

SACRED HEART COLLEGE (AUTONOMOUS)

Department of Environmental Studies

Post Graduate Programme

(Environmental Science)

Course plan

Academic Year 2016 – 17

Semester 2

Course Structure

Course Code	Title Of The Course	No. Hrs./Week	Credits	Total Hrs./Sem
16P2EVST05	Techniques In Research	4	4	90
16P2EVST06	Disaster Management	4	4	90
16P2EVST07	Earth And Atmosphere	4	4	90
16P2EVST08	Remote Sensing And GIS	4	4	90

COURSE PLAN

PROGRAMME	MSc ENVIRONMENTAL SCIENCE	SEMESTER	2
COURSE CODE AND TITLE	16P2EVST05 : TECHNIQUES IN RESEARCH	CREDIT	4
HOURS/WEEK	4	HOURS/SEM	90
FACULTY NAME	Dr. James T J and Dr. Anju S G		

COURSE OBJECTIVES

To know the different analytical techniques.
To understand and learn to apply different types of separation techniques
To learn and apply principle, construction and working of GC and HPLC.
To acquire an extended knowledge about chromatographic techniques used for separation of amino acids and able to apply.
To discuss the problem based on distribution coefficient and extraction techniques.

SESSION	TOPIC	LEARNING RESOURCES	VALUE ADDITIONS	REMARKS
Module I. Microscopy				
1	Differential Interference,	PPT/Lecture	video	
2	contrast microscopy,	PPT/Lecture		
3	Confocal microscope,	PPT/Lecture		
4	Electron microscope	PPT/Lecture		
5	TEM	PPT/Lecture		
6	TEM	PPT/Lecture		
7	SEM,	PPT/Lecture		
8	SEM	PPT/Lecture		
9	Scanning Tunnelling	PPT/Lecture		
10	Atomic Force Microscopes	PPT/Lecture		
Module II. Chromatography				
11	chromatography	PPT/Lecture	Video	

12	Thin layer chromatography	PPT/Lecture		
13	,Thin layer chromatography	PPT/Lecture		
14	Ion exchange chromatography.	PPT/Lecture		
15	Ion exchange chromatography.	PPT/Lecture		
16	Gel permeation chromatography	PPT/Lecture		
17	Gel permeation chromatography	PPT/Lecture		
18	Affinity chromatography	PPT/Lecture	Quiz	
19	Affinity chromatography	PPT/Lecture		
20	Gas chromatography	PPT/Lecture		
21	Gas chromatography	PPT/Lecture		
22	High pressure liquid chromatography	PPT/Lecture		
23	High pressure liquid chromatography	PPT/Lecture		
24	High pressure liquid chromatography	PPT/Lecture		
Module III. Electrophoresis				
25	Electrophoresis	PPT/Lecture		
26	Gel electrophoresis,	PPT/Lecture		
27	Polyacrylamide gel (PAGE)	PPT/Lecture		
28	Polyacrylamide gel (PAGE)	PPT/Lecture		
29	SDS and non SDS	PPT/Lecture		
30	SDS and non SDS	PPT/Lecture		
31	Agarose gel electrophoresis	PPT/Lecture		
32	Disc electrophoresis	PPT/Lecture		

33	Immuno-electrophoresis,	PPT/Lecture		
34	Immuno-electrophoresis,	PPT/Lecture		
35	Isoelectric focusing ()	PPT/Lecture		
36	Isoelectric focusing ()	PPT/Lecture		
Module IV. Colorimetry, Spectrophotometry, Spectroscopy				
37	Principle and applications of colorimetry and spectrophotometry and spectroscopy.,	PPT/Lecture		
38	Principle and applications of colorimetry and spectrophotometry and spectroscopy.,	PPT/Lecture		
39	Flame emission spectroscopy,	PPT/Lecture		
40	Flame emission spectroscopy,	PPT/Lecture		
41	Atomic absorption spectroscopy,	Lecture		
42	Atomic absorption spectroscopy,	PPT/Lecture		
43	Nuclear Magnetic Resonance spectroscopy (NMR)	PPT/Lecture		
44	Nuclear Magnetic Resonance spectroscopy (NMR),	PPT/Lecture		
45	Circular dichorism spectroscopy	PPT/Lecture		
46	Circular dichorism spectroscopy	PPT/Lecture		
47	ESR spectroscopy,	PPT/Lecture	Interactive session	
48	ESR spectroscopy,	PPT/Lecture		

