Integral University, Lucknow

Effective from Session: 2011-12							
Course Code	DEE-501	**Title of the Course**	SWITCH GEAR AND PROTECTION	**L**	**T**	**P**	**C**
Year	Third	**Semester**	Fifth	**3**	**1**	**2**	**-**
Pre-Requisite		**Co-requisite**					
Course Objectives	1. Analysis of symmetrical and unsymmetrical faults in power system. 2. Protection schemes of power system equipment's.						

Course Outcomes	
CO1	Analysis of symmetrical and unsymmetrical faults in power system.
CO2	Understand different types of circuit breakers and its application.
CO3	Analysis of different types of relay characteristics.
CO4	Protection schemes of power system equipment's.
CO5	Methods of grounding and their applications.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
Unit-I	FAULTS	Types of faults, symmetrical and asymmetrical fault representation, effect of short circuit fault on power system, representation of fault condition through single line diagram, per unit system, simple numerical problems on per unit systems.	8	1
Unit-II	CIRCUIT INTERRUPTION DEVICES	Fuse isolator and circuit breaker, arc extinction principle, circuit breaker classification, constructional features and operating principle of modern circuit breakers (Air, oil, SF6, Vacuum).	8	2
Unit-III	RELAY RELAYING CIRCUITRY	Faults: types and nature. Causes and consequences: requisite of protective scheme, relay and their classification. Induction type overcurrent and reverse power relay. Over current. Ground fault. Directional and directional over current relaying circuitry. Different types of static relay and relaying circuitry for over current and ground fault protection	8	3
Unit-IV	SYSTEM PROTECTION	Principle of distance protection. Impedance relaying scheme for protection of feeder. Principle of differential protection. Merz price system for protection of electrical machines. General schemes for power protection system components.	8	4
Unit-V	SURGE PROTECTION AND SYSTEM GROUNDING	Production and consequences of surge. Modern surge diverters. Protection against surges. Grounding and its methods. Grounding of dead metallic parts and neutral.	8	5

References Books:

1. Power system protection and switch gear: Badri Ram
2. Switch gear protection: S.S Rao
3. Switch gear protection: M.V. Desh Pandey
4. Power system protection and switch gear: Ravindranath

e-Learning Source:

https://nptel.ac.in/

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1		2	-		2		2	-						3
CO2		2	1		2		2	1						3
CO3		2	1		2		1	1						3
CO4		2	1		2		2	1						3
CO5		2	1		2		2	2						3

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

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2011-12							
Course Code	DEE-504	**Title of the Course**	ELECTRICAL MACHINES II	**L**	**T**	**P**	**C**
Year	Third	**Semester**	Fifth	**3**	**1**	**-**	**-**
Pre-Requisite		**Co-requisite**					
Course Objectives	1. Study different types of single phase motors. 2. Selection of motor for particular job.						

Course Outcomes	
CO1	Learn the construction and principle of operation of different kinds of rotating AC machines.
CO2	Analyze theoretically, the performance characteristics for different electrical machines and obtain simple equivalent circuit for the machine.
CO3	Develop phasor diagram and examine performance of synchronous machines.
CO4	Study different types of single phase motors.
CO5	Selection of motor for particular job.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
Unit-I	Induction Motor	Construction and working of 3 ph. Induction motor and its types. Double cage induction motor, rotor frequency, rotor emf, rotor current, rotor power factor, torque equation, torque slip characteristic, principle and methods of speed control. Methods of starting, losses and efficiency (simple problems), Testing of motors as per I.S.	8	1
Unit-II	Synchronous motor	Construction, working principle, effect of load on synchronous motor, its vector diagram, effects of change in excitation on performance of synchronous motor, V curve, torque an mechanical power developed, condition for max. Mechanical power, synchronous condenser, hunting and its elimination, starting methods and its uses	8	2
Unit-III	A.C. Generators	Working principle, construction, full pitch and short pitch winding, pitch factor and winding factor, E.M.F. equation, rating of alternator, armatue reaction, voltage drop in alternator, vector diagram of loaded alternator, voltage regulation and its determination, efficiency of alternator, condition for parellel operation, voltage regulation, operation of alternator when connected to infinite bus bar	8	3
Unit-IV	F.H.P. Motors	Classification of F.H.P. motors, Double field revolving theory, construction , working and application of capacitor motor(all types), shaded pole motor, 1 ph. Synchronus motor, 1 ph. Series and universal motor	8	4
Unit-V	Electrical Drives	Advantages of Electrical Drives . characteristic of different mechanical loads. Types of motor used in electrical drives. Specification of commonly used motors, selection of motors for particular loads.	8	5

