

- M. Sc. in FARM-FORESTRY:
- FIRST SEMESTER (ODD SEMESTER)

FACULTY OF NATURAL SCIENCE

Eligibility Criteria  (Qualifying Exams)	Course Code	Course Type	Course (Paper/Subjects)	Credits	Contact Hours Per Week			EoSE Duration (Hrs.)	
					L	T	P	Thy	P
Bachelor Degree in the concerned subject/ discipline	FOR 101	CCC	PLANT TAXONOMY & FOREST ECOLOGY	5	4	2	00	3	00
	FOR 111	CCC	PLANT TAXONOMY & FOREST ECOLOGY- LABORATORY WORK	2	00	00	3	00	3
	FOR 102	CCC	WATERSHED & WASTELAND MANAGEMENT	5	4	2	00	3	00
	FOR 112	CCC	WATERSHED & WASTELAND MANAGEMENT - LABORATORY WORK	2	00	00	3	00	3
	FOR 103	CCC	NURSERY & PLANTATION TECHNOLOGY	5	4	2	00	3	00
	FOR 113	CCC	NURSERY & PLANTATION TECHNOLOGY - LABORATORY WORK	2	00	00	3	00	3
	FOR S01	OSC	RESEARCH METHODOLOGY & COMPUTER APPLICATION: BASICS	6	4	3	00	3	00
	FOR A01	ECC/CB	CONSTITUTIONALISM & INDIAN POLITICAL SYSTEM	6	4	3	00	3	00
	FOR A02	ECC/CB	FOREST FREE IMPROVEMENT & BIOTECHNOLOGY						
	FOR A03	ECC/CB	SOIL SCIENCE						
					TOTAL= 33				

<b>M.Sc in FARM FORESTRY ( FIRST SEMESTER )</b>	
<b>COURSE CODE: FOR 101</b>	<b>COURSE TYPE: CCC</b>
<b>COURSE TITLE: PLANT TAXONOMY &amp; FOREST ECOLOGY</b>	
<b>CREDIT: 07</b>	<b>HOURS: 135</b>
THEORY: 05                  PRACTICAL: 02	THEORY: 90                  PRACTICAL: 45
<b>MARKS: 100</b>	
THEORY: 70                  CCA: 30                  PRACTICAL: 33	
<b>OBJECTIVE: To develop understanding of students about plant taxonomy, ecological aspects of forest, conservation of forest resources &amp; biodiversity, consequences of depleting biodiversity and sustainable use of biodiversity.</b>	
<b>UNIT-1 25 Hours</b>	<p>Taxonomy: Introduction: Characteristics of living beings, Differences between plants and animals, Branches of botany</p> <p>Classification of living organisms: Two kingdom classification, Four Kingdom classification, Five Kingdom Classification, Six kingdom classification, The Plant Kingdom, Modern system of classification.</p> <p>Taxonomy of Angiosperms: Botanical Nomenclature, Units of classification, Artificial System, Natural system, Phylogenetic system.</p> <p>Tools for study of taxonomy: Museum, Herbaria, Botanical Gardens, Some important gardens, etc. Economic Importance of Angiosperms</p>
<b>UNIT-2 20 Hours</b>	<p>Definition of ecology, Basic concepts of ecology, Ecology and ecology factors, Definition, Structure and function of ecosystem, Trophic level, Food chain and Food web.</p>
<b>UNIT-3 25 Hours</b>	<p>Ecology of Population, Basic concepts Population, Population characteristic, Population dynamics, Ecology of Community: Community concept, Community characteristic, Classification and Dynamics, Succession.</p>

