

SACRED HEART COLLEGE (AUTONOMOUS)

Department of Environmental Studies

Post Graduate Programme

(Environmental Science)

Course plan

Academic Year 2016 - 17

Semester 1

Course Code	Title Of The Course	No. Hrs./Week	Credits	Total Hrs./Sem
16P1EVST01	Fundamentals Of Environmental Studies	5	4	90
16P1EVST02	Research Methodology I	4	4	90
16P1EVST03	Research Methodology II	4	4	90
16P1EVST04	Information Technology Applications In Research	4	5	90

COURSE PLAN (COURSE 1)

PROGRAMME	MSc ENVIRONMENTAL SCIENCE	SEMESTER	1
COURSE CODE AND TITLE	16P1EVST01 : FUNDAMENTALS OF ENVIRONMENTAL STUDIES	CREDIT	4
HOURS/WEEK	5	HOURS/SEM	90
FACULTY NAME	Dr. Anjana N S		

COURSE OBJECTIVES

To interpret core concepts and methods from ecological sciences and their application in environmental problem-solving.

To describe the transnational character of environmental problems and ways of addressing them.

To analyse the primary environmental problems (e.g., invasive species, climate change, small populations, pollution) and the science behind those problems.

To develop specific skills necessary to achieve understanding of and solutions to environmental problems, including those necessary for assessment of environmental impact of human activity, and for monitoring of the health of environmental systems.

To develop knowledge and skills needed to effectively manage human resources

To develop skills required to research and analyze environmental issues scientifically and learn how to use those skills in situations that may involve environmental problems and/or issues.

Session	Topic	Learning Resources	Value Additions	Remarks
Module I				
Ecology and Environment				
1	Physical Environment- biotic and abiotic interactions -	Class room, Lecture, PPT Discussion. Photos diagrams of working shown	Video	
2	Concept of Homeostasis			
3	Concept of habitats and niche,	Outdoor study (observation)	E-Resource	
4	resource partitioning,			
5	character displacement			
6	Cybernetic nature of ecosystem, stability through feedback control and through redundancy of components	Group Discussion videos of working shown	Exhibition of charts, models	
7	Resistance and resilience stability.	PPT		
8	Gaia hypothesis	PPT		
9	Concept of limiting factors- Liebig's law,	Class room, Lecture, PPT Discussion. Photos diagrams of working shown	Seminar	
10	Shelford's law.	PPT		

	Ecological indicators			
Module II Ecosystem - Structure and Function				
11	Landscapes, pathways in ecosystem	Class room, Lecture, PPT Discussion. Photos diagrams of working shown	<i>Seminar</i>	
12	energy in the environment- Laws of thermodynamics ,	Class room, Lecture, PPT Discussion. Photos diagrams of working shown		
13	energy flow in the ecosystem.	PPT		
14	Primary productivity, Biomass and productivity measurement	Lab analysis, Group Discussion videos of working shown	<i>Exhibition of charts, models</i>	
15	Food chain, food web, trophic levels.	Out door activity, making food chain and food web	<i>Group discussion</i>	
16	Ecological efficiencies	PPT		
17	Biogeochemical cycles- patterns and types (CNP).	PPT		
18	Tropical versus Temperate Ecology. -	Class room, Lecture, PPT Discussion. Photos diagrams of working shown	<i>Seminar</i>	
19	Ecological pyramids	Class room, Lecture, PPT	<i>Demo video</i>	

		Discussion. Photos diagrams of workingshown		
Module III Population Ecology				
20	Population group properties, density and indices of relative abundance, Concept of rate	Audiovisuals and PowerPoint presentation		
21	Natality and mortality. Population age structure,	Lecturing and PowerPoint presentation		
22	Growth forms and concept of carrying capacity	PPT		
23	Population fluctuations, density dependent and density independent controls.	Students presentation and group discussion	Exhibition of charts, models	
24	Life history strategies, r & k selection.	PPT		
25	Population structure, aggregation,	PPT		
26	Allee's principle, isolation, dispersal and territoriality	Demonstration and Group discussion, Lecturing		
27	Population	PPT		

