PPSU

P P SAVANI UNIVERSITY

SCHOOL OF ENGINEERING

B. TECH. (CIVIL ENGINEERING)

SYLLABUS BOOK

AY 2021-22

INSTITUTE VISION
To emerge as an Institute of Excellence by imparting value-based education aided with Research, Innovation and Entrepreneurial skills.

INSTITUTE MISSION	
1.	To impart the holistic engineering education of highest quality & prepare socially responsible professionals with entrepreneurial skills.
2.	To prepare value-aided engineering professionals to meet up global industry requirements by imparting cutting edge professional education.
3.	To inculcate the attitude of research and innovation among the stake holders through experiential and project-based teaching-learning pedagogy.
4.	To acquire global talent pool by providing world class amenities for teaching, learning & research.

Graduates will demonstrate ability to:

PEO No	PROGRAMME EUCATIONAL OBJECTIVES
PEO 1	Solve real-world engineering problems, design and develop innovative and cost-effective solutions exhibiting engineering skills/fundamentals to cater needs of society.
PEO 2	Excel in Industry/technical profession, higher studies, and entrepreneurship exhibiting comprehensive competitiveness.
PEO 3	Exhibit professional ethics & values, effective communication, teamwork, multidisciplinary approach, and ability to relate engineering issues to broader societal framework.

PO No	PROGRAMME OUTCOMES
PO 1	Engineering knowledge: Apply knowledge of engineering fundamentals, science, mathematics & engineering specialization for the solution of complex engineering problems.
PO 2	Problem analysis: Identify, formulate and analyze complex engineering problems leading to substantial conclusions using basic principles of mathematics, science and engineering.
PO 3	Design/development of solutions: Develop solutions for complex engineering problems and design system components or processes meeting specified needs having due consideration for the safety and societal & environmental considerations.
PO 4	Conduct investigations of complex problems: Use research-based knowledge & methods like design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid & viable conclusions.
PO 5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools for prediction and modeling of complex engineering activities with an understanding of the limitations.
PO 6	The engineer and society: Apply cognitive learning by the contextual knowledge to assess societal, health, safety, legal and cultural issues and following responsibilities relevant to the professional engineering practice.
PO 7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge & skill needed for sustainable development.
PO 8	Values & Ethics: Apply basic moral values & ethical principles and pledge to professional ethics/norms and responsibilities of the engineering practice.
PO 9	Individual and team work: Function effectively as an individual/as a team member or as a leader in diverse teams, and in multidisciplinary settings.
PO 10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects in multidisciplinary environments.
PO 12	Life-long learning: Recognize the need, do necessary preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PSO No	PROGRAMME SPECIFIC OUTCOMES (PSO) CIVIL ENGINEERING
PSO 1	Apply advanced analytical techniques, latest technologies, and management skills in solving real-world challenges that involve technical aspects as well as human management.
PSO 2	Design solutions for complex civil engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health & safety, cultural, societal, and environmental considerations with modern engineering tools.
PSO 3	Design innovative, sustainable, and cost-effective Civil Engineering projects by giving importance to the required safety measures and ethical practices.

Credit Guidelines (General)			
Component	**Hour/Week**	**Credit**	**Total Hours/Semester**
Theory	1	1	15
Practical	2	1	30
Tutorial	1	1	15
Note: In specific cases; extra credits can be granted for specific/important subjects.			

CO-PO Mapping Guidelines		
Mapping Level	**% age Mapping**	**Indicator**
0 / -	0	No Mapping
1	0-33	Low Level (Slightly Mapped)
2	33-66	Medium Level (Moderately Mapped)
3	>66	High Level (Strongly Mapped)

Syllabus Book

B.Tech
(Civil Engineering)

P P Savani University

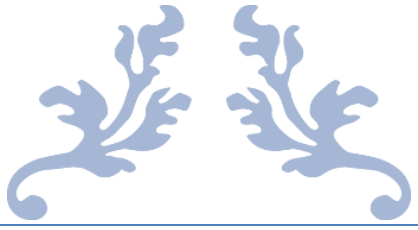
School of Engineering

Effective From: 2021-22

Authored by:

P P Savani University

CONTENT



FIRST YEAR B. TECH

P P SAVANI UNIVERSITY															
SCHOOL OF ENGINEERING															
TEACHING & EXAMINATION SCHEME FOR B. TECH. CIVIL ENGINEERING PROGRAMME AY:2021-22															
Sem	Course Code	Course Title	Offered By	Teaching Scheme					Examination Scheme						
				Contact Hours				Credit	Theory		Practical		Tutorial		Total
				Theory	Practical	Tutorial	Total		CE	ESE	CE	ESE	CE	ESE	
1	SESH1070	Fundamentals of Mathematics	SH	2	0	2	4	4	40	60	0	0	50	0	150
	SEME1010	Engineering Graphics	ME	3	4	0	7	5	40	60	40	60	0	0	200
	SEME1020	Engineering Workshop	ME	0	2	0	2	1	0	0	50	0	0	0	50
	SESH1210	Applied Physics	SH	3	2	0	5	4	40	60	20	30	0	0	150
	SEHV1010	Universal Human Value-I	SH	2	0	0	2	0	100	0	0	0	0	0	100
						Total	**20**	**14**							**650**
2	SESH1080	Linear Algebra & Calculus	SH	3	0	2	5	5	40	60	0	0	50	0	150
	SESH1240	Electrical & Electronics Workshop	SH	0	2	0	2	1	0	0	50	0	0	0	50
	SECV1040	Basics of Civil & Mechanical Engineering	CV	4	2	0	6	5	40	60	20	30	0	0	150
	SECV1080	Mechanics of Solids	CV	4	2	0	6	5	40	60	20	30	0	0	150
	SECE1010	Basics of Computer & Programming	CE	3	2	0	5	4	40	60	20	30	0	0	150
	CFLS1010	Linguistic Proficiency	CFLS	2	0	0	2	2	40	60	0	0	0	0	100
						Total	**26**	**22**							**750**

P P Savani University
School of Engineering

Department of Applied Science and Humanities

Course Code: SESH1070
Course Name: Fundamentals of Mathematics
Prerequisite Course/s: Algebra, Geometry, Trigonometry & Pre-Calculus till 12th Standard level

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	04	40	60	-	-	50	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the course:
To help learners to

- summarize concept of calculus to enhance ability of analysing mathematical problems.
- acquire knowledge and ability to work with differentiation and integration for applications of mathematical techniques in engineering.
- develop the tool of power series for learning advanced Engineering Mathematics.
- analyse and solve system of linear equations and understand characteristics of Matrices.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Calculus** Limits, Continuity, Types of Discontinuity, Successive Differentiation, Rolle's Theorem, LMVT, CMVT, Maxima and Minima.	08	28
2.	**Sequence and Series-I** Convergence and Divergence, Comparison Test, Integral Test, Ratio Test, Root Test, Alternating Series, Absolute and Conditional Convergence.	07	22
Section II			
Module No.	Content	Hours	Weightage in %
3.	**Sequence and Series-II** Power series, Taylor and Macluarin series, Indeterminate forms and L'Hospitals Rule.	06	20
4.	**Matrix Algebra** Elementary Row and Column operations, Inverse of matrix, Rank of matrix, System of Linear Equations, Characteristic Equation, Eigen values and Eigen vector, Diagonalization, Cayley Hamilton Theorem, Orthogonal Transformation	09	30
	TOTAL	30	100

List of Tutorials:

Sr. No.	Name of Tutorial	Hours
1.	Calculus-1	04
2.	Calculus-2	02
3.	Integration	04
4	Sequence and Series-1	04
5.	Sequence and Series-2	04
6.	Sequence and Series-3	02
7.	Matrix Algebra-1	04
8.	Matrix Algebra-2	02
9.	Matrix Algebra-3	02
10.	Matrix Algebra-4	02
	TOTAL	30

Text Book:

Title	Author(s)	Publication
Thomas' Calculus	George B. Thomas, Maurice D. Weir and Joel Hass	Pearson
Elementary linear Algebra	Howard Anton and Chrish Rorres	Wiley

Reference Book:

Title	Author(s)	Publication
Advanced Engineering Mathematics	E Kreyszig	John Wiley and Sons
A textbook of Engineering Mathematics	N P Bali and Manish Goyal	Laxmi
Higher Engineering Mathematics	B S Grewal	Khanna
Engineering Mathematics	T Veerarajan	Tata Mc Graw Hill
Engineering Mathematics-1 (Calculus)	H. K. Dass and Dr. Rama Verma	S. Chand

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

SESH1070	FUNDAMENTALS OF MATHEMATICS

CO 1	To Recall the concepts of limit, continuity and differentiability for analysing mathematical problems.
CO 2	Explain concepts of limit, derivatives and integrals.
CO 3	Analyze the series for its convergence and divergence to slove real world problems.
CO 4	Evaluate linear system using matrices.
CO 5	Adapt the knowledge of eigenvalues and eigenvectors for matrix diagonalization.

Mapping of CO with PO

SESH1070	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	3	1	1								1
CO 2	3	2	1									1
CO 3	3	2	1	1								
CO 4	3	2	1									1
CO5	3	3	1		1							1

Mapping of CO with PSO

SESH1070	PSO1	PSO2	PSO3
CO 1	3		
CO 2	1	1	
CO 3	1	2	
CO 4	2	1	
CO 5	2	2	

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	**Content**	**RBT Level**
1	Calculus	1, 2, 3, 4
2	Sequence and Series – I	1, 2, 3, 4
3	Sequence and Series – II	1, 2, 3, 4
4	Matrix Algebra	1, 2, 3, 4

P P Savani University
School of Engineering
Department of Mechanical Engineering

Course Code: SEME1010
Course Name: Engineering Graphics
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	04	-	05	40	60	40	60	-	-	200

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to

- know conventions and the methods of engineering drawing.
- interpret engineering drawings using fundamental technical mathematics.
- construct basic and intermediate geometry.
- improve their visualization skills so that they can apply these skills in developing new products.
- improve their technical communication skill in the form of communicative drawings.
- comprehend the theory of projection.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction:** Importance of the Course; Use of Drawing Instruments and accessories; BIS – SP – 46; Lettering, Dimensioning and Lines; Representative Fraction; Types of Scales (Plain and Diagonal Scales); Construction of Polygons.	03	05
2.	**Engineering Curves:** Classification and Application of Engineering Curves; Construction of Conics, Cycloidal Curves, Involutes and Spiral along with Normal and Tangent to each.	06	15
3.	**Principles of Projections:** Types of Projections; Introduction of Principle Planes of Projections. **Projection of Points & Line:** Projection of Points in all four Quadrants; Projection of Lines with its inclination to one Referral Plane & two Referral Planes. **Projection of Plane:** Projection of Planes (Circular and Polygonal) with inclination to one Referral Plane and two Referral Planes; Concept of Auxiliary Projection Method.	14	30
Section II			

Module No.	Content	Hours	Weightage in %
4.	**Projection and Section of Solids:** **Projection of solids:** Polyhedral, Prisms, Pyramids, Cylinder, Cone, Auxiliary Projection Method, One View, Two View and Three View Drawings. Missing View, Rules for Selection of Views; Sectional View, Section Plane Perpendicular to the HP & VP and other Various Positions, True Shape of Sections.	08	14
5.	**Orthographic Projection:** Types of Projections: Principle of First and Third Angle Projection - Applications & Difference; Projection from Pictorial view of Object, View from Front, Top and Sides; Full Section View.	07	18
6.	**Isometric Projections and Isometric Drawing:** Isometric Scale, Conversion of Orthographic views into Isometric Projection, Isometric View or Drawing.	07	18
	TOTAL	45	100

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Introduction sheet (dimensioning methods, different types of line, construction of different polygon, divide the line and angle in parts, use of stencil, lettering)	08
2.	Plane scale and diagonal scale	04
3.	Engineering curves	08
4.	Projection of Points & Lines	06
5.	Projection of Planes	08
6.	Projection of solid & Section of solid	10
7.	Orthographic projection	08
8.	Isometric projection	08
	TOTAL	60

Text Book(s):

Title	Author(s)	Publication
A Text Book of Engineering Graphics	P J Shah	S. Chand & Company Ltd., New Delhi
Engineering Drawing	N D Bhatt	Charotar Publishing House, Anand

Reference Book(s):

Title	Author(s)	Publication
Engineering Drawing	P.S.Gill	S. K. Kataria & sons, Delhi
Engineering Drawing	B. Agrawal & C M Agrawal	Tata McGraw Hill, New Delhi
Engineering Drawing made Easy	K. Venugopal	Wiley Eastern Ltd

Web Material Link(s):

- http://nptel.ac.in/courses/105104148/

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 will consist of 60 marks.

Practical:

- Continuous Evaluation consists of Performance of Practical/Tutorial which will be evaluated out of 10 for each practical/Tutorial and average of the same will be converted to 20 Marks.
- Internal Viva consists of 20 Marks.
- Practical performance/quiz/drawing/test will consist of 30 Marks during End Semester Exam.
- Viva/Oral performance will consist of 30 Marks during End Semester Exam.

Course Outcome(s):

After the completion of the course, the following course outcomes will be able to:

SEME1010	**ENGINEERING GRAPHICS**
CO 1	Learn and understand the bis standards, conventions and methods of engineering drawing.
CO 2	Explore the different methods to draw various engineering curves and its applications.
CO 3	Construct basic and intermediate geometry and comprehend the theory of projection.
CO 4	Improve visualization skills and apply it to develop a new product.

. Mapping of CO with PO

SEME1010	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	1	1	1			2				3		1
CO 2	1	1	1		1					3		1
CO 3	1	1	1		1					3		1
CO 4	1	1	2		1					3		1

Mapping of CO with PSO

SEME1010	PSO1	PSO2	PSO3
CO 1	1		
CO 2	2	1	1
CO 3	2	1	1
CO 4	2	1	1

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	Content	RBT Level
1	Introduction	1, 2, 6
2	Engineering Curves	2, 6
3	Principles of Projections, Projection of Points and Line, Projection of Plane	1, 2, 3, 4
4	Projection of Solids	2, 3, 4, 6
5	Orthographic Projection	2, 5, 4
6	Isometric Projections and Isometric Drawing	2, 5, 4

P P Savani University
School of Engineering
Department of Mechanical Engineering

Course Code: SEME1020
Course Name: Engineering Workshop
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	-	01	-	-	50	00	-	-	50

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to

- learn about the safety measures required to be taken while using working in workshop.
- learn about how to select the appropriate tools required for specific operation.
- learn about different manufacturing technique for production out of the given raw material.
- understand applications of machine tools, hand tools, power tools and welding process.

List of Practical:

Sr. No	**Name of Practical**	**Hours**
1.	Introduction and Demonstration of Safety Norms. Different Measuring Instruments.	02
2.	To Perform a Job of Fitting Shop.	06
3.	To Perform a Job of Carpentry Shop.	06
4.	To Perform a Job of Sheet Metal Shop.	06
5.	To Perform a Job of Black Smithy Shop.	04
6.	Introduction and Demonstration of Grinding & Hacksaw Cutting Machine.	02
7.	Introduction and Demonstration of Plumbing Shop & Welding Process.	04
	TOTAL	30

Text Book(s):

Title	**Author(s)**	**Publication**
Elements of Workshop Technology Vol. I	Hajra Chaudhary S. K	Media promoters & Publishers
Workshop Technology Vol. I and II	Raghuvanshi B.S.	Dhanpat Rai & Sons

Reference Book(s):

Title	**Author(s)**	**Publication**
Workshop Technology Vol. I	W.A.J. Chapman	Edward Donald Publication
Workshop Practices	H S Bawa	Tata McGraw-Hill
Basic Machine Shop Practice Vol. I, II	Tejwani V.K	Tata McGraw-Hill

Web Material Link(s):

- http://nptel.ac.in/course.php

Course Evaluation:

Practical:

- Continuous Evaluation Consist of Performance of Practical which will be evaluated out of 10 for each practical/Tutorial and average of the same will be converted to 30 Marks.
- Internal Viva consists of 20 Marks.

Course Outcome(s):

After the completion of the course, the following course outcomes will be able to:

SEME1020	**ENGINEERING WORKSHOP**
CO 1	Understand the various measuring instruments.
CO 2	Understand the safety norms required in the workshop.
CO 3	Understand the application of various tools required for different operations.
CO 4	Remember the process of manufacture from a given raw material.
CO 5	Explain various manufacturing processes in machine shop.

