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UNIVERSITY



OF MYSORE

Estd. 1916

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No.AC.2(S)/401/13-14

Dated: 24-05-2014

**NOTIFICATION**

**Sub:** Distribution of Credits matrix in GIS Programme of MSc.

**Ref:** 1.Proceedings of Faculty of Science & Technology Meeting held on 14-02-2014.  
2. Proceedings of the Meeting of Academic Council held on 29-03-2014.

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The Board of Studies in Geographical Information System (PG) at its meeting held on 02-12-2013 has resolved to recommend Distribution of Credit matrix and revision of syllabus in GIS Programme of MSc. from the academic year 2014-15

The Faculty of Science and Technology and the Academic Council at their meetings held on 14-02-2014 and 29-03-2014 respectively approved the above proposals and the same is hereby notified.

*S. Srinivas*  
REGISTRAR  
UNIVERSITY OF MYSORE  
MYSORE  
24/5/2014

To

1. The Registrar (Evaluation), University of Mysore, Mysore.
2. The Chairperson, BOS/DOS in GIS/Geology MGM
3. The Dean, Faculty of Science & Technology, DOS in Zoology, MGM.
4. The Principals of the Affiliated Science Colleges.
5. The Deputy/Assistant Registrar (Evaluation), University of Mysore, Mysore.
6. Sri Narasimha Murthy, Statistician, E.B. UOM, Mysore.
7. The Supdt AC.1 & AC.2, A.B., Academic Section / PMEB, UOM., Mysore.
8. The P.A. to the Vice-Chancellor/Registrar/Registrar (Evaluation), UOM., Mysore.
9. The Case Worker, AC.7, Academic Section, University of Mysore, Mysore.
10. The Section Guard File(Supdt.AC.2), A.B., A.C., UOM.
11. The Schedule File.

**GIS for Sustainable Development  
Choice Based Credit System (CBCS) - 2013-14 & 2014-15**

# **CHOICE BASED CREDIT SCHEME**

## **SYLLABI**

**For**

**MASTER OF SCIENCE IN GEOGRAPHICAL INFORMATION SYSTEMS  
FOR SUSTAINABLE DEVELOPMENT (M.Sc. in GIS)  
(Hard core, Soft core and open Electives by Semester)**



**MAHARAJA'S COLLEGE  
UNIVERSITY OF MYSORE,  
MYSORE-570 005**

# CHOICE BASED CREDIT SCHEME

MAHARAJA'S COLLEGE MYSORE - 570 005

SCHEME BY SEMESTERS

MASTER OF SCIENCE IN GEOGRAPHICAL INFORMATION SYSTEMS

FOR SUSTAINABLE DEVELOPMENT (M.Sc. in GIS)

For students admitted in 2013-14 & 2014-15

## I Semester (Credits: 24)

SL. No.	Code	Title of Course	Types HC/SC/OE	Number of Credits			
				L	T	P	Total
1	17901	Fundamentals of Geographical Information Systems and Global Positioning Systems	HC I	3	1	0	4
2	17902	Manual and Cyber Cartography	HC II	3	1	0	4
3	Practical	Maps and Mapping Techniques	HC III	0	1	3	4
4	17903	Computer Applications in Geography	SC I	3	1	0	4
5	17904	Applied Geomorphology	SC II	3	1	0	4
6	17905	Land Use and Land Evaluation	SC III	3	1	0	4

Note: All three Hard Core Courses are compulsory. Among the Soft Core courses, students have the option to choose any two of the three Soft Core Courses.

## II Semester (Credits: 24)

SL. No.	Codes	Title of Course	Types HC/SC/OE	Number of Credits			
				L	T	P	Total
1		Remote Sensing Analysis and Interpretation	HC IV	3	1	0	4
2	Practical	Advance Remote Sensing Analysis	HC V	0	1	3	4
3		Minor Research Project	HC VI	0	1	3	4
4		Geography of Networks Analysis	SC IV	3	1	0	4
5		Qualitative and Quantitative Research Methods	SC V	3	1	0	4
6		Participatory Urban Planning and Development	SC VI	3	1	0	4

Note: All three hard cores are compulsory. Among the three soft cores, students have the option to choose any two. Minor research project (Hard Core VI) is compulsory, which is a student research project on a smaller, manageable problem, requiring a report of 50 pages including maps and diagrams and tables (20 pages) and text (30 pages).

## III Semester (Credits: 24)

SL. No.	Codes	Title of Course	Types HC/SC/OE	Number of Credits			
				L	T	P	Total
1		Geographical Information Systems and Global Positioning Systems	HC VII	3	1	0	4
2		Climate Change and Geo-Informatics	HC VIII	3	1	0	4
3	Practical	Advanced GIS and GPS Applications	HC IX	0	1	3	4
4		Natural Resources Management and Conservation	SC VII	3	1	0	4
5		Developing Sustainability Research	SC VIII	3	1	0	4
6		Environmental Impact Assessment	SC IX	3	1	0	4

Note: All three hard cores are compulsory. Among the three soft cores, students have the option to choose any two.

## IV Semester

SL. No.	Codes	Title of Course	Types HC/SC/OE	Number of Credits			
				L	T	P	Total
1		Compulsory for 8 weeks at an appropriate Government or private corporate institution	Internship HC X	0	2	6	8
2		Project work (one term Major Research)	Project HC XI	0	1	3	4

**Internship and Projects** are compulsory.

Note: All course works / programs are compulsory for M.Sc-GIS students.

- **Internships:** Are done in a Government, research and implementation institution and / or a Private, Corporate institution of repute with specialization on the technologies of Cartography, Remote Sensing, GIS and GPS, including Computer work in a prestigious lab. Internship must begin in the first week of February and continue till the end of March.
- **Project work:** This is a Major Project of 3 full months or about 12 weeks, on a larger, manageable program of research, requiring a report of 90 pages including maps and diagrams and tables (40 pages) and text (50 pages). Project work begins in the first week of April.

**Seminars** are a part of Internships and Project work in which seminars have specific purposes. Students make power point presentations on their chosen theme of research for project work, outlining the background, rationale and objectives of research, on their chosen Methodology and the rationale behind them and on their Draft Final report at the end of the 20<sup>th</sup> week of the semester (end of June) under the guidance and supervision of their tutors/advisors/guides.

**Field work and educational tours** are also compulsory for the students of First and Second Years and are conducted by the students with explicit guidance and supervision from the faculty members and guest lecturers. They are better performed before the beginning of the second and fourth semesters.

The students are very intensively engaged by the course works of Internship, Project work, seminars, field work and educational tours, with constant monitoring and evaluation of the work carried out by the teachers. Final seminar where the students make their presentations on their Final Project Report of their major research work will be jointly evaluated by two internal examiners / experts.

