Integral University, Lucknow

Effective from Session: 2024-25							
Course Code	DMA-201	**Title of the Course**	APPLIED MATHEMATICS-II	**L**	**T**	**P**	**C**
Year	I	**Semester**	II	**03**	**01**	**00**	**-**
Pre-Requisite	10th	**Co-requisite**	NA				
Course Objectives	To know the basic concepts of Mathematics with their Applications in Engineering.						

Course Outcomes	
CO1	Definite and Indefinite integral knowledge makes students wide in solving problems related to big summations and areas related problems.
CO2	Applications of Integration will lead students to get a good knowledge of finding areas, volume etc.
CO3	Some different rules like Newton-Cote's Quadrature formula, Trapezoidal rule, Simpson's 1/3rd rule and 3/8th rule, Students will be able to solve big Integral problems in a very easy pattern.
CO4	2D Coordinate Geometry has application in the field of construction. The sketch of a building is a pure geometry. It is also used for finding the distance between places and in geography also it has many applications. It is also used in Astrophysics to find the distance between planets
CO5	Three dimensional geometry is used in various fields like in computer graphics, biotechnology and medical sciences and in different projects also.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
1	i). Integral Calculus-I ii). Indefinite Integral	**Integral Calculus – I:** Definition of Integration (anti-derivative), Integration of standard functions. Rule of integration (Integration of sum, difference and Scalar multiplication). **Indefinite Integral:** Integration by substitution, Integration by parts, Integration by partial fraction.	07	1
2	i). Integral Calculus -II ii). Application of Integral Calculus	**Integral Calculus - II:** **Definite Integral:** Definition of definite integral, properties and evaluation of definite integral. **Application of Integral Calculus:** Finding areas bounded by sample curves.	08	2
3	i). Numerical Integral & Error	**Numerical Integration & Error:** Introduction, Newton-Cote's Quadrature formula, Trapezoidal rule, Simpson's 1/3rd rule and 3/8th rule. Concept of error for simple function.	08	3
4	i). Coordinate Geometry (2Dimention)	**Coordinate Geometry (2-Dimension):** Circle, Equation of circle in standard form. Centre - Radius form, Diameter form, Two intercept form.	08	4
5	i). Coordinate Geometry (3-Dimention)	**Co-ordinate Geometry (3 Dimension):** Straight lines and planes in space, Distance between two points in space, direction cosine and direction ratios, Finding equation of a straight line (without proof).	09	5

References Books:

1. Applied Mathematics: Kailash Sinha, Meerut publication.
2. Applied Mathematics: P. K. Gupta, Asian Publication.
3. Applied Mathematics: H. R. Loothara, Bharat Bharti Publication.
4. Mathematics for Polytechnic: S.P. Deshpande, Pune Vidyarthi Griha.

e-Learning Source:

https://www.youtube.com/watch?v=syLIPtxjN0E&list=PLn78sdsv0QoXBxWmyGp5SQdg-F_AlyB05&pp=iAQB

https://www.youtube.com/watch?v=rBNQ0r7CN2c&list=PLn78sdsv0QoXUdre4aCAobj3cxACkNeLL&pp=iAQB

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

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

Name&SignofProgramCoordinator	**Sign&Seal ofHoD**

Effective from Session: 2010							
Course Code	DPH-201	**Title of the Course**	Applied Physics-II	**L**	**T**	**P**	**C**
Year	I	**Semester**	II	**3**	**1**	**0**	
Pre-Requisite	None	**Co-requisite**	None				
Course Objectives	To equip learners with the foundational concepts of units, dimensions, dimensional analysis, measurement accuracy, and vector operations, enabling them to analyze physical equations, perform unit conversions, estimate errors, and apply vector algebra in solving scientific and engineering problems.						

