

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELGAUM
SCHEME OF TEACHING AND EXAMINATION
M.TECH--GEO-INFORMATICS

IV SEMESTER

CREDIT BASED

Subject Code	Name of the Subject	No. of Hrs./week		Duration of Exam in Hours	Marks for		Total Marks	Credits
		Lecture	Practical / Field Work / Assignment/ Tutorials		I.A.	Exam		
14CGI41	Geo-informatics in Project Planning and Management	4	2	3	50	100	150	4
14CGI421	Elective-III	4	2	3	50	100	150	4
14CGI43	Evaluation of Project Phase – I	--	--		25		25	1
14CGI44	Evaluation of Project Phase- II	--	--		25		25	1
14CGI45	Project work evaluation and Viva-voce	--	--	3		100+100	200	18
Total		08	04	09	150	400	550	28
Grand Total (I to IV Semesters): 2400 Marks; 94 Credits based								

ELECTIVE – III	
14CGI421	Application of Geo- informatics in Disaster management
14CGI422	Geo- informatics in Demography, Business, Health and Humanities.
14CGI423	Emerging trends in Geoinformatics

Note:

1. Project phase – I: 6 weeks duration shall be carried out between II and III Semester. Candidates in consultation with the guides shall carry out literature survey/ visit to Industries to finalize the topic of dissertation.
2. Project phase – II: 16 weeks duration during the III semester. Evaluation shall be taken during the 2nd week of IV semester. Total marks shall be 25.
3. Project evaluation: 24 weeks duration in IV semester. Project work evaluation shall be taken up at the end of the IV semester. Project work Evaluation and Viva voce examinations shall be conducted. Total marks shall be 250 (Phase-I Evaluation: 25

marks, phase-II Evaluation: 25 marks, Project Evaluation marks by Internal Examiner (Guide): 50 marks, Project evaluation marks by external examiner: 50 marks), marks for external and 100 for viva voce).

Mark of Evaluation of Project:

- The I.A. Marks of project phase –I &II shall be sent to the University along with project work report at the end of the semester.
- 4. During the final viva, students have to submit all the reports.
- 5. The project valuation and viva voce will be conducted by committee consisting of the following:
 - a. Head of the Department (Chairman)
 - b. Guide
 - c. Two Examiners appointed by the University. (Out of external examiners at least one should be present)

IV– SEMESTER
GEOINFORMATICS PROJECT PLANNING AND MANAGEMENT

Subject Code: **14 CGI - 41**
No. of Lecture Hrs/ Week: 04
Total no. of Lecture Hrs: 52

IA Marks: 50
Exams Hrs: 03
Exam Marks: 100

Objective

The objective of this subject is to enable the students to formulate, plan, execute and manage Geoinformatics projects.

Introduction

Definition of plan, project, program and scheme. Functions of planning and management. Components of Geoinformatics project. Overview of Geoinformatics projects, types of projects.

GIS Project Planning

Project phases and Project life cycle, project stakeholders, system development lifecycle, Software development models, Project initiation, systems planning and methodology, systems analysis and user requirements studies, GIS software evaluation and selection, Hardware considerations and acquisition, Geographic database design – conceptual, logical, and physical data modeling, planning and database issues - screening of project ideas, selection of project based on techno-economic feasibility analysis, project formulation, product and project design, project report preparation. Project proposals. A case study.

Project Costs

Elements of cost, costing techniques, resources planning, cost components of a geo-informatics project- men, Hardware and software costs, cost of Remote Sensed Data /Imageries, Maintenance cost, organizational cost, service charges, outsourcing cost, pricing the product / service. Cost budgeting.

Project Appraisal

Project appraisal Methods -Discounting and non discounting techniques, Benefit Cost Ratio, Break Even Point Analysis, Cost and Return simulation, return on investment.

Project Time, Quality and Cost Management

Project scheduling- network analysis, PERT and CPM techniques, Gant chart, time and cost crashing. Project cost and time control, feedback mechanisms, quality control / quality assurance. Data standards, interoperability, ISO standards.

Planning A Geo-informatics Project:

Government Geo-informatics projects, Corporate or Enterprise GIS, Health GIS, Census GIS, Market/Business GIS, GIS Strategic Plan, Needs Assessment and Requirements Analysis, Organizational Involvement, Evaluating Existing Data, Accuracy, Completeness. Maintenance, Software and hardware Selection, Technical Environment, Assessing Costs and Benefits, Pulling the needs and ends together.

Project Scope and Risk Management:

Project scope definition, scope verification, scope change control, risk management planning, project risk identification, quantitative and qualitative risk analysis, risk response planning, risk monitoring and control.

GIS Organisations

Vision, mission, goals and objectives, organizational chart, organizational approaches- democratic, authoritative, roles and responsibilities of personnel, recruitments, training, motivation, organizational behaviour, conflict resolving, team building, promotion/ demotion.

