

Syllabus Book

Second Year B Tech
Civil Engineering



P P Savani University

School of Engineering
Department of Civil Engineering

Effective From: 2018-19
Authored by: P P Savani University

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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	
3	-	2	5	40	60	-	-	50	-	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

The course aims to focus on

- orientation of calculus and its applications in solving engineering problems through differential equations.
- introduction of partial differential equations with solution methods.
- application of Laplace transforms to solve linear differential equations.
- introduction of periodic functions and Fourier series with their applications for solving ODEs.

Course Content:

Section I			
Module	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-linear 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	Content	Hours	Weightage in %
1.	Laplace Transform Laplace Transform, Linearity, First Shifting Theorem, Existence	10	20

	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.		
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. RajnishVerma	S. Chand & Company Pvt. Ltd.

Web Material Link(s):

- <http://nptel.ac.in/courses/111105035/>
- <http://nptel.ac.in/courses/111106100/>
- <http://nptel.ac.in/courses/111105093/>
- <http://nptel.ac.in/courses/111108081/>

Course Evaluation:**Theory:**

- Continuous Evaluation consists of two tests of 30 marks and 1 hour of duration and average of the same will be converted to 30 marks.
- Faculty evaluation consists of 10 marks as per the guidelines provided by Course Coordinator.
- End Semester Examination consists of 60 marks.

Tutorial:

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

Course Outcome(s):

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: SECV2011

Course Name: Strength of Materials

Prerequisite Course/s: Engineering Mechanics (SECV1030)

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
3	2	0	4	40	60	20	30	0	0	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 physical and mechanical properties of materials.
- behavior of structural element under the influence of various loads.

Course Content:

Section I			
Module	Content	Hours	Weightage in %
1.	Introduction to Physical and Mechanical Properties of Material Introduction, Classification of materials, Properties related to axial, bending, and torsional & shear loading, Toughness, Hardness, Ductility, Brittleness, Proof stress, Factor of safety, Working stress, Load factor.	03	7
2.	Simple Stress and Strain Definition of stress and strain, Tensile & compressive Stresses, Shear and complementary shear Strains, Linear, Shear, Lateral, Thermal and volumetric. Hooke's law, Stresses and strain in bars of Varying, Tapering & Composite section, Principle of Superposition, Elastic Constants, Modulus of elasticity, Poisson's ratio, Bulk modulus, Shear modulus (Modulus of rigidity).	08	17
3.	Shear Force and Bending Moment Introduction, Types of loads, Supports and beams, Shear force, Bending Moment, Sign conventions for shear force & Bending moment. Statically determinate beam, SFD and BMD for concentrated load and uniformly distributed load, uniformly varying load, Point of contra-flexure.	12	26

Section II			
Module	Content	Hours	Weightage in %
1.	Direct and Bending Stresses 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, Eccentric loading, Symmetrical column with eccentric loading about one axes, Symmetrical columns with Eccentric loading about two axes, Unsymmetrical columns with Eccentric loading.	06	14
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.	05	11
3.	Principle Stress and Strain Stresses on oblique section of a body subjected to a direct stress in one plain, Stresses on oblique section of a body subjected to a direct stress in two mutually perpendicular directions, Stresses on oblique section of a body subjected to a direct stress in one plane and accompanied by a simple shear stress, Stresses on oblique section of a body subjected to a direct stress in two mutually perpendicular directions accompanied by a simple shear stresses two-dimensional system, principal stresses and principal planes, Mohr's circle of Stresses on oblique section of a body subjected to a direct stress in one plain, Stresses on oblique section of a body subjected to a direct stress in two plain.	06	14
4.	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.	05	11

List of Practical:

Sr. No	Name of Practical	Hours
1.	Tensile test on Ductile materials (Mild steel, Copper, Wood)	02
2.	Tensile test on Brittle Materials (Cast iron, Concrete)	02
3.	Compression test on Ductile materials (Mild steel, Copper, Wood)	02
4.	Compression test on Brittle Materials (Cast iron, Concrete)	02
5.	Brinell's hardness test	02
6.	Rockwell hardness test	02
7.	Impact of metals (Izod)	02
8.	Impact of metals (Charpy)	02
9.	Torsion Test	02
10.	Tutorials on Simple Stress and Strain, Principal Stress and Strain	04
11.	Tutorials on SFD & BMD, Bending Stress	04
12.	Tutorials Bending Stress, Shear stress, Torsion	04

Text Book(s):

Title	Author/s	Publication
Strength of Materials (SI Units)	R S Khurmi, N Khurmi	S. Chand & Company Pvt. Ltd.

