

Certificate Course in Geo-Informatics(01 years)

Number of subjects in each semester

1. The Diploma course will be 4 Semester duration each covering a period of 6 months.
2. First Three Semester will have 4 theory papers and 2 laboratory classes / practical, while the final semester will have three (03) theory papers, one practical/lab and one project work of three (03) months duration.
3. Each subject will be of theory classes of 60 minutes duration with a credit of 2.0.
4. Each laboratory class will be of 2:30 hour duration with a credit of 1.0.
5. The total credit for first three (03) semester will be $2 \times 4 = 8$ for theory classes and $01 \times 2 = 02$ for lab classes, i.e. a total of 10 credits.
6. The forth Semester will be of 10 credits. The student will have to carry out Project work of 4 credits in this Semester and have to submit a project report at the end of the Semester. A student has also to appear for a Grand Viva-voce at the end of 4th. Semester based on the project work.

Marks and examinations

1. In each Semester there will be 3 class tests(internal examination) of 20 marks, the best score of two class tests marks out of a maximum marks of $20+20=40$ scored by a student will be counted for addition to the end semester theory paper marks of 80. The internal should account for 20 marks only.
2. Students will be required to give a seminar presentation at the end of a semester with a report write up on any topics assigned to them. The topic will be assigned by the class teacher on the respective theory topic. The maximum marks for this presentation is 20 and is to be substituted by the third internal examination.
3. The total mark for a theory paper will be 100 i.e. 80 for end Semester written examination + 20 for class test.
4. Each laboratory / practical paper will carry maximum marks of 50.
5. The maximum marks for each paper will be 100 for theory and 50 for practical.
6. The marks will be converted in to a 10 point grade as per the following rules.

Theory paper			Practical		
Marks	Grade	Grade point	Marks	Grade	Grade point
90% and above	O	10	90% and above	O	10
80% to 89%	A	9	80% to 89%	A	9
70% to 79%	B	8	70% to 79%	B	8
60% to 69%	C	7	60% to 69%	C	7
50% to 59%	D	6	50% to 59%	D	6
35% to 49%	P	5	35% to 49%	P	5
Below 35%	F	0	Below 35%	F	0

P stands for pass

7. A student has to score a minimum of 5 Semester Grade Point Average (SGPA) and pass in all subjects, both theory and practical in order to qualify for the next semester.
8. A student failing (Grade F) in one or more theory papers in a semester but securing a minimum of 5 SGPA will have to clear the paper in which the student has failed by reappearing in a separate test(s) on payment of additional fees of Rs. 500 per paper failed for which the tests will be carried out by the respective subject teacher.
9. A student has to pass the laboratory classes in one chance and no reexamination will be allowed in laboratory class.
10. Failure in more than two subjects in a semester or obtaining less than 5 SGPA in a semester even while passing in all subjects (Grade P) will debar a student to continue the course.
11. The grading system of project and viva-voce will be as that of the practical.

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Calculation of Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA).

$$SGPA = \frac{\sum_{i=1}^{n=4} (\text{no. of credit in theory} \times \text{grade obtained} + \text{no. of credit in lab} \times \text{grade obtained})}{10}$$

$$CGPA = \frac{\sum_{i=1}^{i=4} ((SGPA \text{ of } i \text{ th Semester} \times \text{no. of credits of } i \text{ th Semester})}{40}$$

In order to be eligible for the Diploma in Geographical Information Systems, Remote Sensing & Geocomputations a student has to pass in all subjects, both theory and practical as well as project and viva-voce and secure a CGPA of 5.0.

Subjects in each Semester

First Semester

Sl. Code Subject & Credit

1. DGIST T001 Principles of Remote Sensing - (2-0)
2. DGIST T002 Cartography & Geo-Statistics – (2-0)
4. DGIST T003 Geo-Sciences & Image Interpretation – (3-0)
5. DGI 105 *Introduction to Calculus, Vectors, Matrices & Computer Programming* (2-0)
6. DGIST P 001 Geo-science & Image Interpretation Lab(1-0)
7. DGIST P 002 Cartography & Geo-Statistics lab(1-0)