Mapping of CO with PO

SEME1020	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2					2			2		1	2
CO 2						3		3	3		1	3
CO 3	2					2			1		1	3
CO 4	2								3		2	3
CO 5	2								3		2	3

Mapping of CO with PSO

SEME1020	PSO1	PSO2	PSO3
CO 1	2	3	2
CO 2			
CO 3	2	3	2
CO 4	3	3	3
CO 5	3	3	3

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Practical No	Content	RBT Level
1	Introduction	1, 2, 4
2	Fitting Shop	1, 2, 3
3	Carpentry and Drilling Shop	1, 2, 3
4	Sheet Metal Shop	2, 3, 4
5	Smithy Shop	2, 3, 4
6	Introduction to Machine Tools	2, 3, 4
7	Introduction to Welding & Plumbing	2, 3, 4

P P Savani University
School of Engineering
Department of Applied Science & Humanities

Course Code: SESH1210
Course Name: Applied Physics
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	-	04	40	60	20	30	-	-	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to

- prepare students for career in engineering where physics principles can be applied for the advancement of technology.
- think in core concept of engineering application by studying various topics involved in branch specific application.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Quantum Mechanics:** Wave-Particle Duality, De-Broglie Matter Wave, Phase and Group Velocity, Heisenberg Uncertainty Principle and its Applications, Wave Function and its Significance, Schrodinger's Wave Equation, Particle in One Dimensional Box	06	15
2.	**Acousic and Ultrasonic:** Introduction, Classification and Characterization of Sound, Absorption Coefficients, Sound Absorbing Materials, Sound Insulation, Ultrasonic, Properties of Ultrasonic, Generation of Ultrasonic Applications of Ultrasonic.	05	10
3.	**Solid State Physics** Introduction, Lattice Points and Space Lattice, Unit Cells and Lattice Parameters, Primitive Cell, Crystal Systems. The Bravais Space Lattices. Miller Indices, X-Ray Properties, Diffraction and Bragg's Law, Bragg's X-Ray Spectrum	06	10
4.	**Nanophysics** Nanoscale, Surface to Volume Ratio, Surface Effects on Nanomaterials, Quantum Size Effects, Nanomaterials and Nanotechnology, Unusual Properties of Nanomaterials, Synthesis of Nanomaterials, Applications of Nanomaterials	06	15
Section II			

Module No.	Content	Hours	Weightage in %
5.	**Non-Linear Optics:** Laser, Spontaneous and Stimulated Emission of Light, Applications of Laser. Fundamental Ideas about Optical Fibre, Advantages of Optical Fibre of Optical Fibre, Applications of Optical Fibre.	07	12
6.	**DC and AC Circuits Fundamentals** Introduction of Electrical Current, Voltage, Power and Energy; Sources of Electrical Energy Inductor and Capacitor, Fundamental Laws of Electric Circuits – Ohm's Law and Kirchhoff's Laws; Analysis of Series, Parallel and Series-Parallel Circuits. Alternating Voltages and Currents and their Vector and Time Domain Representations, Average and Rms Values, From Factor, Phase Difference, Power and Power Factor, Purely Resistive Inductive and Capacitive Circuits, R-L, R-C, R-L-C Series Circuits, Impedance and Admittance, Circuits in Parallel, Series and Parallel Resonance.	08	25
7.	**Electronics:** Semiconductors, Intrinsic and Extrinsic Semiconductor Advantages of Semiconductor Devices, Diodes, Transistors, Types of Bipolar Junction Transistor, Unijunction Junction Transistor, FET and MOSFETS.	07	13
	TOTAL	45	100

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Volt-Ampere Characteristics of Light Emitting Diode	02
2.	Volt-Ampere Characteristics of Zener Diode	02
3.	To determine value of Planck's constant (h) using a photovoltaic cell	02
4.	To determine the Hall coefficient (R) and carrier concentration of a given material (Ge) using Hall effect.	04
5.	To study the Capacitors in series and parallel DC circuit.	04
6.	To determine velocity of sound in liquid using Ultrasonic Interferometer	04
7.	To study RLC Series circuit.	02
8.	To determine numerical aperture of an optical fiber.	04
9.	Determination of Young's Modulus of given material.	04
10.	Analysis of errors.	02
	TOTAL	30

Text Book(s):

Title	Author/s	Publication
Concept of the Modern Physics	A. Beiser	Tata McGraw-Hill Education
Basic electrical engineering	Kothari and Nagrath	Tata McGraw-Hill Education
Quantum Mechanics	P.M. Mathew, K. Venkatesan	Tata McGraw-Hill Education
Waves and Acoustics	Pradipkumar Chakrabarti	New Central Book Agency

	Satyabrata Chawdhary	
Lasers and Nonlinear Optics	G.D. Baruah	Pragati Prakashan
Solid State Physics: Basic Electronics:	S.O. Pillai	New Age Internation Publishers
Basic Electronics for Scientists and Engineers	Dennis L. Eggleston	Cambridge University Press

Web Material Link(s):

- http:/nptel.ac.in/course.php

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 the Course Coordinator.
- End Semester Examination consists of 60 marks.

Practical:

- Continuous Evaluation Consist 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 of 20 marks during End Semester Exam.
- Viva/Oral performance of 10 marks during End Semester Exam.

Course Outcome(s):

After the completion of the course, the following course outcomes will be able to:

SESH1210	**APPLIED PHYSICS**
CO 1	Understand the framework of quantum mechanics and apply the knowledge of basic quantum mechanics to construct one dimensional schrodinger's wave equation.
CO 2	Classify the phenomenon of acoustics and ultrasonic in various engineering field and apply it for various engineering and medical fields. interpret the concept of nanotechnology and understand the synthesis and applications of nanomaterials from technological prospect.
CO 3	Discover the types and properties of superconductors. relate the behaviour of superconductors at high temperatures.
CO 4	Describe the laser and articulate the idea of optical fiber communications and apply the concepts of lasers and optical fiber communications in every possible sector.
CO 5	Distinguish pure, impure semiconductors and characteristics of semiconductor devices. thus will be able to use basic concepts to analyze and design a wide range of semiconductor devices.

Mapping of CO with PO

SESH1210	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	2	1			2						1
CO 2	2	3	2			2	3					3
CO 3	2	2	2			2	3					3

CO 4	2	3	2			2	3					3
CO 5	2	3	2			2	3					3

Mapping of CO with PSO

SESH1210	PSO1	PSO2	PSO3
CO 1	3		
CO 2	3		
CO 3	3		
CO 4	2		
CO 5	3		

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	**Content**	**RBT Level**
1	Quantum Mechanics	2, 3
2	Acoustic Ultrasonic	1, 3
3	Solid State Physics	2, 4
4	Nanophysics	2, 6
5	Non-Linear Optics	1, 2
6	DC and AC Circuits Fundamentals	2, 3
7	Electronics	3, 6

P P Savani University
School of Engineering

Department of Applied Science and Humanities

Course Code: SESH1080
Course Name: Linear Algebra & Calculus
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	05	40	60	-	-	50	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to

- learn about and work with vector space, linear transformation and inner product space.
- apply concepts of linear algebra for solving science and engineering problems.
- introduce the concept of improper integral and Beta-Gamma Function.
- develop the tool of Fourier series for learning advanced Engineering Mathematics.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Vector Space** Concept of vector space, Subspace, Linear Combination, Linear Dependence and Independence, Span, Basis and Dimension, Row Space, Column Space and Null Space, Rank and Nullity.	09	20
2.	**Linear Transformation** Introduction of Linear Transformation, Kernal and Range, Rank and Nullity, Inverse of Linear Transformation, Rank Nullity Theorem, Composition of Linear Maps, Matrix associated with linear map.	07	15
3.	**Inner Product Space** Inner Product, Angle and Orthogonality, Orthogonal projection, Gram-Schmidt process and QR Decomposition, Least square decomposition, Change of basis.	07	15
Section II			
Module No.	Content	Hours	Weightage in %
4.	**Beta and Gamma function** Improper Integrals, Convergence, Properties of Beta and Gamma Function, Duplication Formula (without proof)	06	14
5.	**Fourier Series**	08	18

	Periodic Function, Euler Formula, Arbitrary Period, Even and Odd function, Half Range Expansion, Parseval's Theorem		
6.	**Curve tracing** Tracing of Cartesian Curves, Polar Coordinates, Polar and Parametric Form of Standard Curves, Areas and Length in Polar co-ordinates	08	18
	TOTAL	45	100

List of Tutorial:

Sr. No.	Name of Tutorial	Hours
1.	Vector Space-1	04
2.	Vector Space-2	02
3.	Linear Transformation-1	04
4	Linear Transformation-2	02
5.	Inner Product-1	04
6.	Inner Product-2	02
7.	Beta and Gamma Function-1	04
8.	Beta and Gamma Function-2	02
9.	Curve tracing-1	04
10.	Curve tracing-2	02
	TOTAL	30

Text Book(s):

Title	Author/s	Publication
Thomas' Calculus	George B. Thomas, Maurice D. Weir and Joel Hass	Pearson
Elementary Linear Algebra	Howard Anton and Chrish Rorres	Wiley

Reference Book(s):

Title	Author(s)	Publication
Advanced Engineering Mathematics	E Kreyszig	John Wiley & Sons
A textbook of Engineering Mathematics	N P Bali and Manish Goyal	Laxmi
Higher Engineering Mathematics	B S Grewal	Khanna
Engineering Mathematics for First Year	T Veerarajan	Tata Mc Graw Hill
Engineering Mathematics-1 (Calculus)	H. K. Dass and Dr. Rama Verma	S. Chand

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 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 the completion of the course, the following course outcomes will be able to:

SESH1080	LINEAR ALGEBRA & CALCULUS
CO 1	Determine the basis and dimension of vector spaces and subspaces.
CO 2	Discuss the matrix represntation of a linear transformation given bases of the relevant vector space.
CO 3	Identify the ordinary differentials and partial differentials and solve the maximum and minimum value of function.
CO 4	Classify gamma, beta functions & their relation which is helpful to evaluate some definite integral arising in various branch of engineering.
CO 5	Construct the graphs for function with intervals and identify more application for function.

Mapping of CO with PO

SESH1080	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	1										
CO 2	1											
CO 3	2	1										
CO 4	1	1										
CO 5	1											

Mapping of CO with PSO

SESH1080	PSO1	PSO2	PSO3
CO 1			
CO 2			
CO 3	1		
CO 4			
CO 5			

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	Content	RBT Level
1	Vector Space	1, 2, 3, 4
2	Linear Transformation	1, 2, 3, 4
3	Inner Product Space	1, 2, 3, 4
4	Beta and Gamma Function	1, 2, 4, 5
5	Fourier Series	1, 2, 4, 5
6	Curve Tracing	1, 2, 4, 5, 6

P P Savani University
School of Engineering
Department of Applied sciences & Humanities

Course Code: SESH1240
Course Name: Electrical & Electronics Workshop
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	-	01	-	-	50	00	-	-	50

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to
- identify basic fundamental electronic components in circuits.
- learn to use common electronic component on breadboard.
- understand components of instruments, terminology and applications.

List of Practical:

Sr No	Name of Practical	Hours
1	Understanding of electronic component with specification.	02
2	Understanding of Galvanometer, Voltmeter, Ammeter, Wattmeter and Multimeter	02
3	Understanding of breadboard connections	02
4	Drawing and wiring of basic circuits on breadboard	02
5	Verification of Ohm's law	02
6	Half wave, full wave using centre tap transformer and full wave bridge rectifier	03
7	Kirchhoff's laws (KVL,KCL).	03
8	Faraday's laws of Electromagnetic Induction and Electricity Lab	04
9	LDR characteristics	02
10	Study of CRO, measurement of amplitude (voltage) & time period (frequency)	04
11	PCB designing	04
	TOTAL	30

Text Book:

Title	Author/s	Publication
Electronic Principles	Albert Malvino and David J Bates	Mc Graw Hill(7th Edition)

Reference Book:

Title	Author/s	Publication
Electronic Devices	Thomas L. Floyd	Pearson (7th Edition)
Electronic Devices and Circuits	David A. Bell	Oxford Press (5th Edition)

Integrated Electronics	Jacob Millman, Christos	Tata McGraw Hill (2nd Edition)

Course Evaluation:

Practical:

- Continuous Evaluation Consist of Performance of Practical which should be evaluated out of 10 for each practical in the next turn and average of the same will be converted to 20 Marks.
- Internal viva consists of 30 marks.

Course Outcome(s):

After the completion of the course, the following course outcomes will be able to:

SESH1240	**ELECTRICAL & ELECTRONICS WORKSHOP**
CO 1	Identify the ability to design various electronic circuit on a bread board.
CO 2	Recognize the basic electronic devices and components in a circuit connection.
CO 3	Identify the ability to design a pcb.
CO 4	Define the practical side of basic physics laws.

Mapping of CO with PO

SESH1240	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	3	2	3	3	2	2		3			3
CO 2	2	3	2	3	3	2	2		3			3
CO 3	2	3	3	3	3	2	2		3			3
CO 4	2	3	2	3	3	2	2		3			3

Mapping of CO with PSO

SESH1240	PSO1	PSO2	PSO3
CO 1	3	2	
CO 2	3	2	
CO 3	3	2	
CO 4	3	2	

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Practical No	**Content**	**RBT Level**
1	Quantum Mechanics	2,3
2	Acoustic and Ultrasonic	1,3
3	Nanophysics	2,4
4	Superconductivity	2,6
5	Non linear Optics	1 1,2
6	Non linear Optics -	2 2,3

P P Savani University
School of Engineering
Department of Civil Engineering

Course Code: SECV1040
Course Name: Basics of Civil & Mechanical 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	
04	02	-	05	40	60	20	30	-	-	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to

- study the fundamentals of mechanical systems.
- study and appreciate significance of mechanical engineering in different fields of engineering.
- carry out simple land survey and recent trends in civil engineering.
- understand components of building, building terminology and construction materials.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Civil Engineering: An Overview** Introduction, Branches, Scope, Impact, Role of Civil Engineer, Unit of Measurement, Unit Conversion (Length, Area, Volume)	03	04
2.	**Introduction to Surveying and Levelling:** Introduction, Fundamental Principles, Classification **Linear Measurement:** Instrument Used, Chaining on Plane Ground, Offset, Ranging **Angular Measurement:** Instrument Used, Meridian, Bearing, Local Attraction **Levelling:** Instrument Used, Basic Terminologies, Types of Levelling, Method of Levelling **Modern Tools:** Introduction to Theodolite, Total Station, GPS	07	12
3.	**Building Materials and Construction:** Introduction (Types and Properties) to Construction Materials Like Stone, Bricks, Cement, Sand, Aggregates, Concrete, Steel. Classification of Buildings, Types of Loads Acting on Buildings, Building Components and their Functions, Types of Foundation and Importance, Symbols Used in Electrical Layout, Symbols Used for Water Supply, Plumbing and Sanitation	10	14
4.	**Construction Equipment:**	04	08

	Types of Equipment- Functions, Uses. Hauling Equipment-Truck, Dumper, Trailer. Hoisting Equipment- Pulley, Crane, Jack, Winch, Sheave Block, Fork Truck. Pneumatic Equipment-Compressor. Conveying Equipment- Package, Screw, Flight/scrap, Bucket, Belt Conveyor. Drill, Tractor, Ripper, Rim Pull, Dredger, Drag Line, Power Shovel, JCB, HOE.		
5.	**Recent Trends in Civil Engineering:** Mass Transportation, Rapid Transportation, Smart City, Sky Scarper, Dams, Rain Water Harvesting, Batch Mix Plant, Ready Mix Concrete Plant, Green Building, Earth Quake Resisting Building, Smart Material	06	12
Section II			
Module No.	Content	Hours	Weightage in %
6.	**Basic Concepts of Thermodynamics:** Prime Movers - Meaning and Classification; the Concept of Force, Pressure, Energy, Work, Power, System, Heat, Temperature, Specific Heat Capacity, Internal Energy, Specific Volume; Thermodynamic Systems, All Laws of Thermodynamics	04	08
7.	**Fuels and Energy:** Fuels Classification: Solid, Liquid and Gaseous; their Application, Energy Classification: Conventional and Non-Conventional Energy Sources, Introduction and Applications of Energy Sources like Fossil Fuels, Solar, Wind, and Bio-Fuels, LPG, CNG, Calorific Value	04	08
8.	**Basics of I.C Engines:** Construction and Working of 2 Stroke & 4 Stroke Petrol and Diesel Engines, Difference Between 2-Stroke - 4 Stroke Engine & Petrol-Diesel Engine, Efficiency of I. C. Engines	12	18
9.	**Power Transmission Elements:** Construction and Applications of Couplings, Clutches and Brakes, Difference Between Clutch and Coupling, Types of Belt Drive and Gear Drive	10	16
	TOTAL	60	100

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Unit conversation Exercise and Chart preparation of building components	02
2.	Linear measurements	02
3.	Angular measurements	02
4.	Determine R. L of given point by Dumpy level. (Without Change Point)	02
5.	Determine R. L of given point by Dumpy level. (With Change Point)	02
6.	Presentation on various topics as in module about recent trends	04
7.	To understand construction and working of various types of boilers	04
8.	To understand construction and working of mountings	04
9.	To understand construction and working of accessories	04
10.	To understand construction and working 2 –stroke & 4 –stroke Petrol Engines	02

11.	To understand construction and working 2 –stroke & 4 –stroke Diesel Engines	02
	TOTAL	30

Text Book(s):

Title	Author(s)	Publication
Elements of Mechanical Engineering	S. B. Mathur, S. Domkundwar	Dhanpat Rai & Sons Publications
Elements of Mechanical Engineering	Sadhu Singh	S. Chand Publications
Elements of Civil Engineering	Anurag A. Kandya	Charotar Publication
Surveying Vol. I & II	Dr. B. C. Punamia	Laxmi Publication

Reference Book(s):

Title	Author(s)	Publication
Thermal Engineering	R. K. Rajput	Laxmi Publications
Basic Mechanical Engineering	T.S. Rajan	Wiley Eastern Ltd., 1996.
Surveying and Levelling	N. N. Basak	Tata McGraw Hill
Surveying Vol. I	S. K. Duggal	Tata McGraw Hill
Surveying and Levelling	R. Subramanian	Oxford University
Building Construction and Construction Material	G. S. Birdie and T. D. Ahuja	Dhanpat Rai Publishing
Engineering Material	S.C. Rangwala	Charotar Publication

Web Material Link(s):

- http://nptel.ac.in/course.php
- http://nptel.ac.in/courses/105107157/
- http://nptel.ac.in/courses/105101087/
- http://nptel.ac.in/courses/105107121/
- http://nptel.ac.in/courses/105104100/

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 will consist 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 of 15 marks during End Semester Exam.
- Viva/Oral performance of 15 marks during End Semester Exam.

Course Outcome(s):

After the completion of the course, the following course outcomes will be able to:

SECV1040	**BASICS OF CIVIL & MECHANICAL ENGINEERING**

CO 1	Apply the principles of basic mechanical engineering.
CO 2	Comprehend the importance of mechanical engineering equipments like ic engine and power transmission elements.
CO 3	Understand different structural loads, components, materials and equipment used in the construction of a building.
CO 4	Adapt various methods of area plotting and marking before starting the construction activity.

