

Department of
CIVIL ENGINEERING

4 Years B.Tech Degree Programme

REGULATION & SYLLABUS 2017

Choice Based Credit System
Outcome Based Assessment

SEMESTER-III & IV



AUTONOMOUS

Accredited by NBA

Accredited by NAAC with 'A' Grade (3.28 out of 4.00 CGPA)

GANDHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

Affiliated to UGC New Delhi & Biju Patnaik University of Technology, Odisha

GUNUPUR – 765022, Odisha, India

3rd semester

S. No.	Course category	Subject Code	Subjects	L	T	P	Credits
1	PC	BCVPC3010	Mechanics of Solids	3	1	-	4
2	PC	BCVPC3020	Building Materials & Building Construction	3	-	-	3
3	PC	BCVPC3030	Surveying -I	3	-	-	3
4	ES	BCVES3040	Object Oriented Programming Using JAVA	3	-	-	3
5	BS	BBSBS3050	Engineering Mathematics-III	3	1	-	4
6	HS	BMGHS3061	Engineering Economics & Costing	3	-	-	3
	HS	BBSHS3062	Environmental Engineering & Safety				
Sessional							
7	PC	BCVPC3110	Mechanics of Solids Lab	-	-	2	1
8	PC	BCVPC3120	Building Drawing Lab	-	-	2	1
9	PC	BCVPC3130	Survey Field Work	-	-	2	1
10	ES	BCVES3140	Java Programming Lab	-	-	2	1
Total							24

Subject code	course title	L	T	P	C	QP
	MECHANICS OF SOLIDS					
CEO1-TO solve advanced solid mechanics problems using classical methods						
CEO2- TO apply commercial software on select, applied solid mechanics problems						
Pre-requisites: Basic Concepts of Physics and Mathematics (especially Trigonometry, Geometry and Calculus), Engineering Mechanics						
Course Outcomes						
CO-1	Analyze the statically determinate and indeterminate problems					
CO-2	Determine the stresses and strains in the members subjected to axial, bending and torsional loads					
CO-3	Evaluate the slope and deflection of beams subjected to loads					
CO-4	Determine the principal stresses and strains in structural members					
CO-5	Understand the concept of buckling and be able to solve the problems related to isolated bars					
UNIT-1	(10 Hours)					
Simple Stress and Strain -Load, Stress, Principle of St.Venant, Principle of Superposition, Strain, Hooke's law, Modulus of Elasticity, Stress-Strain Diagrams, Working Stress, Factor of safety, Strain energy in tension and compression, Resilience, Impact loads, Analysis of Axially Loaded Members, Composite bars in tension and compression, temperature stresses in composite rods, Statically indeterminate problems, Shear stress, Complimentary shear stress, Shear strain, Modulus of rigidity, Poisson's ratio, Bulk Modulus, Relationship between elastic constants. Compound Stress and strain - Stresses in thin cylinders, thin spherical shells under internal pressure, wire winding of thin cylinders. Analysis of Biaxial Stress. Plane stress, Principal stress, Principal plane, Mohr's Circle for Biaxial Stress, Two dimensional state of strain, Mohr's circle for strain, Principal strains and principal axes of strain, strain measurements, Calculation of principal stresses from principal strains.						
UNIT-2	(11 Hours)					
Shear Force and Bending Moment for Determinate Beams - Types of load and Types of support. Support reactions, Shear force and bending moment, Relationship between bending moment and shear force, Point of inflection, Shear Force and Bending Moment diagrams for determinate beams.						
UNIT-3	(12Hours)					
Simple Bending of Beams - Theory of simple bending of initially straight beams, Bending stresses, Shear stresses in bending, Distribution of normal and shear stress, beams of two materials, Composite beams. Deflection of Beams - Differential equation of the elastic line, Slope and deflection of beams by integration method and area - moment method.						
UNIT-4	(14Hours)					
Theory of Columns - Eccentric loading of a short strut, Long columns, Euler's column formula, Lateral buckling, Critical Load, Slenderness ratio Torsion in solid and hollow circular shafts - Twisting moment, Strain energy in shear and torsion, strength of solid and hollow circular shafts. Stresses due to combined bending and torsion, Strength of shafts in combined bending and twisting						
Teaching mehod:-Chalk & Board/ PPT/Video Lectures/ MOOC/ Internship/Industry Guest Lecture/ Invited Guest lecture/ Demonstration. etc.(can be chosen one or many)						
Text books:-1. Elements of Strength of Materials by S.P.Timoshenko and D.H.Young, Affiliated East West Press 2. Strength of Materials by G. H. Ryder, Macmillan Press						
Ref.books:- 1. Mechanics of Materials by Beer and Johnston, McGraw Hill 2. Mechanics of Materials byR.C.Hibbeler, Pearson Education						