Second Semester

Sl. Code Subject & Credit

1. DGIST T 005 Geographical Information Systems (2-0)
2. DGIST T 006 Digital Image Processing – (2-0)
3. DGIST T 007 *Elements of Business Communication, Project Management, Communicative English* – (2-0)
4. DGIST T 008 Applications of Geoinformatics – (2-0)
5. DGIST P003 GIS Lab (2-0)
6. DGIST P004 DIP Lab (2-0)

Sessions & Classes

1. The academic session will start from 2nd week of July or as advertised at the time of seeking the applications and will be over in the 2nd Week of following June.
2. The theory classes will be from 11-00 AM to 1:30PM (11.00 – 12.00, 12.10 – 01.10, 01.15 – 2.00) and the lab class will be held from 2:45 pm to 5pm.
3. If it is required the concerned faculty of a relevant discipline may schedule extra classes as per the requirement for the successful accomplishment of the course with due permission from the concerned authorities.
4. Principal (AITER) is the only responsible authority to deal up with the internship of the students, placement and allied aspects. Only best candidates will be absorbed by Prantik Care the Earth in its ventures. Principal, AITER is directly responsible to Administrator, AITER and President cum Director, PCTE in submission of weekly reports as well as other proceedings in time with 100 % honesty and accuracy.
5. The details of the classes, time schedule for the examination as well as other pros and cons are to be placed up in the institute notice board on timely fashion with due permission from Principal, AITER.

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SYLLABUS

1. DGIST T 001 Principles of Remote Sensing - (2-0)

Unit I: Fundamentals of Remote Sensing

Definition of Remote sensing, Advantages and limitations, Remote sensing process & Stages, Electromagnetic Radiation (EMR): EMR Spectrum and its properties, EMR wavelength regions and their applications, Atmospheric windows, Interaction of EMR with matter, Spectral signatures, Resolutions: Spectral, Spatial, Temporal and Radiometric

Unit II: Aerial Photography

Fundamentals of aerial photography, Vertical and Oblique aerial photography, Aerial cameras, Photogrammetry; Basic concepts of scale, object height and length, object area and perimeter, grayscale tone/color of objects, Photo interpretation techniques, Stereo Photogrammetry and stereovision, Parallax bar and its applications.

Unit III: Platforms & Sensors

Photographic System: Cameras, Sensor classification: Active and Passive, along track and across track scanners, Infrared Scanners, Thermal Sensors and Microwave Sensors

Unit IV: Thermal & Microwave Remote Sensing

Introduction to Thermal Infrared Radiation Properties: Kinetic Heat, Temperature, Radiant Energy and Flux, methods of transferring heat, Thermal properties of terrain: Thermal Capacity, Thermal conductivity, Thermal Inertia, Thermal Infrared Multispectral scanners, Thermal IR Remote sensing examples

Passive Microwave Sensors, Active Microwave Sensors, Side looking RADAR, Scatterometer, Orbits of satellite, Kepler's laws of motion, IRS Series of Satellites, LANDSAT, SPOT, IKONOS, QUICKBIRD, MODIS, RADARSAT, NOAA, TERRA, MOS and ERS, Brief introduction to Weather and Communication Satellites

Unit V: Remote Sensing of Environment & Hyper-Spectral Remote Sensing

Spectral Signature and its Response: of Soil, Vegetation and Water, Basics of visual interpretation of satellite images

Hyper-spectral remote sensing

TEXT BOOKS:

1. Jensen, J.R., "Remote Sensing of the Environment – An Earth Resources Perspective", Pearson Education, Inc. (Singapore) Pvt. Ltd., Indian edition, Delhi, 2000
2. George Joseph, "Fundamentals of remote sensing", Universities press (India) Pte Ltd., Hyderabad, 2003

REFERENCE BOOKS

1. Sabins, F.F. Jr., "Remote Sensing – Principles and Interpretation", W.H. Freeman & Co., 2002 Edition.
2. Reeves, Robert G., "Manual of Remote Sensing, Vol. I, American Society of Photogrammetry and Remote Sensing, Falls Church, Virginia, USA
3. Lillesand, Thomas M. and Kiefer, Ralph, W., "Remote Sensing and Image Interpretation", 4th Edition, John Wiley and Sons, New York, 2000
4. Rampal, K.K., Handbook of Aerial Photography and Interpretation, Concept Publishing Company, New Delhi, 1999

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2. DGIST T 002 Cartography & Geo-Statistics – (2-0)

Unit I:

