Integral University, Lucknow

Effective from Session: 2024-25							
Course Code	DMA-101	**Title of the Course**	APPLIED MATHEMATICS-I	**L**	**T**	**P**	**C**
Year	I	**Semester**	I	**03**	**01**	**00**	**-**
Pre-Requisite	10^{th}	**Co-requisite**	--				
Course Objectives	To know the basic concepts of Mathematics with their Applications in Engineering.						

Course Outcomes	
CO1	Arithmetic Progression and Geometric Progression can be applied in real life by analyzing a certain pattern that we see in our daily life.
CO2	Trigonometry is widely used in several fields. Some of its uses are Measuring heights and distances, in construction and architecture, flight engineering, marine biology, application of Physics, electrical engineering, manufacturing industry, gaming industry.
CO3	The concept of Complex Number is used in the field of Computer Science. It is also used in coding and programming.
CO4	Here students are getting the knowledge of Graphs, continuity, and differentiation by which they will be able to find areas of any surface.
CO5	By getting full knowledge of Tangent and normal students will be able to use it in daily lives and further studies in Architecture Engineering, Civil Engineering etc.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
1.	i) Series ii) Binomial Theorem iii) Determinants	**Series**: **Arithmetical Progression**: nth term of AP, Sum of 'n' terms, Arithmetic Mean. **Geometrical Progression**: nth term of GP, Sum of 'n' terms& infinite terms, Geometric Mean. **Binomial theorem:** Definition of factorial notation, permutation and combination, Binomial theorem for positive index, negative and fractional index (without proof), Application of Binomial theorem. **Determinants:** Definition, expansion and elementary properties of determinant of order 2 and 3. Solution of system of linear equations, Consistency of equations, Cramer's rules.	08	1
.	i) Trigonometry ii) Vector Algebra	**Trigonometry:** Relation between sides and angles of triangles: Simple cases only. **Vector Algebra:** Dot and Cross product, Scalar and vector triple product.	07	2
3.	Complex Number	**Complex Number:** Definition of imaginary number, complex number & its conjugate. Algebra of complex number (equality, addition, subtraction, multiplication and division). Geometrical representation of a complex number, modulus and amplitude. Polar form of a complex number, Square root of a complex number. De Moivre's theorem (without proof) & its application.	08	3
4.	Differential Calculus-I	**Differential Calculus-I** **Functions, limits, continuity:** Definitions of variable, constant, intervals (open, closed, semi-open). Definition of function, elementary methods of finding limits (right and left), elementary test for continuity and differentiability. **Methods of finding derivative:** Fundamental rules of derivatives (Sum and Difference), Derivatives of special functions, Trigonometric functions, exponential function, Function of a function.	09	4
5.	Differential Calculus-II	**Differential Calculus - II** **Differentiation:** Logarithmic differentiation, Function with respect to another function, Function power function, Higher order derivatives. **Application:** Finding Tangents, Normal. Maxima/Minima.	08	5

References Books:

1. Applied Mathematics: Dr. 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://youtu.be/syLIPtxjN0E?si=OrM4IRejVzgmwWpl

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	2	3	-	-	3	2	2	1
CO4	2	2	2	1	-	-	-	-	2	1	3
CO5	2	1	2	3	1	-	-	-	1	-	2