Reference Book(s):

Title	Author/s	Publication
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

Web Material Link(s):

- <https://nptel.ac.in/courses/112107146/>
- https://uacg.bg/filebank/att_6146.pdf
- <https://home.iitm.ac.in/kramesh/Strength%20of%20Materials%20Laboratory%20Manual.pdf>
- <https://home.iitm.ac.in/kramesh/Strength%20of%20Materials%20Laboratory%20Manual.pdf>
- https://en.wikibooks.org/wiki/Strength_of_Materials
- https://www.tutorialspoint.com/strength_of_materials/index.asp

Course Evaluation:**Theory:**

- Continuous Evaluation consists of two tests of 30 marks and 1 hour of duration and average of the same will be converted to 30 marks.
- Faculty evaluation consists of 10 marks as per the guidelines provided by Course Coordinator.
- End Semester Examination consists of 60 marks.

Practical/Tutorial:

- 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 consists 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 Outcome(s):

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 problems 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	
4	2	0	5	40	60	20	30	0	0	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	Content	Hours	Weightage in %
1.	Introduction Physical, chemical and engineering properties of building materials. Factors Affecting Choice of Materials, Application of building materials.	02	3
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	7
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	7
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. Aggregate: Types of aggregate as per BIS, Requirements of aggregate	12	20

	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: Properties of Water use for construction Concrete: Requirements of concrete, Properties of fresh and hardened 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	Content	Hours	Weightage in %
1.	Foundation Function and requirements of a good foundation, Types of foundations, <ul style="list-style-type: none"> • 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	8
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. 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.	10	17
3.	Masonry Brick masonry: Technical terms, bonds in brick work- English bond, single & double Flemish bond, garden wall bond, raking bond, Dutch	05	8

	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.		
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.	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 <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • 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 of 30 marks and 1 hour of duration and average of the same will be converted to 30 marks.
- Faculty evaluation consists of 10 marks as per the guidelines provided by Course Coordinator.
- End Semester Examination consists of 60 marks.

Practical/Tutorial:

- Continuous Evaluation consists of performance of practical/tutorial/sketch book which will be evaluated out of 10 for each practical/tutorial/sketch book and average of the same will be converted to 10 marks.
- Internal viva consists 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 Outcome(s):

After completion of the course, the student 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	
3	2	0	4	40	60	20	30	0	0	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

- comprehend basic fundamentals of Fluid Mechanics, which is used in the applications of Aerodynamics, 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	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	5
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 Submerged in Liquid, Horizontal Plane Surface Submerged in Liquid, Inclined Plane Surface Submerged in Liquid, Curved Plane Surface Submerged in Liquid, Total pressure and Centre of Pressure on Lock Gates.	06	15
4	Fluid Kinematics Steady and Unsteady Flow, Laminar and Turbulent Flow, Compressible	07	15

	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		
Section II			
Module	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 practical 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 Book(s):

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 of 30 marks and 1 hour of duration and average of the same will be converted to 30 marks.
- Faculty evaluation consists of 10 marks as per the guidelines provided by Course Coordinator.
- End Semester Examination consists of 60 marks.

Practical/Tutorial:

- 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 consists 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 Outcome(s):

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: 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	
3	2	0	4	40	60	20	30	0	0	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) 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	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	4
Section II			
Module	Content	Hours	Weightage in %
1.	Tacheometry Surveying Introduction, Instruments used, Methods of tacheometry measurement, Distance and elevation measurement for fixed hair,	07	14

	moveable hair and tangential method, Use of Analytic lens, Substance bar.		
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 tacheometry.	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 of 30 marks and 1 hour of duration and average of the same will be converted to 30 marks.
- Faculty evaluation consists of 10 marks as per the guidelines provided by 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 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 of 15marks 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

- 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 and 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	--	--	--	--	100

