



List of New Course (s) Introduced

Department : Department of Forestry, Wildlife and Environmental Sciences

Program Name : B. Sc. (Forestry)

Academic Year : 2016-17

List of New Course(s) Introduced :

The following new courses were introduced in the of B. Sc. (Forestry) Four year degree programme:

B. Sc. (Forestry)	Wood Technology& Nanoforestry
B. Sc. (Forestry)	Nursery Management and Commercial Forestry
B. Sc. (Forestry)	Remote sensing and Its application in Forestry
B. Sc. (Forestry)	Student Project



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

Academic Year : 2016-17

School : School of Natural Resources

Department : Department of Forestry, Wildlife and Environmental Sciences

Date and Time : June, 18, 2015 - 11:00 AM

Venue : Departmental Meeting Hall

The scheduled meeting of member of Board of Studies (BoS) of Department of Forestry, Wildlife and Environmental Sciences, School of Studies of Natural Resources, Guru Ghasidas Vishwavidyalaya, Bilaspur was held to design and discuss the B. Sc. (Forestry) 4 Year Degree Program scheme and syllabi.

The following members were present in the meeting:

1. Prof. N. P. Todaria (External Expert Member BoS, Dept. of Forestry, H. N. B. Garhwal, Central University, UK)
2. Prof. S. S. Singh (Member BoS, Dept. of Forestry, Wildlife and Environmental Sciences)
3. Dr S. S. Dhuria (Member BoS, Associate Professor, Dept. of Forestry, Wildlife and Environmental Sciences)
4. Dr. Garima Tiwari (Member BoS, Assistant Professor, Dept. of Forestry, Wildlife and Environmental Sciences)

Following points were discussed during the meeting

- Prof. N.P. Todaria External Examinees sent revised syllabus as per guidelines of CBCS on 18/06/2015 s a expert
- B.Sc. Forestry 4 years 8 semester and M.Sc. Forestry and Environmental sciences 2 Years four semester syllabus has been discussed restructured and finalized as per the need of choice based credit system.
- The entire syllabus of both programmes were revised and made as per the choice based credit system.
- B.Sc. Forestry programme will have a total of 184 credit point and M.Sc. Forestry Programme will have 98 credit points in total.
- B.Sc. Forestry Syllabus will have 40 papers up to VII Semester and VIII Semester will have following training program :
 - Forest Institutes and Industrial Visits.
 - Forestry Operations (Working Experience)
 - Socio-Economic Survey - Village Attachment



- The students will prepare the report based on the above trainings and evaluation will be done by one external examiner and two internal examiners.
- There will be one student project in B.Sc. Forestry program which will be allotted in III Semester and will be evaluated by a panel of two teachers of the department at the end of IV Semester.
- M.Sc. Forestry and Environmental Sciences syllabus will have 18 papers up to III Semester and IV Semester have following:
 - Field Training (Attachment with State Forest Department)
 - Industrial Training
 - Computational Skills
 - Student Project
- The students will prepare the report based on the above trainings and evaluation will be done by one external examiner and two internal examiners.
- Student project will be evaluated by a panel of two teachers of the department.
- There will be two specializations i.e.,
 - Forest Genetic Resources (FGR)
 - Forest Management (FM)
- Above subjects will be offered to the student as per their choice in the III Semester of the M.Sc. program.
- Minimum passing marks for each theory papers, practical, student project and trainings will be 40%.
- Computation of SGPA and CGPA will be done as per the UGC guidelines.
- Credit details, marks distribution and course content have been mentioned in the syllabus of B.Sc. Forestry and M.Sc. Forestry and Environmental Sciences program.
- The study tour to forest operation sites, forest nursery, wildlife habitat and plantation sites will be conducted as per the requirement in each semester.

The following new courses were introduced in the of B. Sc. (Forestry) Four year degree programme:

B. Sc. (Forestry)	Wood Technology & Nanoforestry
B. Sc. (Forestry)	Nursery Management and Commercial Forestry
B. Sc. (Forestry)	Remote sensing and Its application in Forestry
B. Sc. (Forestry)	Student Project

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

वानिकी, 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

COURSE SYLLABUS FOR

B.Sc. FORESTRY

(w. e. f. 2015-16)



“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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B.Sc. IV th Semester					
S. No.	Title of Paper	Lecture	Tutorial	Practical	Credits
01.	Wood Technology & Nanoforestry	3	--	1	4
02.	Nursery Management and Commercial Forestry	3	--	1	4
03.	Rangeland Management	2	1	1	4
04.	Remote sensing and Its application in Forestry	3	--	1	4
05.	Forest Pathology	3	--	1	4
06.	Forest Policy and Legislation	2	1	1	4
07.	Student Project	--	--	1	1
Total Credits					25