Mapping of CO with PO

SECV1040	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	3	1	3	2	2						3
CO 2	2	3	1	3	2	2						3
CO 3	1	3	1	3	2	2						3
CO 4	1	3	1	3	2	2						3

Mapping of CO with PSO

SECV1040	PSO1	PSO2	PSO3
CO 1	2	2	2
CO 2	2	2	2
CO 3	3	2	2
CO 4	3	2	2

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	**Content**	**RBT Level**
1	Civil Engineering: An overview	1, 2, 3
2	Introduction to Surveying	1, 2
3	Building Materials and Construction	1, 2
4	Construction Equipment	1, 2
5	Recent Trends in Civil Engineering	1, 2
6	Basics Concept of Thermodynamics	1, 2, 3
7	Fuels and Energy	1, 2, 3
8	Basics of I.C. Engines	1, 2
9	Power Transmission Elements	1, 2

P P Savani University
School of Engineering
Department of Civil Engineering

Course Code: SECV1080
Course Name: Mechanics of Solids
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	-	05	40	60	20	30	-	-	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to

- understand different types of forces, systematic evaluation of effect of these forces, behavior of rigid and deformable bodies subjected to various types of forces at the state of rest or motion of the particles.
- understand the stresses developed under the application of force.
- understand the physical and mechanical properties of materials.
- understand the behavior of structural elements under the influence of various loads.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction:** Definition of Rigid Body, Deformable Body, Scalar and Vector Quantities, Fundamental Principles of Mechanics: Principle of Transmissibility, Principle of Superposition, Law of Parallelogram of Forces.	05	08
2.	**Fundamental of Static:** Force, Types of Forces, Characteristics of a Force, System of Forces, Composition and Resolution of Forces. **Concurrent Forces:** Resultant of Coplanar Concurrent Force System by Analytical Method, Law of Triangle of Forces, Law of Polygon of Forces, Equilibrium Conditions for Coplanar Concurrent Forces. **Non-Concurrent Forces:** Moments & Couples, Characteristics of Moment And Couple, Varignon's Theorem, Resultant of Non-Concurrent Forces by Analytical Method, Equilibrium Conditions of Coplanar Non-Concurrent Force System.	10	17
3.	**Centroid and Centre of Gravity:** Centroid of Lines, Plane Areas and Volumes, Examples Related to Centroid of Composite Geometry, Pappus –Guldinus Theorems.	05	08

4.	**Moment of Inertia:** Parallel and Perpendicular Axis Theorems, Polar Moment of Inertia, Radius of Gyration of Areas, Examples related to moment of Inertia of Composite geometry.	10	17
Section II			
Module No.	Content	Hours	Weightage in %
5.	**Mechanical Properties of Materials:** 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.	07*	12
6.	**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 Constant, Relation between Elastic Constants.	09	15
7.	**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, Support Reactions, SFD and BMD for Concentrated Load and Uniformly Distributed Load, Uniformly Varying Load, Point of Contra-flexure.	14	23
	TOTAL	60	100

*(To be covered during lab hours)

List of Practical (Any Ten):

Sr. No	Name of Practical	Hours
1.	Equilibrium of coplanar concurrent forces	02
2.	To verify the law of parallelogram of forces	02
3.	To verify the law of polygon of forces	02
4.	To verify the Lami's theorem	02
5.	Equilibrium of parallel force system – simply supported beam	02
6.	Tensile test on Ductile materials.	02
7.	Compression test on Ductile materials	02
8.	Compression test on Brittle Materials	02
9.	Determination of hardness of metals (Brinell/ Rockwell hardness test)	02
10.	Determination of impact of metals (Izod/ Charpy impact test)	02
11.	Tutorial on concurrent & Non-concurrent forces	04
12.	Tutorials on C. G & MI	02
13.	Tutorials on SFD & BMD	04
	TOTAL	30

Text Book(s):

Title	Author(s)	Publication
Applied Mechanics	S. B. Junnarkar & H. J. Shah	Charotar Publication
Strength of Materials (SI Units)	R S Khurmi, N Khurmi	S. Chand & Company Pvt. Ltd.

Reference Book(s):

Title	Author(s)	Publication
Engineering Mechanics,	Meriam and Karaige,	Wiley-India
Engineering Mechanics: Statics and Dynamics	S Rajsekaran	Vikas Publication
Engineering Mechanics of Solids	Popov E.P	Prentice Hall of India
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	DhanpatRai Publishing Company
Strength of Materials (SI Units)	Er. R . K. Rajput	S. Chand & Company Pvt. Ltd.

Web Material Link(s):

- http://nptel.ac.in/courses/122104014/
- http://nptel.ac.in/courses/112103108/

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 will consist of 60 marks.

Practical:

- Continuous Evaluation consists of performance of practical which should 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 the End Semester Exam.

Course Outcome(s):

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

SECV1080	MECHANICS OF SOLIDS
CO 1	Identify fundamental principles of mechanics, equilibrium, statics reactions and internal forces in statically determinate beams.
CO 2	Understand,the basics of friction and its importance.
CO 3	Apply principles of statics to determine c.g and m.i of a different geometrical shape.
CO 4	Analyse problems and solve the problem related to mechanical elements and analyse the deformation behaviour for different types of loads.

SECV1080	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	1										
CO 2	2	1	1									
CO 3	2	1										
CO 4	2	1		1	1							

Mapping of CO with PO

Mapping of CO with PSO

SECV1080	PSO1	PSO2	PSO3
CO 1	3		
CO 2	3		
CO 3	3		
CO 4	2		

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	Content	RBT Level
1	Introduction	1, 2,
2	Fundamental of Static	2, 3, 4
3	Centroid and Centre of Gravity	2, 4, 5
4	Moment of Inertia	3, 4, 5
5	Mechanical Properties of Materials	1, 2, 5
6	Simple Stress and Strain	2, 4, 5
7	Shear Force and Bending Moment	3, 4, 5

P P Savani University
School of Engineering
Department of Computer Engineering

Course Code: SECE1010
Course Name: Basics of Computer and Programming
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	-	04	40	60	20	30	-	-	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to
- understand basic components of computer system.
- identify appropriate approach to computational problems.
- develop logic building and problem-solving skill.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction to Computer and its Architecture:** Introduction and Characteristics, Generation, Classification, Applications, Central Processing Unit, Communication between Various Units, Processor Speed, Various Input and Output Devices.	03	10
2.	**Memory and Operating Systems:** Introduction to Memory, Memory Hierarchy, Primary Memory and its Type, Secondary Memory, Classification of Secondary Memory, Various Secondary Storage Devices and their Functioning, their Merits and Demerits, Evolution of Operating System, Types and Functions of Operating Systems,	06	15
3.	**Recent Advances in Computer:** Introduction to Emerging Areas like Artificial Intelligence, IoT tools, Data Science, Sensors, 3D Printing, Automization in the field of Civil, Mechanical and Chemical.	05	10
4.	**Computer Programming Language:** Introduction to different types of Programming Languages, Flowcharts and Algorithms. Introduction to C Programming Language, Features of C, Structure of C Program, Development of Program, Types of Errors, Debugging and Tracing Execution of Program.	08	15
Section II			

Module No.	Content	Hours	Weightage in %
5.	**Constants, Variables and data Types:** Character Set, C tokens, Keyword, Constants and Variables, Data Types - Declaration and Initialization, User define type Declarations Typedef, Enum, Basic Input and Output Operations, Symbolic Constants	05	10
6.	**Operators and Expression and Managing I/O operations**: Introduction to Operators and its Types, Evaluation of Expressions, Precedence of Arithmetic Operators, Type Conversions in Expressions, Operator Precedence and Associativity. Managing Input and Output, Reading a Character, Writing a Character, Formatted Input, Formatted Output.	07	16
7.	**Conditional statement and branching:** Decision Making & Branching: Decision Making with If & If ... Else Statements, If - Else Statements (Nested Ladder), The Switch & go - to Statements, The Ternary (?:) Operator Looping: The While Statement, The Break Statement & The Do. While Loop, The FOR Loop, Jump Within Loops - Programs.	06	12
8.	**Arrays and Strings:** Introduction to Array, One Dimensional Array, Two Dimensional Arrays, Declaring and Initializing String Variables, Arithmetic Operations on Characters, Putting Strings Together, Comparison of Two Strings, Basic String Handling Functions	05	12
	TOTAL	45	100

List of Practical:

Sr. No	**Name of Practical**	**Hours**
1.	Introduction to Basic Command	04
2.	Word Processing, Spreadsheets and Presentation Exercises	06
3.	Introduction to Octave Environment	04
4.	Implementation in C for conditional statement and branching Implementation of if, if...else, nested if...else and switch statements Implementation of while loop, do...while loop and for loop	06
5.	Implementation of 1-D and 2-D array	06
6.	Implementation of in built string functions, application programs of array and strings	04
	TOTAL	30

 # Use of different libraries will be covered in Practical Assignments.

Text Book(s):

Title	**Author(s)**	**Publication**
Programming in ANSI C	E. Balagurusamy	Tata McGraw Hill
Introduction to Computer Science	ITL Education Solutions Limited	Pearson Education

Reference Book(s):

Title	Author(s)	Publication
Programming in C	Ashok Kamthane	Pearson
Let Us C	Yashavant P. Kanetkar	Tata McGraw Hill
Introduction to C Programming	Reema Thareja	Oxford Higher Education
Programming with C	Byron Gottfried	Tata McGraw Hill

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 the performance of practical, which will be evaluated out of 10 per each practical. At the end of the semester, the average of the entire practical will be converted to 10 marks.
- Internal viva consists of 10 marks.
- Practical performance/quiz/test consists of 15 marks during End Semester Examination.
- Viva/Oral performance consists of 15 marks during End Semester Examination.

Course Outcome(s):

After the completion of the course, the following course outcomes will be able to:

SECE1010	BASICS OF COMPUTER & PROGRAMMING
CO 1	Observe the different types of operating systems and its functionalities.
CO 2	Explore new emerging area in computer field.
CO 3	Apply basic principles of imperative and structural programming to solve complex problems.
CO 4	Classify the types of errors occur while running the program.

Mapping of CO with PO

SECE1010	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1		1										
CO 2		1		2	1						2	
CO 3		3	2	1								
CO 4		1	1	1								

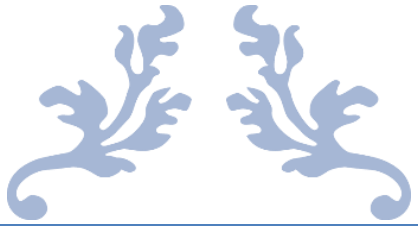
Mapping of CO with PSO

SECE1010	PSO1	PSO2	PSO3
CO 1	3	3	1
CO 2	3	1	3
CO 3	3	3	1
CO 4	1	3	

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	Content	RBT Level
1	Introduction to Computer and its Architecture	1, 2, 4
2	Memory and Operating systems	1, 2, 3
3	Recent Advances in Computer	2, 4, 5
4	Computer Programming Language	1, 2, 3, 4
5	Constants, Variables and Data Types	1, 2, 3
6	Operators and Expression in Managing I/O operations	2, 3, 6
7	Conditional statement and branching	2, 4, 5
8	Arrays and Strings	1, 2, 3, 6



SECOND YEAR B. TECH

P P SAVANI UNIVERSITY															
SCHOOL OF ENGINEERING															
TEACHING & EXAMINATION SCHEME FOR B. TECH. CIVIL ENGINEERING PROGRAMME AY: 2021-22															
Sem	**Course Code**	**Course Title**	**Offered By**	**Teaching Scheme**					**Examination Scheme**						
				Contact Hours				**Credit**	**Theory**		**Practical**		**Tutorial**		**Total**
				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
	SECV2102	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
	SEME2060	Fluid Mechanics	ME	3	2	0	5	4	40	60	20	30	0	0	150
	SECV 2041	Surveying	CV	3	2	0	5	4	40	60	20	30	0	0	150
	SECV2910	Industrial Exposure	CV	2			0	2	0	0	100	0	0	0	100
	CFLS1020	Global Communication skill	CFLS	2	0	0	2	2	40	60	0	0	0	0	100
						Total	**28**		**26**						**950**
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
	SECV2090	Building & Town Planning	CV	3	2	0	5	4	40	60	20	30	0	0	150
	SECV2110	Concrete Technology	CV	3	2	0	5	4	40	60	20	30	0	0	150
	CFLS3010	Foreign Language -I	CFLS	2	0	0	2	2	40	60	0	0	0	0	100
	SEPD3040	Integrated Personality Development Course-I	SEPD	2	0	0	2	1	100	0	0	0	0	0	100
						Total	**29**		**25**						**950**

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	-	02	05	40	60	-	-	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.	07	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.	05	12
Section II			
Module No.	Content	Hours	Weightage in %

4.	**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
5.	**Fourier Series** Periodic function, Euler Formula, Arbitrary Period, Even and Odd function, Half-Range Expansions, Applications to ODEs.	07	15
6.	**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.	06	15
	TOTAL	45	100

List of Tutorials:

Sr No	Name of Tutorial	Hours
1.	Ordinary Differential Equation-1	02
2.	Ordinary Differential Equation-2	02
3.	Ordinary Differential Equation-3	04
4.	Partial Differential Equation-1	02
5.	Partial Differential Equation-2	04
6.	Applications of ODE and PDE	02
7.	Laplace Transform-1	02
8.	Laplace Transform-2	02
9.	Laplace Transform-3	04
10.	Fourier Series-1	02
11.	Fourier Series-2	02
12.	Fourier Integral and Transformation	02
	TOTAL	30

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 Outcome(s):

After the completion of the course, the following course outcomes will be able to:

SESH2011	**DIFFERENTIAL EQUATIONS**
CO1	Describe 1st and 2nd order odes and pdes.
CO2	Classify differential equations and evaluate linear and non linear partial differential equations.
CO3	Illustrate engineering problems (growth, decay, flow, spring and series/parallel electronic circuits) using 1st and 2nd order ode.
CO4	Apply laplace transform as a tool which are used to evaluate differential equation and fourier integral representation.
CO5	Examine the various tests of power series and fourier series for learning engineering.

Mapping of CO with PO

SESH2011	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	1	1	1								1
CO 2	3	1	1	1								1
CO 3	3	2	1	1								1
CO 4	3	1	1	1								1
CO 5	3	1	1	1								1

Mapping of CO with PSO

SESH2011	PSO1	PSO2	PSO3
CO 1	2	1	
CO 2	2	1	
CO 3	2	1	
CO 4	2	1	
CO 5	2	1	

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	Content	RBT Level
1	Ordinary Differential Equation	1, 2, 3, 5
2	Partial Differential Equation	1, 2, 4, 5
3	Application of ODE and PDE	1, 2, 4, 5, 6
4	Laplace Transform	1, 2, 3, 5
5	Fourier Series	1, 2, 3, 5
6	Fourier Integral and Transformation	1, 2, 3, 4

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	-	04	40	60	20	30	-	-	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 elements 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 %
4.	**Principal Stresses and Strains & Theory of Failures** Introduction – Stresses on an inclined section of a bar under axial loading, compound stresses, Normal and tangential stresses on an inclined plane for biaxial stresses, Two perpendicular normal stresses	08	18

	accompanied by a state of simple shear, Mohr's circle of stresses, Principal stresses and strains, Analytical and graphical solutions.		
5.	**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
6.	**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
	TOTAL	45	100

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
	TOTAL	30

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 the End Semester Exam.

Course Outcome(s):

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

SECV2102	**ADVANCED SOLID MECHANICS**
CO 1	Apply mathematical knowledge to calculate the deformation behavior of simple structure.
CO 2	Analyze the critical problems and solve the problem related to mechanical elements and analyze the deformation behavior for different types of loads.
CO 3	Perceive the different types of stresses and strains developed in the member subjected to axial, bending, shear & torsional effects.
CO 4	Apprehension of the physical properties of materials.
CO 5	Study the concept of shearing force and bending moment due to external loads in determinate beams and their effect on stresses.

Mapping of CO with PO

SECV2102	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	3	3	3	3							3
CO 2	3	3	3	3	3							3
CO 3	3	3	3	3	3							3
CO 4		3	3	3	3							3
CO 5	3	3	3	3	3							3

Mapping of CO with PSO

SECV2102	PSO1	PSO2	PSO3
CO 1	3	2	
CO 2	3	2	
CO 3	3	2	
CO 4	3	2	
CO 5	3	2	

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	**Content**	**RBT Level**
1	Bending Stress in Beam	1, 2, 3
2	Shear Stress in Beam	2, 3, 4

3	Direct & Bending Stress	2, 4, 5
4	Principal Stresses and Strains & Theory of Failures	3, 4, 5
5	Column & Strut	1, 2, 5
6	Torsion	2, 4, 5

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	-	05	40	60	20	30	-	-	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to
- develop conceptual knowledge in building materials & Construction.
- select appropriate material in a given field situation.
- develop ideas 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. **Aggregate:** Types of aggregate as per BIS, Requirements of	12	20

	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:** 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 No.	Content	Hours	Weightage in %
6.	**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
7. .	**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, flagstone, tiled cement concrete, granolithic, terrazzo, marble, timber	10	17

	flooring, upper floor - timber, timber floor supported on RSJ flag stone floor resting on RSJ, jack arch floor, reinforced concrete floor, ribbed floor, precast 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.		
8.	**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 (uncoursed) 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
9.	**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
	TOTAL	60	100

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).	04
2.	Perform tests on given sample of brick such as ● Soundness ● Water absorption ● Compressive strength ● Length & width of 20 bricks	04
3.	Identification of different types of stones and lime	02
4.	Conduct field test on given sample of brick and cement	02
5.	Perform lab tests on given sample of cement ● Standard Consistency ● Initial and final setting time	04
6.	Conduct field test on given sample of fine and coarse aggregate	02
7.	Perform Sieve analysis test on given sample of fine aggregate	02
8.	Assess the quality of different types of timber and timber products (visit nearby saw mill or timber mart)	02

9.	Prepare Sketch Book for various Building components.	08
	TOTAL	30

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	Bhavikatti	Vikas 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

SECV2020	BUILDING MATERIAL AND CONSTRUCTION TECHNOLOGY
CO 1	Execute the engineering principles relevant to civil engineering materials.
CO 2	Examine the properties and conduct tests on cement, brick & aggregate.
CO 3	Understand masonry, finishing and form work standards.
CO 4	Identify the components of building and differentiate various types of building materials depending on its function.
CO 5	Understand the impact of building construction on society.

