Integral University, Lucknow

Effective from Session: 2012-13							
Course Code	DME-601	**Title of the Course**	DYNAMICS OF MACHINE	**L**	**T**	**P**	**C**
Year	III	**Semester**	VI	**3**	**1**	**0**	**…**
Pre-Requisite	10^{th}	**Co-requisite**	--				
Course Objectives	Ability to self-learn modern engineering tools, techniques, skills and contemporary engineering practice, necessary for engineering work.						

Course Outcomes	
CO1	Static and dynamic force analysis and construct turning moment diagram and flywheel analysis
CO2	Study the principle of working of different types of governors.
CO3	To study the unbalance and calculate balancing mass and its position.
CO4	To study the balancing of different types of machines
CO5	Identify different types of vibration, their causes and remedies

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
1	**DYNAMICS OF MACHINES**	Static and dynamic force analysis, Graphical and analytical approaches, Engine mechanisms, Turning moment diagram, Flywheel analysis, Gyroscopic action in machines.	6	CO1
2	**GOVERNORS**	Types and classification, Principle of working of gravity controlled and spring controlled governors, Stability, Isochronisms, Sensitivity and capacity.	7	CO2
3	**UNBALANCE IN MACHINES**	Origin of unbalanced forces and moments and effects of unbalance, Unbalance in rotating bodies and balancing of discs and rotors, Balancing machines, Field balancing ofdiscs and rotors, Unbalance in reciprocating machines -engine, Compressor, Presses	6	CO3
4	**ENGINES AND BALANCING**	Unbalance force and moment in a single cylinder engine and balancing, Multi cylinder engine balancing in Line engine, V and Radial engines, Lanchestor balancing techniques.	6	CO4
5	**VIBRATIONS**	Vibration of single degree of freedom, Systems, Free forced, Damped and undamped vibration, Frequency response and resonance, Bare excitation - Transmissibility and Isolation, Free vibration 2 DOF system - Concept of normal mode, vibration absorber, Multi degree of freedom systems, Free vibration of bars, Shafts and beams, Energy methods and approximate methods.	8	CO5

References Books:

1. Theory of Machines by : R.S. Khurmi
2. Theory of Machines by : S.S. Ratan

e-Learning Source:

https://www.youtube.com/watch?v=p075LPq3Eas&list=PL46AAEDA6ABAFCA78

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

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

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

Integral University, Lucknow

Effective from Session: 2012-13							
Course Code	DME-602	**Title of the Course**	REFRIGERATION AND AIR CONDITIONING	**L**	**T**	**P**	**C**
Year	III	**Semester**	VI	**3**	**1**	**0**	**-**
Pre-Requisite	10^{th}	**Co-requisite**	-				
Course Objectives	Apply basic principles of Mathematics and Science to solve engineering problems. Identify and rectify simple and common troubles in automotive vehicles. Supervise operation of boilers, steam turbines, air compressors, IC engines, refrigeration and air-conditioning equipment. Use hydraulic and pneumatic equipment. Use various instruments to measure heat/air related parameters.						