Subject code	course title	L	T	P	C	QP
BCVPC3020	BUILDING MATERIALS AND BUILDING CONSTRUCTIONS	3	-	-	3	
CEO1- To study about the basic building materials, properties and their applications						
CEO2- To know the smart building materials, external paints and their uses.						
CEO3 -To understand different types of masonries and their applications						
Course Outcomes						
CO1	Identify and characterize building materials					
CO2	Understand the manufacturing process of bricks and cement					
CO3	Identify the methods for preservation of timber and metals					
CO4	To select suitable type of flooring, Arch geometry, Plastering and also suitable color to face lift the building.					
CO5	To select and design suitable type of formwork.					
Unit:1		(10 Hours)				
Bricks: Brick as a construction material and its importance, materials suitable for manufacture of bricks, methods of brick manufacture, types of bricks, qualities of a good brick, testing of bricks, uses of bricks.						
Stone: Introduction, classification, composition and characteristics, useful Indian stone, method of quarrying and dressing						
Cement: Classification, chemical composition, Manufacturing of cement, hydration, tests for cement, uses of cement, types of cement, <i>Mortar</i> : Definition, composition and uses of mortar.						
Concrete: Quality of mixing water, Workability, Factors affecting workability, Measurement of workability, Segregation, Bleeding, Uniformity of mixing, Mixing time, vibration of concrete, concrete mix design, admixtures, Grade and strength of Concrete.						
Unit:2		(11Hours)				
Foundation: Types of foundation, spread foundations, pile foundations, pier foundations, excavation of foundation						
Brick Masonry: Terminology used, Materials used, Causes of failure of brick masonry, Types of bonds, Brick laying, Joints in brickwork, Reinforced brickwork, Joint between old and new masonry, Maintenance of brick work.						
Stone Masonry: Terminology used, Materials used, Cutting and dressing of stones, Types of stone masonry-Rubble and Ashlar, General principles of construction, Joints of stone, Stone lining, maintenance of stone work, Artificial stones. Cavity walls: Purpose and method of construction						
Unit:3		(14 Hours)				
Damp Proofing: Causes and effects, materials used for damp proofing, methods of preventing dampness, Damp Proof Course.						
Stairs: Terms used, types of stairs, essential requirements, wooden stairs, concrete stairs, metal stairs.						
Flooring: Types of flooring and their construction- brick, stone, concrete, tile, mosaic, terrazzo, asphalt						
Plastering: Definition. Materials used for plastering, types of plastering, methods of plastering, defects and remedial measures in plastering.						
Unit:4		(10 Hours)				
Building Maintenance and Safety Measures: Purpose, need, importance, methods, Causes and types of defects in buildings, Preparation of report on maintenance work, Remedial measures and execution procedure of any one type of building maintenance work, Importance of various Laws / Norms / Regulations / Acts for safety, Precautions and precautionary Measures, Post-accident procedures						
Teaching Method(s): Chalk & Board/ PPT/Video Lectures/ MOOC/ Internship/Industry Guest Lecture/ Invited Guest lecture/ Demonstration. etc.(can be chosen one or many)						

Text Books

1. "Material of Construction ", D.N.Ghose, TMH Publishing Company Ltd.
2. "Engineering Materials" by S. C. Rangwala et al., Charotar Publishing House
3. A text book of Building Construction by S K Sharma and B.K Kaul, S Chand & Company Limited.
4. " Building Construction", Sushil Kumar, Standard Publishers Distributors, New Delhi

Ref. Books

1. "Properties of concrete" by A M Neville, Low Price Edition
2. "Building Construction" by S P Arora.

