Syllabus Book

2nd Year B. Tech.
Civil Engineering

P P Savani University

School of Engineering
Department of Civil Engineering

Effective From: 2019-2020
Authored by: P P Savani University

P P SAVANI UNIVERSITY

SCHOOL OF ENGINEERING

TEACHING & EXAMINATION SCHEME FOR SECOND YEAR B.TECH. CIVIL ENGINEERING PROGRAMME

Sem.	Course Code	Course Name	Offered by	Teaching Scheme					Examination Scheme						Total
				Contact Hours				Credit	Theory		Practical		Tutorial		
				Theory	Practical	Tutorial	Total		CE	ESE	CE	ESE	CE	ESE	
3	SESH2011	Differential Equations	SH	3	0	2	5	5	40	60	0	0	50	0	150
	SECV2101	Advanced Solid Mechanics	CV	3	2	0	5	4	40	60	20	30	0	0	150
	SECV2020	Building Materials & Construction Technology	CV	4	2	0	6	5	40	60	20	30	0	0	150
	SECV2030	Fluid Mechanics	CV	3	2	0	5	4	40	60	20	30	0	0	150
	SECV2041	Surveying	CV	3	2	0	5	4	40	60	20	30	0	0	150
	SEPD2010	Critical Thinking, Creativity & Decision Making	SEPD	2	0	0	2	2	40	60	0	0	0	0	100
	SECV2910	Industrial Exposure					0	2							100
						Total	30	28							**1000**
4	SESH2022	Numerical & Statistical Analysis	SH	3	0	2	5	5	40	60	0	0	50	0	150
	SECV2051	Determinate Structural Analysis	CV	4	0	1	5	5	40	60	0	0	50	0	150
	SECV2060	Geology & Geotechnical Engineering	CV	3	2	0	5	4	40	60	20	30	0	0	150
	SECV2080	Hands on Training on Modern Civil Engineering Equipment/ Software	CV	0	2	0	2	1	0	0	40	60	0	0	100
	SECV2090	Building & Town Planning	CV	3	2	0	5	4	40	60	20	30	0	0	150
	SECV3030	Concrete Technology	CV	3	2	0	5	4	40	60	20	30	0	0	150
	SEPD2020	Values and Ethics	SEPD	2	0	0	2	2	40	60	0	0	0	0	100
	SEPD3030	Foreign Language (German)			2		2	2	40	60	0	0	0	0	100
						Total	31	27							**950**

CONTENT

Semester 3

Semester 4

P P Savani University
School of Engineering

Department of Science & Humanities

Course Code: SESH2011
Course Name: Differential Equations
Prerequisite Course(s): Elementary Mathematics for Engineers (SESH1010)

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
03	00	02	05	40	60	00	00	50	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to
- provide orientation of calculus and its applications in solving engineering problems through differential equations.
- introduce partial differential equations with solution methods.
- learn application of Laplace transforms to solve linear differential equations.
- learn introduction of periodic functions and Fourier series with their applications for solving ODEs.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Ordinary Differential Equation** First order ODEs, Formation of differential equations, Solution of differential equation, Solution of equations in separable form, Exact first order ODEs, Linear first order ODEs, Bernoulli Equation, ODEs of Second and Higher order, Homogeneous linear ODEs, Linear Dependence and Independence of Solutions, Homogeneous linear ODEs with constant coefficients, Differential Operators Nonhomogeneous ODEs, Undetermined Coefficients, Variation of Parameters.	10	20
2.	**Partial Differential Equation** Formation of First and Second order equations, Solution of First order equations, Linear and Non-liner equations of first, Higher order equations with constant coefficients, Complementary function, Particular Integrals.	7	18
3.	**Applications of ODE and PDE** Orthogonal trajectories, Method of Separation of Variables, D'Albert's solution of wave equation, Solution of heat equation.	5	12

Section II			
Module No.	Content	Hours	Weightage in %
1.	**Laplace Transform** Laplace Transform, Linearity, First Shifting Theorem, Existence Theorem, Transforms of Derivatives and Integrals, Unit Step Function, Second Shifting Theorem, Dirac's Delta function, Laplace Transformation of Periodic function, Inverse Laplace transform, Convolution, Integral Equations, Differentiation and Integrations of Transforms, Application to System of Differential Equation.	10	20
2.	**Fourier Series** Periodic function, Euler Formula, Arbitrary Period, Even and Odd function, Half-Range Expansions, Applications to ODEs.	7	15
3.	**Fourier Integral and Transformation** Representation by Fourier Integral, Fourier Cosine Integral, Fourier Sine Integral, Fourier Cosine Transform and Sine Transform, Linearity, Fourier Transform of Derivatives.	6	15

List of Tutorials:

Sr No	Name of Tutorial	Hours
1.	Ordinary Differential Equation-1	2
2.	Ordinary Differential Equation-2	2
3.	Ordinary Differential Equation-3	4
4.	Partial Differential Equation-1	2
5.	Partial Differential Equation-2	4
6.	Applications of ODE and PDE	2
7.	Laplace Transform-1	2
8.	Laplace Transform-2	2
9.	Laplace Transform-3	4
10.	Fourier Series-1	2
11.	Fourier Series-2	2
12.	Fourier Integral and Transformation	2

Text Book(s):

Title	Author/s	Publication
Advanced Engineering Mathematics	Erwin Kreyszig	Wiley India Pvt. Ltd.

Reference Book(s):

Title	Author/s	Publication
Higher Engineering Mathematics	B. S. Grewal	Khanna Publishers
Advanced Engineering Mathematics	R. K. Jain, S.R.K. Iyengar	Narosa Publishing House Pvt. Ltd.
Differential Equations for Dummies	Steven Holzner	Wiley India Pvt. Ltd.
Higher Engineering Mathematics	H.K. Dass, Er. Rajnish Verma	S. Chand& Company Pvt. Ltd.

Web Material Link(s):
1) http://nptel.ac.in/courses/111105035/
2) http://nptel.ac.in/courses/111106100/
3) http://nptel.ac.in/courses/111105093/
4) http://nptel.ac.in/courses/111108081/

Course Evaluation:

Theory:
- Continuous Evaluation consists of two tests each of 30 marks and 1 Hour of duration, which will be converted to 30 marks.
- Faculty evaluation consists of 10 marks as per the guidelines provided by the course coordinator.
- End Semester Examination consists of 60 marks.

Tutorial:
- Continuous Evaluation consists of performance of tutorial which will be evaluated out of 10 marks for each tutorial and average of the same will be converted to 30 marks.
- MCQ based examination consists of 10 marks.
- Internal Viva consists of 10 marks.

Course Outcomes:

After completion of the course, the student will be able to
- grasp the respective 1st and 2nd order ODE and PDE.
- analyze engineering problems (growth, decay, flow, spring and series/parallel electronic circuits) using 1st and 2nd order ODE.
- classify differential equations and solve linear and non-linear partial differential equations.
- apply understanding of concepts, formulas, and problem-solving procedures to thoroughly investigate relevant real-world problems.

P P Savani University
School of Engineering

Department of Civil Engineering

Course Code: SECV2102
Course Name: Advanced Solid Mechanics
Prerequisite Course(s): Engineering Mechanics (SECV1030), Solid Mechanics (SECV1070)/
Mechanics of Solids (SECV1080)

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
03	02	00	04	40	60	20	30	00	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to understand
- the stresses developed under the application of force.
- the effect of torsion on material.
- behavior of structural element under the influence of various stresses.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Bending Stress in Beam** Theory of simple bending, Assumptions, Derivation of flexural formula, Position of Neutral axis, Section modulus, Second moment of area of common cross sections (rectangular, I,T,C) with respective centroid & parallel axes, Bending stress distribution diagrams,	08	18
2.	**Shear Stress in Beam** Shearing stresses at a section, Derivations of shear stress distribution formula for different sections, shear stress distribution diagrams for common symmetrical sections, Maximum and average shears stresses, Shear connection between flange & web.	08	18
3.	**Direct & Bending Stress** Eccentric loading, Symmetrical column with eccentric loading about one axis, Symmetrical columns with Eccentric loading about two axis, Unsymmetrical columns with Eccentric loading.	07	14

