Integral University, Lucknow

Effective from Session: 2012-13							
Course Code	DAE-501	**Title of the Course**	KINEMATICS OF MACHINE	**L**	**T**	**P**	**C**
Year	III	**Semester**	V	**3**	**1**	**0**	**-**
Pre-Requisite	10th	**Co-requisite**	---				
Course Objectives	Ability to self-learn modern engineering tools, techniques, skills and contemporary engineering practice, necessary for engineering work.						

Course Outcomes	
CO1	Identify mechanism in real life application
CO2	Perform kinematic analysis of simple mechanisms
CO3	Perform statics and dynamics force analysis of slider crank mechanisms
CO4	Determine moment of inertia of rigid bodies experimentally
CO5	Analyze velocity and acceleration of mechanisms by vector and graphical method

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
1	**MECHANISMS AND MACHINES**	Definition, Kinematic pairs, types of mechanism, Special types of mechanism, Space mechanisms.	5	1
2	**KINEMATIC ANALYSIS**	Displacement, Velocity and Acceleration of plane mechanism, Graphical and analytical techniques.	7	2
3	**SYNTHESIS OF MECHANISMS**	Crank Rockers, Four Bar Mechanisms, Slider Crank Mechanisms.	6	3
4	**CAMS AND CAM FOLLOWER MECHANISMS**	Purpose of using cam- Follower mechanisms, types of cams and cam follower mechanisms, Nomenclature synthesis of disc cam profiles for prescribed follower motion, determination of basic dimension, Graphical and analytical approaches for different types of followers, Dynamics of cam – follower systems - Jump and crossover stock.	7	5
5	**GEARS AND GEAR DRIVES**	Power transmission by gears and fundamental law of gearing, Involute profile and conjugate action, Characteristics of involute tooth gear - Pinion to system, Under cutting and interference, Minimum number teeth, types of gears, Various gear drives - Spur, Helical, worm and Bevel gear, Gear train Simple compound and epicyclic gear trains, Differential gears	9	4

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=7WppBa-cLuk&list=PLhSp9OSVmeyJSYB4gKPL8UrmB_a3kfHYI

PO-PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	1	3	--	--	1	--	--	1	3	-	2
CO2	1	--	2	--	1	--	--	3	-	2	-
CO3	--	3	--	--	--	--	--	-	2	-	1
CO4	1	--	--	2	--	2	--	2	-	-	3
CO5	1		2	-	3	-	-	-	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	DAE-502	**Title of the Course**	INDUSTRIAL ENGINEERING AND SAFETY	**L**	**T**	**P**	**C**
Year	III	**Semester**	V	**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

Integral University, Lucknow

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	DAE-503	**Title of the Course**	DESIGN AND ESTIMATION	**L**	**T**	**P**	**C**
Year	III	**Semester**	V	**3**	**1**	**0**	
Pre-Requisite	10^{th}	**Co-requisite**	--				
Course Objectives	1. To understand about basic concepts of Designing. 2. Be able to learn modern engineering tools, techniques, skills and contemporary engineering practice, necessary for machine design.						