Course Outcomes	
CO1	Students will be able to demonstrate fundamental principles of refrigeration and air conditioning.
CO2	Students will be able to identify and locate various important components of the refrigeration and air conditioning system.
CO3	Students will be able to illustrate various refrigeration and air conditioning processes using psychometric chart.
CO4	Students will be able to design Air Conditioning system using cooling load calculations.
CO5	Students will be able to estimate air conditioning system parameters.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
1	REFRIGERATION:	Introduction to refrigeration system, Methods of refrigeration, Carnot refrigeration cycle, unit of refrigeration effect and C. O.P. AIR REFRIGERATION CYCLE: Open and closed air refrigeration cycles, Reversed Cornot cycle, Bell Coleman or Reversed Joule air refrigeration cycle, Aircraft refrigeration system. Classification of aircraft refrigeration system. Simple air refrigeration system. Boot strap refrigeration, Regenerative, reduced ambient, Dry air rated Temperature (DART)	**10**	**CO1**
2	VAPOUR COMPRESSION SYSTEM	Single stage system, analysis of vapour compression cycle, use of T-S and P-H chart, effect of change in suction and discharge pressure on C. O. P., Effect of sub cooling of condensate and superheating of refrigerant vapour on C.O.P. of the cycle, Actual vapour compression refrigeration cycle, Multivapour compression system requirement, removal of flash gas, intercooling, Different configuration of multistage, Cascade system. 8	**08**	**CO2**
3	VAPOUR ABSORPTION SYSTEM	Working principal of vapour absorption refrigeration, Compression between absorption and Compression system, Elementary idea of refrigeration absorption mixtures, Temperature- concentration diagram and Enthalph concentration diagram, Adiabatic mixing of two streams, Ammonia-water vapour absorption system, Lithium Bromide water vapour absorption system Comparison. REFRIGERATION: Classification, Nomenclature, Desirable properties of refrigerants, Common refrigerants, Secondary refrigerant and CFC free refrigerants.	**10**	**CO2**
4	AIR CONDITIONING	Introduction to air conditioning, Psychometric properties and their definitions, Psychometric chart, Different Psychometric processes, thermal analysis of human body Effective temperature and comfort, cooling and heating load calculation, Selection of inside and outside design conditions, Heat transfer through walls & roofs, Infilration and ventilation, Internal heat gain, sensible heat factor (SHF), By- pass factor, Grand Sensible heat factor (GSHF), Apparatus dew point (ADP).	**9**	**CO3**
5	REFRIGERATION EQUIPMENT AND APPLICATION	Elementary knowledge of refrigeration and air conditioning equipments e.g. Compressor, Condensers, Evaporators and Expansion devices, Air washers, Cooling towers and humidifying efficiency, Food preservation, cold storage, Refrigerates Freezers, Ice plant, Water cooling, Elementary knowledge of transmission and industrial air conditioning.	**7**	**CO4**

References Books:

Refrigeration and Air conditioning: C. P. Aurora, TMH

Refrigeration and Air conditioning: Manohar Prasad, New Age

Refrigeration and Air conditioning: R. S. Khurmi

Refrigeration and Air conditioning: P. L. Baloney

e-Learning Source:

https://www.daboosanat.com/wp-content/uploads/2018/02/0041-Air-Conditioning-and-Refrigeration.pdf

https://www.accessengineeringlibrary.com/content/book

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

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

Integral University, Lucknow

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

Integral University, Lucknow

Effective from Session: 2012-13							
Course Code	DME-604	**Title of the Course**	INDUSTRIAL ENGINEERING AND SAFETY	**L**	**T**	**P**	**C**
Year	III	**Semester**	VI	**3**	**1**	**0**	**-**
Pre-Requisite	10^{th}	**Co-requisite**	--				
Course Objectives	Ability to self-learn modern engineering tools, techniques, skills and contemporary engineering practice, necessary for engineering work.						