Section II				
Module No.	Content	Hours	Weightage in %
1.	**Dams** Introduction, Types of dams, Rectangular dam, Stress across the section of the dam, Trapezoidal dam, stability of dam.	08	18
2.	**Column & Strut** Introduction, Failure of a column, Assumptions in Eural's Theory, End conditions for long column, Expression for crippling load when both ends of the column are hinges, Expression for crippling load when both ends of the column are Fixed, Expression for crippling load when both ends of the column are Free, Expression for crippling load when one end of the column is fixed and other is hinged, Effective length of column, Limitations of Eural's formula, Rankine's formula.	07	16
3.	**Torsion** Derivation of equation of torsion, Assumptions, Application of theory of torsion equation to solid & hollow circular shaft, Torsional rigidity, Power Transmitted by shaft, Polar moment of Inertia.	07	16

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Torsion Test	02
2.	Fatigue Test	02
3.	Tutorials on Bending Stress in Beam	04
4.	Tutorials on Shear Stress in Beam	04
5.	Tutorials on Direct and Bending Stress, Torsion	04
6.	Tutorials on Dam	06
7.	Tutorials on Column & Strut	04
8.	Tutorials on Torsion	04

Text Book(s):

Title	Author/s	Publication
Strength of Materials (SI Units)	Dr. R. K. Bansal	Laxmi Prakashan

Reference Book(s):

Title	Author/s	Publication
Strength of Materials (SI Units)	R. S. Khurmi	S. Chand & Company Pvt. Ltd.
Strength of Materials (SI Units)	Er. R . K. Rajput	S. Chand & Company Pvt. Ltd.
Mechanics of Structure-Vol. I	Dr. H.J. Shah & S. B. Junarkar	Charotar Publishing House Pvt. Ltd.
Strength of materials	R. Subramanian	Oxford Publications
Strength of materials	S. Ramamrutham	Dhanpat Rai Publishing Company

Course Evaluation:

Theory:
- Continuous Evaluation consists of two tests each of 30 marks and 1 Hour of duration, which will be converted to 30 marks.
- Faculty evaluation consists of 10 marks as per the guidelines provided by the course coordinator.
- End Semester Examination consists of 60 marks.

Practical:
- Continuous Evaluation consists of performance of practical which will be evaluated out of 10 marks for each practical and average of the same will be converted to 10 marks.
- Internal viva consists of 10 marks.
- Practical performance/quiz/drawing/test consists of 15 marks during End Semester Exam.
- Viva/ Oral performance consists of 15 marks during End Semester Exam.

Course Outcomes:

After completion of the course, the student will be able to
- apply mathematical knowledge to calculate the deformation behavior of simple structure.
- critically analyze problem and solve the problem related to mechanical elements and analyze the deformation behavior for different types of loads.
- understand the different types of stresses and strains developed in the member subjected to axial, bending, shear & torsional effects.
- understand the physical properties of materials.

P P Savani University
School of Engineering

Department of Civil Engineering

Course Code: SECV2020
Course Name: Building Materials & Construction Technology
Prerequisite Course(s): --

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
04	02	00	05	40	60	20	30	00	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to
- develop the conceptual knowledge in building materials & Construction.
- select appropriate material in given field situation.
- develop idea about various building components.
- develop awareness about Smart building materials.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction** Physical, chemical and engineering properties of building materials. Factors Affecting Choice of Materials, Application of building materials.	02	03
2.	**Brick** Classification of clay products, Types of bricks, Properties and requirements of bricks, Manufacturing process of bricks, Test on bricks, Standard requirements and grades of bricks as per BIS.	04	07
3.	**Rocks** Classification of rocks, Rock products, Characteristics of stones - Structure, texture, strength, gravity, porosity, absorption, hardness, durability, weight. etc., Standard requirement of building stone, Important stones used in construction with its suitability.	04	07
4.	**Concrete and Ingredient of Concrete** **Lime:** Sources and classification of Lime, Uses of lime with specific field situation, Types of pozzolanic materials, Advantages of addition of pozzolanic material. **Cement:** Types of cement with their specific use, Grade of cement as per BIS, Engineering properties of cement, Field and laboratory test of cement as per BIS.	12	20

	Aggregate: Types of aggregate as per BIS, Requirements of aggregate as per BIS, Engineering properties of aggregate, Test on aggregate. **Steel:** Classification of Ferrous materials(With Grade), Properties of Steel, Requirements of Steel, Uses of Steel for Construction **Admixtures:** Types of Admixture, Requirements of Admixtures, Use of Admixtures **Water:** Propertied of Water use for construction **Concrete:** Requirements of concrete, Properties of fresh and harden concrete, Types of concrete, Water-Cement ratio, Grades of concrete, Curing of concrete, Water-Cement ratio, Test on Concrete **Plain and Reinforced Concrete**: Pre -cast and cast -in -situ Construction		
5.	**Miscellaneous Construction Materials** Timber: Types of timber, Uses and application of timber, Defects in timber and wood, Seasoning, Wood products with specific uses Plastics and PVC, Ceramic products, Paints and Varnish, Materials for damp proofing, water proofing, Materials for anti-termite treatment, Glass and fiber, Materials used for false ceiling, Asbestos, Concrete blocks, Epoxy Materials, Fly Ash, Slag, Bitumen, Rubber, Geotextile Advance Concretes: Pervious, Light Transmitting, Floating	08	13

Section II			
Module No.	Content	Hours	Weightage in %
1.	**Foundation** Function and requirements of a good foundation, Types of foundations, • **Shallow Foundations:** Types of Shallow foundation, Strip footing, Spread or isolated footing, Combined footing Strap, Mat or raft Foundation. • **Deep Foundation:** Caisson & Pile foundation	05	08
2.	**Super Structure** **Doors, Windows & Ventilators:** a) Doors: Location, technical terms, size, types, construction, suitability. b) Windows: Factors affecting selection of size, shape, location and no. of windows, types, construction, suitability, fixtures and fastenings. c) Ventilators: Ventilators combined with window, fan light **Stairs and Staircases:** Definition, technical terms, requirements of good stair, fixing of going and rise of a step, types of steps, classification, example – stair planning, elevators, escalators. **Floorings:** Introduction, essential requirements of a floor, factors affecting selection of flooring material, types of ground floors, brick, flag stone, tiled cement concrete, granolithic, terrazzo, marble, timber flooring, upper floor - timber, timber floor supported on RSJ flag stone floor resting on RSJ, jack arch floor, reinforced concrete floor, ribbed floor, pre-cast concrete floor.	10	17

	Roofs and Roof Coverings: Introduction, requirements of good roof technical terms, classification, types of roof coverings for pitched roof. A.C. sheet roofs – fixing of A.C. sheets, G.I. Sheets roofs, slates, flat roof – advantages, Dis-advantages, types of flat terraced roofing.		
3.	**Masonry** **Brick masonry**: Technical terms, bonds in brick work- English bond, single & double Flemish bond, garden wall bond, raking bond, Dutch bond. **Stone masonry**: Technical terms, lifting appliances, joints, types – random (un-coursed) rubble, coursed rubble, dry rubble masonry, Ashlar masonry- Ashlar fine, chamfered fine. **Composite masonry**: Stone facing with brick backing, brick facing with concrete backing, Hollow concrete blocks and construction, AAC blocks **Cavity walls:** Brick cavity walls, position of cavity at foundation, roof and at opening levels.	05	08
4.	**Miscellaneous** Wall Finishes: Plastering, pointing and painting **Temporary Works:** Timbering in trenches, types of scaffoldings, shoring, underpinning **Special Treatments:** Fire resistant, water resistant, thermal insulation, acoustical construction and anti -termite treatment. **Green building:** Definition, materials construction, rating system, case study	10	17

List of Practical:

Sr. No.	List of Practical/Exercise	Hours
1.	Conduct local market survey and Prepare a report for different civil engineering materials with respect to applications, cost and quality (Home assignment).	4
2.	Perform tests on given sample of brick such as • Soundness • Water absorption • Compressive strength • Length & width of 20 bricks	4
3.	Identification of different types of stones and lime	2
4.	Conduct field test on given sample of brick and cement	2
5.	Perform lab tests on given sample of cement • Standard Consistency • Initial and final setting time	4
6.	Conduct field test on given sample of fine and coarse aggregate	2
7.	Perform Sieve analysis test on given sample of fine aggregate	2
8.	Assess the quality of different types of timber and timber products (visit nearby saw mill or timber mart)	2
9.	Prepare Sketch Book for various Building components.	8

Text Book(s):

Title	Author/s	Publication
Building Materials & Contraction	B. C. Punamia	Laxmi Publications

Reference Book(s):

Title	Author/s	Publication
Building Construction	Sushil Kumar	Standard Publication
Building Construction	Rangwala	Charator Publishing house
Building Materials	S. K. Duggal	New Age Publications
Building Materials	Varghese	PHI learning pvt.Ltd.
Building Construction	Bhavikhatti	Vikash Publishing

Web Material Link(s):

- http://www.nptelvideos.in/2012/11/building-materials-and-construction.html
- https://sites.google.com/a/mitr.iitm.ac.in/iitmcivil/ce2330
- http://www.vssut.ac.in/lecture_notes/lecture1424085991.pdf
- http://nptel.ac.in/courses/105102088/13
- https://www.classle.net/category/tagskeywords/civil-building-materials-and-construction
- http://www.geethanjaliinstitutions.com/engineering/coursefiles/downloads/civil/bmcp.pdf
- https://theconstructor.org

Course Evaluation:

Theory:
- Continuous Evaluation consists of two tests each of 30 marks and 1 Hour of duration, which will be converted to 30 marks.
- Faculty evaluation consists of 10 marks as per the guidelines provided by the course coordinator.
- End Semester Examination consists of 60 marks.