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) 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	Content	Hours	Weightage in %
1.	Introduction to Critical Thinking <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • Inductive and Deductive Thinking • Questioning for Generating Ideas • Socratic Questioning and its application 	07	25
Section II			
Module	Content	Hours	Weightage
1.	Conceptual Thinking <ul style="list-style-type: none"> • Second order thinking • Synthesizing 	03	10
2.	Creative Thinking and Decision Making <ul style="list-style-type: none"> • Problem Solving • Adapting Various Structures of Decision Making 	06	20
3.	Moral Thinking <ul style="list-style-type: none"> • 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 of 30 marks and 1 hour of duration and average of the same will be converted to 30 marks.
- Faculty evaluation consists of 10 marks as per the guidelines provided by Course Coordinator.
- End Semester Examination consists of 60 marks.

Course Outcome(s):

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.

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	
3	-	2	5	40	60	-	-	50	0	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 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	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, Simpson's 1/3-rule, Simpson's 3/8-rule, Euler-Maclaurin Formulae	7	17

Section II			
Module	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 Tutorials:

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 of 30 marks and 1 hour of duration and average of the same will be converted to 30 marks.
- Faculty evaluation consists of 10 marks as per the guidelines provided by Course Coordinator.
- End Semester Examination consists of 60 marks.

Tutorial:

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

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
4	0	1	5	40	60	00	00	50	0	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

- use various methods to predict the response of a structure (with specific boundary conditions) to specified loads.
- convert complex 3D structures into simplified physical model
- to idealize and analyze statically determinate structures
- understand how commercial software packages function

Section I			
Module	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	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
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Text Book(s):

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

Reference Book(s):

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

Web Material Link(s):

- <http://www.nptel.ac.in/courses/Webcoursecontents/IIT%20Kharagpur/Structural%20Analysis/pdf/m111.pdf>
- <http://nptel.ac.in/courses/Webcoursecontents/IIT%20Kharagpur/Structural%20Analysis/pdf/m7137.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/m115.pdf>
- <http://nptel.ac.in/courses/Webcoursecontents/IIT%20Kharagpur/Structural%20Analysis/pdf/m5131.pdf>

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests Each of 30 Marks and 1 Hour of duration and average of the same will be converted to 30 marks.
- Faculty evaluation consists of 10 marks as per the guidelines provided by Course Coordinator.
- End Semester Examination consists of 60 marks and 2.30 hours of duration.

Tutorial:

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

Course Outcome(s):

After completion of the course, 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	
3	2	0	4	40	60	20	30	0	0	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) 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	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	4
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 investigation, Tunnels, assessment of environmental hazards, Geological considerations in tunneling, Folding, Faulting, Roads and highways, Road cut.	04	8
6.	Introduction of Soil and Soil Mechanics Definition, Development of soil mechanics, Soil formation, Residual and transported soils, Some commonly used soil designations,	04	8

	Structure and texture of soils, Soil as construction material, Limitations of soil mechanics.		
Section II			
Module	Content	Hours	Weightage
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	6
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: 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.	Visual identification and specific gravity	2
2.	Sieve Analysis	2
3.	Hydrometer 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 & Ramamurthy T.N.	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 Link(s):

- <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 of 30 marks and 1 hour of duration and average of the same will be converted to 30 marks.
- Faculty evaluation consists of 10 marks as per the guidelines provided by Course Coordinator.
- End Semester Examination consists of 60 marks.

Practical/Tutorial:

- 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 consists 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.
- develop the ability to classify soils and to evaluate soil parameters such as Atterberg limits, Density, Specific gravity, permeability.

P P Savani University
School of Engineering

Department of Civil Engineering

Course Code: SECV2071

Course Name: Advance Fluid Mechanics & Hydraulic Machine

Prerequisite Course: Fluid Mechanics (SECV2030)

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
3	2	0	4	40	60	20	30	0	0	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to understand

- advance application of fluid flow in practical problem.
- behaviour of fluid flow in open channel.
- fundamental properties of fluid.