49	Mass spectroscopy	PPT/Lecture		
50	Mass spectroscopy	PPT/Lecture	Video	
Module V. Centrifugation				
51	Basic principles of sedimentation	PPT/Lecture	Demo video	
52	Types of centrifuges	Lecture		
53	Analytical Centrifugation	Lecture	Group discussion	
54	Preparative centrifugation	PPT/Lecture		
55	Differential	Lecture		
56	Density gradient centrifugation	PPT/Lecture		
Module VI. Radioisotope				
57	Detection and Measurement	PPT/Lecture		
58	Dosimetry: Ionization chamber	PPT/Lecture		
59	GM counter	PPT/Lecture		
60	, Solid and liquid scintillation counters,	PPT/Lecture		
61	Autoradiography	PPT/Lecture		
62	liquid scintillation counters	PPT/Lecture		
63	Autoradiography	PPT/Lecture		
	Module VII. Nanotechnology			
64	Introduction to Nanobiology.	PPT/Lecture		
65	Nanosensors and Nanomedicines	PPT/Lecture		

66	Nanosensors and Nanomedicines	PPT/Lecture		
	Module VIII. Assays.,			
67	Radio Immuno Assay	PPT/Lecture		
68	Enzyme Linked ImmunoSorbant Assay (ELISA)	PPT/Lecture		
69	Enzyme Linked ImmunoSorbant Assay (ELISA) PPT/Lecture			
	Module IX. pH meter.			
70	Principle and working.	PPT/Lecture		
71	Types of pH meters	PPT/Lecture		
	Module X. Biological and Histological Techniques.			
72	Fixation, preparation of temporary and permanent slides,	PPT/Lecture		
73	Fixation, preparation of temporary and permanent slides,	PPT/Lecture		
74	Preparation of temporary and permanent slides,	PPT/Lecture	PRACTICLE	
75	Preparation of temporary and permanent slides,	PPT/Lecture		
76	Whole mounts, smears, squashes and sections.,	PPT/Lecture		
77	Specimen preparation for TEM	PPT/Lecture		
78	Specimen preparation for SEM	PPT/Lecture		

79	shadow casting, freeze fracturing, freeze etching, negativestaining	PPT/Lecture		
80	Microphotography. Cytochemical and histological methods-	PPT/Lecture		
81	Microphotography. Cytochemical and histological methods-	PPT/Lecture		
82	Cytochemical and histological methods-	PPT/Lecture		
83	Microtome techniques,	PPT/Lecture		
84	Cytochemical and histological methods-	PPT/Lecture		
85	Microtome techniques,	PPT/Lecture		
86	Cytochemical and histological methods-	PPT/Lecture		
87	Microtome techniques,	PPT/Lecture		
88	Fixation, staining.	PPT/Lecture		
89	Fixation, staining.	PPT/Lecture		
90	Cytochemistry of nucleic acids, detection of carbohydrates, proteins and lipids	PPT/Lecture		

INDIVIDUAL ASSIGNMENTS/SEMINAR – Details & Guidelines

	Date of completion	Topic of Assignment & Nature of assignment (Individual/Group – Written/Presentation – Graded or Non-graded etc)
1	15/11/2016	TEM, SEM,
2	4/12/2016	Ion exchange chromatography
3	20/12/2016	Gel permeation chromatography
4	4/01/2017	PAGE) – SDS and non SDS
5	4/02/2017	Flame emission spectroscopy,

GROUP ASSIGNMENTS/ACTIVITES – Details & Guidelines

	Date of completion	Topic of Assignment & Nature of assignment (Individual/Group – Written/Presentation – Graded or Non-graded etc)
1	2/2/2017	Microtome techniques, fixation, staining

References

1. Ackerman, E. 1962. Biophysical Science. Prentice Hall Inc. NJ, USA
2. Alonso, A., and Arrondo, J.L.R.2006. Advanced Techniques in Biophysics.Springer,UK
3. Arora, M. P. 2007.Biophysics. Himalaya Publishing House, New Delhi
4. Baker, E.J. and Silvertown R.E. 1978.Introduction to Medical Laboratory Technology.
5. ELBS. London,UK
6. Das, D. 1991. Biophysics and Biophysical Chemistry. Academic Publishers, Calcutta
7. Ernster, L. (Ed.). 1985. Bioenergetics. Elsevier, NewYork,USA.
8. Ghatak K.L. 2011.Techniques and Methods in Biology. PHI Learning Pvt. Ltd. New Delhi
9. Gupta A. 2009. Instrumentation and Bio-Analytical Techniques.PragatiPrakashan, Meerut.