## OPEN ELECTIVES

### II & IV SEMESTER

Sl. No	Codes	Course Title	Number of Credits			
			L	T	P	Total
01		Fundamentals of GIS	3	1	0	4
02		Ecotourism	3	1	0	4

### III SEMESTER

Sl. No	Codes	Course Title	Number of Credits			
			L	T	P	Total
01		Research Methodology for a Sustainable Development Expert	3	1	0	4

**CHOICE BASED CREDIT SCHEME**  
**For M.Sc., in GIS for Sustainable Development**  
**Maharaja's College, Mysore 570 005**  
**(Hard Core, Soft Core and Open Elective Papers by Semester)**  
**For Students Admitted in 2013-14 & 2014-15**

**FIRST SEMESTER**

**HARD CORE**

**PAPER GIA 01: FUNDAMENTALS GEOGRAPHICAL INFORMATION SYSTEMS  
AND GLOBAL POSITIONING SYSTEMS -17901**

**Objective:** *The concepts of GIS, components of GIS and application areas of GIS are comprehensively understood. The emphasis is on learning GIS and GPS with skills for employment of the students in view.*

**Geographical Information Systems:** Introduction, history and development of GIS, components of GIS, applications of GIS.

**Coordinate Systems:** Geographical coordinate systems, projected coordinate system, map projections.

**Data Models and Management:** Spatial Data Models –Vector and Raster data models and applications. Data collection, capture and Geo processing: Sources, input methods, editing, re-projection, geometric Transformation, Map scale, precision and accuracy;

**GPS:** Introduction, components, types, application of GPS in GIS; and remote sensing data in GIS.

**Textbooks**

1. Heywood, Ian, Sarah Cornelius and Steve Carver 2000: **An Introduction to Geographical Information Systems**, Addison Wesley Longman, New York.
2. Aronoff, S. 1991: **Geographic Information Systems: A Management Perspective**, WDL, Ottawa, Canada.
3. Elangovan, K. 2006: **GIS - Fundamentals, Applications and Implementations**, New India, New Delhi
4. Chang, Kang-Tsung 2002: **Introduction to Geographical Information Systems**, Tata McGraw-Hill, New Delhi.
5. Bhatta, B. 2008: **Remote Sensing and GIS**, Oxford University Press, New Delhi.

**References**

1. Maguire, David J., Michael F. Goodchild, and David W. Rhind (Eds) 1991: **Geographical Information Systems**, Longman Scientific and Technical with John Wiley, New York.
2. Sharma, H.S., D.R. Ram, Rama Prasad and P.R. Binda 2006: **Mathematical Modelling in Geographical Information System, Global Positioning System and Digital Cartography**, Concept, New Delhi.

**Web Resources**

1. <http://www.gsd.harvard.edu/pbcote/courses/gsd6322/lectures.htm>
2. [http://www soi.city.ac.uk/~dk708/part\\_1.htm](http://www soi.city.ac.uk/~dk708/part_1.htm)

## **HARD CORE**

### **PAPER GIA 02: MANUAL AND CYBER CARTOGRAPHY- 17902**

**Objective:** *Manual cartography is the traditional subject of mapping, which has been irretrievably lost because of modern developments, including automated cartography. It is imperative that manual cartography be taught to the students so that they learn the techniques and skills that are necessary for development analysts. Cyber Cartography is, on the other hand, a new theoretical approach that is part of the innovative evolution of cartography. It is multi-sensory, uses multimedia and is highly interactive engaging the user in new ways.*

**Manual and Cyber Cartography:** An overview, cartographic communication process, cartographical cube, map types and functions.

**Cartographic abstraction and symbolization:** Cartographical data models- Data structures and data files, generalization, classification, simplification, choropleth mapping, manipulation; cartographic elements, symbolization of features – point, line and area.

**Map perceptions and design:** Objectives, functions, scope of design, perceptual consideration, graphic communications, control of map design and design planning, design excellence.

**Mapping Algorithms:** Contouring algorithms, Surfaces and surface interpolation algorithms; 3D Visualization with stereo anaglyph images; cyber cartography and interactions between theory and practice.

#### **Textbooks**

1. Robinson, A.H., J.L.Morrison, P.C., Muehrcke, A.J.Kimerling and S.C.Guptill (1995). **Elements of Cartography**, 6<sup>th</sup> Edition. New York., John Wiley & Sons. USA.
2. Misra, R.P. and A.Ramesh (1989). **Fundamentals of Cartography**, Concepts Publishing Company, New Delhi.

#### **References**

1. Kraak, M.J. and F.J.Ormeling 1996: **Cartography: Visualisation of Spatial data**, Longman, England.
2. Tyner, J. 1992: **Introduction to Thematic Cartography**, Prentice-Hall, Englewood Cliff, New Jersey.

#### **Web Resources**

1. <http://www.fes.uwaterloo.ca/crs/geog165/cart.htm>
2. [http://www.colorado.edu/geography/gcraft/notes/cartocom/cartocom\\_ftoc.html#3.0](http://www.colorado.edu/geography/gcraft/notes/cartocom/cartocom_ftoc.html#3.0)

## **HARD CORE**

### **PAPER GIA 03: MAPS AND MAPPING TECHNIQUES**

**Objective:** *Skills in handling physical and socio-economic data are upgraded. The student uses the map and statistical information for generating map outputs.*

**Cartographic Exercises:** Map Appreciation and Conventional Signs: thematic, topographic and atlas maps and appreciation;

**Relief Mapping and Climatic Diagrams:** Relative relief and slope maps, morphometric analysis; Climograph and climatograph, rainfall variability and intensity maps, temperature and rainfall profiles, dispersion and deviation graph, aridity and water balance.

**Distribution Mapping:** Dot maps, density maps, colour and grayscale patterns, index of concentration and diversification.

**Network and Map Analysis:** Transport network analysis and flow maps; located representation of tourism and facilities; point and line patterns analysis; cartograms and 3D maps (Min. 10 exercises).

#### **Textbooks**

1. Monkhouse, F.J. and Wilkinson, H.R. 1976: **Maps and Diagrams**, Methuen, London.
2. Worthington, B.D.R. and Robert Gent 1975: **Techniques in Map Analysis**, Ebenezer Baylis, USA.
3. Tomlin, C.D. 1990: **Geographic Information Systems and Cartographic Modelling**, Prentice Hall, Englewood Cliff, New Jersey.

#### **References**

1. Anson, R.W. (Ed) 1984: **Basic Cartography for Students and Technicians**, Volume 2, International Cartographic Association, Elsevier Applied Science, London.
2. Dorling, D. and David Fairbairn 1997: **Mapping: Map of representing the world**, Addison Wesley Longman Ltd., U.K.

#### **Web Resources**

1. [www.sevenoaks.wa.edu.au/linkpage/geog/copy.html](http://www.sevenoaks.wa.edu.au/linkpage/geog/copy.html)
2. [www.gisdevelopment.net/books/mapping/bmap0010.htm](http://www.gisdevelopment.net/books/mapping/bmap0010.htm)

## SOFT CORE

### PAPER GIA 11: COMPUTER APPLICATIONS IN GEOGRAPHY-17903

**Objective:** *This course teaches skills such as basic computer skills, computer cartography, and spatial analysis tools to query databases and manage relational databases, identifying appropriate data sources via the Internet and offline and presentation skills related to maps and GIS data.*

**Computer Applications in Geography:** Introduction to Computers; Components – Input and Output Devices, operating systems.

**Database Management Systems:** Introduction; databases, database management system - structure, types of DBMS; application of DBMS in GIS; data management using MS-Excel.