References Books:

1. Electrical Technology Vol –II : B.L.Theraja
2. Electrical Machine: Ashfaque Hussain.

e-Learning Source:

https://nptel.ac.in/

PO-PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	-	-	2	-	1	-	-	3	-	-			-	2
CO2	-	-	2	-	1	-	-	3	-	-				2
CO3	-	-	2	-	1	-	-	3	-	-				2
CO4	-	-	2	-	-	-	-	3	-	-				2
CO5	-	-	2	-	-	-	-	3	-	-				2

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

Name & Sign of Program Coordinator	Sign & Seal of HoD

Integral University, Lucknow

Effective from Session: 2011-12							
Course Code	DEE-505	**Title of the Course**	Installation Maintenance and Repair of Electrical Machines	**L**	**T**	**P**	**C**
Year	Third	**Semester**	Fifth	**3**	**1**	**-**	**-**
Pre-Requisite		**Co-requisite**					
Course Objectives	1. Need and procedure of different types of earthing for electrical installations 2. Guidelines for loading, unloading, installation, testing and commissioning of electrical installation.						

Course Outcomes	
CO1	Guidelines for loading, unloading, installation, testing and commissioning of electrical installation.
CO2	Maintenance of electrical machines and switch gears.
CO3	Trouble shooting of electrical machines and underground cables.
CO4	Need and procedure of different types of earthing for electrical installations
CO5	

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
Unit-I	Installation and maintenances	Guidelines for loading and unloading of electrical machines, Accessories used in loading and unloading, precaution taken during loading and unloading. Installation of electrical equipment's, their testing and commissioning, precaution taken while installation.	8	1
Unit-II	Preventive maintenance of Electrical equipment and other installations	Meaning of preventive maintenance, its advantage, preparation of preventive maintenance schedule for transformers, transmission lines, induction motors, circuit breakers, underground cables and storage batteries.	8	2
Unit-III	Trouble Shooting	Causes for failure of electrical equipment's. Classification of faults under (1) electrical (2) magnetic (3) mechanical. Tools and instruments used for trouble shooting and repair. Diagnosis of faults in (1) d.c. machines (2) synchronous machines (3) transformers (4) induction motors (5) circuit breakers (6) overhead and underground distribution lines.	8	3
Unit-IV	Earthing arrangement	Reason for earthing of electrical equipment's, earthing systems permissible earth resistance for different types of installation, methods of improving the earth resistance, measurment of earth resistance. system earthing and equipment earthing.	8	4
Unit-V	Insulation testing	Classification of insulation as per ISS 1271/1958. Insulation resistance measurment, methods of improving insulation resistance, vaccum impregnation, transformer oil testing and interpretation Electrical accidents and safety: Classification of electrical accidents, treatment for electric shock, artificial respiration. general ideas about protection against lightning. Indian electricity rules.	8	5

References Books:

1. Installation, Maintenance of Electrical Engg. Equipment: Basant Kumar
2. Testing, Commissioning, Operation and Maintenance of Electrical Equipment: S. S. Rao

e-Learning Source:

https://nptel.ac.in/

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	-	-	1	-	1	-	-	1	-	-				3
CO2	-	-	2	-	3	-	-	-	-	-				3
CO3	-	-	-	-	2	-	-	3	-	-				3
CO4	-	-	1	-	1	-	-	-	-	-				3
CO5	-	-	1	-	1	-	-	1	-	-				3

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

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2011-12							
Course Code	DEE-506	**Title of the Course**	UTILIZATION OF ELECTRICAL ENERGY	**L**	**T**	**P**	**C**
Year	Third	**Semester**	Fifth	**3**	**1**	**-**	**-**
Pre-Requisite		**Co-requisite**					
Course Objectives	1. Design various lighting scheme for domestic, industrial and commercial installation 2. To impart the knowledge of different methods of illumination, electric heating and welding.						