COURSE PLAN

PROGRAMME	MSc ENVIRONMENTAL SCIENCE	SEMESTER	2
COURSE CODE AND TITLE	16P2EVST06 : Disaster Management	CREDIT	4
HOURS/WEEK	4	HOURS/SEM	90
FACULTY NAME	DR. Anju S G		

COURSE OBJECTIVES
To discuss the disaster management, its components (eg: definitions, terminologies, types, impacts), structure (phases, administrative and institutional) and significance.
To implement disaster management into public policy and planning based on the vulnerability of places and communities.
To develop emergency operations plan
To describe the stages of disaster recovery and associated problems vulnerable groups in disaster and post-disaster times.
To identify the stages of disaster recovery and associated problems vulnerable groups in disaster and post-disaster times.

SESSION	TOPIC	LEARNING RESOURCES	VALUE ADDITIONS	REMARKS
MODULE I (5hrs)				
Introduction				
1	Introduction to Disaster Management	PPT	video	
2	Introduction to Disaster Management	PPT/Lecture	video	
3	Introduction to Disaster Management	PPT/Lecture		
4	Introduction to Disaster Management	PPT/Lecture	e-resource	
5	Introduction to Disaster Management	PPT/Lecture		
MODULE II (10 hrs)				
Disaster Management Cycle				
6	Introduction, Disaster Management Cycle	PPT/Lecture		
7	Introduction, Disaster Management Cycle	PPT/Lecture		
8	Introduction, Disaster Management Cycle	PPT/Lecture		
9	Disaster Mitigation	PPT/Lecture		
10	Disaster Mitigation	PPT/Lecture	video	
11	Mitigation strategies	PPT/Lecture		

12	Mitigation strategies	PPT/Lecture		
13	Hazard identification and vulnerability analysis,	PPT/Lecture		
14	Hazard identification and vulnerability analysis,	PPT/Lecture		
15	Mitigation measures	PPT/Lecture		
MODULE III Disaster Preparedness, Response and Recovery (15hrs)				
13	Introduction to Disaster Preparedness	PPT/Lecture	DISCUSSION	
14	Introduction to Disaster Preparedness	PPT/Lecture		
15	Disaster Risk Reduction (DRR),	PPT/Lecture		
16	Disaster Risk Reduction (DRR),	PPT/Lecture		
17	The Emergency Operation Plan (EOP)	PPT/Lecture		
18	The Emergency Operation Plan (EOP)	PPT/Lecture		
19	Disaster Response	PPT/Lecture		
20	Disaster Response	PPT/Lecture		
21	Disaster Recovery	PPT/Lecture		
22	Disaster Recovery	PPT/Lecture		
23	Disaster Response and Recovery	PPT/Lecture		
24	Modern methods of disaster response	PPT/Lecture		
25	Modern methods of disaster response	PPT/Lecture		
26	Modern methods of disaster response	Lecture	Quiz	
27	The Recovery Plan.	PPT/Lecture		
MODULE IV Disaster Education and Public Awareness 30 hrs				
38	Community-based Initiatives,	PPT/Lecture		
39	Stakeholders' Roles and Responsibilities	PPT/Lecture		
40	Stakeholders' Roles and Responsibilities	PPT/Lecture		
41	Categories of stakeholders Government	PPT/Lecture		
42	Categories of stakeholders Government	PPT/Lecture		
43	Non-Government Organisations (NGOs),	Lecture	Interactive session	
44	Non-Government Organisations (NGOs),	PPT/Lecture		
45	Regional and International Organizations	PPT/Lecture		
46	Regional and International Organizations	PPT/Lecture		
47	Donor Agencies, Island Councils	PPT/Lecture		
48	Donor Agencies, Island Councils	PPT/Lecture	Videos	
49	Local Government, Community Workers,	PPT/Lecture		
50	Local Government, Community Workers,	PPT/Lecture		
51	National and Local Disaster Managers	PPT/Lecture		
52	National and Local Disaster Managers	PPT/Lecture		
53	Trainers, Policy Makers and Grass-roots people	PPT/Lecture		