B.Sc. Vth Semester

SEMESTER – IV

PAPER I. WOOD TECHNOLOGY AND NANOFORESTRY

Cr.4 (3+1)

Wood- macroscopic and microscopic features of wood as raw material, Merits and demerits of wood as raw material, kinds of woods- heartwood, softwood; bamboos and canes. The physical features of wood. Mechanical properties of wood like tension, compression, bending, hardness, impact resistance, nail and screw holding capacities. Suitability of wood for various uses based on mechanical and physical properties. Electrical and acoustic properties of wood. Wood water relationship- shrinkage, swelling, movement, fibre saturation, equilibrium moisture content.

Wood seasoning, principles, types, merits and demerits- air seasoning, kiln seasoning and chemicals seasoning. Seasoning defects and their control. Wood preservation – Need, principles, processes, types of wood preservatives (Water soluble, oil based, etc.). Classification of timbers based on durability. Wood working and sawing doctrine.

NanoForestry:- definition, concept, scope, application and Techniques, Elemental composition of wood through nano particle. Significance of nano forestry.

PRACTICAL

Preliminary idea regarding conversion and milling. Estimation of moisture content and density of wood by oven dry method and by moisture meters. Seasoning of timber. Seasoning defects and their remedies. Woodworking, tools used and various stages and types of joints in wooden members, wooden fasteners, dowels, carving, sanding etc. Polishing and finishing of wood. Surface coating applications and wood primers. Wood preservatives. Chemicals used and methods of wood preservation and fire retardant treatments.

Suggested Readings:

1. Mehta, T.(1981) A handbook of forest utilization. Periodical Expert Book Agency, Delhi.
2. Anonymous. (1976) Indian forest utilization. Volume I and II ICFRE Publication, Dehradun.
3. Rao, K.R. and Juneja, K.B.S. (1992) Field identification of 50 important timbers of India. ICFRE Publi. Dehradun.

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4. Trotter, H. (1982) Indian forest utilisation, Forest Research Institute and Colleges, Dehradun
5. Wadoo, M.S. (1992) Utilization of forest resources. Idris Publ. Srinagar.
6. Bruce Hoodey (1997) Understan wood: A craftman guide to wood technology. Taunton press.
7. Hill Callum A S (2006) Wood modification: chemical thermal and other process. Today and Tommorrow publishers.

PAPER II. NURSERY MANAGEMENT AND COMMERCIAL FORESTRY

Cr.4 (3+1)

Propagation concept, definition, methods and importance. Site selection, planning and layout of nursery area. Types of nursery, types of nursery beds, preparation of beds. Presowing treatments. Methods of seed sowing, pricking, watering methods, weeding, hoeing, fertilization, shading, root culturing techniques, lifting windows, grading, packaging. Storing and transportation. Type and size of containers. Merits and demerits of containerized nursery. Preparation of ingredient mixture. Vegetative propagation techniques - macro and micropropagation. Nursery practices for some important tree species.

Origin, distribution, general description, phenology, silvicultural characters, regeneration methods, silvicultural systems and economic importance of the following conifer and broadleaved tree species of India. Conifers: *Cedrus deodara*, *Pinus roxburghii*, and *Juniperus macropoda*. Broad leaved species: *Tectona grandis*, *Shorea robusta*, *Acacia nilotica*, *Acacia catechu*, *Dalbergia sissoo*, *D. latifolia*, *Ecalyptus spp.* *Albizia lebbek*, *Albizia procera*, *Azardirachta indica* *Madhuca indica*, *Santalum album*, *Terminalia Spp* and *Bamboo Spp.*

PRACTICAL:

Preparation of production and planning schedule for bare root and containerized nurseries. Nursery site and bed preparation. Pre-sowing treatments. Sowing methods of small, medium and large sized seeds. Pricking and transplanting of pricked out stock within nursery in transplant beds. Intermediate nursery management operations. Preparation of ingredient mixture. Filling of containers. Study of vegetative techniques - cutting, grafting etc. Visit to tissue culture laboratory and other nurseries

Study of species composition in surrounding areas. Study of morphology and phenology of tree species growing in the area. Study of artificial regeneration of Pines, Bamboo, Oak, *Dalbergia sissoo* and *Acacia catechu*, etc. Practicing thinning in Bamboo clumps. Study on tree responses to the abiotic and biotic factors viz., light, fire, drought, frost, root suckering, coppicing and pollarding, etc. To study quality characters of nursery planting stock.