	interactions- types, positive and negative,			
28	interspecific and intraspecific interactions.	Video		
29	Ecological and evolutionary effects of competition.	Student presentation, audiovisuals, and collaborating	Group discussio n	
30	Concept of metapopulation	PPT		
31	Levin's model of metapopulation.	PPT		
32	Comparison of Metapopulation and Logistic population model.	Lecturing and group discussion	Seminar	
33	Metapopulation structure	PPT		
Module IV Community Ecology				
34	Concept of community community structure and attributes, ecotone and edge effect	Class room, Lecture, PPT Discussion. Photos diagrams of working shown	Group discussio n	
35	Species diversity in community and it's measurement- Alpha diversity,	Student presentation and discussion	Demo video	
36	Simpson's diversity index,	PPT		
37	Shannon index,	PPT	Demo video	

38	Fisher's alpha, rarefaction	PPT		
39	Beta diversity-Sorensen's similarity index	Class room, Lecture, PPT Discussion. Photos diagrams of working shown	Group discussion	
40	Whittaker's index,	PPT		
41	Evenness, Gamma diversity	PPT		
42	Guild and its functioning in the community.	Class room, Lecture, PPT Discussion. Photos diagrams of working shown		
43	Drivers of species diversity loss and conservation	PPT		
Module V				
Resource Ecology and ecosystem monitoring				
44	Soil-soil formation,	Demonstration and Group discussion, Lecturing	<i>Exhibition of charts, models</i>	
45	physical and chemical properties of soil,	Demonstration and Group discussion, Lecturing		
46	Significance of soil fertility.	Demonstration and		

		Group discussion, Lecturing		
47	Mineral resources with reference to India.	Demonstration and Group discussion, Lecturing	<i>Exhibition of charts, models</i>	
48	Impact of mining on environment;	Student presentation and discussion	Group discussion	
49	Forest resources deforestation, forest scenario of India	PPT		
50	Wetlands and its importance,	PPT		
51	International initiatives for wetland conservation -	Student presentation and discussion	<i>Seminar</i>	
52	Ramsar sites.	Student presentation and discussion		
53	Sand mining and its impacts.	Student presentation and discussion	<i>Seminar</i>	
54	Wetland reclamation-causes and consequences.	Student presentation and discussion		
55	Depletion of resources and impacts on quality of life	Student presentation and discussion		
56	Energy use pattern in different parts of the world, recent issues in energy	Class room, Lecture, PPT Discussion	<i>Demo video</i>	

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57	production and utilization;	Class room, Lecture, PPT Discussion		
58	Energy audit,	Class room, Lecture, PPT Discussion	<i>Demo video</i>	
59	Green technology and sustainable development	Class room, Lecture, PPT Discussion		
60	Ecosystem monitoring- GIS, Physics of remote sensing, role of remote sensing in ecology, GPS and its application	Class room, Lecture, PPT Discussion	<i>Exhibition of charts, models</i>	
61	EIA- tools and techniques, Concept of Ecosystem Modelling.	Class room, Lecture, PPT Discussion	<i>Group discussion</i>	
Module VI				
Impacts on environment and ecological manoeuvre				
62	Session Topic: Environmental Pollution-types, causes and consequences.	Student presentation and discussion	<i>Group discussion</i>	
63	Concept of waste, types and sources of solid wastes including e-waste	PPT		

64	Environmental biotechnology and solid waste management-aerobic and anaerobic systems.	Class room, Lecture, PPT Discussion Student presentation and discussion	<i>Demo video</i>	
65	Concept of bioreactors in waste management	PPT		
66	Liquid wastes and sewage.	Class room, Lecture, PPT Discussion Student presentation and discussion	<i>Group discussion</i>	
67	Bioremediation-need and scope of bioremediation in cleaning up of environment	PPT		
68	Phytoremediation, bio-augmentation	Class room, Lecture, PPT Discussion	<i>Seminar</i>	
69	biofilms, biofilters, bioscrubbers and trickling filters	Student presentation and discussion	<i>Group discussion</i>	
70	Radiation Biology - natural and man-made sources of radioactive pollution;	Class room, Lecture, PPT Discussion	<i>Group discussion</i>	