Practical:
- Continuous Evaluation consists of performance of practical/tutorial/sketch book which will be evaluated out of 10 marks for each practical/tutorial/sketch book and average of the same will be converted to 10 marks.
- Internal viva component of 10 marks.
- Practical performance/quiz/drawing/test of 15 marks during end semester exam.
- Viva/Oral performance of 15 marks during end semester exam.

Course Outcomes:

After completion of the course, the students will be able to
- understand various types of building materials, their properties and applications.
- understand components of Sub-structure and super structure, their classification and application.
- understand new concept and materials used for building.

P P Savani University
School of Engineering

Department of Civil Engineering

Course Code: SECV2030
Course Name: Fluid Mechanics
Prerequisite Course(s): --

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
03	02	00	04	40	60	20	30	00	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objectives of the Course:

To help learners to

- comprehend basic fundamentals of Fluid Mechanics, which is used in the applications of Aero-dynamics, Hydraulics & Hydraulic structures, Marine Engineering, Gas dynamics, Irrigation Systems etc.
- learn about Fluid Properties and characteristics.
- understand the importance of flow measurement and its applications in Industries and to study the various loss of flow in a flow system.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Properties of Fluids** Mass density, specific weight, specific gravity, specific volume, vapour pressure, compressibility and Bulk modulus, elasticity, surface tension, capillarity; Newton's law of viscosity, classification of fluids.	02	05
2.	**Fluid Statics** Force and Pressure, Pascal's law of Pressure at a point, Pressure measurement by Manometers – U tube, Inclined U tube, Differential U-tube, Centre of Pressure, Hydrostatic forces on surface – Vertical, Horizontal and Inclined, Forces on curved Surfaces, Buoyancy and Buoyant Force, Centre of Buoyancy and Meta Centre, Determination of Metacentric Height, Stability of Floating and Submerged Body, Position of metacenter relative to Centre of buoyancy.	07	15
3.	**Hydrostatic Forces on Surfaces** Total pressure and Centre of Pressure, Vertical Plane Surface Sub-merged in Liquid, Horizontal Plane Surface Sub- merged in	06	15

Module No.	Content	Hours	Weightage in %
	Liquid, Inclined Plane Surface Sub- merged in Liquid, Curved Plane Surface Sub- merged in Liquid, Total pressure and Centre of Pressure on Lock Gates.		
4.	**Fluid Kinematics** Steady and Unsteady Flow, Laminar and Turbulent Flow, Compressible and Incompressible Flow, One – two and three Dimensional Flow, Uniform and Non Uniform Flow, Rotational and Irrotational Flow, Stream Lines and Stream Function, Velocity Potential Function, Relation between stream and velocity potential function, Flow nets, Continuity Equation for 2D and 3D flow in Cartesian co-ordinates system, Source Flow, Sink Flow. Vortex flow	07	15

Section II			
Module No.	Content	Hours	Weightage in %
1.	**Fluid Dynamics** Newton's law of motion, Euler's Equation and its applications, Bernoulli's Equation and its applications, Momentum Equation, Pitot Tube, Determination of volumetric flow with pitot tube, Principle of Venturimeter, Pipe Orifice and Rotameter, Orifice and Mouthpieces, Classification of Orifices, Flow through an orifices, Flow through Mouthpiece, Classification of Notches and Weir, Flow through Weir, Flow through Notches, hydraulics Co-efficient (Cv, Cc, Cv).	10	25
2.	**Flow Through Pipes** Major and Minor Losses in Pipes, Losses in Pipe Fittings, Hydraulic Gradient line and Total energy line, Equivalent Pipes, Pipes in series and parallel, Syphon, Power transmission through pipe, Flow through Nozzle, Water Hammer in Pipes.	08	15
3.	**Forces on Submerged Bodies** Drag and Lift, Expression for Drag and Lift, Drag on Sphere and Cylinder, Development of Lift on a Circular Cylinder, Development of Lift on an Airfoil.	05	10

List of Practical: (Any 12 practicals leading to 30 Hours of performance)

Sr No	Name of Practical	Hours
1.	Measurement of viscosity (Verification of Stokes law)	02
2.	Study of pressure measurement devices	02
3.	Hydrostatic force and center of pressure on flat/curved surfaces	02
4.	Determine metacentric height of floating body	02
5.	Verification of Bernoulli's Equation	02
6.	Study of Reynold's apparatus	02
7.	Measurement of velocity of flow using Pitot tube	02
8.	Calibration of Flow measuring devices: Venturimeter and Orificemeter	04
9.	Calibration and Discharge over Notches (V –notch, Rectangular notch, Trapezoidal notch)	04

10.	Determination of drag forced on immersed body	02
11.	Measurement of Friction factor for Different pipes. (Losses due to pipe fittings)	02
12.	Determination of Loss of Head Due To Sudden Enlargement	02
13.	Determination of Loss of Head Due To Sudden Contraction	02
14.	Determination of coefficients of an orifice (Cd, CC, Cv).	02
15.	Determine Co-efficient of Discharge by Rotameter.	02

Text Book(s):

Title	Authors	Publication
Textbook of Fluid Mechanics and Hydraulic Machines	R. K. Bansal	Laxmi Publications
Introduction to Fluid Mechanics and Fluid Machines	S. K. Som & Biswas. G	Tata McGraw Hill Publication

Reference Books:

Title	Author/s	Publication
Fluid Mechanics	Frank M. White	Tata McGraw Hill Publication
Fluid Mechanics	R. K. Rajput	S. Chand Publication

Web Material Link(s):
- http://nptel.ac.in/courses/112105171/1

Course Evaluation:
Theory:
- Continuous Evaluation consists of two tests each of 30 marks and 1 Hour of duration, which will be converted to 30 marks.
- Faculty evaluation consists of 10 marks as per the guidelines provided by the course coordinator.
- End Semester Examination consists of 60 marks.

Practical:
- Continuous Evaluation consists of performance of practical which will be evaluated out of 10 marks for each practical and average of the same will be converted to 10 marks.
- Internal viva consists of 10 marks.
- Practical performance/quiz/drawing/test consists of 15 marks during End Semester Exam.
- Viva/ Oral performance consists of 15 marks during End Semester Exam.

Course Outcomes:
After completion of the course, the student will be able to
- understand fundamentals of fluids.
- analyze various flow problems and flow characteristics.
- determine major and minor losses through different pipes.
- apply the concept of fluid mechanics to design various systems.
- apply the concept of designing hydraulic structure & Irrigation system.