**Computer Applications in Geography:** Colour schemes Versus Black and White / Grayscale; graduated symbols; dot density; symbolizing types of features; Linking data to geography; extracting data from the map; site selection vs. site planning; data suitability.

**GIS in mapping:** ArcGIS field calculator; Online mapping examples; applications of internet in GIS, national and local sources of geospatial data.

#### Textbooks

1. Mather, P.M. 1991: **Computer Applications in Geography**, John Wiley, London.
2. Robinson, A.H. 1995: *Elements of Cartography*, Wiley: New York.
3. Schuurman, N. 2004: *GIS: A Short Introduction*, Blackwell: Oxford.
4. Wood, T. 1992: **The Power of Maps**, Routledge, London.
5. Nag, Prithvish and Smita Sengupta 2007: *Geographical Information Sytem Concepts and Business opportunities*, Concept, New Delhi.

#### References

1. *The ESRI Guide to GIS Analysis, Volume 1, Geographic Patterns and Relationships.* (Mitchell, Andy. 1999), ESRI Press. ISBN: 1879102064
2. Policy Link's "Equitable Development Toolkit: Community Mapping." Online at <http://www.policylink.org/EDTK/Mapping/> Provides a contextual background for how GIS is used in local planning, revitalization, and community building strategies.

#### Web Resources

1. <http://www.policylink.org/EDTK/Mapping/>
2. <http://www.nuim.ie/dpringle/courses/cag/>
3. <http://www.wiley.com/WileyCDA/WileyTitle/productCd-0471926159,descCd-tableOfContents.html>



## SOFT CORE

### PAPER GIA 12: APPLIED GEOMORPHOLOGY-17904

**Objective:** *This course offers an appreciation of applied geomorphology. Landforms evolve in response to a combination of natural and anthropogenic processes. The landscape is built up through tectonic uplift and volcanism. Denudation occurs by erosion and mass wasting, which produces sediment that is transported and deposited elsewhere within the landscape or off the coast. Landscapes are also lowered by subsidence, either due to tectonics or physical changes in underlying sedimentary deposits. These processes are each influenced differently by climate, ecology, and human activity.*

**General Introduction:** introduction, objectives, Status of applied geomorphology, sub disciplines of applied geomorphology.

**Identification of Geomorphological hazards:** Role of geomorphology in identification of natural hazards w.r.t.: Soil erosion by water and wind, river floods, Slope instability, ground surface subsidence, volcanoes and earthquakes.

**Environmental Management:** Role of geomorphology in environmental management with reference to: Control of soil erosion by water and wind, flood control, Management of landslides, coastal management, and urban management.

**Resource Evaluation and Techniques:** Material resources, Techniques of Scenic evaluation, land system mapping, geomorphological mapping, Application of remote sensing techniques in study of resources and hazards, Geomorphology and Engineering works.

#### Textbooks

1. Craige, R.G, and J.L. Craft, ed. (1982): **Applied Geomorphology**, George Allen and Unwin.
2. Hails, J.R. (1974): **Applied Geomorphology**, Amsterdam, Elsevier.

#### References

1. Coates, D.R. (1980): **Geomorphology and Engineering**, George Allen and Unwin.
2. Cooke, R.U. and J.C. Doorn Kamp (1990): **Geomorphology in Environmental Management**, Oxford University Press.
3. S.C. Kalwar et.al.(2005): **Geomorphology and Environment Sustainability**, Concept, New Delhi.
4. Sharma, H.S. ed. (1991): **Indian Geomorphology**, Concept, New Delhi.
5. Singh, Savindra (2000): **Geomorphology**, Prayag, Allahabad.

#### Web Resources

1. Geographers' Craft, Teaching Resources.

## **SOFT CORE**

### **PAPER GIA 13: LAND USE PLANNING AND LAND EVALUATION-17905**

**Objective:** *This course is to motivate the students to study land use systems, land uses, land utilization types, land evaluation and land use planning. Essentially, the course places the above aspects in the context of natural resources systems analysis so that students could gain insights on the land use and land evaluation perspectives.*

**Land Use:** Land use systems, land uses and land utilization types; land and land use classifications – rural and urban land uses and land use patterns and processes.

**Data Sources for Land Evaluation:** Documentary and map resources, land-soil-water resources surveys; remote sensing and GPS surveys of land uses; land use and land cover classification from remotely sensed data; vegetation indices, supervised and unsupervised classification.

**Land Evaluation:** The logical basis of land evaluation; land evaluation for land use planning; Biophysical models of land evaluation, the FAO two-stage approach to land evaluation; other approaches to land capability and suitability classifications.

**Land Use Planning:** The importance and difficulty of land use planning, land use policies, principles of land use planning and land use management; urban land use planning, critical issues of land use planning in India; land use planning and sustainable development.

#### **Textbooks**

1. UNFAO (1993): Guidelines for land use planning, FAO, Development series 1, Rome, Italy.
2. Vink, A.P.A. (1973): Agricultural land use planning, Verlag: London.

#### **References**

1. David G. Rossiter's lecture notes on Land Use, Land Use Planning and Land Evaluation.
2. FAO, 1976. A framework for land evaluation. FAO Soils Bulletin 32.
3. FAO, 1983. Guidelines: Land evaluation for rainfed agriculture, FAO Soils Bulletin 52.
4. FAO, 1984. Land evaluation for forestry. FAO Forestry Paper 48.
5. FAO, 1985. Guidelines: Land evaluation for irrigated agriculture, FAO Soils Bulletin 55.
6. FAO, 1991. Guidelines: land evaluation for extensive grazing.
7. FAO/UNEP, 1993. Agro-ecological assessments for national planning: the example of Kenya. FAO Soils Bulletin, 67, 154p.

#### **Web Resources**

1. [www.fao.org/ag/agl/agll/landuse/docs/landevaluationatfao.doc](http://www.fao.org/ag/agl/agll/landuse/docs/landevaluationatfao.doc)
2. [www.itc.nl/~rossiter/Docs/Scas494/s494ch2.pdf](http://www.itc.nl/~rossiter/Docs/Scas494/s494ch2.pdf)
3. [http://www.fao.org/catalog/book\\_review/giii/w9692-e.htm](http://www.fao.org/catalog/book_review/giii/w9692-e.htm)
4. <http://www.fao.org/ag/agl/agll/soter.stm>
5. <http://www.css.cornell.edu/landeval/ales/ales.htm>

# CHOICE BASED CREDIT SCHEME

For M.Sc., in GIS for Sustainable Development

Maharaja's College, Mysore 570 005

(Hard Core, Soft Core, Open Elective Papers by Semester)

For Students admitted in 2013-14 & 2014-15

## SECOND SEMESTER

### HARD CORE

#### PAPER GIB 01: REMOTE SENSING ANALYSIS AND INTERPRETATION

**Objective:** *The objective in this paper is to impart to students the skills necessary for remote sensing analysis and interpretation so that students acquire transferable and also employable skills in remote sensing. This is a step ahead of the fundamentals and more practical for learning.*

**Visual Image Interpretation:** Remote sensing products, image interpretation, elements of visual interpretation, interpretation keys, generating thematic maps; thermal and radar image interpretation.

**Digital Image Processing:** Image processing systems, digital image, data formats of digital image, pre-processing, image enhancement and transformation and image classification.