Course Outcomes	
CO1	Students learn to analysis to effect of building acoustic condition.
CO2	Students learn about the application of ultrasound in various fields like SONAR, medical and research work and sound signal etc.
CO3	The student learns to introduce and overview of optical fiber and process of transmission of signal and application of various field.
CO4	Students learn to investigate broken telegraph wire with the help of post office box.
CO5	Students learn to simplify complicated circuits by using Kirchhoff's law.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
Unit-1	**Application of Sound Waves**	**Acoustics**: Standing waves, Closed and Open organ pipes, Resonance, End correction. Definition of pitch, loudness, quality and intensity of sound waves. Echo and reverberation and reverberation time. Sabine's formula, Control of reverberation time (problems on reverberation time). Acoustics of buildings, defects and remedy. **Ultrasonics:** Generation, Magnetostriction, Piezoelectric effect, Application in new technology	6	CO-1
Unit-2	**Fiber Optics**	Quantum nature of light, Coherence (Spatial and temporal), Duality of wave and particle, Concept of Interference, Biprism, Fraunhoffer single slit diffraction, grating, Resolving and dispersive power, Elementary concept of polarization. Critical angle, Total internal reflection, Principle of fiber optics, Optical fiber, Pulse dispersion in step-index fibers, Graded index fiber, Single mode fiber, Optical sensor	8	CO-2
Unit-3	**D.C. Circuits, Dielectrics**	Principle of Wheat Stone bridge and application of this principle in measurement of resistance (Meter bridge and Post Office Box); potentiometer, Kirchhoff's Law and their simple application. Principle of Carey-Foster's bridge. Electric potential, potential energy, Energy of a charged capacitor. Charging and discharging of capacitors. Electric dipole; effect of electric field on dielectrics, polarization. Magnetic Fields & Materials: Dia, Para and Ferromagnetism, Ferrites, Hysteresis, Hysteresis curve of a ferro magnetic materials and their uses, Basic idea of super conductivity.	8	CO-3
Unit-4	**Semiconductor Physics, Nuclear Physics**	classification of solids into conductors, insulators and semiconductors based on energy band structure. Intrinsic and extrinsic semiconductors, Electrons and holes as charge carriers in semiconductors, Effect of temperature in conduction in semiconductors, P-type and N-type semiconductors, P-N junction formation, barrier voltage, Forward and reverse biasing of a junction diode. Continuous and characteristics of X-rays, Properties & applications of X-rays. Radioactivity, Nuclear stability, Radioactive emission, radiation hazards, nuclear fission and fusion, nuclear reactors and their application, Mass-energy relation, atomic mass unit, Mass defect and binding energy.	10	CO-4
Unit-5	**Lasers and their Applications, Non-conventional energy resources**	Absorption and Emission of energy by atom, Spontaneous and Stimulated Emission, Population inversion. Main components of laser and types of lasers, Ruby Laser, He-Ne laser and their applications. Wind energy: Introduction, scope and significance, measurement of wind velocity by anemometer, general principle of windmill, Indian wind energy program. Solar energy: Solar radiation and potentiality of solar radiation in India, unit of solar radiation. Biofuel and Gobar gas plants Uses of solar energy: Solar Cooker, solar water heater, solar photo-voltaic cells, solar energy collector, Modern applications in technology.	8	CO-5

References Books:

1. Nootan Physics: Kumar & Mittal
2. Applied Physics: P.K. Gupta.
3. Pradeep Fundamental: Gogia & Gomber.
4. Applied Physics: P.S. Kushwaha.

e-Learning Source:

1. https://www.youtube.com/watch?v=2BzQYDwZeZk&list=PL5zwY2E7i60XzRPOrKzvSzjvxnyK6jQB3
2. https://www.youtube.com/watch?v=IEju3AT1olk&list=PLgwJf8NK-2e4iGfcV1Jz81dF6sXk5LlT3

PO-PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2											2		
CO2	2										1	2		
CO3	2				2	1						2		
CO4	1				2		3					1		
CO5	2	2										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: 2025-26							
Course Code	DCH-201	**Title of the Course**	Applied Chemistry II	**L**	**T**	**P**	**C**
Year	I	**Semester**	II	**3**	**1**	**0**	**0**
Pre-Requisite	None	**Co-requisite**	None				
Course Objectives	1. To understand all the chemical reactions, principle and theory related to topics 2. To provide examples and unsolved problems as much as possible 3. To provide example related to industrial as well as domestic proposes						