<b>UNIT-4</b> <b>20 Hours</b>	Biogeochemical cycling of elements: Nitrogen, Phosphorus, Carbon, Water cycle, Nitrogen fixation, Mycorrhiza.
<b>COURSE CODE: FOR 111</b> <b>LABORATORY WORK</b>	<p>Visit to nearby forests for Phytosociological study, Study of diversity indices</p> <p>Study of forest community structure and its successional status, Estimation of productivity of forest ecosystem, Trip to different regions of the state to study forest vegetation, Collection and preservation of specimen, Methods of vegetation analysis, Measurement of biomass and productivity, Quantification of litter production and decomposition, Visit to national parks, wildlife sanctuaries, botanical gardens and arboreta.</p> <p>Visit to a local area to document environmental assets- forests/grasslands/hill/mountain/river/pond.</p> <p>Preparation of Herbarium, Collection of Seeds, etc.</p>
<b>SUGGESTED READINGS</b>	<ol style="list-style-type: none"> <li>1. Sharma, P.D. 2014-2015. <i>Ecology and Environment</i>. Rastogi publications, Meerut.</li> <li>2. Kaushik, M.P.2014. <i>A Text Book of Modern Botany</i>. Prakash Publications, Muzaffarnagar.</li> <li>3. Malik, C.P. 2014. <i>Plant Physiology</i>. Kalyani Publishers, New Delhi.</li> <li>4. Khanna, L.S. And Chaturvedi, A.N. 2012. <i>Handbook of Forestry</i>. Khanna Bandhu Publications, Dehradun.</li> </ol>

<b>M.Sc in FARM FORESTRY</b> <b>( FIRST SEMESTER )</b>			
<b>COURSE CODE: FOR 102</b>		<b>COURSE TYPE: CCC</b>	
<b>COURSE TITLE: WATERSHED &amp; WASTELAND MANAGEMENT</b>			
<b>CREDIT: 07</b>		<b>HOURS: 135</b>	
THEORY: 05	PRACTICAL: 02	THEORY: 90	PRACTICAL: 45
<b>MARKS: 100</b>			
THEORY: 70	CCA: 30	PRACTICAL: 33	
<b>OBJECTIVE: To provide the students knowledge about the watershed, soil and water conservation and water harvesting structure.</b>			
<b>UNIT-1</b> <b>25 Hours</b>	<p>Watershed Management: Concept of watershed management, characteristics of a watershed and their role in management plan, restoration of deteriorated watershed.</p> <p>Soil and water conservation: Types, causes and factor affecting soil erosion, land capability classification, general practices for soil and water conservation mulching, windbreaks, Shelterbelts, contour farming, strip cropping, terracing, bounding and grassed waterways, gully control.</p>		
<b>UNIT-2</b> <b>25 Hours</b>	<p>Water harvesting structures for soil conservation works, check dams, anicuts, spill ways etc. Reconnaissance survey, preliminary survey etc.</p>		
<b>UNIT-3</b> <b>20 Hours</b>	<p>Biological aspects: soil management, crop management, alternate land use in Agro-forestry. Engineering approaches in watershed management.</p>		
<b>UNIT-4</b> <b>20 Hours</b>	<p>Wasteland definition, distribution in India and world, types of wasteland development and management, selection of tree species for wasteland development, development through afforestation and reforestation.</p>		

<b>COURSE CODE: FOR 112 LABORATORY</b>	<p>Survey of watershed, Preparation of micro-plan and planning of watershed for effective implementation. Preparation of contour maps, Estimation of earth work, Design of check dams, Acquaintance with water lifting devices, Use of measurement, Conveyance and control structures. Watershed delineation using GIS techniques.</p>
<b>SUGGESTED READINGS</b>	<ol style="list-style-type: none"> <li>1. <i>Dhuruva Narayana VV, Sastry G &amp; Patnaik VS. 1990, Watershed Management. ICAR.</i></li> <li>2. <i>Murty JVS. 1995. Watershed Management in India. Wiley Eastern.</i></li> <li>3. <i>Singh R. 2001. Watershed Planning and Management. Scientific Publ.</i></li> </ol>

