Effective from Session: 2016							
Course Code	DCE-301	**Title of the Course**	Elementary Electrical & Mechanical Engineering	**L**	**T**	**P**	**C**
Year	II	**Semester**	III	**3**	**1**	**-**	**-**
Pre-Requisite	DCE-301	**Co-requisite**	NA				
Course Objectives	1. Operation on different mechanical instrument 2. Operation on different electrical instruments.						

Course Outcomes	
CO1	Basic concepts and working of different electrical lamps,wiring materials and accessories.
CO2	Study basic principles of operation, construction and specification of Electrical machines.
CO3	Identify the hand tools and instruments.
CO4	Knowledge of various machining operations and machine tools.
CO5	To understand the working of different I.C engines and different types of gears. Jack plane and material handling equipments

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
Unit-I	Elements of Mechanical Engineering	Construction and working of I.C. Engines, their classifications (2 stroke and 4 stroke), details of 4 stroke I.C. Engines. Types of compressors and their uses. Different type of gears and their applications Various types of bearings & their uses.	8	**CO4**
Unit-II	Different component of mechanical engineering	Conveyers, hoists and other material handling equipment's-their functioning and uses. Different kinds of lathes, shaper machines, planer machines and drilling machines. Different kinds of Jacks & Hammers and their uses.	8	**CO5**
Unit-III	Elements of Electrical Engineering	1. A.C.Machines (a) Transformers (b) Alternators (c) Induction Motor - their types, uses and Physical & Electrical specification. 2. General idea of electrical measuring instruments like Ammeter, Voltmeter, Wattmeter and Megger and their uses.	8	**CO2**
Unit-IV	Lighting systems	Different types of lamps like incandescent lamps, sodium vapor lamps, florescent tube. Halogenlamps - CFL, their merits, demerits and use. Bye laws pertaining to electrical installations, Fans and AC's different types of artificial Lighting systems, Lighting systems for residential buildings, public building, schools, colleges, hotels, hospital,exhibition hall, library etc.(IS)	8	**CO1**
Unit-V	Earthing	Simple electrical circuits used in house wiring Earthing - need and procedure.Safety against electrical shocks.	8	**CO3**

References Books:

1. Electrical estimating and design.
2. Dr. B.R.Gupta, "Generation of Electrical Energy", S.Chand Publication.

e-Learning Source:

https://nptel.ac.in/

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

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

Name & Sign of Program Coordinator	Sign & Seal of HoD

Effective from Session: 2016							
Course Code	**DCE-302**	**Title of the Course**	**STRENGTH OF MATERIAL**	**L**	**T**	**P**	**C**
Year	II	**Semester**	III	**03**	**01**	**00**	
Pre-Requisite	**DCE-302**	**Co-requisite**	NA				
Course Objectives	The objective of the present course is to make the students acquainted with the concept of load resultant, consequences and how different kinds of loadings can be withstood by different kinds of members with some specific materials.						