Course Outcomes	
CO1	Ability to apply knowledge of engineering graphics, machine drawing, basic science & basic applied mathematics, basic machining processes, material science, for design procedures of mechanical component use in industries & incorporated in machine design.
CO2	Understand different welded and riveted joint structure and able to apply its knowledge to analyze its strength.
CO3	Be able to apply knowledge subjected to twisting moment ,machine parts subjected to combined bending and twisting moment and able to apply its knowledge to analyze its strength.
CO4	Be able to apply knowledge of the stresses & strain of mechanical component & incorporated in gear design.
CO5	Ability to apply knowledge of engineering machine drawing basic machining processes, material science, for estimation of material requirement & estimation of time for different machining operations.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
1	INTRODUCTION TO DESIGN & MACHINE PARTS SUBJECTED TO DIRECT LOADS AND SHEAR LOADS	General design consideration in machine parts. Mechanical properties of materials of construction, steps in machine design. Factor of safety, Selection of materials. Threaded connections, core and nominal diameter of screw, boiler-Stay. Design for number of studs or bolts and their diameter for cylinder covers due to external forces. Punching and shearing. Design of cotter and Knuckle joints.	6	CO1
2	RIVETED AND WELDED JOINTS MACHINE PARTS SUBJECTED TO BENDING MOMENT	Types of riveted joints, possible failure of riveted joints. Strength and efficiency of riveted joint. Unwins formula. Determination of safe load and pitch of rivets. Design of lap and butt joints. Common type of welded joints, definition of leg length, throat thickness and size of weld. Simple design for 'V' butt welded joint, Transverse fillet and parallel filletwelded joints. Design for the diameter of railway-Wagon axle, axle used in road-vehicles.Semi-elliptic Laminated spring-Proof load and proof stress stiffness. Expression for max. stress and deflection.determination of different dimensions number of Laminations, Central deflection in a Laminated spring.	7	CO2
3	MACHINE PARTS SUBJECTED TO TWISTING MOMENT,MACHIN E PARTS SUBJECTED TO COMBINED BENDING AND TWISTING MOMENT	Springs. Maximum shear stress induced for given axial load. Expression for axial deflection, spring index, solid length and stiffness. Calculation for number of coils, mean coil dia and dia of spring wire for axial gradual loads. Simple cases of composite springs. Design of keys and coupling bolts for a rigid flanged coupling Theory of failures: (i) Maxm. Principal stress theory. (ii) Maxm. shear stress theory concept of equivalent bending moment, equivalent torque, Design of over hung crank pin. Design of shaft dia for over hung pulley in a belt drive.	7	CO3
4	MACHINE PARTS SUBJECTED TO COMBINED DIRECT AND BENDING STRESS ANDD ESIGN OF GEAR	Eccentric load and eccentricity. Max. and minimum stress intensities. Reversal of stress. Design for safe load on small columns. Design of brackets and clamps for eccentric loading. Selection of material, Design analyzing, Lewis equation, Stress concentration, Dynamic load, Surface compressive stress, Beam strength, Bending stress, check or plastic deformation, Design procedure for Spur gear and Helical gear.	6	CO4
5	ESTIMATION OF MATERIAL REQUIREMENT & ESTIMATION OF TIME FOR DIFFERENT MACHINING OPERATIONS	Estimation of weight of simple machine parts. Review of the area/volume of triangle, equilateral triangle, Hexagon, rectangle, Square rhomboid, parallelogram, Octagen, circle, Hollow circle, Sector of circle, Sector of Hollow circle circular, Semi circle, Cube prism, Square prism, general prism, Cylinders, Sphere, Hollow sphere segment of sphere, Zone of a sphere, Cones pyramids, Frustum of a pyramid, Frustum of a cone. Turning, Facing, Chamfering, Knurling, Taper Turning, Threading, Drilling, Boring, Shaping and planning, Milling, Broaching, Simple problems pertaining to above.	8	CO5

References Books:

1. Machine Design by : V.B. Bhandari
2. Machine Design by : Dr. Rajendra Kaur, Laxmi Publications.

Integral University, Lucknow

3. Machine Design by : R.S. Khurmi
e-Learning Source:
https://youtube.com/playlist?list=PL3D4EECEFAA99D9BE&si=2nw22IU8g_E1YaP5

PO-PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	1	2	3	--	2	---	--	1	3	-	2
CO2	1	1	--	2	---	---	--	3	-	2	-
CO3	--	3	1	1	1	2	--	-	2	-	1
CO4	1	---	--	--	--	--	--	2	-	-	3
CO5	1	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	DAE-505	**Title of the Course**	REFRIGERATION AND AIR CONDITIONING	**L**	**T**	**P**	**C**
Year	III	**Semester**	V	**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: 2015-16							
Course Code	DAE-507	**Title of the Course**	COMPUTER AIDED DESIGN AND MANUFACTURING	**L**	**T**	**P**	**C**
Year	III	**Semester**	V	**3**	**1**	**0**	**-**
Pre-Requisite	10th	**Co-requisite**	--				
Course Objectives	Creating 2D and 3D models Understanding CAD concepts Creating engineering drawings Understanding 3D modeling concepts Understanding CAM concepts						