<b>M.Sc in FARM FORESTRY ( FIRST SEMESTER )</b>			
<b>COURSE CODE: FOR 103</b>		<b>COURSE TYPE: CCC</b>	
<b>COURSE TITLE: NURSERY &amp; PLANTATION TECHNOLOGY</b>			
<b>CREDIT: 07</b>		<b>HOURS: 135</b>	
THEORY: 05	PRACTICAL: 02	THEORY: 90	PRACTICAL: 45
<b>MARKS: 100</b>			
THEORY: 70	CCA: 30	PRACTICAL: 33	
<b>OBJECTIVE: To impart knowledge on modern nursery techniques about types of nursery, vegetative propagation, use of green house, mist chamber and fertilizer use.</b>			
<b>UNIT-1 25 Hours</b>	Review of regional nursery practices. Nursery site selection, type, design and layout, Nursery soil and water management. Production schedule, Seed source; collection; processing, storage, testing and pre-sowing treatment, Seed bed preparation and sowing. Early tending-watering, weeding and shading. Container and bare-root seedling. Pricking out transplanting, lifting, packing and transportation.		
<b>UNIT-2 20 Hours</b>	Media and mixture. Propagation structure: shade house, mist chambers and growth chambers. Nursery soil fertility management. Rhizobial and mycorrhizal associations. Protection and pest control. Plantation technique in arid, coastal and hilly areas, waterlogged and salt affected sites. Plantation layout and designs. After care for seedling establishment.		
<b>UNIT-3 25 Hours</b>	Plantation forestry :Need for man made forests in the tropics. Plantation silviculture- native vs exotics. Single species plantations vs mixed plantation silviculture- native vs exotics. Single species plantations vs mixed plantations vs multiple purpose tree (MPT) plantations. Selection of plantation stock. Pruning- need, timing, intensity and economics. Rotations and regeneration.  Failure of plantations- reasons, unsuitable species, non-application of standard techniques. Impact assessment and integration of plantation forestry.		

<b>UNIT-4</b> <b>20 Hours</b>	<p>Seed storage: Definition, importance classification and factors affecting the seed storage. Seed longevity and factors affecting seed longevity. Pre storage treatment. Physiological change during aging. Viability and vigour. Storage of orthodox, recalcitrant and pre-storage of intermediate seeds. Fumigation and seed treatment, seed certification.</p>
<b>COURSE CODE: FOR</b> <b>113</b> <b>LABORATORY</b>	<p>Preparation of nursery bed and raising of seedlings, collection and handling of seeds, Calculation of seed rate, Preparation of soil mixture, filling in poly bags, Preparation and planting of cuttings, Seed treatment of given tree seed for preservation and germination; Seed treatment and sowing; Planting technique for arid, waterlogged, salt affected and sloping lands; Tending operations and vigour of seedling; Assessment of quality of seedlings; Collection of pathological insects etc.</p>
<b>SUGGESTED READINGS</b>	<ol style="list-style-type: none"> <li>1. <i>C.D. Katoch 1992. Forest Nursery Handbook. Periodical Experts Book Agency, Delhi, India.</i></li> <li>2. <i>R. K. Luna 1989. Plantation Forestry in India. International Book Distributors, Dehradun, India.</i></li> <li>3. <i>Umarani, R. and Vanangamudi, K. 2004. An Introduction to Tree Seed Technology. IBH, Dehradun, India</i></li> </ol>