P P Savani University
School of Engineering

Department of Civil Engineering

Course Code: SECV2041
Course Name: Surveying
Prerequisite Course(s): Elements of Civil Engineering (SECV1020)

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
03	02	00	04	40	60	20	30	00	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objectives of the Course:

To help learners to

- understand the engineering approach about surveying.
- understand process of measuring the direct and in direct measurement.
- carry out simple land survey process and area computation.
- understand components of instruments, terminology and applications.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Plane Table Surveying** Introduction, working principle, precise plane table equipment, Temporary adjustments, setting up the plane table, methods of plane tabling, advantages, sources of errors.	05	14
2.	**Theodolite Traversing** Introduction, Classification, Definitions, Essentials of theodolite, Temporary and Permanent adjustment of theodolite, Measurement methods of horizontal and vertical angles, lines and relation, Sources of errors, methods of traversing, closing error, computation of traverse, check in closed and open traverse, balancing of traverse, Gale's table, traverse area, omitted measurements.	09	18
3.	**Trigonometric Leveling** Introduction, Different cases for determine height and elevation.	06	14
4.	**Setting Out Works:** Building, Culvert, Bridge, Tunnel	03	04

Section II			
Module No.	Content	Hours	Weightage in %
1.	**Tacheometry Surveying** Introduction, Instruments used, Methods of tacheometry measurement, Distance and elevation measurement for fixed hair, moveable hair and tangential method, Use of Analytic lens, Substance bar.	07	14
2.	**Curve Surveying** Introduction, Classification, Definitions, Simple circular curve: Elements, Designation, Setting out methods, Elements of compound curve, Reverse curve and its elements, Transit curve: super elevation, length, ideal transit curve.	10	26
3.	**Computation of Area and Volume** Introduction, Methods of computing area: from plan, from offset, from coordinate, By planimeter, Volume from cross sections, Trapezoidal and Prismoidal formulae, Prismoidal correction, Curvature correction, capacity of reservoir.	05	10

List of Practical:

Sr. No	Name of Practical	Hours
1	Locating the given building point by plane table using method of radiation.	02
2	Plane Table Traversing	04
3	Three Point Problem	04
4	Measurement of horizontal angle using theodolite by method of repetition.	02
5	Measurement of horizontal angle using theodolite by method of reiteration.	04
6	Measurement of vertical angle using theodolite.	02
7	Determination of multiplying and additive constants of a Tacheometer	02
8	Determination of horizontal and vertical distance with tacheometery.	04
9	Setting out simple circular curve using Rankine's Deflection angle method	02
10	Setting out simple circular curve using Rankine's Two Theodolite Method	04

Text Book(s):

Title	Author/s	Publication
Surveying Volume I & II	Dr. B.C. Punamia, Dr. Ashok K. Jain	Laxmi Publication

Reference Book(s):

Title	Author/s	Publication
Surveying Volume I & II	S.K. Duggal	McGraw Hill
Surveying and Leveling	N. N. Basak	Tata McGraw Hill
Surveying and Leveling	R. Subramanian	Oxford University
Surveying Volume I and II	K.R. Arora	Standard Book House
Surveying and Leveling, Advance	R. Agor	Khanna

Web Material Link(s):
- http://nptel.ac.in/courses/105107122/2
- http://nptel.ac.in/courses/105104101/1
- http://nptel.ac.in/courses/105104101/

Course Evaluation:

Theory:
- Continuous Evaluation consists of two tests each of 30 marks and 1 Hour of duration, which will be converted to 30 marks.
- Faculty evaluation consists of 10 marks as per the guidelines provided by the course coordinator.
- End Semester Examination consists of 60 marks.

Practical:
- Continuous Evaluation consists of performance of practical and noted the same in manual and record book which should be evaluated out of 10 marks for each practical and average of the same will be converted to 10 marks.
- Internal viva component of 10 marks.
- Practical performance/quiz/drawing/test of 15marks during End Semester Exam.
- Viva/Oral performance of 15marks during End Semester Exam.

Course Outcome(s):

After completion of the course, the student will be able to
- get an adequate knowledge of surveying practices applied for real life problems.
- work with various surveying equipment, like, Theodolite, Plane table, Tacheometry etc. in order to apply the theoretical knowledge to carry out practical field work.
- understand carry out measurements with various surveying equipment employed in practice.

P P Savani University
School of Engineering

Centre for Skill Enhancement & Professional Development

Course Code: SEPD2010
Course Name: Critical Thinking, Creativity and Decision Making
Prerequisite Course(s):

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
02	00	00	02	40	60	00	00	00	00	100

CE: Continuous Evaluation, ESE: End Semester Exam

Objectives of the Course:

To help learners to
- develop a familiarity with the mechanics of critical thinking and logic.
- understand basic concepts of critical and creative thinking.
- explore and understand critical thinking for the purpose of creativity in context of professional, social and personal spectrum.
- explore an application critical thinking and creativity in personal, social, academic, global and profession life.
- understand Decision making as a skill to be learned through critical thinking.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction to Critical Thinking** • Concept and meaning of Critical Thinking • Significance of Critical Thinking in personal, social and professional life • Thinking with arguments, evidences and language	08	25
2.	**Applied Critical Thinking** • Inductive and Deductive Thinking • Questioning for Generating Ideas • Socratic Questioning and its application	07	25
Section II			
Module No.	Content	Hours	Weightage in %
1.	**Conceptual Thinking** • Second order thinking • Synthesizing	03	10

2.	**Creative Thinking and Decision Making** • Problem Solving • Adapting Various Structures of Decision Making	06	20
3.	**Moral Thinking** • Generating and structuring ideas • Designing and Evaluating the solutions • Case Study	06	20

Text Book (s):

Title	Author/s	Publication
Thinking Skills for Professionals	B. Greetham, Palgrave	Macmillan, 2010

Reference Book(s):

Title	Author/s	Publication
An Introduction to Critical Thinking and Creativity: Think More, Think Better	J. Y. F. Lau	John Wiley & Sons., New hercy
Critical Thinking: A Beginner's Guide to Critical Thinking, Better Decision Making and Problem Solving	Jennifer Wilson	CreateSpace Independent Publishing Platform, 2017
Creativity and Critical Thinking	edited by Steve Padget	Routledge 2013

Course Evaluation:

Theory:
• Continuous Evaluation consists of two tests each of 30 marks and 1 Hour of duration, which will be converted to 30 marks.
• Faculty evaluation consists of 10 marks as per the guidelines provided by the course coordinator.
• End Semester Examination consists of 60 marks.

Course Outcomes:

After completion of the course, the student will be able to
• comprehend the concept and application of critical thinking as well as its applications.
• understand the critical thinking in context of creativity, logical arguments, moral reasoning.
• understand the application of critical thinking for social, academic, global and professional spectrum.
• correlate their thinking skills for better productivity and outcome-based tasks.
• be in a better position to apply 360° analysis of the situation for decision making.

P P Savani University
School of Engineering

Department of Civil Engineering

Course Code: SECV2910
Course Name: Industrial Exposure
Prerequisite Course(s): --

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
00	00	00	02	00	00	100	00	00	00	100

CE: Continuous Evaluation, ESE: End Semester Exam

Objective of the Course:

To help learners to
- get exposed to the industrial spectrum.
- learn the mechanisms of industry/ workplace.
- be aware about work culture and policies of industries.

Outline of the Course:

Sr. No	Content
1.	Selection of Companies
2.	Company Information collection
3.	Report Writing
4.	Presentation & Question-Answer

Course Evaluation:

Sr. No.	Evaluation criteria	Marks
1	Actual work carried & Report Submission	50
2	Final Presentation & Question-Answer session	50
	Grand Total:	**100**

Course Outcome:

After completion of the course, the student will be able to
- get acquainted with the industrial scenario.
- be aware about his future prospects in the respective field.
- gain knowledge of work culture and industrial expectations.

Report Writing Guidelines

A. Report Format:
1. Title Page (to be provided by the respective supervisor)
   The title page of the project shall give the following information in the order listed:
   - Full title of the project as approved by the Mentor;
   - The full name of the student/Group of students with enrollment number;
   - The qualification for which the project is submitted;
   - The name of the institution to which the project is submitted;
   - The month and year of submission.
2. Project Certification Form
   [The form should be duly filled signed by the supervisors.]
3. Acknowledgements
   [All persons (e.g. supervisor, technician, friends, and relatives) and organization/authorities who/which have helped in the preparation of the report shall be acknowledged.]
4. Table of Contents/Index with page numbering
5. List of Tables, Figures, Schemes
6. Summary/abstract of the report.
7. Introduction/Objectives of the identified problem
8. Data Analysis and Finding of Solution
9. Application of the identified solution
10. Future Scope of enhancement of the Project and Conclusion
11. "Learning during Project Work", i.e. "Experience of Journey during Project Duration"
12. References(must)
13. Bibliography
14. Annexures (if any)

B. Guideline for Report Formatting:
- Use A4 size page with 1" margin all sides
- Header should include Project title and footer should contain page number and enrollment numbers
- Chapter Name should be of Cambria font, 20 points, Bold
- Main Heading should be of Cambria font, 14 points, Bold
- Sub Heading should be of Cambria font, 12 points, Bold
- Sub Heading of sub heading should be of Cambria font, 12 points, Bold, Italic
- Paragraph should be of Cambria font, 12 points, no margin at the start of the paragraph
- Line spacing for all content – 1.15, before - 0, after - 0
- No chapter number for references
- Before chapter 1, give page numbers in roman letter