54	Advantages and Disadvantages of the Community-Based Approach,	PPT/Lecture		
55	Advantages and Disadvantages of the Community-Based Approach	PPT/Lecture		
56	Duties of Response Personnel	PPT/Lecture		
60	Duties of Response Personnel	PPT/Lecture		
61	Pre-Disaster Mitigation Plan	PPT/Lecture		
62	Pre-Disaster Mitigation Plan	PPT/Lecture	Videos	
63	Hazardous Materials	PPT/Lecture		
64	Hazardous Materials	PPT/Lecture		
65	Ways of storing hazardous material	PPT/Lecture		
66	Ways of storing hazardous materials	PPT/Lecture	Interactive session	
67	Safely handling hazardous materials	PPT/Lecture		
68	Safely handling hazardous materials	PPT/Lecture		
69	Opportunities	PPT/Lecture		
70	Opportunities	PPT/Lecture		
71	Regional planning for hazard management	PPT/Lecture	Videos	
72	Regional planning for hazard management	PPT/Lecture		
73	Revision	PPT/Lecture		
74	Revision	PPT/Lecture		
Module V				
The Role of Technology in Disaster Management 30 hrs				
58	Geographic Information Systems (GIS)	PPT/Lecture		
59	Geographic Information Systems (GIS)	PPT/Lecture		
60	Disaster Management	PPT/Lecture		
61	Disaster Management	PPT/Lecture		
62	Remote Sensing and Disaster Management	PPT/Lecture		
63	Remote Sensing and Disaster Management	PPT/Lecture		
64	The Role of Media in Disaster Management	PPT/Lecture		
65	The Role of Media in Disaster Management	PPT/Lecture		
66	Physical impacts of Disasters	PPT/Lecture		
67	Physical impacts of Disasters	PPT/Lecture		
68	Socio-economic Impacts of Disasters	PPT/Lecture		
69	Socio-economic Impacts of Disasters	PPT/Lecture		
70	Disaster Associated Health Issues	PPT/Lecture		
71	Disaster Associated Health Issues	PPT/Lecture		
72	Emergency Health Services in Disasters	PPT/Lecture		
73	Emergency Health Services in Disasters	PPT/Lecture		
74	Infrastructure and procedures in accessing emergency situations	PPT/Lecture		

75	Infrastructure and procedures in accessing emergency situations	PPT/Lecture		
76	Infrastructure and procedures in accessing emergency situations	PPT/Lecture	Q&A	
77	Communicable diseases common in disaster situations	PPT/Lecture		
78	Communicable diseases common in disaster situations	PPT/Lecture		
79	Monitoring and Evaluation of Communicable Diseases	PPT/Lecture		
80	Monitoring of Communicable Diseases	PPT/Lecture		
81	Evaluation of Communicable Diseases	PPT/Lecture		
82	Evaluation of Communicable Diseases	PPT/Lecture		
83	Control, Programme Disaster and Development	PPT/Lecture		
84	Control, Programme Disaster and Development	PPT/Lecture		
85	The impact of disasters on development programmes	PPT/Lecture		
86	The impact of disasters on development programmes	PPT/Lecture		
87	The impact of disasters on development programmes	PPT/Lecture		
88	Vulnerabilities caused by development	PPT/Lecture		
89	Vulnerabilities caused by development	PPT/Lecture		
90	Revision	PPT/Lecture		
91	Revision	PPT/Lecture		

INDIVIDUAL ASSIGNMENTS/SEMINAR – Details & Guidelines

	Date of completion	Topic of Assignment & Nature of assignment (Individual/Group – Written/Presentation – Graded or Non-graded etc)
1	09/11/2016	CASE STUDIES
2	19/12/2016	Non-Government Organisations (NGOs),Regional and International Organizations
3	15/01/2017	Disaster preparedness

Students were told to take different case studies, Non-Government Organisations (NGOs),Regional and International Organizations

GROUP ASSIGNMENTS/ACTIVITIES – Details & Guidelines

	Date of completion	Topic of Assignment & Nature of assignment (Individual/Group – Written/Presentation – Graded or Non-graded etc)
1	2/12/2016	An awareness video regarding DM