<b>M.Sc in FARM FORESTRY</b> <b>( FIRST SEMESTER )</b>	
<b>COURSE CODE: FOR S01</b>	<b>COURSE TYPE: OSC</b>
<b>COURSE TITLE:RESEARCH METHODOLOGY &amp; COMPUTER APPLICATION: BASICS</b>	
<b>CREDIT: 06</b>	<b>HOURS : 90</b>
<b>THEORY: 06</b>	<b>THEORY: 90</b>
<b>MARKS : 100</b>	
<b>THEORY: 70</b>	<b>CCA : 30</b>
<b>OBJECTIVE:</b>	
<ul style="list-style-type: none"> <li>- Understands the concept and place of research in concerned subject</li> <li>- Gets acquainted with various resources for research</li> <li>- Becomes familiar with various tools of research</li> <li>- Gets conversant with sampling techniques, methods of research and techniques of analysis of data</li> <li>- Achieves skills in various research writings</li> <li>- Gets acquainted with computer Fundamentals and Office Software Package .</li> </ul>	
<b>UNIT - 1</b> <b>15 Hrs</b>	<p><b>CONCEPT OF RESEARCH :</b></p> <p>Meaning and characteristics of research , Steps in research process , Types of research -</p> <p>i) Basic, applied and action research ii) Quantitative and qualitative research , Areas of research in concern discipline</p> <p><b>SELECTION OF PROBLEM FOR RESEARCH :</b></p> <p>Sources of the selection of the problem , Criteria of the selection of the problem ,Drafting a research proposal , Meaning and types of variables ,Meaning and types of hypotheses.</p>
<b>UNIT - 2</b> <b>15 Hrs</b>	<p><b>TOOLS OF RESEARCH :</b></p> <p>Meaning and general information about construction procedure of (i) Questionnaire, (ii) Interview, (iii) Psychological test, (iv) observation (v) Rating scale (vi) Attitude scale and (vii) check list , Advantages and disadvantages of above tools</p> <p><b>SAMPLING :</b></p> <p>Meaning of population and sample , Importance and characteristics of sample , Sampling techniques - i) Probability sampling : random sampling, stratified random sampling, systematic sampling, cluster sampling ii) Non-probability sampling: incidental sampling, purposive sampling, quota sampling</p>

<b>UNIT - 3</b> <b>15 H rs</b>	<p><b>METHODS OF RESEARCH</b></p> <p>Meaning and conducting procedure of following methods of research : Historical method , Survey method , Case study , Causal comparative method , Developmental methods , Experimental methods</p>
<b>UNIT - 4</b> <b>15 Hrs</b>	<p><b>TREATMENT OF DATA :</b></p> <p>Level of measurements of data , Steps in treatment of data: editing, coding, classification, tabulation, analysis and interpretation of results</p> <p><b>WRITING RESEARCH REPORT :</b></p> <p>Sections of report : Preliminary section , Content section : various chapters , Supplementary section : appendices, references, abstract , Format and style</p>
<b>UNIT - 5</b> <b>15 Hrs</b>	<p><b>Computer Fundamentals</b></p> <p><b>Computer System :</b> Features, Basic Applications of Computer, Generations of computers.</p> <p><b>Parts of Computer System :</b> Block Diagram of Computer System ; Central Processing Unit (CPU) ; Concepts and types of Hardware and Software, Input Devices - Mouse, Keyboard, Scanner, Bar Code Reader, track ball ; Output Devices - Monitor, Printer, Plotter, Speaker ; Computer Memory - primary and secondary memory, magnetic and optical storage devices.</p> <p><b>Operating Systems - MS Windows :</b> Basics of Windows OS ; Components of Windows - icons, taskbar, activating windows, using desktop, title bar, running applications, exploring computer, managing files and folders, copying and moving files and folders ; <b>Control panel :</b> display properties, adding and removing software and hardware, setting date and time, screensaver and appearance ; <b>Windows Accessories :</b> Calculator, Notepad, WordPad, Paint Brush, Command Prompt, Windows Explorer.</p>

**Office Software Package**

**Word Processing - MS Word :** Creating, Saving, Opening, Editing, Formatting, Page Setup and printing Documents ; Using tables, pictures, and charts in Documents ; Using Mail Merge sending a document to a group of people and creating form, letters and label.

**Spreadsheet - MS Excel :** Opening a Blank or New Workbook, entering data/Function/ Formula into worksheet cell, Saving, Editing, Formatting, Page Setup and printing Workbooks.

**Presentation Software - MS Power Point :** Creating and enhancing a presentation, modifying a presentation, working with visual elements, adding Animations & Transitions and delivering a presentation.