Course Outcomes	
CO1	Students learn how to create 2D drawings and 3D models of products using CAD software.
CO2	Students learn the basics of CAD software, such as AutoCAD, Solid Works, and Fusion 360
CO3	Students learn how to create engineering drawings using part and assembly models
CO4	Students learn about wireframe, surface, and solid modeling.
CO5	Students learn how CAM systems can be used to monitor and regulate production.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
1	Introduction	Introduction to CAD and CAM. Need, Scope & Importance of CAD in Industries, Design Steps & Reasons for Implementing CAD System, Salient Features, Benefits & Functional Areas of CAD. Introduction to CAM, Functions of CAM, Benefits of CAM, Integrated CAD/CAM Organization-Concept, Necessity of CAD/CAM Integration, Computer Integrated Production System-Features & Advantages.	07	CO03
2	Hardware & software	Hardware & Software In CAD SYSTEM, Input & output devices- types, configuration, applications &Installation. Graphic packages: Types, features, system requirements & applications; GUI-concept, meaning & features; Graphic standards such as GKS, PHIG, IGES. 2D & 3D geometric transformations, translation, sealing, rotation, Mirror, zooming. Geometric modeling; types, features & applications, Animation concepts, need applications	10	CO02
3	Modeling	3D modeling, Difference between 2D & 3D, Axes nomenclature. Surfaces- types & applications. Solid modeling- methods & applications, Feature based modeling-concept, meaning & applications. Parametric modeling- concept, meaning & applications. Constraints – concept, meaning, common. Constraints & their utilities. Dimensional relationships- concept, meaning & utility. Model tree- concept, applications & benefits.	08	CO04
4	CNC machines	CNC Machines, components and part programming. Numerical control: Introduction, features, Advantages & limitations, Layout of CNC system, functions of each component of NC system, manufacturing methodology of NC system, Development of CNC& DNC Systems. Computer numerical control (CNC): Introduction, types &classification, features, specifications, benefits & applications, Salient construction features of CNC machines differing from conventional machines. CNC tooling-types, working & applications. Working of Automatic Tool Changer (ATC) & Automatic Pallet Changer (APC), Work holding & loading devices.	07	CO03
5	Manufacturing	CNC axes, motion nomenclature & coordinate system, Various positions like machine zero, home position, work piece zero, program zero . Machine control systems- types & applications. Preparatory functions (G codes) & miscellaneous functions (M codes). APT programming, tool nose radius compensation, linear &circular interpolation methods-coding. Macros, subroutines, fixed cycles, canned cycles. Programming practice problems on plain, step & taper turning. Recent trends in CAD/CAM. Adaptive control-Definition, meaning, block diagram& applications. Direct Numerical Control -Definition, meaning, block diagram, applications. Flexible Manufacturing System- Concept, evaluation, main elements, layout, importance & applications. Robotics- Definition of robot, classification, types of robot, elements of robot & applications. Computer Integrated Manufacturing- Concept, definitions, area covered benefits.	08	CO02

References Books:

CAD/CAM/CIM by R. Radhakrishnan, S. Subramanain, New Age International Ltd.

CAD/ CAM by Ibrahim Zeid, Mastering TMH Publishing Company Ltd.

CAD/CAM by Mikell P. Groover, Emory Zimmens, Jr. Prentice Hall of India

Computer Integrated Design and Manufacturing, McGraw Hill-Bedworth David. D

Computer Integrated Manufacturing, PHI-Paul G. Ranky

e-Learning Source:

https://www.youtube.com/watch?v=3qEK7Lnk2TI

https://www.youtube.com/watch?v=a9dyeCl6Ejc&list=PLvBMRJ-z4QC9H3kuJzOqBxe_LPf9f3b-Y

https://www.vssut.ac.in/lecture_notes/lecture1530947994.pdf

https://mrcet.com/downloads/digital_notes/ME/IV%20year/CAD%20CAM%20Digital%20Notes.pdf

Integral University, Lucknow

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	1	2	1	1	1	1	1
CO4	1	1	1	2	2	1	2	1	2	2	1
CO5	1	1	2	2	2	2	1	2	2	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	DIM-501	**Title of the Course**	INDUSTRIAL MANAGEMENT AND ENTREPRENEURSHIP DEVELOPMENT	**L**	**T**	**P**	**C**
Year	III	**Semester**	V	**3**	**1**	**0**	**-**
Pre-Requisite	10th	**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

Integral University, Lucknow

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	DWS-551	**Title of the Course**	Mechanical Workshop	**L**	**T**	**P**	**C**
Year	III	**Semester**	V	0	0	3	-
Pre-Requisite	10th	**Co-requisite**	---				
Course Objectives	To understand and compare the shaping/machining/treatment of various materials by different processes. To impart the knowledge of machines and tools used in different mechanical Processes.						

Course Outcomes	
CO1	To acquire skills in basic engineering practice.
CO2	To identify the hand tools and instruments.
CO3	To acquire measuring skills.
CO4	To acquire practical skills in the trades
CO5	To provides the knowledge of job materials in various shops.

