



**Department of Environmental Science
Integral University, Lucknow**

Effective from Session: 2023-2024							
Course Code	B150601T/ ES321	Title of the Course	Environmental Legislation and Impact Assessment	L	T	P	C
Year	3rd	Semester	VI	4	0	0	4
Pre-Requisite	10+2 Law, Botany, Chemistry	Co-requisite	Nil				
Course Objectives	The course has two major components of Environmental Science: Law and EIA. The course is designed to impart knowledge to students about the history of the constitution of India and the importance and implementation of environmental laws. It will help the students to analyze the significance and compliance of laws in the Indian set-up. This course also provides a basic understanding of the EIA process as it is used for research, planning, project or program evaluation, monitoring, and regulatory enforcement. Introduce students to the legal, economic, administrative, and technical process of preparing and/or evaluating environmental impact documents. To relate the uses of scientific research to practical situations in project planning and decision-making.						

Course Outcomes	
CO1	Define the Indian constitutional provisions concerning environmental protection, division of powers, and fundamental rights and have an in-depth knowledge of the processes associated with EIA
CO2	Classify and know the origins, needs, and sources of environmental laws, and understand how and by whom environmental laws are made and deduced.
CO3	Develop skills and the ability to describe the complex social, scientific, and humanistic purview of environmental issues about the laws of the country
CO4	Have the ability to identify the potential impacts of proposed developments and propose solutions to address these impacts in a range of contexts.
CO5	Review the EIA process and the regulatory frameworks in which EIA operates in a range of countries

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	Introduction and History of Environmental Law	Constitution of India; fundamental rights; fundamental duties; Union of India; union list, state list, concurrent list; legislature; state assemblies; judiciary; panchayats and municipal bodies. Provision of Environmental Conservation - British India: Indian Penal Code 1860, Forest Act 1865, Fisheries Act 1897; Independent India: Van Mahotsava 1950, National Forest Policy 1952, National Forest Policy 1988.	6	CO 1
2	Directive Principles	Legal definitions (environmental pollution, natural resource, biodiversity, forest, sustainable development); Article 48A (The protection and improvement of environment and safeguarding of forests and wildlife); Article 51 A (Fundamental duties).	4	CO 2
3	Environmental Legislation in India	The Indian Forest Act 1927; The Wildlife (Protection) Act 1972; The Water (Prevention and Control of Pollution) Act 1974; The Water (Prevention and Control of Pollution) Cess Act 1977; The Forests (Conservation) Act 1980; The Air (Prevention and Control of Pollution) Act 1981; The Environment (Protection) Act 1986; Motor Vehicle Act 1988; The Public Liability Insurance Act 1991; Noise Pollution (Regulation and Control) Rules 2000; The Biological Diversity Act 2002; The Schedule Tribes and Other Traditional Dwellers (Recognition of Forests Rights) Act 2006; The National Green Tribunal Act 2010; scheme and labeling of environment-friendly products, Eco marks	10	CO2&CO3
4	Role of Government Institutions, National & International Policies	Role of Ministry of Environment, Forests & Climate Change in environmental law and policy-making; role of central and state pollution control boards in environmental law and policy-making; National Green Tribunal; National Environment Policy, 2006. Stockholm Conference 1972; United Nations Conference on Environment and Development 1992; Rio de Janeiro (Rio Declaration, Agenda 21); Montreal Protocol 1987; Kyoto Protocol 1997; Copenhagen and Paris summits; Ramsar convention.	8	CO2 & CO3
5	Introduction to EIA	Environmental impact assessment (EIA): definitions, introduction, and concepts; rationale and historical development of EIA; scope and methodologies of EIA; role of project proponents, project developers and consultants; Terms of Reference; impact identification and prediction; baseline data collection; Environmental Impact Statement (EIS), Environmental Management Plan (EMP)	6	CO 4
6	India's Status & Rapid EIA	EIA regulations in India; status of EIA in India; current issues in EIA; case study of hydropower projects! thermal projects. Strategic Environmental Assessment; Social Impact Assessment; Cost-Benefit analysis; Life cycle assessment; environmental appraisal; environmental management - principles, problems and strategies; environmental planning; environmental audit; introduction to ISO and ISO	8	CO 4