Subject Code	Course title	L	T	P	C	QP
BCVPC3030	SURVEYING I	3	-	-	3	
CEO1- Have the ability to apply knowledge of mathematics, science, and engineering to understand the measurement techniques and equipment used in land surveying						
CEO2- Gain an appreciation of the need for lifelong learning through the discussion of recent changes in survey procedures and equipment.						
CEO3 -Have the ability to use techniques, skills, and modern engineering tools necessary for engineering practice.						
CEO4 -Ability to function as a member of a team.						
CEO5 -Understand the importance of professional licensure to protect the public in the Practice of land surveying.						
CO1	undertake measurement and plotting in civil engineering					
CO2	Ability to perform levelling and contouring of given ground					
CO3	Ability to set different types of curves					
CO4	Ability to apply the basic principles of surveying and can carry out the survey in the field for various purposes using chain, compass, plane table and Theodolite.					
CO5	plan a survey, taking accurate measurements, field booking, plotting and adjustment of traverse					
Unit:1						(10 Hours)
Linear measurement and chain survey: Use of chains and tapes for measurement of correct length of lines, direct and indirect ranging, chaining along sloping ground. Obstacle in chaining, errors and their elimination.						
Compass surveying: Use of prismatic compass, temporary adjustment, bearing of a line, local attractions, and correction of bearing						
Unit:2						(8 Hours)
Leveling: Use of dumpy level and leveling staff. Temporary and Permanent adjustment of dumpy level, Reduction of levels by height of instrument and rise and fall method. Curvature and refraction error, sensitiveness of level tube, reciprocal leveling, leveling difficulties and common errors, Automatic and Electronic or Digital levels						
Unit:3						(10 Hours)
Contouring: Contour interval and horizontal equivalent, characteristics of contours, methods of contouring- different and indirect method, contour gradient						
Theodolite Survey: Use of theodolite, temporary adjustment, measuring horizontal and vertical angles, theodolite traversing						
Unit:4						(10 Hours)
Modern Surveying Instruments – Electromagnetic Spectrum, Radar, Electronic Distance Measurement, EDM Equipment, Corrections to measurement, Digital Theodolite, Total Stations, Introduction to Remote Sensing and GIS						
Teaching Method(s): Chalk & Board/ PPT/Video Lectures/ MOOC/ Internship/Industry Guest Lecture/ Invited Guest lecture/ Demonstration. etc.(can be chosen one or many)						
Text Books						
1. <i>Surveying & Levelling. Vol-I</i> by T.P.Kanethar & S.V.Kulkarni, Pune Vidyarthi Griha Prakashan						
2. <i>Surveying and Leveling</i> by R. Subramanian, Oxford University Press						
3. <i>Surveying- Vol.I</i> , by B.C. Punmia, Laxmi Publications						
Ref. Books						
1. <i>Surveying Vol-1</i> by R Agor, Khanna Publishers						
2. <i>A Textbook of Surveying</i> , C. Venkatramaiah, Universities Press						
3. <i>Surveying And Levelling</i> , N.N. Basak, McGraw-Hill Education						