Department of Science & Humanities

Course Code: SESH2022
Course Name: Numerical & Statistical Analysis
Prerequisite Course(s):
SESH1020-Linear Algebra & Vector Calculus, SESH2011-Differential Equations/SESH2031-Differential Methods for Chemical Engineers

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
03	00	02	05	40	60	00	00	50	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to
- acquire the knowledge of numerical analysis & statistical methods to the students.
- mentally prepare them to identify and formulate the engineering problem and and obtain their solutions.
- inculcate the analytical skills to the students to apply the Numerical & Statistical techniques to the problems of Civil, Mechanical & Chemical engineering.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Complex Variables** Complex numbers with operators and geometric representation, Analytic function, Derivative of complex function, Cauchy-Riemann equation, Trigonometric and Hyperbolic functions, Complex Integration, Conformal Mapping, Linear functional transformations, Cauchy's Integral, Calculation of residue	10	20
2.	**Numerical Solutions of Linear and Non-linear Equations** Errors and their computations, General error formula, Bisection Method, Iteration Method, Newton-Raphson Method, Solution of system of non-linear equation, Solution of linear system, Gauss Elimination	6	13
3.	**Numerical Differentiation and Integration** Interpolation, Finite Differences, Error in numerical differentiation, Cubic Splines Method, Differentiation Formulae, Numerical solution of ODEs, Picard's Method, Euler's Method, Runge-Kutta Method, Numerical Integration, Trapezoidal Rule,	7	17

	Simpson's 1/3-rule, Simpson's 3/8-rule, Euler-Maclaurin Formulae		

Section II			
Module No.	Content	Hours	Weightage in %
1.	**Basics of Statistics** Elements, Variables, Observations, Quantitative and Qualitative data, Corss-sectional and Time series data, Frequency distribution, Dot plot, Histogram, Cumulative distribution, Measure of location, Mean, Median, Mode, Percentile, Quartile, Measure of variability, Range, Interquartile Range, Variance, Standard Deviation, Coefficient of Variation, Regression Analysis, Regression line and regression coefficient, Karl Pearson's method	7	15
2.	**Probability Distribution** Introduction, Conditional probability, Independent events, independent experiments, Theorem of total probability and Bayes' theorem, Probability distribution, Binomial distribution, Poisson distribution, Uniform distribution, Normal distribution.	8	18
3.	**Testing of Hypothesis** Introduction, Sampling, Tests of significance for parametric test, Null Hypothesis, Type 1 and Type 2 errors, Level of significance, Chi-square test, Student's t-test, Seducer's f-test	7	17

List of Tutorial:

Sr No	Name of Practical/Tutorial	Hours
1.	Complex Variables-1	4
2.	Complex Variables-2	2
3.	Numerical Solutions of Linear and Non-linear Equations-1	2
4.	Numerical Solutions of Linear and Non-linear Equations-2	4
5.	Numerical Differentiation and Integration-1	2
6.	Numerical Differentiation and Integration-2	2
7.	Basics of Statistics-1	2
8.	Basics of Statistics-2	4
9.	Probability-1	2
10.	Probability-2	2
11.	Testing of Hypothesis-1	2
12.	Testing of Hypothesis-2	2

Text Book(S):

Title	Author/s	Publication
Advanced Engineering Mathematics	Erwin Kreyszig	Wiley India Pvt. Ltd., New Delhi
Probability and Statistics for Engineers	Richard A. Johnson Irwin Miller, John Freund	Pearson India Education Services Pvt. Ltd., Noida

Reference Book(s):

Title	Author/s	Publication
Higher Engineering Mathematics	B. S. Grewal	Khanna Publishers, New Delhi
Advanced Engineering Mathematics	R. K. Jain, S. R. K. Iyengar	Narosa Publishing House, New Delhi.
Introductory Methods of Numerical Analysis	S. S. Sastry	PHI Learning Pvt. Ltd., New Delhi.

Web Material Link(s):
- http://nptel.ac.in/courses/111106094/
- http://nptel.ac.in/courses/111106084/
- http://nptel.ac.in/courses/111105035/
- http://nptel.ac.in/courses/111101003/
- http://nptel.ac.in/courses/111105090/

Course Evaluation:

Theory:
- Continuous Evaluation consists of two tests each of 30 marks and 1 Hour of duration, which will be converted to 30 marks.
- Faculty evaluation consists of 10 marks as per the guidelines provided by the course coordinator.
- End Semester Examination consists of 60 marks.

Tutorial:
- Continuous Evaluation consists of performance of tutorial which will be evaluated out of 10 Marks for each tutorial and average of the same will be converted to 30 marks.
- MCQ based examination consists of 10 marks.
- Internal Viva consists of 10 marks.

Course Outcome(s):
After completion of the course, the student will be able to
- derive numerical solution of linear and non-linear system of equation.
- acquire knowledge of finite differences, interpolation, numerical differentiation and numerical integration.
- select appropriate method to collect data and construct, compare, interpret and evaluate data by different statistical methods.
- apply concept of probability in decision making, artificial intelligence, machine learning etc.

P P Savani University
School of Engineering

Department of Civil Engineering

Course Code: SECV2051
Course Name: Determinate Structural Analysis
Prerequisite Course(s): Strength of Material (SECV2011)/Solid Mechanics (SECV1070)

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
04	00	01	05	40	60	00	00	50	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to
- understand the structural behavior before and after application of loads.
- able to determine deflections of beams and frames using classical methods.
- ability to idealize and analyze statically determinate and indeterminate structures.
- able to analyze statically determinate trusses, beams, and frames and obtain internal loading.
- able to analyze cable and arch structures

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Types of Structure and Determinacy** Introduction, Types of Statically Determinate and Indeterminate structures, Static and kinematic Indeterminacy, Stability of structures, Computation of Internal forces in Statically Determinate structures such as Truss, Portals, Gables, Grids, Beams curved in plan, Shear Force and Bending moment diagram for Beam and Plane Frame.	08	13
2.	**Influence Line Diagram** Define and Use of Influence line Diagram, Properties of influence lines, ILD for support reaction, Shear Force and Bending moment Computation of Maximum Moment and Maximum Shear for a series of Concentrated loads and udl for beams, Absolute maximum Shear, Bending moments, ILD for trusses.	12	20
3.	**Force Method** Moment Area Method, Conjugate Beam Method	10	17

Section II			
Module No.	Content	Hours	Weightage in %
1.	**Displacement Method** Double Integration Method, Macaulay's Method	10	18
2.	**Energy Method** Introduction, Castiglino's First Theorem, Unit Load Method for Beam and Truss.	10	16
3.	**Analysis of Arches Cables and Suspension Bridge** Introduction, Analysis of Three Hinge and Two Hinge Arches, Cable and Suspension Bridge.	10	16

Text Books:

Title	Author/s	Publication
Theory of Structures	Khurmi R.S.	S Chand
Structural Analysis	S. Ramamurtham	Wiley

Reference Bookss:

Title	Author/s	Publication
Struct Anal SI Units	Pandit & Gupta	Tata MacGrawHill
Structural Analysis	Hibller	Pearson

Web Material Link(s):

- http://www.nptel.ac.in/courses/Webcoursecontents/IIT%20Kharagpur/Structural%20Analysis/pdf/m1l1.pdf
- http://nptel.ac.in/courses/Webcoursecontents/IIT%20Kharagpur/Structural%20Analysis/pdf/m7l37.pdf
- https://gradeup.co/force-methods-flexibility-method-study-notes-for-civil-engineering-i-0e7ccce0-8f13-11e7-885e-82ae4c75fae5
- http://www.brainkart.com/article/Structural-Analysis--Flexibility-Method_4580/
- http://www.nptel.ac.in/courses/Webcoursecontents/IIT%20Kharagpur/Structural%20Analysis/pdf/m1l5.pdf
- http://nptel.ac.in/courses/Webcoursecontents/IIT%20Kharagpur/Structural%20Analysis/pdf/m5l31.pdf

Course Evaluation:
Theory:
- Continuous Evaluation consists of two tests each of 30 marks and 1 Hour of duration, which will be converted to 30 marks.
- Faculty evaluation consists of 10 marks as per the guidelines provided by the course coordinator.
- End Semester Examination consists of 60 marks.

Tutorial:
- Internal viva of 20 marks.
- Submission of class note and assignment consists of 30 marks.