Course Outcomes	
CO1	To study about Knowledge and skill required for effective utilization of available resources in an industry.
CO2	To study the need, importance and functions the production, planning and control in the industries.
CO3	To make students about plant layout and various national and international codes and certifications.
CO4	To study the control charts for variables and attributes.
CO5	To make students aware of industrial safety requirement, causes of accidents and preventive steps.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
1	**INSPECTION AND WORK STUDY**	Inspection, Need and its planning, objective. Types of inspection. Inspection standards. Duties of inspector in inspection. Inspection needs. Method Study-Process chart, Flow process chart, Flow diagram, Man and Machine chart, Gang process Chart. Work Measurement-Time study, Tools used in time study, Performance rating, Allowance and use of time standard, Time and Motion study. Principle of human motion economy, Micro motion study, Memo motion study, Therbligs, left hand and right hand chart.	8	CO1
2	**PRODUCTION, PLANNING AND CONTROL, MATERIAL HANDLING AND MATERIAL HANDLING EQUIPMENT**	Methods of production-Unit, Batch, mass. Sales forecasting and its use. Planning-Products, process parts, materials, Optimum Batch quantity for production and Inventory, Theory and Analysis of M/C capacity, Batch quantity, Loading and balancing-Scheduling M/C loading. Preplanning activities, Routing, Dispatching, Follow up activities Factors in material handling problems, Cost reduction through improved material handling, Reduction in time of material handling, Material handling equipments –Lifting lowering devices, Transporting devices, Combination devices, Maintenance of material handling equipments.	8	C02
3	**PLANT LAYOUT, STANDARD AND CODE**	General plant location factors, Influence of location on plant layout, selection of plant site, Product layout, Process layout. Advantages and disadvantage of process Layout. National and International code, value of standardization. Standardization programme, Role of Standardization department, standardization techniques and problems.ISO-9000 - Concept and its evolution and implications	8	CO3
4	**QUALITY CONTROL AND COST ESTIMATION**	Concept of quality control, Quality assurance elements of quality control, Statistical quality control, Acceptance sampling, control chart for variable and attributes, Uses of X, R, "P" and "C" chart - O.C. curve, Concept of Total Quality Management Introduction and function of cost estimation, estimation procedure, elements of cost, depreciation - methods of calculating depreciation, overhead expenses, distribution of over head expenses, calculation of cost for machining and metal forming process and break even analyzer.	8	CO4
5	**VALUE ENGINEERING, ACCIDENTS AND SAFETY**	Concept of value engineering and technique Classification of accidents, causes of accidents, Effects of accidents, Action to be taken in case different types of accidents, Safety - needs, consciousness, procedures, measures. General safety devices used on machines, Safe working condition and productivity	8	CO5

References Books:

1.Industrial Engineering And Management by O.P Khanna

2. Industrial Engineering And Production Management by M . Mahajan

e-Learning Source:

https://archive.nptel.ac.in/courses/112/107/112107292/

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

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CO5	2	--	2	-	1	-	-	-	3	2	1

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

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

Integral University, Lucknow

Effective from Session: 2015-16							
Course Code	DME-607	**Title of the Course**	METROLOGY & QUALITY CONTROL	**L**	**T**	**P**	**C**
Year	III	**Semester**	VI	**3**	**1**	**0**	**-**
Pre-Requisite	10th	**Co-requisite**	…				
Course Objectives	Use hydraulic and pneumatic equipment. Use various instruments to measure heat/air related parameters.						

Course Outcomes	
CO1	It provides a basis for understanding how structure property. processing relationships are developed and used for different types of materials.
CO2	It provides a basis for testing of metal alloys.
CO3	It illustrates how to improve properties of metals.
CO4	It provides properties , characteristics and use of miscellaneous materials.
CO5	It provides a basis for understanding how structure /property/ processing relationships are developed and used for different types of materials.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
1	INTRODUCTION TO METROLOGY	Metrology Basis: Definition of metrology, objectives, categories, scientific metrology, Industrial metrology, legal metrology, need of inspection, precision, accuracy, sensitivity, readability, calibration, traceability, reproducibility, sources of errors. Linear and Angular Measurements: Definition of standards, line & end standards, end and length bars, wave length standards. Instruments used for angular measurements: (a) Vernier and optical Bevel Protractor. (b) Sine bars angle gauges, clinometers, Auto collimator.	8	CO-1
2	SURFACE FINISH MACHINE TOOL TESTING	Meaning of surface texture, surface roughness, methods of measuring surface finish, stylus probe instruments, tomlinson surface meter, root mean square value, center line average value, symbols for designating the surface roughness on drawings. Parallelism, straightness, squareness, co-axiallity, roundness, alignment testing of machine tools such as lathe machine, milling machine & drilling machine. Study of optical flat for flatness testing	8	CO-2
3	LIMITS, FITS, TRANSDUCERS, COMPARATORS	Concept of limits, fits and tolerances, interchangeability, hole & shaft basis system, Taylor principle. Transducers: classification of transducers, active & passive, resistive, inductive ,capacitive ,piezo resistive, thermo-resistive. Comparators: classification of comparators, use & working principle of comparators, dial indicator, sigma comparator, pneumatic comparator-high pressure differential type, electrical (LVDT) advantages & disadvantages	9	CO-2
4	TEMPERATURE MEASUREMENT MEASUREMENT OF VIBRATIONS	Non electrical methods- Bimetallic, liquid in glass and pressure thermometer . Electrical methods- Platinum resistance thermometer, thermistor, RTD. Pyrometers- radiation & optical.Seismic Accelerometer, Potentiometric type, L.V.D.T. Type, Piezoelectric type accelerometer.	6	CO-3
5	QUALITY CONTROL	Quality: Definitions, meaning of quality of produce & services, Quality characteristics, Quality of design, Quality of conformance, Quality of performance, Concept of reliability, cost, Quality assurance, Cost of network & repair, Quality & Inspection, Inspection stages. Total Quality Management: Principles & concept of total quality management. (a) Quality Audit: Concept of audit practices, lead assessor certification. (b) Six sigma: statistical meaning, methodology of system improvement. (c) Introduction of ISO 9001-2008.ISO-14000 & TS 16949. Statistical Quality Control: Basics of Statistical concepts, Meaning & importance of SQC, Variable & attribute Measurement. Control charts-inherent & assignable sources of variation, control charts for variables-X & R charts, control charts for attributes, p, np, C charts, process capability of machines, Cp & Cpk calculations, determination of statistical limits, different possibilities, Rejection area, statistically capable & incapable processes.	9	CO-4

