Annexure-II

DEPARTMENT OF GEOGRAPHY

Scheme of Examination For

DIPLOMA IN REMOTE SENSING AND GIS (DRG1)

Session: 2022-23 onwards

PROGRAM SPECIFIC OUTCOMES

Students will be able to:

PSO1: Develop a better thinking and decision making using Remote Sensing and GIS techniques in everyday life.

PSO2: Understand places, regions and spatial relationship as result of series of inter-related factors of nature, culture and individual human actions.

PSO3: Apply spatial knowledge to solve natural, environmental and societal problems and challenges.

PSO4: Carry out geospatial research/investigation independently to address real life problems.

PSO5: Receive the theoretical knowledge with local realities by making field visits to different areas.

PSO6: Enhance and equipped with concepts, methodologies and applications of Geospatial Technology.

PSO7: Develop practical understanding of geospatial processes, mechanisms and Operational aspects of space-based technology to seek effective solutions of the problems.

PSO8: Enhance technical skills in the field of Geospatial technologies

SEMESTER I
PAPER I

Note: The question paper will have five units. Each of the first four units of question paper will contain two questions from each unit. Candidate(s) are required to attempt one question from each unit. Unit-V shall be compulsory and contain eight short answer type questions covering entire syllabus. All questions carry equal marks.

Program Name	Diploma in Remote Sensing and GIS	Program Code	DRG1
Course Name	Air Photo and Remote Sensing Techniques	Course Code	22DRG11C1
Credits	4	No. Hours/Week	4
Duration of End term examination	3 Hours	Total Marks Internal Marks Theory Exam	100 20 80

Course Objectives:

1. To impart the knowledge about aerial photographs and photogrammetry.
2. To introduce the basic concepts and significance of photogrammetry.
3.To impart the knowledge on concepts and significance of remote sensing.
4.To understand the sensor characteristics of various remote sensing systems.
5.To know about remote sensing programmes of other countries.

Course Outcomes:

Students will be able to:

1.Understand the basic principles and concepts of aerial photography and photogrammetry.
2.Understand various types of aerial photographs and their geometric specifications.
3.Understand the basic concepts and principles of remote sensing.
4.Know about remote sensing set up in India and programmes of other countries.
5.Better decision making with remote sensing to manage the resources and problem solving.

Unit 1

Aerial Photography: Meaning, Concepts, Nature, Scope, History and Development; Aerial Photographs - Types and Characteristics; Planning and Execution of Photographic Flights and Flight Planning; Photogrammetry: Meaning, Concepts, Nature and Scope; Geometry and Scale of Aerial Photographs; Determination of Height from Aerial Photographs

Unit 2

Remote Sensing: Definition, Evolution, Principles, Types (Active and Passive); Electromagnetic Spectrum; Energy Source and Characteristics; Black Body Radiation Principles; Atmospheric Windows; Energy Interactions with Atmosphere and Earth

Unit 3

Components of Remote Sensing: Platforms and Sensors; Resolution Types; Satellite Orbits; Bands and Band Characteristics of Optical Sensors; Concepts of Thermal Imaging; Thermal Scanners

Unit 4

Microwave Remote Sensing: Basic Concept and Principles; Sensors; Hyper spectral Remote Sensing: Sensors and Satellite Systems; Remote Sensing Programmes: USA, Russia, India, China and ESA

Recommended Readings:

Campbell, J.B. (1996). Introduction to Remote Sensing, Guilford, New York.

Chanrda, A.M. & Ghosh, S.K. (2006). Remote Sensing and Geographical Information System. Narosa Publishing House, New Delhi.

Curran, Paul J. (1985). Principles of Remote Sensing, Longman, London & New York.

Ghosh, S. K. (2005). Fundamentals of computation Photogrammetry. Concept publishing, New Delhi.

Harris, R (1987). Satellite Remote Sensing an introduction. Routledge & Kegan Paul. London & New York

Joseph, G. (2005). Fundamentals of Remote Sensing, Universities Press Hyderabad.

Lillesand, T.M. & Ralph W. Keifer, (2002). Remote Sensing and Image Interpretation.John Wiley & Sons, Inc., New York.

Moffitt, F.H. & Mikhail, E.M., (Eds.). (1980). Photogrammetry, Harper and Row,
Panda, B.C. (2005). Remote Sensing: Principles and Applications. Viva Books Pvt. Ltd., New Delhi.