71	Radioisotopes of ecological importance; effects of radioactive pollution	PPT	<i>Group discussion</i>	
72	Nuclear disasters (two case studies), Disposal of radioactive wastes.	Class room, Lecture, PPT Discussion Student presentation and discussion	<i>Group discussion</i>	
73	Toxicology- Principles, toxicants- types, dose and effects, toxicity of heavy metals	Class room, Lecture, PPT Discussion Student presentation and discussion	<i>Exhibition of charts, models</i>	
74	Global environmental problems and debates - past and present	Student presentation and discussion		
Module VII				
Conservational Ecology				
75	Principles and major approaches to conservation and environmental management.	Class room, Lecture, PPT Discussion		
76	Role of UN-conventions, protocols	PPT		
77	Climate change and the emerging discussions – mitigation and adaptation;	Class room, Lecture, PPT Discussion	<i>Group discussion</i>	

78	Role of UNFCC and IPCC	PPT		
79	Country specific laws- mention major environmental/conservation laws and rules in India-Wildlife Protection Act 1972 amended 1991,	Class room, Lecture, PPT Discussion		
80	Forest Conservation Act, 1980, Air (Prevention and Control of Pollution) Act 1981,	Class room, Lecture, PPT Discussion	Group discussion	
81	Water (Prevention and Control of Pollution) Act 1974, amended 1988,	PPT		
82	The Environment Seminar Protection Act, 1986 and Rules, 1991.	PPT	Group discussion	
83	The Biological Diversity Act 2002, Rules 2004.	Class room, Lecture, PPT Discussion		
84	Restoration Ecology- need and policies,	Class room, Lecture, PPT Discussion	Group discussion	
85	case studies and success stories - global and national;	PPT		

86	Participatory resource management,	PPT		
87	community reserves, sacred groves, biovillages.	PPT		
88	Role of Intergovernmental and Nongovernmental organizations in conservation-IUCN	PPT		
89	, WCMC, WRI,	Student presentation and discussion		
90	WWF, CI and Green Peace.	PPT		
91	National and Local NGOs	Class room, Lecture, PPT Discussion	Group discussion	

GROUP ASSIGNMENTS/ACTIVITES – Details & Guidelines

	Date of completion	Topic of Assignment & Nature of assignment (Individual/Group – Written/Presentation – Graded or Non-graded etc)
1	02/07/2016	Role of Intergovernmental and Nongovernmental organizations in conservation

References

1. Abbasi, S.A. and Ramasami, E.V.1998.Biotechnological Methods of Pollution Control. Oxford University Press, Hyderabad.
2. Arvind, K., and Pashupati, K,R. (2008), Environmental resource management: (critical issues) Astral International.
3. Benton, A.H. and Werner, W.E. 1976. Field Biology and Ecology. Tata McGraw Hill, New Delhi.
4. Biswas, A., and Cline, S.: Global warming: Impacts onWater and Food Security, Dehra dun, 1982.
5. Holling C.S. 1973. Resilience and stability of ecological systems. Annual Review of ecology and systematic 4: 1-23.

6. Boitani, L and T.K.Fuller.2000.Research Techniques in Animal Ecology. Columbia University Press, USA
7. Daniel,C.D. 2010.Environmental Science.(8thedn).Jones and Bartlett Publishers.
8. Dasman, R.F: (1972). Environmental conservation, New York, Wiley,
9. EmbardHaque C (2005) Mitigation of Natural Hazards and DisastersNatural

COURSE PLAN

PROGRAMME	MSc ENVIRONMENTAL SCIENCE	SEMESTER	1
COURSE CODE AND TITLE	16P1EVST02 : RESEARCH METHODOLOGY I	CREDIT	4
HOURS/WEEK	4	HOURS/SEM	90
FACULTY NAME	MS. RESHMI.A.N		

COURSE OBJECTIVES
To tabulate statistical information given in descriptive form.
To use graphical techniques and interpret
To compute various measures of central tendency, dispersion.
To compute correlation coefficient and Regression
To compute probability of various events based on Binomial Poisson and Normal Distribution
To do Large Sample Tests, Small Sample test , Chi square Test, Anova , Non Parameteric Test