Suggested Readings:

1. Vinod Kumar (2011) Nursery and plantation practices in India. Today and Tommorrow publishers.
2. Mishra S.R (2010) Textbook of Dendrology. Today and Tommorrow publishers.

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Prof. S. K. Singh
29/6/15



systems. Research, IRRI. Los Banos - Philippines.

PAPER IV: REMOTE SENSING AND ITS APPLICATION IN FORESTRY

Cr.4 (3+1)

Remote Sensing definition, scope, merits and brief history of RS. RS used for forestry in Indian context, Sources of Energy and its interaction with Earth surface features. especially forest, Electromagnetic spectrum and its properties, orbit, sensor and platforms, Space Imaging Satellites used for forestry application.

GIS concept, components, variables, advantage and limitation, digital image concept, source of data and formats Hardware and Software used for Digital Image Processing. Procedure used for forest mapping and species identification, thematic image classification, GPS system and ground truthing, map, features types and uses, and map preparation. Application of remote sensing for forest identification and stock mapping, forest land use/land cover classification, change detection analysis, fire mapping.

PRACTICAL

Familiarization with hard copy and soft copy of images, map reading of SOI toposheets, introduction to different GIS and RS Software, File export import/ translation, Conversion of file formats, image, Projection, File sub setting, mosaicing, digitization, feature identification, GPS survey and point location, unsupervised and supervised classification of images for forest type and stock mapping, forest land use/land cover classification, field visit for ground data collection and truthing.

Suggested Readings:

1. Curran, P.J. (1985) Principles of Remote Sensing, Long man Group Ltd., England
2. Janssen, L.F.(2000) Principles of Remote Sensing. ITC. Edl. Text Book Series II. The Netherlands
3. Rolf A.de By. (2000) Principles of Geographical Information Systems. ITC. Edl. Text Book Series I. The Netherlands
4. Sabins, F.F.(1978) Remote Sensing-Principles and Interpretation. W.H.Freeman and Co., San Francisco.
5. Sharma, M.K.(1986) Remote Sensing and Forest Surveys, International Book Distributors, Dehra Dun

PAPER V. FOREST PATHOLOGY

Cr.4 (3+1)

Relation of plant pathology with forest pathology and other sciences, classification of tree diseases. Role of microbes and fungi in a natural forest ecosystem. Broad classification of different pathogens causing tree diseases. General characteristics of fungi, bacteria, viruses, phytoplasma and phanerogames. Important characters of ascomycetes and basidiomycetes. Growth and reproduction of

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List of New Course (s) Introduced

Department : Department of Forestry, Wildlife and Environmental Sciences

Program Name : M Sc (Forestry and Environmental Sciences)

Academic Year : 2016-17

List of New Course(s) Introduced

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Course Code	Name of the Course
M.Sc. (FGR)	Molecular Genetics of Forest Trees
M.Sc. (FGR)	Forest Genetic Diversity, Conservation & Environmental Impact
M.Sc. (FGR)	Field Training (Attachment with State Forest Department for analysis of FGR & its distribution) Project report writing, Presentation & Viva-voce
M. Sc. (FGR)	Industrial Training
M. Sc. (FM)	Tree Business Management
M. Sc. (FM)	Forest Management for Environmental Conservation
M. Sc. (FM)	Field Training (Attachment with State Forest Department for analysis of Forest Management patterns & Management techniques)
M. Sc. (FM)	Industrial Training



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

Academic Year : 2016-17

School : School of Natural Resources

Department : Department of Forestry, Wildlife and Environmental Sciences

Date and Time : June 18, 2015 - 11:00 AM

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M.Sc. (FGR)	Forest Genetic Diversity, Conservation & Environmental Impact
M.Sc. (FGR)	Field Training (Attachment with State Forest Department for analysis of FGR & its distribution) Project report writing, Presentation & Viva-voce
M. Sc. (FM and FGR)	Industrial Training
M. Sc. (FM)	Tree Business Management
M. Sc. (FM)	Forest Management for Environmental Conservation
M. Sc. (FM)	Field Training (Attachment with State Forest Department for analysis of Forest Management patterns & Management techniques)

गुरु घासीदास विश्वविद्यालय
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विभागाध्यक्ष
Head

वानिकी, 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
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Scheme and Syllabus

COURSE SYLLABUS
FOR

M.Sc. FORESTRY & ENVIRONMENTAL SCIENCES
(w. e. f. 2015-16)



"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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Handwritten signatures and dates:
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SPECIALIZATION
FOREST GENETIC RESOURCES (FGR)