Course Outcomes	
CO1	Analyze indeterminate structures like fixed and continuous beams of simple structures.
CO2	Analyze shear force and bending moments for different types of beams.
CO3	Study of different types of stresses and their variation along the length of beam.
CO4	To analyse and understand principal stresses due to the combination of two-dimensional stresses on an element and failure mechanisms in materials.
CO5	To evaluate the behavior of torsional members, columns and struts.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
Unit-I	**Principal Stress and Principal Planes. Bending Moment and Shear Force**	Principal stress and principal plane under direct and shear stress. Graphical determination by Mohr's circle method. Concept of a beam, and supports (Hinged, Roller and Fixed). Types of Beams: Simply supported, cantilever, fixed, overhang and continuous beams. Types of loads (distributed, point and varying). Concept of Bending Moment & Shear Force. Sign conventions. Bending moment and shear force diagrams for cantilever, simply supported and overhanging beams subjected to uniformly distributed, concentrated and uniformly varying loads. Relationship between load, shear force and bending moment. Point of maximum B.M. and contraflexure, concept of fixed and continuous beams.	10	CO-1
Unit-II	**Bending and Shear Stresses Combined Direct & Bending Stresses**	Assumption of theory of simple bending. Derivation of the equation. M/I=F/Y=E/R. Concept of centroid and second moment of area, Radius of gyration, Theorems of parallel and perpendicular axes, Second Moment of area for sections: rectangle, triangle, circle, trapezium, angle, Tee, I, Channel and compound sections. Moment of resistance, section modulus and permissible bending stresses, Bending stresses in circular rectangular, I, T and L section. Comparison of strength of the above sections. Concept of shear stresses in beams, Shear stress distribution in rectangular, I and T section. Concentric and eccentric loads, eccentricity, effect of eccentric load on the section, middle third rule; Stresses due to eccentric loads. Examples in the case of short columns, chimneys and dams.	10	CO-2
Unit-III	**Slopes and Deflections of Beams**	Definition of slope and deflection, sign convention. Circular bending. Calculation of maximum slope and deflection for the following standard cases by double integration or moment area method. Cantilever having point load at the free end. Cantilever having point load at any point of the span. Cantilever with uniformly distributed load over the entire span Cantilever having U.D.L. over part of the span from free end Cantilever having U.D.L. over a part of span from fixed end Simply supported beam with point load at centre of the span. Simply supported beam with U.D. load over entire span. NOTE: All examples will be for constant moment of inertia without derivation of formula.	8	CO-3
Unit-IV	**Columns & Struts**	Columns & Struts: Definition of long column, short column and strut, slenderness ratio, equivalent length, critical load, collapse load, End conditions of column. Application of Euler's and Rankine's formula (no derivation), simple numerical problems based on Euler's and Rankine's formulae.	6	CO-4
Unit-V	**Torsion & Fixed and Continuous Beam**	Definition of torque and angle of twist. Derivation of torsion equation. Polar moment of inertia. Strength of hollow and solid shaft, advantage of a hollow shaft over a solid shaft. Comparison of weights of solid and hollow shafts for same strength. Horsepower transmitted. Calculation of shaft diameter for a given Horsepower. Fixed and Continuous Beam: Effect of fixing and continuity, fixed beams with point loads and U.D. Load. Continuous beam of uniform section covering three spans with free ends (supports being at the same level) B.M. & S.F. Diagram. Points of Contraflexure of fixed and continuous beams.	8	CO-5

References Books:

1. "Strength of Materials – R.K. Rajput
2. "Strength of Materials – R.S. Khurmi

e-Learning Source:

1. **https://archive.nptel.ac.in/courses/105/105/105105108/**

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3		3						2	1			
CO2	3	2	2							2				
CO3	3	3	2							2				
CO4	2	2	2							4				
CO5	3	1								3	1			

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

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

Effective from Session: 2016							
Course Code	DCE-303	**Title of the Course**	HYDRAULICS	**L**	**T**	**P**	**C**
Year	II	**Semester**	III	**3**	**1**	**0**	
Pre-Requisite	DCE-303	**Co-requisite**	NA				
Course Objectives	1. To initiate the students into theory and practice of calculating discharge of different types of fluid 2. To know about different types of losses in pipes.						

Course Outcomes	
CO1	Perform various tests regarding behavior of fluid/liquid.
CO2	Interpret the problems related to fluid/liquid and apply for solving fluid mechanics problem.
CO3	Compute discharge and loss of head through pipes, open channels, notches and other hydraulic structures.
CO4	To determine different types of pressure acting on a fluid.
CO5	To know different types of Pumps.