References

1. Maxx Dilley (2005) Disaster Hotspots Nambodripad P(2008)Disasters and Hazard Mangement. Rajadhani Printers, Delhi.
2. Sharma R.K and Gagandeep, Sharma (2005) Natural Disaster. , APH Publishing Corporation, New Delhi.
3. Srinivas, H. (2005) Disasters: a quick FAQ. Accessed on 24/01/08 at:http://www.gdrc.org/uem/disasters/1-what_is.html
4. Sumit Malhotra,(2005) Natural Disaster Management. Aavishkas Publishing, Jaipur William J Petals et al.(1982)Natural Hazard Risk Assessment and Public Policy, Springer-verlag ,New York

COURSE PLAN

PROGRAMME	MSc ENVIRONMENTAL SCIENCE	SEMESTER	2
COURSE CODE AND TITLE	16P2EVST07 : EARTH AND ATMOSPHERE	CREDIT	4
HOURS/WEEK	4	HOURS/SEM	90
FACULTY NAME	DR. REMYA.R		

COURSE OBJECTIVES
To discuss the principle and scope of Environmental Science
To describe the concept of life and life supporting systems
To explain the various components of Physical Environment and geomorphological processes
To examine the effect of climate change on ecosystems and human welfare
To discuss the climatic regions of India with special reference to tropical monsoon climate
To demonstrate the use of soil survey, aerial photos, topographic maps and other resource data in landscape management
To assess the various impacts of invasive species on environment

SESSION	TOPIC	LEARNING RESOURCES	VALUE ADDITIONS	REMARKS
MODULE I : Introduction to Environmental Science				
1	Definition, Principle and Scope of environmental Science	PPT	video	
2	Definition, Principle and Scope of environmental Science	PPT/Lecture		
3	Definition, Principle and Scope of environmental Science	PPT/Lecture		
4	Environmental Science and its relation to other sciences	PPT/Lecture	e-resource	
5	Environmental Science and its relation to other sciences	PPT/Lecture		
MODULE II : Earth System and Biosphere				
6	Concept of life	PPT/Lecture		
7	Life supporting systems	Lecture		
8	Origin of earth	Lecture	Quiz	
9	Structure of earth	Lecture		
10	Planetary differentiation	Lecture		
11	Formation of core, mantle, crust	PPT/Lecture		
12	Formation of atmosphere and hydrosphere	PPT/Lecture		

MODULE III : The Physical Environment				
13	Lithosphere - Weathering and soil formation	PPT/Lecture		
14	Soil colloids, adsorption and exchange of anions and cations,	PPT/Lecture		
15	Role of microbes in soil	PPT/Lecture		
16	Types of soil	Lecture	Quiz	
17	Soil profile	PPT/Lecture		
18	Classification of rocks	PPT/Lecture		
19	Folds, faults and dykes	PPT/Lecture		
20	Folds, faults and dykes	PPT/Lecture		
21	Geological formations and their environmental significance	PPT/Lecture		
22	Geomorphological processes-plate tectonics, sea floor spreading, mountain building	PPT/Lecture		
23	Evolution of continents and structural deformation	PPT/Lecture		
24	Evolution of continents and structural deformation	PPT/Lecture		
25	Atmosphere -Physico-chemical characteristics, divisions	Lecture	Q & Ans Session	
26	Composition and significance of atmospheric components	PPT/Lecture		
27	Composition and significance of atmospheric components	PPT/Lecture		
28	Hydrosphere -Visible and invisible hydrosphere	PPT/Lecture		
29	Range of aquatic habitats	PPT/Lecture		
30	Water cycles between earth and the atmosphere	PPT/Lecture		
31	Water cycles between earth and the atmosphere	PPT/Lecture	Exhibition of charts, models	
32	Global water balance, ice sheets	PPT/Lecture		
33	Origin and composition of sea water	PPT/Lecture		
34	Sea level changes	PPT/Lecture		
35	River basins and watershed	PPT/Lecture		
36	Physico-chemical characteristics of water-	PPT/Lecture		
37	Influence of pH, Turbidity and light on aquatic life	PPT/Lecture		
MODULE IV : Weather and Climate				
38	Definitions and scope of climatology			
39	Weather and climate	PPT/Lecture		
40	Components of climate system	Lecture		
41	Earth's thermal environment	PPT/Lecture		
42	Earth intercepts solar radiation	PPT/Lecture		

