS. 2007. Manual of Indian forest utilization. Today and Tomorrow Printers and Publishers, New Delhi

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**PAPER VI. FOREST STATISTICS & RESEARCH METHODOLOGY** CR.4

(3+1)

**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  $\chi^2$ -test

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

**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

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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  $\chi^2$ -test.

ANOVA under the different types of designs: Completely Randomized Block Design, Randomized Block Design, Latin Square Design

**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.

Surendran C, Sehgal RN & Paramathma M. *Statistical Methods for Agricultural Workers*. ICAR. 2003.

R. Rangaswamy: A Text Book of Agricultural Statistics, New Age International Pvt Ltd Publisher, ISBN-9788122425925, 9788122425925

Dr. S R S Chandel: A handbook of Agricultural Statistics, IMPECT PUBLISHER ISBN-9780012599754, 0012599751



**PAPER V: SUSTAINABLE FOREST MANAGEMENT IN CHANGING WORLD**

New

CR.4 (3+1)

**Theory**

Sustainable Forest Management-concept, principles, origin and challenges, 'sustainable forest management principles. The Montreal Process, Criteria and Indicators of Sustainable Forest Management, Bhopal India Process.

Management of Common Property Resources (CPRs) and open access resources, The role of indigenous and local communities on forest management and sustainable livelihood strategies, Sustainable Fuel wood, Sustainable NTFP management, Forests in rural development, forest societies, social and cultural factors of forest management, Forest rights of people.

Micro-level planning and participatory rural appraisal. Techniques of PRA and RRA, role of NGOs and other community based organizations in forest management. Gender dimension of forest management. Ecotourism: sustainable tourism and people's participation.

Global environmental challenges and issues, Carbon credit, CIFOR, REDD, REDD+ Payments for environmental services. National strategies and action plans for SFM, CAMPA, JFM, ASSISTED NATURAL REGENERATION, National Green Tribunal.

SFM in protected forest area, Wildlife and human conflicts, Community participation in wildlife management; International programmes for biodiversity conservation, convention on biological diversity (CBD), CITES, ITTA, IUCN, WWF, UNFCCC, Kyoto Protocol, TRIPS, (IPR) Intellectual Property Right and bio resource patenting.

**Practical**

Practice of Participatory Rural Appraisal technique. Preparation of micro plan for sustainable forest management. Resource survey and preparation of resource map. Exercise on designing training program for sustainable forest management. How to prepare leaflets and pamphlets ?.

**Suggested Readings**

Anonymous. 2006. Report of the National Forest Commission. Govt. of India, New Delhi.

E. Claussen, V. A. Cochran, and D. P. Davis. 2001. *Climate Change: Science, Strategies, & Solutions*, University of Michigan.

Huxley P. 1999. *Tropical Agroforestry*. Blackwell Science.

Koskela J, Buck A & Teissier du Cros E. 2007. *Climate Change and Forest Genetic Diversity: Implications for Sustainable Forest Management in Europe*. Biodiversity International; Rome, Italy.

*Strategies and Solutions*. Pew Centre on Global Climate Change, USA.

Streck, C et al, 2006 *Climate Change and Forests Emerging Policy and Market Opportunities*

Today & Tomorrow's Printers and Publishers New Delhi.

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**PAPER: VI. Urban Forestry**

Need

CR.2

**Theory:**

Introduction, objective and scope of urban forestry, History of Urban Forestry/Distribution and Ownership of the Urban. Forest Functions and Values of the Urban Forest, Urban Forest Environment, Tree Hazard Assessment and Management of Street, roads and parks, tree inventories and Valuation. The Urban Wildland Interface, Species selection for Street Tree and Park Management: Planting, Tree Maintenance, Removals. Urban Forestry Ordinances, biomass estimation for carbon stock assessment and mitigation. Carbon footprint calculation, Report writings on different aspects of urban forestry for the improvement of communication skills.

**Suggested Readings**

1. Urban forestry: planning and management by Malcolm Fisher, Syrawood publication house.
2. Forestry and forest resources edited by V.K. Prabhakar, Anmol Publication, New Delhi.
3. Urban and recreational forestry by S.S. Negi, International book distributors Dehradun.
4. Manual of forestry by S.S. Negi, Bishen singh, Mahendra pal singh, Dehradun.
5. Plantation Forestry by R.K. Luna.

**3. ICT TOOLS AND TECHNIQUES APPLICATION IN FORESTRY.**

Need

Introduction to MS Office (Word, Excel, Power Point). Introduction of Statistical, GIS & plagiarisms softwares. Application of Remote sensing for forest resource measurements.

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Introduction to Multi-Media and its application. E-content survey consultation of scientific database concept of online learning platform (MOOCS, SWAYAM, NPTEL).

**4. STUDENT REPORT DISSERTATION**

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Field / laboratory based mini research work on different aspects of forestry, wildlife and environmental sciences.

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