UnitNo.	Title of the Unit		Contact Hrs.	Mapped CO
UNIT-I	**Fluid, Properties of Fluid**	Fluid: Real fluid, ideal fluid. Fluid Mechanics, Hydraulics, Hydrostatics, Hydro kinematics and Hydrodynamics. Mass density, specific weight, specific gravity, cohesion, adhesion, viscosity, surface tension, capillarity, vapour pressure and compressibility. Hydrostatic Pressure: Pressure, intensity of pressure, pressure head, Pascal's law and its applications. Total pressure, resultant pressure, and centre of pressure. Total pressure and centre of pressure on vertical and inclined plane surfaces: Rectangular, Triangular, Trapezoidal, Circular.	8	CO-1
UNIT-II	**Calculation of Pressure**	Measurement of Pressure Atmospheric pressure, gauge pressure, vacuum pressure and absolute pressure. Piezometers, simple manometer, differential manometer and mechanical gauges. Measurement of pressure by manometers and pressure gauges. Types of Flow: Steady and unsteady flow Laminar and Turbulent flow Uniform and Non-uniform flow. Discharge and continuity equation (flow equation) Types of hydraulic energy. Potential energy, Kinetic energy, Pressure energy Bernoulli's theorem; statement and description (without proof of theorems). Venturi-meter (horizontal and inclined) and Orifice Plate meter	8	CO-2
UNIT-III	**Orifice, Flow through pipes**	Definition of Orifice, and types of Orifices, Hydraulic Coefficients. Large vertical orifices. Free, Drowned and partially drowned orifice. Time of emptying a rectangular/circular tank with flat bottom. Definition, laminar and turbulent flow explained through Reynolds's Experiment. Reynolds Number, critical velocity and velocity distribution. Head Losses in pipelines due to friction, sudden expansion and sudden contraction entrance, exit, obstruction and change of direction (No derivation of formula) Hydraulic gradient line and total energy line. Flow from one reservoir to another through long pipe of uniform and composite section. Water Hammer Phenomenon and its effects.	8	CO-3
UNIT-IV	**Open Channel**	Flow through open channels. Definition of a channel, uniform flow and open channel flow. Discharge through channels using:(i) Chezy's formula (no derivation) (ii) Manning's formula Most economical sections:(i) Rectangular(ii) Trapezoidal	6	CO-4
UNIT-V	**Flow Measurements and Hydraulic Machine**	Measurement of velocity by: - (i) Pitot tube (iii) Surface Float (ii) Current-meter (IV) Velocity rods. Measurement of Discharge by a Notch Difference between notches and orifices. Discharge formulae for rectangular notch, triangular Notch, trapezoidal notch, and conditions for their use. (With derivation) Measurement of discharge by weirs. Difference between notch, weir and barrage. Discharge formula for free, drowned, and broad crested weir with and without end contractions; velocity of approach and condition of their use. Venturi flumes to measure flow. Measurement of Discharge by velocity area-method **HYDRAULIC MACHINE:** Reciprocating pumps, Centrifugal pumps, Impulse Turbine & Reaction Turbines Sketching and description of principles of working of above-mentioned machines.	10	CO-5

References Books:

1. Fluid Mechanics – D.S. Kumar
2. Hydraulics – R.K Bansal

e-Learning Source:

1. https://www.youtube.com/watch?v=q0WG__VV8so&pp=ygUeZGlmZmVyZW50IHR5cGVzIG9mIGZsdWlkIGZsb3cg
2. https://www.youtube.com/watch?v=g6MhpVYExW0&pp=ygUXZGlmZnJlbnQgdHlwZXMgb2YgcHVtcHM%3D

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3		3		1						1		
CO2	2	3		2		2								2
CO3	3	3	3			2							3	
CO4	2	2		3		1								1
CO5		2		2		1							2	

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

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

Effective from Session: 2016							
Course Code	DCE-304	**Title of the Course**	PUBLIC HEALTH ENGINEERING I	**L**	**T**	**P**	**C**
Year	II	**Semester**	III	**03**	**01**	**00**	
Pre-Requisite	DCE-304	**Co-requisite**	NA				
Course Objectives	This course is aimed at teaching the students the functions of the various components of the water supply system, water resources and their utilization, determination of water demand, water quality, intake construction, water treatment technology and construction of water mains and distribution.						