Basic Concept of cartography, Categories of maps, Interpretation of topographic maps, Cartographic databases, data measurement, cartographic design issues, colour and pattern, map lettering, map compilation, map scale, Generalization, symbolization, dot, isopleth and choropleth mapping, multivariate and dynamic mapping, map production, methods of map composing and printing,

Unit II:

Basic Assumptions of projection system, Map Projections, Grouping of map projections: conic projection, cylindrical projection, Zenithal, Projection Types: Mercator, Transverse Mercator, Polyconic, Lambert, Orthomorphic, UTM Projections and their comparison, choosing a Map Projection, Map Projection transformation, Analysis and visualization of distortion

Unit III:

Visualization of geospatial data: Design aspects, Multiscale and geometric aspects scale, dissemination of (visualized) geospatial data, data products, use and users of products, Various issues in map visualization., Computer Cartography, the nature of Data, Database and Data structures, Data Input: Method of data capture, digitization and scanning method, Techniques and procedure for digitizing, Vector and Raster; Data output: Screen display system, file organization and formats, rectification of digital maps, software for digital mapping.

Unit IV:

Statistics: Basic Concepts; Graphical representation of Statistical Data., Measures of central tendency & Dispersion (mean, median, mode, standard deviation), kurtosis & Skeweness, Regression analysis (multiple, logistic), trend surface analysis, spatial auto correlation, quadrant analysis, weighted mean, sampling (random, systematic and stratified), standard error measurement, Probability, correlation coefficient, variance, covariance, Basic Matrix algebra, Kriging; Trend Analysis.

REFERENCE BOOKS

1. Keates, J.S. (1973): Cartographic Design and production, London, Longman
2. Ramesh, P. A. (2000): Fundamentals of Cartography, Concept Publishing Co., New Delhi.
3. Rampal, K.K. (1993): Mapping and Compilation, Concept Publishing Co., New Delhi.
4. Anson, R.W. & Ormeling, F.J. (1993), Basic Cartography, Vol. 1, 2nd ed., Elsevier Applied Science, Publishers, London.
5. Robinson A.H. & Morrison J.L. (1995) Elements of Cartography, John Wiley & Sons
6. Gregory, S. (1978): Statistical Methods for Geographers, Longman
7. Singh, R.L & Dutt. P.K, “Elements of Practical geography”, Students Friends Allahabad
8. Peterson, M.P. (1995) “Interactive and Animated Cartography” Upper Sadde River, NJ: Prentice Hall.

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3. DGIST T 003: Geo-Sciences & Image Interpretation

UNIT 1: GEO SCIENCE & IMAGE INTERPRETATION

-) Visual and Digital Satellite Image Interpretation
-) Elements of Image Interpretation
-) Development of Interpretation Keys
-) Concepts of terrain mapping using image interpretation
-) Rock Types, their field characteristics; delineation on satellite imagery, Mineral deposits & their Characteristics.
-) Drainage pattern, their texture and their characteristics; delineation on satellite data.
-) Terrain types and their image characteristics: Arid, Coastal, Fluvial, Volcanic, Glacial, Peri-glacial.

UNIT 2: VISUALIZATION

-) Visualization of 2D and 3D data
-) Rendering of three dimensional data in virtual GIS environment
-) Visualization of 3D vector graphics

UNIT 3: GEOINFORMATICS FOR ENVIRONMENTAL ANALYSIS AND MANAGEMENT

-) Geoinformatics for Environmental Pollution & EIA studies
-) Space Technology for Environmental Management: Introduction, Challenges and opportunities (Administrative, Socio-economic, Political)
-) Environmental Data base creation (Global, Regional, Local) (Topographic Data; Soil Resource Information; Hydrological Data; Oceanographic Data; Large Area Land Cover Characterization; Biodiversity Data and Information)

UNIT 4: APPLICATION AREAS

-) Biodiversity management and characterization
-) Watershed management for soil and water conservation planning
-) Urban resource planning- an integrated approach
-) Integrated coastal zone management
-) Disaster management (Basic Concepts, Geological: landslides, Coal Mines hazards etc., Hydro-meteorological: floods & droughts. Forest Fire etc.)
-) Application of Geoinformatics in Mineral and ground water exploration.
-) Land degradation and desertification
-) Engineering Geology Application.