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

Integral University, Lucknow

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

Effective from Session: 2010							
Course Code	DPH-101	**Title of the Course**	Applied Physics-I	**L**	**T**	**P**	**C**
Year	I	**Semester**	I	**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 convert one unit to different unit and they use conversation factor which is numerically quantity that we multiply or divide to the quantity. Student learns accuracy of the lab instrument with the help of significant figure.
CO2	In this student learn investigate the effect of gravity and friction on the motion of machines (mechanical) instrument etc.
CO3	Fundamental concepts of electrochemistry, including oxidation-reduction (redox) reactions, electrolytes, electrodes, and electrochemical cells.
CO4	Explain the fundamental principles of chemical kinetics, including the definition of reaction rate, rate laws, and the role of molecular collisions in reactions.
CO5	Identify and explain various physical, chemical, and biological parameters of water quality, including turbidity, pH, dissolved oxygen, hardness, and biological oxygen demand (BOD). 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.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
Unit-1	**Measurement & Vector**	**Measurement:** Units and Dimensions, Fundamental and derived units: S.I. Units and Dimensions of physical quantities, Dimensional formula and dimensional equation, Principal of homogeneity and application of homogeneity principle to:(i) Checking the correctness of physical equations (ii)Deriving relations among various physical quantities, (iii)Conversion of numerical values of physical quantities form one system of units into another, Limitations of dimensional analysis, Errors in measurement, accuracy and precision, random and systematic errors, estimation of probable errors in the result of measurement (combination of errors in addition, subtraction, multiplication and power). Significant figures and order of accuracy in respect to instruments. **Vector**: Scaler and vector quantities; Addition, Subtraction, Resolution of vector; Cartesian components of vector, Scaler and vector product of vectors	6	CO-1
Unit-2	**Force and Motions, Fluid mechanics and fiction, Work, Power and Energy**	**Force and Motions:** Newton's Law of Motion, Circular motion, angular velocity, angular acceleration and centripetal acceleration. Relationship between linear velocity and angular velocity, Relationship between linear acceleration and angular acceleration. **Fluid mechanics and fiction**: Surface tension, capillaries, equation of continuity, Bernoulli's theorem, stream line and turbulent flow, Reynold's number. Physical significance of friction, Advantage and disadvantage of friction and its role in everyday life, Static and dynamic frictional forces, Coefficients of static and dynamic frictions and their measurement, Viscosity, Coefficients of viscosity and its determination by Stoke's method. **Work, Power and Energy:** Work done by force on bodies moving on horizontal and inclined planes in presence of frictional forces, Concept of power and its units, Calculation of power (simple cases). Concept of kinetic and potential energy, various forms of energy, conservation of energy, Force constant of spring, Potential energy of stretched spring.	10	CO-2
Unit-3	**Elasticity**	**Elasticity:** Stress and Strain, Hooke's law, Elastic limit, Yielding point and breaking point, Modulus of elasticity, Young's modulus, Bulk modulus and modulus of rigidity, Poisson ratio, Resilience. Simple Harmonic Motion, Periodic Motion, Characteristics of Simple Harmonic Motion, Equation of Simple Harmonic Motion and determination of Velocity and acceleration, Graphical representation, Spring Mass system, Simple pendulum, Derivation of their periodic time, Energy conservation in Simple Harmonic Motion, Definition of free, Forced, undamped and damped vibrations, Resonance and its sharpness, Q-factor.	8	CO-3
Unit-4	**Gas laws and specific heats of gases**	Boyle's law, Charle's law, Gay Lussac's law, Absolute temperature, Kelvin scale of temperature, General gas equation(without derivation), Molar or universal gas constant, Universal gas equation, Standard or normal temperature and pressure (N.T.P), Specific heat of gases, Relation between two specific heat, Thermodynamics variables, first law of thermodynamics(statement and equation only), Isothermal, Isobaric, Isochoric and adiabatic processes (Difference among these processes and equation of state).	8	CO-4
Unit-5	**Heat transfer and radiation**	**Heat transfer and radiation:** Modes of heat transfer, Coefficient of thermal conductivity and its determination by (i) Searle's Method for good conductors. (ii) Lee's Method for poor conductors. Conduction of heat through compound media, Conduction and convection, Radial flow of heat, Blackbody radiation, Stefan's law, Wein's displacement and Rayleigh- Jeans laws, Planck's law.	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://youtu.be/RYwU769Eny4?si=VOn3l74xnpyIdfbM

PO-PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3								2		3	3	1		2	3	2
CO2	3										2	2					2
CO3	3	1										1					2
CO4	2	2										1					2
CO5	2			2								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: 2018-19							
Course Code	DCH-101	**Title of the Course**	APPLIED CHEMISTRY(A)	**L**	**T**	**P**	**C**
Year	I	**Semester**	I	**3**	**1**	**0**	**0**
Pre-Requisite	10th	**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	Atomic Model helps to explain the significance of atomic models in designing materials at the atomic and molecular level. Governing atomic structure and their application in engineering fields like semiconductor physics and nanotechnology. The ability to analyze electron configurations and predict how they influence material properties, such as electrical conductivity, magnetic behavior, and chemical reactivity.
CO2	To explain the fundamental types of chemical bonds (ionic, covalent, and metallic) and their significance in determining the properties of engineering materials. Understand the role of electrons in bond formation and the concept of valency. Classify different types of chemical bonds based on electron sharing or transfer.
CO3	Fundamental concepts of electrochemistry, including oxidation-reduction (redox) reactions, electrolytes, electrodes, and electrochemical cells. Analyze standard electrode potentials, and apply the Nernst equation to calculate cell potentials under different conditions. Distinguish between different types of electrochemical cells, such as galvanic (voltaic) and electrolytic cells, and describe their operational principles.
CO4	Explain the fundamental principles of chemical kinetics, including the definition of reaction rate, rate laws, and the role of molecular collisions in reactions. Determine the rate law for a chemical reaction, identify the order of the reaction with respect to each reactant, and calculate the overall reaction order.
CO5	Identify and explain various physical, chemical, and biological parameters of water quality, including turbidity, pH, dissolved oxygen, hardness, and biological oxygen demand (BOD). Describe the basic water treatment processes such as coagulation, flocculation, sedimentation, filtration, and disinfection.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
Unit-1	**Atomic Structure** **Classification of Elements**	Basic concept of atomic structure, Matter wave concept, Quantum number, Heisenberg's uncertainty principle, Shapes of orbital Modern classification of elements (s, p, d, and f block elements), periodic properties: ionization potential, electro negativity, electron affinity.	10	
Unit-2	**Chemical Bonding**	Overview of basic concept of Ionic, Covalent & Co-ordinate bonds, Hydrogen bonding, Valence bond theory, Hybridization, VSEPR theory, Molecular orbital theory.	06	
Unit-3	**Electrochemistry-I &II**	Arrhenius theory of electrolytic dissociation, Transport number, Electrolytic conductance, Ostwald dilution law. Concept of acid and bases: Arrhenius, Bronsted & Lewis theory. Concept of pH and numerical. Buffer solutions, Indicators, Solubility product, Common ion effect with their application. Redox reactions, electrode potential (Nernst equation), Electro-chemical cell (Galvanic & Electrolytic). EMF of a cell & free energy change. Standard electrode potential, Electrochemical series & Application. Chemical & electrochemical theory of corrosion, Galvanic Series. Prevention of corrosion by various methods.	10	
Unit-4	**Chemical Kinetics** **Catalysis** **Solid State**	Introduction, Law of mass action, order and molecularity of reaction. Activation energy, rate constants, 1st order reactions and 2nd order reactions. Definition, catalytic reactions properties, Catalytic promoters & poison, autocatalysis & negative catalysis. Theory of catalysis & applications. Types of solids (Amorphous and Crystalline), classification (Molecular, Ionic, Covalent and Metallic), Band theory of solids (Conductors, Semiconductors & Insulators), types of crystals, FCC, BCC, Crystal imperfection.	07	
Unit-5	**Water Treatment**	Hardness of water, its limits and determination of hardness of water by EDTA method. Softening methods (Soda lime, Zeolite and Ion exchange resin process). Disadvantages of hard water in different industries, scale & sludge formation, corrosion, caustic embrittlement, priming & foaming in boilers. Disinfection of Water by chloramine-T, Ozone and chlorine. Advantages and disadvantages of chlorination. Industrial waste & sewage, Municipality waste water treatment, Definition of BOD & COD. Numerical problems based on topics.	07	