Rampal, K.K. (1999). Hand book of aerial photography and interpretation. Conceptpublication

Reddy,A.M. (2001) Remote Sensing and Geographical Information System. BSP BSPublication,Hyderabad

Singh, S. & Patel, A.N. (1999). Principles of Remote Sensing. Scientific Publishers (India)

Wolf, Paul R. (1983) Elements of Photogrammetry. McGraw-Hill. New York.

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PAPER 2

Note: The question paper will have five units. Each of the first four units of question paper will contain two questions from each unit. Candidate(s) are required to attempt one question from each unit. Unit-V shall be compulsory and contain eight short answer type questions covering entire syllabus. All questions carry equal marks.

Program Name	Diploma in Remote Sensing and GIS	Program Code	DRG1
Course Name	Fundamentals of Digital Image Processing	Course Code	22DRG11C2
Credits	4	No. Hours/Week	4
Duration of End term examination	3 Hours	Total Marks Internal Marks Theory Exam	100 20 80

Course Objectives:

1. To introduce the concept of acquisition of digital image, processing and display.
2. To impart knowledge on various types of image distortions and their corrections.
3. To familiarize with various image enhancement techniques.
4. To develop the expertise in image interpretation on digital platform.
5. To develop the capability for quantitative assessment of objects from images.

Course Outcomes:

Students will be able to:

1. Understand basic of digital images and their characteristics.
2. Know about pre and post processing techniques of satellite images.
3. Understand basic elements of digital image interpretation.
4. Know about digital image enhancement techniques.
5. Acquire expertise in the use of digital images for solving spatial problems.

Unit 1

Digital Image Processing: Concept of Digital Image Processing, Definition of Digital Image, Historical Development; Digital Data Formats; Elements of image Interpretation and Convergence of Evidence; Color Composites

Unit 2

Corrective measures: Atmospheric Distortions and Corrections; Radiometric Distortions and Corrections; Geometric Distortions and Corrections; Layer Information, Digital Image Histogram

Unit 3

Image Enhancement Techniques: Linear and Non-Linear Contrast Enhancement; Histogram Equalization; Density slicing; Spatial filtering; Image transformation: Band rationing; Principal Component Analysis

Unit 4

Image Classification: Unsupervised Image Classification; Supervised Image Classification; Classification Accuracy Assessment; Object Based Image Analysis

Recommended Readings:

Burger W., and Burge, M.J. (2009) Principles of Digital Image Processing, Springer-Verlag London Limited.

Gibson, P.J. & Power, C. H. (2000). Introductory Remote Sensing: Digital Image Processing andApplications, Routledge, London.

Jahne, B. (1991). Digital Image Processing, New York: Springer-Verlag.

Jain, A.K. (1989). Fundamentals of Digital Image Processing, Englewood Cliffs, NJ, Prentice Hall.

Jonson, J.R. (1996). Introductory Digital Image Processing, Printice-Hall, Inc.

Lillsand, T.M. and Kiefer, R.W. (1999). Remote Sensing and Image Interpretation, New York: Wiley.

Lillesand, T.M., Kiefer, R.W., &Chipman, J.W. (Eds.). (2004). Remote Sensing and Image Interpretation, Wiley.

Mathur, P.M. (1999). Computer Processing of Remotely Sensed Images: An introduction, Wiley, Chichester.

Mullar J.P. (1986). Digital Image Processing in Remote Sensing, Taylor & Francis.

Pratt, W.K. (1991). Digital Image Processing 2nd ed., New York Wiley.

Prost, Gary L., (2013) Remote Sensing for Geoscientists: Image Analysis and Interpretation, 3rd Edition, CRC Press, Taylor & Francis.

Richards, J. A., (2013) Remote Sensing Digital Image Analysis: An Introduction, 5 th Edition, Springer Verlag Berlin Heidelberg.

Russ, J.C. (1992). Image Processing Handbook. Boca Raton, FL: CRC Press

Schowengerdt, R.A. (1983). Techniques for image processing and classification in Remote Sensing, New York: Academic Press.

SEMESTER I

PAPER 3

Note: The question paper will have five units. Each of the first four units of question paper will contain two questions from each unit. Candidate(s) are required to attempt one question from each unit. Unit-V shall be compulsory and contain eight short answer type questions covering entire syllabus. All questions carry equal marks.