Course Outcomes	
CO1	To impart the knowledge of different methods of illumination, electric heating and welding.
CO2	Design various lighting scheme for domestic, industrial and commercial installation.
CO3	Conservation and management of energy considering environmental issues.
CO4	To impart knowledge of AC and DC electric traction system.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
Unit-I	ILLUMINATION	Definition (illumination, luminous intensity, illumines efficiency, law of illumination, flux, solid angle), Problems on illumines for calculation of number of light points and illumination at different points, Sodium lamp and Discharge lamp, Difference between Incandescent and Discharge lamp.	8	1
Unit-II	ELECTRIC HEATING, ELECTRIC WELDING	Advantage of electric heating, Resistance heating (direct resistance and indirect resistance heating), Electric arc heating, Induction heating and Dielectric heating, Electric ovens. Classification of welding methods, Resistance welding (butt, spot, projection, seam and percussion welding), Electric arc welding, Under water welding, Welding equipment.	8	2
Unit-III	ELECTRIC COOLING	Concept of refrigeration and air conditioning, define ton, refrigerant and their examples Vapor compression refrigeration cycle, Electric circuit used in refrigerator, air condition, water cooler	8	3
Unit-IV	ECONOMIC CONSIDERATION, ENERGY CONSERVATION	Load factor, demand factor, load curve, load estimation, diversity factor, plant capacity factor and utilization factor (simple problem on above factors) Tariff and type of tariff (flat rate, block rate, maximum demand and two parts tariffs), fixed cost and running cost, economic load division between power stations. Need of energy conservation, energy management, basic idea of energy audit	8	4
Unit-V	ELECTRIC TRACTION	Advantage of electric traction, AC and DC electric traction system, accessories for track electrification, block diagram of locomotive, electric braking (plugging, rheostat and regenerative braking) types of pantograph, suburban and rural electrification, typical speed time curve and simplified speed time curve	8	4

References Books:

1. Utilization of electrical energy: Sharma K Nath
2. Transmission Distribution and Utilization of Electrical Energy: C.L. Wadhwa
3. Utilization of Electrical Energy: J.B.Gupta

e-Learning Source:

https://nptel.ac.in/

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	-	-	1	-	-	-	3	2	-	-			2	
CO2	-	-	-	-	2	-	3	1	-	-			2	
CO3	3	1	-	-	-	-	2	-	1	-			3	
CO4	-	-	2	-	-	-	2	1	-	-			2	
CO5	-	-	1	-	-	-	3	2	-	-			2	

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

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2011-12							
Course Code	DEE-507	**Title of the Course**	POWER ELECTRONICS-I	**L**	**T**	**P**	**C**
Year	Third	**Semester**	Fifth	**3**	**1**	**-**	**-**
Pre-Requisite		**Co-requisite**					
Course Objectives	1. Study and characteristics of high power switching devices. 2. Concept of power electronics and thyristor family.						

Course Outcomes	
CO1	Concept of power electronics and thyristor family.
CO2	Study and characteristics of high power switching devices.
CO3	Analysis of uncontrolled rectifier for different types of loads.
CO4	Analysis of different types of controlled rectifier for various combinations of loads.
CO5	

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
Unit-I	Introduction, Thyristor family	Concept of power electronics, application of power electronics, advantages and disadvantages of power electronics converters, types of power electronics converters. Thyristor family: PUT, SUS, SAS, light activated thyristor, DIAC, TRIAC, GTO (symbols and characteristics)	8	1
Unit-II	HIGH POWER SWITCHING DEVICES	Power semiconductor diode: V-I characteristic, reverse recovery characteristics Types of power diodes: general purpose diode, fast recovery diode, Schottky diode Power transistors: BJT, MOSFET, IGBT	8	2
Unit-III	DIODE CIRCUIT AND RECTIFIER	Introduction. Single phase half wave rectifier: R load, L load, RLE Load, RL load. Single phase full wave rectifier: mid-point rectifier, Bridge rectifier (R load, RL load) Concept of free- wheeling diodes. Three phase converter system using diodes	8	3
Unit-IV	THYRISTORS	Constructional details of thyristor **Characteristic of thyristor:** Reverse blocking mode, forward blocking mode, forward conduction mode Thyristor turn on methods: forward voltage triggering, gate triggering, dv/dt triggering, temperature triggering, light triggering Switching characteristic of thyristor during turn on and turn off. UJT(symbol, characteristic and application) **Thyristor protection:** di/dt protection, dv/dt protection , snubber circuit	8	4
Unit-V	CONTROLLED RECTIFIER	Single phase half wave converter with R load, RL load and free wheeling diode' with RLE load(working and waveform) single phase full wave convertor: mid point converter , bridge converter. Single phase semi converter. Three phase full converter system using thyristor only for R circuit	8	4

