Programme and Course Outcome
Of The Department of Remote Sensing & GIS Applications

Name of Program	Program Outcome	Program Specific Outcome	Name of the Course	Course Outcome
M.Sc. Remote Sensing & GIS Applications	**PO1:** An ability to independently carry out investigation and development work to solve real life geospatial problems. **PO2:** An ability to write and present a substantial technical report/document /international level research article. **PO3**: Students should be able to demonstrate a degree of mastery over the areas of Geoinformatics. **PO4:** An ability to share theoretical and practical knowledge in both teaching and research as well as in industries. **PO5:** An ability to apply professional ethics, accountability and equity.	1. After completing M.Sc. in Remote sensing and GIS Applications, students will be able to solve complex real-world problems such as natural resource management, disaster risk mapping, environmental monitoring, landuse/landcover dynamics and modelling 2. After completing this course, Remote sensing and GIS Professional can start their career in central govt (e.g. Space application centre, NRSC, SULSI etc.), State govt (District NRDMS centre, Land record department), Academic institutions (research), private sector (ESRI India), overseas (As a remote sensing and GIS Professional) and as an entrepreneur.	**Semester I** Aerial Remote Sensing (SOES/RS/C001)	• This paper possesses a thorough grasp of aerial photography and remote sensing principles. • Students will excel in photo flight planning, spectral sensitivity, photogrammetry fundamentals and cartographic techniques, ensuring adeptness in acquiring, analysing and visualizing spatial data for diverse applications.
			Satellite Remote Sensing (SOES/RS/C002)	• This paper covers remote sensing fundamentals, physics, atmospheric impacts, sensor principles and spectral analysis. • Students will trace the historical development of space imaging, focusing on satellites such as Landsat, Spot, and NOAA, IRS series, meteorological satellites and grasp orbit dynamics and data output. Additionally, they'll master multispectral, thermal, and hyperspectral scanning for versatile image interpretation.
			Digital Image Processing and Microwave Remote Sensing (SOES/RS/C003)	• Through this paper, students will excel in digital image processing (DIP), encompassing rectification, restoration and enhancement techniques. They will proficiently apply image classification methods and comprehend microwave remote sensing principles, spatial characteristics, and spaceborne radar systems for diverse remote sensing applications.
			Geographic Information System and Global Navigation Satellite System (SOES/RS/C004)	• This paper equips students with computer basics and GIS principles, covering raster and vector GIS, database creation and spatial data integration. They'll grasp network analysis, concept of DEM and Web GIS applications and fundamentals of GPS and GNSS.
			Laboratory Course I (SOES/RS/C005)	• In this paper, students will proficiently analyse aerial photos, interpret, satellite data and stereo images. They will excel in studying multispectral data, processing raw data, and conducting histogram analysis. Additionally, they will demonstrate expertise in digital classification, enhancing satellite data and extracting thematic information through image processing techniques.

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			Laboratory Course II (SOES/RS/C006)	• This paper ensures proficiency in Geographic Information System (GIS), covering Geo-referencing, GIS database design and data editing. Students will gain practical skills in attribute data manipulation and output generation. Additionally, hands-on training in GPS and experimentation with Bhuwan Geoportal will enhance their geographical positioning proficiency.
			Semester II Environmental Management (SOES/RS/C007)	• This paper aims to equip students with a comprehensive understanding of environmental principles, policies and practices. After completion, students will demonstrate proficiency in analysing environmental issues, devising sustainable solutions and effectively communicating their insights.
			Environmental Impact Assessment (SOES/RS/C008)	• Decision-Making: The outcomes of EIA provide decision-makers and stakeholders with relevant information to make informed decisions about the project. The information includes the potential environmental impacts of the project, the significance of the impacts, and the measures to mitigate or prevent the impacts.
			Disaster Management (SOES/RS/C009)	• To equip students with comprehensive knowledge and practical skills to understand and manage various natural and technical disasters effectively. The course focuses on imparting a deep understanding of the disaster management cycle, including mitigation, preparedness, response, and recovery phases, both at national and international levels.
			Climate Change (SOES/RS/C010)	• After completing the course, participants will be able to know the fundamentals of climate change science. Present the international climate change legal and policy framework and explain key issues under negotiation.
			Laboratory Course I (SOES/RS/C011) & Laboratory Course II (SOES/RS/C012)	• Agricultural and Environmental Monitoring: It will enable students to conceptualize and overview agricultural droughts, flood mapping, monitoring and forest fire assessment using remote sensing (RS) and geographic information systems (GIS). • Technological Proficiency: Students will develop the ability to utilize RS,