M.Sc. III rd Semester					
S.No.	Title of Paper	Lecture	Tutorial	Practical	Credits
01.	Breeding Methods in Forest Trees	3	---	1	4
02.	Forest Trees Reproductive Biology and Seed Orchards	3	---	1	4
03.	Molecular Genetics of Forest Trees	3	---	1	4
04.	Quantitative Genetics of Forest Trees	3	---	1	4
05.	Forest Genetic Diversity, Conservation & Environmental Impact	3	---	1	4
Total Credits					20

M.Sc. IV th Semester		
S.No.	Title of Paper	Credits
01.	Field Training (Attachment with State Forest Department for analysis of FGR & its distribution) Project report writing, Presentation & Viva-voce	10
02.	Industrial Training Project report writing, Presentation & Viva-voce	09
03.	Computational Skills	05
04.	Student Project	01
Total Credits		25

Grand Total of Credits = 98

- The student project will be allotted in III semester and will be evaluated at the end of IV semester. Students may choose any project related to their curriculum. There will be no supervisor for the project.
- **Visits:** Visits to forest operation sites, forest nursery, wildlife habitat and plantation sites will be conducted as per the requirement of curriculum.

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SPECIALIZATION
FOREST MANAGEMENT (FM)

M.Sc. III rd Semester					
S.No.	Title of Paper	Lecture	Tutorial	Practical	Credits
01.	Forest Resource Analysis	3	---	1	4
02.	Production Management in Nursery and Plantation Forestry	3	---	1	4
03.	Finance and Marketing Management of Forest Resources	3	---	1	4
04.	Tree Business Management	3	---	1	4
05.	Forest Management for Environmental Conservation	3	---	1	4
				Total Credits	20

M.Sc. IV th Semester			
S.No.	Title of Paper	Credits	
01.	Field Training (Attachment with State Forest Department for analysis of Forest Management patterns & Management techniques)	10	
02.	Industrial Training Project report writing, Presentation & Viva-voce	09	
03.	Computational Skills	05	
04.	Student Project	01	
		Total Credits	25

Grand Total of Credits = 98

- The student project will be allotted in III semester and will be evaluated at the end of IV semester. Students may choose any project related to their curriculum. There will be no supervisor for the project.
- **Visits:** Visits to forest operation sites, forest nursery, wildlife habitat and plantation sites will be conducted as per the requirement of curriculum.

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PAPER V: FOREST GENETIC DIVERSITY, CONSERVATION & ENVIRONMENTAL
IMPACT CR 4(3+1)

Objective

To provide the students knowledge about the genetic diversity in forest tree species, their distribution, assess and analysis law and methodology of *in-situ* and *ex-situ* conservation.

Forest biodiversity: concept, levels and measurement. Forest genetic diversity: Values, Services and threats. Levels of Genetic Variation in Forest Trees. Characteristics of Forest Genetic Diversity: Interspecific and Intraspecific diversity, Ecotypes, Subspecies, Population, Metapopulation, Provenance, Land race, Cline. Dynamics of forest genetic diversity: Genetic erosion, Population bottleneck, Genetic drift, Selection, Migration and Mutation. Genetic diversity in natural forests. Natural and induced genetic diversity in forest tree species. Biodiversity in forests of India (Tropical and Temperate Forests). Hotspots of forest genetic diversity Measurement of forest genetic diversity and diversity indices. Monitoring of forest genetic diversity: Documentation and evaluation, Climate change and forest genetic diversity.

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Conservation Of Forest Genetic Diversity: *in situ* and *circa situ* conservation; Protected areas, Biosphere reserves, National parks, Sanctuaries, gene reserve forest and Community reserves. *Ex Situ* Conservation: gene banks, Cryopreservation. Targeted Species-Based Approach. Intellectual property rights. The Biological Diversity Act, 2002, Quarantine laws and FGR exchange. Conservation efforts in India and worldwide. International conservation bodies: FAO, IUFRO, CIFOR, IUCN and WWF.

Practical

Visits and survey of forests biodiversity within their natural habitat. Measurement of forest biological diversity. FGR analysis of Natural stands in nearby forest area.



PAPER IV. TREE BUSINESS MANAGEMENT

CR.4 (3+1)

Objective

To develop understanding and management skills of the student with special reference to tree farm business management.

Theory

Tree Farm : concepts, present scenario, and business application. Relationship of farm sciences with other sciences. Types of tree Farm in India, nature, scope and function of farm business management. Principles involved in Tree farm management decision making. Law of diminishing returns, substitution law, cost and price principle, depreciation. Principles of farm planning and budgeting. Working out existing and alternative farm plans. Importance of farm records, types of physical and financial records, Farm business efficiency measures. Fundamentals of inventory. Management of special farm projects like, nursery, plantations Teak, Eucalyptus, Bamboo, Sissoo, and Terminalia, sericulture. Farm labour and its problems. Labour efficiency measurement, work allocation, raising labour productivity, staff control, work progress charts. Farm capital and its problems, Farm machinery and its working principle, Field assessment for species selection and growth analysis of tree in the farm.