43	Seasonal variation in intercepted solar radiation, air temperature in relation to altitude	PPT/Lecture	Interactive session	
44	Global circulation of air masses, wind and earth's rotation on ocean currents	PPT/Lecture		
45	Global circulation of air masses, wind and earth's rotation on ocean currents	PPT/Lecture		
46	Influence of temperature on moisture content of air	PPT/Lecture		
47	Global pattern of precipitation	PPT/Lecture		
48	Influence of topography on regional pattern of precipitation	PPT/Lecture		
49	Classification of climate	PPT/Lecture		
50	Koepfen's classification	PPT/Lecture	Video	
51	Thornthwaite's scheme	PPT/Lecture		
52	Climatic types and zones	PPT/Lecture		
53	Global climatic phenomena-El Nino and La Nina,	PPT/Lecture		
54	Causes and factors of climate change	PPT/Lecture		
55	Effect of climate change on ecosystems and human welfare.	PPT/Lecture		
56	Organisms and microclimate	PPT/Lecture		
57	Organisms and microclimate	PPT/Lecture		
MODULE V : Climate of India				
58	Climatic regions of India	Lecture		
59	Tropical monsoon climate-onset, rain bearing systems	PPT/Lecture		
60	Break in the monsoon, retreat of monsoon	PPT/Lecture		
61	Monsoon in Kerala	PPT/Lecture		
62	Oceanic and continental influence	PPT/Lecture	Debate	
MODULE VI : Landscape Ecology				
63	Land and Landscape processes	Lecture	Demo video	
64	Hierarchy: ecosystems to land units;	Lecture		
65	Ecological principles at work with Landscapes	Lecture	Group discussion	
66	Ecological principles at work with Landscapes	Lecture		
67	Human dimensions and Land Use in agro-ecosystems	PPT/Lecture		
68	Urban ecosystems, rangelands, riparian and wetland systems	PPT/Lecture		
69	Coastal and estuarine systems	PPT/Lecture		
70	Coastal and estuarine systems	PPT/Lecture		

71	Concept of ecological land degradation desertification	PPT/Lecture		
72	Water logging	PPT/Lecture	Group discussion	
73	Salinisation and soil erosion.	PPT/Lecture		
73	Salinisation and soil erosion.	PPT/Lecture		
74	Ecological assessment of landscape for vegetation and habitats.	PPT/Lecture		
75	Integrated analytical techniques- land suitability analysis and carrying capacity studies;	PPT/Lecture		
76	Use of soil survey, aerial photos, topographic maps and other resource data in landscape management	PPT/Lecture		
	Use of soil survey, aerial photos, topographic maps and other resource data in landscape management	PPT/Lecture		
77	Case studies on corridor selection problems	PPT/Lecture		
MODULE VII				
Biological Invasions				
79	Introduction Elton's hypothesis	PPT/Lecture		
80	Invasion patterns and process biological attributes for invasion:	PPT/Lecture		
81	Reproductive potential, Allelopathy Phenotypic plasticity, fitness to the new environment	PPT/Lecture		
82	Hypotheses for invasion success: Natural enemy hypothesis evolution of invasiveness hypothesis,	PPT/Lecture		
83	Hypotheses for invasion success: empty niche hypothesis, novel weapon hypothesis,	PPT/Lecture		
84	Hypotheses for invasion success: turbulence hypothesis and Propagule pressure hypothesis	PPT/Lecture		
85	Invasive alien species of India (plants and animals)	PPT/Lecture	Interaction	
86	Databases of biological invasions.	PPT/Lecture		
87	Impacts and management of invasions: impacts exotics on biodiversity	PPT/Lecture		
88	Impacts and management of invasions: productivity, nutrient cycling	PPT/Lecture		
89	Management: Bio-control programmes,	PPT/Lecture		
90	Management: mechanical and chemical control	PPT/Lecture	Debate	
91	Management: Positive utilization quarantine and EIA of biological invasion	PPT/Lecture		

92	Positive utilization quarantine and EIA of biological invasion	PPT/Lecture	Group discussion	
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INDIVIDUAL ASSIGNMENTS/SEMINAR – Details & Guidelines

	Date of completion	Topic of Assignment & Nature of assignment (Individual/Group – Written/Presentation – Graded or Non-graded etc)
1	4/12/2016	Physico-chemical characteristics of water- diffusion of oxygen from the atmosphere to surface waters
2	20/12/2016	Different aquatic habitats and the influence of pH, turbidity and light on aquatic life-
3	4/01/2017	Different processes of energy transfer in the atmosphere and the Earth's surface (with diagrams)
4	19/02/2017	Different conditions of atmospheric stability and the relationship of stability and daily weather