Course Outcome:
After completion of the course, the student will be able to
- apply principles of statics to determine reactions & internal forces in statically determinate structures.
- determine displacements of statically determinate structures.
- determine stresses due to axial & eccentric loading.
- determine strain energy stored in a body.
- determine stresses in thin cylinders and spherical vessels.

P P Savani University
School of Engineering

Department of Civil Engineering

Course Code: SECV2060
Course Name: Geology & Geotechnical Engineering
Prerequisite Course(s): --

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
03	02	00	04	40	60	20	30	00	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective of the Course:

To help learners to

- understand the properties and behaviour of soil for the design of structures.
- introduce students with basic principles of geosciences and their applications in Civil Engineering.

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction to Physical Geology** Scope of geology in civil engineering, Branches of geology, Weathering, Landform and Process associated with ground water, Causes & Classification of earthquake.	03	04
2.	**Mineralogy** Physical properties of minerals, Monoclinic system, Quartz group, Felspar group, Pyroxenes group, Amphibole group, Hornblende: (compound-complex silicate), Mica group.	04	10
3.	**Rock Classification** Igneous rocks, Textures of igneous rocks, Forms of igneous rocks, Important igneous rocks, briefly explain about sedimentary rocks, Important sedimentary rocks, lime stones, metamorphic rocks, Classification of metamorphic rocks.	04	10
4.	**Structural Geology and Geophysical Methods** Outcrop, Folds arts of a fold, Classification of folds, Causes of folding, fault & faulting, Joints and jointing, Geophysical investigations, Seismic methods, Gravitational methods, Magnetic methods.	04	10
5.	**Application of Geological Investigations** Geological conditions necessary for construction of dam definition, Selection of sites, Geological characters for	04	08

	investigation, Tunnels, assessment of environmental hazards, Geological considerations in tunneling, Folding, Faulting, Roads and highways, Road cut.		
6.	**Introduction of Soil and Soil Mechanics** Definition, Development of soil mechanics, Soil formation, Residual and transported soils, Some commonly used soil designations, Structure and texture of soils, Soil as construction material, Limitations of soil mechanics.	04	08
Section II			
Module No.	Content	Hours	Weightage in %
1.	**Composition of Soil Terminology, Index Properties and Relationships** Composition of soil, Phase diagram, Basic terms and definitions, Water content, Soil Relative density, Functional relationships, Determination of index properties, Relative density for granular soil, Consistency limits and its determination, different indices, Field moisture equivalent, Activity, Sensitivity & Thixotropy of soil.	03	06
2.	**Soil Classification & Particle Size Analysis** Objectives, Basis, Textural, Unified soil classification, IS classification method, group index. Field identification and General characteristics of the soil, Size and nomenclature of soil particles as per IS, Sieve analysis, Sedimentation analysis, Particle size distribution curve and its uses.	07	16
3.	**Soil Moisture** Water type, Effect of moisture content on soil, Ground water, Hygroscopic moisture, Capillary water, Apparent cohesion, Natural and effective pressure, Seepage velocity. **Capillary:** Capillary rise in soil, Introduction of seepage and flow net. **Permeability:** Permeability derivation and definition, Laboratory Permeability, Field permeability, Permeability of layered soil.	08	18
4.	**Soil Sub-Surface Investigations** Planning soil exploration, Methods of exploration, Soil borings, sounding, Sampling, Spacing and depth of borings, Stand and penetration test, Record of field investigation.	04	10

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Moisture Content	2
2.	Visual identification and specific gravity	2
3.	Sieve Analysis	2
4.	Liquid and Plastic Limit Test	4
5.	Shrinkage limit Test	2

6.	In-situ Density-Core Cutter & Sand Replacement method	4
7.	Permeability Test: Constant and Variable Head	4
8.	Study of rock specimen.	4
9.	Study of Strike and dip using models.	4
10.	Case study: Geologic problems encountered during civil engineering projects.	2

Text Book(s):

Title	Author/s	Publication
Engineering and general Geology	Parbin Singh	S. K. Kataria& Sons.
Basic & Applied Soil Mechanics	Gopal Ranjan & Rao A. S. R	New Age International Publication

Reference Book(s):

Title	Author/s	Publication
Soil Mechanics and Foundation Engineering	V. N. S. Murthy	Dhanpatrai Engineering
Laboratory Testing for Soils, Rocks and Aggregates.	Sivakugan, Arulrajah	J. Ross Publishing
Engineering Geology for Civil Engineers	P. C. Varghese	PHI Learning Pvt. Ltd
Geotechnical Engineering (Soil Mechanics)	T.G. Sitharam & T.N. Ramamurthy	S. Chand
Geotechnical Engineering	C. Venkatramaiah	Universities Press
Geotechnical Engineering	Manoj Datta, Shashi K Gulhati	Tata MacGrawHill
Laboratory Testing for Soils, Rocks and Aggregates.	Sivakugan, Arulrajah, Bo	J. Ross Publishing

Web Material Links:
- https://www.vidyarthiplus.com/vp/thread-36461.html#.WjzMdt-WY2w
- http://www.soest.hawaii.edu/martel/Courses/GG454/index.html
- https://web.viu.ca/earle/geol111/lecture-notes.htm
- http://nptel.ac.in/downloads/105101001/
- http://www.vssut.ac.in/lecture_notes/lecture1428371514.pdf
- http://www.vssut.ac.in/lecture-notes.php?url=civil-engineering
- https://drshahpak.weebly.com/uploads/5/6/3/3/5633102/intro.pdf

Course Evaluation:
Theory:
- Continuous Evaluation consists of two tests each of 30 marks and 1 Hour of duration, which will be converted to 30 marks.
- Faculty evaluation consists of 10 marks as per the guidelines provided by the course coordinator.
- End Semester Examination consists of 60 marks.

Practical
- Continuous Evaluation consists of performance of practical/tutorial which should be evaluated out of 10 for each practical/tutorial and average of the same will be converted to 10 marks.
- Internal viva component of 10 marks.
- Practical performance/quiz/test/assignment of 15 marks during end semester exam.
- Viva/Oral performance of 15 marks during end semester exam.

Course Outcome(s):

After completion of the course, the student will be able to
- understand the fundamentals of geology, Structural features of rocks & various geological investigations.
- developed the ability to classify soils and to evaluate soil parameters such as Atterberg limits, Density, Specific gravity, permeability.

Department of Civil Engineering

Course Code: SECV2080
Course Name: Hands on Training on Modern Civil Engineering Equipment/Software
Prerequisite Course(s): --

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
00	04	00	02	00	00	40	60	00	00	100

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to
- understand the real engineering approach about surveying.
- know process of measuring the direct and in direct measurement with modern instruments.
- understand basic components of instruments, terminology and its applications in real world.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Electronic Theodolite** Wild T-1000 Theomat, Wild T-2000 Theomat, Wild T-2000 S Theomat.	05	10%
2.	**Elect0ronic Distance Measurement** Introduction, EM waves, EDM instruments: The geodimeter, Tellurometer, Distometer, Total Station.	10	15%
3.	**Minor Instruments** Hand level, Abney level, Indian pattern clinometers, Burel hand level, Foot rule clinometers, Ceylon ghat tracer, Fennel's clinometers, The peantagraph, The sextant.	10	15%
4.	**Precise Leveling Instrument** Introduction, Wild N-3 precision level, The cooke S-500 precise level, Engineer's precise level, Fennel's precise level, Field procedure for precise leveling.	10	15%
5.	**Special Instrument** Introduction, The site square, Auto level, Transist level, Mountain compass transist, Burnton Universal pocket transist.	10	15%
6.	**Theory of Errors** Introduction, types of errors, definitions, laws of accidental	05	10%

	errors, laws of weights, theory of least squares, rules for giving weights and distribution of errors to the field observations, Normal equation, Adjustments: Triangle, Angle and Station.		
7.	**GIS, GPS and RS:** **GIS**: Introduction, Subsystem, Hardware, Data, representation of data, Raster and Vector data, Map overlay analysis, Selective software, Applications. **RS**: Introduction, Process, EM spectrum, Sensor system, energy interaction with earth surface, Applications. **GPS**: Introduction, Segments, Survey techniques, Applications.	10	20%