Subject Code	Course title	L	T	P	C	QP
BCVES3040	OBJECT ORIENTED PROGRAMMING USING JAVA	3	-	-	3	
CEO1- To understand fundamentals of object-oriented programming in Java which includes defining classes, invoking methods, using class libraries.						
CEO2- To create Java application programs using sound OOP practices such as interfaces, APIs and error exception handling.						
CEO3 -Using API to solve real world problems.						
Pre-Requisites (If any)						
Course outcome						
CO1	Knowledge of the structure and model of the Java programming language, (knowledge)					
CO2	Use the Java programming language for various programming technologies (understanding)					
CO3	Develop software in the Java programming language, (application) evaluate user requirements for software functionality required to decide whether the Java programming language can meet user requirements (analysis)					
CO4	Propose the use of certain technologies by implementing them in the Java programming language to solve the given problem (synthesis)					
CO5	Choose an engineering approach to solving problems, starting from the acquired knowledge of programming and knowledge of operating systems. (evaluation)					
Unit:1		(10 Hours)				
An introduction Object Oriented Programming, Features of Object Oriented Programming Introduction to Java. Difference between C/C++ and Java, Features of Java, First Java Program, Writing the java program, Compiling the program, JVM and its significance in executing a program?, Architecture of JVM. Understanding, Java Tokens, Datatypes, Operators, Control Structures and Arrays, Conditional Statements, Loops/ Iterators, Jumping Statements, Java Arrays, Multidimensional Arrays, Taking Input from keyboard, Command Line Arguments, Using Scanner Class, Using Buffered Reader class.						
Unit:2		(10 Hours)				
Introduction to Classes and Objects. Constructors, static Keyword , this Keyword, Array of Objects, Access Modifiers (Public, Private, Protected, Default). Inheritance ,Types of Inheritance and Java supported Inheritance, super, Polymorphism, Method Overloading, Constructor Overloading, Method Overriding, Dynamic Method Dispatching. String Manipulations. Wrapper classes, Auto boxing and unboxing. Abstract classes, Interfaces, Multiple Inheritance Using Interfaces, Java API Packages, User-Defined Packages, Accessing Packages, Error and Exception Handling, Types of exceptions Hierarchy of Exception classes, try, catch, finally, throw, throws, Commonly used Exceptions and their details ,User defined exception classes.						
Unit:3		(8 Hours)				
Multithreading , Thread in Java, Thread execution prevention methods. (yield(), join(), sleep()), Concept of Synchronization, Inter Thread Communication, Basics of Deadlock, Demon Thread, Improvement in Multithreading, Inner Classes, Introduction, Member inner class, Static inner class, Local inner class, Anonymous inner class. IO Streams (java.io package) ,Byte Stream and Character Stream, Files and Random Access Files, Serialization, Collection Frame Work (java.util), Util Package interfaces, List, Set, Map.						
Unit:4		(8 Hours)				
Applet Introduction, Life Cycle of an Applet, GUI with an Applet, Abstract Window Toolkit (AWT), Introduction to GUI, Description of Components and Containers, Component/Container hierarchy, Understanding different Components/Container classes and their constructors, Event Handling, Different mechanisms of Event Handling, Listener Interfaces, Adapter classes.						
Teaching Method(s): Chalk & Board/ PPT/Video Lectures/ MOOC/ Internship/Industry Guest Lecture/ Invited Guest lecture/ Demonstration. etc.(can be chosen one or many)						
Text Books:						
1. Programming in Java. Second Edition. Oxford higher education. (SachinMalhotra/SauravChoudhary)						
2. Core Java for beginners. (RashmiKanta Das), Vikas Publication						
Ref. Books:						
JAVA Complete Reference (9th Edition) HerbaltSchelidt.						

Subject Code	Course Title	L	T	P	C	QP
	ENGINEERING MATHEMATICS-III	3	-	-	3	
CEO1-	Mathematics fundamental necessary to formulate, solve and analyze engineering problems					
CEO2-	An understanding of Fourier Series and Laplace Transform to solve real world problems.					
CEO3 -	An understanding of Linear Algebra through matrices.					
CEO4 -	An understanding of Complex integration.					
Pre-Requisites (If any)						
Course Outcomes						
CO1	Apply the fundamental concepts of Ordinary differential equations and partial differential equations and basic numerical methods for their resolution.					
CO2	Solving the problems choosing the best suitable method					
CO3	Use computational tools to solve problems and applications of Ordinary Differential Equations and Partial Differential Equations.					
CO4	Use an adequate scientific language to formulate the basic concepts of the course.					
CO5	Formulate and solve differential equation problems in the field of Industrial Organization Engineering.					
Unit:1						(10 Hours)
special functions :						
Beta and Gamma functions, relation between Beta and Gamma functions, Error function, Series solution of differential equations (up to second order), Legendre equation, Legendre polynomials and their properties, Bessel's function.						
Unit:2						(8 Hours)
Complex Analysis:						
Analytic function, Cauchy-Riemann equations, Laplace equation, Complex integration: Line integral in the complex plane, Cauchy's integral theorem, Cauchy's integral formula, Derivatives of analytic functions						
Unit:3						(10 Hours)
Taylor's series, Laurent's series, Singularities and zeros, Residue integration, evaluation of real integrals.						
Unit:4						(10 Hours)
Approximation and round of errors, Roots of equation: fixed point iteration, the Newton-Raphson method.						
Interpolation: Lagrange Interpolation, Newton divided difference interpolation, Newton's forward and backward interpolation. Numerical Differentiation, Numerical integration: The trapezoidal rule, The Simpson's rules, Ordinary differential equation: Euler's method, modified Euler's method.						
Teaching Method(s): Chalk & Board/ PPT/Video Lectures/ MOOC/ Internship/Industry Guest Lecture/ Invited Guest lecture/ Demonstration. etc.(can be chosen one or many)						
Text Books						
1. E. Kreyszig," Advanced Engineering Mathematics:, Eighth Edition, Wiley India						
2. Numerical method for Engineers by M. K. Jain and Iyenger.						
Ref. Books						
1. Higher Engineering Mathematics by B S Grewal :Khanna Publishers, New Delhi.						
2. Numerical Analysis by Dutta and Jena						