GROUP ASSIGNMENTS/ACTIVITES – Details & Guidelines

	Date of completion	Topic of Assignment & Nature of assignment (Individual/Group – Written/Presentation – Graded or Non-graded etc)	Course Outcome
1	2/02/2017	Causes and factors of climate change. Effect of climate change on ecosystems and human welfare	

References

- Chapman, G.P. 1977. Human and Environmental Systems: A Geographer's Appraisal. Academic Press, London
- Geomorphological Processes 1st Edition Studies in Physical Geography, Authors: E Derbyshire K. J. Gregory J. R. Hails Editors: K. J. Gregory, e Book ISBN: 9781483192406, Elsevier Publishers.
- Climatology : (An Atmospheric Science: NHBS - John Hidore, John Oliver, Mary Snow, Richard Snow) Pearson Education
- Odum E P (1971), Fundamentals of Ecology, W B Saunders Company, Philadelphia
- **Web resource references:**
- http://cse.ucpress.edu/200_general_topic

COURSE PLAN

PROGRAMME	MSc ENVIRONMENTAL SCIENCE	SEMESTER	2
COURSE CODE AND TITLE	16P2EVST08 : REMOTE SENSING AND GIS	CREDIT	4
HOURS/WEEK	4	HOURS/SEM	90
FACULTY NAME	Dr. Anjana N S		

COURSE OBJECTIVES

To recognize and explain at a basic level fundamental physical principle of remote sensing
To describe main Remote Sensing Systems and programs (sensors, platforms, etc.) and assess its potential to spatial analysis
To recognize which remote sensing techniques suite their specific needs.
To find the information content of remotely sensed data and how to retrieve the information.
To explain fundamental concepts and practices of GIS and advances in Geospatial Information Science and Technology (GIS&T).
Recognize and explain basic computational properties of remote sensing data acquisition, storage, and processing.
To demonstrate competency with the ArcMap software to enhance and interpret data
To apply GIS analysis to address geospatial problems and/or research questions.
To develop a strategy to implement an effective GIS
To develop critical thinking skills in solving geospatial problems

Session	Topic	Learning Recourses	Value Additions	Remarks
Module I : Fundamentals of Environmental Appraisal Tools				
1	Scales- Definition,)	Learning Activity using a map, Power point presentation	Concept maps (Graphic representation of students' knowledge or how they organize and represent knowledge)	
2	Types of scales	PPT		
3	Representation and conversion (introduction only)	PPT		
4	Maps- Definition and classification, -	Learning Activity using a map, Visuals and Outdoor activity	Computer based Experimental leaning activities	
5	Map conversions	PPT		
6	Grids, Contours,	PPT		
7	Isobars	PPT		
8	Measurements of area and distance	PPT		
9	Square and Planimeter Methods	PPT		

10	Topographical Maps, Cadastral maps, Toposheets (Interpretation and studies)	PowerPoint presentation, Learning Activity using a map	Class room assignments and resulting students work	
11	Surveying: Definition and classification,	Demonstration, and Outdoor activity	Assessing outdoor group work	
12	Survey instruments	PPT		
13	Introduction to Compass,	PPT		
14	Theodolite,	PPT		
15	Clinometer,	PPT		
16	Abeny Level,	PPT		
17	Cartographic equipment,	PPT		
18	Preparation of maps	PPT	Video	
19	Basics of cartography	PPT		
20	Photogrammetry	PPT		
21	Definition and types	PPT		
22	Aerial and terrestrial photographs	Group discussion by comparing different aerial and terrestrial photographs	Video	

23	Aerial and terrestrial photographs	PPT		
24	Terrestrial photographs	PPT		
25	Method and equipment used in Aerial Photo Interpretation (Introduction only)	PPT	Group seminar presentation	
Module II : Remote Sensing: Introduction				
26	Definition, History and Scope of Remote Sensing	Audiovisuals and PowerPoint presentation	Seminar presentation	
27	Principles of Remote Sensing	Audiovisuals and PowerPoint presentation	Class room assignments and resulting students work	
28	Concepts of Remote Sensing			
29	Indian Remote sensing Programs	Students presentation and group discussion	Conducting quiz	
30	Indian Remote sensing Programs	PPT		
31	Indian Remote sensing Programs	Students presentation and group discussion	Conducting quiz	
Module III: Remote Sensing: Application				