Mapping of CO with PO

SECV2020	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	1		1		1	2			3	3	2	
CO 2	1	1	2	3	2				3	3	2	
CO 3	1		1	1	1	2			3	3	2	
CO 4	1		1	1	1				3	3	2	
CO 5	1		1	1	1	3	3	1	3	3	2	

Mapping of CO with PSO

SECV2020	PSO1	PSO2	PSO3
CO 1	3	2	2
CO 2	3	2	2
CO 3	3	2	2
CO 4	3	2	2
CO 5	3	3	3

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	Content	RBT Level
1	Introduction	1, 2
2	Brick	1, 2, 3
3	Rocks	1, 2, 3
4	Concrete and Ingrideints of Conrete	2, 3, 4, 6
5	Miscellaneous Construction material	2, 3, 4

6	Foundation	2, 3, 4, 5
7	Super structure	2, 3
8	Masonry	2, 3
9	Miscellaneous	1, 2

P P Savani University
School of Engineering
Department of Civil Engineering

Course Code: SEME2060
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	-	04	40	60	20	30	-	-	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 Liquid, Inclined Plane Surface Sub- merged in Liquid, Curved Plane Surface Sub- merged 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 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 %
5.	**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
6.	**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
7.	**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
	TOTAL	45	100

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	02
9.	Calibration and Discharge over Notches (V –notch, Rectangular notch, Trapezoidal notch)	02
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
	TOTAL	30

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 Outcome(s):

After the completion of the course, the following course outcomes will be able to:

SEME2060	**FLUID MECHANICS**
CO 1	Differentiate fluid properties and its behavior in static and dynamic mode.
CO 2	Apply dimensional analysis to design the system and interpret types of fluid flow.
CO 3	Determine major and minor losses through different pipes.
CO 4	Diagnose the viscosity of fluids.
CO 5	Diagnose pressure exerted by the fluids and rate of flow of fluids.

Mapping of CO with PO

SEME2060	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2			2					3			
CO 2	3	2	2	3					3			
CO 3	3	2		3					3			
CO 4	3	3		3					3			
CO 5	3	1		3					3			

Mapping of CO with PSO

SEME2060	PSO1	PSO2	PSO3
CO 1		2	
CO 2	3	3	
CO 3	3	3	
CO 4	3	3	
CO 5		2	

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	Content	RBT Level
1	Properties of Fluids	1, 2
2	Fluid Statics	1, 2, 5
3	Fluid Kinematics	1, 2, 5
4	Fluid Dynamics	2, 3, 4, 5
5	Dimensional Analysis	2, 3, 5
6	Flow Through Pipes & Open Channels	2, 3, 4, 5
7	Viscous Flow	2, 3, 4, 5
8	Boundary Layer Theory	2, 3, 4, 5

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	-	04	40	60	20	30	-	-	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 %
5.	**Tacheometry Surveying**	07	14

	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.		
6.	**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
7.	**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
	TOTAL	45	100

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
	TOTAL	30

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 the completion of the course, the following course outcomes will be able to:

SECV2041	**Surveying**
CO 1	Learn and practice various method used for surveying to determine the angles and distance.
CO 2	Prepare the various maps from the obtained data and to compute the area and volume of cut and fill.
CO 3	Understand fundamentals of curve surveying and the method used for the setting out of curves and buildings.
CO 4	Learn advanced surveying methods like total station, gps etc. and its application.

Mapping of CO with PO

SECV2041	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	1	3	2	3	3	2						1
CO 2	1	3	2	3	3							1
CO 3	1	3		3								1
CO 4	1	2	1	2	3		2					1

Mapping of CO with PSO

SECV2041	PSO1	PSO2	PSO3
CO 1	3	2	2
CO 2	3	2	2
CO 3	3	2	2
CO 4	3	2	2

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	Content	RBT Level
1.	Plane Table Surveying	2, 3
2.	Theodolite Traversing	2, 3, 6
3.	Trigonometric Leveling	2, 3, 6
4.	Setting Out Works	2, 3, 6
5.	Tacheometry Surveying	2, 3, 6
6.	Curve Surveying	2, 3, 6
7.	Computation of Area and Volume	2, 3, 5

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	-	-	02	-	-	100	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
	TOTAL	**100**

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

Course Outcome(s):

After the completion of the course, the following course outcomes

SECV2910	**INDUSTRIAL EXPOSURE**
CO 1	Construct company profile by compiling brief history, management structure, products/services offered, key achievements and market performance for the company visited during internship.
CO 2	Determine the challenges and future potential for his/her internship organization in particular and the sector in general.
CO 3	Test the theoretical learning in practical situations by accomplishing the tasks assigned during the internship period.
CO 4	Apply various soft skills such as time management, positive attitude and communication skills during performance of the tasks assigned in internship organization.
CO 5	Analyze the functioning of internship organization and recommend changes for improvement in processes.

Mapping of CO with PO

SECV2910	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1		2		3	3	3	3	3	3	3	2	3
CO 2		2		3	3	3	3	3	3	3	2	3
CO 3		2		3	3	3	3	3	3	3	2	3
CO 4		2		3	3	3	3	3	3	3	2	3
CO 5		1		3	3	3	3	3	3	3	2	3

Mapping of CO with PSO

SECV2910	PSO1	PSO2	PSO3
CO 1	3	3	3
CO 2	3	3	3
CO 3	3	3	3
CO 4	3	3	3
CO 5	3	3	3

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	Content	RBT Level
1	Industrial Exposure	2,3,5,6

P P Savani University
School of Engineering
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	-	02	05	40	60	-	-	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	06	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	07	17
Section II			
Module	Content	Hours	Weightage

No.			in %
4.	**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	07	15
5.	**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.	08	18
6.	**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	07	17
	TOTAL	45	100

List of Tutorial:

Sr No	Name of Practical/Tutorial	Hours
1.	Complex Variables-1	04
2.	Complex Variables-2	02
3.	Numerical Solutions of Linear and Non-linear Equations-1	02
4.	Numerical Solutions of Linear and Non-linear Equations-2	04
5.	Numerical Differentiation and Integration-1	02
6.	Numerical Differentiation and Integration-2	02
7.	Basics of Statistics-1	02
8.	Basics of Statistics-2	04
9.	Probability-1	02
10.	Probability-2	02
11.	Testing of Hypothesis-1	02
12.	Testing of Hypothesis-2	02
	TOTAL	30

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, Delhi.
Introductory Methods of Numerical Analysis	S. S. Sastry	PHI Learning Pvt. Ltd., 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 the completion of the course, the following course outcomes will be able to:

SESH2022	**NUMERICAL & STATISTICAL ANALYSIS**
CO 1	Derive numerical solution of linear and non linear system of equation.
CO 2	Apply probability in decision making, artificial intelligence, machine learning etc.
CO 3	Construct different statistical methods to collect, compare, interpret & evaluate data .
CO 4	Acquire knowledge of finite differences, interpolation, numerical differentiation and numerical integration.

Mapping of CO with PO

SESH2022	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	2	1	1								1
CO 2	3	2	1	2								1
CO 3	3	2	1	1								1
CO 4	3	2	1	1								1

Mapping of CO with PSO

SESH2022	PSO1	PSO2	PSO3
CO 1		2	
CO 2		2	
CO 3		2	
CO 4		2	

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	Content	RBT Level
1	Complex variables	1, 2, 3, 4, 6
2	Numerical Solutions of Linear and Non-Linear Equations	1, 2, 3, 5
3	Numerical Differentiation and Integration	1, 2, 3, 5
4	Basics of Statistics	1, 2, 3, 4, 5
5	Probability Distribution	1, 2, 3, 4, 5
6	Testing of Hypothesis	1, 2, 3, 5, 6

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	-	01	05	40	60	-	-	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 structures.
- able to analyse statically determinate trusses, beams, and frames and obtain internal stress.
- able to analyse the behaviour of Structural element under rolling/moving load

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.	10	17
3.	**Force Method** Moment Area Method, Conjugate Beam Method	12	20
Section II			
Module No.	Content	Hours	Weightage in %

4.	**Displacement Method** Double Integration Method, Macaulay's Method	15	25
5.	**Energy Method** Introduction, Castiglino's First Theorem, Unit Load Method for Beam and Truss.	15	25
	TOTAL	60	100

List of Tutorial:

Sr. No	Name of Tutorial	Hours
1.	Static and Kinematic indeterminacy.	02
2.	Influence line diagram.	02
3.	Moment area method	03
4.	Conjugate beam method	04
5.	Double integration method	04
	TOTAL	15

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 notes and assignment consists of 30 marks.

Course Outcome(s):

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

SECV2051	DETERMINATE STRUCTURAL ANALYSIS
CO 1	Apply principles of statics to determine the reactions & internal forces to the statically determinate structures.
CO 2	Calculate the displacements of statically determinate structure.
CO 3	Determine the stress generated in the structure under different loading condition.
CO 4	Assess the strain energy stored in a body to rectify the deformed shape of the structural elements.
CO 5	Analyse the behaviour of Structural element under rolling/moving load.

Mapping of CO with PO

SECV2051	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	3	3	3	3		3					3
CO 2	3	3	3	3	2		3					3
CO 3	3	3	3	3	3		3					3
CO 4	3	3	3	3	3		3					3
CO 5	3	3	3	3	3		3					3

Mapping of CO with PSO

SECV2051	PSO1	PSO2	PSO3
CO 1	3	2	
CO 2	3	2	
CO 3	3	2	
CO 4	3	2	
CO 5	3	2	

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	Content	RBT Level
1	Types of Structure and Determinacy	1, 2
2	Influence Line Diagram	2, 3, 4, 6
3	Force Method	2, 4, 5
4	Displacement Method	3, 4, 5
5	Energy Method	1, 2, 4, 5

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	-	04	40	60	20	30	-	-	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.	04	10
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.	05	10
4.	**Structural Geology and Geophysical Methods** Outcrop, Folds arts of a fold, Classification of folds, Causes of folding, fault & faulting, Joints and jointing.	05	10
5.	**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.	05	10
Section II			
Module	Content	Hours	Weightage

No.			in %
6.	**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
7.	**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
8.	**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
9.	**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
	TOTAL	45	100

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Moisture Content	02
2.	Visual identification and specific gravity	02
3.	Sieve Analysis	02
4.	Liquid and Plastic Limit Test	04
5.	Shrinkage limit Test	02
6.	In-situ Density-Core Cutter & Sand Replacement method	04
7.	Permeability Test: Constant and Variable Head	04
8.	Study of rock specimen.	04
9.	Study of Strike and dip using models.	04
10.	Case study: Geologic problems encountered during civil engineering projects.	02
	TOTAL	30

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

SECV2060	GEOLOGY & GEOTECHNICAL ENGINEERING
CO 1	Categorise and list various properties of rocks and minerals.
CO 2	Identify rocks and minerals.
CO 3	Compare various soil and solve three phase system problems.
CO 4	Solve any practical problems related to soil permeability and seepage.

Mapping of CO with PO

SECV2060	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1												1
CO 2												1
CO 3				1								
CO 4	1											

Mapping of CO with PSO

SECV2060	PSO1	PSO2	PSO3
CO 1		1	
CO 2			
CO 3			
CO 4	2		

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	Content	RBT Level
1	Introduction to physical geology	1, 2, 3,4
2	Mineralogy	1, 2, 3,4
3	Rock Classification	1, 2, 3,4
4	Structural Geology and Geophysical Methods	1, 2, 3,4
5	Introduction of Soil and Soil Mechanics	1,2
6	Composition of Soil Terminology, Index Properties and Relationships	1,2, 3, 4,5
7	Soil Classification & Particle Size Analysis	1,2, 3, 4,5
8	Soil Moisture	1,2, 3, 4,5
9	Soil Sub-Surface Investigations	2,5

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	
03	02	-	04	40	60	20	30	-	-	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 %
5.	**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
6.	**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
7.	**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
8.	**Housing and Slums** Housing: Definition, Importance, Requirement of residential building, Classification, Housing agencies, HUDCO, HDFC, LIC. SLUMS: Definition, Causes, Prevention method.	06	12
	TOTAL	45	100

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
	TOTAL	30

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

SECV2090	**Building & Town Planning**
CO 1	Discuss and apply various aspects of principles of building planning.
CO 2	Comprehend local building bye laws and provisions of national building code in respect of building & town planning.
CO 3	Understand, interpret and prepare working drawings, foundation plans, perspective drawings and other executable drawings.
CO 4	Implement various aspects of principles of building planning & architectural compositions
CO 5	Illustrate the concept of development of town, importance of survey in town planning & appraise of zoning, land use, housing, slums and latest form of urban planning.

Mapping of CO with PO

SECV2090	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	1	2	1			2		3	3	3	3
CO 2	2	1	1			3		1	3	3	3	3
CO 3	2	1	3	1	1				3	3	3	3

CO 4	2	1	2	1			2		3	3	3	3
CO 5	2	1	3	3		3	2	3	3	3	3	

Mapping of CO with PSO

SECV2090	PSO1	PSO2	PSO3
CO 1	3	3	3
CO 2	3	3	3
CO 3	3	3	3
CO 4	3	3	3
CO 5	3	3	3

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	**Content**	**RBT Level**
1	Building Planning	1, 2, 4
2	Building Bye Laws	1, 2, 3
3	Residential Building Planning	1, 2, 3, 4, 5, 6
4	Perspective Drawing	1, 2, 3, 4, 5, 6
5	Town Planning Introduction	1, 2, 3, 4
6	Civic Survey and Neighbourhood planning	1, 2, 3, 4
7	Land use and Zoning	1, 2, 3, 4
8	Housing and Slums	1, 2, 3, 4

P P Savani University
School of Engineering
Department of Civil Engineering

Course Code: SECV2110
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	-	04	40	60	20	30	-	-	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to
- understand the 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 %
6.	**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
7.	**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
8.	**Durability of Concrete** Introduction to durability, relation between durability and permeability, chemical attack of concrete, corrosion of steel rebars, other durability issues**.**	07	16
9.	**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 concrete.	04	10
	TOTAL	45	100

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
	TOTAL	30

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 the End Semester Exam.

Course Outcome(s):

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

SECV2110	**CONCRETE TECHNOLOGY**
CO 1	Understand the process of manufacturing of cement and also identify the materials used for the concrete production.
CO 2	Determine the various key properties of cement by performing various tests as per Indian standards.
CO 3	Prepare a mix design for different grades of concrete and evaluate the performance by conducing tests on fresh and hardened concrete.
CO 4	Discover and generate a report on various factors causing failure in concrete.
CO 5	Understand and determine the types of special cements used in the industry.

Mapping of CO with PO

SECV2110	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	1	1	1	1		2	3	3	2	2	1	3
CO 2	1	2	3	3	2	2		1	2	3	2	3
CO 3	1	2	3	3	2	2		1	2	3	3	3
CO 4	1	2	3	3	1	2		1	2	3	3	3
CO 5	1	1						3	2	2	1	3

Mapping of CO with PSO

SECV2110	PSO1	PSO2	PSO3
CO 1	3	3	3
CO 2	3	2	3
CO 3	3	2	3
CO 4	3	2	3
CO 5	3	3	3

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	**Content**	**RBT Level**
1	Cement	1,2,3
2	Aggregates	1,2,3
3	Chemical and mineral admixtures	1,2,3
4	Concrete Mix Design	1,2,3
5	Concrete Production and Fresh Concrete	1,2,3
6	Engineering Properties of concrete	1,2,3
7	Dimensional Stability and Durability	1,2,3
8	Durability of concrete	1,2,3
9	Special Concretes	1,2,3

THIRD YEAR B.TECH

P P SAVANI UNIVERSITY															
SCHOOL OF ENGINEERING															
TEACHING & EXAMINATION SCHEME FOR B. TECH. CIVIL ENGINEERING PROGRAMME AY:2021-22															
Sem	**Course Code**	**Course Title**	**Offered By**	**Teaching Scheme**					**Examination Scheme**						
				Contact Hours				**Credit**	**Theory**		**Practical**		**Tutorial**		**Total**
				Theory	**Practical**	**Tutorial**	**Total**		**CE**	**ESE**	**CE**	**ESE**	**CE**	**ESE**	
5	SECV3011	Soil Mechanics & Foundation Engineering	CV	4	2	0	6	5	40	60	20	30	0	0	150
	SECV3022	Indeterminate Structural Analysis	CV	4	0	1	5	5	40	60	0	0	50	0	150
	SECV3040	Environmental Engineering	CV	3	2	0	5	4	40	60	20	30	0	0	150
	SECV3051	Hydrology & Water Resource Management	CV	3	0	2	5	5	40	60	0	0	50	0	150
	SECV3070	Basics of Transportation Engineering	CV	3	0	0	3	3	40	60	0	0	0	0	100
	SECV3910	Summer Training	CV	4			0	4	0	0	100	0	0	0	100
	CFLS3021	Foreign Language-II	CFLS	2			2	2	40	60	0	0	0	0	100
	SEPD3050	Integrated Personality Development Course-II	SEPD	2	0	0	2	1	100	0	0	0	0	0	100
						Total	**28**	**29**							**1000**