Program Name	Diploma in Remote Sensing and GIS	Program Code	DRG1
Course Name	Geographical Information System	Course Code	22DRG11C3
Credits	4	No. Hours/Week	4
Duration of End term examination	3 Hours	Total Marks Internal Marks Theory Exam	100 20 80

Course Objectives:

1.To impart knowledge about fundamental concepts and practices of GIS.
2.To impart necessary skills for spatial data handling, analysis and data base management.
3.To apply GIS analysis to address geospatial problems.
4. To introduce modern trends such as web based, mobile and virtual GIS, etc.
5. To demonstrate proficiency in the use of GIS tools to understand the realistic world.

Course Outcomes:

Students will be able to:

1.Learn the capabilities of GIS.
2. Know how to integrate spatial and non-spatial data in GIS.
3.Data generation, analysis and effective output in GIS.
4. Do geo-processing, model building for real world problem solving.
5.Acquire Knowledge on web-based GIS software.

Unit 1

Introduction to GIS: Meaning, Concept, History, Development and Scope; Components and Functions; Recent Trends in GIS; Nature of GIS Data: Spatial and Non-Spatial; Sources of Spatial Data: Types, Accessibility and Availability

Unit 2

GIS Data Management: Data Base Management System; Database Models; Spatial Data Modelling: Introduction, Types and Processing; Data Input and Editing: Data Input Methods, Capture, Verification and Editing; Data Quality Issues: Components, Accuracy, Precision and Resolution, Consistency, Completeness; Sources and Types of Errors in GIS

Unit 3
Data Processing and Analysis: Introduction, Generation, Collection, Derivatives, Process and Visualization of Digital Elevation Model; Spatial Analysis: Introduction, Spatial Interpolation Types, Problems and Methods; Overlay and Buffering Analysis.
Unit 4
Surface Modeling: Introduction, Generation, Visualization, Interpretation and Applications of Digital Terrain Model; Open-Source GIS: Platforms, Software and Libraries; Web-based GIS: Introduction, Development, Applications and Significance; Virtual GIS: Introduction, Concept and Applications; GIS in India: Education, Issues and Progress

Recommended Readings:

Burrough P.P. &McDonnel, R.A. (1998). Principles of GIS, Oxford University Press.

Chang, K (2008). Introduction to Geographic Information Systems, Tata McGraw-Hill Publishing Company Ltd, New Delhi.

Davis, B. E. (2001). GIS: A visual approach, Onword Press.

Gordon, C. E. (2001). Database Management, Tata McGraw-Hill, New Delhi.

Heywood, I., Cornelius, S., Carver, S., &Raju, S. (Eds.). (2007). An Introduction to Geographic Information Systems, Pearson Education.

Li, S., Dragicevic, S., &Veenendaal, B. (Eds.). (2011). Advances in web-based GIS, mapping services and applications, CRC Press.

Lo, C. P. & Yeung K.W. (2007). Concepts and Techniques in Geographic Information

Martin, D. (2002). Geographic Information Systems, Routledge, London.

Panigrahi,N. (2008). Geographical Information Science, University Press.

Reddy, M. A. (2001). Remote Sensing and Geographic Information Systems, B S Publications, Hyderabad.

Yang, C., (2011). Advanced geo information Science, CRC Press.

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Program Name	Diploma in Remote Sensing and GIS	Program Code	DRG1
Course Name	Practical: Aerial Photographs and Satellite Imagery	Course Code	22DRG11C4
Credits	4	No. Hours/Week	8
Duration of End term examination	4 Hours	Total Marks Lab Record Viva-Voce Written Test	100 20 20 60

Course Objectives:

1. To develop understanding on the basics of photogrammetry.
2. To impart knowledge about the principles and methods of aerial photo interpretation.
3.To introduce kinds of satellite images and their sources.
4.To develop skill of geographical thinking through geospatial technology products.
5. To introduce Drone, its functions and applicability.

Course Outcomes:

Students will be able to:

1. Know the basic concepts and significance of photogrammetry.
2. Understand the principles and methods of measurement using aerial photographs.
3. Know the usefulness of satellite data.
4. Learn the visual interpretation techniques using satellite images.
5.Understand the geography through geospatial technology products.