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		14000; sustainable development.		
7	Risk assessment	Introduction and scope; Project planning; Exposure assessment; Toxicity assessment; Hazard identification and assessment; Risk characterization; Risk communication; Environmental monitoring; Community involvement; Legal and regulatory framework; Human and ecological risk assessment. Review of different Case studies on Environmental Laws and EIA.	8	CO 5
8	Case studies	Relevant Case studies related to environmental conservation via laws and Environmental Impact Assessments case studies	10	CO5

Reference Books:

1. Divan S. and Rosencranz A. (2005) Environmental Law and Policy in India, 2nd ed., Oxford, New Delhi
2. Leelakrishnan P. (2008) Environmental Law in India, 3rd ed., Lexis Nexis, India
3. Armin Rosencranz - Environmental Law and Its Policy in India.
4. P. Leelakrishnan - Environmental Law in India /Cases.
5. Birnie P. (2009) et al., International Law and the Environment, 3rd ed., Oxford.
6. Environmental Impact Assessment, L. W. Canter, Mc Graw Hill, New York, 1996.
7. Handbook of Environmental Impact Assessment Vol I and II, J. Petts, Blackwell Science, London, 1999.
8. The Theory and the Practice of Environmental Impact Assessment, S. A. Abbasi and N. Ramesh, DPH, New Delhi, 2003.
9. Complete Guide to ISO 14000, R. B. Clements. Simon & Schuster, 1996.
10. Environmental Management, Kulkarni, V. and Ramachandra T.V., Capitol Pub. Co., New Delhi. 2006
11. Handbook of Environmental Impact Assessment, Petts, J. - Volume 1 and 2. Blackwell Publishers, UK 2005.
12. Introduction to Environmental Impact Assessment, Glasson, J. Therivel, R. and Chadwick, A. Routledge, London. 2006

e-Learning Source:

MOOC

SWAYAM

EIA reports for various sectors are available on the official website of the Ministry of Environment and Forest (www.envfor.nic.in)

EIA Manuals prepared by ASCI and IL & FS on the official website of the Ministry of Environment and Forest (<http://environmentclearance.nic.in/>)

Standard terms of reference [TOR] for EIA / EMP report for projects/activities requiring environment clearance under EIA notification, 2006 (<http://moef.gov.in/sites/default/files/final%20Booklet.pdf>)

Course Articulation Matrix: (Mapping of Cos with POs and PSOs)												
PO-PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO												
CO1	2	1	1	1	2	3	2	1	3	3	1	3
CO2	2	1	2	1	2	3	2	1	3	2	1	3
CO3	2	1	1	1	2	3	2	1	3	2	1	3
CO4	2	1	1	1	2	3	2	1	3	3	1	3
CO5	2	1	1	1	1	3	2	1	3	2	1	3

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation



**Department of Environmental Science
Integral University, Lucknow**

<p>Name & Sign of Program Coordinator</p>	<p>Sign & Seal of HoD</p>
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Integral University, Lucknow
Department of Environmental Science

Effective from Session: 2023-2024							
Course Code	B150603P/ ES322	Title of the Course	Practical on EIA, Biostatistics, and Computer Applications	L	T	P	C
Year	3rd	Semester	VI	0	0	4	2
Pre-Requisite	10+2 Law, Botany, Chemistry	Co-requisite	Nil				
Course Objectives	Upon successful of this Lab. course students should be able to know about process of EIA, calculation of Mean, Median & Mode, Graphical representation of data & Applications in Statistics and EIA Case Studies.						