Course Outcomes	
CO1	To acquire the foundational knowledge needed to understand the properties, combustion behaviors, and potential impacts of different fuels.
CO2	To understand the all, disperse systems used in pharmaceutical and other paint industry.
CO3	To provide knowledge about the nature of compounds and nature of bonds of organic compound as well as the possibility of chemical reaction.
CO4	To provide the fundamental understanding needed to design and optimize industrial Process
CO5	To understand the vital material which is used in a range of application across various industries. Understand manufacturing process to create sustainable material.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
Unit-1	**Fuels**	Definition, its classification, high and low calorific value. Determination of calorific value of solid and liquid fuels by Bomb calorimeter. Liquid fuel- Petroleum and its refining, distillates of petroleum (Kerosene oil, Diesel and Petrol), Benzol and power alcohol. Knocking, Anti-knocking agents, Octane number and Cetane number. Cracking and its type, Gasoline from hydrogenation of coal (Bergius process and Fischer Tropsch's process) Gaseous Fuel- Coal gas, Oil gas, Water gas, Producer gas, Biogas, LPG and CNG. Numerical problems based on topics.	10	1
Unit-2	**Colloidal State of Matter Lubricants**	Concept of colloidal and its types, different system of colloids, dispersed phase and dispersion medium. Methods of preparation of colloidal solutions, Dialysis and electrodialysis. Properties of colloidal solution with special reference to absorption, Brownian movement, Tyndal effect, Electrophoresis and Coagulation. Relative stability of hydrophilic and hydrophobic colloids. Protection and protective colloids. Emulsion, types, preparation, properties and uses. Application of colloids chemistry in different industries. Definition, classification, necessity and various kinds of lubricants. Function and mechanism of action of lubricants and examples. Properties of lubricants, importance of additive compounds in lubricants, Synthetic lubricants and cutting fluids. Industrial application, its function in bearing.	06	2
Unit-3	**Hydrocarbons**	A. Classification and IUPAC nomenclature of organic compounds homologous series (Functional Groups). B. Preparation, properties and uses of Ethane, Ethene, Ethyne (Acetylene), Benzene and Toluene	10	3
Unit-4	**Organic Reactions and Mechanism:**	Fundamental aspects- A. Electrophiles and nucleophiles, Reaction intermediates, Free radicals, Carbocation, Carbanion. B. Inductive effect, Mesomeric effect, Electrometric effect. Mechanism- A. Mechanism of addition reaction (Markovnikov's Rule, Cyanohydrin and Peroxide effect). B. Mechanism of substitution reactions; (Nucleophilic) hydrolysis of alkyl halide, electrophilic substitution halogenations, Sulphonation, Nitration and Friedel- Craft reaction. C. Mechanism of Elimination reaction- Dehydration of primary alcohol, Dehydrohalogenation of primary alkyl halide.	07	4
Unit-5	**Polymers and Synthetic Materials**	Polymers and their classification. Average degree of polymerization, Average molecular weight, Free radical polymerisation (Mechanism). Thermosetting and thermoplastic A. Addition polymers and their industrial applications- Polythene, Polystyrene, PVA, PVC, PAN, PMMA, Buna-S, Buna-N, Teflon. B. Condensation polymers and their industrial applications- Nylon 6, Nylon 6,6, Bakelite, Melamine formaldehyde, Urea formaldehyde, Terylene or Dacron, Polyurethanes. General concept of Bio polymers, Biodegradable polymers and Inorganic polymers (Silicon). Synthetic Materials- A. Introduction- Fats and Oils B. Saponification of fats and oils, Manufacturing of soap C. Synthetic detergents, types of detergents and its manufacturing. Explosives: TNT, RDX and Dynamite, Paint and Varnish.	07	5

References Books:

1. Applied Chemistry: R. S. Katiyar and J. P. Chaudhary
2. Applied Chemistry: Rakesh Kapoor
3. Principles of general and inorganic chemistry: O. P. Tandon

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4. Engineering Chemistry: S. Chandra
5. Applied Chemistry: M. Gupta
e-Learning Source:
https://drive.google.com/file/d/176P2RihIzLCSWmWqeMf5W1ja5uYcqRXn/view?usp=drive_link https://drive.google.com/file/d/1HkrXSpQw7_Y5FZPf8iq0T92DRyuGrms3/view?usp=drive_link https://drive.google.com/file/d/1lsZHgt7nlIdB0iReCbTaP53JZjgzjOZ3/view?usp=drive_link
https://drive.google.com/file/d/176OiA-haF34K1Bzg_xA2PwSXkwGb-FMD/view?usp=drive_link

PO-PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	03	-	01	-	-	-	01				
CO2	03	-	-	-	-	-	-				
CO3	03	-	01	-	-	-	02				
CO4	03	01	02	-	-	-	02				
CO5	03	-	-	-	-	-	02				

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

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

Integral University, Lucknow

Effective from Session: 2010-11							
Course Code	DED-201	**Title of the Course**	ENGINEERING DRAWING	**L**	**T**	**P**	**C**
Year	I	**Semester**	II	**3**	**1**	**0**	
Pre-Requisite	10th	**Co-requisite**	---				
Course Objectives	To gain knowledge of Engineering Drawing.						