SESSION	TOPIC	LEARNING RESOURCES	VALUE ADDITIONS	REMARKS
MODULE I : Basics of Biostatistics				
1	Introduction to statistics	PPT	video	
2	Collection of data, Types of data	PPT/Lecture		
3	Sampling methods	PPT/Lecture		
4	Classification and Tabulation	PPT/Lecture	e-resource	
5	Diagrammatic representation of data	PPT/Lecture		
6	Graphical Representation of data			

7	Parametric and Non parametric tests			
8	Bivariate and Multivariate Analysis			
MODULE II : Measures of Central Tendency				
9	Mean	PPT/Lecture		
10	Median	Lecture		
11	Mode	Lecture	Quiz	
12	Geometric mean and Harmonic mean, problems	Lecture		
MODULE III : Measures of Dispersion				
13	Absolute and relative measures of dispersion	PPT/Lecture		
14	Range, Quartile Deviation	PPT/Lecture		
15	Mean Deviation	PPT/Lecture		
16	Standard Deviation	Lecture	Quiz	
17	Standard Deviation	PPT/Lecture		
18	Properties, Problems	PPT/Lecture		
19	Folds, faults and dykes	PPT/Lecture		
20	Folds, faults and dykes	PPT/Lecture		
21	Skewness	PPT/Lecture		
22	Kurtosis	PPT/Lecture		
MODULE IV : Correlation Analysis				
38	Correlation			
39	Correlation Coefficient	PPT/Lecture		
40	Rank Correlation	Lecture		
41	Rank Correlation Coefficient	PPT/Lecture		
42	Problems	PPT/Lecture		
MODULE V : Regression Analysis				
58	Regression Equations	Lecture		

59	Regression Problems	PPT/Lecture		
60	Probit Analysis	PPT/Lecture		
61	Mathematical models in Biology	PPT/Lecture		
62	Length-Weight Relationship	PPT/Lecture		
63	VBG Model	PPT/Lecture		
MODULE VI : Theory of Probability				
64	Probability concepts, Random Experiment	Lecture	Demo video	
65	Sample Space, Events, Probability Measure	Lecture		
66	Classical definition of probability	Lecture	Group discussion	
67	Statistical Definition of probability	Lecture		
68	Axiomatic Definition Of probability	PPT/Lecture		
69	Addition Theorem	PPT/Lecture		
70	Conditional Probability	PPT/Lecture		
70	Independence of events	PPT/Lecture		
71	Multiplication Theorem	PPT/Lecture		
72	Random variable, Probability Distribution	PPT/Lecture	Group discussion	
73	Binomial ,poisson Distributions.	PPT/Lecture		
74	Normal Distribution	PPT/Lecture		
MODULE VII : Testing of Hypothesis				
79	Testing of Hypothesis introduction	PPT/Lecture		
80	Definitions	PPT/Lecture		
81	Large Sample Tests	PPT/Lecture		
82	Large Sample Tests	PPT/Lecture		
83	Chi –square Tests	PPT/Lecture		

84	Small Sample Tests	PPT/Lecture		
85	t test	PPT/Lecture		
86	Paired t test	PPT/Lecture		
87	F test	PPT/Lecture		
88	Anova one way	PPT/Lecture		
89	Anova one way	PPT/Lecture		
90	Non Parametric test : u -test	PPT/Lecture		
MODULE VIII : Vital Statistics				
91	Introduction, uses, records and system of classification	PPT/Lecture		
92	Sample Registration system, Sample Design	PPT/Lecture		
93	Survey of causes of death and age classification	PPT/Lecture		
94	Measures of vital Statistics and Measures of population	PPT/Lecture		
95	Mortality Rate, Fertility Rate, Life Tables	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	11/07/2016	Problems based on measures of central Tendency,Dispersion
2	04/08/2016	Problems Based on Correlation
3	23/08/2016	Problems based on Regression
4	12/09/2016	Problems based on Testing

References

- Bailey,N.T.J. 1994. Statistical Methods in Biology (3rdedn). Cambridge University Press.
- Chap T.Le.2003.Introductory Biostatistics. John Wiley &Sons, NJ, USA.