Course Content:

Section I			
Module	Content	Hours	Weightage in %
1.	Viscous Flow Introduction, Flow of viscous through circular pipe, Flow of viscous fluid between Two Parallel Plates, Kinetic Energy Correction and Momentum Correction Factors, Loss of Head Due to Friction in Viscous Flow.	07	16
2.	Turbulent Flow Introduction, Reynolds Experiments, Friction loss in Pipe Flow, Shear stress in Turbulent Flow, Velocity Distribution in Turbulent Flow in Pipes. Resistance of Smooth and Rough Pipes.	07	16
3.	Flow Through Open Channel Introduction, Classification of Flow in Channels, Chezy's Formula, Most Economical Section of Channels, Non- Uniform Flow Through Open Channels, Specific Energy and Specific Energy Curve, Hydraulic Jump and Standing Wave, Gradually Varied Flow.	08	18
Section II			
Module	Content	Hours	Weightage
1.	Dimensional Analysis Introduction, Secondary or Derived Quantities, Dimensional Homogeneity, Methods of Dimensional Analysis, Model Analysis, Similitude-Types of Similarities, Forces acting on Moving Fluid, Dimensionless Numbers, Model laws or Similarity Laws, Classification of Models.	07	14
2.	Hydraulic Machines: Turbines	08	18

	Introduction, Definitions of Heads and Efficiencies of a Turbine, Classification of Hydraulic Turbines, Pelton Wheel Turbine, Radial Flow Reaction Turbines, Francis Turbines, Axial Flow Reaction Turbines, Draft-Tube, Specific Speed, Unit Quantities, Characteristic curves of Hydraulic Turbines, Governing of Turbines.		
3.	Pumps Centrifugal Pumps, Work Done by the Centrifugal Pump, Definitions of Heads and Efficiencies of a Centrifugal Pump, Minimum Speed for Starting a Centrifugal Pump, Multistage Centrifugal Pump, Specific Speed of a Centrifugal Pump, Priming of a Centrifugal Pump, Maximum Suction Lift, Net Positive Suction Head(NPSH), Cavitation in Centrifugal Pump, Reciprocating Pump, Working of Reciprocating Pump, Slip of Reciprocating Pump, Classification of Reciprocating Pump, Indicator Diagram, Comparison between Centrifugal And Reciprocating Pump.	08	18

List of Practical:

Sr No	Name of Practical	Hours
1.	Determination of Chezy's and Manning's constants	02
2.	Determination of co-efficient of discharge for venturi flume /standing wave flume	02
3.	Determination of pipe friction factor	02
4.	Determination of minor losses.	02
5.	Study of hydraulic jump	02
6.	Fluid flow analogy using Reynolds apparatus	02
7.	Study of performance characteristics of a Pelton wheel turbine at constant speed	02
8.	Study of performance characteristics of a Francis turbine at constant speed	02
9.	Study of performance characteristics of a Kaplan turbine at constant speed	02
10.	Study of performance characteristics of a centrifugal pump at constant speed	04
11.	Study of performance characteristics of a centrifugal pump at different speeds	04
12.	Study of performance characteristics of a reciprocating pump at constant speed	02
13.	Determination of coefficient of discharge of open channel flow measurement	02

Text Book(s):

Title	Author/s	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 Book(s):

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

Course Evaluation:**Theory:**

- Continuous Evaluation consists of two tests of 30 marks and 1 hour of duration and average of the same will be converted to 30 marks.
- Faculty evaluation consists of 10 marks as per the guidelines provided by Course Coordinator.
- End Semester Examination consists of 60 marks.

Practical/Tutorial:

- 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 consists 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 Outcome(s):

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

- understand basics of compressible flow
- correlate fundamentals of fluid mechanics with various mechanical systems.
- understand an application of hydraulic machine & Hydraulic Structure.

**P P Savani University
School of Engineering**

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	
0	4	0	2	--	--	40	60	--	--	100

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to understand

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

Course Content:

Section I			
Module	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 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.	05	10
7.	GIS, GPS and RS: GIS: Introduction, Subsystem, Hardware, Data, representation of data, Raster and Vector data, Map overlay analysis, Selective software, Applications.	10	20

	RS: Introduction, Process, EM spectrum, Sensor system, energy interaction with earth surface, Applications. GPS: Introduction, Segments, Survey techniques, Applications.		
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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 pentagraph 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 should be evaluated out of 10 for each practical and average of the same will be converted to 20 marks.
- Internal viva/quiz consists 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 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.
- 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.