Course Outcomes	
CO1	Students will be able to understand about process of EIA
CO2	Students will be able to study about calculation of Mean, Median & Mode
CO3	Students will be able to study about Graphical representation of data & Applications in Statistics
CO4	Students will be able to study about EIA Case Studies

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	EIA	To study about EIA process	15	CO1
2	Biostatistics	To Study about calculation of Mean from a given Data To Study about calculation of Median from a given Data To Study about calculation of Mode from a given Data	15	CO2
3	Computer Applications	To study about Graphical representation of data & Applications in Statistics	15	CO3
4	Application of EIA by Case Studies	To study about EIA Case Studies	15	CO4

Reference Books:	
1.	Introduction to Biostatistics By S Chand
2.	Environmental Impact Assessment Handbook: A practical guide for planners, developers and communities, Third edition by Barbara Carroll, Josh Fothergill, Jo Murphy and Trevor Turpin
3.	Practical Statistics for Data Scientists by Peter Bruce, Andrew Bruce
e-Learning Source:	
	https://www.youtube.com/watch?v=5OEDrvFjCME
	https://www.youtube.com/watch?v=3F_V5alJubk
	https://www.youtube.com/watch?v=co9G_-L3_7U
	https://www.youtube.com/watch?v=K5ikiXvqOgw

Course Articulation Matrix: (Mapping of COs with POs and PSOs)																		
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO4	PSO5	PSO6	PSO7
CO1	3	2	-	-	-	-	-	-	-	-	-	-	2	3	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-	2	3	-	-	-	-
CO3	3	2	-	-	-	-	-	-	-	-	-	-	2	3	-	-	-	-
CO4	3	2	-	-	-	-	-	-	-	-	-	-	2	3	-	-	-	-

6- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	Sign & Seal of HoD
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Integral University, Lucknow
Department of Environmental Science

Effective from Session:2023-2024							
Course Code	B150602T/ES323	Title of the Course	Environmental Priorities and Research Tools	L	T	P	C
Year	3 rd	Semester	VI	3	1	0	4
Pre-Requisite	10+2, Chemistry, Biology, Geography	Co-requisite	Nil				
Course Objectives	This course provides students environmental movements, priorities with working knowledge of Basic Analysis methods and principles of related Instruments						

Course Outcomes	
CO1	Learn about general national environmental movements and Rivers Action Plans, Sustainable development and Human Health.
CO2	Develop understanding about different environmental disasters and their management.
CO3	Students will be able to understand about Chemical & Biological hazards.
CO4	Able to understand the environmental priorities in India. Students will learn about increase in population growth, its impact on environment and welfare programs.
CO5	Developed skills about environmental sampling & analysis Techniques.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	National Environmental movement and River Plans	Silent valley movement, Chipko movement, Narmada movement, Green Revolution, Appiko movement, Tehri Dam movement; Namami Gange and Yamuna Action Plan; International Solar Alliance.	8	CO1
2	Environmental Priorities in India:	Sustainable Development; Urban and Rural planning, Power generation; Human Population Explosion; Environment and human health; Sanitation and health education; Role of information technology in environment and human health	8	CO1
3	Environmental Disaster	Natural hazards; earthquake, flood, cyclones, landslides, desertification and fire; Resettlement and rehabilitation process; NDRF/SDRF; NDMA	8	CO2
4	Environmental Toxicology	Environmental Toxicants, Water borne pathogens and diseases, Pesticides and heavy metal toxicity, Bioindicators	6	CO3
5	Environmental Approaches	Population growth, variation among nations, Need for gender equity, Population explosion - Family Welfare Programme. Human Rights and Value Education. National Green Tribunal.	8	CO4
6	Environmental research methodology	Concept of secondary and primary data sources. Spatial and non-spatial data. Environmental sampling: sampling designs, sampling types, representative samples – its characteristics. Sampling errors, calibration. Concept of control, blank and standards. Concept of detection limits.	8	CO4
7	Environmental sampling & Analysis	Environmental sampling techniques - air, water, soil, noise, aquatic and soil biota. Sample handling, transportation and preservation.	6	CO5
8	Instrumentation Analysis	Introduction to Techniques, Basic principles, and applications- Centrifuge, Titration, pH meter Conductivity meter, Nephelometry; Gravimetry; Microscopy; Ultraviolet-visible (UV-VIS) Spectroscopy, Flame photometry	8	CO5