- Daniel, W.W. 2006. Biostatistics: A Foundation for Analysis in the Health Sciences (7th edn). John Wiley & Sons, New York.
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- Frank, Harry and Steven C. Althoen, 1995. Statistics: Concepts and Applications. Cambridge University Press
- Pagano, M and K.Gauvreau. 2000. Principles of Biostatistics. Brooks/Cole, CA, USA
- Prabhakara ,G.N. 2006.Biostatistics.Jaypee Bro. New Delhi
- Rajathi A. and P. Chandran, 2010. SPSS for You. MJP Publishers, Chennai.
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- Zar, Jerrold H. 2008. Biostatistical Analysis (3rdedn.). Pearson Education Inc., New Delhi.

COURSE PLAN

PROGRAMME	MSc ENVIRONMENTAL SCIENCE	SEMESTER	1
COURSE CODE AND TITLE	16P1EVST03 : RESEARCH METHODOLOGY II	CREDIT	4
HOURS/WEEK	4	HOURS/SEM	90
FACULTY NAME	DR. T J James and Dr Remya R		

COURSE OBJECTIVES

To explain some basic concepts of research and its methodologies

To identify appropriate research topics

To define appropriate research problem and parameters

To prepare a project proposal (to undertake a project)

To organize and conduct research (advanced project) in a more appropriate manner

To prepare a research report and thesis

To prepare a research proposal (for grant)

Session	Topic	Learning Resource	Value Addition	Remarks
Module I. Science and Life Sciences				
1	Basic concepts - Knowledge, Information and Data	PPT Discussion	e-resource	
2	Science, Pseudoscience	PPT Discussion	e-resource	
3	Life Science - Definition, Laws, Characteristics.	PPT Discussion	e-resource	
4	Scientific temper	PPT Discussion	e-resource	
5	Empiricism	PPT Discussion	e-resource	
6	Rationalism	PPT Discussion	e-resource	
7	Units of measurements.	PPT Discussion	e-resource	
Module II. Concepts of Research				
8	Basic concepts of research	PPT Discussion Seminar		
9	Meaning, Objectives, Motivation and Approaches.	PPT, Seminar Discussion		
10	Types of Research: (Descriptive/Analytical, applied/ Fundamental,	PPT Discussion		

		Seminar		
11	Types of Research: qualitative/Quantitative,	PPT Discussion Seminar	Student Assignment	
12	Types of Research: Conceptual/Empirical.	PPT Discussion Seminar		
13	Serendipity, Research methods versus Methodology,	PPT Discussion Seminar		
14	Research and scientific method.	PPT Discussion Seminar		
15	Research Process.	PPT Discussion		
16	Research Process.	PPT Discussion		
17	Research Process.	PPT Discussion		
18	Research Process.	PPT Discussion		
Module III. Research Formulation				
19		Lecture, PPT	. e-resource	

	Research formulation - .	Discussion		
20	Observation and Facts	Lecture, PPT Discussion		
21	Prediction and explanation,	Lecture, PPT Discussion		
22	Induction,	Lecture, PPT Discussion		
23	Deduction.	Lecture, PPT Discussion		
24	Defining and formulating the research problem,	Lecture, PPT Discussion		
25	Defining and formulating the research problem,	Lecture, PPT Discussion		
26	Defining and formulating the research problem,	Lecture, PPT Discussion		
27	Selecting the problem and necessity of defining the problem.	Lecture, PPT Discussion		

28	Selecting the problem and necessity of defining the problem.	Lecture, PPT Discussion		
29	Literature review -	Lecture, PPT Discussion	e-resource	
30	Literature review -	Lecture, PPT Discussion		
31	Importance of literature reviewing in defining a problem	Lecture, PPT Discussion		
32	Critical literature review,			
33	Identifying gap areas from literature review.	Lecture, PPT Discussion		
34	Hypothesis -	Lecture, PPT Discussion		
35	Null and alternate hypothesis	Lecture, PPT Discussion		
36	testing of hypothesis	Lecture, PPT Discussion		
Module IV. Research Designs				
37	Research Design - a	PPT		

		Group Discussion		
38	Basic principles of research design	PPT Discussion		
39	Research Design: Meaning and Need	PPT Discussion		
40	features of good design,	PPT Discussion		
41	important concepts.	PPT Discussion		
42	Types of research designs	PPT Group Discussion	video	
43	Types of research designs	PPT Discussion		
44	Development of a research plan -	PPT Group Discussion		
45	Development of a research plan: Exploration	PPT Discussion		
46	Development of a research plan: Description	PPT Discussion		
47	Development of a research plan: Diagnosis	PPT Discussion		