Course Outcomes	
CO1	Students' ability in legible writing letters and numbers will be improved.
CO2	Students' ability to perform basic sketching techniques and mechanical component drawing will be improved.
CO3	Students will be able to draw orthographic projections of different objects irrespective of number of dimensions and to develop pictorial views.
CO4	Students' ability to produce engineered drawing of any newly designed object will be improved.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
1	**Drawing, instruments and their uses and Introduction to Scales**	Introduction to various drawing, instruments.Correct use and care of Instruments.Sizes of drawing sheets and their layouts. Lettering Techniques 1 Sheet Printing of vertical and inclined, normal single stroke capital letters. Printing of vertical and inclined normal single stroke numbers. Stencils and their use. **Introduction to Scales :** 1 Sheet Necesssity and use, R F.Types of scales used in general engineering drawing. Plane, diagonal and chord scales.	7	2
2	**Conventional Presentaion, Principles of Projection and Dimensioning Techniques**	Thread (Internal and External), Welded joint, Types of lines, Conventional representation of materials, Conventional representation of machine parts. **Principles of Projection :** Orthographic, Pictorial and perspective. Concept of horizontal and vertical planes. Difference between I and III angle projections. **Dimensioning Techniques:** Projections of points, lines and planes. 2 Sheet Orthographic Projections of Simple Geometrical Solids. Edge and axis making given angles with the reference planes. Face making given angles with reference planes. Face and its edge making given angles withreferance planes. Orthographic views of simple composite solids from their isometric views.Exercises on missing surfaces and views.	7	3
3	**Section of Solids and Isometric Projection**	Concept of sectioning Cases involving cutting plane parallel to one of the reference planes and prependicular to the others. Cases involving cutting plane perpendicular to one of the reference planes and inclind to the others plane,true shape of the section **Isometric Projection :** 1 Sheet Isometric scale.Isometric projection of solids.	8	2
4	**Free hand sketching and Development of Surfaces**	Use of squared paper Orthographic views of simple solids Isometric views of simple job like carpentary joints **Development of Surfaces :** 1 Sheet Parallel line and radial line methods of developments. Development of simple and truncated surfaces (Cube, prism, cylinder, cone and pyramid).	8	4
5	**Assembly and Disassembly Drawings, Orthographic Projection of Machine Parts and Practice on AUTO CAD**	**Assembly and Disassembly Drawings :** 2 Sheet Plummer block Footstep bearings Couplings etc. Rivetted & Welded Joints Screw and form of screw thread **Orthographic Projection of Machine Parts :** Nut and Bolt, Locking device, Wall bracket 1 Sheet **Practice on AUTO CAD :** To draw geometrical figures using line, circle, arc, polygon, ellipse, rectangle - erase and other editing commonds and osnap commands (two dimensional drawing only) (Printouts of figures)	10	3

References Books:

1. Engineering Drawing : ND Bhatt

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2. Engineering Drawing : R.K. Dhawan
3. Engineering Drawing : B.K.Goel.
e-Learning Source:
https://www.youtube.com/watch?v=gp3oKSEnEFM&list=PLDN15nk5uLiD3MEUiqsYPnZOHcVu7um6_

PO-PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	3	2	2		2		1	-	2	1	-
CO2	3	3	2			2	2	2	3	-	2
CO3	2	3			2		1	3	-	2	1
CO4	2	3	2		2		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: 2024-25							
Course Code	DAM-201	**Title of the Course**	APPLIED MECHANICS-II	**L**	**T**	**P**	**C**
Year	I	**Semester**	II	**3**	**1**	**0**	**-**
Pre-Requisite	10th	**Co-requisite**	--				
Course Objectives	1. The subject Applied Mechanics deals with basic concepts of friction, center of gravity, equilibrium of a body. 2. The subject Applied Mechanics deals with the basic concept of simple machines and its working.						

