CENTRE FOR GEOINFORMATICS
THE GANDHIGRAM RURAL INSTITUTE (DEEMED TO BE UNIVERSITY)
Gandhigram – 624 302, Dindigul District, Tamil Nadu
Ministry of Education (Shiksha Mantralaya), Govt. of India
Accredited by NAAC with 'A' Grade (3rd Cycle)

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Ref: C4Geo/Elective/2023-2024   09.02.2024

CIRCULAR

We are offering the following Generic Elective and Value added course to the students of PG Programmes during the Even Semester (2023-2024).

Elective Generic

S.No.	Sem	Code	Title
1	II	21GISP02G1	Basics of Geoinformatics
2	II	21GISP02G2	Geoinformatics for Disaster Management

Value Added Course

S.No.	Sem	Code	Title
1	II	21GISP2VA3	Satellite Meteorology
2	II	21GISP2VA4	Land Use/ Land Cover Mapping using Google Earth Engine

Kindly bring this information to the notice of **PG students of your department**, so that those who are interested may contact the undersigned for further details.

Yours faithfully,

Encl: Syllabus

(M.MUTHUKUMAR)

DIRECTOR i/c
Centre for Geoinformatics
The Gandhigram Rural Institute
(Deemed to be University)
Gandhigram - 624 302
Dindigul District, Tamil Nadu, India.

To
The Head / Director / Course Coordinator
All Departments / Centres
GRI (DTBU), Gandhigram

Semester	II	Course Code	21GISP02G1
Course Title	**Basics of Geoinformatics**		
No. of Credits	3	No. of contact hours per Week	3
New Course / Revised Course	Revised Course	If revised, Percentage of Revision effected	20%
Category	• Non-Major Elective		
Scope of the Course	• Basic Skill / Advanced Skill		
Cognitive Levels addressed by the Course	• K-1: (Remember) • K-2: (Understand) • K-3: (Apply)		
Course Objectives (Maximum: 5)	The Course aims to • Provide an introduction to various technologies of Geoinformatics and its applications.		

UNIT	Content	No. of Hours
I	Definition - Meaning – Scope – Technologies of Geoinformatics - Contributing Technologies. Remote Sensing: Definition – Components – EMR - Remote Sensing Resolutions – Types of Remote Sensing - Types of Satellites –Image Interpretation -	8
II	Digital Image Processing: Definition, Stages in Image Processing, Image Preprocessing, Image enhancement – Image Classification.	10
III	Definition - Components of GIS – types of data – sources of spatial/attribute data - Geodatabase - Analytical Tools of GIS: Buffer – Overlay – Query - Spatial interpolation - Surface analysis - network analysis.	10
IV	Definition - Working Principles – Segments - Advantages – Disadvantages of GNSS – Global: NAVSTAR, GLONASS, GALILEO; Regional – IRNSS, QZSS; Augmentation – WAAS, LAAS - Stand alone Vs DGPS.	10
V	Natural Resources Management - Environmental Studies - Disaster Management - Urban Studies - Military Applications – Navigation - Location Based Services – Civil Engineering - Agriculture.	10
References	***Text Books*** 1. Chandra A.M., Geoinformatics, New Age International Publishers, New Delhi, 2016.	
	Reference Books 1. Ian Heywood, Sarah Cornelivs and Steve Carver, An Introduction to Geographical Information System (3rd Edition), Pearson Education Pvt. Ltd., New Delhi, 2017. 2. Peter A. Burrough et al., Principles of Geographical Information System (3rd Edition), Oxford University Press Inc., New York, 2015. 3. Michael N.Demers, Fundamentals of Geographic Information Systems (4th Edition), Wiley India Pvt. Ltd., New Delhi, 2013.	

Semester	II	Course Code	21GISP02G2
Course Title	**Geoinformatics for Disaster Management**		
No. of Credits	3	No. of contact hours per Week	3
New Course /Revised Course	Revised Course	If revised, Percentage of Revision effected	20%
Category	• Non-Major Elective		
Scope of the Course	• Basic Skill / Advanced Skill • Skill Development • Value-Added Courses imparting transferable and life skills		
Cognitive Levels addressed by the Course	• K-1:(Remember) • K-2:(Understand) • K-3:(Apply) • K-4:(Analyze)		
Course Objectives	The Course aims to • Introduce technologies of Geoinformatics in disaster management		