References Books:

D. S. Kumar: Mechanical Measurement & Control Publication:- Metropolitan, New Delhi

R. K. Jain: Mechanical & industrial Measurements Khanna Publication, New Delhi

S. K. Singh Industrial Instrumentation & Control: - Tata McGraw Hill

R.K. Rajput Mechanical Measurement & Instrumentation: - KATSON Publication

e-Learning Source:

https://ftp.idu.ac.id/wp-content/uploads/ebook/tdg/TEKNOLOGI%20REKAYASA%20MATERIAL%20PERTAHANAN/Materials%20Science%20and%20Engineering%20An%20Introduction%20by%20William%20D.%20Callister,%20Jr.,%20David%20G.%20Rethwish%20(z-lib.org).pdf

https://home.iitk.ac.in/~anandh/E-book.htm

PO-PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	1	2	2	1	1	1	2	3	1	1	2

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CO2	1	2	2	1	1	1	2	3	1	1	2
CO3	1	1	1	1	2	1	2	3	2	3	2
CO4	1	2	2	1	1	2	2	3	1	1	2
CO5	1	2	2	1	2	1	2	3	1	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: 2012-13							
Course Code	DIM-601	**Title of the Course**	INDUSTRIAL MANAGEMENT AND ENTREPRENEURSHIP DEVELOPMENT	**L**	**T**	**P**	**C**
Year	III	**Semester**	VI	**3**	**1**	**0**	**-**
Pre-Requisite	10^{th}	**Co-requisite**	--				
Course Objectives	The course Industrial Management and Entrepreneurship Development prepares Diploma in Automobile Engineering students with essential management and entrepreneurial skills. It covers key management principles like planning, organizing, and control, while enhancing leadership, communication, and motivation techniques. Students learn human resource development, industrial relations, labor welfare, and financial management, including wage administration and costing. Material management concepts such as inventory control and procurement are addressed, alongside industrial laws like the Factory Act and taxation policies. The course also highlights entrepreneurship, project report preparation, and intellectual property rights, equipping students for leadership roles and entrepreneurial opportunities in the automobile industry.						

Course Outcomes	
CO1	The course will increase the skills in the students like communication skills, presentation, Human skills, Leadership skills, Managerial skills etc. after the completion of the course.
CO2	Increase students' capabilities and confidence to handle administrative, managerial and financial activities.
CO3	The course will assist in developing intellectual skills like creative thinking, Decision making, Leadership, Brain Storming, Motivation, etc.
CO4	The course will introduce skills in the students like team work, leadership skills, communication skills, body languages, positive attitude, etc.
CO5	This course is designed to develop understanding of various functions of management, role of workers and engineers and providing knowledge

