

**K. J. SOMAIYA COLLEGE OF SCIENCE AND COMMERCE,
AUTONOMOUS**

**POST GRADUATE DIPLOMA IN
REMOTE SENSING TECHNOLOGY
AND GEOGRAPHIC INFORMATION
SYSTEM**

Department of Geology

2019-2020

This document contains the structure of course, details of syllabus and evaluation pattern

Course Details

- **Course type** : Post Graduate Diploma
- **Course Title** : Post Graduate Diploma in Remote Sensing Technology and Geographic Information

- **Preamble**

Remote sensing (RS) deals with the use of satellite images and their analysis for providing up to date information of surface features.

Geographic information system (GIS) is a technology, which enables the analysis of data related to entities, which have geographic distribution.

RS & GIS are increasingly being used to monitor the natural resources, mining, telecommunications, utilities, Groundwater assessment, linking of rivers, National agriculture Atlas, state/district level crop yield estimation etc. RS & GIS can also be used to monitor the effect of environmental management techniques in adhering to global norms.

The subject of Remote Sensing & GIS encompasses several disciplines and it is interdisciplinary nature of the technology that sets it apart from other technologies. This is evident from its wide applications in varied disciplines like Geosciences, Biosciences, Life sciences, Environmental sciences, Physical sciences, Hydrology, Engineering applications, Rural and Urban planning, Land cover and land use, Agriculture, Soil mapping, Medical sciences, IT, Detailed mapping, Library Information systems, Wild-life habitat, Wet land mapping, Utilities (Telecommunications, Electrical, Hydro), Business Decisions, Facilities Mapping, Asset Managements, etc.

- **Objectives of course :**

- To gain knowledge about the different satellites, their basic characteristics and their application in various fields of remote sensing
- Learn about the applications of remote sensing in geological mapping, environmental assessment, archeology, soil mapping and water resources management
- Learn about the applications of GIS in e-Governance, telecommunication, transportation, facilities and asset management
- Acquire skills to rectify, enhance satellite imageries and use them to generate land use land cover maps
- Comprehend methods for data modelling, DEM generation and use in remote sensing applications

- **Learning Outcomes :**

- To augment the knowledge and expertise gained at UG and PG levels
- To enhance employment opportunities and career prospects in industry and academia
- To acquire additional training simultaneously in multiple fields
- To lay emphasis on entrepreneurial development
- To gain insight into the functioning of RS-GIS in the public sector and corporate world

- **Prerequisites / Eligibility Criteria :**

A candidate who is enrolled in the Faculty of Science/commerce/Arts in the University of Mumbai or has already successfully passed the B.A/B.Com/B.Sc. or M.A/M.Com/M.Sc. degree of University of Mumbai or any other university.

Notwithstanding anything contained above, a candidate shall have to fulfil minimum admission criterion for the Certificate Course as given below, considering the contents of such courses and the minimum maturity level of the candidates to grasp, appreciate and derive maximum benefits from such courses:

Sr. no	Name of the Certificate Course	Minimum Entry/ Admission level
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		Required
1.	Remote Sensing Technology and Geographic Information Systems	First year Degree students of any faculty

A candidate, who is a regular student, shall pursue such Certificate Course simultaneously while he/she is studying for his/her graduation degree in University of Mumbai.

- **Intake Capacity** : **20**
- **Duration** : **1 year**
- **Course Coordinator** : **Mr. Deepak Sahu, Dr. Dnyanada Salvi**
- **Career opportunities**
 - Public sector- ISRO, Groundwater Board, NGRI, NIO, AGRI, SAC, and State research centres.
 - Private sector – Rolta, RIL, L&T, ESRI, HereMaps, Capgemini, TomTom, TCS, Arcadis.