P P SAVANI UNIVERSITY															
SCHOOL OF ENGINEERING															
TEACHING & EXAMINATION SCHEME FOR B. TECH. CIVIL ENGINEERING PROGRAMME AY:2022-23															
Sem	Course Code	Course Title	Offered By	Teaching Scheme					Examination Scheme						
				Contact Hours				Credit	Theory		Practical		Tutorial		Total
				Theory	Practical	Tutorial	Total		CE	ESE	CE	ESE	CE	ESE	
6	SECV3062	Structural Design - I	CV	3	0	2	5	5	40	60	0	0	50	0	150
	SECV3082	Irrigation and Hydraulic structure	CV	3	0	0	3	3	40	60	0	0	0	0	100
	SECV3090	Estimation and Costing	CV	3	0	2	5	5	40	60	0	0	50	0	150
	SECV3101	Water and Waste Water Engineering	CV	3	2	0	5	4	40	60	20	30	0	0	150
	SECV4041	Highway & Traffic Engineering	CV	3	2	0	5	4	40	60	20	30	0	0	150
	SECV3490	Online NPTEL Course	CV	3	0	0	3	3	100	0	0	0	0	0	100
	SEPD3020	Corporate Grooming & Etiquette	SEPD	1	2	0	3	2	0	0	50	50	0	0	100
						Total	**29**	**26**							**900**

P P Savani University
School of Engineering
Department of Civil Engineering

Course Code: SECV3011
Course Name: Soil Mechanics & Foundation Engineering
Prerequisite Course/s: Geology & Geotechnical Engineering (SECV2060)

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	-	05	40	60	20	30	-	-	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to

- understand about the shear and compaction parameters of soil.
- understand the basic properties and strength nature of various soils and their settlement behaviour in foundations.
- understand about the stress distribution in soil.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Soil Compaction** Theory of compaction, Factors affecting compaction, Laboratory compaction tests, Effect of compaction on soil properties, Placement water content, Placement layer thickness, Field control of compaction, Proctor's needle, Methods of compaction used in field.	07	12
2.	**Shear Strength of Soil** Mohr's strength theory, Mohr- coulomb's strength theory, Modified Mohr coulomb's theory, Shear parameters, Test: Direct shear test, Unconfined compression test, lab. Vane shear test, Triaxial compression test, Shear tests based on drainage conditions.	09	15
3.	**Consolidation of Soil** Compressibility of soils, Definitions and mechanism of consolidation Spring analogy, Void ratio and effective stress relation, Related indices, Assumptions of Terzaghi's one dimensional consolidation theory, Time factor, one dimensional consolidation tests, Laboratory and theoretical time curves, Determination of pre-consolidation pressure, Estimation of consolidation settlement and rate of settlement for uniform pressure increment in a clay layer.	14	23
Section II			

Module No.	Content	Hours	Weightage in %
4.	**Earth Pressure** Types of lateral earth pressure, Rankine's and Coulomb's earth pressure, Theory and their application for determination of lateral earth pressure under different conditions, Rebhann's and Culmann's Graphical methods of determination of lateral earth pressures.	14	23
5.	**Shallow Foundation** Introduction of shallow foundation, Requirements of shallow foundation, Location and depth of shallow foundation, Terminologies, Bearing capacity of shallow foundation, settlement of shallow foundation,	09	15
6.	**Pile Foundation** Introduction of Pile foundation, Uses of pile, Types of piles, Selection of pile, pile driving, pile load capacity in compression, static pile load formula, Load test on piles, Dynamic pile formula, Group action of piles, Negative skin friction, Laterally loaded piles.	07	12
	TOTAL	60	100

List of Practical:

Sr. No	Name of Practical	Hours
1.	Proctor Compaction Test	02
2.	CBR Test	02
3.	Consolidation /Oedometer test	02
4.	Direct Shear Test	02
5.	Unconfined Compression Test	02
6.	Demonstration of Triaxial test	02
7.	Free swell potential	02
8.	Tutorials on shear strength of Soil	02
9.	Tutorials on Consolidation of Soil	02
10.	Tutorials on Earth Pressure	04
11.	Tutorials on Shallow foundation	04
12.	Tutorials on Pile Foundation	04
	TOTAL	30

Text Book(s):

Title	Author/s	Publication
Soil Mechanics & Foundation Engineering	V. N. S. Murthy	Sai Kripa Technical Consultants, Bangalore

Reference Book(s):

Title	Author/s	Publication
Basic and applied soil mechanics	Gopal Ranjan, Rao A.S.R	New age int. (p) ltd.
Principles of Geotechnical Engineering	Das Braja M.	Thomson Asia Pvt. Ltd
Soil Mechanics and Foundation Engineering	P. Purushothama Raj	Pearson Education

Web Material Link(s):

- https://nptel.ac.in/courses/105103097/
- https://nptel.ac.in/courses/105103097/25
- https://www.aboutcivil.org/soil-mechanics.html
- https://www.brighthubengineering.com/structural-engineering/44795-what-is-soil-mechanics/
- https://www.britannica.com/science/soil-mechanics

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

SECV3011	**SOIL MECHANICS & FOUNDATION ENGINEERING**
CO1	Resolving practical issues related to consolidation accounting and accounting time rate
CO2	Determine shear strength of soil.
CO3	Illustrate various tests of the soil for finding out compaction parameters, settlement parameters and shear strength.
CO4	Finding out compaction parameters of soil by using fundamental properties of soil mechanics.
CO5	Calculate bearing capacity of soil and propose appropriate foundation design.

Mapping of CO with PO

SECV3011	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	1	1	1	1	1							1
CO 2		1	1	1	2							1
CO 3		1	1	2	1							1
CO 4		1	1	1	1							1
CO 5		1	2	1	1					1		

Mapping of CO with PSO

SECV3011	PSO1	PSO2	PSO3
CO 1	2		
CO 2	2		
CO 3	2		

CO 4	2		
CO 5	3	1	

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	**Content**	**RBT Level**
1	Soil Compaction	1, 2
2	Shear Strength of Soil	2, 3, 4, 6
3	Consolidation of Soil	2, 4, 5
4	Earth Pressure	3, 4, 5
5	Shallow Foundation	1, 2, 4, 5
6	Pile Foundation	1,2,4

P P Savani University
School of Engineering
Department of Civil Engineering

Course Code: SECV3022
Course Name: Indeterminate Structural Analysis
Prerequisite Course/s: Strength of Materials (SECV2011), Determinate Structural Analysis (SECV2051)

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	-	01	05	40	60	-	-	50	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to

- analyze the indeterminate structures.
- quickly chose a method for analysis.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction** Review of basic concepts -Static and kinematic indeterminacy.	02	03
2.	**Analysis of Statically Indeterminate Structures by Displacement Methods** Review, development of slope-deflection equations for beams, frames without and with side sway, concept of stiffness, moment distribution method and applications plane truss with and without side sway, multistoried frames with side sway, beams with and without support settlement.	12	20
3.	**Influence Lines for Statically Indeterminate Structures** Moving loads and its effects on structural members, influence lines for beams, influence lines for simple trusses, Muller-Breslau principle.	07	12
4.	**Analysis of Statically Indeterminate Structures by Force Method** Introduction to force method, application to beams, trusses, frames, three moment equations, temperature stress, lack of fit and settlement of supports.	09	15
Section II			
Module No.	Content	Hours	Weightage in %
5.	**Analysis of Statically Indeterminate Structures by Direct Stiffness Method**	11	18

	Application to beams, plane frames, truss, errors in analysis and fabrication of trusses because of temperature changes.		
6.	**Analysis of Statically Indeterminate Structures by Flexibility Method** Introduction, axes and coordinates, flexibility matrix, analysis of continuous beams and plane trusses using system approach, analysis of simple orthogonal rigid frames using system approach with static indeterminacy ≤ 3.	12	20
7.	**Approximate Methods of Indeterminate Structural Analysis** Indeterminate trusses, industrial frames, building frames.	07	12
	TOTAL	60	100

List of Tutorials:

Sr. No.	List of Tutorials	Hours
1.	Static and Kinematic Indeterminacy	01
2.	Slope deflection and Moment Distribution	02
3.	Influence lines for beams and trusses	02
4.	Force method for beams and trusses	02
5.	Direct stiffness for beams, plane frames, Truss	03
6.	Flexibility Method	03
7.	Approximate Methods	02
	TOTAL	15

Text Book(s):

Title	Author/s	Publication
Theory of Structures	S. Ramamrutham	Dhanpat Rai Publishing company
Structural Analysis	Devdas Menon	Narosa Publication
Matrix Methods of Structural Analysis	Dr. A. S. Meghre & S. K. Deshmukh	Charotar Publishing house Pvt. Ltd.

Reference Book(s):

Title	Author/s	Publication
Elementary Structural Analysis	S. Utku, C.H. Norris and J.B. Wilbur	McGraw Hill Book Company
Indeterminate Structural Analysis	C.K. Wang	McGraw Hill Book Company
Matrix Framed Structures.	W. Weaver and J.M. Gere	CBS Publishers, Delhi
Structural Analysis.	R.C. Hibbeler	Pearson Education Asia publication

Web Material Link(s):

- https://nptel.ac.in/courses/105101086/
- https://nptel.ac.in/courses/105105109/

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(s):

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

Course Outcome(s):

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

SECV3022	**INDETERMINATE STRUCTURAL ANALYSIS**
CO1	Apply the equilibrium and compatibility equations to determine the response of indeterminate structures.
CO2	Evaluate the internal forces and displacement of statically indeterminate structures by classical, iterative, and matrix methods to get a structural response.
CO3	Calculate the reaction and internal force generated in the indeterminate structures due to moving loads.
CO4	Perceive the different stresses and strains developed in the structural member subjected to axial, bending, shear & torsional effect.

Mapping of CO with PO

SECV3022	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	3	3	3	3							1
CO 2	3	3	3	3	3							1
CO 3	3	3	3	3	3							1
CO 4	3	3	3	3	3							1

Mapping of CO with PSO

SECV3022	PSO1	PSO2	PSO3
CO 1	3	3	2
CO 2	3	3	2
CO 3	3	3	2
CO 4	3	3	2

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	Content	RBT Level
1	Introduction	1, 2
2	Analysis of Statically Indeterminate Structures by Displacement Methods	2, 3, 4, 6
3	Influence Lines for Statically Indeterminate Structures	2, 4, 5
4	Analysis of Statically Indeterminate Structures by Force Method	3, 4, 5
5	Analysis of Statically Indeterminate Structures by Direct Stiffness Method	1, 2, 4, 5
6	Analysis of Statically Indeterminate Structures by Flexibility Method	1, 2, 4, 5
7	Approximate Methods of Indeterminate Structural Analysis	2, 4, 5, 6

P P Savani University
School of Engineering
Department of Civil Engineering

Course Code: SECV3040
Course Name: Environmental 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	-	04	40	60	20	30	-	-	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to

- design various units of a water treatment plant.
- identify the physical, chemical and biological characteristics of sewage.
- estimate sewage and storm water discharge and thereby design sewer pipeline and storm water drain.
- design modern and low-cost wastewater treatment plants.
- characterize solid wastes and methods of their collection and transportation.
- manage solid wastes using different techniques.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction** Man and Environment: Overview (socio-economic structure & occupational exposures), Scope of Environmental Engineering, pollution problems due to urbanization & industrialization	05	11
2.	**Air Pollution** **Causes of air pollution** Types & sources of air pollutants, Climatic & Meteorological effect on air pollution concentration, Formation of smog and fumigation **Analysis of Air Pollutants** Collection of Gaseous Air Pollutants, Collection of Particulate Pollutants, Analysis of Air Pollutants like: Sulphur dioxide – Nitrogen oxide – Carbon monoxide – Oxidants &Ozone – Hydrocarbons – Particulate Matter. **Methods & Approach of Air Pollution Control** Controlling smoke nuisance – Develop air quality criteria and practical emission standards – Creating zones suitable for industry based on micrometeorology of air area – Introducing artificial methods of	08	13

	removal of particulate and matters of waste before discharging to open atmosphere		
3.	**Water Sources Origin of waste water** Types of water pollutants and their effects **Different Sources of Water Pollution** Biological Pollution (point & non-point sources) – Chemical Pollutants: Toxic Organic & Inorganic Chemicals – Oxygen demanding substances – Physical Pollutants: Thermal Waste – Radioactive waste – Physiological Pollutants: Taste affecting substances – other forming substances **Water Pollution & Its Control** Adverse effects on: Human Health & Environment, Aquatic life, Animal life, Plant life — Water Pollution Measurement Techniques – Water Pollution Control Equipment & Instruments – Indian Standards for Water Pollution Control.	10	26
Section II			
Module No.	Content	Hours	Weightage in %
1.	**Soil Pollution** Liquid & Solid Wastes, Domestic & Industrial Wastes, Pesticides Toxic, Inorganic & Organic Pollutants, soil Deterioration, Poor Fertility, Septicity, Ground Water Pollution, Concentration of Infecting Agents in Soil.	05	12
2.	**Noise Pollution & Control** Noise Pollution, Intensity, Duration – Types of Industrial Noise – Ill effects of Noise – Noise Measuring & Control – Permissible Noise Limits.	04	09
3.	**Municipal Solid Waste Management** Characteristics, generation, collection and transportation of solid wastes, engineered systems for solid waste management (reuse, recycle, energy recovery, treatment and disposal). Industrial waste minimization: Volume and strength reduction of industrial wastes, need, strategies and methods of neutralization, equalization and proportioning, zero waste discharge and concept of good house-keeping.	10	22
4.	**Environmental Legislations, Authorities & Systems** Air & Water Pollution Control Acts & Rules (Salient Features only) – Functions of State / Central Pollution Control Boards – Environmental Management System: ISO 14 000 (Salient Features only)	03	07
	TOTAL	45	100

List of Practical:

Sr. No	Name of Practical	Hours
1.	Measurement of Ph for water & Waste water	02
2.	Introduction to Standards, Sampling, Collection and Preservation of Samples	04
3.	Measurement of conductivity for water & waste water	02

4.	Determination of acidity for water & waste water	02
5.	Determination of hardness by EDTA method	04
6.	Determination of residual chlorine.	02
7.	Determination of optimum coagulant dose by jar test	04
8.	Determination of sulphate content	02
9.	Determination of chlorides content	02
10.	Determination of suspended, settle able, volatile and fixed solids	04
11.	Determination of turbidity by using nephelometer	02
	TOTAL	30

Text Book(s):

Title	Author/s	Publication
Elements of Environmental Engineering	K. N. Duggal	S. Chand & Company Publications
Environmental Engineering Vol. I	S. K. Garg	Khanna Publisher, New Delhi

Reference Book(s):

Title	Author/s	Publication
Waste Water Engineering	Punamia & Jain	Laxmi Publications (P) Ltd., New Delhi.
Environmental Engineering	Pevy	McGraw-Hill Publishing Company Ltd.
Solid Waste Treatment and Disposal	G. Tchabanoglous	McGraw-Hill Publishing Company Ltd.

Web Material Link(s):

- https://en.wikipedia.org/wiki/Environmental_engineering
- https://www.conserve-energy-future.com/sources-effects-methods-of-solid-waste-management.php
- https://en.wikipedia.org/wiki/Waste_management
- https://www.slideshare.net/dushyantchhatrola/quantity-and-quality-of-water-for-supply-in-town-city
- http://www.who.int/water_sanitation_health/dwq/monograph42.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 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 the completion of the course, the student will be able to

SECV3040	ENVIRONMENTAL ENGINEERING
CO 1	Know the basics, importance, and methods of water supply.
CO 2	Study the various sources and properties of water.
CO 3	Understand the various methods of conveyance of water.
CO 4	Learn the objectives and methods of water treatment and to study the features and function of different water treatment units.

Mapping of CO with PO

SECV3040	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1				1								
CO 2							1					
CO 3				1								
CO 4		1		1			2					

Mapping of CO with PSO

SECV3040	PSO1	PSO2	PSO3
CO 1			
CO 2		1	2
CO 3			
CO 4		1	1

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	Content	RBT Level
1	Introduction	1,2
2	Air pollution	1,2,3
3	Water sources, origin of waste water	2,3,6
4	soil pollution	2,3,6
5	noise pollution and control	2,3,6
6	municipal solid waste management	2,3,6
7	Environmental legislations, authorities and system	2,3

P P Savani University
School of Engineering
Department of Civil Engineering

Course Code: SECV3051
Course Name: Hydrology and Water Resources Management
Prerequisite Course/s: 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	
03	-	02	05	40	60	-	-	50	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to

- develop understanding about precipitation, infiltration, evapotranspiration, hydrograph, capacity of reservoir.
- enable the students for estimation of runoff, infiltration, evaporation, floods and reservoir capacity.
- create understanding about features of various types of dam.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction** Hydrologic cycle, Climate and water availability, Water balances, Precipitation Forms, Classification, Variability, Measurement, Data analysis, Evaporation and its measurement, Evapotranspiration and its measurement, Penman Monteith method, Infiltration, Factors affecting infiltration, Horton's equation and Green Ampt method.	08	18
2.	**Hyetograph and Hydrograph Analysis** Hyetograph, Runoff, drainage basin characteristics, Hydrograph concepts, assumptions and limitations of unit hydrograph, Derivation of unit hydrograph, S- hydrograph, Flow duration curve, Groundwater and it's Occurrence, Darcy's law, Well hydraulics, Well losses, Yield, Pumping and recuperation test.	08	18
3.	**Reservoir and Dams** Types, Site selection criteria and investigation, Zones of storage, Safe yield, Reservoir capacity, Reservoir sedimentation and control, Introduction and types of dams, spillways and ancillary works, Site assessment and factors affecting selection of type of dam, Information about major dams and reservoirs of India.	07	14
Section II			

Module No.	Content	Hours	Weightage in %
4.	**Hydroelectric Power** Low, Medium and High head plants, Power house components, Hydel schemes.	04	10
5.	**Flood Management** Indian rivers and floods, Causes of floods, Alleviation, Leeves and floodwalls, Floodways, Channel improvement, Flood damage analysis. **Hydrologic Analysis:** Design flood, Flood estimation, Frequency analysis, Flood routing through reservoirs and open channels.	08	18
6.	**Drought Management and Water Harvesting** Definition of drought, Causes of drought, measures for water conservation and augmentation, drought contingency planning. Water harvesting: rainwater collection, small dams, runoff enhancement, runoff collection, ponds, tanks.	10	22
	TOTAL	45	100

List of Tutorial:

Sr. No	Name of Tutorial	Hours
1.	Determination of Average rainfall depth and missing rainfall data	04
2.	Estimation of Infiltration indices	04
3.	Deriving Unit hydrographs of Various time interval	06
4.	Determining well Yield and aquifer parameters	06
5.	Flood frequency analysis, Risk and Probability determination	06
6.	Watershed Delineation	04
	TOTAL	30

Text Book(s):

Title	Authors	Publication
Hydrology and Water Resources Engineering	Garg S.K.	Tata McGraw Hill, New Delhi
Hydrology and Water Resources Engineering	R.K. Sharma and T.K. Sharma	Dhanpat Rai Publications

Reference Book(s):

Title	Authors	Publication
Engineering Hydrology	Subramanya, K.,	Tata McGraw Hill, New Delhi.
Textbook of Fluid Mechanics and Hydraulic Machines	R. K. Bansal	Laxmi Publications
Hydrology – Principles, Analysis and Design	Raghunath, H.M.	Wiley Eastern Ltd., New Delhi

Groundwater Hydrology	Todd, D.K.	John Wiley & Sons
A Textbook of Hydrology	Dr. P.Jaya Rami Reddy	University Science Press
Engineering Hydrology	C.S.P. Ojha, R, Berndtsson and P. Bhunya	Oxford University Press, New Delhi

Web Material Link(s):

- https://nptel.ac.in/courses/105104103/
- http://www.nptelvideos.in/2012/11/water-resources-engineering.html
- http://www.groundwatermanagement.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.