4TH SEMESTER

S. No.	Course category	Subject Code	Subjects	L	T	P	Credits
1	PC	BCVPC4010	Geotechnical Engineering-I	3	1	-	4
2	PC	BCVPC4020	Fluid Mechanics & Hydraulic Machines	3	1	-	4
3	PC	BCVPC4030	Surveying -II	3	-	-	3
4	ES	BCVES4040	Data Base Management Systems	3	-	-	3
5	PC	BCVPC4050	Structural Analysis –I	3	-	-	3
6	HS	BMGHS3061	Environmental Engineering & Safety	3	-	-	3
	HS	BBSHS3062	Engineering Economics & Costing				
Sessionals							
7	PC	BCVPC4110	Geotechnical Engineering Lab	-	-	2	1
8	PC	BCVPC4120	Fluid Mechanics & Hydraulic Machines Lab	-	-	2	1
9	PC	BCVPC4130	Surveying –II Lab	-	-	2	1
10	ES	BCVES4140	Data Base Management System Lab	-	-	2	1
Total							24

Subject Code	Course title	L	T	P	C	QP
BCVPC4010	GEOTECHNICAL ENGINEERING-I	3	1	-	4	
CEO1- Prepare civil engineering students for a career in foundation engineering.						
CEO2- Prepare civil engineering students to design foundation excavations/retaining walls and analyze the stability of structures on or below slopes.						
CEO3 - Prepare civil engineering students to analyze groundwater conditions in geotechnical engineering practice.						
CEO4 - Prepare civil engineering students to design and determine construction requirements for buried conduits.						
Pre-Requisites (If any) –						
Course Outcomes						
CO1	Ability to understand soil type classifications.					
CO2	Solve any practical problems related to soil stress estimation, permeability , seepage including flow net diagram					
CO3	Estimate the stress under any system of foundation loads					
CO4	Ability to solve practical problems related to consolidation settlement and time rate of settlement					
CO5	Ability to understand bearing capacity of soil for creating foundation					
Unit:1 (10 Hours)						
Origin of Soil and Grain Size: Rock Cycle and the origin of soil, soil particle size, clay minerals, mechanical analysis of soil, grain size distribution curve, particle shape, weight volume relationships, specific gravity, unit weight, void ratio, moisture content, and relationships, relative density, Consistency of soil: Atterberg limits - liquid limit, plastic limit, shrinkage limit. Liquidity index and consistency index, activity, soil structure. Engineering classification of soil: IS, USCS, HRB and ASTM.						
Unit:2 (12 Hours)						
Soil Hydraulics: Modes of occurrence of water in soil. Stress conditions in soil- total, effective and neutral stresses and relationships. Permeability - Bernaulli's equation, Darcy's Law, hydraulic conductivity, laboratory determination of hydraulic conductivity, equivalent hydraulic conductivity in stratified soil. Seepage- Laplace equation of continuity, flow nets, seepage calculation from a flow net, flow nets in anisotropic soils, seepage through earth dam, critical hydraulic gradient and quick sand condition. Soil Compaction: mechanism and principles, Standard and Modified Proctor Test, factors affecting compaction, effect of compaction on soil properties, field compaction techniques.						
Unit:3 (10 Hours)						
Consolidation of soils: Consolidation and compaction, primary and secondary consolidation, Terzaghi's theory of one dimensional consolidation, consolidation test, determination of coefficient of consolidation. Stresses in Soil: Normal and shear stresses on a plane, Boussinesq's solution for a point load, line load, strip load, uniformly loaded circular and rectangular areas, Isobar and pressure bulb concept, stress distribution on horizontal and vertical planes, Newmark's chart and its application, contact pressure.						
Unit:4 (10 Hours)						
Shear Strength: Mohr-Coulomb failure criterion, shear strength parameters and determination: direct and tri-axial shear test, unconfined compression test, vane shear test. Other methods of determining the un-drained shear strength of soil, sensitivity and thixotripy of clay. Stability of Slopes: Terminology, stability of finite and infinite slopes, Swedish slip circle method and friction circle method of analysis of slopes, Taylor stability Number and stability curves, Bishops Method.						
Teaching Method(s): Chalk & Board/ PPT/Video Lectures/ MOOC/ Internship/Industry Guest Lecture/ Invited Guest lecture/ Demonstration. etc.(can be chosen one or many)						
Text Books						
1. Principles of Geotechnical Engineering by Braja M. Das, Cengage Learning						
2. Soil Mechanics and Foundation Engineering by B. C Punmia et al., Laxmi Publications Pvt Ltd						
Ref. Books						
1. Basic and applied soil mechanics, New Age International Publishers						
2. Geotechnical Engineering by T.N. Ramamurthy & T.G. Sitharam,S. C						