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

Integral University, Lucknow

4. Engineering Chemistry: S. Chandra
5. Applied Chemistry: M. Gupta
e-Learning Source:
https://drive.google.com/file/d/1lymiyHymX86HqsdnkmuIsvZp-zIm02RR/view?usp=drive_link
https://drive.google.com/file/d/1mH1CQmpYLKJeTvyi018gIW2KUS4l-9RK/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	DPC- 101	**Title of the Course**	PROFESSIONAL COMMUNICATION	**L**	**T**	**P**	**C**
Year	I	**Semester**	I	**3**	**1**	**0**	**-**
Pre-Requisite	10th	**Co-requisite**	--				
Course Objectives	Enhance Verbal Communication Skills Master Written Communication Cultivate Interpersonal Skills Develop Professional Etiquette Utilize Communication Technologies						

Course Outcomes	
CO1	Introduction of the concept of communication, types skills, modern tools, etc...
CO2	The CO of this unit is to make inquiry about people, product, price etc. with the expansion of business operations of a business, importance of business letter is also increasing. To take right decisions: Taking right decisions require accurate information.
CO3	The CO of this unit is to control sentence-level error (grammar, punctuation, and spelling). Its outcome is to employ techniques of active reading, critical reading, and informal reading response for inquiry, learning, and thinking.
CO4	Learning objectives focus on student performance. Action verbs that are specific, such as list, describe report, compare, demonstrate, and analyze, should state the behaviors students will be expected to perform in Hindi
CO5	The conclusion of this subject is to increase the student's English communication skills by Improving fluency through regular practice and speaking drills. Understanding of basic grammar structures like nouns, verbs and adjectives through class reading and speaking tasks.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
1	Communication in English	Concept of communication, importance of effective communication, types of communication, formal and informal, verbal and nonverbal, spoken and written, Techniques of communication, Listening and reading, writing and speaking, Barriers to communication- Modern tools of communication Fax, e-mail, Telephone, telegram, etc., Techniques for clear, concise, correct and coherent writing, Difference between technical writing and general writing.	8	CO-1
2	Letters	Kinds of letters: Official, demi-official, unofficial, enquiry letter, quotation, tender and order giving letters. Application for a job, Resume, complaint letter and adjustment letter. Report writing, Note making and minutes writing.	8	CO-2
3	Grammar	Transformation of sentences, synthesis, Preposition, Articles, Idioms and Phrases, One word substitution, Abbreviations. Tenses, Active and Passive voice. Composition on narrative, descriptive, imaginative, argumentative, discussion and factual topics.	8	CO-3
4	Spoken English	Phonemes (Speech sound), Consonant sounds, vowels sounds and diphthongs, Phonetic transcription, IPA, word stress and Intonation. Development of comprehension and knowledge of English through the study of text material and language exercises based on the prescribed text book of English.	8	CO-4
5	Letter writing in Hindi	Kinds of letters: Official, demi-official, unofficial, enquiry letter, quotation, tender and order giving letters, Application for a job.	8	CO-5

References Books:

Dr. R.P. Chauhan, Asian Publishers, Muzaffarnagar

S.V. Singh & M. S. Verma: Bharat Bharat Prakashan, Meerut.