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				GIS, and Global Navigation Satellite System (GNSS) technologies for disaster management. • Geo-spatial Data Analysis: To familiarize students with geo-spatial data requirements, existing methodologies, and tools pertinent to disaster management. • Decision Support Systems: Students will be capable of leveraging GIS-based decision support systems in managing emergencies and making informed decisions during disasters.
			Semester III Specialization-I Forestry and Ecology	• To provide students with a comprehensive understanding of forest ecosystems, their management, and the role of remote sensing and GIS in conservation and development. The course is divided into four papers, each focusing on a specific aspect of forestry and ecological studies. • Students will be proficient in using advanced tools and methodologies for forest classification, inventory, ecosystem analysis, and eco-development. They will be prepared to contribute to the field of forestry and ecology with a strong emphasis on sustainability and conservation.
			Specialization-II Agriculture and Soils	• To provide students with a detailed understanding of the principles and applications of remote sensing in agriculture and soil sciences. The course is designed to enhance students' abilities to use satellite imagery for crop and soil analysis, leading to informed agricultural management and sustainable land use practices. • This specialization will prepare students to apply remote sensing technologies to advance agricultural practices and soil management, contributing to the sustainability of these critical resources.
			Specialization-III Geosciences	• Students will have a solid foundation in geosciences with practical skills in remote sensing and GIS applications, enabling them to contribute to the field of Earth sciences effectively. They will be prepared to address challenges related to geological exploration, environmental conservation, and climate change impacts on geological features.

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			Specialization-IV Human Settlement and Analysis	• To equip students with the skills to analyse and interpret urban environments using remote sensing (RS) and geographic information systems (GIS). It focuses on understanding the spectral characteristics of urban features, the principles of aerial photography, and the application of statistical methods for urban planning. The course also emphasizes the use of digital image processing (DIP) and GIS for urban studies, particularly for the planning and development of human settlements.
			Specialization-V Water Resources	• To provide students with the necessary abilities to evaluate hydrological components, define watershed features, oversee water resources, and formulate plans for the responsible use of water resources. The focus is on utilizing remote sensing techniques to analyse hydrological processes, geology, and landforms related to water science, as well as employing digital elevation models for water-related projects. • It prepares students to become proficient in the assessment and management of water resources, utilizing advanced technologies and methodologies to ensure the sustainability and efficient use of water in various sectors.
			Semester IV Experimental Designing (SOES/RS/C016)	• This paper is design to provide students with a thorough understanding of statistical methods and their application in designing experiments. • It covers a wide range of topics, from basic statistical concepts to advanced experimental designs, ensuring that students are well-equipped to conduct research and analyse data effectively.
			Research Methodology (SOES/RS/C017)	• To provide students with a systematic understanding of the key elements involved in conducting high-quality research. • It is designed to guide students through the entire research process, from the inception of a research idea to the dissemination of findings.
			Laboratory Course I (SOES/RS/C018)	• The course will teach the principal steps in sample surveys, including understanding population, sampling units, sample size, bias, accuracy, and precision.

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				• Learners will be able to apply the principles of experimental design, including randomization, layout, and data analysis for Completely Randomized Design (CRD), Randomized Block Design (RBD), Latin Square Design (LSD), Split Plot, and Strip Plot design.
			Project Work and Dissertation (SOES/RS/E004)	• To provide students with the opportunity to apply their knowledge and skills in a practical research project, culminating in the production of a dissertation. • This paper is designed to foster independent research abilities and to enhance students' proficiency in presenting their research findings.