**Data Integration, Analysis and Presentation:** Multiple approaches to image analysis, multispectral images, multi-temporal / multi-seasonal images, multisources data, integration with GIS and presentations.

**Applications of Remote Sensing:** Applications of remote sensing in agriculture (crop-yield estimation), forestry (vegetation index, biodiversity/species estimation), oceans and coastal monitoring (sea surface temperatures, oil spills), and monitoring atmosphere components.

#### Textbooks

1. Bhatta, B. 2008: Remote Sensing and GIS, New Delhi: Oxford (Chapters 9-12).
2. Lillesand, T.M. and Keifer, R.W. 2000: **Introduction to Remote Sensing and Image Interpretation**; John Wiley, New York.
3. Gibson, Paul. J. 2000: **Introductory Remote Sensing**, Routledge, New York.
4. Jensen, John R. 2006: **Remote Sensing of the Environment**, Pearson Education, Singapore.
5. Joseph, George 2008: **Fundamentals of Remote Sensing**, University Press, New Delhi.

#### References

1. Avery, T.E. and G.L. Berlin, (1992), **Fundamentals of Remote Sensing and Air Photo Interpretation**, Macmillan, New York.
2. James B. Campbell (1996); **Introduction to Remote Sensing**; Taylor & Francis, London

#### Web Resources

1. [http://www.colorado.edu/geography/gcraft/notes/gps/gps\\_f.html](http://www.colorado.edu/geography/gcraft/notes/gps/gps_f.html)
2. <http://www.gpsworld.com/gpsworld/>
3. <http://www.colorado.edu/geography/gcraft/notes/remote/>
4. [http://ccrs.nrcan.gc.ca/resource/tutor/fundam/index\\_e.php](http://ccrs.nrcan.gc.ca/resource/tutor/fundam/index_e.php)

## **HARD CORE**

### **PAPER GIB 02: ADVANCED REMOTE SENSING ANALYSIS**

**Objective:** *Remote Sensing Technology is applied to problems and issues in sustainable development. Remotely sensed data are manipulated for feature extraction, spatial analysis and raster based GIS modeling.*

**Image Processing Overview:** data acquisition, processing /analysis and output concepts and Components; statistical and mathematical foundations: matrix algebra and its applications - sampling, estimation and interpolation and extrapolation principles.

**Decision making principles:** parametric and non-parametric decision, classification and clustering principles; digital image processing system; an overview of hardware and software, processing principles.

**Data acquisition and digital image processing:** Enhancement, contrast manipulation, density slicing, and colour coding, image rectification: noise removal, spectral, radiometric and geometric corrections; unsupervised classification, filtering, generalization and thematic map extraction; supervised classification: training sites, classifiers, accuracy of estimates; *in situ* support; equipment in field data collection: radiometers and GPS.

**Data interpretation:** concepts of map, remote sensing, field work and attribute data integration; post classification tasks, design and layout principles, map output.

#### **Textbooks**

1. Lillesand and Keifer (2000): Introduction to Remote sensing and Image interpretation; John Willy & sons Ltd., New York.
2. Paul. J. Gibson (2000): Introductory Remote Sensing; Routledge; New York.

#### **References**

1. Avery, T.E. and G.L. Berlin, (1992), Fundamentals of Remote Sensing and Air Photo Interpretation, Macmillan Publishing Company, New York.
2. James B. Campbell (1996); Introduction to Remote Sensing; Taylor & Francis, London
3. Lillesand, T.M. & R.W.Kiefer (1987), Remote Sensing and Image Interpretation, John Wiley and Sons, Canada

#### **Web Resources**

1. [http://www.colorado.edu/geography/gcraft/notes/gps/gps\\_f.html](http://www.colorado.edu/geography/gcraft/notes/gps/gps_f.html)
2. <http://www.gpsworld.com/gpsworld/>
3. <http://www.colorado.edu/geography/gcraft/notes/remote/>
4. [http://ccrs.nrcan.gc.ca/resource/tutor/fundam/index\\_e.php](http://ccrs.nrcan.gc.ca/resource/tutor/fundam/index_e.php)

## **HARD CORE**

### **GIB 03: MINOR PROJECT**

One term minor project, this requires students to select a simple, manageable project idea and work on it with a view to researching a minor problem of analysis and submit a report for valuation at the end of the semester.

For the purpose of evaluation, the students are expected to make a power point presentation at a class seminar on the term work. The report will be no more than 50 pages, including maps and diagrams and tables and text. The students are expected to submit a neat, bound report for evaluation by an external expert along with an internal examiner.

## **SOFT CORE**

### **PAPER GIB 11: GEOGRAPHY OF NETWORKS**

***Objective:** The paper introduces network theory, applications of network theory in analyzing social and urban networks, especially transport networks. Lectures introduce network data structures and other analytic tools. GIS-T helps students gain knowledge and skills in input, management analysis and reporting on transportation issues.*

**Network Theory:** What is network theory? Applications of network theory, web applications of social networks, graphs – socio-grams, connections, distances and measures of power and prestige, applications of social networks in geographical information systems applications.

**Network data models:** Nature and utility of network data models, basic representations of node and link tables, layer-based and object-oriented approaches to network analysis.

**Graph Theory:** Basic graph definitions, links and their structures, basic structural properties, measures and indices (detour, network intensity, PI, Eta, Theta, Beta, Alpha and Gamma indices), connectivity and total accessibility.

**GIS for Transportation (GIS-T):** Data representation, analysis and modeling (multi-dimensional GIS-T models), Applications and problems – travelling salesman problem, vehicle routing problem, facility location problems and spatial interaction models.

#### **Textbooks**

1. Rodrigue, Jean-Paul, Comtois, C. and Slack, B. (2009): The Geography of Transport Systems, New York: Routledge.
2. Scott, John (1991): Social Network Analysis: A Handbook, London: Sage.

#### **References**

1. Bell, M.G.H. and Iida, Y (1997): Transportation Network Analysis, New York: Wiley.
2. Haggett, P. and Chorley, R. (1969): Network Analysis in Geography, New York: St. Martin's Press.

#### **Web Resources**

1. [www.digitalmedievalist.org/journal/4/isaksen/](http://www.digitalmedievalist.org/journal/4/isaksen/)
2. [www.wiley.com/WileyCDA/.../productCd-047196493X.html](http://www.wiley.com/WileyCDA/.../productCd-047196493X.html)
3. [web.mit.edu/asevtsuk/www/current.html](http://web.mit.edu/asevtsuk/www/current.html)

## **SOFT CORE**

### **PAPER GIB 12: QUALITATIVE AND QUANTITATIVE RESEARCH METHODS**

**Objective:** *Qualitative research involves the use of multiple methods to explore social interactions in natural settings. This course is designed for field methods, to practice and apply in research and work related to it. As field workers, the students of GIS for Sustainable Development may use qualitative research methods to improve their performance in participatory methodologies. Quantitative research methods involve the use of theory and methods, that is, in a sense constructing and operationalising theories. The course is designed in a way sampling and sample statistics, instrument construction, experimental designs and content analysis are all included.*

**Research methodology:** meaning, objectives, motivation, types, approaches, significance and process of research, research methods- qualitative and quantitative.