R. Thakur & M. Singh, Meerut Publication.

e-Learning Source:

https://www.bbau.ac.in/Docs/FoundationCourse/TM/AECC105/Lecture%20Types%20&%20Modes%20of%20Communication.pdf

https://www.uou.ac.in/sites/default/files/slm/BHMAECC-II.pdf

PO-PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	3	2									
CO2	2	2									
CO3	1	1									
CO4	2	2									
CO5	3	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: 2024-25							
Course Code	DAM-101	**Title of the Course**	APPLIED MECHANICS-I	**L**	**T**	**P**	**C**
Year	I	**Semester**	I	**3**	**1**	**0**	--
Pre-Requisite	10th	**Co-requisite**	---				
Course Objectives	1. The subject Applied Mechanics deals with basic concepts of mechanics like laws of forces, laws of motion and moments which are required by the students for further understanding of other allied subjects. 2. The subject Applied Mechanics enhances the analytical ability of the students.						

Course Outcomes	
CO1	The students will be able to Interpret various types of units and their conversion from one to another.
CO2	Analyze different types of forces acting on a body and draw free body diagrams.
CO3	Determine the resultant of coplanar concurrent forces and basic concepts of beam.
CO4	To understand basic concept of moment and its application.
CO5	Determine the resultant of forces by moment and understand equilibrium conditions of bodies.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
I	**Introduction**	**Introduction** Concept of engineering mechanics, definition of mechanics, statics, dynamics, application of engineering mechanics in practical fields. Definition of Applied Mechanics. Definition, basic quantities and derived quantities of basic units and derived units. Different systems of units (FPS, CGS, MKS and SI) and their conversion from one to another for density, force, pressure, work, power, velocity, acceleration ,Concept of rigid body, scalar and vector quantities	**8**	**CO1**
II	**Forces**	**Forces** Definition of force, measurement of force in SI units, its representation, types of force: Point force/concentrated force & Uniformly distributed force, effects of force, characteristics of a force. Different force systems (coplanar and non-coplanar), principle of transmissibility of forces, law of superposition. Composition and resolution of coplanar concurrent forces, resultant force, method of composition of forces, [Simple problems]	**8**	**CO2**
III	**Laws of forces & Beams**	**Laws of forces** laws of forces, triangle law of forces, polygon law of forces - graphically, analytically, resolution of forces, resolving a force into two rectangular components Free body diagram Equilibrant force and its determination Lami's theorem (concept only) **Beams** Type of Load, supports, Beams- definition, types and analysis for simply supported, cantilever beams [Simple problems on above topics]	**8**	**CO3**
IV	**Moment**	**Moment** Concept of moment. Moment of a force and units of moment. Varignon's theorem (definition only). Principle of moment and its applications (Levers – simple and compound, steelyard, safety valve, reaction at support).Parallel forces (like and unlike parallel force), calculating their resultant	**10**	**CO4**
V	**Couple**	**Couple** Concept of couple, its properties and effects. General conditions of equilibrium of bodies under coplanar forces. Position of resultant force by moment [Simple problems on the above topics]	**6**	**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	2	2	1	3	-	-	-	-	-	-	-	-	1	2	-	2	-
CO2	1	1	-	2	-	-	-	-	-	-	-	-	2	2	-	2	-
CO3	1	1	-	2	-	-	-	-	-	-	-	-	2	2	-	2	-
CO4	-	1	1	3	-	-	-	-	-	-	-	-	1	3	-	3	-
CO5	-	1	1	3	-	-	-	-	-	-	-	-	1	3	-	3	-

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	DWS-101	**Title of the Course**	ELEMENTARY WORKSHOP TECHNOLOGY	**L**	**T**	**P**	**C**
Year	I	**Semester**	I	**3**	**1**	**0**	
Pre-Requisite	10th	**Co-requisite**	--				
Course Objectives	Ability to use Workshop Technology fundamentals, techniques, skills, modern tools and measuring instruments for engineering practices.						