**P P Savani University
School of Engineering**

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	
3	02	0	4	40	60	20	30	0	0	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) 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	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	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 Mohanjo-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	Name 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 Link(s):

- [http://bis.org.in/sf/mtd/MTD32\(5079\)W.pdf](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 of 30 marks and 1 hour of duration and average of the same will be converted to 30 marks.
- Faculty evaluation consists of 10 marks as per the guidelines provided by Course Coordinator.
- End Semester Examination consists of 60 marks.

Tutorial:

- Continuous Evaluation consists of minimum 4 drawing sheets which should be evaluated out of 10 for each sheet and average of the same will be converted to 10 marks.
- Internal viva consists 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:

- 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.

P P Savani University
School of Engineering

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	--	--	--	--	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	Content	Hours	Weightage
1	Introduction to Values <ul style="list-style-type: none"> • Definition and Concept • Types of Values • Values and its Application 	03	10
2	Elements and Principles of Values <ul style="list-style-type: none"> • Universal & Personal Values • Social, Civic & Democratic Values • Adaptation Models & Methods of Values 	06	20
3	Values and Contemporary Society <ul style="list-style-type: none"> • Levels of Value Crisis • Value Crisis Management • Values in Indian Scriptures 	06	20
Section II			
Module	Content	Hours	Weightage in %
1.	Ethics and Ethical Values <ul style="list-style-type: none"> • Definition and Concept • Acceptance and Application of Ethics • Ethical Issues and Dilemma • Universal Code of Ethics: Consequences of Violation 	07	25
2.	Applied Ethics <ul style="list-style-type: none"> • 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 of 30 marks and 1 hour of duration and average of the same will be converted to 30 marks.
- Faculty evaluation consists of 10 marks as per the guidelines provided by Course Coordinator.
- End Semester Examination consists of 60 marks.

Course Outcome(s):

After completion of the course, the student 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: Foreign Language (German)

Prerequisite Course: --

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	-	-	02	40	60	-	-	-	-	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	Content	Hours	Weightage in %
1.	Introduction to German <ul style="list-style-type: none"> • Alphabets • German accents • German Numbers • What are the similarities and differences between English and German? • Greetings 	2	15
2.	German Time <ul style="list-style-type: none"> • Basic Introduction 	2	08
3.	Vocabulary part-1 <ul style="list-style-type: none"> • The days of the week • The months of the year • Seasons • Directions • Weather 	2	05
4.	Vocabulary part-2 <ul style="list-style-type: none"> • Family • Colors and Shapes • Day/time indicators 	2	07

	<ul style="list-style-type: none"> • Body parts • Clothing 		
5.	Vocabulary Part-3 <ul style="list-style-type: none"> • Food and Meals • Fruits, Vegetables and Meats • Sports and Hobbies 	2	05
6.	<ul style="list-style-type: none"> • Transportation • House and Furniture 	2	05
7.	<ul style="list-style-type: none"> • School Subject • Places • Common Expressions 	2	05
Section II			
Module	Content	Hours	Weightage in %
1.	German grammar <ul style="list-style-type: none"> • 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.	<ul style="list-style-type: none"> • 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.	<ul style="list-style-type: none"> • Nicht trennbare und trennbare Verben • Die Modalverben • Personalpronomen-Nominativ 	2	10
4.	<ul style="list-style-type: none"> • W-Frage • Ja/Nein-Fragen • Nomen und Artikel-Nominativ • Die Anrede 	2	10
5.	<ul style="list-style-type: none"> • Nomen-Genusregeln • Adjektiv • Nomen und Artikel-Akkusativ • Personalpronomen-Akkusativ 	2	10
6.	<ul style="list-style-type: none"> • Practice of Writing • Practice of Speaking 	2	-
7.	<ul style="list-style-type: none"> • Practice of Listening 	2	-
8.	<ul style="list-style-type: none"> • 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=PLRps6yTcWQbpoqIOCmqMeI1HLnLIRmO_t
<https://www.youtube.com/watch?v=GwBfUzPCiaw&list=PL5QyCnFPRx0GxaFjdAVkx7K9TfEkiY4sg>

Course Evaluation:**Theory:**

- Continuous Evaluation consists of a test of 30 marks and 1 Hour of duration.
- Faculty evaluation consists of 10 marks as per the guidelines provided by Course Coordinator.
- End Semester Examination consists of 60 marks.

Course Outcome(s):

After the 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.