- Agrawal, Y. P. (1988). *Better sampling : Concepts, Techniques and Evaluation*. New Delhi : sterling Publishers Private Ltd. Best, J. W. (1993).  
*Research in Education* (6<sup>th</sup> ed.) New Delhi : Prentice-Hall of India Pvt. Ltd.  
 Broota, K. D. (1992) *Experimental design in Behavioral Research* (2<sup>nd</sup> ed.)  
 New Delhi : Wiley Eastern Limited.  
 Dasgupta, A. K. (1968). *Methodology of Economic Research*. Bombay: Asia Publishing House.  
 Edwards, A. L. (1957). *Techniques of Attitude Scale construction*. New York : Appleton-Contury  
 Gall, M. D., Gall, J. P. and Borg, W. R. (2007). *Educational Research : An introduction*  
 (8<sup>th</sup> ed.) Coston : Allyn and Bacon.  
 Garrett, H. E. & Woodworth, R. S. (1969). *Statistics in Psychology and Education*. Bombay :  
 Vakils, Fecffer & Simons Pvt. Ltd.  
 Goode, W. J. & Hatt, Paul K. (1952). *Methods in Social Research*. New York : McGraw-Hill.  
 Gopal, M. H. (1964). *An Introduction to research Procedure in Social Sciences*. Bombay : Asia  
 Publishing House.  
 Hillway, T. (1964) *Introduction to Research* (2<sup>nd</sup> ed.) Noston : Houghton Mifflin.  
 Hyman, H. H., et al. (1975). *Interviewing in Social Research*.  
 Chicago : University of Chicago Press.  
 Kerlinger, F. N. (1983) *Foundation of Behavioural Research*. (2<sup>nd</sup> Indian Reprint)  
 New York : Holt, Rinehart and Winston.  
 Kothari, C. R. (2007) *Research Methodology: Methods & Techniques* ( 3<sup>rd</sup> ed.)  
 New Delhi : Wishwa Prakashan. Fundamentals Of Computers, Dr. P. Mohan, Himalaya  
 Publishing House.  
 Microsoft First Look Office 2010, K. Murray, Microsoft Press.  
 Fundamental Of Research Methodology And Statistics, Y.K. Singh, New Age  
 International (P) Limited, Publishers. Practical Research Methods, Dr Catherine Dawson,  
 The Essence Of Research Methodology, Jan Jonker & Bartjan Pennink, Springer.

<b>M.Sc in FARM FORESTRY</b> <b>( FIRST SEMESTER )</b>	
<b>COURSE CODE: FOR A01</b>	<b>COURSE TYPE: ECC/CB</b>
<b>COURSE TITLE: CONSTITUTIONALISM &amp; INDIAN POLITICAL SYSTEM</b>	
<b>CREDIT: 06</b>	<b>HOURS : 90</b>
<b>THEORY: 06</b>	<b>THEORY: 90</b>
<b>MARKS : 100</b>	
<b>THEORY: 70</b>	<b>CCA : 30</b>
<b>OBJECTIVE:</b>	
<ul style="list-style-type: none"> <li>- Understands the concept of Constitutionalism</li> <li>- Gets acquainted with various Indian Political System</li> <li>- Becomes familiar with various Union Executive</li> <li>- Gets conversant with Legislatures, Legislative Bills</li> <li>- Achieves skills in various writings</li> </ul>	
<b>UNIT - 1</b> <b>12 Hrs</b>	<p>Unit- I:</p> <p>Meaning: Constitution, Constitutional government &amp; constitutionalism; Difference between Constitution &amp; Constitutionalism; Constitutionalism: Basis, Elements, Features &amp; future. Forms of Government: Democracy &amp; Dictatorship, Unitary &amp; Federal, Parliamentary &amp; Presidential form. Ideals of the Indian Constitution incorporated in the Preamble.</p> <p>Special Features of the Indian Constitution.</p>
<b>UNIT - 2</b> <b>24 Hrs</b>	<p>Unit-II:</p> <p>Concept of State and Citizenship, Judicial Review and Fundamental Rights, Directive Principles of the State Policy, Fundamental Duties, Procedure to Amend the Indian Constitution, Judiciary: Supreme Court and High Court, Judicial Activism and Public Interest Litigation and Provisions relating to Emergency.</p>
<b>UNIT - 3</b> <b>10 H rs</b>	<p>Unit-III:</p> <p>Union Executive- President, Prime Minister, Council of Ministers. State Executive- Governor, Chief Minister and Council of Ministers. Local Bodies &amp; Panchayati Raj</p>

