Unit 8	**Remote sensing of forest ecosystem:** Forest change detection using time-series data. Hyperspectral Remote Sensing for species/community delineation, Microwave remote sensing in forestry, LiDAR remote sensing for tree height determination, Biophysical spectral response-based forest canopy density (FCD) mapping. Use of RS and GIS in Forest fire and wildlife habitat assessment. Mapping of forest density and type, issues in forest management. Forest Fire Modeling, Wild Life Habitat Assessment Modeling, Soil Erosion Modeling.	6 hrs

BIBLIOGRAPHY

1. Application of Remote Sensing in Forestry by A.G. Koppad and Anup Kumar Das.
2. Book of Remote Sensing and Geographical Information Systems by M Anji Reddy.
3. Forester's Perspective: Remote Sensing & Geographic Information System by Avichal Tripathi.
4. Land, T. G. 1999. ArcView-3D Analyst. ESRI press. 6-23.
5. Michael Zeiler 1999. The ESRI Guide to GIS Analysis, vol. I. ESRI press.4-16.
6. Michael Zeiler, Modeling Our World: The ESRI Guide to Geodatabase Design. ESRI press.3-7.
7. R.W. Tank: Focus on Environmental Geology (p. 256).
8. Remote sensing and Geographic Information System in Forestry by Girish B Shahapurmath, A. G. Koppad.
9. Remote Sensing For Sustainable Forest Management by Steven E. Franklin.
10. Remote Sensing With Special Reference to Agriculture and Forestry by National Academy of Sciences.

GIS 505: COMPUTER PROGRAMMING

Skills, employability and entrepreneurship: In this course, students learn about programming languages like C++, Java and Python, which are used in GIS software primarily for customization and automation. Python and Java are commonly used in GIS environments for scripting, spatial analysis, modeling, mapping applications and integrating GIS functions into web-based platforms. There are employment opportunities in MNCs, private companies. Students can start their own entrepreneurship.

Unit 1	**Basics of Computers:** An introduction to computers, development of computers, Hardware and Software. Fundamentals of Computers – operating systems, input devices, output devices, storage devices-primary, secondary, central processing unit, computer languages, translators.	8 hrs
Unit 2	**Information Super Highway:** Introduction to Internet. Scope of Internet. Equipment required for an Internet Connection. Electronic Mail. Concepts of Information Storehouse. Surfing the Net. Browsing the WWW. Search Engines and their applications. Application of internet to Geoinformatics. Introduction to networks, Local area network devices, topologies, protocols, wide area networks, servers, hubs, nodes, modems, internet.	8 hrs
Unit 3	**HTML (Web design):** Basic & advanced HTML, Types of tags, Document creations, Linking, Creating Link List, handling images, tables and, style sheets. Types of tags, Creating hyper text links. Formatting the text (example). Creating Image Links.	8 hrs

Unit 4	**Outlines of Python:** Introduction. Creating/Opening/Closing a net CDF file, Dimensions, Variables, attributes in a net CDF file. Writing and retrieving data from a net CDF file. Numpy, Scipy, Matplotlib modules/packages.	8 hrs
Unit 5	**Handling of Character strings:** Declaring and initializing string variables. C++ Programming: C++ Tokens, Expressions and Control Structure. Object oriented concepts: classes and objects, Functions: Defining Member functions Inheritance, Polymorphism, operator overloading, Constructors and Destructors, Control structures statements.	8 hrs
Unit 6	**JAVA:** Fundamentals of Objects- Oriented Programming. Overview of Java, Data types, Variables, Constants, Operators and Expressions Decision Making: Branching and looping statements, Classes, Objects and methods, multiple Inheritance, packages, multi-threaded programming, managing errors and exceptions, applets.	8 hrs

BIBLIOGRAPHY

1. Beekman, G. 1999. Computer Confluence: Exploring Tomorrow's Technology. Addison-Wesley, Reading, MA. (3rd Ed).
2. Willis H. Means 19087A content analysis of six introduction to computer science textbooks ACM New York, NY, USA, 403 - 413
3. Beekman, G. George Beckman, 2000. Tech Nation. Online. Internet. [March 14]. Available WWW:http://www.computerconfluence.com/about/tech.htm
4. Cheryl Schmidt Complete 1990. Computer Repair Textbook, Scott Jones, 22-408.
5. Dix, A., Finlay, J., Abowd, G., and Beale, R. 1999. Human-Computer Interaction. Prentice-5. Hall, Herts. UK. 67-089.
6. Goldberg, M. W. Web CT and First Year Computer Science June, 1997: Student Reaction to and Use of a Web-Based Resource in First Year Computer Science, in Proceedings of the ACM's ITiCSE Conference on Integrating Technology into Computer Science Education. ACM Press. 127-129.
7. E. Balaguruswamy, Programming in C++
8. E. Balaguruswamy, Programming in Java.

GIP 506: DIP AND COMPUTER PROGRAMMING (Lab S)

Skills, employability and entrepreneurship: In this course, students become proficient in the laboratory by using C++, Python, and Java which are commonly used in spatial analysis, modeling, mapping applications, and integrating GIS functions into web-based platforms. There are employment opportunities in private firms, MNCs and private companies. Students can start their own entrepreneurship.

	Digital Image Processing Lab
1.	ERDAS Imagine
2.	Geometric Correction
3.	Radiometric correction
4.	Histogram construction for digital data
5.	Outputs of linear and non-linear stretch
6.	Filtered outputs