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Application of Electronic theodolite	04
2.	Application of geodimeter	04
3.	Application of tellurometer	04
4.	Application of distometer	04
5.	Application of Total station	04
6.	Application of Abney level, Burel hand level, Hand level	04
7.	Application of Indian pattern clinometers, Foot rule clinometers	04
8.	Application of peantagraph and sextant	04
9.	Application of Wild N-3 precision level, cooke S-500 precise level	04
10.	Application of Engineer's precise level, Fennel's precise level	04
11.	Application of Auto level, Transist level	04
12.	Application of Mountain compass transist, Burnton Universal pocket transist	04
13.	Use of parallaxbar and stereoscope	04
14.	Use of ZNL zenith and nadir plummet	04
15.	Use of auto collimation eye piece	04

Text Book(s):

Title	Author/s	Publication
Surveying Volume I & II	Dr. B.C. Punamia, Dr. Ashok K. Jain	Laxmi Publication

Reference Book(s):

Title	Author/s	Publication
Surveying Volume I & II	S.K. Duggal	McGraw Hill
Surveying and Leveling	N. N. Basak	Tata McGraw Hill
Surveying and Leveling	R. Subramanian	Oxford University
Surveying Volume I and II	K.R. Arora	Standard Book House
Surveying and Leveling, Advance	R. Agor	Khanna

Web Material Link(s):
- http://nptel.ac.in/courses/105107121/
- http://nptel.ac.in/courses/105104100/
- http://nptel.ac.in/courses/105107157/

Course Evaluation:

Practical:

- Continuous Evaluation consists of performance of practical and noted the same in manual and record book which will be evaluated out of 10 marks for each practical and average of the same will be converted to 20 marks.
- Internal viva/quiz component of 20 marks.
- Practical performance test/Submission of report & presentation of real field project work of 40 marks during End Semester Exam.
- Theoretical performance of 20 marks during End Semester Exam.

Course Outcomes:

After completion of the course, the student will be able to

- get an adequate knowledge of surveying practices applied for real life problems.
- learn to work with various modern surveying equipments, like, Total station, Precise levelling, EDM, Stereo scope, Parallax bar etc. in order to apply the theoretical knowledge to carry out practical field work in real life.
- understand carry out measurements with various surveying equipment employed in practice.

Department of Civil Engineering

Course Code: SECV2090
Course Name: Building & Town Planning
Prerequisite Course(s): --

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
03	02	00	04	40	60	20	30	00	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objectives of the Course:

To help learners to
- understand the building typology and symbols used in practice.
- understand importance of bye law for building construction.
- carry out design of building planning, working drawing, perspective view.
- understand process of planning the urban area.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Building Planning** Introduction to buildings, Classification of buildings, Principles of building planning, Principles of architecture composition, Standard conventional signs and symbols & abbreviations, ISI nomenclature: Size of scale, standard method of dimensioning	04	10
2.	**Building Bye Law** Introduction, Necessities, Importance, Standards for residential buildings, Different building by–laws, Provision of bye laws as per local authority, standards for industrial, public, commercial and institutional buildings.	08	18
3.	**Residential Building Planning** Minimum size requirement, Line diagram, Detail drawing, :plan, elevation, section, Preparing working drawing of residential building: detached, semidetached, row houses and apartments with scale proportion, open spaces standard as per permissible F.S.I. , Building services like water supply, drainage, electrification etc. for modern buildings, Auto CAD application in planning.	07	12

4.	**Perspective Drawing** Elements of perspective views, Types of views such as one point, two-point perspective	03	10

Section II			
Module No.	Content	Hours	Weightage in %
1.	**Town Planning Introduction** History, ancient planning in India, origin and Growth of Town Planning, Objects & importance of town planning, Principal of town planning, Stages in town planning, Forms of planning, Planning of Mohenjo-Daro, Lothal and Indus valley civilization, Present position of town planning in India.	05	10
2.	**Civic Survey & Neighborhood planning** Necessity for Planning purpose, Types of survey, Methods of Data collection, its presentation and analysis, Application of data in planning, Neighborhood planning; Principle, Features	07	18
3.	**Land Use and Zoning** Land use planning and its percentage for category of town, Principle of land use, Zoning: Object, Principle, Advantage, Importance, Aspects.	05	10
4.	**Housing and Slums** Housing: Definition, Importance, Requirement of residential building, Classification, Housing agencies, HUDCO, HDFC, LIC. SLUMS: Definition, Causes, Prevention method.	06	12

List of Practical:

Sr. No.	List of Practical	Hours
Note: Minimum Four A1 Size Drawing sheet		
1.	Residential Building Planning: Two storied Building with Plans, elevation, section, lay-out plan, key plan, site plan, area table, schedule of opening in the scale of 1:100.	07
2.	Public Building: Ground Floor plan, typical floor plan, elevation, section, lay-out plan, key plan, site plan, area table, schedule of opening	07
3.	Working Drawing: sheet should accommodate minimum six types with sectional details like Furniture plan, Drainage lay out, Toilet Detail, Wood work detail, Kitchen detail, Electrical plan etc	06
4.	Perspective Drawing: Two-point perspective of sheet -1 planning/ any other problem	06
5.	Neighborhood layout planning	04

Text Book(s):

Title	Author/s	Publication
Building Planning, Designing and Scheduling	Gurcharan Singh	Standard Book
Town Planning	S.C. Rangwala	Charotar

Reference Book(s):

Title	Author/s	Publication
Civil Engineering Drawing	V. B. Sikka	S.K. Kataria & Sons
Building Drawing	M. G. Shah, C.M. Kale, S.Y. Patki	Tata McGraw Hill
Planning and Designing Building	Y. S. Sane	
G.D.C.R.	S.U.D.A./ S.M.C.	S.U.D.A./ S.M.C.

Web Material Links:
- http://bis.org.in/sf/mtd/MTD32(5079)W.pdf
- http://www.sudaonline.org/gdcr/
- https://www.studentartguide.com/articles/one-point-perspective-drawing
- http://www.ancientindia.co.uk/index.html

Course Evaluation:

Theory:
- Continuous Evaluation consists of two tests each of 30 marks and 1 Hour of duration, which will be converted to 30 marks.
- Faculty evaluation consists of 10 marks as per the guidelines provided by the course coordinator.
- End Semester Examination consists of 60 marks.

Tutorial:
- Continuous Evaluation consists minimum 4 drawing sheets which should be evaluated out of 10 marks for each sheet and average of the same will be converted to 10 marks.
- Internal viva component of 10 marks.
- Practical performance/quiz/drawing/test of 15 marks during End Semester Exam.
- Viva/Oral performance of 15 marks during End Semester Exam.

Course Outcomes:

After completion of the course, the student will be able to
- understand local building bye-laws in respect of building and town planning.
- discuss various aspects of principles of planning and architecture in building planning.
- prepare working drawings, foundation plans and other executable drawings with proper details with hand and with Auto-CAD software for residential buildings.
- understand concept of development of town, important of survey in town planning.
- understand importance of zoning, land use and latest form of urban planning.

Department of Civil Engineering

Course Code: SECV3030
Course Name: Concrete Technology
Prerequisite Course(s): --

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
03	02	00	04	40	60	20	30	00	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to
- understand basics of modern concrete.
- use mineral and chemical admixtures.
- understand the material properties of concrete with emphasis on its durability.
- design the required concrete mix based on the field conditions.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Cement** Production, composition and properties, cement chemistry, types of cements, special cements.	03	07
2.	**Aggregates** Mineralogy, properties, tests and standards.	05	11
3.	**Chemical and Mineral Admixtures** Water reducers, air entrainers, set controllers, specialty admixtures structure properties, and effects on concrete properties, introduction to supplementary cementing materials and pozzolans, fly ash, blast furnace slag, silica fume, and metakaolin - their production, properties, and effects on concrete properties, other mineral additives - reactive and inert.	06	13
4.	**Concrete Mix Design** Basic principles, IS method, ACI method, new approaches based on rheology and particle packing.	07	16
5.	**Concrete Production & Fresh Concrete** Batching of ingredients, mixing, transport and placement. Consolidation, finishing, and curing of concrete, initial and final set - significance and measurement. Workability of concrete and its measurement.	02	03

Section II

Module No.	Content	Hours	Weightage in %
1.	**Engineering Properties of Concrete** Compressive strength and parameters affecting it, tensile strength - direct and indirect, modulus of elasticity and Poisson's ratio, stress strain response of concrete.	05	11
2.	**Dimensional Stability and Durability** Creep and relaxation, parameters affecting, shrinkage of concrete - types and significance, parameters affecting shrinkage, measurement of creep and shrinkage**.**	06	13
3.	**Durability of Concrete** Introduction to durability, relation between durability and permeability, chemical attack of concrete, corrosion of steel rebars, other durability issues**.**	07	16
4.	**Special Concretes** Properties and Applications of: High strength - high performance concrete, reactive powder concrete, lightweight, heavyweight, and mass concrete, fibre reinforced concrete, self-compacting concrete, shotcrete, other special concretes.	04	10

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Fineness of Cement	02
2.	Soundness of Cement	02
3.	Slump cone test	02
4.	Compaction factor test	02
5.	Vee Bee Consistometer test	02
6.	Flow table test	02
7.	Compressive strength Tests	02
8.	Split Tensile Test	02
9.	Mix design	06
10.	Young's Modulus and Poisson's Ratio of concrete	04
11.	Rebound Hammer Test	02
12.	Ultrasonic Pulse Velocity Test	02

Text Book(s):

Title	Author/s	Publication
Concrete Technology	A.M. Neville and J.J. Brooks	ELBS
Concrete Technology	M.S. Shetty	S. Chand

Reference Book(s):

Title	Author/s	Publication
Concrete Structure, Material and Properties	P.K. Mehta	Prantice Hall Inc.
Cement based composites: Materials, Mechanical Properties and Performance	A.M. Brandt	E & FN Spon.