Course Outcomes	
CO1	To calculate the co-efficient of friction for different types of surfaces.
CO2	Determine the centroid/centre of gravity of plain and composite lamina and solid bodies.
CO3	Calculate the least force required to maintain equilibrium on an inclined plane.
CO4	Determine velocity ratio, mechanical advantage and efficiency of simple machines
CO5	To understand the basic concept of simple machines and it's working.

Unit No.	Title of the Unit	Content of unit	Contact Hrs.	Mapped CO
1	**Friction**	**Friction** Definition and concept of friction, types of friction, force of friction, Laws of static friction, coefficient of friction, angle of friction, angle of repose,cone of friction.	6	CO1
2	**Centre of Gravity**	**Centre of Gravity** Concept, definition of centroid of plain figures and centre of gravity ofsymmetrical solid bodies. Determination of centroid of plain and composite lamina using moment methodonly, centroid of bodies with removed portion. Determination of center of gravity of solid bodies - cone, cylinder, hemisphereand sphere; composite bodies and bodies with portion removed [Simple problems on the above topics].	10	CO2
3	**Equilibrium of a Body**	**Equilibrium of a Body** Equilibrium of a body lying on a horizontal plane, equilibrium of a body lying ona rough inclined plane. Calculation of least force required to maintain equilibrium of a body on a rough inclined plane subjected to a force: (a) Acting along the inclined plane Horizontally (b) At some angle with the inclined plane	8	CO3
4	**Machines**	**Machines** Definition of effort, velocity ratio, mechanical advantage and efficiency of amachine and their relationship, law of machines Simple and compound machine (Examples).Definition of ideal machine, reversible and self locking machine. Effort lost in friction, Load lost in friction, determination of maximum mechanicaladvantage and maximum efficiency.	6	CO4
5	**Working of Simple Machines**	**Working of Simple Machines** System of pulleys (first, second, third system of pulleys), determination of velocityratio, mechanical advantage and efficiency. Working principle and application of wheel and axle, Weston's Differential Pulley Block, simple screw jack, worm and worm wheel, single and double winch crab. Expression for their velocity ratio and field of their application[Simple problems on the above topics]	10	CO5

References Books:

1. Applied Mechanics & Strength of Material : R.S. Khurmi, S.Chand Publication
2. Applied Mechanics: Hemendra Dutt Gupta, Navbharat Publication

e-Learning Source:

https://www.youtube.com/watch?v=nGfVTNfNwnk

https://www.youtube.com/watch?v=TnWBAnkCDuc&list=PLq7jO-L_k0yUk2tfPwhea9asGRBXcUEpL

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	3	1	2	-	-	-	-	-	-	-	-	2	1	-	2	-
CO2	1	3	2	2	-	-	-	-	-	-	-	-	2	2	-	2	-
CO3	1	3	2	2	-	-	-	-	-	-	-	-	2	2	-	2	-
CO4	3	1	1	3	-	-	-	-	-	-	-	-	2	2	-	3	-
CO5	3	1	1	3	-	-	-	-	-	-	-	-	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: 2010-11							
Course Code	DME-201	**Title of the Course**	ELEMENTS OF MECHANICAL ENGINEERING	**L**	**T**	**P**	**C**
Year	I	**Semester**	II	**3**	**1**	**0**	
Pre-Requisite	10^{th}	**Co-requisite**	----				
Course Objectives	After the successful completion, learner will develop following attributes.						