Exp No.	Title of the Experiment	Content of the Experiment(Any Ten)	Contact Hrs.	MappedCO
1.	Making utility jobs on lathe involving	Step turning, Parallel Turning, Taper turning and Knurling	3	1
2.		Drilling, Boring, Counter boring and Internal taper turning under cutting, Chamfering & Facing.	3	5
3.		V. thread cutting (Internal and External)	3	1
4.		Square thread Cutting (internal and external)	3	1
5.	Making utility jobs on	Planer - Planing of C.I Block & finish it on surface grinder togiven specification	3	2
6.		Shaper - 'V' Block of different size	3	2
7.	Group work on milling machine involving down and climb Milling	Slab Milling	3	1
8.		Groove Cutting(Dovetail, Square, T-slot and Radius)	3	5
9.	Fitting shop	To make different types of keys.	3	2
10.		Making male and female fitting jobs.	3	2

References Books:

Workshop Technology: R S Khurmi and J K Gupta

e-Learning Source:

https://www.vlab.co.in/

PO-PSO CO	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 6	PO 7	PO 8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO 5
CO1	1	-	-	1	-	2	-	-	-	-	-	-	-	1	1	-	1	-
CO2	1	-	-	1	-	2	-	-	-	-	-	-	-	2	1	-	2	-
CO3	1	-	-	1	-	2	-	-	-	-	-	-	-	1	1	-	2	-
CO4	1	-	-	1	-	2	-	-	-	-	-	-	-	1	1	-	1	-
CO5	2	-	-	3	-	-	-	-	-	-	-	-	-	2	1	-	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	DAE-554	**Title of the Course**	COMPUTER AIDED DESIGN LAB	**L**	**T**	**P**	**C**
Year	III	**Semester**	V	**0**	**0**	**2**	**-**
Pre-Requisite	10th	**Co-requisite**	--				
Course Objectives	Creating 2D and 3D models Understanding CAD concepts Creating engineering drawings Understanding 3D modeling concepts Understanding CAM concepts						

Course Outcomes	
CO1	Students learn how to create 2D drawings and 3D models of products using CAD software.
CO2	Students learn the basics of CAD software, such as AutoCAD, SolidWorks, and Fusion 360
CO3	Students learn how to create engineering drawings using part and assembly models
CO4	Students learn about wireframe, surface, and solid modeling.
CO5	Students learn how CAM systems can be used to monitor and regulate production.

No.	Title of the Unit		Contact Hrs.	Mapped CO
1	EXPERIMENT-01	Development of simple graphic package using 2-D and 3-D transformation and algorithms for generation of lines and circles (programming using C)	02	CO-3
2	EXPERIMENT-02	Development of wire frame models of simple 3-D objects like box , cylinder, cone, pyramids, prisms and sphere (programming using C).	02	CO-5
3	EXPERIMENT-03	FEM Mesh generation	02	CO-4
4	EXPERIMENT-04	Stress analysis / heat conduction analysis using standard FEM package.	02	CO-3
5	EXPERIMENT-05	Stress analysis of cantilever using U.D.L.	02	CO-2
6	EXPERIMENT-06	Stress analysis of simply supported beam using point load.	02	CO-3
7	EXPERIMENT-07	Benching of circular plate and analysis of stress and strain	02	CO-1
8	EXPERIMENT-08	Heat conduction analysis using circular bar	02	CO-4
9	EXPERIMENT-09	Design and analysis of crank shaft.	02	CO-1

References Books:

CAD/CAM/CIM by R. Radhakrishnan, S. Subramanain, New Age International Ltd.

CAD/ CAM by Ibrahim Zeid, Mastering TMH Publishing Company Ltd.

CAD/CAM by Mikell P. Groover, Emory Zimmens, Jr. Prentice Hall of India

Computer Integrated Design and Manufacturing, McGraw Hill-Bedworth David. D

Computer Integrated Manufacturing, PHI-Paul G. Ranky

e-Learning Source:

https://www.youtube.com/watch?v=3qEK7Lnk2TI

https://www.youtube.com/watch?v=a9dyeCl6Ejc&list=PLvBMRJ-z4QC9H3kuJzOqBxe_LPf9f3b-Y

https://www.vssut.ac.in/lecture_notes/lecture1530947994.pdf

https://mrcet.com/downloads/digital_notes/ME/IV%20year/CAD%20CAM%20Digital%20Notes.pdf

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	1	2	1	1	1	1	1
CO4	1	1	1	2	2	1	2	1	2	2	1
CO5	1	1	2	2	2	2	1	2	2	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	DAE-555	**Title of the Course**	REFRIGERATION AND AIR CONDITIONING LAB	**L**	**T**	**P**	**C**
Year	III	**Semester**	V	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