Tutorial(s):

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

Course Outcome(s):

After the completion of the course, the following course outcomes will be able to:

SECV3051	**Hydrology and Water resource management**
CO 1	Understand and analyze the important meteorological parameter which affect the watershed hydrology and outflow from watershed.
CO 2	Compute the yield of the well, aquifer parameters and to understand the construction of well.
CO 3	Carryout hydrologic analysis and understand importance of it for hydraulic structure.
CO 4	Understand the importance of topographical and geological features affecting the site selection for the dam and its allied structure.
CO 5	Formulate effective drought management and water harvesting plan for water scarces area.

Mapping of CO with PO

SECV3051	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	3	1	3	3		2					3
CO 2	2	3	2	3	3		2					3
CO 3	2	3	2	3	3		3					3
CO 4	1	2	2	1	1		2					3
CO 5	1	1	1	1	1		3					3

Mapping of CO with PSO

SECV3051	PSO1	PSO2	PSO3
CO 1	3	2	
CO 2	3	2	
CO 3	3	2	
CO 4	3	2	1
CO 5	3	3	3

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	**Content**	**RBT Level**
1.	Introduction	1, 2, 3
2.	Hyetograph and Hydrograph Analysis	1, 2, 3, 4
3.	Reservoir and Dams	1, 2
4.	Hydroelectric Power	1, 2
5.	Flood Management & Hydrologic Analysis:	2, 3, 4, 5
6.	Drought Management and Water Harvesting	1, 2

P P Savani University
School of Engineering

Department of Civil Engineering

Course Code: SECV3070
Course Name: Basics of Transportation 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	-	-	03	40	60	-	-	-	-	100

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to

- comprehend basic requirements of the highway.
- understand highway development and planning.
- comprehend basic concepts and components of railways, bridges, docks and harbour.
- understand the design of the railway track geometry.
- get idea about concepts of tunnelling.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Highway Engineering** Introduction: Importance and different mode of transportation and its scope, characteristics of road transport, scope of highway engineering.	02	05
2.	**Highway Development and Planning** Historical development of road construction, highway development in India, necessity of highway planning, classification of roads, planning surveys and interpretation.	05	10
3.	**Railway Engineering** Introduction: History, Indian railways, recent developments, different gauges, requirements of an ideal alignment.	04	09
4.	**Railway components:** rails, sleepers, ballast, types of sleepers and ballast.	06	13
5.	**Geometric design of Track** Gradients, grade compensation on curves, circular curves, super elevation, safe speed on curves, transition curves, compound curves, extra clearance and widening of gauge on curves, vertical curves.	06	13
Section II			

Module No.	Content	Hours	Weightage in %
6.	**Bridge Engineering** Introduction**:** History, components, classification, types, requirements. Culverts and causeway: Layout plan, advantages and disadvantages, site suitability and selection criteria.	06	12
7.	**Tunnelling:** Classification of tunnels, Site Investigation & Planning Location of bridges and tunnels, Criteria for selection of site, Alignment, Hydrological, geological & Geotechnical investigations.	08	19
8.	**Docks and Harbours Engineering:** General, classification, requirements, planning and different components of port.	08	19
	TOTAL	45	100

Text Book(s):

Title	Author/s	Publication
Highway Engineering	Dr. S.K. Khanna and Dr. C.E. G. Justo	Khanna Publishers
Harbors, Dock and Tunnel Engineering	R. Srinivasan	Tata McGraw Hill Publication
Bridge Engineering	Rangwala	Charotar Publishing House
Railway Engineering	Satish Chandra and M.M. Agrawal	Oxford University Press

Reference Book(s):

Title	Author/s	Publication
Highway Engineering	L.R. Kadiyali	Khanna Publishers, New Delhi
Principles, Practice & Design of Highway Engineering	S.K. Sharma	S. Chand & Co., New Delhi.
Roads, Railways, Bridges and Tunnels Engineering	Ahuja T.D. and Birdi G. S	Standard Book House,Delhi
Bridge Engineering	Ponnuswamy S.	Tata McGraw Hill Publication, New Delhi

Web Material Link(s):

- https://nptel.ac.in/courses/105103097/
- https://nptel.ac.in/courses/105103097/25

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):

After the completion of the course, the following course outcomes will be able to:

SECV3070	BASICS OF TRANSPORTATION
CO1	Understand about highway engineering and highway development planning and its classification.
CO2	Explain the fundamentals of railway engineering and railway components.
CO3	Understand the principles of highway geometrics design as per irc standards.
CO4	Identify and practice knowledge about harbour, dock, tunnel & bridge.

Mapping of CO with PO

SECV3070	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1		1	2	1	2	2			3	3	2	
CO 2		1	1	1	2	2	1		3	3	2	
CO 3		1	1	1	2	2			3	3	2	
CO 4		1	2	1	2	2	1		3	3	2	

Mapping of CO with PSO

SECV3070	PSO1	PSO2	PSO3
CO 1	3	2	2
CO 2	3	2	2
CO 3	3	2	2
CO 4	3	2	2

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	Content	RBT Level
1	Highway Engineering	1,2
2	Highway Development and Planning	1,2,6
3	Railway Engineering	1,2
4	Railway components	1,2
5	Geometric design of Track	1.2.4,5
6	Bridge Engineering	1,2,3,4,5,6
7	Tunnelling	1,2,5
8	Docks and Harbors Engineering	1.2

P P Savani University
School of Engineering

Department of Civil Engineering

Course Code: SECV3910
Course Name: Summer Training
Prerequisite Cours/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	-	04	-	-	100	00	-	-	100

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to

- have first-hand experience the real time situations in industrial scenario.
- get familiar with engineering applications in industrial spectrum.
- learn to adapt themselves in professional scenario.

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
	TOTAL	**100**

Course Outcome:
After completion of the course, the student will be able to

- apply their theoretical knowledge into reality.
- learn to adapt the workplace situations when they will be recruited.
- be prepared for the real-world situations in their future.

Report Writing Guidelines

A. Report Format:

- 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.
- Project Certification Form
- [The form should be duly filled signed by the supervisors.]
- 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.]
- Table of Contents/Index with page numbering
- List of Tables, Figures, Schemes
- Summary/abstract of the report.
- Introduction/Objectives of the identified problem
- Data Analysis and Finding of Solution
- Application of the identified solution
- Future Scope of enhancement of the Project and Conclusion
- "Learning during Project Work", i.e. "Experience of Journey during Project Duration"
- References(must)
- Bibliography
- 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

Course Outcome(s):

After the completion of the course, the following course outcomes will be able to:

SECV 3910	**SUMMER TRAINING**
CO 1	Construct company profile by compiling brief history, management structure, products/services offered, key achievements and market performance for the company visited during internship.

CO 2	Determine the challenges and future potential for his/her internship organization in particular and the sector in general.
CO 3	Test the theoretical learning in practical situations by accomplishing the tasks assigned during the internship period.
CO 4	Apply various soft skills such as time management, positive attitude and communication skills during performance of the tasks assigned in internship organization.
CO 5	Analyze the functioning of internship organization and recommend changes for improvement in processes.

Mapping of CO with PO

SECV 3910	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1		2	3	3	3	3	3	3	3	3	3	3
CO 2	3	2	3	3	3	3	3	3	3	3	3	3
CO 3	3	2	3	3	3	3	3	3	3	3	3	3
CO 4	3	2	3	3	3	3	3	3	3	3	3	3
CO 5		2	3	3	3	3	3	3	3	3	3	3

Mapping of CO with PSO

SECV3910	PSO1	PSO2	PSO3
CO 1	2	3	3
CO 2	2	3	3
CO 3	2	3	3
CO 4	2	3	3
CO 5	2	3	3

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	**Content**	**RBT Level**
1	Summer Training	1,2,3,4,5,6

P P Savani University
School of Engineering

Department of Civil Engineering

Course Code: SECV3062
Course Name: Structural Design-I
Prerequisite Course/s: Strength of Materials (SECV2011), Concrete Technology (SECV3030)

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	05	40	60	-	-	50	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to

- understand the basics of modern concrete.
- understand various design philosophies to be used in the design of structural elements.
- understand the behavior of various elements under different loading conditions.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**General Features of Reinforced Concrete** Introduction, design loads, materials for reinforced concrete and code requirements. Design philosophy – limit state design principles. Philosophy of limit state design, principles of limit states, factor of safety, characteristic and design loads, characteristic and design strength.	02	05
2.	**Principles of Limit State Design and Ultimate Strength of R.C. Section** General aspects of ultimate strength, stress block parameters for limit state of collapse, ultimate flexural strength of singly reinforced rectangular sections, ultimate flexural strength of doubly reinforced rectangular sections, ultimate flexural strength of flanged sections, ultimate shear strength of RC sections, ultimate torsional strength of RC sections, concepts of development length and anchorage.	07	15
3.	**Flexure and Serviceability Limit States** General specification for flexure design of beams-practical requirements, size of beam, cover to reinforcement-spacing of bars. General aspects of serviceability-deflection limits in IS: 456 – 2000-calculation of deflection (theoretical method), cracking in structural concrete members, calculation of deflections and crack width.	06	15

4.	**Design of Beams** Design procedures for critical sections for moment and shears. Anchorages of bars, check for development length, reinforcement requirements, slenderness limits for beams to ensure lateral stability, design examples for simply supported and cantilever beams for rectangular and flanged sections.	07	15
Section II			
Module No.	Content	Hours	Weightage in %
5.	**Design of Slabs** General consideration of design of slabs, rectangular slabs spanning one direction, rectangular slabs spanning in two directions for various boundary conditions. Design of simply supported, cantilever and continuous slabs as per IS: 456 – 2000.	06	15
6.	**Design of Columns** General aspects, effective length of column, loads on columns, slenderness ratio for columns, minimum eccentricity, design of short axially loaded columns, design of column subject to combined axial load and uniaxial moment and biaxial moment using SP – 16 charts.	06	15
7.	**Design of Footings** Introduction, loads for footing, design basis for limit state method, design of isolated rectangular footing for axial load, uniaxial and biaxial moment, design of pedestal.	05	10
8.	**Design of Stair Cases** General features, types of stair case, loads on staircases, effective span as per IS code provisions, distribution of loading on stairs, design of stair case with waist slabs.	06	10
	TOTAL	45	100

List of Tutorial(s):

Sr. No.	Name of Tutorial	Hours
1.	Loads and Strength	02
2.	Ultimate strength of RC Section	04
3.	Flexure and Serviceability Limit States	04
4.	Design of Beams	06
5.	Design of Slabs	04
6.	Design of Columns	04
7.	Design of Footings	04
8.	Design of Stair Cases	02
	TOTAL	30

Text Book(s):

Title	Author(s)	Publication
Reinforced concrete Design	Pillai and Menon	TMH Education Private Limited

Reference Book(s):

Title	Author(s)	Publication
Limit State Design of Reinforced concrete	P.C. Varghese	PHI Learning Private Limited
Fundamentals of Reinforced concrete Design	M. L. Gambhir	PHI Learning Private Limited
Reinforced concrete Design	S. N. Shinha	TMH Education Private Limited

Web Material Link(s):

- https://nptel.ac.in/courses/105105105/
- https://nptel.ac.in/downloads/105105105/

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 assessment in 15 tutorials which will be evaluated out of 30 marks each and average of the same shall be considered.
- MCQ based test consists of 10 marks.
- Internal viva consists of 10 marks.

Course Outcome(s):

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

SECV3062	STRUCTURAL DESIGN -I
CO1	Understand the significance of various provisions made in the Indian standard codes (IS 456:2000 and SP: 16) for RCC structures adapting various design philosophies.
CO2	Calculate various loads acting on the structure and the load combinations considered under various conditions.
CO3	Design various elements like slab, beam, column, footing and staircase with necessary checks as per limit state method provisions given in is 456:2000.
CO4	Assess the various critical conditions of the structural elements and ensure the safety and durability of the structure.

Mapping of CO with PO

SECV3062	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	1	3	2	3	3	2			2	3	2	3
CO 2	1	3	2	3	3	2			2	3	2	3
CO 3	2	3	2	3	3	2			2	3	2	3
CO 4	1	3	2	3	3	2			2	3	2	3

Mapping of CO with PSO

SECV3062	PSO1	PSO2	PSO3
CO 1	3	3	3
CO 2	3	3	3
CO 3	3	3	3
CO 4	3	3	3

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	**Content**	**RBT Level**
1	General Features of Reinforced Concrete	1,2
2	Principles of limit state design and ultimate strength of RC Sections	2,3
3	Flexure and serviceability limit states	2,3,4
4	Design of beams	4,5,6
5	Design of slabs	4,5,6
6	Design of columns	4,5,6
7	Design of footings	4,5,6
8	Design of staircases	4,5,6

P P Savani University
School of Engineering
Department of Civil Engineering

Course Code: SECV3082
Course Name: Irrigation & Hydraulic Structure
Prerequisite Course/s: Fluid Mechanics (SECV 2030), Hydrology & Water Resource Management (SECV 3051)

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	-	-	03	40	60	-	-	-	-	100

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to

- understand the basic types of irrigation methods, irrigation standards and crop water assessment.
- study the different aspects of design of hydraulic structures such as energy dissipaters, head and cross regulators, canal falls, and structures involved in cross drainage works.
- understand the analysis of seepage and hydraulic jump into design different types of dams.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction** Irrigation, necessity, Types of irrigation, Methods of supplying water ,Assessment of irrigation water , Consumptive use and its determination water requirement of various crops – Duty – Delta – Base period and crop period, Principal Indian crops, Gross command area, Culturable command area, Intensity of irrigation, Duty and delta relation, Introduction to various methods of application of irrigation water, Irrigation efficiency, assessment of irrigation water.	10	22
2.	**Diversion Works** Different stages of a river and their flow characteristics, Weir and barrages, Various parts of a weir and their functions, Exit gradient, Principles of weir design on permeable formations -Bligh's creep theory and Khosla's theory.	06	14
3.	**Storage and Outlet works** Types of earthen dams, Seepage in earth dams, Gravity dams, Forces acting on a gravity dam, Rock-fill dams, Spillways, Types of spillways, Spillways gates and energy dissipation works.	06	14
Section II			

Module No.	Content	Hours	Weightage in %
4.	**Distribution Works** Modes of conveying irrigation water- Types of irrigation canals contour canal, ridge canal, side sloping canals, Canal sections-filling, cutting, partial cutting and partial filling, Balanced depth, Canal FSL, Capacity factor and Time factor, L-section, Losses of canal water, Silting and scouring of canals, Method of design of unlined section of irrigation canal, Silt theories, Lined canals, Design of lined canal, Link canals.	11	22
5.	**Regulating and Cross Drainage Works** Canal falls, Cross drainage works, Types of cross drainage works, Canal escapes, Head regulator and Cross regulator, Silt ejector, Flow meters – Parshall flume, Irrigation outlets and types of outlets.	08	18
6.	**Water Logging** Definition, causes, Reclamation, Drainage principles and practice, Indian case study and prevention.	04	10
	TOTAL	45	100

Text Book(s):

Title	Author/s	Publication
Irrigation and Hydraulics Structures	Garg, S.K.	Khanna Publishers

Reference Book(s):

Title	Author/s	Publication
Irrigation and Water Power Engineering	Punmia, B.C.	Standard Publishers
Irrigation, Water Power & Water Resources Engineering	Dr. K. R. Arora	Standard Publishers Distributors
Irrigation Engineering	S.K. Mazumder	Tata McGraw-Hill Publishing Company
Principles and Practice of Irrigation Engg.	Sharma, S.K.	S. Chand & Co.

Web Material Link(s):

- https://onlinecourses.nptel.ac.in/noc18_ar07/

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):

After the completion of the course, the following course outcomes will be able to:

SECV3082	IRRIGATION AND HYDRAULIC STRUCTURE
CO 1	Recognize the terms associated with irrigation and remember methods of irrigation.
CO 2	Analyse the weir design on permeable strata.
CO 3	Summarize the function and need of various components of irrigation scheme.

CO 4	Evaluate and design the irrigation channels in different conditions.
CO 5	Formulate effective water application method to prevent water logging and increase efficiency.