**Qualitative research methods:** Introduction, merits and demerits, data collection methods, manipulation and analysis, report writing.

**Quantitative research methods:** Introduction, merits and demerits, data collection methods, manipulation and analysis, report writing.

**Mixed research methodology:** Blending (why and how) of qualitative and quantitative research methods, advantages and disadvantages, applications of mixed research methods.

#### **Textbooks**

1. Garnier, B.J. 1964: **Practical Work in Geography**, Edward Arnold, London.
2. Johnson, R.A. and D.W. Wichern 1996: **Applied Multivariate Statistical Analysis**, Prentice Hall India, New Delhi.
3. Kothari, C.R. 2004: **Research methodology**, New Age International, Delhi.
4. Khan, Najma 2003: **Quantitative Methods in Geographical Research**, Concept, New Delhi.

#### **References**

1. Hammond, P. and McGullah, P.S. 1978: **Quantitative Techniques in Geography**, Oxford University Press, New York.
2. Mathews, J.A. 1981: **Quantitative and Statistical Approaches to Geography**, Pergamon Press, Great Britain.

#### **Web Resources**

1. <http://www.earthmapping.com/papers>
2. [http://rst.gsfc.nasa.gov/Intro/Part2\\_1.html](http://rst.gsfc.nasa.gov/Intro/Part2_1.html)
3. <http://ciesin.columbia.edu/TG/RS/RS-home.html>

## SOFT CORE

### PAPER GIB 13: PARTICIPATORY URBAN PLANNING AND DEVELOPMENT

**Objective:** *This elective paper builds an understanding of the political, economic and social avenues of participation in urban development planning and policy, develops the capacity to evaluate the conditions under which participation empowers or dis-empowers community residents, opens or closes dialogue between communities and government and cultivates a solid conceptual understanding, and a contextually sensitive appreciation, of methods to support meaningful participation in urban development processes (policy, planning and implementation).*

**Introduction:** Holding Ground – On participation and power in the community; Classic views on Power, Powerlessness and Participation (PPP) – India and Abroad; Opportunities and obstacles to community engagement.

**Social Capital:** What is it? Do we have any? Should we care? Spirituality and participation, Advocacy and organizing: Is organizing compatible with development? Communication and deliberation, participation and capacity building.

**The International Experience:** Formal channels for participations, participatory planning and development: Methods overview - PAR, PPA, RRA and other participatory development strategies; Visioning, missioning, planning and participation; Participation via Mass Media and the Internet.

**Practices and discussions:** Round table discussions on different types of participation, participatory planning; demonstration of participatory, community planning methods; field work in a city neighbourhood.

#### Textbooks

1. Hamdi, Nabeel and R. Goethert 1997: *Action Planning for Cities: A Guide to Community Practice*, John Wiley, New York.
2. Barry Dalal-Clayton and Stephen Bass (2002): **Sustainable Development Strategies: A Resource Book** (Organisation for Economic Cooperation and Development and United Nations Development Programme).

#### References

1. Garry Green, Anna Haines, Stephen Halebsky (2000): **Building Our Future: A Guide to Community Visioning**, Cooperative Extension Publishing: University of Wisconsin.
2. Judith E. Innes (1999): **Information on communicative Planning**, APA National Planning Conference. Available at <http://www.asu.edu/caed/proceedings99/JAPA/INNES.HTM>.
3. Paul Streeten (2002): **Empowerment, Participation and the Poor**, Occasional Paper, *Background paper for Human Development Report 2002* (UNDP). [http://hdr.undp.org/docs/publications/background\\_papers/2002/Streeten\\_2002.pdf](http://hdr.undp.org/docs/publications/background_papers/2002/Streeten_2002.pdf)
4. Judy Burgess (2006): **Participatory Action Research: First-person perspectives of a graduate student**, *Action Research*, 4(4): 419-437.
5. Randy Stoecker (2000): **Cyberspace vs. Face to face: Community Organizing in the New Millennium**, <http://comm-org.utoledo.edu/papers2000/cyberorganize.htm>.

#### Web Resources

1. <http://www.nssd.net/working/resource/indexa.htm>.
2. <http://comm-org.utoledo.edu/papers2000/cyberorganize.htm>.
3. <http://www.asu.edu/caed/proceedings99/JAPA/INNES.HTM>



## OPEN ELECTIVE

### PAPER GIB 21: FUNDAMENTALS OF GEOGRAPHICAL INFORMATION SYSTEMS

*Objective: The concepts of GIS, components of GIS and application areas of GIS are comprehensively understood. The emphasis is on learning GIS and GPS with skills for employment of the students in view.*

**Geographical information systems:** Introduction, history and development of GIS, components of GIS, applications of GIS.

**Coordinate systems:** Geographical coordinate systems, projected coordinate system, map projections.

**Data Models and Management:** Spatial Data Models –Vector and Raster data models and applications. Data collection, capture and Geoprocessing: Sources, input methods, editing, re-projection, geometric Transformation, Map scale, precision and accuracy;

**Application of GIS:** Geology, water resources, land use and land cover mapping, natural resource management.

#### Textbooks

1. Ian Heywood, Sarah Cornelius and Steve Carver 2000: **An Introduction to Geographical Information Systems**, Addison Wesley Longman, New York.
2. Aronoff, S. (1991) **Geographic Information Systems: A Management Perspective**, WDL Publications, Ottawa, Canada.
3. Elangovan, K. 2006: **GIS: Fundamentals, Applications and Implementations**, New India, New Delhi.
4. Chang, Kang-Tsung 2002: **Introduction to Geographical Information Systems**, Tata McGraw-Hill, New Delhi.
5. Bhatta, B. 2008: **Remote Sensing and GIS**, Oxford University Press, New Delhi.

#### References

1. Maguire, David J., Michael F. Goodchild and David W. Rhind (Eds) 1991: **Geographical Information Systems**, Longman Scientific and Technical with John Wiley, New York.

#### Web Resources

1. <http://www.gsd.harvard.edu/pbcote/courses/gsd6322/lectures.htm>
2. [http://www soi.city.ac.uk/~dk708/part\\_1.htm](http://www soi.city.ac.uk/~dk708/part_1.htm)
3. <http://www.ncgia.ucsb.edu/education/curricula/giscc>

**CHOICE BASED CREDIT SCHEME**  
**For M.Sc., in GIS for Sustainable Development**  
**Maharaja's College, Mysore 570 005**  
**(Hard Core, Soft Core and Open Elective Papers by Semester)**  
**For students admitted in 2013-14 & 2014-15**

**THIRD SEMESTER**

**HARD CORE**

**PAPER GIC 01: GEOGRAPHICAL INFORMATION SYSTEMS AND  
GLOBAL POSITIONING SYSTEMS**

**Objective:** *Students will go beyond the conventional fundamentals in GIS and GPS and move forward into modeling and applications, including specialized GPS surveys for planning studies.*

**Geospatial data:** Data input-existing GIS data, creating new data; Data exploration introduction, attribute data query, spatial data query, raster data query, geospatial data for sustainable development projects (at least three examples in natural resources).

**Data analysis:** Vector data analysis: buffering, overlay, pattern; raster data analysis– local operations, neighborhood operations, zonal operations; terrain mapping and analysis- data for terrain mapping and analysis (DEM and TIN), contour, hill shading, slope and aspect, data analysis applications in sustainable development studies (3 examples).