Unit 1

1.1. Stereo vision test, orientation of stereo model under mirror stereoscope
1.2. Determination of scale on an aerial photograph
1.3.Preparation of Index maps
1.4.Preparation of stereogram and stereo triplet
1.5.Measurement of height of an object on single vertical aerial photograph
1.6. Identification, mapping and interpretation of natural features
1.7 Identification, mapping and interpretation of cultural features

Unit 2

2.1. Kinds of satellite images
2.2. Open sources of satellite data –types, acquisition and availability
2.3 BHUVAN PANCHAYAT (ISRO Geo-portal)- information and services
2.4 Study of a satellite image annotation - IRS 1A – 1D, Cartosat-1,2,2A & 2B
2.5. Visual interpretation of satellite images: principles and methods
2.6. Identification, mapping and interpretation of natural & cultural features on Optical, Thermal and Microwave data
2.7. Land surveying / Ground data collection using Drone

Note:

(i) The question paper shall contain six questions in all, including three questions from each unit. Candidate(s) are required to attempt three questions in all selecting at least one questions from each unit. All questions carry equal marks.

(ii) Candidates shall produce their lab work record before the Board of Examiners for evaluation at the time of their viva-voce examination.

Recommended Readings:

Avery, T.E., & Berlin, G.L. (Eds.). (1992). Fundamentals of Remote Sensing and Air photo Interpretation, Macmillan, New York.

Chauniyal, D.D. (2016). Principles of Remote Sensing and Geographical Information System (Hindi version), ShardaPustakBhawan, Allahabad.

Drury, S.A. (1998). Images of the Earth: A Guide to Remote Sensing, Oxford UniversityPress, Oxford.

Joseph, G. (2005). Fundamentals of Remote Sensing, Universities Press Hyderabad.

Lillesand, T.M. & Kiefer, R.W. (Eds.). (2002). Remote Sensing and ImageInterpretation, John Wiley and Sons, New York.

Panda, B.C. (2005). Remote Sensing: Principles and Applications. Viva Books Pvt.Ltd., New Delhi.

Rampal, K.K. (1999). Handbook of Aerial Photography and Interpretation, ConceptPublishing Co., New Delhi.

Reddy, A. M. (2001). Remote Sensing and Geographical Information Systems. BSPB.S. Publications, Hyderabad.

Sabins, F.F. (1986). Remote Sensing-Principles and Interpretation, Second Edition,WH Freeman and Co., New York.

Wolf, Paul.R. (1983). Elements of Photogrammetry 2nded,McGraw-Hill,New York

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PAPER 5

Program Name	Diploma in Remote Sensing and GIS	Program Code	DRG1
Course Name	Practical: GIS, GNSS and Field Survey	Course Code	22DRG11C5
Credits	4	No. Hours/Week	8
Duration of End term examination	3 Hours	Total Marks Lab Record Viva-Voce Written Test	100 20 20 60

Course Objectives:

1. To impart the knowledge of GIS, Navigation System and Surveying.
2. To develop the skill of data creation and processing in GIS.
3. To introduce the various types of surveying instruments, their functions and applicability.
4. To develop the model building skill in GIS for solving societal problems.
5. To prepare good quality GIS analysts for enhancing employability/start up programmes.

Course Outcomes:

Students will be able to:

1.Acquire knowledge about fundamental concepts and practices of GIS.
2. Learn data integration on GIS software.
3.Understand various types of data analysis techniques.
4. Learn through field survey using GPS/DGPS and Total station.
5. Design good quality maps on GIS platform.

Unit 1

1.2. Introduction to GIS Software: GIS Software Types and Specification.

1.2. Data Input – Output; Import-Export and Georeferencing.

1.3. Data Exploration and Attribute Data Joining.

1.4. Topology Building.

1.5. Data Query: Spatial Querying and Attribute Querying.

1.6. Overlay Analysis.

1.7. Buffer Analysis

Unit 2

2.1. Digital Elevation Model: Generation, Visualization and Interpretation.

2.2. Digital Terrain Model: Generation, Visualization and Interpretation.

2.3. Data Creation: By Interpolation Methods

2.4. Neighborhood Analysis

2.5. Working with Google Earth

2.6. Survey using GPS/DGPS : Data Import, Export, Processing and Mapping

Note:

(i) The question paper shall contain six questions in all, including three questions from each unit. Candidate(s) are required to attempt three questions in all selecting at least one questions from each unit. All questions carry equal marks.

(ii) Candidates shall produce their lab work record before the Board of Examiners for evaluation at the time of their viva-voce examination.

Recommended Readings:

Alfred, L. (2004). GPS Satellite Surveying, Third Edition, John Wiley & Sons, Inc., Hoboken, NewJersey.

Burrough P.P. & McDonnel, R.A. (1998). Principles of GIS, Oxford University Press.