Reference Books:
1) Agarwal, K.C. 2001 Environmental; Biology, Nidi Pub. Ltd. Bikaner.
2) Methods in Environmental Analysis: Water, Soil and Air. PK Gupta
3) Disaster Management and Preparedness. Nidhi Dhawan and Ambrina Sardar Khan
4) Hand Book of Analytical Instruments 2006 McGraw-Hill Education Private Limited

e-Learning Source:
https://www.standardsmedia.com/Instrumentation-1109-mc.html .
https://byjus.com/free-ias-prep/disaster-management-india/
https://byjus.com/free-ias-prep/disaster-management-india/

PO-PS O	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	1	3	1	1	3	2	-	-	-	-	-	3	2	3	1	3
CO2	2	1	3	1	1	3	2	-	-	-	-	-	3	2	3	1	3
CO3	2	1	3	1	1	3	2	-	-	-	-	-	3	2	3	1	3
CO4	2	1	3	1	1	3	2	-	-	-	-	-	3	2	3	2	3
CO5	2	1	3	1	1	2	2	-	-	-	-	-	3	2	3	3	3

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

<p style="text-align: center;">Name & Sign of Program Coordinator</p>	<p style="text-align: center;">Sign & Seal of HoD</p>
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Effective from Session:2023-2024							
Course Code	B150602T/ES323	Title of the Course	Environmental Priorities and Research Tools	L	T	P	C
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Pre-Requisite	10+2, Chemistry, Biology, Geography	Co-requisite	Nil				
Course Objectives	This course provides students environmental movements, priorities with working knowledge of Basic Analysis methods and principles of related Instruments						

Course Outcomes	
CO1	Learn about general national environmental movements and Rivers Action Plans, Sustainable development and Human Health.
CO2	Develop understanding about different environmental disasters and their management.
CO3	Students will be able to understand about Chemical & Biological hazards.
CO4	Able to understand the environmental priorities in India. Students will learn about increase in population growth, its impact on environment and welfare programs.
CO5	Developed skills about environmental sampling & analysis Techniques.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	National Environmental movement and River Plans	Silent valley movement, Chipko movement, Narmada movement, Green Revolution, Appiko movement, Tehri Dam movement; Namami Gange and Yamuna Action Plan; International Solar Alliance.	8	CO1
2	Environmental Priorities in India:	Sustainable Development; Urban and Rural planning, Power generation; Human Population Explosion; Environment and human health; Sanitation and health education; Role of information technology in environment and human health	8	CO1
3	Environmental Disaster	Natural hazards; earthquake, flood, cyclones, landslides, desertification and fire; Resettlement and rehabilitation process; NDRF/SDRF; NDMA	8	CO2
4	Environmental Toxicology	Environmental Toxicants, Water borne pathogens and diseases, Pesticides and heavy metal toxicity, Bioindicators	6	CO3
5	Environmental Approaches	Population growth, variation among nations, Need for gender equity, Population explosion - Family Welfare Programme. Human Rights and Value Education. National Green Tribunal.	8	CO4
6	Environmental research methodology	Concept of secondary and primary data sources. Spatial and non-spatial data. Environmental sampling: sampling designs, sampling types, representative samples – its characteristics. Sampling errors, calibration. Concept of control, blank and standards. Concept of detection limits.	8	CO4
7	Environmental sampling & Analysis	Environmental sampling techniques - air, water, soil, noise, aquatic and soil biota. Sample handling, transportation and preservation.	6	CO5
8	Instrumentation Analysis	Introduction to Techniques, Basic principles, and applications- Centrifuge, Titration, pH meter Conductivity meter, Nephelometry; Gravimetry; Microscopy; Ultraviolet-visible (UV-VIS) Spectroscopy, Flame photometry	8	CO5