Course Outcomes	
CO1	Students will have elementary understanding of workshop safety rules and process procedures.
CO2	Students will have elementary knowledge of workshop tools and their types as well as specifications of smithy shop.
CO3	Students will have elementary knowledge of workshop tools and their types as well as specifications of sheet metal shop.
CO4	Students will have understanding of welding and allied processes like soldering and brazing.
CO5	Students will be aware of application as well as scope of different workshops in the real engineering world.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
1	**General Introduction**	Scope of subject "Workshop Technology" in engineering. (Different shop activities and broad division of the shops on the basis of nature of work done such as Wooden Fabrication (Carpentry) Metal Fabrication (shaping and Forming, Smithy, Sheet metal and Joining-welding, Rivetting, Fitting and Plumbing. Carpentary : Fundamental of wood working operations: - Marking & Measuring. - Holding & Supporting. - Cutting & Sawing. - Drilling & Boring. - Turning. - Jointing. Common Carpentry Tools: Their classification, size, specification (name of the parts and use only). Marking and measuring tools: Rules, try square, Bevel Square, Marking gauge, Mortisegauge, Scriber (marking knife). Combination set Holding and supproting Tools: Carpentary vice, Bench hold fast, Bar clamp, Bench hook, Hand clamp C and G clamp. Cutting and Sawing Tools: Saws: (Grip or Hand, panel, cross cut, Tenon, dove tail, compass, key hole and bow saw), Chisel: (Firmer, dovetail, mortise and gauge), Planes: (Wooden & Iron plane. Jack plane, Smoothing plane). Drilling and Boring tools: Auger, Gimlet, Hand drill, Brace and bits. Striking Tools: Mallet and Claw hammer. Turning Tools & Equipment: Wood working lathe and lathe tools. Miscellaneous Tools: Screwdriver, Rasp, Pincer, Oil stone, Triangular file and Saw set. Joining of Timber Components For Fabrication Works: Assembly of joints (Preparation steps and tools used only) Mortise, Tenon, Rivet , Groove, Tongue, Dowel, operations in assembly-Simple lap and butt, Mortise, Tenon, Dovetail, Mitre & briddle joints. Uses of glue, dowelpin and screw in preparation of joints. Common defects likely to occur during and after joining, defects due to wrong use of tools, defects due to wrong operation, defects due to improper seasoning of timber their identification and remedy. Safety (personal and equipment) to be observed.	8	CO1
2	**Metal Fabrication**	Metal Shaping : Smithy: Operations involved (concept only)-Preparation of fire, Supporting and holding the metal, cutting the metal in size, heating, drawing down or fullering, usetting, swaging, bending, punching, blanking, drifting and forge welding, Tools and equipment used (Names, size,specification for identification only). Heating and fuel handling equipment-Smithy Forge, Blower, Shovel, Poker. Holding and supporting tools-Common tongs, anvil, swage block. Striking Tools-Ball pein, cross pein, Straight pein double face and sledge hammers . Cutting tools - Hot and cold chisel and shear set. Punching & Drifiting Tools - Punch & Drift. Bending Tools and fixture. Forming & Finishing Tools - Fullers, Swage Flatters, Set hammers. Defects likely to Occur during and after operations their Identification and Remedy. Defects due to wrong operation, wrong tool and wrong heating. Safety of Personnel, Equipment & Tools to be observed.	7	CO2
3	**Sheet Metal Working**	Tools and Operation: Operations involved (Names and concept only) Laying out, marking and measuring,cutting, Shearing and blanking, Straightening bending and seaming, Punching and piercing , burring and stamping, Sheet metal joints - Lap, seam, Locked seam,hemp,wirededge, cup or circuler, Flange, angular and cap. Tools and equipments used (Name, size, specification for identification only). Marking Tools- Scriber, Divider and Trammel, Protractor, Trysquare, Dot punch, Steel Rule, Steel tape, Sheet metal gauge. Cutting and shearing Tools-hand Shear and lever, Snips, Chisels. Straightening tool-Straight edge. Striking Tools-Mallet, Hammer. Holding Tools-Vice, Plier, C or G clamps, Tongs. Supporting Tools-Stakes and Anvil. Bending Tools-Crimpers, Form dies, Roundnose plier, Rails. Punching-Piercing and Drifting tools. Burring Tools-Files. Common defects likely to occur during and after operation-Their identification and remedy. Defects due to wrong operation or wrong tool. Safety of Personnel, Equipment & Tools to be observed.	7	CO3
4	**Metal Joining During Fabrication**	Permanent Joining:Welding methods-Forgewelding, gas welding (high and low pressure-oxyacetylene welding, types of flames. Electric welding- D.C. & A.C., Connected tools, operation, materials and safety measures. Soldering & Brazing: For black Galvanized and Tincoated Iron sheet, brass and copper sheets only. Its concept, comparison with welding as joining method and classification, electric soldering and forge soldering. Soldering operation-edge preparation of joints, Pickling and degreasing, Fluxing, Tinning and Soldering. Materials Used-Common fluxes, soft and hard solder, solder wire (Plain and Resin core) and sticks, spelters and their specifications and description (For Identification Only), forge soldering bits. Electric soldering iron. Common defects likely to occurs during and after	9	CO4