Management Issues in GIS:

Making GIS efficient, effective and safe to use, data as management issue, GIS as a management tool, impact of broad societal issues.

Trends in GIS:

Enterprise GIS, Corporate GIS, BPO in GIS, Spatial Data Warehouse, Interoperability and Open GIS, NSDI.

REFERENCE BOOKS:

1. A guide to the Project Management Body Of Knowledge

-2000 edition, Project Management Institute, USA

2. The Design and Implementation of Geographic Information

Systems, John E. Harmon, Steven J. Anderson by Wiley Publishers

ISBN: 0-471-20488-9

3. Geographic Information Systems, abridged by Paul A Longley,

Michael F Goodchild, David J. Maguire, and David W. Rhind,
second edition, 2005

4. Project Management using PERT / CPM – Weist & Levy, PHI

5. Concepts and Techniques of Geographic Information System by C P

Lo Albert K W Yeung, 2002, EEEPrantice Hall of India Private Ltd.

6. Project Management PERT / CPM & Precedence Diagramming

Moder, Philip, Galgotia

7. UNIDO Guide to Project Appraisal

**APPLICATIONS OF GEOINFORMATICS IN
DISASTER MANAGEMENT**

Subject Code: **14 CGI - 421**

IA Marks: 50

No. of Lecture Hrs/ Week: 04

Exams Hrs: 03

Total no. of Lecture Hrs: 52

Exam Marks: 100

Objective: The course aims at introducing various types of natural disasters and application of space inputs for disaster management and GIS techniques used for mapping, impact assessment, forewarning, preparedness and mitigation of adverse effects

Introduction: Definition, classification of disasters, types of Disaster, importance of RS and GIS in Disaster Management- Reconnaissance, forecast, forewarning systems, Disaster preparedness with respect to different disasters. SDI to facilitate Disaster Management. GIS based DSS for disaster management. Satellite surveillance for disaster mitigation.

Drought: Drought types, causes, mitigation measures, delineation of drought vulnerable areas using RS and GIS; Drought Information System; Drought monitoring; GIS based drought analysis; Desertification factors, Assessment of drought impact using RS and GIS. Monitoring vegetative biomass, Drought management- prediction, preparedness, monitoring of drought.

Earthquake: Causes of earthquake, prediction of earthquake, Geomatics in earthquake mitigation, seismic damage evaluation and loss estimation, RS and GIS application for post quake rehabilitation, GIS database for previous earthquakes, space technology and earthquake prediction, geospatial information system for earthquake disaster management, mapping tectonic lineaments. El-Nino damage assessment using RS and GIS.

Fire: Forest fire, causes, forest fire management using geospatial information system, forest fire risk zonation mapping, forest fire monitoring, forest fire, forecasting system using internet GIS and Satellite Remote Sensing, delineation of coal fire risk zonation.

Flood, Cyclone and Tsunami: Floods types-flash and riverine floods, snowmelt floods, ice jams, and mud flows; causes and mitigation measures, flooding potential zonation mapping, flood hazard assessment, flood risk analysis using RS and GIS, tropical cyclone monitoring using INSAT, ERS-1,NOAA, and DMSPP satellites, RS and GIS in Hurricane mapping and mitigation, flood disaster monitoring and reporting system, terrain modeling for flood plain zoning, digital surface modeling and flood hazard simulation, ice cover monitoring and its role in flooding. Flood damage impact minimization, damage assessment in hurricane / tornado affected areas. Cyclone tracking, Cyclone warning, cyclone management. Tsunami- types, causes, RS and GIS applications for post Tsunami damage assessment and rehabilitation

Landslide: Landslides, causes, types, and mitigation measures, land slidezonation, land slide susceptibility mapping, land slide monitoring, landslide analysis in GIS, geospatial technology for landslide management, sand drift in Indian desert, topographic and morphometric features affecting in landslide.

Soil Erosion: Types, causes, and mitigation measures, application of RS and GIS for soil erosion and sediment estimation, RS and GIS application for desertification studies, desertification studies, estimation of soil erosion, soil erosion mapping universal soil loss equation and GIS, land degradation studies, sodic soil mapping,

Volcano: Volcanoes, types causes of volcanoes, hazards of volcanoes, remote sensing of geothermal field, mapping lava flows, ashfalls and lahars, mapping damage, volcano hazard management.

Disaster Management in Human Settlements: Mapping disaster vulnerable zones, fire hazards, flood and storm water inundations, earthquake impact assessment

Recent Trends: The role of Mobile GIS and SDI as an integrated framework in Emergency Management

REFERENCE BOOKS:

1. Amdahl G (2002) **Disaster Response:** GIS for Public Safety, Published by ESRI, Redlands California.
2. <http://www.esri.com/news/arcnews/winter0102/articles/gishomeland.html> - visited on October 2002.

