

Course Structure & Syllabus

M.Tech. Remote Sensing



Department of Remote Sensing
Birla Institute of Technology
Mesra, Ranchi- 835215

Jharkhand, INDIA

May, 2018

COURSE STRUCTURE**SEMESTER - I**

SEMESTER-I	Course Category	Course Code	Subjects	L	T	P	Credit	
	PC	RS 501	Principles of Remote Sensing and Digital Satellite Image Processing	3	0	0	3	
		RS 502	Geographic Information System and Satellite Navigation System	3	0	0	3	
		RS 503	Remote Sensing and Digital Satellite Image Processing Laboratory	0	0	4	2	
		RS 504	Geographic Information System & Satellite Navigation System Laboratory	0	0	4	2	
	PE	RS *	ELECTIVE – I	3	0	0	3	
		RS *	ELECTIVE – I Laboratory	0	0	4	2	
	OE	OPEN ELECTIVE			3	0	0	3
	Total Credits (1 st Semester)							18

SEMESTER – II

SEMESTER-II	Course Category	Course Code	Subjects	L	T	P	Credit
	PC	RS 511	Aerial and Satellite Photogrammetry & Image Interpretation	3	0	0	3
		RS 512	Advanced Remote Sensing and Geospatial Modelling	3	1	0	4
		RS 513	Aerial and Satellite Photogrammetry & Image Interpretation Laboratory	0	0	4	2
		RS 514	Advanced Remote Sensing and Geospatial Modelling Laboratory	0	0	4	2
		RS 515	Programming and Customisation in geospatial domain Laboratory	0	0	4	2
	PE	RS *	ELECTIVE – II	3	0	0	3
		RS *	ELECTIVE – II Laboratory	0	0	4	2
	OE	OPEN ELECTIVE			3	0	0
Total Credits (2 nd Semester)							21

SEMESTER – III

SEMESTER-III	Course Category	Course Code	Subjects	L	T	P	Credit
	PC	RS 601	Thesis (Part – I)				8
		RS 602	Data Sources, Statistics and Research Methods in Geospatial Domain	3	1	0	4
	OE	OPEN ELECTIVE / MOOC (excluding already taken courses)			3	0	0
Total Credits (3 rd Semester)							15

SEMESTER – IV

SEMESTER R-IV	Course Category	Course Code	Subjects	L	T	P	Credit
	PC	RS 604	Thesis (Part – II)				16
	Total Credits (4 th Semester)						

TOTAL = 70 credits

ELECTIVES*Course No. Course Title**

PE-I (Semester-I)

RS 505	Remote Sensing in Agriculture & Forestry
RS 506	Remote Sensing in Disaster Management
RS 507	Remote Sensing in Hydrology & Water Resources
RS 508	Remote Sensing in Agriculture & Forestry Laboratory
RS 509	Remote Sensing in Disaster Management Laboratory
RS 510	Remote Sensing in Hydrology & Water Resources Laboratory

PE-II (Semester- II)

RS 516	Remote Sensing in Snow and Glacier Hydrology
RS 517	Remote Sensing in Climate Change and Environmental Impact Assessment
RS 518	Remote Sensing in Snow and Glacier Hydrology Laboratory
RS 519	Remote Sensing in Climate Change and Environmental Impact Assessment Laboratory

Thesis (Part – I) – Focus on Problem definition, Literature Review, Data Collection, Objectives and Research Questions Formulation and Detailed Work Plan, and partial fulfillment of initial objectives.

Thesis (Part – II) – Focus on systematic execution of work plan, data processing, analysis, interpretation, inferences and fulfillment of objectives and research questions, and report preparation, and finally leading to a research publication in peer reviewed journals.

M. Tech. (REMOTE SENSING)**Course code: RS 602****Course title: DATA SOURCES, STATISTICS AND RESEARCH METHODS IN GEOSPATIAL DOMAIN****Pre-requisite(s): Knowledge of statistics****Co- requisite(s): Knowledge of RS & GIS**

Credits:	L:	T:	P:	C:
	3	1	0	4

Class schedule per week: 4**Class: M.Sc.****Semester / Level: 03/06 (Monsoon)****Branch: Geoinformatics****Name of Teacher:****Course Objectives**

This course aims to make the students:

1.	Learn about various geo-spatial data providers at global and national level.
2.	Understand various steps and important components involved in project management, field report preparation, and sampling statistics.
3.	Gain knowledge about importance of quality, ethics, and different research methods being used in the geo-spatial domain.