48	Development of a research plan: Experimentation	PPT Discussion		
49	Determining experimental and sample designs.	PPT Group Discussion		
50.	Determining experimental and sample designs.	PPT Discussion		
51.	Important experimental designs	PPT Group Discussion	e-resource	
Module V. Sampling				
52	Definition	PPT seminar		
53	Purpose,	PPT Discussion		
54	principle advantages of sampling.	PPT Discussion		
55	Unit of sampling	PPT Discussion		
56	Population: techniques	PPT seminar	Student Assignment	
57	Characteristics of good samples	PPT Discussion		
58	Sampling errors	PPT		

		Discussion		
59	Sampling errors	PPT Discussion		
60	Ways to reduce sampling errors	PPT Discussion		
Module VI. Data Collection.				
61	Experiments and surveys,	PPT	. Quiz	
62	Data collection techniques	PPT Discussion	e-resource	
63	collection of primary data	PPT Discussion		
64	data through questionnaires,	PPT		
65	data through schedules	PPT		
66	secondary data,	PPT	video	
67	selection of appropriate method for data collection, case study method.	PPT Discussion		
Module VII. Scientific Documentation and Communication				
68	Research report writing	PPT	e-resource	
69	Research report writing	PPT		
70	Thesis and dissertations,	PPT Discussion		

71	Research articles,	PPT Discussion	e-resource	
72	Oral communications.	PPT Discussion		
73	Project proposal writing	PPT	video	
74	Project proposal writing	PPT Discussion		
75	Project proposal writing	PPT Discussion		
76	Presentation techniques	PPT Discussion	e-resource	
77	Assignment, Seminar, Debate,	PPT Discussion	Video e-resource	
78	Workshop, Colloquium, Conference.	PPT Discussion	video	
79	Abstract, synopsis, summary	PPT Discussion	e-resource	
80	Referencing methods.	PPT Discussion	e-resource	
Module VIII. Information Science, Extension and Ethics				
81	Sources of Information - Primary and secondary sources.	PPT Discussion	e-resource	

82	Library - books, journals, periodicals, reference sources	Class room, Lecture, PPT	Quiz	
83	abstracting and indexing sources, Reviews, Treatise, Monographs, Patents	PPT Discussion	e-resource	
84	Internet -Search engines and software, online libraries, e-Books, eEncyclopedia, TED Talk, Institutional Websites.	Class room, Lecture, PPT	Video e-resource	
85	Intellectual Property Rights - Copy right, Designs, Patents, Trademarks, Geographical indications.	Class room, Lecture, PPT	e-resource	
86	Safety and precaution - ISO standards for safety, Lab protocols,	Class room, Lecture, PPT	e-resource	
87	Lab animal use, care and welfare, animal houses, radiation hazards.	PPT Discussion	Video	
88	Extension: Lab to Field, Extension communication, Extension tools.	Class room, Lecture, PPT		
89	Bioethics: Laws in India, Working with man and animals,	Class room, Lecture, PPT	Quiz	
90	Consent, Animal Ethical Committees and Constitution	Class room, Lecture, PPT		

GROUP ASSIGNMENTS/ACTIVITES – Details & Guidelines

Date of completion	Topic of Assignment & Nature of assignment (Individual/Group – Written/Presentation – Graded AND Non-graded etc)
8/08/2016	Bioethics: Laws in India, Working with man and animals, Consent, Animal Ethical Committees and Constitution - Written

GROUP ASSIGNMENTS/ACTIVITES – Details & Guidelines

Date of completion	Topic of Assignment & Nature of assignment (Individual/Group – Written/Presentation – Graded AND Non-graded etc)
8/07/2016	Assignment, Seminar, Debate, project proposal writing, report writing- Written
11/08/2016	Workshop, Colloquium, Conference.- group discussion
20/09/2016	Workshop, Colloquium, Conference- Mock workshop, seminar, colloquium