Course Outcomes	
CO1	Understand about the working, functions and applications of machine components.
CO2	Identify the broad context of Mechanical engineering problems, including describing the problem conditions and related factors.
CO3	Understand the fundamental elements of Mechanical engineering systems, system components and processes
CO4	Understand the fundamental elements of Mechanical engineering systems, system components and processes
CO5	Synthesize analysis results to provide constructive and creative engineering solutions that reflect social and environmental sensitivities.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	Sources of Energy , Fuels & Combustion	Basic ideas, conventional and nonconventional forms- Thermal, Hydel, Tidal, wind, Solar, Biomass and Nuclear and their uses. Introduction to common fuels - solid, liquid and gases and their composition. Combustion of fuels- their higher and lower calorific values Combustion equations for carbon, sulphur, Hydrogen and their simple compounds. Calculation of minimum amount of air required for Complete combustion. Combustion analysis on mass basis and on volume basis. Concept of Excess air in a boiler furnace combustion. Heat carried away by flue gases. Analysis of flue gases by Orsat apparatus. Simple numerical problems.Idea of specific properties of liquid fuels such as detonation, knock resistance (cetane and octane Numbers), viscosity, solidification point, flash point and flame point.	8	CO1
2	Machine Components	Brief Idea of loading on machine components. Pins, Cotter and Knuckle Joints. Keys, Key ways and spline on the shaft. Shafts, Collars, Cranks, Eccentrics. Couplings and Clutches Bearings-Plane, Bushed, Split-step, ball, Roller bearing, Journal bearing, Foot step bearing, thrust bearing, collar bearing and Special type bearings and their applications. Selection of ball bearing and roller bearing for given application using s,	8	CO2
3	Gears and Springs	Different types of gears, gear trains and their use for transmission of motion. Determination of velocity ratio for spur gear trains; spur gear, single and double helical gears, Bevel gears, Mitre Wheel, worms, Rack and Pinion. Simple and compound and epicyclic gear trains and their use. Definition of pitch and pitch circle & module. Compression, Tension, Helical springs, Torsion springs, Leaf and Laminated springs. Their use and material. Selection of spring by design data book, simple numerical problem	8	CO3
4	Transmission of Motion By Belts, Ropes & Pulleys, Chain Mechanisms	Open and cross belt drive, determination of velocity ratio. Effect of thickness and slip on the velocity ratio (Concept only, No mathematical treatment), Method of prevention of slip, Determination of velocity ratio in compound belt drive, use of stepped pulley. Classification and uses of ropes in transmission operation. Chains and their classifications, their application in power transmission, their comparison with other drive systems, Definition of link, Frame and mechanism. Difference between machine and mechanism, kinematic pairs, lower and higher pairs. Velocity diagram for four bar mechanism, slider crank mechanism, quick return mechanism. Introduction to Cam and its use.	8	CO4
5	Lubrication	Different lubrication system for lubricating the components of machines. Principle of working of wet sump and dry sump system of lubrication. (Explain with simple line diagram)	8	CO5

References Books:

Elements of mechanical engineering by V,K, Manglik.

Elements of mechanical engineering by R.S, Khurmi

e-Learning Source:

https://onlinecourses.nptel.ac.in/noc24_me104/preview

PO-PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	2	3	1	3	2	1	1	2	1	2	3
CO2	3	3	1	3	1	1	2	2	1	2	3
CO3	3	2	2	3	2	1	2	1	3	3	2
CO4	1	2	3	3	1	2	3	1	2	3	2
CO5	3	1	3	3	3	1	3	3	3	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: 2010-11							
Course Code	DCH-251	**Title of the Course**	APPLIED CHEMISTRY LAB	**L**	**T**	**P**	**C**
Year	I	**Semester**	II			**2**	**0**
Pre-Requisite	10th	**Co-requisite**	None				
Course Objectives	4. To understand all the chemical reactions, principle and analysis of chemicals 5. To examine the unknown chemical compounds and unsolved problems as much as possible 6. To analyse the water related to industrial as well as domestic proposes						

Course Outcomes	
CO1	The process of qualitative analysis by applying knowledge of acidic basic nature of chemical properties and ions that sharpens the laboratory skills.
CO2	The careful analysis of substances to ensure the correct compounds are used or safely disposed of during manufacturing process.
CO3	Fundamental concepts of electrochemistry, including oxidation-reduction (redox) reactions, electrolytes, electrodes, and electrochemical cells.
CO4	To identify the components in a mixture, whether it's for designing manufacturing processes, dealing with wastewater treatment, or working with catalysts and chemical reactions.
CO5	Identify the chemical, and biological parameters of water quality, including turbidity, pH, temporary and permanent hardness. Understand modern water purification technologies like reverse osmosis (RO), ultrafiltration (UF), ion exchange, and membrane filtration, and their applications in industrial and municipal water treatment.