Unit No.	**Title of the Unit**		**Contact Hrs.**	**Mapped CO**
UNIT-I	Principles Of Management	Definition of management, Administration organisation, Functions management, Planning, Organizing, Co- ordination and control, Structure and function of industrial organisations, Leadership- Need for leadership, Factors to be considered for accomplishing effective leadership, Communication -Importance, Processes, Barriers to communication, Making communication, Effective, formal and informal communication, Motivation - Factors determining motivation, Positive and negative motivation, Methods for improving motivation, Incentives, Pay promotion and rewards, Controlling - Just in time, Total quality management, Quality circle, Zero defect concept. Concept of Stress Management.	08	CO1
UNIT-II	Human Resource Development And Human And Industrial Relations	Introduction, Staff development and career development, Training rategies and methods. Human relations and performance in organisation, Understand self and others for effective behaviour, Industrial relation and disputes, Characteristics of group behaviour and Trade unionism, Mob psychology, Labour welfare, Workers participation in management.	08	CO2
UNIT-III	Personnel And Financial Management	Responsibilities of human resource management - Policies and functions, Selection - Mode of selection - Procedure- training of workers, Job evaluation and Merit rating Objectives and importance wage and salary administration - Classification of wage, Payment schemes, Components of wage, Wage fixation. Fixed and working capital - resource of capital, Shares, types preference and equity shares, Debenture types, Public deposits, Factory costing, Direct cost, Indirect cost, Factory over head, Fixation of selling price of product, Depreciation- Causes, Methods.	08	CO3
UNIT-IV	Material Management, Labour, Industrial And Tax Laws	Objective of a good stock control system - ABC analysis of inventory, Procurement and consumption cycle, Reorder level, Lead time, Economic order quantity, Purchasing procedure, Stock keeping, Bin card. Importance and necessity of industrial legislation, Types of labour laws and dispute, Factory Act 1948, Payment of Wages Act 1947, Employee State Insurance Act 1948, Various types of taxes - Production Tax, Local Tax, Trade tax, Excise duty, Income Tax.	08	CO4
UNIT-V	Entrepreneurship Development And Intellectual Property Rights :	Concept of entrepreneurship, need of entrepreneurship in context of prevailing employment conditions of the country. Successful entrepreneurship and training for entrepreneurship development. Idea of project report preparation. Introduction to IPR (Patents, Copy Right, Trade Mark), Protection of undisclosed information, Concept and history of patents, Indian and International Patents Acts and Rules, Patentable and No patentable invention including product versus Process.	08	CO5

References Books:

Industrial Management And Entrepreneurship Development by Dr. Mohd. Shuaib Siddiqui

e-Learning Source:

https://www.youtube.com/watch?v=kqY4m059zFk&list=PLY8pCdWSlXrSNy8EBIQ9vclPRtd0qmpNo

https://www.youtube.com/watch?v=Jq_BeC-gMEk&list=PL0x1u9aMwXImXW1J5Z7wfH2uwQW9ZgK83

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PO-PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1
CO1	-	-	-	-	1	-	-	-	1	-	-	-	-
CO2	-	-	3	-	1	-	-	-	1	-	-	-	-
CO3	-	3	-	-	-	-	-	-	1	1	-	-	-
CO4	-	-	-	-	-	-	-	-	-	1	-	-	-
CO5	2	2	-	2	-	-	-	2	-	1	-	-	-
CO6	-	1	-	3	-	-	-	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: 2012-13							
Course Code	DEV-601	**Title of the Course**	ENVIRONMENTAL EDUCATION AND DISASTER MANAGEMENT	**L**	**T**	**P**	**C**
Year	III	**Semester**	VI	**3**	**1**	**0**	
Pre-Requisite	10^{th}	**Co-requisite**	…				
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 to 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 controlling 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. 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.

