AMITY UNIVERSITY
UTTAR PRADESH

COURSE CURRICULUM

Course Title: **Geoinformatics In Geosciences**

Course Code:

Credit Units: 4

Course Level: PG

L	T	P/S	SW/FW	TOTAL CREDIT UNITS
2	1	1	-	4

Course Objectives:

To teach the students about basics of geosciences and application of remote sensing and GIS in assessment and monitoring of Geoscientific problems.

Pre-requisites: Student should have the basic of Geological science and remote sensing.

Student Learning Outcomes:

- Analyses of remote sensing data and finding the problems encountered in professional practice and develop appropriate methods for studying and/or solving the problems.
- Development of appropriate methods for interpretation and collection of geoscientific data from satellite images..
- Formulate and carry out independent research in the general field of geosciences possibly as part of a multi-disciplinary research and development project.

Course Contents/Syllabus:

	Weightage (%)
Module I	

Descriptors/Topics The Earth System: Concept of Earth System, lithosphere, biosphere, hydrosphere & atmosphere, plate tectonic theory and its relationship to earthquakes, and volcanic activity. • Remote Sensing in Geosciences – An overview • Basic concept of geomorphology, earth surface process and resultant landforms • Spectral properties of geologic features in different regions of Electromagnetic Spectrum, • Nature of the spectra of rocks and minerals. • Geologic Remote sensing and its significance in Geologic mapping • Case studies.	**20**
Module II	**20**
Descriptors/Topics • Interpretation of drainage patterns through aerial photographs and satellite images • Interpretation of fluvial landforms • Interpretation of glacial and coastal landforms • Interpretation of eolian and volcanic landforms • Case studies	
Module III	**20**
Descriptors/Topics • Interpretation of Karst landforms. • Interpretation of structural and denudational landforms – cuesta, hogback, butte, mesa etc. • Interpretation of landforms related to igneous, sedimentary and metamorphic rocks • Geomorphological mapping and terrain evaluation using satellite data. • Case Studies	
Module IV	**20**
Descriptors/Topics • Lithological interpretation of Igneous rocks • Lithological interpretation of Sedimentary rocks • Lithological interpretation of Metamorphic rocks • Structure – Definition, types and structural mapping Interpretation of folds, faults, unconformities and lineaments. • Case studies	
Module V	**20**
Descriptors/Topics • Remote Sensing in Mineral exploration - An Overview and application of Remote Sensing in Mineral Exploration . • Remote Sensing in Oil Exploration – Features helpful in detection of target areas for oil exploration • Engineering geological Investigation, Alignment studies – roads, tunnels, canals etc Site selection studies – Dams, bridges, highways etc • Natural disaster mapping and management.	

• Case Studies	

Pedagogy for Course Delivery:

The course is designed to be taught through the lecture mode and laboratory exercises. However seminar presentations on various themes related to the course and discussion on various case studies. Class room interaction will definitely have to be an integral part of the learning experience.

Lab/ Practicals details, if applicable:

List of Experiments:

- Study of borderline information of satellite image and topographical sheets and correlating satellite image features with the topographical sheet.
- Study of satellite images for identification of lithological units.
- Rock type mapping using satellite data.
- Study of lineaments / structure on satellite image using digital image processing
- Landform mapping from satellite images.
- Alluvial terrain mapping from satellite images.
- Digital Image Processing for lithological discrimination
- Application of different types of filters for lineament and structural mapping

Assessment/ Examination Scheme:

Theory L/T (%)	Lab/Practical/Studio (%)	End Term Examination
30 %	NA	70 %

Theory Assessment (L&T):

Continuous Assessment/Internal Assessment					End Term Examination
Components (Drop down)					
Weightage (%)	10	05	10	05	70

Lab/ Practical/ Studio Assessment:

	Continuous Assessment/Internal Assessment	End Term Examination

Components (Drop down	Class Test (Practical Based)	Attendance	Mid Term Viva	Major Lab Exercise	Minor	Practical Records	Viva
Weightage (%)	15	05	10	35	15	10	10

Text & References:

- Murk & Skinner., 1999, Geology Today- Understanding our planet, John Wiley and Sons Inc, New York
- Lillisand, T. M. and Keifer, R. W., 2007, Remote Sensing and Image interpretation', John Willey and Sons, New York, Third Edition
- Pandey, S. N., 1987, Principles and applications of photogeology. New Delhi: Eastern Wiley.
- Drury, S.A. , 2004, Image interpretation in geology, Chapman & Hall India.
- Thornbury, W. D., (I969),: Principles of Geomorphology, John Wiley and Sons, New York
- Sabins, Floyd F., (2007), Remote Sensing: Principles and Interpretation, 2nd ed., Freeman, New York.

Research Journals

- Environmental Earth Science
- Hydrogeology Journal
- Hydrological Science Journal
- Journal of Geological Society of India
- Journal of Earth System Science
- Current Science
- Journal of Indian Society of Remote Sensing
- Remote Sensing of Environment
- IEEE Geoscience and Remote Sensing
- Applied Earth Observation and Geo-information