32	Electromagnetic spectrum -	Demonstration and Group discussion	Outdoor group activities	
33	Spectral characteristics of surface features of rocks	PPT		
34	Spectral characteristics of surface features of soils,	PPT		
35	Spectral characteristics of surface features of water).	PPT		
36	Spectral characteristics of surface features of vegetation	PPT		
37	Sensors and Platforms	PPT		
38	Types of platforms,	Student presentation, audiovisuals, and collaborating	Using concept test (short, informal, targeted tests)	
39	scanners	PPT		
40	data products Image processing	PPT	Interactive session	
41	Photo-interpretation	PPT		
42	Photogrammetry -	Lecturing and group discussion	Assignment -1	

43	Applications of remote Sensing	Discussion of case studies, Student presentation	Assignment-2	
44	Space Imaging Landsat,	Student presentation and discussion	. Group seminar presentation	
45	SPOT,	PPT		
46	IRS	PPT		
47	NOAA	PPT		
48	Seasat	PPT	Interactive session	
49	ERS	PPT		
50	RADARSAT	PPT	Video	
51	INSAT.	PPT		
52	Digital Image Processing Principles	PPT	Video	
53	Image Rectification and restoration,	Class room activities, demonstration	Assignment-3	
54	Image enhancement and Mosaicing.	PPT		
55	Image classification, Supervised, Unsupervised	Class room activities, demonstration	Computer based experimental leaning activity	

56	Ground truth data and training set manipulation,	PPT		
57	Classification accuracy assessment.	PPT		
Module IV: Geographical Information System (GIS)				
58	History and Development	Lecturing And discussion	Conducting quiz	
59	Concepts, Components			
60	Organization of GIS			
61	Introduction to mapping and GIS	Demonstration and explanation	Group seminar presentation	
62	Introduction to mapping and GIS	Demonstration and explanation	Group seminar presentation	
Module V: Geographical Information System (GIS)				
63	Fundamentals of computing GIS	Lecturing, Demonstration and explanation	Assignment-4	
	Theory of GIS	PPT	Video	
64	Spatial Data concepts			
65	Processing and visualization,	Demonstration and explanation		
66	Information analysis	PPT	Video	
67	Information analysis	PPT		

68	Information analysis	PPT		
69	Information analysis	PPT		
70	Information analysis	PPT		
71	Digital data processing	PPT	Interactive session	
72	Digital data processing	PPT		
73	Digital data processing	PPT		
74	Digital data processing	PPT		
75	Digital data processing	PPT		
76	Raster and vector data	PPT		
77	Raster and vector data	PPT		
78	Raster and vector data	Demonstration and explanation	Assignment-5	
79	Map projection	Class room activity, demonstration	Assignment-6	
80	Map projection	PPT		
81	Map projection	PPT		
82	Map projection	PPT		
83	Software used in GIS Surveying:	Student presentation and discussion		
84	Leveling,	PPT		

85	Triangulation, y	PPT		
86	Geodetic surge	PPT	Interactive session	
87	Global Positioning System (GPS)	PPT		
88	Basic principles	PPT		
89	Applications to environmental studies.	PPT		
90	Applications to environmental studies.	PPT		
91	Applications to environmental studies.	Outdoor activity and demonstration	Assignment-7	

GROUP ASSIGNMENTS/ACTIVITES – Details & Guidelines

	Date of completion	Topic of Assignment & Nature of assignment (Individual/Group – Written/Presentation – Graded or Non-graded etc)
1	14/11/2016	Application of high-resolution thermal infrared remote sensing and GIS to assess the urban heat island effect
2	7/12/2016	Applications of Remote Sensing and GIS Technologies in Groundwater Hydrology: Past, Present and Future
3	20/12/2016	Satellite Remote Sensing and GIS Applications in Agricultural Meteorology
4	11/01/2017	Application of remote sensing and GIS for the demarcation of groundwater potential zones of a river basin in Kerala, southwest coast of India
5	01/02/2017	Advances In Remote Sensing And GIS Analysis
6	27/02/2017	Remote Sensing and Gis Applications for Mapping and Spatial Modelling of Invasive Species
7	01/03/2017	Application of remote sensing and geographic information systems to forest fire hazard mapping

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