REFERENCES

- Ahuja,V.K. 2010. Law of Copy Rights and Neighbouring Rights: National and International Perspectives..Lexis Nexis- Butterworths Wadhwa, Nagpur
- Ahuja,V.K. 2007. Law Relating to Intellectual Property Rights. Lexis Nexis-Butterworths Wardha,Nagpur.
- Bright Wilson. 1990. An Introduction to Scientific Research. Dover Publications. NY.
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COURSE PLAN

PROGRAMME	MSc ENVIRONMENTAL SCIENCE	SEMESTER	1
COURSE CODE AND TITLE	16P1EVST04 : INFORMATION TECHNOLOGY APPLICATIONS IN RESEARCH	CREDIT	5
HOURS/WEEK	4	HOURS/SEM	90
FACULTY NAME	TRESSA SHYBE		

COURSE OBJECTIVES

To identify the importance of IT enabled services and challenges.

To identify the components of a computer system and demonstrate basic proficiency in commonly used applications.

To interpret the ability to effectively integrate IT-based solutions into the user environment.

To illustrate various IT web services for betterment of knowledge.

SESSION	TOPIC	LEARNING RESOURCES	VALUE ADDITIONS	REMARKS
MODULE 1 - BASICS OF COMPUTER				
1.	Introducing Computers	Lecture		
2.	Computer Characteristics	Lecture		
3.	History and Evolution of Computers	PPT/Lecture		
4.	Generations of Computers	PPT/Lecture		
5.	Components of Computers	PPT/Lecture	e-resource	
6.	Organization of Computers	PPT/Lecture	e-resource	

7.	Types of Computers	PPT/Lecture	Assignment	
8.	Classification - Digital and Analog systems	PPT/Lecture		
9.	Classification – On Basis of Size	PPT/Lecture		
10.	Classification –on basis of functions	PPT/Lecture		
11.	Hardware	PPT/Lecture		
12.	Software & Firmware	Lecture		
13.	Computer Functioning	PPT/Lecture	video	
14.	Booting , Formatting	Lecture		
15.	File, File Extensions	Lecture		
16.	Temporary Files, Folders	Lecture		
17.	GUI, Icon; Installation of Programs	PPT/Lecture	video	
18.	Commands, Biossetup, Date and Time	PPT/Lecture		
19.	Memory Partitions, Registry	PPT/Lecture		
20.	Default Operations; Defragmentation	Lecture		
21.	Number Systems: Base of a number system, Positional number system, Popular number systems	Lecture		
22.	Conversion-Decimal to Binary, Binary to Decimal	Lecture		
23.	Decimal to Octal, Octal to decimal	Lecture		
24.	Decimal to hexadecimal, Hexadecimal to decimal	Lecture		
25.	Octal / Hexadecimal to Binary	Lecture		
26.	Binary to Octal/Hexadecimal	Lecture		
MODULE 2 - HARDWARE BASICS				
27.	Input Devices	PPT/Lecture		
28.	Input Devices - Types	PPT/Lecture		

29.	Input Devices –Working and functions	PPT/Lecture	Video	
30.	Output Devices	PPT/Lecture		
31.	Output Devices –Types	PPT/Lecture		
32.	Output Devices - Working and functions	PPT/Lecture	Video	
33.	Storage Devices	PPT/Lecture		
34.	Storage Devices – Different types	PPT/Lecture		
35.	CPU components - Mother boards, SMPS	PPT/Lecture		
36.	CPU components - Processors	PPT/Lecture		
37.	Accessory Cards – Graphic /Sound/ Networking/ Bluetooth/Wifi	PPT/Lecture		
38.	Memory –Classification	PPT/Lecture	Seminar Presentation	
39.	Types of memory	PPT/Lecture		
40.	Memory Units	PPT/Lecture		
41.	Memory Devices	PPT/Lecture		
42.	New Generation Computers	PPT/Lecture	Assignment	
43.	Input/Output Devices	PPT/Lecture		
44.	Memory Devices	PPT/Lecture	Seminar Presentation	
45.	Storage Devices	PPT/Lecture		
MODULE 3 - SOFTWARE BASICS				
46.	System Software	PPT/Lecture		
47.	Introduction to Operating System: definition, functions	PPT/Lecture	Seminar Presentation	
48.	Operating System - CUI and GUI	PPT/Lecture		
49.	Working of OS; DOS and Windows	PPT/Lecture		