GEOINFORMATICS IN DEMOGRAPHY, BUSINESS, HEALTH AND HUMANITIES

Subject Code: 14 CGI - 422	IA Marks: 50
No. of Lecture Hrs/ Week: 04	Exams Hrs: 03
Total no. of Lecture Hrs: 52	Exam Marks: 100

Objective:

On completion of study of this subject the student would be able to analyse demographic data, economic data, epidemiological data and others and use it for making spatially informed decision.

Geodemographics : Spatial distribution of population according to age, gender, and socio-group, racial and socioeconomic segregation, geoethnography, labour market exploration, health equality, crime analysis, population and environmental linkage, spatial planning, temporal analysis, spatial dispersal and sparsity, changing pattern of demography, GIS functionality for demographic analysis.

Business GIS :Competitive market analysis, trade area analysis, site analysis and selection for distribution centers and shopping centres, customer service stations, facility management, target marketing, market demographics demographic analysis for marketing based on customer profiling, lifestyle matching and consumer behaviour, sales promotion planning, advertisements targeting; geo-market segmentation by product category, sales territory rationalization, forecasting market potential and modeling sales.

Health GIS: Spatial epidemiology: RS and GIS in study of epidemics and their control- malaria, leprosy, polio, TB, filariasis, dengue, chikengunya, cholera, AIDs Cancer; disease mapping, ecological analysis, disease clustering, bioterrorism and disease surveillance, infectious disease modeling. Health infrastructure and facility location mapping, planning future health facility requirement, disease surveillance and monitoring and other health indicators, Karnataka Health Systems Development Project, health and disease atlas of India and medical geography, internet and health GIS, integrated disease surveillance system, spatial distribution and spread of diseases.

Power: Site suitability assessment for power plants- thermal, hydroelectric, nuclear, mini-hydroelectric power plants, wind power, and impact assessment. Electrification and network planning, GIS in management of electricity distribution network, underground cable maintenance and management in power sector, GIS as decision support system,

Telecommunication: Applications of GIS in telecommunication industry, internet GIS for telecommunication, facility management in telecommunication industry, optical fiber cable alignment.

Transportation :Transportation GIS: vehicle routing and scheduling, optimizing routes and schedules, delivery routing/fleet management, vehicle navigation, vehicle tracking system, intelligent transportation system

Tourism: Tourism internet GIS applications, tourism planning, tourism marketing, tourism research, tourism impact, ecotourism planning,

Archeology: RS and GIS applications in mapping cultural heritage, spotting historical monuments and sites, identification of palaeorivers, GIS of historical maps.

REFERENCE BOOKS:

1. “GIS and GPS based asset management for Road and Railway

Transportation Systems “- GPS based vehicle tracking system. www.gisdevelopment.net

www.esri.com www.aboutgis.com

EMERGING TRENDS IN GEOINFORMATICS

Subject Code: **14 CGI - 423**

No. of Lecture Hrs/ Week: 04

Total no. of Lecture Hrs: 52

IA Marks: 50

Exams Hrs: 03

Exam Marks: 100

Objective:

The objective of this subject is to enable the students to have a fair knowledge about global and Indian Geo-informatics Industry and its major stake holders, trends, and scenarios.

Global and Indian Scenario of Geo-informatics- Current status and Recent Advances in the field of RS, GIS, Photogrammetry, GPS, products and process, software and hardware.

Global and Indian R&D Organisations :Global Institutions- NASA, ESRI, ERDAS, Canadian Institute of Remote Sensing, International Institute of Photogrammetry and Remote Sensing, Google, India- ISRO and its subunits, NRSA, SAC, Antrix, IIRS, RRSSCs; State Remote Sensing Centres; Funding Sources for R&D projects; Global and National Spatial Data Centres, Satellite data sources and procurement procedures.

World and Indian Space Programmes :Satellites and sensors and their products and applications; Geoinformatics usage by Government and Private Sectors - User Departments of Central Govt. and State Govt. and their major projects: Central - SOI, MOEF, MOUD, MOD, few Case studies.

Global and Indian Geoinformatics Market: Present trends and future prospects and problems, GIS BPO in private sector in India, GIS companies in India.

Global and National Major Initiatives in RS and GIS: Digital Earth, GSDI, 3D Cities, NSDI.

Education and Training facilities in Geoinformatics :Global Geoinformatics Courses, scholarships; Web Resources for e-learning; eBooks; open sources of free softwares; International Journals, Review magazines, News Letters, e-journals.

Laws and Policy Perspectives and International Co-operations :Laws and policy matters at international and national level with respect to Space, Sea, photogrammetry, data sharing and data security, interoperability; Global and national Geoinformatics survey reports, case-studies, show cases of best practices.

REFERENCE BOOK:

1. “GIS Development”.net, ESRI web site, NCGIA, UCGIA, Google Earth, Yahoo Maps, NASA web site, ISRO website.