**GIS Modelling:** Basic elements of GIS modeling; Spatial interpolation: elements, global methods, local methods, kriging method, comparison of spatial interpolation methods, Application and interfacing of GIS models in sustainable development case studies (3 case studies).

**GNSS:** Introduction, history, components, different GNSS, GNSS Augmentation, GPS - types, application of GPS in GIS, three typical GPS surveys for sustainable development case studies.

**Textbooks**

1. Lo, C.P. and Albert K. W. Yeung 2007: **Concepts and Techniques of GIS**, Prentice Hall of India, New Delhi.
2. Chiras, D.D., O.S. Owen and J.P. Reginold 2004: **Natural resources conservation: Management for a Sustainable Future**, Prentice Hall, New York.
3. Chang, Kang-Tsung 2002: **Introduction to Geographical Information Systems**, Tata McGraw-Hill, New Delhi.
4. Ramasamy, SM. (Ed) 2005: **Remote Sensing in Water Resources**, Rawat, Jaipur, India.
5. Sahu, K.C. 2008: **Textbook of Remote Sensing and Geographical Information Systems**, Atlantic, New Delhi.

**References**

1. Hardoy, J.C., D. Mitlin and D. Satterthwaite 2006: **Environmental Problems in an Urbanizing World**, Earthscan, London.
2. Bhatnagar, D.K. 2008: **Sustainable Development: Mobilization and Globalization**, Cyber Tech, New Delhi.
3. Sinha, Rajiv K. 2007: **Sustainable Development: Striking a balance between economy and ecology**, Pointer, Jaipur, India.

**Web Resources**

1. <http://www.amazon.com/GIS-Sustainable-Development-Michele-Campagna/dp/0849330513>
2. <http://www.gisdevelopment.net/thesis/thesis1/appeb.htm>
3. <http://www.gisdevelopment.net/application/nrm/mountain/mount0002pf.htm>
4. <http://www.conservationgis.org/links/sustdev1.html>
5. <http://www.biology.ualberta.ca/facilities/gis/index.php?Page=338>
6. [http://www.esri.com/data/free\\_data/](http://www.esri.com/data/free_data/)

## HARD CORE

### PAPER GIC 02: CLIMATE CHANGE AND GEOINFOMATICS

**Objective:** *Climate change and its corollary global warming are the much talked-about these days for there is an impending danger to the earth we live in by the climate change caused primarily by the human activities on the earth. Climate change has already brought untold sufferings to the world that the world countries met several times to work towards a strategy for reducing global warming and the consequent climate change. This paper offers deep insights into the working of climate change and how to overcome it.*

**Earth System Dynamics:** Introduction to atmosphere, hydrosphere, biosphere, lithosphere, and human interventions in earth system dynamics and operations, anthropogenic activities and global warming.

**Climate Change, the Process:** Introduction, Concept, causes, effects, measures, importance of climate change, climate change and energy, climate change and emerging diseases, climate and change and community.

**Issues in Climate Change:** Global warming, green house effect, carbon cycle, nitrogen cycle, water cycle, ozone depletion, floods, droughts and weather variations, El-NINO and La-NINA, changing ecosystems, snow / glaciers melting,

**Geoinformatics Applications:** Hazards, risks and vulnerability analysis relating to global warming, floods and droughts, and weather variations, ecosystems changes, and snow/glaciers melting, energy studies, health and diseases studies and other case studies (at least 5).

#### Textbooks

1. Burroughs, W.J. 2001: **Climate Change: A Multidisciplinary Approach**, Cambridge University Press, Cambridge.
2. Hillman, Mayer, Tina Fawcett and Sudhir Chella Rajan 2007: **The Suicidal Planet: How to Prevent Global Climate Change**, St. Martin's Press, New York.

#### References

1. Kolbert, Elizabeth 2006: **Field Notes from a Catastrophe: Man, Nature, and Climate Change**. New York.
2. McDonough, William and Michael Braungart 2002: **Cradle to Cradle: Remaking the way we make things**, North Point Press, New York.
3. Ehlers, M. 1993: Integration of GIS, remote sensing, photogrammetry and cartography: the geoinformatics approach, *Geo-Information-Systeme (GIS)*, **6(5)**: 18-23.
4. Goodchild, M. 2004: GIScience: Geography, form, and process, *Annals of the Association of American Geographers*, **94**: 709-714.

#### Web Resources

1. <http://www.aip.org/history/climate/rapid.htm>
2. [http://ec.europa.eu/environment/climat/home\\_en.htm](http://ec.europa.eu/environment/climat/home_en.htm)
3. <http://www.scidev.net/en/climate-change-and-energy/>
4. <http://www.globalwarming.org.in/>
5. <http://timeforchange.org/cause-and-effect-for-global-warming>
6. <http://knowledge.allianz.com>
7. <http://worldviewofglobalwarming.org>
8. <http://globalwarming.com>
9. <http://www.uncep.org/climatechange>

## **HARD CORE**

### **PAPER GIC 03: ADVANCED GIS AND GPS APPLICATIONS**

**Objective:** *Techniques of GIS methodology from data creation to fundamentals of GIS analysis are used for skill development for sustainable development. This is a practical course offering theme based, problem solving real time applications.*

**Manual Exercises:** Raster data encoding: point, run length, block, chain, quadtree, raster coding for point, line area and elevation data.

**Vector Data Encoding:** Topological and non-topological encoding principles, point, line, area and elevation coding, GRID and TIN principles.

**Mapematics:** Set theory and Boolean operations, local, neighborhood, regional operations of overlay analysis.

**Online (Computer) Exercises:** Data capture, transformation and thematic mapping, map scan registration and projection, feature creation (point, line and area), coverage editing, topology, attribute data editing and integration, class interval selection, thematic mapping and output.

**Ground Truth Support:** Ground verification, use of GPS for sitting and routing, GPS with field data attributes.

#### **Textbooks**

1. Heywood *et al.* 2002. An Introduction to Geographical Information Systems. Addison Wesley Longman. Second Edition
2. Ghosh, A. and G. Rushton (1987). Spatial analysis and Location-Allocation Models, van Nostrand Reinhold Company, New York..

#### **References**

1. Tomlin, C.D. (1990). Geographic Information Systems and Cartographic Modelling. Prentice Hall, Englewood Cliff, New Jersey
2. Paul A. Longley, Michael F. Goodchild, David J. Maguire and David W. Rhind. (2001)Geographic Information Systems and Science, New York, NY: John Wiley & Sons, Inc.
3. Clarke, C., K., Parks., O., B., Crane., P., M. (eds.) Geographic Information Systems and Environmental Modeling. Prentice Hall, Upper Saddle River, New Jersey.

#### **Web Resources**

1. [www.amonline.net.au/centres/cbcr/](http://www.amonline.net.au/centres/cbcr/)
2. [http://www.csiss.org/aboutus/presentations/files/goodchild\\_gismodeling\\_sept03.pdf](http://www.csiss.org/aboutus/presentations/files/goodchild_gismodeling_sept03.pdf)

## SOFT CORE

### PAPER GIC 11: NATURAL RESOURCES MANAGEMENT AND CONSERVATION

**Objectives:** *This course addresses natural resources and problems associated with the usage of natural resources and the techniques available to evaluate, develop, manage and conserve natural resources.*

**Introduction to Resources:** Concepts, classification and appraisal- Natural resources – natural resource economics - management of natural resources: government–other agencies

**Resource Assessment:** Land evaluation methods- land classification methods-soil and water conservation- land use and Land cover mapping- land use planning and development-Case studies (at least 3).