Subject Code	Course title	L	T	P	C	QP
BCVPC4020	FLUID MECHANICS & HYDRAULIC MACHINES	3	1	-	4	
CEO 1- To study and know Physical quantities and terms important in fluid flow and analyze fluid problems under static conditions.						
CEO 2- To study and know the different equations governing fluid behaviour with respect to hydrostatics and hydrodynamics forces						
CEO 3- To Study the importance of dimensionless number and fluid kinematics in governing fluid behaviour in rest and motion						
CEO4- To apply the knowledge of fluid statics and dynamics in studying and redesigning hydraulic machineries and equipments						
Pre-Requisites (If any) –						
Course Outcomes						
CO1	Ability to know the fundamental concepts of fluid mechanics					
CO2	Ability to apply the basic equations of fluid statics to determine forces					
CO3	Ability to know the concept of fluid kinematics and stream functions.					
CO4	Ability to use Euler's and Bernoulli's equation and the conservation of mass to determine the velocities, pressure and acceleration of fluids					
CO5	Ability to understand the concept of turbines and pumps of different types used in industry					
Unit:1		(10 Hours)				
Introduction - Physical property of Fluid: Density, specific gravity, specific weight, specific volume, surface tension and capillarity, viscosity, compressibility and bulk modulus, Fluid classification.						
Fluid statics - Pressure, Pascal's Law, Pressure variation for incompressible fluid, atmospheric pressure, absolute pressure, gauge pressure and vacuum pressure, manometer. Hydrostatic pressure on submerged surface, force on a horizontal submerged plane surface, force on a vertical submerged plane surface. Buoyancy and floatation, Archimedes' principle, stability of immersed and floating bodies, determination of metacentric height.						
Unit:2		(10 Hours)				
Fluid kinematics - Introduction, description of fluid flow, classification of fluid flow. Reynolds's number, Acceleration of fluid particles, flow rate and continuity equation, differential equation of continuity, Mathematical definitions of irrotational and rotational motion. Circulation, potential function and stream function. Flow net						
Unit:3		(10 Hours)				
Fluid dynamics - Introduction, Euler's equation along a streamline, energy equation, Bernoulli's equation and its application to siphon, venturimeter, orificemeter, pitot tube. Flow in pipes and ducts: Loss due to friction, Minor energy losses in pipes Hydraulic Gradient Line (HGL), Total Energy Line (TEL), Power transmission in the fluid flow in pipes, fluid flow in pipes in series and parallel. Flow through nozzles.						
Unit:4		(10 Hours)				
Hydraulic turbine: Classification, Impulse and Reaction turbine; Tangential, Radial and axial turbine. Impulse turbine, Pelton wheel, bucket dimensions, number of buckets in pelton wheel, efficiency and performance curves. Reaction Turbines: Francis turbine and Kaplan turbine, velocity triangle and efficiencies, performance curve. Function of draft tube and casing cavitation Centrifugal Pump: constructional features, vane shape, velocity triangles, Efficiencies, Multi stage centrifugal pumps, Pump Characteristic, NPSH and Cavitation. Positive displacement pumps: Reciprocating Pump, Working principle, Discharge, work done and power requirement, Slip, Indicator diagram						
Teaching Method(s): Chalk & Board/ PPT/Video Lectures/ MOOC/ Internship/Industry Guest Lecture/ Invited Guest lecture/ Demonstration. etc.(can be chosen one or many)						
Text Books:- 1. <i>Fluid Mechanics and Hydraulic Machines</i> , P. N. Modi & S.M Seth, STANDARD BOOK HOUSE 2. <i>A Text Book of Fluid Mechanics and Hydraulic Machines</i> , R.K.Bansal, Laxmi Publications						
Ref. Books 1. <i>Fluid Mechanics</i> , J. F. Douglas, J. M. Gasiorek, J. A. Swaffield, , Pearson Education, 2. <i>Fluid Mechanics</i> , F. M. White, McGraw-Hill 3. <i>Fluid Mechanics Foundations and Application of Mechanics</i> , C.S.Jog, Cambridge University Press						