Gopi, S. (2005). Global Positioning System Principles and Applications. Tata McGraw-Hill

John S., Brian, G. F, Philip,H .P. & John B.V. (2003). Global Positioning System: A Field Guide for the Social Sciences, Blackwell Publishing.Ltd.

Holfmann-wellenhof, B.; Lichtenegger, H.; Collins, J.; Hofmann-wellenhof, B. (Eds.). (2013). GPS global positioning system: Theory and practice 5th edition, New Delhi, Springer (india) private limited.

Misra, P., &Enge, P. (2006). Global Positioning System: Signals, Measurements and Performance Second Edition. Massachusetts: Ganga-Jamuna Press.

Panigrahi,N. (2008). Geographical Information Science, University Press.

Van Sickle, J. (2015). GPS for land surveyors, 4th edition, London, CRC press.

Yang, C., (2011). Advanced geo information Science, CRC Press.

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PAPER 6

Note: The question paper will have five units. Each of the first four units of question paper will contain two questions from each unit. Candidate(s) are required to attempt one question from each unit. Unit-V shall be compulsory and contain eight short answer type questions covering entire syllabus. All questions carry equal marks.

Program Name	Diploma in Remote Sensing and GIS	Program Code	DRG1
Course Name	Fundamental of Cartography	Course Code	23DRG12C1
Credits	4	No. Hours/Week	4
Duration of End term examination	3 Hours	Total Marks Internal Marks Theory Exam	100 20 80

Course Objectives:

1. To expose the students to fundamental principles of cartography.
2. To train the students in the art of geographic representation.
3. To impart knowledge on map projections and their significance.
4. To develop the skills for transformation of globe information on paper and machine.
5. To emphasize the scope and significance of cartography.

Course Outcomes:

Students will be able to:

1. Know the basic concepts, importance, and methods of cartography.
2. Study map projections and coordinate system.
3. Learn the different aspects of design in cartography.
4. Give clear and correct graphic expression to their ideas.
5. Develop skills in composition and drawing of quality maps.

Unit 1

Basic Concepts of Cartography: Definition, Meaning, Scope and Signification; Historical Perspective of Cartographic Development; Traditional and Digital Cartography; Cartography and GIS; Tools and Techniques of Cartography

Unit 2

Data Types and Map Basics: Levels of Measurements; Data: Types (Spatial and Attribute data); Sources of data; Map Types and Classifications; Map Scale; Map Projections, Datum and Coordinate System

Unit 3

Ground Survey and Positioning: Principles and Methods of Surveying; Measurement Techniques; Automated Survey System; Data Referencing: Spatial and Temporal

Unit 4

Map Designs and Production: Principles of Symbolization; Basics of Colour Schemes and Representation; Map Lettering and Legend Presentation; Map Layout and Product Generation; Web - GIS: 2D and 3D; Mobile Mapping

Recommended Readings:

Cromley, R.G. (1992). Digital Cartography, Prentice-Hall, New York.

Dent, B.D. (1999). Cartography- Thematic Map Design, 5th Edition, WCB McGrew Hill, Boston.

Krygier,J and Denis,W (2005) Making Maps: A visual guide to map design for GIS, Guilford Publications, New York

Keates, J.S. (1998). Cartographic Design and Production, Longman, London.

Kraak, M. J. and A. Brown (1996). Web Cartography: Developments and Prospects, Addison Wesley Longman Limited, England.

Misra, R.P. & Ramesh, A. (2014). Fundamental of Cartography, Concept Publishing Company, New Delhi.

Monkhouse, F.J.R. & Wilkinson, H.R. (2000). Maps and Diagrams, Methuen &Co. London.

Monmonier, M.S. (1982). Computer Assisted Cartography: Principles and Prospects, Prentice Hall.

Nichollas, T. (2017). Cartography Science of making maps, Larsen & Keller, New York.

Raise, Erwin (1962). Principles of Cartography, McGraw-Hill, New York.

Robinson A. H. (2016). Elements of Cartography. New York: John Wiley and Sons.

Robert G. Cromley, (1992). Digital cartography, Prentice Hall, Englewood Cliffs, New Jersey

Tyner, J.A. (2010) Principles of Map Design, Guilford Publications, New York, 2010

Walford, N. (2002) Geographical data characteristics and sources. Jhon Wiley and Sons, LTD.

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PAPER 7

Note: The question paper will have five units. Each of the first four units of question paper will contain two questions from each unit. Candidate(s) are required to attempt one question from each unit. Unit-V shall be compulsory and contain eight short answer type questions covering entire syllabus. All questions carry equal marks.