References Books:

1. Industrial Electronics: D.C. Gupta
2. Industrial Electronics and Control: Bhattacharya
3. Power Electronics: P.S.Bhimbra

e-Learning Source:

https://nptel.ac.in/

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	-	2	-	-	-	-	-	2	-	-				2
CO2	-	-	2	-	-	-	-	-	-	-				3
CO3	-	-	-	1	-	-	-	-	-	-				2
CO4	-	-	-	-	-	3	-	-	-	-				2
CO5	-	2	-	-	-	-	-	2	-	-				3

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

Name & Sign of Program Coordinator	Sign & Seal of HoD

Integral University, Lucknow

Effective from Session: 2011-12							
Course Code	DEE-553	**Title of the Course**	POWER ELECTRONICS-I LAB	**L**	**T**	**P**	**C**
Year	Third	**Semester**	Fifth			**3**	**-**
Pre-Requisite		**Co-requisite**					
Course Objectives	1. Application and verification of characteristic of power electronic components 2. Different methods for triggering of SCR.						

Course Outcomes	
CO1	Application and verification of characteristic of power electronic components.
CO2	Study and performance of different rectifier circuits.
CO3	Different methods for triggering of SCR.
CO4	Application and verification of characteristic of power electronic components.

Experiment No.	Experiment	Contact Hrs.	Mapped CO
Experiment-1	To study and plot V-I characteristics of SCR	3	1
Experiment-2	To study the characteristics of UJT	3	2
Experiment-3	To study the characteristics of MOSFET	3	2
Experiment-4	To study the characteristics of IGBT	3	2
Experiment-5	To study the characteristics of Diac	3	2
Experiment-6	To study the characteristics of Triac	3	2
Experiment-7	To study the characteristics of PUT	3	2
Experiment-8	Study the resistor capacitor (R-C) triggering .	3	3
Experiment-9	To study the phenomena of holding current and latching current in SCR .	3	3
Experiment-10	Study of three phase half wave rectifier (common cathode configuration) with R load	3	4
Experiment-11	Study of three phase diode bridge rectifier with R load	3	4
Experiment-12	Study the triggering of SCR using UJT	3	4
Experiment-13	Study of full wave controlled mid-point rectifier with R load	3	4

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	-	2	-	-	-	-	-	2	-	-			2	
CO2	1	-	-	-	-	-	-	-	-	2			2	
CO3	-	-	-	-	2	-	-	-	-	-			3	
CO4	-	-	-	-	-	3	-	-	-	-			2	

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

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2011-12							
Course Code	DEE-554	**Title of the Course**	ELECTRICAL MACHINE II LAB	**L**	**T**	**P**	**C**
Year	Third	**Semester**	Fifth			**3**	**-**
Pre-Requisite		**Co-requisite**					
Course Objectives	1. Performance characteristic of single phase Induction motor. 2. Operation of Universal motor under different types of supply.						

Course Outcomes	
CO1	Performance characteristic of single phase Induction motor.
CO2	Performance characteristic of three phase Induction motor.
CO3	Acquire hands on experience of conducting various tests on three phase synchronous machines and obtaining their performance.
CO4	Operation of Universal motor under different types of supply.

Experiment No.	Experiment	Contact Hrs.	Mapped CO
Experiment-1	To determine performance characteristics of a poly phase induction motor (load Vs efficiency, load Vs power factor, load Vs slip)	3	1
Experiment-2	To start a three phase induction motor and to determine its slip at various load	3	2
Experiment-3	To determine V curve of a synchronous motor.	3	2
Experiment-4	To connect and start an induction motor by using star delta starter, auto transformer starter, rotor starter and to change its direction of rotor.	3	2
Experiment-5	To perform open circuit and block rotor test on a three phase induction motor and to determine its efficiency	3	2
Experiment-6	Determination of performance curve and hence the coreloss of single phase series motor.	3	2
Experiment-7	To perform open circuit and short circuit test on a 3 phase synchronous machines and to determine synchronous impedance and regulation at leading/lagging power factor.	3	2
Experiment-8	Sequential operation of motors using timers.	3	3
Experiment-9	Achieving high starting torque in case of 3 phase slip ring motor by increasing external resistance in rotor circuit and determine speed regulation at different loads	3	3