50.	Working of OS; Linux and UNIX	PPT/Lecture		
51.	Application Software -Programs and Packages	PPT/Lecture	Seminar Presentation	
52.	MS Word – Introducing Features and Uses	PPT/Lecture		
53.	MS Word – Creating, Editing and Formatting Documents	Guided Practice		
54.	MS Word – Essential features and Tools	Guided Practice		
55.	MS Excel – Introducing Features and Uses	PPT/Lecture		
56.	MS Excel – Formatting Cells, Using Formulas	Guided Practice		
57.	MS Excel – Creating different graphs and charts	Guided Practice		
58.	MS PowerPoint - Features and Uses	PPT/Lecture		
59.	MS PowerPoint – Designs, Animations, Transitions	Guided Practice		
60.	MS PowerPoint - graphs and charts etc...	Guided Practice		
61.	Publisher, Acrobat Reader, E Book Reader, Explorer, Photoshop	PPT/Lecture	Video	
62.	Virus and Antivirus	PPT/Lecture	Seminar Presentation	
63.	Statistical Software	PPT/Lecture		
64.	Databases -MS Access	PPT/Lecture		
65.	Revision Test			
MODULE 4 - COMPUTER LANGUAGES				
66.	Programming Languages: Machine Language, Assembly Language, High Level Language	PPT/Lecture		

67.	Computer languages –Classification	PPT/Lecture		
68.	Computer languages –Types, HTML, C and Java Programming concepts	PPT/Lecture		
69.	Algorithm, Codes	PPT/Lecture		
70.	Flow Charts	PPT/Lecture		
71.	Revision Test			
MODULE 5 - NETWORKING, INTERNET AND INFORMATION TECHNOLOGY				
72.	Networking, Internet and Information Technology	PPT/Lecture	Seminar Presentation	
73.	Computer Communication –Networks	PPT/Lecture	Video	
74.	Network Types LAN, WAN, MAN etc.	PPT/Lecture		
75.	Media of networking	PPT/Lecture		
76.	Network Topologies	PPT/Lecture	Seminar	
77.	Modem and Gateway	PPT/Lecture		
78.	A Brief Introduction to the Internet	PPT/Lecture		
79.	Internet and its Services	PPT/Lecture		
80.	The World Wide Web, Web Browsers,	PPT/Lecture		
81.	Web Servers, Uniform Resource Locators	PPT/Lecture		
82.	Uploading, Downloading, Hosting	PPT/Lecture		

83.	Portal, Search Engines	PPT/Lecture	Seminar Presentation	
84.	Firewalls	PPT/Lecture		
85.	Global Information System –BIOSIS	PPT/Lecture		
86.	Cyber Crime and Cyber Laws	PPT/Lecture		
87.	Uploading, Downloading, Hosting	Guided Practice		
88.	Revision			
89.	Revision			
90.	Revision			

INDIVIDUAL ASSIGNMENTS/SEMINAR – Details & Guidelines

	Date of completion	Topic of Assignment & Nature of assignment (Individual/Group – Written/Presentation – Graded or Non-graded etc)
1.	18/6/2016	CPU components – processors, motherboard, SMPS, Accessory Cards
2.	20/7/2016	Memory – classification – types – memory devices
3.	27/8/2016	Computer Software – types – language translators
4.	14/9/2016	Operating System – types – functions

GROUP ASSIGNMENTS/ACTIVITES – Details & Guidelines

	Date of completion	Topic of Assignment & Nature of assignment (Individual/Group – Written/Presentation – Graded or Non-graded etc)
1	24/07/2016	Internet - services – world wide web – uploading – downloading –search engines
2	2/08/2016	Virus and Antivirus – Firewalls

REFERENCES

- Anitha Goel.2010. *Computer Fundamentals*. Pearson Education India
- Pradeep Sinha and Priti Sinha.2010.*Computer Fundamentals*. BPB Publications., New Delhi
- Sudipto Das.2010. *A Complete Guide to Computer Fundamentals*. Lakshmi Publishers (P) Ltd. New Delhi