Program Name	Diploma in Remote Sensing and GIS	Program Code	DRG1
Course Name	Fundamentals of Global Navigation Satellite System	Course Code	23DRG12C2
Credits	4	No. Hours/Week	4
Duration of End term examination	3 Hours	Total Marks Internal Marks Theory Exam	100 20 80

Course Objectives:

1.To impart basic knowledge on GNSS.
2.To expose the students on components, operations, functions of GNSS and data capture.
3.To enhance the capability through spatial data analysis.
4.To Use of tools and techniques for real-time data-based applications.
5.To develop skills for solving various societal problems.

Course Outcomes:

Students will be able to:

1.Know historical development of navigation.
2.Understand the concepts behind the working of navigation systems.
3.Learn and understand data collection methods and techniques.
4.Analyze variations in spatial and non-spatial data.
5.Learn use of navigation instruments for field operations.

Unit 1

Concept and Characteristics of Global Navigational Satellite System (GNSS); Historical Background;Segments; Features of Navigation Satellites, Principles of Operation

Unit 2

Satellite Geodesy; Datum; Co-ordinate Systems related to GNSS; Signals; Receivers and Antennas; Sources of Errors

Unit 3

Global Satellite Navigation Systems:GPS; GLONASS;GALILEO; BEIDOU;IRNSS; QZSS

Unit 4
Augmentation Systems: Satellite Based Augmentation System (SBAS); Ground Based Augmentation System (GBAS); Aircraft-Based Augmentation System (ABAS); Location-based Services: Practical Applications

Recommended Readings:

Alfred,L. (2004). GPS Satellite Surveying, Third Edition, John Wiley & Sons, Inc., Hoboken, NewJersey.

Gopi, S. (2005). Global Positioning System Principles and Applications. Tata McGraw-Hill

Hofmann-Wellenhof, B., Lichtenegger, H., &Wasle, E. (2007). GNSS–Global Navigation Satellite Systems: GPS, GLONASS, Galileo, and More. Springer Science & Business Media.

Holfmann-wellenhof, B.; Lichtenegger, H.; Collins, J.; Hofmann-wellenhof, B. (Eds.). (2013). GPS global positioning system: Theory and practice 5th edition, New Delhi, Springer (india) private limited.

Kennedy,M. (2002). 'The Global Positioning System and GIS: An Introduction', Taylor and FrancisInc. New York.Publishing Company Limited, New Delhi.

Misra, P., &Enge, P. (2006). Global Positioning System: Signals, Measurements and Performance Second Edition. Massachusetts: Ganga-Jamuna Press.

Peter. J. E. Teunissen& Oliver. M. Eds. (2017). Springer Handbook of Global Navigation Systems, Springer International Publishing AG 2017.

Rabbany, A.EI. (2002). Introduction to GPS The global Positioning System. Artech House Boston. London.

Van Sickle, J. (2008). GPS for land surveyors, 3rd edition, London, CRC press.

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PAPER 8

Note: The question paper will have five units. Each of the first four units of question paper will contain two questions from each unit. Candidate(s) are required to attempt one question from each unit. Unit-V shall be compulsory and contain eight short answer type questions covering entire syllabus. All questions carry equal marks.

Program Name	Diploma in Remote Sensing and GIS	Program Code	DRG1
Course Name	Applications of Geospatial Technology	Course Code	23DRG12C3
Credits	4	No. Hours/Week	4
Duration of End term examination	3 Hours	Total Marks Internal Marks Theory Exam	100 20 80

Course Objectives:

1.To impart knowledge about applications of remote sensing.
2.To impart knowledge about applications of GIS.
3. To develop the necessary skill to address problems through geospatial technology.
4. To develop the geographical thinking through technology.
5. To demonstrate proficiency in the use of GIS tools for various applications.

Course Outcomes:

Students will be able to:

1. Know capabilities of remote sensing and GIS in different fields.
2. Know how to integrate different kinds of spatial and non-spatial data in GIS.
3. Use remote sensing and GIS for data generation, analysis and modeling.
4. Do geo-processing, model building for real world problem solving.
5. Acquire Knowledge and skills in diverse applications of remote sensing and GIS.

Unit 1

Applications of Remote Sensing and GIS in Geomorphological Studies: Principles and Recognition Elements for Terrain Evaluation, Mapping of Structure of Terrain, Classification of Land Forms; Interpretation of Erosional and Depositional Land Forms; Interpretation of Drainage System; Study of Land Slide and Floods - Case Studies.