ESSENTIAL READING

-) 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, Fourth Edition
-) Jenson, J.R., (2006). Remote Sensing of the Environment – An Earth Resource Perspective, Prentice Hall Inc.
-) Drury, S.A. , (2004). Image Interpretation in Geology, Chapman & Hall, India.
-) Sabins, Floyd F., (2007). Remote Sensing and Principles of Image Interpretation, 2nd Ed., Freeman, New York.

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4. DGI 105 Fundamentals of Calculus, Vectors, Matrices & Computer Programming (2-0)

Unit I: Algebra & Trigonometry

Formula from plane elementary algebra and geometry and trigonometry, elements of variables, continuous variables, functions and limits, principle of differentiation, derivative as rate of change, derivative of a function of one variable, general rule for differentiation, interpretation of derivative by geometry, rules for differentiation, differentiation of a sum, differentiation of product and function, power rules, differentiation of inverse function, various applications of derivatives, tangent and normal, maximum and minimum values of a function, successive differentiation, curvature of a circle, formula for curvature, rectangular coordinates.

Unit II: Calculus

Constant of integration, indefinite integral, Rules for integrating standard elementary forms, constant of integration, geometrical significance of constant of integration, Definite integral, calculation of areas, volumes, integration as a process of summation, ordinary differential equation and solution

Unit III: Vectors & Matrices

Matrices, and determinants, properties of matrices, evaluation of determinants, product, sum and differences of matrices, adjoint and inverse of a matrix, linear homogeneous equations and solutions, eigen values and eigen vectors. Vectors and scalars cross and dot product of vectors, addition and subtraction of vectors

Unit IV: Computer Programming

Introduction to Computers: Essential PC hardware, peripherals and software, Data storage and manipulation
Computer configurations including PCs, terminals & workstations for networks to serve large and small businesses
Introduction to Networks: Star and Bus LAN topologies; Central and distributed computing; Wide area and global networks; The World Wide Web. Introduction to Algorithms: Definition of Program & Algorithm; I/O functions, Pseudocode, Flowchart, Implementation of algorithms Data types, constants, variables and arrays, declarations, expressions, statements, Control Statements, symbolic constants Operators and Expressions, Arithmetic operators, unary operators, relational, logical and bitwise operators, assignment operators Functions: defining a function, accessing a function, passing arguments to a function, specifying argument data types, function prototypes, recursion, call by value, call by reference. Arrays and Pointers: Defining an array, processing an array, passing array to a function, multidimensional arrays, arrays and strings, pointer declarations, passing pointer to a function, pointer and one dimensional array, Operation on pointers, pointers and multidimensional arrays.
Introduction to databases, characteristics of the database approach, database users and designers, role of a DBA
Advantages of using a DBMS, data models, schemas, instances, DBMS architecture (Three-Schema Architecture)
Conceptual Data Modeling: Phases of database design, entity type, entity set, attributes, keys, value sets, relationships, relationship types, relationship sets, relationship instances, relationship degree, role names, recursive relationships, constraints on relationship types, attributes of relationship types, weak entity types, ER Diagram, naming conventions and design issues.

REFERENCE BOOKS:

-) SCHAUM series books of calculus, vectors, statistics and matrices
-) Byron S. Gottfried, *Theory and Problems of Programming with C*, Tata McGraw Hill Publication
-) R.Elmasri, S.B Navathe, *Fundamentals of Database Systems*, Addison, Wesley
-) Computer Processing of Remote Sensed Images, Paul M. Mather, John Wiley & Soins, 1987
-) Alvi, Z 1995, *Statistical Geography-methods and applications*, Rawat Publications, New Delhi
-) King,L.J., *Statistical Analysis in Geography*, Prentice –Hall,1969
-) Lafore,Robert.*Object-Oriented Programming in C++* Dorling Kindersley(India) Pvt. Ltd.,2002

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DGIST P 001 Geo-Sciences & Image Interpretation Lab

-) Exercise 1 Study of a satellite image – annotation (IRS-1B, IRS-1C etc.)
-) Exercise 2 Visual interpretation and separation of physical and cultural features
-) Exercise 3 Identification and comparison of objects on panchromatic, multiband and FCC
-) Exercise 4 Interpretation and delineation of satellite image for landuse/landcover
-) Exercise 5 Interpretation of Thermal Image
-) Exercise 6 Interpretation of microwave image
-) Exercise 7 Field visit and comparison of ground details with details on image
-) Exercise 8 Visualization and rendering of 3D data- Arc Scene /ERDAS Virtual GIS/ Google Earth
-) Exercise 9 Draping of satellite data in Arc Scene
-) Exercise 10 satellite based interpretation of Glaciated, Aeolian and plain landforms