Course Outcomes	
CO1	Understand the terms involved in public water supply, domestic and industrial sewage.
CO2	Know different types of sources of water for public water supply.
CO3	Understand the methods for estimating quantity of water supply required for city or town.
CO4	Suggest the treatment required by knowing the quality of water.
CO5	Understand the hydraulic design of Units in treatment plan.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
Unit-I	**Water Supply**	Introduction: Necessity and brief description of water supply system. Water requirement: Per capita consumption for domestic, industrial, public and firefighting uses as per IS standards. Consumption, demand and its variation. Surface water sources: Rivers, canal, impounding reservoir and lakes, their quality of water and suitability.	8	CO-1
Unit-II	**Water Quality and Treatment**	Suspended, colloidal and dissolved impurities. Physical, chemical and bacteriological characteristics and their significance. Minimum standards required for drinking water, Principles of Sedimentation, Coagulation, Flocculation, Filtration, Disinfection (Chlorination) including Jar Test, Break point chlorination, Residual chlorine. Flow diagram of different treatment units. Function, constructional details, working and operation.	10	CO-2
Unit-III	**Water Distribution System and Storage**	Pipes: Different types of Pipes: Details of their sizes, joints and uses. Appurtenances: Sluice (Gate and spindle), air, reflux, scour and safety valves, fire hydrants. Types of lay out-dead end, grid, radial and ring systems. System of water supply-intermittent and continuous. Service reservoirs-types, necessity and accessories. Storage: Necessity, types of storing tanks: G.I. Sheet Tank, P.V.C. tank, over head tanks.	8	CO-3
Unit-IV	**Laying of Pipes**	Laying of Pipes: Setting out alignment of pipeline. Excavation in different types of soils and precautions taken. Precautions taken for traffic control, bedding for pipeline. handling, lowering, laying and jointing of pipes, testing of pipelines and back filling. Use of boning rods.	6	CO-4
Unit-V	**Building Water Supply& Maintenance**	Building Water Supply: General layout of water supply arrangement for a building (single and multistoried) as per IS Code of practice. Water supply fixtures and their installation. Tapping of water mains. Hot and Cold-Water supply in buildings. Use of Solar water heaters. Rural water supply: Sources, treatment and distribution. Maintenance Leakage detection and prevention. Replacement of damaged pipe. Maintenance of domestic plumbing fixtures.	8	CO-5

References Books:

1. "Public Health Engg. - S.K. Garg
2. "Public Health Engg. - Rangwala

e-Learning Source:

1. **https://archive.nptel.ac.in/courses/105/105/105105201/**

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	2	3		1									
CO2	2	3			2			2				1	
CO3	2	3			2			2			2		3
CO4	2	3		1	1	2						2	
CO5	2	3				1	1						2

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

Name & Sign of Program Coordinator	Sign & Seal of HoD

Effective from Session: 2016							
Course Code	DCE-305	**Title of the Course**	BUILDING CONSTRUCTION AND MAINTENANCE ENGG. -I	**L**	**T**	**P**	**C**
Year	II	**Semester**	III	**3**	**1**	**0**	
Pre-Requisite	DCE-305	**Co-requisite**	NA				
Course Objectives	The course aims to train students who can deal with construction project with knowledge of various aspects of construction practices						

Course Outcomes	
CO1	Know various technical terms related to different components of building structure.
CO2	Understand various construction processes of different building components with use of equipment.
CO3	Understand the process of setting out of building.
CO4	Know various materials required for execution of various construction processes.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
UNIT-I	**Introduction**	Definition of a building, classification of buildings based on occupancy. Different parts of a building. Orientation of buildings. Site selection. Exposure to building bylaws/master plan and building approval	6	CO-1
UNIT-II	**Foundation**	(i) Concept of foundation and its purpose. (ii) Types of foundations-shallow and deep. (a) Shallow foundation – Constructional details of: Spread foundations for walls, Thumb rules for depth and width of foundation and thickness of concrete block stepped foundation, masonry pillars and concrete columns, raft foundation, Grillage foundation and machine foundation. (b) **Deep foundations**. Pile foundations, their suitability, classification of piles according to function, material and installation of concrete piles (under reamed, bored, compacted). (c) Construction-preparing foundation plans, setting out, excavation, timbering and dewatering. Well point system.	14	CO-2
UNIT-III	**Walls**	**Purpose of walls**; Classification of walls-Load Bearing and Non-Load Bearing. Dwarf wall. Classification of walls as per materials of construction, brick, stone, reinforced brick, reinforced concrete, precast hollow and solid concrete block and composite masonry walls. Brick masonry-Definition of terms; mortar, Bond, facing, backing, hearting, column, column, pillar, jambs, reveals, soffit, plinth, plinth masonry, Brick: header, stretcher, bed of brick, bat, queen closer, king closer, frog and quoin. Bond- Meaning and necessity: Types of bonds and their suitability (English, Flemish, Header and Stretcher) 1, 1-1/2 and 2 Brick thick walls in English Bond. T, X and right-angled corner junctions. Sketches for 1, 1- 1/2 and 2 Brick square pillars in English Bond. Construction of Brick walls- Method of laying bricks in walls, precautions observed in the construction of walls, method of bonding new brick work with old (Toothing, raking back and block bonding). Construction and Expansion Joints. Stone Masonry (a) Glossary of terms-Natural bed of a surface, bedding planes, string course, corbel, cornice, block-in course, grouting, molding, templates, throating, through stones, parapet, coping, spalls, pilaster and buttress. (b) Types of Stone Masonry: Rubble Masonry; random and coarse, Ashlar Masonry, Ashlar fine, Ashlar rough tooled Ashlar facing, specifications for coursed rubble masonry, principles to be observed in construction of stone masonry walls. Partition walls: Constructional details, suitability and uses of brick and wooden partition walls. Mortars-preparation, use and average strength of cement, lime, lime cement, lime surkhi and mud mortar. Scaffolding: Constructional details and suitability of Mason's Brick Layers and Tubular scaffolding Centering & Shuttering. Shoring & under pinning: Types and uses. Safety in construction of low rise and high-rise buildings.	6	CO-3
UNIT-IV	**Arches and Lintels**	(i) Meaning and use of Arches and Lintels. (ii) Glossary of terms used in Arches and Lintels- Abutment, Peir, Arch ring, Intrados, Soffit Extrados, Voussoirs, Springer, Springing line, Crown, Key stone, Skew back, Span, Rise, Depth of an Arch, Haunch, Spandrel, Jambs, Bearing, Thickness of lintel, Effective span. (iii) Arches: (a) types of Arches-Semicircular, segmental, elliptical and parabolic, flat, inverted and relieving. (b) Stone arches and their construction. (c) Brick arches and their construction.	8	CO-1
UNIT-V	**Doors and windows**	Glossary of terms, used in Doors and Windows. Doors-Name; uses and sketches of Metal doors; Ledged and Battened Doors; Ledged, battened and braced door; Framed and Paneled doors; glazed and paneled doors; flush doors; collapsible doors; Rolling steel Shutters, side sliding doors; Door frames, PVC shutters & metal doors. Windows-names, uses and sketches of metal windows, fully paneled windows, fully glazed Windows, casement windows, fanlight windows and ventilators, sky light window frames, Louvered shutters (emphasis shall be given for using metals and plastics etc. in place of timber).	6	CO-2