		soldering. Safety of Personnel, Equipment & Tools to be observed. Rivetting:Its comparison with welding as joining method. Rivets and Materials. Operation involved-Marking from given data, edge preparation, drilling and punching arrangements of joint elements (Lap, Butt with single cover plate and double cover plate) upsetting of rievet tail, shaping head and caulking. Tools and equipments used- (Names, Size, Specification and uses)-Supporting and holding tools (Stakes and Tonqs)-Striking tools-Ball pien, Straight pien and Cross pien hammers and head forming tools (Shapes), drills punches and solid punches, drift, elementary knowledge about working of pneumatic, hydraulic and electric rivetor. Temporary Joining (Fasteners & Their Uses): Introduction to Various types of Bolts (Names of prats and specification) and various types of washers and nuts used with them and their uses, material they are made of , studs and foundation bolts. Screws, keys, pins and cottors-their material and use. Pipe connectors-Sockets, elbows, tees, cross and bends, unions, volves, glands packing and operation in use of pipe connectors-cutting, marking, threading, pipe bending, joining different pipe line fittings- (Steps of operation only)		
5	**Tools Used in Mechanical Engineering Workshop**	Tools and equipment used in their operations (Name, Size, Specification and Discription for Identification). Supporting and holding tools-Pipe vices (Bench, leg and hand), Pipe wrenches, Spanners. Cutting Tools- Hack saw and Pipe cutters. Threading Tools- Pipe dies and Taps. Materials Used for Joining-White lead, Cotton and Gasket. Common defects lickely to occur during and after operation and their remedies. (3) Familiarity with The Use of Various Tools Used In Mechanical Engineering Workshop: Marking & Measuring: Steel rule, surface gauge, marking block, protractor, trysquare, scriber, punches, divider and callipers, surface plate, V. block, gauges- (screw, pitch, radius, feeler), Vernier callipers, Micrometer, Vernier height and depth gauge, use of dialgauge. Holding Tools: Vices (Bench, leg and hand vice), clamps tongs, pliers, Cutting Tools: Hack saw (Fixed and Adjustable framce), chisels-flat, cross cut, diamond, round nose. Files: According to section-Knife edge, Flat, Triangular round, Square, Half round, According to grade - Rough, Bastard, Second cut, Smooth and Dead smooth, Drills and Allied Tools: Parallel and taper shank Twist drill, Thread Cutting Tools: Taps and Dies, Miscellaneous Tools: Wrenches, Keys, Spaners, Pliers, Screw drivers their specification and many others which have not been named for use in various shops. They should be shown physically to each student for famillarity. Protection of fabricated Sructures from Weather : 1. Painting: Its need, Introduction to methods of paintings (Classification only); Mannual, Machine (spray) and dip painting at room temperature, operations involveddiscription of steps only eg. surface preparation method for old and new surface in timber and iron structure-sanding, derusting, deqreasing, filling of pore and dents, paint application- manual, machine (spray and dip painting drying of paint air drying and oven drying under coat and filler material (red oxide, putty, yellow clay), surface preparation materials (sand and emery papers); tools and equipments used (Name, size specification for indification). Brushes-Round and flat wire brush, scraper, trowel , spray gun, compressor. Defects likely to occur in painting and their remedies Safety of Personnel, Equipment & Tools to be observed. 2. Varnishing and Polishing: Its need operation involved (description of step only), surface preparation method of old and new articles, application of polishing materials, materials used for preparation of french and sprit polish,copal varnish. Defects likely to occur. Safety of Personnel, Equipment & Tools to be observed. 3. Foundry Work : Elementary idea of patterns, green sand moulds and moulding, tools and equipment used in green sand moulding. 4. Machine Shop : Introduction to machine tools viz lathe, drilling machine, shaper and planer simple line and block diagram of components and their functions. Brief concept of NC and CNC machines.	9	CO5

References Books:

1. A TEXTBOOK OF WORKSHOP TECHNOLOGY (MANUFACTURING PROCESSES) by R.S KHURMI
2. Elements Of Workshop Technology Vol-1" by Choudhury H S K

e-Learning Source:

https://youtu.be/6ISddRRHAhA

PO-PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	1	3	2	2	---	2		1	3	-	2
CO2	1	2	1	1	--	--	2	3	-	2	-
CO3	2	2	3	1	---	2	2	-	2	-	1
CO4	1	---	2	--	--	--	--	2	-	-	3
CO5	1	1	3	--	---	--	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:							
Course Code	DPH-151/251	**Title of the Course**	Applied Physics Lab	**L**	**T**	**P**	**C**
Year	1st	**Semester**	1st / 2nd	**0**	**0**	**3**	
Pre-Requisite	None	**Co-requisite**	None				
Course Objectives							

Course Outcomes	
CO1	To gain practical knowledge by applying the experimental methods to correlate with the Physics theory.
CO2	Experience and understand basic physical fundamentals and the key vocabulary to describe them: basic Electronics & Electrical, kinematics, dynamics, work and energy, gravitation, fluids.
CO3	Develop skills in observation, interpretation, reasoning, synthesis, generalizing, predicting, and questioning as a way to learn new knowledge.
CO4	Apply conceptual understanding of the physics to general real-world situations.