Subject Code	Course Title	L	T	P	C	QP
BCVPC4030	SURVEYING -II	3	-	-	3	
CEO 1- To study the use of advanced surveying instruments.						
CEO 2- To computerize the distances and angles by using advanced equipments						
Pre-Requisites (If any) –						
Course Outcomes						
CO1	Ability to set out curves , buildings, culverts, tunnels					
CO2	Ability to carry out geodetic survey, taking accurate measurements with instruments and adjusting with traverse.					
CO3	Applying mathematical adjustment of accidental errors involved in survey					
CO4	Planning a survey for road alignment and height of building					
CO5	Gaining confidence for advance surveying techniques over conventional techniques.					
Unit:1		(10 Hours)				
Tachometry: General principles of stadia system, determination of tachometric constants, analytic lens, fixed and movable hair methods, inclined sights with staff vertical, inclined sight with staff normal to the line of sight, tangential system, errors in tachometer						
Curves: Types of curves, elements of curve, different methods of setting out simple circular curves, compound curves, reverse curves, transition curves, types of transition curves, super elevation, vertical curves.						
Unit:2		(10 Hours)				
Triangulation: Classification of triangulation system, operation in triangulation survey, reconnaissance, selection of site for base line, its measurement and extension, correction to base line measurement using EDM and Total station, selection of stations, triangulation figures, scaffolds and signals, marking of stations, inter visibility, strength of figures, reduction to centre.						
Unit:3		(9 Hours)				
Setting out of work: Laying out of buildings and sewer lines.						
Photogrammetric: Basic concepts, type of photographs, Terrestrial Photogrammetry, Aerial Photogrammetric: stereoscopy and parallax.						
Unit:4		(9 Hours)				
Theory of Errors: Definitions, law of weight, probable errors, most probable value, distribution of error, normal equations, method of least square						
Teaching Method(s): Chalk & Board/ PPT/Video Lectures/ MOOC/ Internship/Industry Guest Lecture/ Invited Guest lecture/ Demonstration. etc.(can be chosen one or many)						
Text Books						
1. Surveying Volume II and III : B.C. Punmia						
2. Surveying –Volume II: S.K.Duggal, TMH Publications						
3. Advance Surveying : R. Agor						
<i>Ref.Books:</i>						

Subject Code	Course title	L	T	P	C	QP
BCVES4040	DATA BASE MANAGEMENT SYSTEMS	3	-	-	3	
Course Outcomes						
Pre-Requisites (If any) –						
CO1	Design and create a ERD (Entity Relationship Diagram) using software tool.					
CO2	Learn how to design and create and use a relational database system.					
CO3	Learn basic and advanced SQL command operations..					
CO4	Design, develop and demonstrate a small database application.					
CO5	Impart familiarity to a non-relational DBMS, such as Mongo DB					
Unit:1						(9 Hours)
Introduction to database Systems, advantages of database system over traditional file system, Basic concepts & Definitions, Database users, Database Language, Database System Architecture, Schemas, Sub Schemas, & Instances, database constraints, 3-level database architecture, Data Abstraction, Data Independence, Mappings, Structure, Components & functions of DBMS, Data models.						
Unit:2						(11 Hours)
Entity relationship model, Components of ER model, Mapping E-R model to Relational schema, Relational Algebra, Tuple & Domain Relational Calculus, Relational Query Languages: SQL and QBE. Database Design :-Database development life cycle (DDLC), Automated design tools, Functional dependency and Decomposition, Join strategies, Dependency Preservation & lossless Design, Normalization, Normal forms:1NF, 2NF,3NF, and BCNF, Multi-valued Dependencies, 4NF & 5NF. Query processing and optimization: Evaluation of Relational Algebra Expressions, Query optimization, Query cost estimation.						
Unit:3						(8 Hours)
Network and Object Oriented Data models, Storage Strategies: Detailed Storage Architecture, Storing Data, Magnetic Disk, RAID, Other Disks, Magnetic Tape, Storage Access, File & Record Organization, File Organizations & Indexes, Order Indices, B+ Tree Index Files, Hashing Data Dictionary.						
Unit:4						(10 Hours)
Transaction processing and concurrency control: Transaction concepts, properties of transaction, concurrency control, locking and Timestamp methods for concurrency control schemes. Database Recovery System, Types of Data Base failure & Types of Database Recovery, Recovery techniques. fundamental concepts on Object-Oriented Database, Object relational database, distributed database, Parallel Database, introduction to Data warehousing & Data Mining.						
Teaching Method(s): Chalk & Board/ PPT/Video Lectures/ MOOC/ Internship/Industry Guest Lecture/ Invited Guest lecture/ Demonstration. etc.(can be chosen one or many)						
Text Books						
1. Sudarshan, Korth: Database System Concepts , 6th edition, McGraw-Hill Education.						
Ref.Books:						
1. Elmasari&Navathe: Fundamentals of Database System , Pearson Education.						
2. Ramakrishnan: Database Management Systems , McGraw-Hill Education.						