Web Material Link(s):
- https://onlinecourses.nptel.ac.in/noc18_ce20/preview
- https://onlinecourses.nptel.ac.in/noc18_ce21/preview

Course Evaluation:
Theory:
- Continuous Evaluation consists of two tests each of 30 marks and 1 Hour of duration, which will be converted to 30 marks.
- Faculty evaluation consists of 10 marks as per the guidelines provided by the course coordinator.
- End Semester Examination consists of 60 marks.

Practical:
- Continuous Evaluation consists of performance of practical which will be evaluated out of 10 marks for each practical and average of the same will be converted to 10 marks.
- Internal viva consists of 10 marks.
- Practical performance/quiz/drawing/test consists of 15 marks during End Semester Exam.
- Viva/Oral performance consists of 15 marks during End Semester Exam.

Course Outcome(s):
After completion of the course, the student will be able to
- thoroughly understand the concrete production process.
- understand how each additive affects the properties of the concrete.
- be able to design a required concrete mix.

Centre for Skill Enhancement & Professional Development

Course Code: SEPD2020
Course Name: Values and Ethics
Prerequisite Course(s): --

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
02	00	00	02	40	60	00	00	00	00	100

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to:
- develop a familiarity with the mechanics of values and ethics.
- understand basic concepts of values and ethics
- explore and understand values, ethics in context of professional, social and persona spectrum
- explore an understand values, ethics in context of globalization and global issues
- explore an application of values and ethics in personal, social, academic, global and professional life.
- to facilitate the learners to understand harmony at all the levels of human living and live accordingly.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction to Values** • Definition and Concept • Types of Values • Values and its Application	03	10
2.	**Elements and Principles of Values** • Universal & Personal Values • Social, Civic & Democratic Values • Adaptation Models & Methods of Values	06	20
3.	**Values and Contemporary Society** • Levels of Value Crisis • Value Crisis Management • Values in Indian Scriptures	06	20

Section II			
Module No.	Content	Hours	Weightage in %
1.	**Ethics and Ethical Values** • Definition and Concept • Acceptance and Application of Ethics • Ethical Issues and Dilemma • Universal Code of Ethics: Consequences of Violation	07	25
2.	**Applied Ethics** • Professional Ethics • Organizational Ethics • Ethical Leadership • Ethics in Indian Scriptures	08	25

Text Book (s):

Title	Author/s	Publication
Values and Ethics in Business and Profession	By Samita Manna, Suparna Chakraborti	PHI Learning Pvt. Ltd., New Delhi, 2010

Reference Book(s):

Title	Author/s	Publication
Just a Job?: Communication, Ethics, and Professional life	George Cheney	Oxford University Press, 2010
Professional Ethics and Human Values	M. Govindarajan, S. Natarajan, V. S. Senthilkumar	PHI Learning Pvt. Ltd, 2013
Creating Values In Life: Personal, Moral, Spiritual, Family and Social Values	By Ashok Gulla	Author House, Bloomington, 2010
E-Book(s)		

- Ethics for Everyone, Arthur Dorbin, 2009.
  (http://arthurdobrin.files.wordpress.com/2008/08/ethics-for-everyone.pdf)
- Values and Ethics for 21st Century, BBVA. (https://www.bbvaopenmind.com/wp-content/uploads/2013/10/Values-and-Ethics-for-the-21st-Century_BBVA.pdf)

Course Evaluation:
Theory:
- Continuous Evaluation consists of two tests each of 30 marks and 1 Hour of duration, which will be converted to 30 marks.
- Faculty evaluation consists of 10 marks as per the guidelines provided by the course coordinator.
- End Semester Examination consists of 60 marks.

Course Outcome(s):

Students will be able to

- understand and relate the concepts and mechanics of values and ethics in their life.
- correlate the significance of value and ethical inputs in and get motivated to apply them in their life and profession.
- realize the significance of value and ethical inputs in and get motivated to apply them in social, global and civic issues.
- learn to apply such principles with reference to Indian scriptures

P P Savani University
School of Engineering

Center for Skill Enhancement and Professional Development

Course Code: SEPD3030
Course Name: Foriegn Language (German)
Prerequisite Course(s): Foreign Language

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
02	00	00	02	40	60	00	00	00	00	100

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to
- develop and integrate the use of the four language skills i.e. listening, speaking, reading and writing.
- use the language effectively and appropriately on topics of everyday life situations.
- develop an interest in the appreciation of German.
- develop an intercultural awareness.
- enhance the ability of the candidates to express their ideas and feelings in their own words and for them to understand the use of correct language.
- appreciate the language as an effective means of communication.
- understand language when spoken at normal conversational speed in everyday life situations.
- understand the basic structural patterns of the language, vocabulary and constructions.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	Introduction to German - Alphabets - German accents - German Numbers - What are the similarities and differences between English and German? - Greetings	2	15
2.	German Time Basic Introduction	2	08
3.	Vocabulary part-1 The days of the week	2	05

Module No.	Content	Hours	Weightage in %
	• The months of the year • Seasons • Directions • Weather		
4.	Vocabulary part-2 • Family • Colors and Shapes • Day/time indicators • Body parts • Clothing	2	07
5.	Vocabulary Part-3 • Food and Meals • Fruits, Vegetables and Meats • Sports and Hobbies	2	05
6.	• Transportation • House and Furniture	2	05
7.	• School Subject • Places • Common Expressions	2	05
Section II			
Module No.	Content	Hours	Weightage in %
1.	German grammar • Verb Sein (to be) • Verb Haben (to have) • Introduction of Regular verbs and Irregular verb • Konjugation of Regular verb • First group verbs('EN' group)	2	10
2.	• Konjugation of Regular verbs • Second group verbs('Ten/Den' group) • Konjugation of Irregular verbs • Third group verbs (Stem change verb) • Fourth group verbs (Spell Change Verb)	2	10
3.	• Nicht trennbare und trennbare Verben • Die Modalverben • Personalpronomen-Nominativ	2	10
4.	• W-Frage • Ja/Nein-Fragen • Nomen und Artikel-Nominativ • Die Anrede	2	10
5.	• Nomen-Genusregein • Adjektiv • Nomen und Artikel-Akkusativ • Personalpronomen-Akkusativ	2	10

6.	• Practice of Writing • Practice of Speaking	2	-
7.	• Practice of Listening	2	-
8.	• Practice of Reading	2	-

Text Book(s):

Title	Author/s	Publication
Namaste German	Yoshita Dalal	Yoshita Dalal

Reference Book(s):

Title	Author/s	Publication
Fit in Deutsch	Hueber	Goyal Publication

Web Material Link(s):

- https://www.youtube.com/watch?v=iGovllrEsF8&list=PLRps6yTcWQbpoqIOCmqMeI1HLn LIRmO_t
- https://www.youtube.com/watch?v=GwBfUzPCiaw&list=PL5QyCnFPRx0GxaFjdAVkx7K9Tf EklY4sg

Course Evaluation:
Theory:
- Continuous Evaluation consist of a test of 30 marks and 1 Hour of duration.
- German Speaking Exam consist of 10 marks.
- End Semester Examination consists of 60 marks.

Course Outcome(s):

After completion of the course, the student will be able to

- demonstrate speaking, reading, writing and listening in German.
- understand German Technology.
- communicate easily in four Language and they can get good job in German Company.
- demonstrate the level of proficiency necessary to enable them to function in an environment where German is used exclusively.