Mapping of CO with PO

SECV3082	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	2	3	2		3	3		3	3	3	1
CO 2	2	2	3	2		3	3		3	3	3	1
CO 3	2	2	3	2		3	3		3	3	3	1
CO 4	2	2	3	2		3	3		3	3	3	1
CO 5	2	2	3	2		3	3		3	3	3	1

Mapping of CO with PSO

SECV3082	PSO1	PSO2	PSO3
CO 1	3	3	3
CO 2	3	3	3
CO 3	3	3	3
CO 4	3	3	3
CO 5	3	3	3

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	**Content**	**RBT Level**
1.	Introduction	1, 2, 3, 4
2.	Diversion Works	2, 3, 6
3.	Storage and Outlet works	2
4.	Distribution Works	2, 3, 4, 6
5.	Regulating and Cross Drainage Works	2
6.	Water Logging	2

P P Savani University
School of Engineering
Department of Civil Engineering

Course Code: SECV3090
Course Name: Estimation & Costing
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	05	40	60	-	-	50	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to

- realize how individual components add up costs
- understand how construction costs can be optimized

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Estimation and Modes of Measurement** Types of estimate and Data required, Overhead charges, contingencies, water charges, provisional sum, prime cost, provisional quantities, spot items, day work, General rules for the measurements and its units of different items of civil engineering work, Quality and duties of good estimator.	05	10
2.	**Specifications of Civil Works** Importance specification, Types of specification, Principle of writing specification, Specification of Earthwork in Excavation, cement concrete, Brick masonary, R.C.C. Work, Plastering Work, Painting, Flooring.	08	18
3.	**Rate Analysis of Civil Works** Task Work and influencing factors, Labour required for different works and Labour rates, Market rates of construction materials, Schedule of Rates (SOR) Rate analysis and factors affecting it rate analysis , Rate analysis for earthwork in excavation, C.C.Work, Brick masonry Work, R.C.C. Work, Plastering, flooring work.	10	22

Section II			
Module No.	Content	Hours	Weightage in %
4.	**Estimation of Civil Works**	22	50

	Methods of detailed estimation, One/ two room building, Two storied buildings (RCC footings, Column, beams, slab) RCC retaining wall/ Culverts, Methods of calculating earthwork quantities for roads and canals.		
	TOTAL	45	100

List of Tutorial:

Sr. No	Name of Tutorial	Hours
1.	Rate analysis for different construction activities.	02
2.	Estimation for One/Two Room Building	02
3.	Estimation for Two Storied Buildings	06
4.	BBS for Slab	04
5.	BBS for Beam	04
6.	BBS for Column	04
7.	Detailed estimation for culverts.	02
8.	Estimating quantities for RCC retaining walls.	02
9.	Calculation of cut and fill quantities for roads.	04
	TOTAL	30

Text Book(s):

Text Book	Author	Publication
Estimating and Costing in Civil Engg.	B.N.Dutta	Ubspd, New Delhi
Estimating and Costing in Civil Engg.	S.C.Rangwala	Charotar Publication, Anand, Gujarat

Reference Book(s):

Title	Author/s	Publication
Estimation and Costing	M.C Chakraborti	Chakraborti (2006)

Web Material Link(s):

- https://nptel.ac.in/courses/105104161/6
- https://nptel.ac.in/courses/105103023/35

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.
- Internal viva consists of 10 marks.
- Quiz/drawing/test consists of 10 marks .

Course Outcome(s):

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

SECV3090	ESTIMATION & COSTING
CO 1	Identify and calculate the units for various quantities for item of work.
CO 2	Develop detailed specifications and work out rate analysis for all works related to civil engineering projects.
CO 3	Understand the preparation of an abstract estimate and detailed estimate of building.
CO 4	Design and prepare bar bending schedule for reinforcement works.
CO 5	Calculation of earth work quantity for roads and canals.

Mapping of CO with PO

SECV3090	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2				2	2			3	3		3
CO 2	1				1	2			3	3		3
CO 3	1				2	2			3	3		3
CO 4	1				2	2			3	3		3
CO 5	2				1	2			3	3		3

Mapping of CO with PSO

SECV3090	PSO1	PSO2	PSO3
CO 1	3	3	3
CO 2	3	3	3
CO 3	3	3	3
CO 4	3	3	3
CO 5	3	3	3

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	Content	RBT Level
1	Estimation and Modes of Measurement	1, 2, 4
2	Specifications of Civil Works	1, 2, 3, 4
3	Rate Analysis of Civil Works	1, 2, 3, 4, 5, 6
4	Estimation of Civil Works	1, 2, 3, 4, 5, 6

P P Savani University
School of Engineering
Department of Civil Engineering

Course Code: SECV3101
Course Name: Water & Waste Water Engineering
Prerequisite Course/s: - Environmental Engineering (SECV3040)

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	-	04	40	60	20	30	-	-	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to
● test raw water as per the standard practices.
● prepare lay out plan and maintain water distribution and sewer-networks.
● maintain the pipe-network for water supply and Sewage disposal effectively.
● plan and implement house plumbing work effectively.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Planning for Water Supply System** Public water supply system, Planning, Objectives, Design period, Population forecasting, Water demand, Sources of water and their characteristics, Surface and Groundwater, Impounding Reservoir Well hydraulics, Development and selection of source, Water quality, Characterization and standards, Impact of climate change.	08	17
2.	**Conveyance of Water** Types of pipes used for conveyance, Pipe joints, Laying of Pipes, Distribution system, Types of valves, Types of Meters, Pipe fittings and fixtures, Necessity, Methods to prevent leaks, Measures for conservation of water.	06	15
3.	**Water Distribution and Supply to Buildings** Requirements of water distribution, Components, Service reservoirs, Functions and drawings, Network design, Economics, Appurtenances, operation and maintenance, Methods. Principles of design of water supply in buildings, House service connection, Systems of plumbing, and drawings of types of plumbing.	09	18
Section II			
Module No.	Content	Hours	Weightage in %
4.	**Sanitation System**	08	18

	Introduction, Objective of sewage disposal, Methods of sewage collection, Conservancy system, Water carriage system, Classification of Drains, Sewer section, Sewer joint, Manhole, Flushing tank, Catch basin, Laying of sewer, Hydraulic testing of sewer pipe, Maintenance of sewer, Procedure for maintenance of sewerage system, Causes of trouble and odor, Sewer cleaning operations, Explosives in sewers, Safety measures for sewer-men.		
5.	**Waste Water Engineering** Physical, chemical and biological characteristics of sewage. Generation and collection of wastewaters, sanitary, storm and combined sewerage systems, Quantities of sanitary wastes and storm water. Design of sewerage system. Characteristics of sewage, Sampling of sewage, Treatment of sewage, B.O.D. Test, C.O.D. test, Methods of sewage disposal.	08	18
6.	**House Plumbing** Plumbing terms, Plumbing tools, Pipes and pipe fittings, Fixing and jointing pipes and accessories, Traps, House drainage plant, Plumbing practice and operations, Safety and precautions, Sanitary fittings.	06	14
	TOTAL	45	100

List of Practical:

Sr. No	Name of Practical	Hours
1	Introduction to standards, collection and preservation of samples, sampling techniques and laboratory equipment	02
2	Determine Turbidity of water sample	02
3	BOD test for water and waste water	02
4	COD test for water and waste water	02
5	Determination of D.O. by Winkler's methods	02
6	Design septic tank	04
7	Visit water treatment plant & Making visit report	02
8	Visit Sewage treatment plant & Making visit report	02
9	Treatability study of domestic wastewater	02
10	Determination of dose of chemicals for removal of hardness of given water sample	02
11	Determination of langelier's saturation index	02
12	Prepare Sketches	06
	TOTAL	30

Text Book(s):

Title	Author/s	Publication
Text book of water supply & Sanitary Engg.	S. K. Hussain	Oxford & IBH
Water supply & Sanitary Engg.	Vazirani & Chandola	Khanna Publishers

Reference Book(s):

Title	Author/s	Publication

Water and Waste water Engineering	Gorden, Fair & Gayer Okun	John Willey & Sons
A Text book of water supply engineering	V.N. Gharpure	Allied Book Stall, Baroda
Water supply and Sanitary Engineering	J S Birdie	Dhanpat Rai and Sons Publication, New Delhi

Web Material Link(s):

- https://en.wikipedia.org/wiki/Water_supply_network
- https://www.isws.illinois.edu/iswsdocs/wsp/ppt/MAC_12_10_07.pdf
- http://www.allianceforwaterefficiency.org/uploadedFiles/Resource_Center/Library/United_States/Rhode_Island/RI-water-efficiency-and-management-rules.pdf
- http://ecoursesonline.iasri.res.in/mod/page/view.php?id=2571

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 students will be able to

SECV3101	**WATER & WASTE WATER ENGINEERING**
CO 1	Understand need of proper treatment of the water and waste water before supply and disposal as per government standards.
CO 2	Interpret and summarize various elements of water conveyance/distribution, their need and suitability.
CO 3	Understand and use various components of sewer network, maintenance of sewer network and allied risk in maintaining it.
CO 4	Design the component of waste water treatment plant and factor which govern the design of it.
CO 5	Identify various physical, chemical and biological parameter for deciding proper treatment method and doses determination.

Mapping of CO with PO

SECV3101	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	2	2	1	1	3	3	1		1		3
CO 2	2	2	3	3	1	2	1			1		3
CO 3	2	2	3	3	1	2	1			1		3
CO 4	2	3	3	3	1	2	2			1		3
CO 5	2	2	3	3	2	2	1			1		3

Mapping of CO with PSO

SECV3101	PSO1	PSO2	PSO3
CO 1	2	3	3
CO 2	2	2	3
CO 3	2	2	3
CO 4	3	2	3
CO 5	3	3	3

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	Content	RBT Level
1	Planning for Water Supply System	1, 2, 4
2	Conveyance of Water	1, 2, 3, 4
3	Water Distribution and Supply to Buildings	1, 2, 3, 4, 5, 6
4	Sanitation System	1, 2, 3, 4, 5, 6
5	Waste Water Engineering	1, 2, 3, 4, 5
6	House Plumbing	1, 2, 3, 4

P P Savani University
School of Engineering
Department of Civil Engineering

Course Code: SECV4041
Course Name: Highway & Traffic Engineering
Prerequisite Course(s): Basics of Transportation Engineering (SECV3070)

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	-	04	40	60	20	30	-	-	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to

- gain knowledge about highly efficient traffic flow through ample research and innovative design efforts.
- use research for designing roadways and highways that increase traffic safety (strategic implementation of stop signs, traffic signs, and traffic lights).
- understand geometric and structural design of highway.
- understand traffic parameters and traffic control.
- understand accident causes and remedies.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction** Scope of Highway Engineering, Highway Planning and Development in India, Classification of Rural and Urban Roads, Road Patterns, Planning and Alignment Surveys.	03	07
2.	**Traffic Characteristics** Road user's characteristics - general human characteristics, physical, mental and emotional factors, factors affecting reaction time, PIEV theory, Vehicular characteristics: (static and dynamic), Characteristics affecting road design-width, height, length and other dimensions. Weight, power, speed and braking capacity of a vehicle.	08	18
3.	**Highway Geometric Design** Introduction; highway cross section elements, sight distance, design of horizontal alignment, design of vertical alignment, super-elevation, widening, gradients.	11	25
Section II			

Module No.	Content	Hours	Weightage in %
4.	**Highway material and construction** Pavement materials- Materials used in Highway Construction- Soils, Stone aggregates, bituminous binders, bituminous paving mixes; Portland cement and cement concrete: desirable properties, tests, requirements for different types of pavements. Problems.	05	11
5.	**Pavement Design** Types and component parts of pavements, Factors affecting design and performance of pavements. Stresses and Deflections in Flexible Pavements: Stresses and deflections in homogeneous masses. Burmister's two layer theory, three layer and multi-layer theories; wheel load stresses, various factors in traffic wheel loads; ESWL of multiple wheels. Repeated loads and EWL factors; sustained loads. Pavement behaviour under transient traffic loads. Flexible Pavement Design Methods For Highways and design of flexible pavements as per IRC.	10	22
6.	**Traffic engineering** Basic parameters, Traffic studies, Different traffic control devices, Signs, markings, signals, Traffic management and regulation, Concepts of at-grade & grade separated intersections, highway capacity, level of service.	08	17
	TOTAL	45	100

Text Book(s):

Title	Author/s	Publication
Highway Engineering	Dr. S.K. Khanna and Dr. C.E. G. Justo	Nem Chand & Bros., Roorkee
Traffic Engineering and Transport Planning	L.R. Kadiyali	Khanna Publishers, Delhi

Reference Book(s):

Title	Author/s	Publication
Highway Engineering	L.R. Kadiyali	Khanna Publishers, New Delhi
Principles, Practice & Design of Highway Engineering	S.K. Sharma	S. Chand & Co., New Delhi.
IRC – 37 Guidelines for Design of flexible Pavements, IRC, New Delhi – 2001.		
IRC – 67 Code of Practice for Road Signs, IRC, New Delhi – 2001.		
IRC: 58, 2002: "Guidelines for the Design of Plain Jointed Rigid Pavements for Highways", IRC, N. Delhi, December, 2002.		

Web Material Link(s):

- https://nptel.ac.in/courses/105103097/
- https://nptel.ac.in/courses/105103097/25

List of Practical:

Sr. No	Name of Practical	Hours
1.	California Bearing Ratio (CBR) Test	04
2.	Aggregate crushing Test	02
3.	Aggregate Impact Test	02
4.	Flakiness Index and Elongation Index Test for Aggregate	02
5.	Los Angeles Abrasion Test / Deval Abrasion Test	02
6.	Marshall stability test on Bitumen mix.	02
7.	Specific gravity and Water Absorption test for Aggregate.	02
8.	Penetration test for Bitumen.	02
9.	Softening point test for Bitumen.	02
10.	Ductility test for Bitumen.	02
11.	Flash and Fire Point test for Bitumen.	04
12.	Specific gravity test for Bitumen	02
13.	Viscosity Test for Bitumen.	02
	TOTAL	30

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests each of 30 marks and of 1 Hour duration and average of the same 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 of 15 marks during End Semester Exam.

Course Outcome(s):

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

SECV4041	HIGHWAY & TRAFFIC ENGINEERING
CO 1	Understand the importance of highway engineering.
CO 2	Discuss traffic engineering and its characteristics.
CO 3	Determine various tests on the materials used in highway construction work.
CO 4	Review various aspects related to the construction and maintenance of highways
CO 5	Evaluate the various methods of pavement design.

Mapping of CO with PO

SECV4041	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1		1	2	1	2	2	1		3	3	2	1
CO 2		1	2	2	2	2	2		3	3	2	1
CO 3		1	2	3	2	2	1		3	3	3	1
CO 4		1	2	2	2	2	2		3	3	2	1
CO 5		1	2	2	3	2	1		3	3	3	1

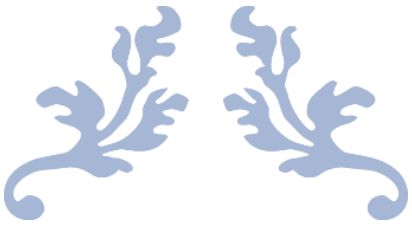
Mapping of CO with PSO

SECV4041	PSO1	PSO2	PSO3
CO 1	3	2	1
CO 2	3	2	1
CO 3	3	2	1
CO 4	3	2	1
CO 5	2	2	1

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	Content	RBT Level
1	Introduction	1, 2
2	Traffic Characteristics	1,2,4,6
3	Highway Geometric Design	1,2,3,4,5
4	Highway material and construction	1,2,4,5
5	Pavement Design	1,2
6	Traffic engineering	1,2,3,4,5



FOURTH YEAR B.TECH

P P SAVANI UNIVERSITY															
SCHOOL OF ENGINEERING															
TEACHING & EXAMINATION SCHEME FOR B. TECH. CIVIL ENGINEERING PROGRAMME AY: 2021-22															
Sem	**Course Code**	**Course Title**	**Offered By**	**Teaching Scheme**					**Examination Scheme**						
				Contact Hours				**Credit**	**Theory**		**Practical**		**Tutorial**		**Total**
				Theory	**Practical**	**Tutorial**	**Total**		**CE**	**ESE**	**CE**	**ESE**	**CE**	**ESE**	
7	SECV4011	Structural Design - II	CV	3	0	2	5	5	40	60	0	0	50	0	150
	SECV4021	Professional Practice & Valuation	CV	3	0	0	3	3	40	60	0	0	0	0	100
	SECV4030	Construction Management & Equipment	CV	3	0	1	4	4	40	60	0	0	20	30	150
	SECV4060	Earthquake Engineering	CV	3	0	0	3	3	40	60	0	0	0	0	100
		Elective-I		2	2	0	4	3	40	60	20	30	0	0	150
	SECV4910	Project /Summer internship	CV	5			0	5	0	0	100	0	0	0	100
	SEPD4010	Creativity, Problem Solving & Innovation	SEPD	3	0	0	3	3	100	0	0	0	0	0	100
						Total	**22**	**26**							**850**
8	SECV4930	Project/Training	CV	12			12	12	0	0	200	300	0	0	500
						Total	**12**	**12**							**500**
						Total	**194**	**180**							**6550**