Subject Code	Course title	L	T	P	C	QP
BCVPC4050	STRUCTURAL ANALYSIS –I	3	-	-	3	
CEO 1- To understand the concept of analysis of indeterminate structures by various classical methods						
CEO 2- To study the use of ILD for determinate structure						
CEO 3- To learn the concepts of moving loads and its effect on structures						
CEO 4- To understand the concept of equivalent UDL						
CEO 5- To study the reversal of stress under live load						
CO1	Ability to determine various internal forces in beams and frame from bending moment and shear force diagram					
CO2	Ability to select appropriate method to determine slope and deflection of determinate beams and frames					
CO3	Ability to determine internal forces in the members of plane & space truss, three hinged arch and cables.					
CO4	Ability to determine absolute maximum internal forces due to rolling or moving loads from Influenced line Diagrams					
CO5	Ability to determine structural stability of beam, column etc.					
Unit:1						(10 Hours)
Concept of determinate and indeterminate structures, determination of degree of static and kinematic indeterminacy in plane frame and continuous structures. Methods of Analysis: Equilibrium equations, compatibility requirements, Introduction to force and displacement methods. Analysis of propped cantilever by consistent deformation method, Analysis of fixed and continuous beams by Moment-Area method, Conjugate beam method and theorem of three moments.						
Unit:2						(10 Hours)
Energy theorems and its application, Strain energy method, Virtual work method, unit load method, Betti's and Maxwell's laws, Castigliano's theorem, concept of minimum potential energy. Analysis of redundant plane trusses. Deflection of pin jointed plane trusses. Analytical method and Williot – Mohr diagram. Introduction to space truss.						
Unit:3						(8 Hours)
Rolling loads and influence lines for determinate structures, simply supported beams, cantilever, ILD for reaction, shear force and bending moment at a section, ILD for wheel loads, point loads And udl, maximum bending moment envelope.						
Unit:4						(10 Hours)
Analysis of three hinged arches, Suspension cable with three hinged stiffening girders subjected to dead and live loads, ILD for Bending Moment, Shear Force, normal thrust and radial shear for three hinged arches						
Teaching Method(s): Chalk & Board/ PPT/Video Lectures/ MOOC/ Internship/Industry Guest Lecture/ Invited Guest lecture/ Demonstration. etc.(can be chosen one or many)						
Text Books						
1. Theory and Problems in Structural Analysis by L Negi, McGraw Hill						
2. Structural Analysis by T.S. Thandamoorthy, Oxford University Press						
3. Basic Structural Analysis by C S Reddy, McGraw Hill						
Ref. Books						
1. Elementary Structural Analysis by Norris and Wilber, McGraw Hill						
2. Structural Analysis by Aslam Kassimali, Cengage Learning						
3. Structural Analysis by R.C. Hibbeler, Pearson Education						

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Unit:3		(8 Hours)				
Rolling loads and influence lines for determinate structures, simply supported beams, cantilever, ILD for reaction, shear force and bending moment at a section, ILD for wheel loads, point loads And udl, maximum bending moment envelope.						
Unit:4		(10 Hours)				
Analysis of three hinged arches, Suspension cable with three hinged stiffening girders subjected to dead and live loads, ILD for Bending Moment, Shear Force, normal thrust and radial shear for three hinged arches						
Teaching Method(s): Chalk & Board/ PPT/Video Lectures/ MOOC/ Internship/Industry Guest Lecture/ Invited Guest lecture/ Demonstration. etc.(can be chosen one or many)						
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