**Resource Assessment:** Water resource assessment- watershed analysis and management- coastal and ocean resources and management- fisheries management-Case studies (at least 3).

**Risk Assessment:** Wildlife, forest, recreational, agricultural and rangeland assessment - Ecological Risk Assessments (ERA)- Natural Resource Damage Assessments (NRDA)– Case studies (at least 3)

#### Textbooks

1. Mitchell, Bruce 2001: **Resources and Environmental Management**, Pearson Education Canada, Toronto.
2. Burrough, P.A. 1986: **Principles of Geographical Information Systems for Land Resource Assessment**, Clarendon Press, Oxford, New York.
3. Chiras, D.D., O.S. Owen and J.P. Reginold 2004: **Natural resources conservation: Management for a Sustainable Future**, Prentice Hall, New York.
4. Holechek, J. L., R. A. Cole, J. T. Fisher, and R. Valdez 2003: **Natural Resources: Ecology, Economics and Policy** (2<sup>nd</sup> Edition), Prentice Hall Education, New Delhi.
5. Alexander, Mike 2005: **The CMS Guide to Management Planning**, Conservation Management System Consortium, Talgarth, Wales, UK.

#### References

1. Colin W. Mitchell 1991: **Land Evaluation**, Longman Scientific and Technical with John Wiley, New York.
2. Knight, Richard L., and Sarah F. Bates 1995: **A New Century for Natural Resource Management**, Island Press, New York.
3. Lillesand, T.W. and R.W. Keifer 2000: **Introduction to Remote Sensing and Image Interpretation**, John Wiley, New York.

#### Web Resources

1. <http://www.colorado.edu/geography/virtdept/resources/educatio/courses/courses.htm>
2. <http://leafsociety.in/?gclid=CKPLuomO-54CFYswpAodhxQ48g>
3. <http://www.cmsconsortium.org/index.html?gclid=COyTu6eO-54CFYIvpAodJQ4uIw>
4. <http://www.esdm.co.uk/Portals/0/cms/CMS%20Plan%20Guide%202005.pdf>
5. <http://www.esdm.co.uk/downloads/CMS.asp>
6. <http://www.nrcs.usda.gov/Feature/backyard/>

## SOFT CORE

### PAPER GIC 12: DEVELOPING SUSTAINABILITY RESEARCH

**Objective:** *Students of GIS for Sustainable Development, in the context of, say, urban environment or resources management, needs to understand the research process which contributes to an informed critique of their fields of study and research. This self-study elective is not intended to give training in research techniques but rather to make students aware of a broad sweep of investigative analytical stages and techniques. This course is designed to introduce students to the principles, frameworks, and tools of sustainability in several modes.*

**Sustainability Frameworks and Systems:** Sustainability and Sustainable Frameworks; *Design is the Problem* (a class discussion); Exercise: Map any system, Field Trip: local garbage dump, recycling centre, or a waste (water, solid) processing plant to gain insights on sustainability question in the development contexts.

**Resources Use:** Co-creating new social compact; stakeholder needs interviews and analysis in the context of sustainability at the individual, family, community and area levels; Leading change through sustainability; Exercise: Further observations and field work in rural and urban communities (2 villages nearby and 2 urban neighbourhoods with typical urban problems).

**Making the case for sustainability:** Making the case internally: Real-World experiences; Making the case externally: Real-World experiences; Making the case externally: Building partnerships for sustainable development; Exercise: Class discussion on ‘Concept Generation, Brainstorming and Selection of strategies from the exercise’; Frameworks and approaches for gender matrix and stakeholder analysis.

**Sustainability in a Greater Context:** Class discussion of ‘Lessons Learned’, from the exercises and case studies; Skills assessment: Critical analysis skills, research skills, collaboration skills, discipline specific techniques skills; Understanding sustainability, meaning and value creation, creativity and critical thinking skills; Oral, written and visual communication skills.

#### Textbooks

1. Shedroff, N. 2009: **Design is the Problem**, Rosenfeld Media, New York.

#### References

1. Doppelt, R. 2003: **Leading Change Towards Sustainability**, Greenleaf Publications, New York.
2. Hawken, P., A. Lovins and H. Lovins 2008: **Natural Capitalism**, Back Bay Books, New York.

#### Web Resources

1. [www.biothinking.com/btintro.htm](http://www.biothinking.com/btintro.htm)
2. [www.theatlantic.com/doc/199810/environment/2](http://www.theatlantic.com/doc/199810/environment/2)
3. [www.svtconsulting.com/pdfs/SROI\\_Analysis\\_1%5B1%5D.0.pdf](http://www.svtconsulting.com/pdfs/SROI_Analysis_1%5B1%5D.0.pdf)
4. [www.future500.org/case\\_03.php/mts.sustainableproducts.com/standards.htm](http://www.future500.org/case_03.php/mts.sustainableproducts.com/standards.htm)
5. [www.greenflyonline.org](http://www.greenflyonline.org)
6. [www.idsa.org/whatsnew/sections/ecosection/okala.html](http://www.idsa.org/whatsnew/sections/ecosection/okala.html)
7. [www.rosenfeldmedia.com/books/sustainable-design](http://www.rosenfeldmedia.com/books/sustainable-design)

## SOFT CORE

### PAPER GIC 13: ENVIRONMENTAL IMPACT ASSESSMENT

**Objective:** *Over the past three decades, environmental impact assessment has been an important foundation for public and private development and planning decisions. In development disputes, the interaction between communities and government and special interests and the private sector shape the fabric of neighbourhoods, cities and regions around the world. In this course, students obtain essential skills to critically read, review and conduct impact assessments to balance environmental, social and economic needs. Elements evaluated in actual impact statements include real estate, urban design, transportation, energy, natural resources, sustainable design, and social justice (all accessed through internet). New areas of concern will be incorporated as well, such as recovery and rebuilding following catastrophic events (tsunami, for example).*

**Overview of and Trends in EIS Processes, Procedures and Law:** Introduction, patterns and trends in Environmental Impact Assessment; Needs and emerging issues, processes and procedures for Environmental Assessment and Review, international initiatives, Law and regulatory framework for EIA.

**Technical Components of Environmental Impact Assessment:** Methods for Environmental Assessment and Review, UN procedures, Procedures adopted in Developed (USA and Canada) and Developing Countries (India, China); What is right and wrong with the EIA procedures adopted in India?

**Case Studies and EIA and Review:** for Water resources, wetlands and water quality; Land resources and terrestrial ecology; Infrastructure-Energy, waste management, hazardous materials; Green building initiatives; Traffic and transportation, air quality: mobile and stationary sources, noise, social and economic impacts and land use, neighbourhood and community impacts and environmental justice.