Unit 2

Role of Geospatial Technology in Resource Planning; Spectral characteristics of soils; Remote Sensing Application in Soil Survey and Mapping; Principles of Remote Sensing in Water Resource Assessment; Spectral characteristics of water and water quality; Ground and Surface Water Inventory; Forest Mapping: Spectral Properties of Vegetation Indices.

Unit 3
Role of Geospatial Technology in smart Urban Planning; Urban Information System: Land, Housing, Transportation, Infrastructure; Urban Hazards and Risk Management: Application of Database Creation and Management for Infrastructure Development; Decision Support System for Urban Management.
Unit 4
Applications of Remote Sensing and GIS for Governance: Decentralized Planning, Monitoring and Effective Decision Making; Large Scale Mapping and Monitoring of Resources; Disaster Management, Environmental Monitoring and Community Planning.

Recommended Readings:

Agarwal, C. S. and P.K. Garg, (2000), A Text Book on remote Sensing in Natural Resources Monitoring and Management, Wheeler, Publishing Co., New Delhi.

Arthur L. Bloom, Geomorphology, Prentice Hall, New Delhi.

Burrough. P.A., (1986), Geographical Information Systems for Land Resources Systems, Oxford University Press, New York.

Escalante, R. B. (2012): Remote Sensing- Advances techniques and Plateforms, Intech, Rijeka Croatia

Escalante, R. B. (2012): Remote Sensing Application, Intech, Rijeka Croatia

Greedry, Alan, F., (1974), Application of Remote Sensing with Special References ton Geosciences, Gregory Geo-Science.

Martin, D. (2002). Geographic Information Systems, Routledge, London.

Nirupama. (2002). Role of Remote Sensing in Disaster Management, ICIR Research Paper Series N0.21, Institute for catastrophic loss reduction, University of Western Ontario, Ontario

Panigrahi,N. (2008). Geographical Information Science, University Press.

Reddy, M. A. (2001). Remote Sensing and Geographic Information Systems, B S Publications, Hyderabad.

Roy, P.S., Dwivedi, R. S. (2010): Remote Sensing Application. www.nrsc.gov.in/Learning-Center, E Book. html

Siegal, B. S. & Gillespie, A. R., (1986), remote Sensing in geology, John Wiley Publications.

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PAPER 8

Program Name	Diploma in Remote Sensing and GIS	Program Code	DRG1
Course Name	Practical: Digital Cartography and Image Processing	Course Code	23DRG12C4
Credits	4	No. Hours/Week	4
Duration of End term examination	3 Hours	Total Marks Lab Record Viva-Voce Written Test	100 20 20 60

Course Objectives:

1. To introduce the practical knowledge on digital image, processing and display.
2. To impart knowledge on types of distortions and corrections as required in an image.
3. To familiarize with image enhancement techniques.
4. To develop expertise in image interpretation.
5. To develop the capability for quantitative assessment and mapping of image.

Course Outcomes:

Students will be able to:

1. Familiarize with image processing software's.
2. Learn data input, output, export and import in processing software.
3. Apply various techniques for image processing and quantification.
4. Learn enhancement in the quality of images for better results.
5. Have software skills and analytical expertise in use of processing software.

Unit 1

1.1. Displaying individual pixel value and image information
1.2. Geocoding and Georeferencing of satellite image/toposheet
1.3. Creating subset from satellite image/toposheet
1.4. Generating true, false and pseudo colour composite (FCC)
1.5. Preparation of mosaic of toposheets / satellite images
1.6. Representation of statistical data: Choropleth, Isopleth and dot method

Unit 2

2.1. Image enhancement techniques
2.2. Supervised classification
2.3. Unsupervised classification
2.4. Change detection
2.5. Accuracy assessment
2.6. Cartographic design map layout, and printing

Note:

(i) The question paper shall contain six questions in all, including three questions from each unit. Candidate(s) are required to attempt three

questions in all selecting at least one questions from each unit. All questions carry equal marks.

(ii) Candidates shall produce their lab work record before the Board of Examiners for evaluation at the time of their viva-voce examination.