References Books:

1. "Concrete Technology" Theory & Practice – Shetty M.S. – S. Chand & Co. Ltd.

e-Learning Source:

1. https://www.youtube.com/watch?v=cx5gPKp9QEc&list=PLbMVogVj5nJQU7M0LdA77p_XaaWBJniNc

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

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

Name & Sign of Program Coordinator	Sign & Seal of HoD

Effective from Session: 2016							
Course Code	DCE-306	**Title of the Course**	Concrete Technology – I	**L**	**T**	**P**	**C**
Year	II	**Semester**	III	**3**	**1**	**0**	**-**
Pre-Requisite	DCE-306	**Co-requisite**	NA				
Course Objectives	The objective of the Concrete Technology course is to provide students with a comprehensive understanding of the materials, mix design, properties, and construction techniques involved in producing high-quality concrete for various civil engineering applications.						

Course Outcomes	
CO1	Identify the functional role of ingredients of concrete and apply this to mix design philosophy.
CO2	Acquire and apply fundamental knowledge in the fresh and hardened properties of concrete.
CO3	Develop an awareness of the utilization of waste materials as novel innovative for use in concrete.
CO4	Evaluate physical properties of cement, sand and aggregate.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
UNIT - I	**Introduction**	Definition of concrete. Brief introduction to properties of concrete. Advantages of concrete. Uses of concrete in comparison to other building materials.	4	CO-1
UNIT - II	**Ingredients of Concrete**	Cement: The chemical ingredients causing changes in properties, situations of use and special precautions in use of the following types of cement: Ordinary Portland cement, rapid hardening cement, low heat cement, high alumina cement, blast furnace slag cement, quick setting, white and coloured cements. Aggregates: Classification of aggregates according to source, size and shape. Characteristics of aggregates particle size and shape, surface texture; specific gravity of aggregate; bulk density, water absorption surface moisture, bulking of sand and deleterious materials in the aggregate. Grading of Aggregate: -Coarse aggregate, fine aggregate; All in-aggregate; fineness modulus; interpretation of grading charts and combination of two aggregates. Water: Limits on the impurities as per ISI; effect of excessive impurities on concrete, Ascertaining the suitability of water with the help of concrete cube test.	10	CO-2
UNIT - III	**Water Cement Ratio**	Hydration of cement, Effect of various W/C ratios on the physical structure of hydrated cement, water cement ratio law and conditions under which the law is valid, internal moisture, temperature, age, and size of specimen. Definition of cube strength of concrete. Relations between water cement ratio and strength of concrete. Use of CBRI chart.	10	CO-4
UNIT -IV	**Workability**	Definition of workability. Concept of Internal friction, Segregation, Harshness. Factors affecting workability; water content, shape, size and percentage of fineness passing 300 mics. Measurement of workability slump test, compaction factor test. Recommended slumps for placement in various conditions. Vee-Bee Consistometer.	8	CO-5
UNIT -V	**Proportioning for Ordinary Concrete**	Object of mix design, Strength required for various grades as per IS 456, Preliminary test, Works cube test. Proportioning for ordinary mix as prescribed by IS and its interpretation. Adjustment on site for: Bulking, water content, Absorption, Workability Design data for moisture, bulkage, absorption and suitable fine aggregate and coarse aggregate ratio. Difference between ordinary and controlled concrete.	8	CO-5