Course Outcomes (CO):

On completion of this course, students should be able to:

CO1.	Explain the formulation of various schemes in Geoinformatics domain
CO2.	Write Project reports and project proposals
CO3.	Apply research methods quantitatively and qualitatively
CO4.	Use the National/Global standards of research

SYLLABUS**MODULE 1: GEO-SPATIAL RESEARCH & DATA SOURCES**

Geo-spatial Research Problems. National and International Projects: Past and Recent, Different types of Geo-spatial data requirement, USGS Global Visualization Viewer (GloVis), NASA Earth Observation (NEO), USGS Earth Explorer, ESA's Sentinel data, NOAA, IPMUS Terra, LANCE, VITO Vision, Bhuvan, MOSDAC, India-WRIS, Identification of problems at regional and Local level.

MODULE 2: FIELD AND PROJECT REQUIREMENTS

Need for Field Visit and Preparation of field reports, Research proposal, Literature review, Project/Report Writing, Components of Research Thesis/Project Report, Project Administrator and project management, Classification of Projects/thesis, Problems and opportunities in Projects.

MODULE 3: SAMPLING AND STATISTICS

Statistical Concepts: Population, Sample, Random, Bias, Percentile, Standard Score, Distribution, Correlation, Regression (logistic, linear), Analysis of variance, Need for sampling, types of sampling, sample size estimation and accuracy evaluation. Hypotheses and its testing, chi-square test, t-test, Calculation and Evaluation of Confidence Intervals.

MODULE 4: METHODS IN GEOINFORMATICS

Types of Research Methods: Quantitative and Qualitative, Research Techniques and Tools: Questionnaire, Interview, Observation, etc., Analytical methods in Geoinformatics, Different models in various Natural Resources Monitoring.

MODULE 5: TOOLS, QUALITY AND ETHICS

Tools & Methods: Project Communications and Presentation, Intellectual property Right, Plagiarism and associated softwares, Evaluating Quality of Research paper/journal: Citation Index, Impact Factor, National/Global standards, SCI, SCOPUS, etc., Referencing/Citation methods, Reference management software.

TEXT BOOKS:

1. Deborah Rumsey (2003). Statistics for Dummies, Wiley Publishing, Inc., New Jersey.
2. Huxold, W.E. and Levinsohn A.G. (1995). Managing Geographic Information Projects. Oxford University Press, New York.
3. Earickson, R. and Harlin, J. (1994). Geographic Measurement & Quantitative Analysis, Macmillan, New York

REFERENCE BOOKS:

1. Bennet P. Lientz & Kathryn P., (2001) Project Management for the 21st Century Academic Press, California.
2. Miguel Roig (2015). Avoiding plagiarism, self-plagiarism, and other questionable writing practices: A guide to ethical writing. (<https://ori.hhs.gov/sites/default/files/plagiarism.pdf>)

COURSE OUTCOME (CO) ATTAINMENT ASSESSMENT TOOLS & EVALUATION
PROCEDURE

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Continuous Internal Assessment	50
Semester End Examination	50

Continuous Internal Assessment	% Distribution
3 Quizzes	30 % (3 × 10%)
Assignment (s)	10
Seminar before a committee	10

Indirect Assessment –

1. Student Feedback on Faculty
2. Student Feedback on Course Outcome

Course Evaluation:

Individual assignment, Quizzes, Mid and End semester examinations

Course Delivery Methods

CD1	Lecture by use of boards/LCD projectors/OHP projectors
CD2	Assignments/Seminars
CD3	Laboratory experiments/teaching aids
CD4	Industrial/guest lectures
CD5	Industrial visits/institutional visits/field visit
CD6	Self- learning such as use of NPTEL materials and internets

MAPPING BETWEEN COURSE OUTCOMES AND PROGRAMME OUTCOMES

	PO1	PO2	PO3	PO4	PO5
CO1			2	3	
CO2	2	3			3
CO3	3	2		2	1
CO4	3	3		2	3

< 34% = 1, 34-66% = 2, > 66% = 3

MAPPING BETWEEN COURSE OUTCOMES AND COURSE DELIVERY METHOD

Course Outcomes	Course Delivery Method
CO1	CD1, CD2, CD6
CO2	CD1, CD2, CD6
CO3	CD1, CD2, CD6
CO4	CD1, CD2, CD4, CD6