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	-	-	3	-	1	-	-	3	-	1				2
CO2	-	-	3	-	1	-	-	3	-	1				3
CO3	-	-	3	-	1	-	-	3	-	1				2
CO4	-	-	3	-	1	-	-	3	-	1				2

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

Name & Sign of Program Coordinator	Sign & Seal of HoD

Integral University, Lucknow

Effective from Session: 2011-12							
Course Code	DEE-555	**Title of the Course**	INSTALLATION MAINTENANCE LAB	**L**	**T**	**P**	**C**
Year	Third	**Semester**	Fifth			**3**	**-**
Pre-Requisite		**Co-requisite**					
Course Objectives	1. Application of different types of instruments used for electrical installation. 2. Troubleshooting of different starters, circuit breakers and electrical machines.						

Course Outcomes	
CO1	Application of different types of instruments used for electrical installation.
CO2	Application of megger for fault identification.
CO3	Troubleshooting of different starters, circuit breakers and electrical machines.
CO4	Routine and daily maintenance of different electrical installation

Experiment No.	Experiment	Contact Hrs.	Mapped CO
Experiment-1	Setting handling of tools and accessories for installation of heavy equipment.	3	1
Experiment-2	Commissioning of electrical equipment's.	3	2
Experiment-3	Measurement of earth resistance	3	2
Experiment-4	Testing of transformer oil	3	2
Experiment-5	Fault finding and repairing of different types of electrical wiring	3	2
Experiment-6	Disassembling and assembling of electrical machines e.g electric iron , washing machine ,geyser, submersible pumps, coolers etc.	3	2
Experiment-7	Trouble shooting and repairing of different types of domestic and industrial electrical equipment.	3	2
Experiment-8	Wiring of small ac motor/transformer/chokes.	3	3
Experiment-9	Cable jointing using epoxy resin kits.	3	3
Experiment-10	Repair and maintenance of circuit breakers upto 11 Kv	3	4
Experiment-11	Trouble shooting and repair of direct on line and star delta starter	3	4

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	-	-	-	-	-	-	-	-	-	3				3
CO2	-	-	-	-	-	-	-	-	-	1				2
CO3	-	-	-	-	3	-	-	-	-	2				2
CO4	-	-	2	-	1	-	-	-	-	-				3

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

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Effective from Session: 2012							
Course Code	DEV-501	**Title of the Course**	ENVIRONMENTAL EDUCATION AND DISASTER MANAGEMENT	**L**	**T**	**P**	**C**
Year	III	**Semester**	V	**3**	**1**	**0**	
Pre-Requisite	DEV-501	**Co-requisite**	NA				
Course Objectives	1.The course objective is to provide a comprehensive understanding of ecology, environmental impacts of human activities such as urbanization and industrialization, pollution control, waste management, and the legal framework governing environmental protection. Additionally, it introduces disaster management, environmental impact assessment (EIA), and strategies for mitigation and prevention, emphasizing sustainable development and environmental preservation.						

Course Outcomes	
CO1	Understand the natural environment and its relationships with human activities.
CO2	Characterize and analyze human impacts on the environment.
CO3	Integrate facts, concepts, and methods from multiple disciplines and apply to environmental problems.
CO4	Capacity to integrate knowledge and to analyze, evaluate and manage the different public health aspects of disaster events at a local and global levels.
CO5	Capacity to obtain, analyze, and communicate information on risks, relief needs and lessons learned from earlier disasters in order to formulate strategies for mitigation in future scenarios.