Reference Books:
1) Agarwal, K.C. 2001 Environmental; Biology, Nidi Pub. Ltd. Bikaner.
2) Methods in Environmental Analysis: Water, Soil and Air. PK Gupta
3) Disaster Management and Preparedness. Nidhi Dhawan and Ambrina Sardar Khan
4) Hand Book of Analytical Instruments 2006 McGraw-Hill Education Private Limited

e-Learning Source:
https://www.standardsmedia.com/Instrumentation-1109-mc.html .
https://byjus.com/free-ias-prep/disaster-management-india/
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PO-PS O	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	1	3	1	1	3	2	-	-	-	-	-	3	2	3	1	3
CO2	2	1	3	1	1	3	2	-	-	-	-	-	3	2	3	1	3
CO3	2	1	3	1	1	3	2	-	-	-	-	-	3	2	3	1	3
CO4	2	1	3	1	1	3	2	-	-	-	-	-	3	2	3	2	3
CO5	2	1	3	1	1	2	2	-	-	-	-	-	3	2	3	3	3

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

<p style="text-align: center;">Name & Sign of Program Coordinator</p>	<p style="text-align: center;">Sign & Seal of HoD</p>
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Integral University, Lucknow
Department of Environmental Science

Effective from Session: 2023-2024

Course Code	B150605T/ ES325	Title of the Course	Environmental Monitoring and Modelling	L	T	P	C
Year	3rd	Semester	VI	4	0	0	4
Pre-Requisite	10+2 with Science	Co-requisite	Nil				
Course Objectives	This course aims to provide an introduction to the fundamental monitoring & modeling concepts, and their applications in simulating pollution monitoring and resource utilization in natural environmental systems. The tools and techniques help in investigating, understanding, representing the current, and predicting the future state of the environment.						

Course Outcomes

CO1	Recall basic concepts and principles of environmental monitoring.
CO2	Summarize definitions of sample, its types etc. Explain various steps and precautions required before sampling of soil, water, air etc.
CO3	Understand the different modeling approaches, their scope and limitations
CO4	Become aware of a wide range of applications of modelling in environmental management & decision-making.
CO5	To understand the basic principle and application of instruments.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	Basics of Environmental Monitoring	What is environmental quality? Quality of environment for life on earth and man; Advantages of Environmental Monitoring, Deterioration of environmental quality concerning anthropogenic impact; Methods of assessment of environmental quality; Short-term studies/surveys; Rapid assessment; Continuous short- and long-term monitoring	8	CO1
2	Water Monitoring	Objectives of water monitoring, Collection of samples, sample preservation, Physical, chemical, and biological parameters of water & its monitoring, General effluent standards, stream standards Drinking water standard (IS10500 and WHO Standards),	8	CO2
3	Air Monitoring	Air sampling: types, techniques, Site and parameter selection, National standards for ambient air quality, monitoring of particulate matter, SO _x and NO _x , Ambient and stack air monitoring techniques, Air Monitoring tools/instruments used for air its work principle	6	CO2
4	Soil Monitoring	Objectives of soil monitoring/testing, Types of soil sampling and sample units, Site selection, Important soil quality indicators Instruments/equipment used in soil monitoring	6	CO2
5	Introduction	Environmental modeling: scope and problem definition, goals and objectives, definition; modeling approaches– deterministic, stochastic and the physical approach; applications of environmental models; the model building process	8	CO3
6	Concept of Environmental Modelling	Introduction to environmental system analysis; Approaches to the development of models, linear simple and multiple regression models; Validation and forecasting Modelling techniques; Model performance, accuracy and utilization	8	CO4
7	Environmental Modelling Applications	Water quality modeling: surface water quality modeling – lakes and impoundments, rivers; groundwater pollution modeling Air quality modeling: the box model, the Gaussian plume model point sources, line sources, area sources; special topics; Gaussian puff model	8	CO4&5
8	Instruments in Environmental Monitoring	pH meter, Conductivity meter, Colorimeter, UV Spectrophotometer, Atomic absorption spectrophotometer, Flame photometer, Hot air oven, autoclave, laminar flow, RSPM 2.5, Gas chromatography, Mass spectroscopy, Scanning electron microscopy	8	CO5