**Synthesis and Case Applications:** Actual impact statements of cases on: real estate, urban design, transportation, energy, natural resources, sustainable design, and social justice (all accessed through internet) and New areas of concern such as recovery and rebuilding in the aftermath of catastrophic events (2004-Tsunami).

#### Textbooks

1. Gilpin, A. 2000: **Environmental Impact Assessment: Cutting Edge for the 21st Century**, Cambridge University Press, Cambridge.
2. Marriot, Cram 2007: **Environmental Impact Assessment**, Academic Internet Publishers, London.
3. Newman, P. and Jeffrey Kenworthy 1999: **Sustainability and Cities. Overcoming Automobile Dependence**, Island Press, Washington, DC.

#### References

1. Wright, Richard T. 2005: **Environmental Science Toward a Sustainable Future**, Pearson/Prentice Hall, Upper Saddle River, New Jersey.
2. Ortolano, Leonard 1997: **Environmental Regulation and Impact Assessment**, John Wiley, New York.

#### Web Resources

1. NepaNet (regulations, guidance, statistics, etc.) <http://ceq.eh.doe.gov/nepa/nepanet.htm>
2. NYS Department of Environmental Conservation, environmental forms under SEQ: <http://www.dec.state.ny.us/permits/6191.html>
3. <http://www.nepa.gov/nepa/regs/nepa/nepaeqia.htm>
4. <http://www.epa.gov/region5/defs/html/nepa.htm>

## OPEN ELECTIVE

### RESEARCH METHODOLOGY FOR A SUSTAINABLE DEVELOPMENT EXPERT

**Objective:** *This elective is a simple way of reflecting upon the methodologies learnt in the earlier semester and getting to know some features of research process, ethics of research and styles of writing a proposal and a thesis, using their own time and pace of learning, by themselves. Internet sources could be usefully accessed to get materials (lecture notes, research papers and even power point presentations) for self learning.*

**Research Basics:** What research is and is not? Where research comes from? Research deliverables; Methodologies: Research process, Quantitative versus qualitative research and questions.

**Research Projects:** Research projects, research project pitfalls, quality research, sources of research problems, stating the research problem, hypotheses, delimitations, definitions, assumptions, research proposals, literature review and its pitfalls, processes and methodologies and steps in research process.

**Methodologies and Ethics of Research:** Common methodologies; Traditional criteria: Reliability, validity and objectivity; reformulating traditional criteria, validation of qualitative and quantitative research, credibility of qualitative research; Grounded theory; qualitative versus quantitative (positivist versus interpretive or critical); Research Ethics: Moral reasoning, Conflicts of interest; international research, authorship and investigating allegations of scientific misconduct.

**Writing a Proposal and a Thesis:** Why write a proposal and a thesis? What a proposal is not? What a thesis is not? Term work and project work proposals, PhD proposals and thesis, project work and thesis, advisor / supervisor, thesis committee, writing a report, common mistakes; and defending your research, thesis and what are examiners looking for?

#### Textbooks

1. Gilbert, N. 2001: **Researching Social Life**, Sage, London.

#### References

1. Flowerdew, R. and D. Martin 2005: **Methods in Human Geography: A Guide for students doing a research project**, Prentice Hall, New York.
2. Clifford, N.J. and G. Valentine 2003: **Key methods in Geography**, Sage, London.
3. Leedy, P. D. and J.E. Ormrod 2001: **Practical Research: Planning and Design**,

#### Web resources

1. <http://computer.org>
2. <http://www.acm.org>
3. <http://www.intute.ac.uk/socialsciences/>



# CHOICE BASED CREDIT SCHEME

For M.Sc., in GIS for Sustainable Development

Maharaja's College, Mysore 570 005

(Internship and Major Project Work)

For students admitted in 2013-14 & 2014-15

## FOURTH SEMESTER

**GID 01      INTERNSHIP**

**GID 02      PROJECT WORK (RESEARCH)**

- **GID 01: Internships** are done in a Government, research and implementation institution and / or a Private, Corporate institution of repute with specialization on the technologies of cartography, remote sensing, GIS and GPS, including Computer work in a prestigious lab. Internship must begin in the first week of February and continue till the end of March.
- **GID 02: Project work**, which is a major project of 3 full months or about 12 weeks, on a larger, manageable program of research, requiring a report of 80 pages including maps and diagrams and tables and text. Project work begins in the first week of April.
- **Seminars** have specific purposes. Students make power point presentations on their chosen theme of research for project work, outlining the background, rationale and objectives of research in the first seminar at the end of the 10<sup>th</sup> week of the semester (mid April), on their chosen methodology and the rationale behind them in the second seminar at the 14<sup>th</sup> week of the semester (mid-May) and on their final report at the end of the 20<sup>th</sup> week of the semester (end of June) under the guidance and supervision of their tutors/advisors/guides.
- **Field Work and Educational Tours** are compulsory activities the students must engage themselves in, in the First and Second Year of their course. The two activities give them the necessary exposure to the rigours of field work and the joy of educational tours.

The students are very intensively engaged by the course works of internship, project work, seminars, field work and educational tours, with constant monitoring and evaluation of the work carried out by the teachers. Third seminar where the students make their presentations on their draft final report of research work will be jointly evaluated by an internal and an external examiner / expert.

## OPEN ELECTIVE

### PAPER GID 03: ECOTOURISM

**Introduction:** What is Tourism? Definitions and Concepts, tourist destination, Services and industry, definition and historical development. General Tourism Trends., Visitor, Traveller, and Excursionist–Definition and differentiation. Tourism, Recreation and Leisure, their inter–relationships.

**Types and Forms of Tourism:** Inter–regional and intra–regional tourism, inbound and outbound tourism, domestic, international tourism. Forms of Tourism: religious, historical, social, adventure, health, business, conferences, conventions, incentives, sports and adventure, senior tourism, special interest tourism like culture or nature oriented, ethnic or ‘roots’ tourism.

**Ecotourism and Sustainable Tourism:** Concept of ecotourism and sustainable tourism and its Management. The impacts of ecotourism in an area (positive and negatives), some best practiced ecotourism sites in world. Rural and Urban Tourism.

#### **Emerging trends in tourism. Outbound and Inbound Tourism Trends.**

Determinants and Motivations of Tourism Demand, Measuring the Tourism Demand. Tourism Statistics: Types of Tourist Statistics and their sources and limitations, Domestic Tourism sources, methods and dimensions. International Tourism: sources, methods, dimension. Emerging trends, cause of variation of tourism trends. Some important outbound and inbound Tourism packages & Destinations

#### **Suggested Readings:**

- Mill and Morrison, (1992), The Tourism System: An Introductory Text , Prentice Hall.
- Cooper, Fletcher et al, (1993), Tourism Principles and Practices, Pitman.
- Burkart and Medlik, (1981), Tourism: Past, Present and Future ,Heinemann, ELBS.
- Mill, R.C., (1990), Tourism: The International Business, Prentice Hall, New Jersey.
- Bhatia, A.K., - International Tourism
- Seth, P.N., (1999) Successful Tourism Management (Vol 1 &2)
- Pearce, D.G. and Butler, R.W. Contemporary issues in tourism development, Routledge
- Hall, CM and Page, SJ. The Geography of Tourism and Recreation, Routledge.
- Dixit, M. Tourism Products, Royal Publishers.