<b>UNIT - 4</b> <b>24 Hrs</b>	<p>Unit-IV:</p> <p>Parliament of India, State Legislatures, Legislative Bills: Ordinary, Money and Financial, Union State Relations, Principles of the ‘Separation of Power and the ‘Principles of Check &amp; Balance’.</p> <p>Political Parties and Pressure Groups.</p> <p>Challenges before Indian Democracy: Terrorism, Regionalism, Communalism, <i>Linguistics</i> and National Integration.</p>
<b>UNIT - 5</b> <b>20 Hrs</b>	<p>Unit-V:</p> <p>Controller &amp; Accountant General of India, Solicitor General, Advocate General, Election Commission, Union and State(s) Public Service Commission, Finance Commission.</p>
<b>SUGGESTED READINGS</b>	<p>HOBBS, Thomas, The Leviathan, Chapters XIII &amp; XVII [entry]          LOCKE, John, The Second Treatise of Civil Government, Chapter IX [entry]          ROUSSEAU, Jean-Jacques, The Social Contract or Principles of Political Right          MONTESQUIEU, The spirit of the laws,          RAZ, Joseph, “The rule of law and its virtue”, in The authority of law, Oxford University Press, 1979          Dicey on British constitution          P. Ishwara Bhat Inter-relationship between Fundamental Rights          M P Jain Indian Constitutional Law          H M Seervai Constitutional Law of India          V N Shukla Constitution of India          D DBasu Shorter Constitution of India          B Sivarao Constitutional Assembly Debates          J. V R Krishna Iyer Fundamental Rights and Directive Principles          Paras Diwan Human Rights and the Law          P K Tripathi Some Insight into Fundamental Rights          S P Sathe Fundamental Rights and Amendment to the Constitution          P B Gajendragadkar Law, Liberty and Social Justice          David Karrys Politics of Law</p>

<b>M.Sc in FARM FORESTRY ( FIRST SEMESTER )</b>			
<b>COURSE CODE: FOR A02</b>		<b>COURSE TYPE: ECC/CB</b>	
<b>COURSE TITLE: FOREST TREE IMPROVEMENT &amp; BIOTECHNOLOGY</b>			
<b>CREDIT: 06</b>		<b>HOURS: 90</b>	
THEORY: 06	PRACTICAL: 00	THEORY: 90	PRACTICAL: 00
<b>MARKS: 100</b>			
THEORY: 70		CCA: 30	
<b>OBJECTIVE: To acquaint the students about general principles of tree breeding with examples of important trees. Application of plant tissue culture and biotechnology in tree improvement.</b>			
<b>UNIT-1 25 Hours</b>	General concept of forest tree breeding, tree improvement and forest genetics. Reproduction in forest trees. Pollination mechanisms. Variation in trees importance and its causes. Natural variation as a basis for tree improvement. Geographic variations – Ecotypes, clines, races and land races. Pollen dispersion distances, pollinators and their energetics. Attractants for pollinators. Pollen handling forced flowering for seed orchard manipulation		
<b>UNIT-2 25 Hours</b>	Seed, seed formation, dispersal, storage, stratification and seed dormancy. Selective breeding methods- mass, family, within family, family plus within family. Plus tree selection for wood quality, disease resistance and agroforestry objectives. Selection strategies and choice of breeding methods and progress in selective breeding in forest trees. Indirect selection for biotic and abiotic stresses.		
<b>UNIT-3 20 Hours</b>	Historical development of biotechnology, scope of biotechnology in forestry, different methods of biotechnology related to forestry. Plant tissue culture, principles, history, development, fields of application, progress and prospects with special reference to tree crops, application of plant tissue culture in tree improvement		