Sr No.	Experiment No		Contact Hrs.	Mapped CO
1	**Experiment 1**	Analysis of acid and basic radical of inorganic mixture No1	2	1
2	**Experiment2**	Analysis of acid and basic radical of inorganic mixture No2	2	1
3	**Experiment3**	Analysis of acid and basic radical of inorganic mixture No3	2	2
4	**Experiment4**	Analysis of acid and basic radical of inorganic mixture No4	2	2
5	**Experiment5**	Determination of chloride content by Mohr's method in supplied water	2	3
6	**Experiment6**	Testing of total hardness of water sample by EDTA titration method in terms of CaCO3	2	3
7	**Experiment7**	Analysis of temporary hardness in water sample through O'Hener's method	2	4
8	**Experiment8**	Dissolve oxygen analysis in water sample	2	5
9	**Experiment9**	Analysis of strength of HCl solution through NaOH solution by using pH meter	2	5

References Books:

6. Applied Chemistry: R. S. Katiyar and J. P. Chaudhary
7. Applied Chemistry: Rakesh Kapoor

https://drive.google.com/file/d/1K_tMkEUCeiEuWuTuUHf2fYrn0ASKdFvl/view?usp=drive_link
https://drive.google.com/file/d/16AxAY-ykhA-nhABsMQGPe7W3sI6g6HMT/view?usp=drive_link
https://drive.google.com/file/d/10huj7rhxLNrJxjXELMmmgimUVBu-X_mC/view?usp=drive_link
https://drive.google.com/file/d/1YE5zh9X_ZNKZgb01vyPjn15P8QlaedWY/view?usp=drive_link
https://drive.google.com/file/d/1X-zvmfiPgJ_LvbxI7X5ciwJBXHvhadHI/view?usp=drive_link
https://drive.google.com/file/d/18GE6ureXZhU8_H6ieqD5dkaeI-Xgo1jZ/view?usp=drive_link
https://drive.google.com/file/d/10yJEYjqYJMl5fhv4zLPEx9Mr7ZflQTM0/view?usp=drive_link
https://drive.google.com/file/d/17MlIBcwsWhaaWq0RpZRHwlzKGigw6Muc/view?usp=drive_link
https://drive.google.com/file/d/1zHoVQc0zC8GW7LSoIxkjmEevHjYfY8iK/view?usp=drive_link

PO-PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	03	-	01	-	-	-	01				
CO2	03	-	-	-	-	-	-				
CO3	03	-	01	-	-	-	02				
CO4	03	01	02	-	-	-	02				
CO5	03	-	-	-	-	-	02				

Integral University, Lucknow

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

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

Integral University, Lucknow

Effective from Session: 2010-11							
Course Code	DME-251	**Title of the Course**	ELEMENTS OF MECHANICAL ENGINEERING LAB	**L**	**T**	**P**	**C**
Year	I	**Semester**	II	**0**	**0**	**2**	**-**
Pre-Requisite	10^{th}	**Co-requisite**	--				
Course Objectives	To learn the working, functions and applications of mechanical components.						

Course Outcomes	
CO1	Understand the working, functions and applications of machine components.
CO2	Identify the broad context of Mechanical engineering problems, including describing the problem conditions and related factors.
CO3	Understand the fundamental elements of Mechanical engineering systems, system components and processes.
CO4	Understand the fundamental elements of Mechanical engineering systems, system components and processes.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
1.	Study and demonstration	Solar Cooker, Wind Mill, Bio Gas Plant.	2	CO1
2.	Study of key	Key's, Key ways and Splined shaft	2	CO2
3.	Bearings	Plane, Bush, Split step bearings, Ball Roller bearings, Thrust bearings.	2	CO3
4.	Gears	Spur gear, Single and Double helical gears, Bevel gears.	2	CO4
5.	Springs.	Compressor and Tension helical springs.	2	CO5
6.	Gear Trains	Simple spur gear train, Compound gear train, Epicyclic gear train	2	CO1
7.	Pins	Split pin, Taper cotter type split pin, Cotter pin	2	CO2
8.	Mechanism	Slider Crank Mechanism	2	CO3
9.	Clutch and coupling	Clutch and Coupling	2	CO4
10.	Velocity diagram	Velocity diagram of a four bar chain mechanism	2	CO5

References Books:

Elements of mechanical engineering by V,K, Manglik.