Reference Books:

- 1-Handbook of Methods in Environmental Studies: Vol.1 By Maiti, Subodh. (2003).
- 2-Handbook of Methods in Environmental Studies: Vol 2 (Air, noise, soil and overburden analysis). By Maiti, Subodh. (2003).
- 3-Fundamentals of Environmental Pollution, Krishnan Khannan, S. Chand and Company Ltd., 1994.
- 4-Maiti, S.K. 2014. Handbook of Methods in Environmental Studies Vol-I & II. Oxford Book Company, New Delhi
- 5-Gupta, P.K. 2011. Methods in Environmental Analysis: Water, Soil, Air (2nd Edition) Vatsal Enterprises, New Delhi
- 6-Trivedy, R.N. 2002. A Text Book of Environmental Pollution and Control. Anmol Publication, New Delhi.
- 7-Ramaswami A., Milford J.B. and Small M.J. (2005) Integrated Environmental Modelling, John Wiley and Sons, Inc., New Jersey.
- 8-Schnoor J.L. (1996) Environmental Modeling, John Wiley & Sons, Inc., New York.

e-Learning Source:

SWAYAM, MOOC, NPTEL

Course Articulation Matrix: (Mapping of COs with POs and PSOs)

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO4	PSO5	PSO6	PSO7
CO1	1	2	2	3	3	3	3						1	1	1	1		
CO2	3	2	3	3	3	3	2						1	2	2	2		
CO3	1	1	2	2	2	3	3						3	3	2	1		
CO4	3	3	3	3	3	3	3						1	2	2	2		
CO5	2	2	2	1	1	1	1						3	3	2	2		

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	Sign & Seal of HoD
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Integral University, Lucknow
Department of Environmental Science

Effective from Session: 2023-2024							
Course Code	B150606P/ ES326	Title of the Course	Environmental monitoring Lab	L	T	P	C
Year	3rd	Semester	VI	0	0	4	2
Pre-Requisite	10+2 with Science	Co-requisite					
Course Objectives	The course is designed to develop sampling and analytical skills of the students which are required in environmental monitoring. The students will be exposed to various standard protocols used in environmental monitoring.						

Course Outcomes	
CO1	Students will be trained in analytical and conceptual skills required for soil analysis.
CO2	Students will be trained in analytical and conceptual skills required for water analysis.
CO3	Students will be trained in analytical and conceptual skills required for air monitoring.
CO4	Students will be expert in instrumental experiment of environmental monitoring.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	Soil monitoring	Analysis of soil moisture content by oven dry method. Determination of electrical conductivity of soil sample.	15	CO1
2	Water monitoring	Determination of total alkalinity of water sample. Determination of chloride content of water sample.	15	CO2
3	Air monitoring	Determination of physical composition and characteristics of municipal solid waste. Analysis of nitrogen dioxide (NO ₂) and suspended particulate matter (SPM) in air	15	CO3
4	Environmental Monitoring Instrument	pH meter, Conductivity meter, Colorimeter, UV Spectrophotometer, Atomic absorption spectrophotometer, Flame photometer, Hot air oven, autoclave, laminar flow, RSPM 2.5, Gas chromatography, Mass spectroscopy, Scanning electron microscopy	15	CO4