DGIST P 002 Cartography, Geo-Statistics & Computer Programming Lab – (0-1)

-) Construction of different types of scales
-) Construction of different types of map projection: Conical projection, Cylindrical Projection, WGS 84
-) Preparation of UTM grid
-) Base Map
-) Designing and Symbolization
-) Analog to Digital Conversion
-) Analysis of Toposheet
 - Updation of maps from Satellite Imagery.
-) Introduction to computers & programming concept
-) Programming using concepts of variables, operators
-) Programming using control structures
-) Programming using functions and arrays
-) Programming using strings
-) Programming using data structure
-) Programming using file handling
-) Creation of forms and using control variables
-) Creating menus in forms
-) Connecting with database
-) Adding maps in VB Projects
-) Adding database of maps in the projects

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5. DGIST T 005 Geographical Information Systems (2-0)

UNIT 1: INTRODUCTION

-) Basic concepts: Definition and history
-) Components of GIS,
-) Data structure and formats
-) Spatial data models – Raster and Vector
-) Data base design - editing and topology creation in GIS, Linkage between spatial and non spatial data
-) Data inputting in GIS

UNIT 2: RASTER AND VECTOR DATA ANALYSIS

-) Integration of Raster & Vector Data
-) Cartographic Modeling - Map Algebra
-) Raster Data & its Representation: Types, Data Structure, Data Compression, Data Files, Data Conversions
-) Raster Data Analysis – Overlay Operations, Slope & Aspects, Statistical Analysis
-) Geometric Transformations - Affine Transformation and Geometric Transformation Coefficients, RMS Error
-) Vector data representation: Topological & Non-topological Vector Data, Map scale, Spatial Resolution, Spatial Data Accuracy, Location Data Accuracy and Precision, Vector Data Sources
-) Comparison between Raster & Vector Data
-) Feature Based Topological functions: Buffering Overlay Analysis, Distance Measurements
-) Layer Based Topological Functions

UNIT 3: DATA EXPLORATION & DATA INTEGRATION

-) Interactive Data Exploration, Vector Data Query, Attribute Data Query
-) Logical Expressions, Types of Operations
-) Relational Database Query: Use of SQL, Descriptive Statistics of Attribute Data
-) Spatial Data Query, Raster Data Query, Query by Cell Value, Query using Graphical Methods, Charts
-) Geographic Visualization, Data Classification, Spatial Aggregation, Map Comparison
-) Problem Identification & Designing a Data Model

UNIT 4: APPLICATIONS OF GIS

-) Application of GIS Techniques in Various Fields
-) Web GIS

ESSENTIAL READING

-) Burrough, Peter A. and Rachael McDonnell,(1998), ‘ Principles of Geographical Information Systems’ Oxford University Press, New York.
-) C.P.L and Albert K.W.Yeung (2006) “Concepts and Techniques of Geographic Information Systems” Prentice Hall of India,New Delhi.
-) Demers, Michael N. 2000. *Fundamentals of Geographic Information Systems*. John Wiley, Singapore.
-) ESRI 1993. *Understanding GIS*. Redlands, USA
-) George, Joseph 2003. *Fundamentals of Remote Sensing*. Universities Press (Pvt.) Ltd, Hyderabad.
-) Girard, M-C. and Girard, C. M. 2003. *Processing of Remote Sensing Data*. Oxford & IBH, New Delhi.
-) Heywood, Ian 2003. *An Introduction to Geographical Information Systems*. 2nd ed. Pearson Publ. Co., Singapore.
-) Kang-tsung Chang (2007),‘Introduction to Geographic Information Systems’ Tata McGraw Hill, New Delhi.
-) Longley, P., Goodchild, M.F., Maguire, D. and Rhind, D. 1999. *Geographic Information Systems. Principles, Techniques, Management, Applications*. John Wiley, New York.
-) Magwire, D. J., Goodchild, M.F. and Rhind, D. M., (2005),‘Geographical Information Systems: Principles and Applications’, Longman Group, U.K.
-) Martin, D. 1996. *Geographic Information Systems: Socioeconomic Implications*. Routledge, London.