Elements of mechanical engineering by R.S, Khurmi

e-Learning Source:

www.google.com/search https:/

PO-PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	1	3	1	3	2	1	3	2	2	3	1
CO2	2	2	1	3	1	3	1	2	2	1	3
CO3	3	2	2	2	2	3	2	2	1	3	2
CO4	1	2	2	3	1	1	3	3	2	1	1
CO5	2	1	3	1	3	2	2	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: 2016-17							
Course Code	DCS-251	**Title of the Course**	COMPUTER APPLICATION LAB	**L**	**T**	**P**	**C**
Year	I	**Semester**	II	**1**	**0**	**2**	**-**
Pre-Requisite	10^{th}	**Co-requisite**	---				
Course Objectives	To develop basic knowledge and understanding of Computers and C programming language.						

Course Outcomes	
CO1	Students become familiar with the basic fundamentals and concepts of Computer
CO2	Practical knowledge of the MS Office package, viz. MS Word, MS Excel and MS PowerPoint.
CO3	Students are trained with the basic concepts of the C programming language
CO4	Students will be able to develop logics which will help them to create basic programs and applications in C.
CO5	The course is designed to provide complete knowledge of C language.

Practical No.	List of Practicals	Contact Hrs.	Mapped CO
1	Introduction of computer types, generation, Application, characteristic & Memory.	03	CO1
2	Introduction and practice of Ms-Office package (Ms-Word, Ms- Excel, Ms- Power point & Ms-Access).	03	CO2
3	Introduction & Practice of Internet and e-mail.	03	CO2
4	Programming of 'C'- History, character set, variables, and keywords, token data types input and output function.	03	CO3
5	Introduction of Decision control statement- if, if- else, nester if statement and switch case.	03	CO3
6	Programming practice of if, if – else, nested if statement and switch case.	03	CO4
7	Loops- while loop, do- while loop, for loop, break and continuous statements.	03	CO4
8	Programming practice of while loop do- while loop, for loop, break and continuous statements.	03	CO4
9	Array Declaration, initialization of one and two dimensional array.	03	CO5
10	Programming practice on array.	03	CO5

References Books:

1.Computer fundamental- Sinha & Sinha

2.Computer Basics & 'C'- V. Rajaraman

3.Office 2007 -Ruthosky, Seguim, Ruthosky

4.Programming in ANSI- E Balagurusamy

e-Learning Source:

PO-PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	PSO4
CO1	1	3	2										1		
CO2	1	2	2							1			1		
CO3				1						2				2	
CO4				2						3				2	
CO5				2						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: 2015-16							
Course Code	DCAD-251	**Title of the Course**	BASIC COMPUTER AIDED DESIGN LAB	**L**	**T**	**P**	**C**
Year	I	**Semester**	II	**0**	**0**	**2**	**-**
Pre-Requisite	10^{th}	**Co-requisite**	-				
Course Objectives	The course objective is to develop proficiency in using AutoCAD software for drafting, sketching, dimensioning, creating and modifying geometrical figures, drawing orthographic and isometric views, generating top, front, and side views of isometric figures, producing sectional views of solid objects, and performing practical tasks on page setup and scaling.						

Course Outcomes	
CO1	Students will develop good communication skills and teamwork.
CO2	Students will become familiar with office practice and standards.
CO3	Students will become familiar with Auto Cad's two-dimensional drawings.
CO4	Students' ability to convert sketches into engineered drawings will increase.
CO5	Students will be able to draw orthographic projections and sections.

No.	Title of the Unit		Contact Hrs.	Mapped CO
1	**AutoCAD**	To study Auto CAD software.	2	CO1
2	**Sketch and drafting**	Study And Sketch of drafting setting.	2	CO2
3	**Dimensional sketch**	Study and sketch of Dimensional settings.	2	CO3
4	**Draw geometrical figure**	Draw geometrical figure using drawing commands	2	CO4
5	**Modify figure Scaling**	To modify a geometrical figure using editing comment.	2	CO5
6	**Orthographic**	To draw an orthographic view of a geometrical figure.	2	CO1
7	**Isometric view**	To Draw isometric view of a geometrical figure.	2	CO2
8	**Different view**	To Draw top front and side view of an isometric figure.	2	CO3
9	**Sectional view**	To draw a sectional view of a solid object.	2	CO4
10	**Scaling**	To do practical on page set up & scaling of drawing.	2	CO5

References Books:

Auto CAD by Rohit Mongia

e-Learning Source:

https://www.googleadservices.com

https://www.googleadservices.com

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

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

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