Reference Books:
Radojevic M. and Valdimir N.B. (2006) Practical Environmental Analysis, RSC publishing
APHA (1980) Standard Methods for the Examination of Water and Wastewater Published by American Public Health Association, 15th ed.
Wagner T.P. and Robert S. (2009) Environmental Science: Active Learning Laboratories and Applied Problem Sets, 2nd Edition, Wiley.
Wells E. (2009) Lab Manual for Environmental Science, Cengage Learning
e-Learning Source:
SWAYAM
MOOC
NPTEL

PO-PSO CO	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO4	PSO5	PSO6	PSO7
CO1	1	3	3	3	1	1	2						1	1	3	1		
CO2	1	3	3	3	1	1	2						1	1	3	1		
CO3	1	3	3	3	1	1	2						1	1	3	1		
CO4	1	3	3	3	1	1	2						1	1	3	1		

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	Sign & Seal of HoD
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**Department of Environmental Science
Integral University**

Effective from Session:2023-2024							
Course Code	B150607R/ ES327	Title of the Course	Internship/Apprenticeship, (Research Project III)	L	T	P	C
Year	3 rd	Semester	VI	0	0	0	3
Pre-Requisite	10+2 Botany, Physics, Chemistry	Co-requisite	Nil				
Course Objectives	Upon finishing the course students will be able to come up with a gain of professional work in industry and research project experience.						

Course Outcomes	
CO1	To apply theoretical concepts learned in degree course work to a practical situation
CO2	To obtain experience with relevant materials and methodologies.
CO3	Achieve/complete assigned target(s)/ task(s) given by the person to whom the intern or apprentice is reporting (Supervisor)

Unit No.	Title of the Unit	Content of unit	Mapped CO
1	Internship/Apprenticeship (Research Project I)	<p>Students are encouraged to undergo summer/winter in plant training in a suitable industry, consultancy, research laboratory, institute, Protected Areas etc. So as to get firsthand experience of corporate environmental management and of natural habitat. Candidates will write a field project report on issues related to Environmental Science under the guidance of their respective guides. Each student will work independently on the topic. The field project must consist of a review of the literature and produce a deep insight of the subject based on personal research. Field project work will be initiated at the start of Semester. The students will undertake fieldwork in terms of the collection of data and surveys. The field project will have to be submitted for appraisal and acceptance by the University. The students should submit their field project report in the following format:</p> <p>Chapter I: Introduction with Aims and Objectives: A background with historical information and a review of existing material or data on the subject along with the aims and objectives of the study. Chapter II: Methodology with Material and Methods: Description of the issue, methodology adopted for the study. Chapter III: Experimental: Presentation of data collected and detailed analysis of results. Chapter IV: Result and Discussion: Discussion on the data and results obtained and Presentation of method suggested to solve the problem. Chapter V: Summary and Conclusions: A summary of the dissertation and important conclusions drawn at the end of the investigation. Bibliography or References: A list of references cited in the text.</p> <p>The Field Project Report should be typed on A4 size bond paper with 1.5 line spacing. Illustrations and photographs should be of high quality. The report should be flawless without any spelling mistakes or grammatical errors. Students will have to submit their field project report one month before the practical examination at the end of Semester. The field work report will carry 100 marks (Internal marks 20 and External marks 80). Assessment of the report will be done at the end of the year. Students have to present a Power Point Presentation. Assessment of the field work shall be done by the external examiner appointed by HOD, Integral University.</p>	CO1,2,3,

Course Articulation Matrix: (Mapping of COs with POs and PSOs)																		
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	2	2	1			1		2	1			1	2				
CO2	3	2	1	1				1		1			1	1				
CO3	3	2	2	2	2	2					2		1	1	1			

1-Correlation Low Correlation; 2- Moderate Correlation; 3- Substantial

Name & Sign of Program Coordinator	Sign & Seal of HOD
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