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DGIST T 006: Digital Image Processing (DIP) (2-0)

UNIT 1: INTRODUCTION

-) Concepts about digital image and its characteristics
-) Spectral, Spatial, Radiometric and Temporal resolution
-) Visual vs. Digital methods, Image data storage and retrieval
-) Image restoration and Noise Abatement , Radiometric and Geometric correction technique
-) Interpolation methods – linear and non linear transformation for geometric corrections

UNIT 2: IMAGE ENHANCEMENT & FILTERING TECHNIQUES

-) Look-up Tables (LUT) and Types of image displays and FCC
-) Image Enhancement Techniques: Radiometric and Spatial
-) Contrast stretching: Linear and non-linear methods
-) Spatial Filtering: High and Low frequency, Image smoothing

UNIT 3: MULTI-BAND ENHANCEMENT TECHNIQUES & CLASSIFICATION

-) Band ratio, Types of Vegetation indices
-) Principal Component Analysis
-) Multi dated data analysis and Change detection
-) Digital Image Classification: Supervised & Unsupervised
-) Accuracy Assessment, Error Matrix

UNIT 4: PATTERN RECOGNITION

-) Concept of Pattern Recognition, Multi-spectral pattern recognition
-) Spectral discrimination, Signature bank, Parametric and Non-Parametric classifiers

ESSENTIAL READING

-) Sabins, Floyd F. (2007), Remote Sensing: Principles and Interpretation, H. Freeman and C., New York.
-) Thomas M. Lillesand & Kiefer, Ralph W. (2007), Remote Sensing and Image Interpretation, John Wiley & Sons, New York.
-) Jensen, JR. (2006), Remote Sensing of the Environment- An Earth Resources Perspective, Prentice Hall Inc.
-) Rencz, Andrew N. , (1999), Remote Sensing for the Earth Sciences: Manual of Remote Sensing, 3rd ed., John Wiley & Sons, Inc., New York.
-) Curran, P., (1985), Principles of Remote Sensing, Longman, London.
-) Campbell, James B., (2006), Introductory Remote Sensing: Principles and Concepts, Routledge.
-) Gibson, P.J., (2000), Introduction to Remote Sensing, 2nd ed., Taylor & Francis, London.
-) Cracknell, A.P. & Hayes, L.W B., (2007), Introduction to Remote Sensing, Taylor & Francis, London.

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DGIST T 007: Elements of Business Communication, Project Management, Communicative English (2-0)

UNIT-I

Communication-Defining communication, Process of communication, Communication Model, Objectives of communication, Principles of communication, Importance of Business communication, Importance Feed back,

UNIT II

Channels of communication, Types of communication, Dimensions of communication, Barriers to communication: Verbal, Non-Verbal, Formal, Informal communication.

UNIT III

Fundamental of Business writing, Format of Business, Types of Business letter, Inquiry letter, complaint letter Persuasive letter, Proposal, Report Writing.

UNIT IV

Employment Messages Writing Resume, Application letter, writing the opening paragraph, Writing the closing paragraph, summarizing

UNIT V

Spoken skills Conducting Presentation, Oral presentation, Debates, Speeches, Interview,

Group Discussion, English Pronunciation, Building Vocabulary. Barriers to Effective Communication and ways to overcome them, Listening: Importance of Listening, Types of Listening, Barriers to Listening and overcoming them, Listening situations, Developing Listening Skills.

UNIT VI

Project management: definition & basic concepts, cycles of Project Management, Initiation of Project, Planning of Project, Execution of the project, Monitoring & Control of the Project, Closing the project, Concept of Team game, Some case studies in the sequence of Remote Sensing, GIS based projects

Essential Reading:

Schwalbe, K. (2009). Information Technology Project Management (6th ed.). Course Technology; ISBN-10: 0324786921, ISBN-13: 978-0324786927

Project Management Institute. (2008). A Guide to the Project Management Body of Knowledge: (4th ed.). Project Management Institute. ISBN-10: 1933890517, ISBN-13: 978-1933890517

Cervone, H. F. (2004). How not to run a digital library project. OCLC Systems & Services, OCLC Syst. Serv. (UK), 20(4), 162-6.