Recommended Readings:

Gibson, P.J. & Power, C. H. (2000). Introductory Remote Sensing: Digital Image Processing andApplications, Routledge, London.
Jahne, B., (1991). Digital Image Processing, New York: Springer-Verlag.
Jain, A.K., (1989). Fundamentals of Digital Image Processing, Englewood Cliffs, NJ, Prentice Hall.
Jonson, J.R. (1996). Introductory Digital Image Processing, Printice-Hall, Inc.
Lillesand, T.M., Kiefer, R.W., & Chipman, J.W. (Eds.). (2004). Remote Sensing and Image Interpretation, Wiley.
Mathur, P.M. (1999). Computer Processing of Remotely Sensed Images: An introduction, Wiley, Chichester.
Mullar J.P. (1986). Digital Image Processing in Remote Sensing, Taylor & Francis.
Pratt, W.K. (1991). Digital Image Processing 2nd ed., New York Wiley.
Reddy, M. A. (2001). Remote Sensing and Geographic Information Systems, B S Publications, Hyderabad.
Richards, J.A. (1986). Remote Sensing Digital Image Analysis, New York: Springer- Verlag.
Russ, J.C. (1992). Image Processing Handbook. Boca Raton, FL: CRC Press 445p

SEMESTER 2

PAPER 10

Program Name	Diploma in Remote Sensing and GIS	Program Code	DRG1
Course Name	Internship and Project Report	Course Code	23DRG12C5
Credits	4	Hours/Week	16
Duration	12- 15 weeks	Total Marks Internship Viva-Voce Project Report	100 20 20 60

Internship: Student continuing for 2nd semester shall have to do internship and write a project report. Both these activities shall be carried out in a government/government sponsored/autonomous/private, corporate institute / research Centre/state space application Centre/industry with a specialization in geospatial technology. Internship begins just after the completion of 1st semester examinations. The department will arrange the center/institute/industry for the intern towards the end of 1st semester. Each student would undergo internship/training for a period of 120 hrs / 15 days in an institute/center/ industry mentioned above/approved by the department. Training cost would be borne by the students himself/herself.

Project Report: A student is required to write a project report on the basis of work done or experience gained during internship period. He/she will be provided supervisor from the department and co supervisor from center/institute/industry where the student intends to complete his/her project work.

The topic of the project report has to be proposed by the candidate a month before the end of semester 1st.The project report should be completed in 30-40 pages which include maps and diagrams. The project report in triplicate must be submitted 10 days before the commencement of 2nd semester theory examinations. The findings of the project report will be presented by the candidate in a seminar on a date decided by the HOD. Student has to make power point presentation on his/her chosen theme of project work, outlining the background, rationale, objectives on the chosen methodology. The content of the project report, its presentation in the seminar and viva – voce shall be evaluated by a committee comprising of the HOD, concerned supervisor(s)/guide(s) and one faculty member nominated by HOD from among the teachers engaged in the teaching of the course in first and second semester.

MAHARSHI DAYANAND UNIVERSITY, ROHTAK

DIPLOMA IN REMOTE SENSING AND GIS

DEPARTMENT OF GEOGRAPHY

SESSION: 2022-23

Scheme of Examination
First Semester: (Total Credits - 20)

Sr. No.	Course Code	Nomenclature	Hours / Week (L+T+P/gr)	Maximum Marks				Examination Hours	Credits
				Internal	Theory	Practical	Total		
01	22DRG11C1	Air Photo and Remote Sensing Techniques	04(4+0+0)	20	80		100	03	4
02	22DRG11C2	Fundamentals of Digital Image Processing	04(4+0+0)	20	80		100	03	4
03	22DRG11C3	Geographical Information System	04(4+0+0)	20	80		100	03	4
04	22DRG11C4	Practical: Aerial Photographs and Satellite Imagery	08(0+0+8)			100	100	04	4
05	22DRG11C5	Practical: GIS, GNSS and Field Survey	08(0+0+8)			100	100	04	4

Second Semester: (Total Credits - 20)

Sr. No.	Course Code	Nomenclature	Hours / Week (L+T+P/gr)	Maximum Marks				Examination Hours	Credits
				Internal	Theory	Practical	Total		
01	23DRG12C1	Fundamental of Cartography	04(3+1+0)	20	80		100	03	4
02	23DRG12C2	Fundamentals of Global Navigation Satellite System	04(3+1+0)	20	80		100	03	4
03	23DRG12C3	Applications of Geospatial Technology	04(3+1+0)	20	80		100	03	4
04	23DRG12C4	Practical: Digital Cartography and Image Processing	08(0+0+8)			100	100	04	4
05	23DRG12C5	Internship and Project Report	08(0+0+8)			100	100	04	4