References Books:

1. "Advances in Building Materials and Const."- Rai Mohan and Jai Singh M.P., CBRI, roorkee.
2. "Concrete Technology Theory & Practices" – Shetty M.S. – S.Chand Company Ltd. New Delhi

e-Learning Source:

1. **https://youtu.be/qlKzl7QOnUc?si=FeUISL1U5yYhpp__**

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

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

Name & Sign of Program Coordinator	Sign & Seal of HoD

Effective from Session: 2016							
Course Code	DCE-352	**Title of the Course**	STRENGTH OF MATERIALS LAB	**L**	**T**	**P**	**C**
Year	II	**Semester**	III	**0**	**0**	**3**	
Pre-Requisite	DCE-352	**Co-requisite**	NA				
Course objectives	To determine the mechanical properties of various construction materials, such as tensile strength, compressive strength, hardness, and elasticity.						

Course Outcomes	
CO1	Demonstrate the basic principles in the area of strength and mechanics.
CO2	Evaluate the allowable loads and associated allowable stresses before mechanical failure.
CO3	Perform tests to measure the properties of the materials such as impact strength, tensile strength, compressive strength, hardness, ductility etc.
CO4	Analyse the performance of deformable solids in various materials under the action of different kinds of loads.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
1	**Experiment No-1**	Determination of shear force at different sections on simply supported beam under points loads.	3	CO-1
2	**Experiment No-2**	Determination of bending moment at different sections on a simply supported beam under different types of loading.	3	CO-1
3	**Experiment No-3**	Determination of yield stress, ultimate stress, percentage elongation, plot the stress strain diagram and compute the value of Young's Modulus of mild steel.	3	CO-2
4	**Experiment No-4**	Determination of the maximum deflection and Young's Modulus of elasticity by deflection apparatus.	3	CO-2
5	**Experiment No-5**	Determination of modulus of rigidity of material by Torsion apparatus.	3	CO-3
6	**Experiment No-6**	Determination of stiffness/deflection of a helical spring	3	CO-3
7	**Experiment No-7**	Determination of hardness of a metal plate by Rock Well Brinell hardness testing machine.	3	CO-4
8	**Experiment No-8**	To perform impact test on Izod Impact testing machine.	3	CO-4

References Books:

1. Lab manual of University Polytechnic Civil Department

e-Learning Source:

1. https://www.youtube.com/watch?v=2QZS685f0wg

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

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

Name & Sign of Program Coordinator	Sign & Seal of HoD

Effective from Session: 2016							
Course Code	DCE-353	**Title of the Course**	Hydraulic lab	**L**	**T**	**P**	**C**
Year	II	**Semester**	III	**0**	**0**	**3**	
Pre-Requisite	DCE-353	**Co-requisite**	NA				
Course objectives	The objective of the hydraulics lab test course is to provide students with practical experience in conducting experiments to analyze fluid behavior, pressure, flow, and other key hydraulic principles in real-world applications.						

Course Outcomes	
CO1	Measure theoretical discharge in pipes, Venturi meter, orifice meter and notches.
CO2	Demonstrate and conduct experiment to find characteristic curves of various pumps.
CO3	Demonstrate and conduct experiment to find characteristic curves of various turbines.
CO4	Demonstrate the different losses in pipe.