Cervone, H. F. (2005). Making decisions: Methods for digital library project teams. OCLC Systems & Services, 21(1), 30-35.

Cervone, H. F. (2005). MANAGING DIGITAL LIBRARIES: THE VIEW FROM 30,000 FEET: Influencing: a critical skill for managing digital library project teams. OCLC Systems & Services, 21(2), 105-109.

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DGIST T 008: Applications of Geoinformatics (2-0)

Unit I: Basic Concepts & Introduction to Geoinformatics

Emergence of Geoinformatics technology in application areas, understanding potentials of Geoinformatics in Allied sectors, Geoinformatics advantage over conventional techniques. Indian satellite missions with focused Applications, Recent trends in Geoinformatics applications.

UNIT II: Geoinformatics & Land Resources

Application in Land Resource: Remote sensing in mapping soil degradation, impact of surface mining on land Resources, forest resources, Application in Water Resources: Remote sensing in hydro-Geomorphological interpretation for groundwater exploration, water quality monitoring, reservoir sedimentation, snow cover mapping and modeling approaches.

UNIT III: Geoinformatics in Disaster Management

Application in Disaster Management: Mapping and modeling Landslide hazards, floods, Cyclones Forest fire and drought.

UNIT IV: Geoinformatics in Urban Planning & Regional Development

Application in Urban Planning: Mapping urban landuse, transportation network, Utility-Facility mapping, urban sprawl, site selection for urban development, Urban Information System

UNIT V: Geoinformatics in Geo-Technical Engineering & Environmental Management

Application in Geo-technical Engineering: Slope stability and drainage network analysis, Digital Terrain Modeling, Geoinformatics in Dam site selection, Highways, and Tunnel Alignment studies.
Application in Environmental Management: Selection of disposal sites for industrial and municipal wastes, solid waste management, Environmental Impact Assessment (EIA)

TEXT BOOKS:

1. Schultz, G. A. and Engman, E. T. 2000. Remote Sensing in Hydrology and Water Management, Springer-Verlag, Berlin, Germany
2. Lillisand, T. M. and Keifer, R. W. 1994. Remote Sensing and Image interpretation', John Willey and Sons, New York, Third Edition
3. Jenson, J.R. 2000. Remote Sensing of the environment – An Earth Resource Perspective, Prentice Hall Inc
4. P.S. Roy (2000). Natural Disaster and their mitigation. Published by Indian Institute of Remote Sensing (IIRS), 2000

REFERENCE BOOK:

1. Spatial Technologies for Natural Hazard Management. Proceedings of ISRS National Symposium, Nov. 21-22, 2000, IIT, Kanpur

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DGIST P 003: Geographical Information Systems Lab (0-1)

- Exercise 1** a) Introduction to Arc GIS software and overview of Map digitization and Map composition.
b) Spatial and Non Spatial data collection, representation and standardization
- Exercise 2** a) Graphical Representation of Spatial data (Raster/Vector Method).
b) Data Organization (location, attributes, consistency, scale)
- Exercise 3** a) Raster Geo-referencing; b) Vector Geo-referencing in ArcGIS & Arc Info software
- Exercise 4** Spatial Data Analysis (Raster & Vector), data Linkage for Analysis
- Exercise 5** Topology Creation; Map Algebra
- Exercise 6** a) Simple & Complex Relational Data Base Query b) Network Analysis.
- Exercise 7** a) Open source GIS demo- GRASS GIS
b) Open source GIS demo- Q-GIS
- Exercise 8** Open source GIS demo- Post GIS

DGIST P 004: Digital Image Processing Lab (0-1)

- Exercise 1** Import / Export of files using DIP Software (ERDAS IMAGINE)
- Exercise 2** Geo-reference of the Toposheet and imageries
- Exercise 3** Sub-setting of area of interest, Image Mosaic, Interpretation and Analysis of Imageries
- Exercise 4** Performing contrast enhancement techniques, Filtration: High, Low frequency
- Exercise 5** Principal Component Analysis
- Exercise 6** Classification: Supervised
- Exercise 7** Classification: Unsupervised
- Exercise 8** Map composition

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References/Suggested Readings:

1. Programming with Java: A Primer,3E, E BALAGURUSAMY, Tata McGraw Hill
2. The Complete Reference JAVA, Patrick Naughton and Herbert Schildt , Tata McGraw-Hill Publishing Company Ltd.