UNIT	Content	No. of Hours
I	Nature, characteristics and types of Disasters – Causes and effects of Disaster – Disaster Profile of India – Disaster Management cycle.	8
II	Disaster Management; Earthquakes: Causes and effects – measurements - earthquake zones of the world and India – vulnerability and microzonation; Volcanoes: Causes and effects – volcanic zones of the world and in India - volcanic hazards; Landslides: Causes and effects – landslide prone zones in India – GIS case studies for earthquake, volcano and landslide.	10
III	Drought : Types – factors influencing drought – variable identification – vegetation index – land use / ground water level changes – soil erosion –delimiting drought prone areas – short term and long term effects; Desertification :Processes – over utilization of water and land resources – GIS based management strategies – GIS case studies for drought and desertification.	10
IV	Cyclone: Origin and types - effects on land and sea – damage assessment; Flooding: Topography, land use and flooding – Space-time integration – GIS based parameters and layers – flood prone area analysis and management – risk assessment – GIS case studies for cyclones and floods.	10
V	Atmospheric Disasters: Ozone layer depletion – green house / global warming –acid rain – snow melt – sea level rise – related problems; Nuclear, Chemical /Industrial and Mining Disasters: Types – consequences – major disasters of the world and India; Marine Disasters: Oil spill and chemical pollution – coastal zone management strategies – GIS case studies.	10

Semester	II	Course Code	21GISP2VA3
Course Title	**Satellite Meteorology**		
No. of Credits	3	No. of contact hours per Week	3
New Course / Revised Course	Revised Course	If revised, Percentage of Revision effected	20%
Category	• Value added course		
Scope of the Course	• Basic Skill / Advanced Skill		
Cognitive Levels addressed by the Course	• K-1: (Remember) • K-2: (Understand) • K-3: (Apply)		
Course Objectives	The Course aims to • introduce the technologies of remote sensing in meteorology		

UNIT	Content	No. of Hours
I	Basics – Concepts in Satellite Meteorology – Conventional Direct Measurements – Indirect Methods and Remote Sensing.	6
II	Weather Satellites and Sensing Systems – Orbit Types and Altitudes – View Angle and Implications – INSAT and KALPANA – TRMM and GPM and others – American and European Missions, availability of data and derived data sets.	6
III	Data Records and Applications – Active and Passive Sensor Data – Microwave Sensors and Applications – Altitude. Wind. Temperature and Wave Measurements and Sensors – AWS Global Network in Measurements.	6
IV	Meteorological Applications – Oceanographic Applications – Weather Forecasting – Aviation Meteorology – Agriculture and Irrigation Management – Meteorology in Transportation Industry – Business and Trade Application.	6
V	Management and Monitoring : Satellite Meteorology in Welfare Management – Cyclone Warning Systems – World Precipitation and Warming – Sea level Monitoring – Ice and Snow – Flood and Storm Surge Warning Systems – Storms – Wild Fires and Volcanic Ash.	6
References	***Text Books*** 1. R R Kelkar, Satellite Meteorology, 2nd Edition, BS Publications,2017	
	Reference Book 1. Text book on Satellite Meteorology, https://metnet.imd.gov.in/imdetp/lecture_notes/course10/LN_10_55_Lecture%20on%20Satellite%20Meteorology.pdf	
	E.Resources 1. Remote Sensing Applications with Meteorological Satellites, https://cimss.ssec.wisc.edu/rss/brienza/source/AppMetSat12.pdf 2. Satellite Meteorology, http://iprc.soest.hawaii.edu/users/yqwang/EOLSS satellite.pdf	

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Semester	II	Course Code	21GISP2VA4
Course Title	**Land Use/ Land Cover Mapping using Google Earth Engine**		
No. of Credits	2	No. of contact hours per Week	2
New Course / Revised Course	New Course	If revised, Percentage of Revision effected	-
Category	• Value added course		
Scope of the	• Value-Added Courses imparting transferable and life skills		
Cognitive Levels addressed by the Course	• K-2: (Understand) • K-3: (Apply) • K-4: (Analyze) • K-5: (Evaluate) • K-6: (Create)		
Course Objectives	The Course aims to • exposes the students to know about Earth engine and its applications.		

UNIT	Content	No. of Hours
I	Introduction to Earth Engine - Explore Earth Engine - Sign Up with Earth engine. JavaScript code Editior - JavaScript Syntax - Code Editor	6
II	Unsupervised Classification - Clustering - Training Reference Data Supervised Classification with Landsat - Processing Landsat Data - Classification with Landsat - Confusion Matrix	6
III	Supervised classification with Sentinel - Processing Sentinel Data - Classification with sentinel - Confusion matrix Supervised Classification with MODIS - Processing MODIS Data - Classification with MODIS - Confusion Matrix	6
IV	Change Detection Analysis - Water Change Analysis - Forest Change Analysis - Assignment: Water Change Analysis	6
V	Global Land Cover Products - Globe Cover - NLCD Land Cover. - Case Study.	6
References	**Text Books** 1. Google Earth Engine Applications, Lalit Kumar and Onisimo Mutanga, MDPI publications.	
	Reference Books 1. Programming Google App Engine with Java, Sanderson, Dan, O'Reilly Media, Year: 2015 2. Programming Google App Engine with Python: Build and Run Scalable Python Apps on Google's Infrastructure, Dan Sanderson O'Reilly Media, Year: 2015	
	E-Resources 1. https://earthengine.google.com/	

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