<b>UNIT-4</b> <b>20 Hours</b>	<p>Transgenic plants: molecular markers and its application in forestry, modification of plant species to practically desired products, biodegradation of forestry wastes through genetically engineered microbes.</p>
<b>SUGGESTED READINGS</b>	<ol style="list-style-type: none"> <li>1. <i>Bajaj YPS. (Ed.). 1988. Biotechnology in Agriculture and Forestry. Spriner Verlag.</i></li> <li>2. <i>Gupta PK. 2000. Elements of Biotechnology. Rastogi Publ.</i></li> <li>3. <i>Kumar S &amp; Singh MP. 2008. Plant Tissue Culture. APH Publ.</i></li> <li>4. <i>Mandal AK &amp; Gibson GL. (Eds). 1997. Forest Genetics and Tree Breeding. CBS.</i></li> <li>5. <i>Punia MS. 1998. Plant Biotechnology and Molecular Biology. Scientific Publ.</i></li> <li>6. <i>Singh BS &amp; Singh MP. 2007. Fundamental of Plant Biotechnology. Sodesh Serial Publ.</i></li> <li>7. <i>Srivastava PS, Narula A &amp; Srivastava S. (Ed.). 2004. Plant Biotechnology and Molecular Markers. Anamaya Publ.</i></li> <li>8. <i>Surendran C, Sehgal RN &amp; Paramathma M. 2003. Text Book of Forest Tree Breeding. ICAR Publ.</i></li> <li>9. <i>White JW. 1976. Introduction to Forest Genetics. Academic Press.</i></li> <li>10. <i>Zobel BJ &amp; Talber J. 1984. Applied Forest Tree Improvement. John Wiley &amp; Sons.</i></li> </ol>

<b>M.Sc in FARM FORESTRY ( FIRST SEMESTER )</b>			
<b>COURSE CODE: FOR A03</b>		<b>COURSE TYPE: ECC/CB</b>	
<b>COURSE TITLE: SOIL SCIENCE</b>			
<b>CREDIT: 06</b>		<b>HOURS: 90</b>	
THEORY: 06	PRACTICAL: 00	THEORY: 90	PRACTICAL: 00
<b>MARKS: 100</b>			
THEORY: 70		CCA: 30	
<b>OBJECTIVE: To acquaint the students about forest soil, soil fertility, essential nutrients for plant growth and fertility management.</b>			
<b>UNIT-1 25 Hours</b>	Concept and definition of soil; Factors and process of soil formation; Soil profile and its development under different climate, topography and vegetation, Soil classification		
<b>UNIT-2 25 Hours</b>	Methods of soil survey and their utility; Preparation of soil survey map; Systems of soil classification in general and USDA classification system in particular- its principles and nomenclature at different levels. Properties of soil; Soil texture, structure, particle density, bulk density, water, air and temperature.		
<b>UNIT-3 20 Hours</b>	Inorganic and organic colloids; Sources of charges on soil particles; Soil pH and its effect on nutrients availability; Colloidal control and Buffer capacity; Cation and anion exchange Phenomenon; Percent Base Saturation. Soil Organic matter and its impact on soil fertility, source, composition and steps of decomposition, humus; properties, and role, C:N Ration.		

<b>UNIT-4</b> <b>20 Hours</b>	<p>Soil fertility: factors affecting soil fertility, essential nutrients for plant growth, methods of soil fertility evaluation, role and deficiency symptoms of N, P and K and their transformation. Occurrence and distribution of microorganism in soil and their classification, Essential plant nutrients, their role and deficiency symptoms; Soil fertility and its evaluation; Fertility management through organic and inorganic fertilizers.</p>
<b>SUGGESTED READINGS</b>	<ol style="list-style-type: none"> <li>1. <i>Nature and Properties of Soils by Brady</i></li> <li>2. <i>Mrida Vigyan ke Moolbhut Siddhant by Dr Vinay Singh Published by Bharati Bhandar Meerut.</i></li> <li>3. <i>Soil Physics by Ghildyal &amp; Tripathi, Published by Wiley and Eastern LTD, New Delhi.</i></li> <li>4. <i>Mrida Vigyan By NL Sharma and TB Singh Rama Publishin House Baduot Merrut</i></li> <li>5. <i>Soil Physics by LD Baver et al, Published by Wiley and Eastern LTD, New Delhi..</i></li> </ol>