

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)

DR.M.MUTHUKUMAR, M.Sc., M.Tech., Ph.D.
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Director i/c



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Ref:C4Geo/2023-2024

04.12.2023

CIRCULAR

We are offering the following Generic Electives for UG Programmes during the even semester (2023-2024).

UG Level

S.No.	Sem	Code	Title
1	IV	21GISU04G1	Introduction to Geoinformatics
2	IV	21GISU04G2	Geoinformatics for Agriculture
3	IV	21GISU04G3	Geoinformatics for Water Resource Management

Kindly bring this information to the notice of UG students of your Department/Centre, so that those who are interested may contact the undersigned for further details.

Yours faithfully,

(M.MUTHUKUMAR)

Encl: Syllabus

To

All HODs / Directors / Course Coordinators

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

Semester	IV	Course Code	21GISU04G1
Course Title	Introduction to 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	<ul style="list-style-type: none"> • Non-Major Elective 		
Scope of the Course	<ul style="list-style-type: none"> • Basic Skill / Advanced Skill 		
Cognitive Levels addressed by the Course	<ul style="list-style-type: none"> • K-1: (Remember) • K-2: (Understand) • K-3: (Apply) 		
Course Objectives	<p>The Course aims to</p> <ul style="list-style-type: none"> • introduce the technologies of Geoinformatics • create an outline on Remote sensing and Digital Image Processing • teach the concept of GIS and GPS • discuss about the various areas of application of Geoinformatics 		
UNIT	Content	No. of Hours	
I	Definition - Meaning - Contributing technologies of Geoinformatics. Remote Sensing: Definition - Components - EMR - Remote Sensing Resolutions - Optical - Thermal and Microwave.	8	
II	Digital Image Processing - Stages - Image Preprocessing, Image Enhancement and Image Classification.	10	
III	GIS: Definition - Components of GIS - Data used in GIS - data structures - Analytical Tools of GIS: Buffer - overlay - reclass - Spatial Interpolation.	10	
IV	Definition - Segments of GPS - Global: NAVSTAR - GLONASS - GALILEO; Regional: IRNSS - QZSS.	10	
V	Natural Resources Management - Disasters Mapping and Management - Environmental Studies - Military - Civil Engineering - Agriculture - Location Based Services.	10	
References	<p>Text Books</p> <ol style="list-style-type: none"> 1. Chandra A.M., Geoinformatics, New Age International Publishers, New Delhi, 2016. <p>Reference Books</p> <ol style="list-style-type: none"> 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. 4. Lillesand, Kiefer and Chipman, Remote Sensing and Image Interpretation (6th Edition), Wiley India Pvt.Ltd, New Delhi, 2017. 5. Hofmann - Wellenhof, Lichtenegger and Collins, GPS: Theory and Practice (5th edition), Springer Wien, New York, 2015. 		

Semester	IV	Course Code	21GISU04G2
Course Title	Geoinformatics for Agriculture		
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	<ul style="list-style-type: none"> • Non-Major Elective 		
Scope of the Course	<ul style="list-style-type: none"> • Basic Skill / Advanced Skill 		
Cognitive Levels addressed by the Course	<ul style="list-style-type: none"> • K-1: (Remember) • K-2: (Understand) • K-3: (Apply) 		
Course Objectives	<p>The Course aims to</p> <ul style="list-style-type: none"> • introduce the technologies of Geoinformatics • create an outline on Remote sensing and Digital Image Processing. • teach the concept of GIS and GPS. • discuss about the various areas of application of Geoinformatics. 		
UNIT	Content		No. of Hours
I	Geoinformatics: Definition - Meaning –Concept of Geoinformatics - Contributing Technologies: Remote sensing – Digital Image Processing – GIS – GNSS.		8
II	Crop inventory and remote sensing: Introduction – leaf optical properties – identification of crops and crop inventorying – crop acreage estimation – vegetation indices – yield estimation.		10
III	Remote sensing for soil: Introduction – soil genesis and soil classification – soil taxonomy – soil reflectance properties – soil mapping using remote sensing – soil erosion estimation and sedimentation.		10
IV	Land Evaluation and management: Introduction – land use/ land cover classification – change dynamics – land capability assessments.		10
V	Damage assessment: Introduction – crop loss assessment by floods – flood hazard zone mapping – drought management – reflectance properties of stressed crops.		10
References	<p>Text Books</p> <ol style="list-style-type: none"> 1. Francis J. Pierce, David Clay, GIS Applications in Agriculture, CRC Press, 2007 		
	<p>Reference Books</p> <ol style="list-style-type: none"> 1. Dr. Graciela Metternicht, Dr. Alfred Zinck, Remote Sensing of Soil Salinization: Impact on Land Management, CRC Press, 2008. 2. Janis L. Boettinger, David W. Howell, Amanda C. Moore, Alfred E. Hartemink, Suzann Kienast-Brown, Digital Soil Mapping: Bridging Research, Environmental Application, and Operation, Springer Science & 		

Semester	IV	Course Code	21GISU04G3
Course Title	Geoinformatics for Water Resource 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	<ul style="list-style-type: none"> • Non-Major Elective 		
Scope of the Course	<ul style="list-style-type: none"> • Basic Skill / Advanced Skill 		
Cognitive Levels addressed by the Course	<ul style="list-style-type: none"> • K-1: (Remember) • K-2: (Understand) • K-3: (Apply) 		
Course Objectives	<p>The Course aims to</p> <ul style="list-style-type: none"> • introduce the technologies of Geoinformatics and their areas of application in water resource management 		
UNIT	Content	No. of Hours	
I	Geoinformatics: Definition - Meaning –Concept of Geoinformatics - Contributing Technologies: Remote sensing – Digital Image Processing – GIS – GNSS.	8	
II	Watershed Management: Watershed characterization, delineation and codification, watershed problems and management strategy, Geoinformatics approach for watershed prioritization. Remote Sensing in Surface – Subsurface Water Exploration: Application of remote sensing in hydro-geomorphological interpretation for ground water exploration, water quality monitoring through remote sensing.	10	
III	Water Conservation Projects: Geoinformatics based site selection for river valley projects, surface water harvesting structures: check dam, Nala bunds, subsurface dykes etc.	10	
IV	Operational Applications in Water Resources: Flood prediction, drought evaluation, snow cover mapping, reservoir sedimentation evaluation.	10	
V	Geoinformatics Models in Water Resources: Geoinformatics based Runoff and hydrological modeling, flood Hazards' modeling, snowmelt runoff modeling.	10	
References	<p>Text Books</p> <ol style="list-style-type: none"> 1. John G. Lyon, GIS for Water Resource and Watershed Management, CRC Press, 2003 <p>Reference Books</p> <ol style="list-style-type: none"> 1. John G. Lyon, Geographic Information Systems in Water Resources Engineering, CRC Press, 2009. <p>E-Resources</p> <ol style="list-style-type: none"> 1. Geographic Information Systems in Water Resources Engineering, https://www.pdfdrive.com/geographic-information-systems-in-water-resources-engineering-e190107317.html 2. Integrating GIS, Remote Sensing, and Mathematical Modelling for 		