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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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3								2						2					1
CO2	3								2							2				
CO3	3								2							2				
CO4	3								1									2		
CO5	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: 2012-13							
Course Code	DME-652	**Title of the Course**	REFRIGERATION AND AIR CONDITIONING LAB	**L**	**T**	**P**	**C**
Year	III	**Semester**	VI	0	0	2	--
Pre-Requisite	10^{th}	**Co-requisite**	-				
Course Objectives	Understand the basic processes of air conditioning, including psychometric charts and cooling load calculations						

Course Outcomes	
CO1	The fundamental principles and applications of refrigeration and air conditioning system.
CO2	Obtain cooling capacity and coefficient of performance by conducting test on vapor compression refrigeration systems.
CO3	Present the properties, applications and environmental issues of different refrigerants
CO4	Operate and analyze the refrigeration and air conditioning systems

Experiment no	Experiment	Contact Hrs.	MappedCO
Experiment no-1	Experiment on the refrigeration test-rig and calculation of various performance parameters.	2	CO1
Experiment no-2	To study different types of expansion devices used in a refrigeration system	2	CO2
Experiment no-3	To study different types of evaporators used in a refrigeration system	2	CO3
Experiment no-4	To study basic components of an air conditioning system.	2	CO4
Experiment no-5	Experiment on air conditioning test-rig and calculation of various performance parameters	2	CO5
Experiment no-6	To study air washers.	2	CO1
Experiment no-7	Study and determination of volumetric efficiency of a compressor	2	CO2
Experiment no-8	Visit of a central air conditioning plant	2	CO3
Experiment no-9	Visit of a cold storage plant	2	CO4
Experiment no-10	Study of a window air conditioner	2	CO5

PO-PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	3		2			3		2		1	
CO2		3	3				2	3			
CO3		3	2	3			2		3	3	
CO4	2	1					2				
CO5	3	1	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: 2012-13							
Course Code	DME-653	**Title of the Course**	METROLOGY LAB	**L**	**T**	**P**	**C**
Year	III	**Semester**	VI	**3**	**1**	**0**	**-**
Pre-Requisite	10th	**Co-requisite**	…				
Course Objectives	Use hydraulic and pneumatic equipment. Use various instruments to measure heat/air related parameters.						

Course Outcomes	
CO1	It provides a basis for understanding how structure property. Processing relationships are developed and used for different types of materials.
CO2	It provides a basis for testing of metal alloys.
CO3	It illustrates how to improve properties of metals.
CO4	It provides properties , characteristics and use of miscellaneous materials.
CO5	It provides a basis for understanding how structure /property/ processing relationships are developed and used for different types of materials.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
1	EXPERIMENT NO-01	Measurement of angle with the help of sine bar/ vernier Bevel protractor	2	CO-1
2	EXPERIMENT NO-02	Study and sketch of various types of optical projectors.	2	CO-2
3	EXPERIMENT NO-03	Use of comparators for measurement	2	CO-2
4	EXPERIMENT NO-04	To measure the diameter of a hole with the help of precision balls.	2	CO-3
5	EXPERIMENT NO-05	To measure the diameter of a hole with the help of precision balls.	2	CO-4
6	EXPERIMENT NO-06	To test the squareness of a component with autocollimeter.	2	CO-4
7	EXPERIMENT NO-07	To measure the pitch, angle and form of thread of a screw	2	CO-4
8	EXPERIMENT NO-08	Measurement of gear elements by using gear tooth vernier.	2	CO-4
9	EXPERIMENT NO-09	To measure the straightness of the edge of a component with the help of auto collimeter	2	CO-4
10	EXPERIMENT NO-010	Use of linear measuring instrument such as vernier caliper and micrometer.	2	CO-4
11	EXPERIMENT NO-011	Use of height gauge and vernier calipers.	2	CO-4

References Books:

D. S. Kumar: Mechanical Measurement & Control Publication:- Metropolitan, New Delhi

R. K. Jain: Mechanical & industrial Measurements Khanna Publication, New Delhi

e-Learning Source:

https://ftp.idu.ac.id/wp-content/uploads/ebook/tdg/TEKNOLOGI%20REKAYASA%20MATERIAL%20PERTAHANAN/Materials%20Science%20and%20Engineering%20An%20Introduction%20by%20William%20D.%20Callister,%20Jr.,%20David%20G.%20Rethwish%20(z-lib.org).pdf

https://home.iitk.ac.in/~anandh/E-book.htm

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

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

Name & Sign of Program Coordinator	Sign & Seal of HoD