- **P.G Diploma Syllabus**

Semester 1

Course	Title	Credits	L/Week
USDGI101	Remote Sensing Technology	1	2
USDGI102	Geographic Information System	1	2
USDGI103	Digital Image Processing	1	2

Practical

Course	Title	Credits	L/Week
USDGIP1	Practical of course USDGI101+ USDGI102 + USDGI103	1.5	3

Semester 2

Course	Title	Credits	L/Week
USDGIPRJ	Project	1.5	4 (Total 96 LP)

Semester I

USCGI101 Remote Sensing Technology Theory

Course	Title	Credits	L/Week
USDGI101	Earth Resources Satellite-1 IRS series of satellites Hyperspectral remote sensing, RADAR remote sensing, Thermal remote sensing	1	30
	Earth Resources Satellite-2 OceanSat remote sensing, MeteoSat and CartoSat remote sensing		
	Applications of remote sensing in Landuse Landcover mapping and geological mapping		
	Applications of remote sensing in Environmental impact assessment, soil mapping		
	Application of remote sensing in Archaeological studies, water resources management		

USCGI102 Geographic information system

Course	Title	Credits	L/Week
USDGI102	GIS Implementation and Project Management GIS Project Planning, System analysis, User Requirements, GIS database design and methodology, Digital representation of data, Statistical Computing, digital data acquisition and sampling	1	30
	Data Processing Analysis and Visualization Spatial analysis and modelling, DEM, TIN, Network Analysis, ANN, Data Mining methods		
	GIS Applications In e-Governance, Telecommunication		
	GIS Applications In Transportation, Facilities Mapping and Asset Management		
	GIS Applications In Environmental Management utilities (Electrical, water, sewer mapping)		

USDGI103: Digital image processing

Course	Title	Credits	L/Week
USDGI103	Image Enhancement techniques-1: Linear and non-linear contrast enhancement, histogram equalization	1	30
	Image Enhancement techniques-1: Band ratioing, radiometric correction, noise removal		
	Image Classification Techniques-1: Supervised Classification. Unsupervised Classification, density slicing		
	Image Classification Techniques-2: Classification Accuracy Assessment, error matrix		
	Multi-image manipulation Vegetation indices, NDVI techniques		

Practical

USDGIP1	Practical of course USDGI101+ USDGI102 + USDGI103	Credits	L/Week
Course USDGI101 + USDGI102+ USDGI103	Remote sensing - USDGI101 Raster data modelling GIS - USDGI102 Theissen polygon, DEM generation DIP - USDGI103 Image rectification, image restoration, Digital image analysis (generating FCC, linear and non-linear contrast analysis) Supervised Classification, unsupervised Classification, accuracy assessment, NDVI	1.5	3 (Total 72 LP)

Semester II

USCGIPRJ Project

Course code	Title	Credits	L/Week
USDGIPRJ	Project to be based on topics related to RS, GIS and DIP, field work in project area	1.5	4 (total 96 LP)

- **Evaluation Pattern :**

The One Year Post Graduate Diploma Course shall consist of SIX Theory Papers (100 marks each), SIX Practicals Papers (50 marks each), One Special Theory Paper (100 marks), Industrial Visit and its report (30 marks), Project (250 marks) and Viva Voice (20 marks), thus totalling to 1300 marks.

The One Year Post Graduate Diploma Course shall be covered in 210 lectures (30 lectures per paper), 48 practicals (4 hours per week for 48 weeks) and 48 hours of Project guidance per batch.

The examination shall be conducted at the end of each Semester 24 weeks after the commencement of the One Year Post Graduate Diploma Course.

- **Reference Books :**

- Introduction to Geographic Information, Chang, K. Sc., Tata McGraw Hill, 2002
- Remote sensing and Image Interpretation, Lillesand, Kiefer and Chipman. Fifth Ed. Wiley and Sons
- Introductory Digital Image Processing- A Remote Sensing Perspective, John Jensen. Second Ed. Prentice Hall
- Remote Sensing - Principles and Interpretation, Sabins. Third Ed. Freeman
- Aerial photos in geologic interpretation, Ray R.G. 1969 USGS Prof. Paper 373
- Practical Geography – A systematic Approach, Ashish Sarkar