Practical

Visit of agricultural farm, plantations. Calculation of fertilizers and compost quantity in different tree farms. Formulation of farm budget. Cost of production, maintenance of single and double entry system of account, preparation of farm records. Farm tools and its use in tree farm.

Suggested Readings:

- Bamoul WJ & Oates WE. 1975. *The Theory of Environmental Policy*. Prentice Hall.
- Busby RJN. 1981. *Investment Appraisal in Forestry*. Forestry Commission Research Station, Surveys.
- FAO 1986. *Guidelines to Project Evaluation*. Natraj Publ.
- FAO, 1981. Tropical Forest Resources Assessment Project (In the Framework of Gems). *Forest Resources of Tropical Africa. Part 1 & 2 Regional Synthesis*.
- Joshi. SS. and T.R. Kapoor., 2001. *Fundamental of farm business Management*. Kalyani Publishers.
- Ken JM, MarothiaDK, Singh, K Ramaswamy, C & Bentley WR. 1997, *Natural Resource Economics-Theory and Application in India*, Oxford & IBH.
- MakchauJP & Malcolm LE. 1986. *Economics of Tropical Farm Management*. Cambridge Univ. Press.
- Nautiyal JC. 1988. *Forest Economics - Principles and Applications*; Natraj Publ.
- Panda SC 2011. *Farm management and Agricultural Marketing*, Kalyani Publishers
- Sharma LC. 1980. *Forest Economics - Principles and Applications*; Natraj Publ.

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PAPER V. FOREST MANAGEMENT FOR ENVIRONMENT CONSERVATION CR.4
(3+1)

Objective

To develop understanding and management skills of the student with special reference to Environment conservation

Theory

Definition, concept and principle of sustainable forest management. Problems in modern forest management, ITTO's principles, Montreal Process, SFM within the context of climate change. Sustainable energy and NTFP management, Sustainable harvesting, Gender sensitization in SFM, Process flow for women involvement SFM. Concept of participatory development. Participatory management and key elements of processes for planning and implementation, monitoring and evaluation. Concept of PRA & RRA, techniques & tools of PRA. Importance of PRA, problems in PRA, RRA applications. Watershed Management: Concept, Scope, importance and Principles of watershed management. Application of Remote sensing & GIS for sustainable forest management. Criteria and Indicators of SFM, Bhopal India Process. CAMPA, JFM, Assistant natural regeneration, Forest Certification. Concept of tree outside forest.

Practical

Practice of participatory rural appraisal technique. Preparation of micro plan for sustainable forest management. Resource survey and preparation of resource map. Exercises on designing training program for sustainable forest management. Reading of watershed map: Region/Basin /Catchment/Watershed preparation of classification chart. Writing news items, success stories, leaflets, and folders for the SFM. Visual interpretation of imageries and preparation of land use land class classification. Digitization of raster data.

Suggested Readings:

Bhattacharya, P et al. 2008., *Joint Forest Management in India in 2 Vols.* Today's and tomorrow Printers and Publishers.

Lal J.B. 2011. *Farm Management Classical Approach to current imperatives*, Natraj Publication.

Neela Mukherjee. *Participatory Appraisal of Natural resources*, Concept publishing company new Delhi.

Osmoston. *Management of forest*, International Book Distributors.

S K Gupta *Aspects of sustainability of IFM* Richon Singh Mohandranal Singh



SEMESTER- IV

This semester will have following training programmes.

1. Field Training (Attachment with State Forest Department for analysis of Forest Management patterns & Management techniques)

Specialization: Forest management

Visit to modern forest nurseries, herbal gardens and watersheds. To study the medicinal and aromatic plants diversity, their conservation and domestication. Study the felling and logging operations, timber lots and industrially important products. Introduction to Working Plan, data generation-enumeration and volume/yield calculation. Writing of compartment history files. Study the catchment area treatment plan and FDA. Study the Regeneration and Management of regionally important forestry tree species. Laying out sample plots, stump analysis, preparation of local volume table and use of forestry field equipments/ instruments. Visit to National Parks, Sanctuaries and Bio-sphere reserves. Visit to ecologically degraded areas around cement plants, mined areas etc and study rehabilitation measures adopted. Visit to plantation site and data collection for its growth pattern and feasibility.