Experiment No.	Title of the Experiment	Content of the Unit	Contact Hrs.	Mapped CO
1		Determination of 'g' using simple pendulum.	2	1
2		To find the surface Tension of water by the method of capillary rise.	2	1
3		To determine the frequency of A.C. mains by using a sonometer and a horse shoe magnet.	2	1
4		To determine the value of modulus of rigidity of given material of a wire by statical method using Barton's apparatus.	2	1
5		Determination of coefficient of viscosity of water by capillary flow (Poiseuille's method).	2	2
6		To determine the height of a tower by Sextant.	2	3
7		To determine the moment of Inertia of a flywheel.	2	3
8		Determination of velocity of sound by resonance tube.	2	3
9		Determination of resistivity of a given wire by Post Office Box.	2	3
10		By using Potentiometer, determination of (i) E1/E2 (ii) Internal resistance of given cell.	2	4
11		Determination of coefficient of friction on a horizontal plane.	2	1
12		Determination of viscosity coefficient of a lubricant by Stoke's law.	2	4
13		Determination of Spring Constant.	2	4
14		Verification of Kirchoff's laws.	2	2
15		To draw the characteristics of a p-n junction diode.	2	3

Note: Any ten experiments are to be performed.

References Books:

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

e-Learning Source:

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

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

Name & Sign of Program Coordinator	Sign & Seal of HoD

Integral University, Lucknow

Effective from Session: 2010-11							
Course Code	DWS-151	**Title of the Course**	WORKSHOP PRACTICE	**L**	**T**	**P**	**C**
Year	I	**Semester**	I	**0**	**0**	**3**	**-**
Pre-Requisite	10th	**Co-requisite**	--				
Course Objectives	The Workshop Practice course is designed to provide hands-on experience with essential tools, machines, and techniques used in various engineering workshops. Students will learn the principles and operations of turning, tapering, threading, and grinding in the lathe shop, emphasizing precision machining and tool grinding. In the fitting and bench working shop, students will practice filing, drilling, tapping, dieing, and creating accurate male-female joints. The blacksmith shop focuses on foundational operations like upsetting, punching, bending, and swaging. Welding exercises include butt joints, lap joints, and oxy-acetylene welding. In the sheet metal shop, students will fabricate objects like funnels, trays, and electrical panel boxes with soldering and forming techniques. Carpentry introduces students to woodworking tools, joints like half-lap and mortise-tenon, and basic lathe operations. Finally, in the foundry, students will make moulds with single and multi-piece patterns, create cores, and cast aluminium. The course aims to equip students with practical skills and knowledge for effective problem-solving and application in mechanical engineering.						

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 provide the knowledge of job materials in various shops.
CO5	To provides the knowledge of core technical subjects for making and working of any type of project.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
1.	Machine Shop	a. Study of tools and operations b. Plane turning c. Step turning d. Taper turning e. Threading f. Single point cutting tool grinding	6	CO1
2.	Fitting Bench Working Shop	a. Study of tools and operations b. Simple exercises involving filing work c. Making perfect male-female joint d. Simple exercises involving drilling/tapping/die	3	CO2
3.	Black Smithy Shop	a. Study of tools and operations b. Simple exercises based on black smithy operations such as c. Upsetting/drawing down, punching, bending, fullering and swaging	3	CO2
4.	Welding Shop	a. Study of tools and operations b. Simple butt Joint c. Lap Joint d. Oxy acetylene welding	6	CO3
5.	Sheet Metal Shop	a. Study of tools and operations b. Making funnel complete with soldering c. Fabrication of tool box, tray, electrical panel box etc.	3	CO4
6.	Carpentry Shop	a. Study of tools and operation and carpentry Joints. b. Simple exercise using jack plain c. To prepare half lap corner, joint, mortise and tenon joints. d. Simple exercise on woodworking lathe.	3	CO5
7.	Foundry	a. Making a mould using single piece pattern b. Making a mould using two piece pattern c. Making a mould using a pattern with core print d. Making Pouring and Making an Aluminium Casting.	6	CO5

References Books:

Workshop Technology by R. S. Khurmi

e-Learning Source:

https://www.youtube.com/watch?v=sHbvMmOKdjg&list=PL8PvmC2cEsGSCry_RY0Qk2PcsNI5DQZ-h&index=2

Integral University, Lucknow

PO-PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13
CO1	2	-	-	2	2	-	-	2	-	-	-	2	2
CO2		-	-	-	3	-	-	-	2	-	-	3	-
CO3	3	-	-	2		-	3	2	-	-	-	2	-
CO4	-	-	-	-	2	-	2	2	-	2	-	2	-
CO5	-	-	-	3	2	-	2	3	2	-	-	-	3
	3	-	-	-	-	2	2	2	-	-	3	-	2

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

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

Integral University, Lucknow

Effective from Session: 2010-11							
Course Code	DAM-151	**Title of the Course**	APPLIED MECHANICS LAB	**L**	**T**	**P**	**C**
Year	I	**Semester**	I			**2**	
Pre-Requisite	10th	**Co-requisite**	--				
Course Objectives	To provide a quality education for students entering the mechanical engineering profession or Seeking careers in related fields						