Unit No.	Title of the Unit		Contact Hrs.	MappedCO
1	**Experiment No-1**	To verify Bernoulli's Theorem.	3	CO-1
2	**Experiment No-2**	To find out venturimeter coefficient.	3	CO-1
3	**Experiment No-3**	To determine coef. of velocity (Cv), Coef. of discharge(Cd) Coef. of contraction (Cc) and verify the relation between them.	3	CO-2
4	**Experiment No-4**	To perform Reynold's Experiment.	3	CO-2
5	**Experiment No-5**	To determine Darcy's coefficient of friction for flow through pipes.	3	CO-4
6	**Experiment No-6**	To verify loss of head due to: (a) Sudden enlargement (b) Sudden Contraction.	3	CO-4
7	**Experiment No-7**	To determine the velocity of flow of an open channel by using a current meter.	3	CO-4
8	**Experiment No-8**	To determine coefficient of discharge of a rectangular notch/triangular notch.	3	CO-3
9	**Experiment No-9**	Study of the (a) Reciprocating Pumps or Centrifugal Pumps. (b) Impulse turbine or Reaction turbine.	3	CO-4
10	**Experiment No-10**	Study of the Pressure Gauge/water meter/mechanical flow meter pitot tube.	3	CO-4

References Books:

1. Lab manual of University Polytechnic Civil Department

e-Learning Source:

1. https://youtu.be/Pu_SqEK2ZBU?si=MvKvOI6cCT0NZbLe

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

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

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

Effective from Session: 2016							
Course Code	DCE-356	**Title of the Course**	Concrete Technology & Building Construction and Maintenance lab	**L**	**T**	**P**	**C**
Year	II	**Semester**	III	**0**	**0**	**3**	
Pre-Requisite	DCE-356	**Co-requisite**	NA				
Course objectives	The objective of the concrete lab test course is to equip students with practical skills and knowledge in performing standard concrete tests to evaluate its properties and suitability for construction applications.						

Course Outcomes	
CO1	To know about the different tests of cement and aggregate.
CO2	To know about the workability and strength of concrete.
CO3	To know the different types of concrete and mix design.
CO4	To know the basic properties of ingredients of concrete.

Unit No.	Title of the Unit		Contact Hrs.	MappedCO
1	**Experiment No-1**	To determine flakiness index and elongation index of coarse aggregate (ISI:2386-pt.1-1963)	3	CO-1
2	**Experiment No-2**	Field method to determine fine silt in aggregate.	3	CO-1
3	**Experiment No-3**	Determination of specific gravity and water absorption of aggregates (IS:2386 Part-III-1963) (for aggregates 40mm to 10mm)	3	CO-2
4	**Experiment No-4**	Determination of bulk density and voids of aggregates (IS:2386-Part-III-1963)	3	CO-2
5	**Experiment No-5**	Determination of surface moisture in fine aggregate by displacement method (IS:2383-Part-III-1963)	3	CO-3
6	**Experiment No-6**	To determine necessary adjustment for bulking of fine aggregate by field method (IS:2383-Part-III-1983).	3	CO-3
7	**Experiment No-7**	Test for workability (slump test); (i) To verify the effect of water, fine aggregate/coarse aggregate ratio and aggregate/cement ratio on slump. (ii)To test cube strength of concrete with varying water cement ratio. (iii) Compacting factor test for workability (IS:1199-1959) (iv)Workability of concrete by Vee-Bee consistometer.	3	CO-4
8	**Experiment No-8**	Fineness modulus of sand.	3	CO-3
9	**Experiment No-9**	Building Construction & Maintenance (a) Layout of a building. (b) To construct brick bonds (English and Flemish bonds) in one, one and half and two brick thick. (i) Walls. L, T and cross junction. (ii) Columns	3	CO-4
10	**Experiment No-10**	Visit to construction site for showing the following item of works and to write specific report about the works seen. (i) Timbering of excavated Trenching, Construction of Masonry Walls, Flooring: Laying of flooring on an already prepared lime concrete base, Plastering and Pointing of wall, Finishing of wall surface by Lime, Distemper, Snowcem, etc. and calculation of material in100 Sqm. wall area, Use of Special type of shuttering/cranes/heavy machines in construction work.	3	CO-4

References Books:

1. Lab manual of University Polytechnic Civil Department

e-Learning Source:

1. https://youtu.be/RiWOyRhRCck?si=SF217IGwhnKEwnBb

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

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

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