UnitNo.	**Title of the Unit**		**Contact Hrs.**	**Mapped CO**
UNIT-I	**Ecology & Ecosystem**	Basics of ecology, Ecosystem, Biodiversity Human activities and its effect on ecology and eco system, different development i.e. irrigation, urbanization, road development and other engineering activities and their effects on ecology and eco system, Mining and deforestation and their effects. Lowering of water level, Urbanization. Biodegradation and Biodegradability, composting, bioremediation, Microbes. Use of biopesticides and bio fungicides. Global warning concerns, Ozone layer depletion, Greenh ouse effect, Acid rain etc. Sources of pollution, natural and man-made, their effects on living environments and related legislation.	8	CO-1
UNIT-II	**Water & Noise Pollution**	Factors contributing water pollution and their effect. Domestic wastewater and industrial wastewater. Heavy metals, microbes and leaching metal. Physical, Chemical and Biological Characteristics of wastewater. Indian Standards for quality of drinking water. Indian Standards for quality of treated wastewater. Treatment methods of effluent (domestic wastewater and industrial/ mining wastewater), its reuse/safe disposal Sources of noise pollution, its effect and control.	8	CO-2
UNIT-III	**Air Pollution & Radioactive Pollution**	Definition of Air pollution, types of air pollutants i.e. SPM, NOX, SOX, GO, CO2, NH3, F, CL, causes and its effects on the environment. Monitoring and control of air pollutants, Control measures techniques. Introductory Idea of control equipment in industries i.e. Settling chambers Cyclones Scrubbers (Dry and Wet) Multi Clones Electrostatic Precipitations Bog Fillers. Ambient air quality measurement and their standards. Process and domestic emission control Vehicular Pollution and Its control with special emphasis of Euro-I, Euro-II, Euro-III and Euro IV. Sources and its effect on human, animal, plant and material, means to control and preventive measures.	8	CO-3
UNIT-IV	**Solid Waste Management & Legislations**	Municipal solid waste, Biomedical waste, Industrial and Hazardous waste, Plastic waste and its management. Preliminary knowledge of the following Acts and rules made there under- The Water (Prevention and Control of Pollution) Act - 1974. The Air (Prevention and Control of Pollution) Act - 1981. The Environmental Protection (Prevention and Control of Pollution) Act -1986. Rules notified under EP Act - 1986 Viz. The Manufacture, Storage and Import of Hazardous Chemical (Amendment) Rules, 2000. The Hazardous Wastes (Management and Handling) Amendment Rules, 2003. Bio-Medical Waste (Management and Handling) (Amendment) Rules, 2003. The Noise Pollution (Regulation and Control) (Amendment) Rules, 2002. Municipal Solid Wastes (Management and Handling) Rules, 2000. The Recycled Plastics Manufacture and Usage (Amendment) rules, 2003.	8	CO-4
UNIT-V	**Environmental Impact Assessment (EIA) & Disaster Management**	Basic concepts, objective and methodology of EIA. Objectives and requirement of Environmental Management System (ISO-14000) (An Introduction). Definition of disaster - Natural and Manmade, Type of disaster management, How disaster forms, Destructive power, Causes and Hazards, Case study of Tsunami Disaster, National policy- Its objective and main features, National Environment Policy, Need for central intervention, State Disaster Authority- Duties and powers, Case studies of various Disaster in the country, Meaning and benefit of vulnerability reduction, Factor promoting vulnerability reduction and mitigation, Emergency support function plan. Main feature and function of National Disaster Management Framework, Disaster mitigation and prevention, Legal Policy Framework, Early warning system, Human Resource Development and Function, Information dissemination and communication.	8	CO-5

References Books:

1. "Environmental Education and Disaster Management" – Dr. Sameer Rastogi, Dr. Praveen Kumar Gaur, Ms. Nidhi Srivastava.

e-Learning Source:
1. https://www.youtube.com/watch?v=k_sYIs8C-IQ&t=10s&pp=ygUURWNvbG9neSBhbmQgRWNvc3R5ZW0%3D
2. https://www.youtube.com/watch?v=76snt7DG57U&pp=ygUXV2F0ZXIgYW5kIGFpciBwb2xsdXRpb24%3D
3. https://www.youtube.com/watch?v=t6wKiSyhmtE&list=PLfYetoC-zFdCM1v0OvvqcQJsmcuKLmRET

PO-PSO CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PO 13	PO 14	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO6
CO 1	3								2						2					1
CO 2	3								2							2				
CO 3	3								2							2				
CO 4	3								1									2		
CO 5	3								2									2		

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

Name & Sign of Program Coordinator	Sign & Seal of HoD