Course Outcomes	
CO1	Learn basics of machine mechanics.
CO2	Students learn how to operate different lifting machines.
CO3	Students learn how to calculate the mechanical advantage of different lifting machines.
CO4	Learn basics of principle of moments, resolution of forces and coefficient friction.
CO5	Students learn about the efficiency of different machines.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
1	Law of Polygon	To verify the law of Polygon of forces	2	3
2	Law of parallelogram and triangle	To verify the law of parallelogram and triangle of forces	2	1
3	Law of principle of moments	To verify the law of principle of moments	2	4
4	Coefficient of friction	To find the coefficient of friction between wood, steel, copper and glass	2	4
5	Reaction at supports	To find the reaction at supports of a simply supported beam carrying point loads only	2	1
6	Forces in the jib & tie of a jib crane	To find the forces in the jib & tie of a jib crane	2	2
7	Forces in the members of a loaded roof truss	To find the forces in the members of a loaded roof truss	2	2
8	Mechanical advantages, velocity ratio and efficiency	To find the mechanical advantage, velocity ratio and efficiency of any (i) Simple wheel & axle (ii) Differential wheel & axle (iii) Differential pulley block (iv) Simple Screw jack (v) Simple Worm & worm wheel (vi) System of Pulleys (any type).	6	5

References Books:

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

e-Learning Source:

https://www.youtube.com/watch?v=alHUJ-jvrpU&list=PLCGTVPoYH6Rbj2Ye38lQgUKACNMMem-wA

PO-PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	1		1	3	1	1	2	-	2	-	3
CO2	2		1			1	2	2	-	1	-
CO3	1	1	1				1	3	2	-	2
CO4	1	1	1	1	3		1	-	3	2	-
CO5	1	1	1		3		2	1	-	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: 2010-11							
Course Code	DPC-151	**Title of the Course**	PROFESSIONAL COMMUNICATION LAB	**L**	**T**	**P**	**C**
Year	I	**Semester**	I	**0**	**0**	**2**	
Pre-Requisite	10th	**Co-requisite**	---				
Course Objectives	Develop Effective Verbal and Non-Verbal Communication Skills Enhance Written Communication Abilities Foster Active Listening and Interpersonal Skills Master Communication Tools and Technology Understand and Adapt to Diverse Communication Styles						

Course Outcomes	
CO1	Introduction of International Phonetic Alphabet and Pronunciation practice.
CO2	From a psychological perspective, objective and outcome of self-description in formal communication situations means that you are focusing attention on you and your behavior, which allows you to evaluate what you see based on the standards and expectations that you have developed throughout your life.
CO3	The CO of this unit is breeding fresh ideas and taking inputs from a particular group of students... Identify a solution to a specific problem or issue. Selecting candidates after their written test for hiring in a company.
CO4	The key objectives outcomes that underline a good presentation often include the following: To establish credibility with your audience. To communicate information clearly to your audience. To persuade and/or influence your audience. The CO of this unit is to establish credibility with your audience. To communicate information clearly to your audience. To persuade and/or influence your audience.
CO5	The CO of this unit is to differentiate between views and facts, to formulate and delineate useful questions, to choose and apply suitable research methods, to look critically at acquired information and to doubt information that has been offered

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
1	Introduction to speech sounds	Introduction to speech sounds through (IPA) International Phonetic Alphabet. - Pronunciation practice emphasizing the articulation of vocal sounds & Word stress. - Pronunciation Practice emphasizing the words with spelling pronunciation Mismatch.	4	1
2	Techniques of giving focused self-description	Techniques of giving focused self-description in formal communication Situations. - Practice in describing objects.	4	2
3	The basics of group discussion	The basics of group discussion. - Common pitfalls in group discussion. - Techniques for making a claim & supporting it in group discussion. - Techniques for offering polite but firm counter arguments. - Participating in a Debate.	4	3
4	The essentials of Seminar Presentation	The essentials of Seminar Presentation. - Techniques for preparing a Seminar Presentation. - Mock Interview: Preparation, unfolding of personality and expressing Ideas effectively. - Role Play/General Conversation, Making polite enquiries at Railway station, Post Office and other Public Places.	4	4
5	Project	Project: At the beginning of the Semester each student in the class will be given topics for one informative & one persuasive speech to be delivered by him/her towards the end of the semester. The students will research for, organize and finalize the speeches under the guidance of the subject teacher. For each speech, the student will submit a one-page written outline.	4	5

References Books:

Grant Taylor: English Conversation Practice (T.M.H.) 2. Grathe King: Colloqnial English Routledge London

Grant Taylor : English Conversation Practice (T.M.H.) 2. Grathe King: Colloqnial English Routledge London

e-Learning Source:

https://siayainstitute.ac.ke/wp-content/uploads/2021/05/COMM-SKILLS-NOTES.pdf

https://mrcet.com/downloads/MBA/Professional%20Communication%20Skills.pdf

https://www.scribd.com/document/389612555/COMMUNICATION-SKILLS-SELF-STUDY-NOTES-1-pdf

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

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

Name & Sign of Program Coordinator	Sign & Seal of HoD