TEACHING & EXAMINATION SCHEME FOR B. TECH. CIVIL ENGINEERING PROGRAMME AY: 2022-23 LIST OF ELECTIVES														
Course Code	**Course Title**	**Offered By**	**Teaching Scheme**					**Examination Scheme**						
			Contact Hours				**Credit**	**Theory**		**Practical**		**Tutorial**		**Total**
			Theory	**Practical**	**Tutorial**	**Total**		**CE**	**ESE**	**CE**	**ESE**	**CE**	**ESE**	
SECV3592	Prestressed Concrete	CV	3	0	0	3	3	40	60	0	0	0	0	100
SECV3612	Soil Improvement Techniques & Geotextile Engineering	CV	3	0	0	3	3	40	60	0	0	0	0	100
SECV4511	Legal Aspects in Construction Practice	CV	3	0	0	3	3	40	60	0	0	0	0	100
SECV4531	Road Safety Audit	CV	2	0	1	3	3	40	60	0	0	50	0	150
SECV4543	Software Tools in Structural Analysis & Design	CV	1	4	0	5	3	0	0	50	50	0	0	100
SECV4552	Solid Waste Management	CV	2	0	1	3	3	40	60	0	0	50	0	150
SECV4561	Traffic Engineeering: Operation and Controls	CV	2	0	1	3	3	40	60	0	0	50	0	150
SECV4571	Urban Infrastructure Engineering & Management	CV	2	0	1	3	3	40	60	0	0	50	0	150
SECV4582	Waste Water Treatment	CV	2	0	1	3	3	40	60	0	0	50	0	150
SECV4601	Urban Transportation Planning	CV	3	0	0	3	3	40	60	0	0	0	0	100
SECV4611	Modern Transportation System	CV	2	0	1	3	3	40	60	0	0	50	0	150
SECV4621	Repair Rehabilitation and Non-Destructive testing methods in Civil Engineering	CV	3	0	0	3	3	40	60	0	0	0	0	100

P P Savani University
School of Engineering
Department of Civil Engineering

Course Code: SECV4011
Course Name: Structural Design-II
Prerequisite Course(s): SECV3062 - Structural Design-I

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	05	40	60	-	-	50	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to
- understand Limit state design with code of practice for general construction.
- understand the design concept of various connections and structural members.
- apply plastic design of steel structures like water tank and roof truss.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction** Introduction to Engineering Structures - Principles of Design, Loads, Factor of Safety, Properties of Steel.	04	09
2.	**Design of Connections in Steel Structures** Bolted and Welded Connections, Different Types of Joints, Design of Various Types of Riveted and Welded Connections Subjected to Direct Loads and Moments. **Design of Tension Members** Selection of Section, IS- Specifications, Design of Axially Loaded Tension Members, Design of Members for Axial Tension and Bending, End Connections, Design of Lug Angles and Tension Splices.	10	23
3.	**Design of Compression Members** Theory of Buckling, Design of Column, Cross Section (Single and Built Up Sections), Design of Angle Struts, Eccentrically Loaded Columns, Column Splices, Lacings and Battens Design of Beams: Laterally Stability, Design of Single and Built Up Beams, Plated Beams and Curtailment of Flange Plates	08	18
Section II			

Module No.	Content	Hours	Weightage in %
4.	**Design of Column Bases and Column Footings** Slab Base-Gusseted Base Foundation and Column Bases, Subjected to Moment, Introduction to Plastic Design of Members and Load Resistance Factored Design (Lrfd) Method, Independent Column Footing, Combined Column Footing	07	14
5.	**Water Tanks** Design of Rectangular Pressed Steel Tanks, Cylindrical Tanks with Hemispherical Bottom, Design of Staging; Plastic Design of Steel Structures: Review of Plastic Analysis as Covered in Earlier Courses, Effect of Normal and Shear Forces on Plastic Moments, Lateral Buckling and Local Buckling of Beam. Design of Beams and Frames, Design of Connections-Straight Corner, Beam Column and Plate Connections	08	18
6.	**Design of Roof Trusses & Industrial Roof** Types of Trusses, Roofs and Side Coverage, Types of Loadings and Load Combinations, Design of Members and Connections. Analysis and Design of Typical Industrial Roof Trusses with Gantry Girder and Portal Frames	08	18
	TOTAL	45	100

List of Tutorials:

Sr. No	Name of Tutorial	Hours
1.	Bolted and welded connections	05
2.	Tension members	05
3.	Compression members	05
4.	Column base & slab base	05
5.	water tank	05
6.	Roof truss	05
	TOTAL	30

Text Book(s):

Title	Author/s	Publication
Design of Steel Structures	K. S. Sai Ram	Pearson Education
Design of Steel Structures	Arya & Ajmani	Nem Chand Bros, Roorkee
Design of Steel Structures". Vol – I & II	Ram Chandra	Standard Book House, New Delhi
Design of Steel Structure	Dugal S K	Tata Mc Graw Hill Publication, New Delhi

Reference Book(s):

Title	Author/s	Publication
Design of Steel Structures	P. Dayaratnam	S. Chand of Co.
Steel Structures	B.C.Punamia	Laxmi Publication

Design of Steel Structures	Negi K S	Tata Mc Graw Hill Publisher Co. Ltd

Web Material Link(s):

- https://nptel.ac.in/courses/105105162/

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.
- Internal viva consists of 10 marks.
- Drawing sheet of tutorials consists of 10 marks.

Course Outcome(s):

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

SECV4011	**STRUCTURAL DESIGN -II**
CO1	Understand the significance of various provisions made in the Indian standard codes (is 800:2007) for steel structures adapting various design philosophies.
CO2	Identify, sketch, understand and design various connections in steel structures.
CO3	Design compression, tension and flexure members using limit state method provisions in Indian standard.
CO4	Adapt and propose different column bases and design the base plates for the steel structures.
CO5	Design of industrial roof truss along with gantry girder and also special structures like water tanks using limit state method and working stress method.

Mapping of CO with PO

SECV4011	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	1	3	2	2	1	2			2	3	3	3
CO 2	1	3	2	2	1	2			2	3	3	3
CO 3	1	3	2	2	1	2			2	3	3	3
CO 4	1	3	2	2	1	2			2	3	3	3
CO 5	1	3	2	2	1	2			2	3	3	3

Mapping of CO with PSO

SECV4011	PSO1	PSO2	PSO3
CO 1	3	2	3
CO 2	3	2	3
CO 3	3	2	3
CO 4	3	2	3
CO 5	3	2	3

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	**Content**	**RBT Level**
1	Introduction	1,2
2	Design of connections in steel structures and design of tension members	2,3,4,5
3	Design of compression members	2,3,4,5,6
4	Design of column bases and column footings	4,5,6
5	Water tanks	4,5,6
6	Design of roof trusses and industrial roof	4,5,6

P P Savani University
School of Engineering
Department of Civil Engineering

Course Code: SECV4021
Course Name: Professional Practice & Valuation
Prerequisite Course(s): SECV3090 - Estimating and Costing

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	-	-	03	40	60	-	-	-	-	100

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to
- develop a basic understanding of the scope of professional practice.
- gain knowledge on types of contracts.
- understand about tendering system.
- evaluate valuation for building and land.
- understand the building procurement process.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Office Practice** Organizational Set-up, Working of Professional Firms, Office Procedure, Construction Contracts, Legal Aspects, Professional Charges, Role of Builder and Contractor. **Entrepreneurship Development** Concept Need and Scope of Entrepreneurship, Characteristic of Entrepreneurship, Forms of Business Organization	09	20
2.	**Arbitration & Easement** The Purpose of Arbitration, the Powers and Duties of Arbitrator, Arbitration and Building Contract, Types of Arbitration, Fire Insurance, Easement Characteristics and its types. **IPR and Patent Act** Importance and Scope, Forms of IPR, Patents, Copyrights, Trademarks, Relevant Acts.	07	16
3.	**P.W.D. Accounts and Procedure of Works** Organizational Set up, Classification of work, Execution of work, Book Keeping, Measurement Book, Store Procedure, Mode of Payments, Public works Accounting System.	06	14

Section II			
Module No.	Content	Hours	Weightage in %
4.	**Contracts** Introduction, Types of contracts, Formation of contract, Contract conditions, Contract for labour, material, design, construction, drafting of contract documents based on IBRD / MORTH Standard bidding documents, Construction contracts, Contract problems, Arbitration and legal requirements.	08	18
5.	**Tenders** Tender Notices, Types, Tender Procedures, Drafting Model Tenders, E-Tendering - Digital Signature Certificates, Encrypting, Decrypting, Reverse Auctions.	05	10
6.	**Valuation** Definitions, Classification of Valuations, Valuation Methods, Purpose of Valuation, Types of Property, Depreciation, Sinking Fund, Lease Hold and Free Hold Property, Obsolescence, Gross Income, Outgoing and Net Income, Capitalized Value and Year's Purchase; Rental Method of Valuations, and Typical Problems, Escalation, Valuation of Land, Buildings, Calculation of Standard Rent, Mortgage, Lease.	10	22
	TOTAL	45	100

Text Book(s):

Title	Author/s	Publication
Construction Project Management, Theory and Practices	Kumar Neeraj Jha	Pearson
Principles and Practices of Valuation	D. N. Banerjee	V Edition, Eastern Law House
Estimating, Coasting & Valuation	S.C.Rangwala	Charotar Publication

Reference Book(s):

Title	Author/s	Publication
Professional Practice	Rashan Nanavati	Lakhani book Depot, Mumbai
PWD Handbook & Survey	Govt. of India	
Indian Standard Code-1200	Govt. of India	
Construction Project Management	K K Chitkara	Tata Mac Grow Hill

Web Material Link(s):

- https://en.wikipedia.org/wiki/Contract
- https://eprocure.gov.in/eprocure/app
- http://www.civilprojectsonline.com/civil-projects/methods-of-valuation-of-a-building/
- https://en.wikipedia.org/wiki/Easement
- https://en.wikipedia.org/wiki/Arbitration

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.

Course Outcome(s):
After completion of the course, the student will be able to

SECV4021	**Professional Practice & Valuation**
CO 1	Understand about office procedure, entrepreneurship development, ipr & easement.
CO 2	Execute and understanding work flow of pwd for initiating of works.
CO 3	Analyze and apply industry professional knowledge.
CO 4	Apply knowledge of tendering and contracting in civil engineering practices.
CO5	Analyze property data and trends to determine property value for a property.

Mapping of CO with PO

SECV4021	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	1					3		3	3	3	2	3
CO 2	1					3		3	3	3	2	3
CO 3	1					3		3	3	3	2	3
CO 4	1					3		3	3	3	2	3
CO 5	2	2				3		3	3	3	3	

Mapping of CO with PSO

SECV4021	PSO1	PSO2	PSO3
CO 1	3	2	3
CO 2	3	2	3
CO 3	3	2	3
CO 4	3	2	3
CO 5	3	1	3

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	Content	RBT Level
1	Office Practice & Entrepreneurship Development	1, 2, 3
2	Arbitration & Easement, IPR and Patent Act	1, 2, 3, 4
3	P.W.D. Accounts and Procedure of Works	1, 2, 3, 4, 5, 6
4	Contracts	1, 2, 3, 4
5	Tenders	1, 2, 3, 4, 5, 6
6	Valuations	1, 2, 3, 4, 5, 6

P P Savani University
School of Engineering
Department of Civil Engineering

Course Code: SECV4030
Course Name: Construction Management & Equipment
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	-	01	04	40	60	-	-	20	30	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to
- define and describe construction processes and various engineering roles involved.
- describe, interpret, and differentiate between project delivery systems in construction projects.
- explain and develop work breakdown structures.
- develop construction plans and schedules.
- categorize construction operations, equipment.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Construction Management** Introduction of Construction Management, Objectives and Scope of Construction Management. A Construction Project, Phases of Construction Project, Importance of Construction and Construction Industry, Indian Construction Industry Need of Construction Management, Stakeholders of Construction Management	06	14
2.	**Construction Planning** Types of Project Plans, Work Break Down Structure, Planning Techniques, Bar Charts, CPM and PERT Network Analysis, Line of Balance Method, Project Scheduling and Resource Leveling, Resource Allocation, Importance of Project Scheduling	06	14
3.	**Construction Quality Management** Construction Quality, Inspection, Quality Control and Quality Assurance in Projects, Total Quality Management.	11	22
Section II			
Module No.	Content	Hours	Weightage in %

4.	**Construction Equipment** Introduction to Construction Equipment and their Contribution and Importance in Construction Industry. Classification of Equipment, Financial Aspects related to Construction Equipment: Discounted Present Worth Analysis, Depreciation, Cost of Owning and Operating Construction Equipment, Basics of Equipment Replacement Policy	08	18
5.	**Excavating Equipment** Power Shovels, Draglines, Hoes, Clam Shells and Trenching Machines, their Basic Parts, Operation, Output Estimation, Factors Influencing output and Methods to Enhance it, Tractors and Related Equipment: Bulldozers, Rippers, Scrapers & Overview of Other Equipment	08	18
6.	**Belt Conveyor System** Terminology, Classification, Components, Power Requirement Estimation and Design. **Hauling Equipment** Trucks and Wagons, Operation and Guideline for Selection and Deployment.	06	14
	TOTAL	45	100

List of Tutorials:

Sr. No	Name of Tutorial	Hours
1	Write a scope and objectives of construction management.	01
2	Draw a work break down structure for a given job and draw a job layout for given construction project.	01
3	Example based on Bar charts.	02
4	Example based on Milestone charts.	02
5	Example based on line of balance technique.	02
6	Tutorial based on CPM & PERT.	02
7	Tutorial based on resource allocation and resource scheduling.	02
8	Tutorial based on construction equipment like classification of equipment, financial aspect, depreciation, cost of owning and operating.	02
9	Write in brief about hauling equipment, excavating equipment and belt conveyor system with neat sketches.	01
	TOTAL	15

Text Book(s):

Title	Author/s	Publication
Construction Planning, Equipments and Methods	R.L. Peurifoy and W.B. Ledbetter	McGraw-Hill Publishers. New Delhi.
Project Planning and control with PERT & CPM	B.C. Punmia and K.K Khandelwal	Laxmi Publication Pvt. Ltd. New Delhi.

Reference Book(s):

Title	Author/s	Publication
A Management Guide to PERT/ CPM	J. D. Weist and F.K. Levy	Prentice Hall of India Pvt. Ltd.
Construction Project Management (Theory & Practice)	Kumar Neeraj Jha	Pearson
Construction Planning and Management	P.S. Gahlot and B.M. Dhir	New Age International Pvt. Ltd., New Delhi.

Web Material Link(s):

- https://en.wikipedia.org/wiki/Construction_management
- http://www.interventions.org/pertcpm/
- https://www.smartsheet.com/blog/5-strategies-of-construction-pm
- https://www.thebalancesmb.com/construction-schedule-techniques-844480
- https://www.designingbuildings.co.uk/wiki/Line_of_balance_(LOB)

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.

Tutorial:

- Continuous Evaluation consists of tutorial which will be evaluated out of 10 for each tutorial and average of the same will be converted to 10 marks.
- Internal viva consists of 10 marks.
- Viva/Oral performance of 30 marks during End Semester Exam.

Course Outcome(s):

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

SECV4030	Construction Management & Technique
CO 1	Understand the different construction management techniques and application of different construction equipment.
CO 2	Learn the concept of construction management and different job layout.
CO 3	Develop the cpm and pert network of various construction activities.
CO 4	Develop concepts related with construction management & equipment management.
CO 5	Categorize construction equipment in relation to their functional application on projects.

Mapping of CO with PO

SECV4030	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	1			1	1	2	3	3	3	3	3	3
CO 2					1	2	3	3	3	3	3	3
CO 3	2	1			1		3	3	3	3	3	3
CO 4					1	2	3	3	3	3	3	3
CO 5				1	1	2	3	3	3	3	3	3

Mapping of CO with PSO

SECV4030	PSO1	PSO2	PSO3
CO 1	3	3	3
CO 2	3	3	3
CO 3	3	3	3
CO 4	3	3	3
CO 5	3	3	3

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	Content	RBT Level
1	Construction Management	1, 2, 3
2	Construction Planning	1, 2, 3,4
3	Construction Quality Management	1, 2, 3, 4
4	Construction Equipment	1, 2, 3, 4, 5, 6
5	Excavating Equipment	1, 2, 3, 4
6	Belt Conveyor Systems & Hauling Equipment	1, 2, 3, 4

P P Savani University
School of Engineering
Department of Civil Engineering

Course Code: SECV4060
Course Name: Earthquake Engineering
Prerequisite Course(s): - Structure Design I and II (SECV3062 & SECV4011)

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	-	-	03	40	60	-	-	-	-	100

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to

- Understand ground motion, magnitude, intensity, frequency and plate tectonics
- Compute ground motion intensity measures and attenuation relationships.
- Understand the earthquake hazard and design response spectra for the same.
- Apply building code earthquake requirements in design of structural systems.
- Apply the basics of structural dynamics in analysis of structures subjected to earthquakes

Course Content:

Section I			
Module	Content	Hours	Weightage in %
1.	**Introduction** Inner & Outer core of earth plate tectonics & its circulation – Earthquake types – Types of faults – Different types of seismic waves – Measuring instruments of earthquake – Strong ground motion & it's characteristics – Magnitudes intensity of earthquake	06	14
2.	**Seism tectonic / Seismic Environment of Indian Region** Seismic Geography and tectonic features of India – Seismic zones earthquake in India	07	16
3.	**Seismic effect on Structures & Seismic Design Philosophy** Inertia force in structures & its foundation deformations in structure – Horizontal & vertical movement of structures – Drift – Twisting of structures during earthquake – Building codes. Earthquake Design philosophy – Acceptance damage & ductility of building & capacity design concept – Quality control – Importance of Flexibility of structures – Indian seismic codes.	09	20
Section II			
Module	Content	Hours	Weightage in %

4.	**Seismic Effects on Masonry Structures** Behaviour of Brick Masonry & stone masonry under earthquake engineering – Construction aspects to improve the behaviour of masonry wall – selection of building materials – Structure configuration of masonry buildings – Earthquake resistant features of masonry work, Earthquake Structure.	05	10
5.	**Seismic effect on Reinforced Concrete Building** Reinforced concrete buildings – Role of slab & masonry works – Behaviour R C Beams under seismic loadings, infill wall effect, shear wall position & effect.	08	18
6.	**Base Isolation System** Introduction to seismic dampers – viscous damper – Friction dampers – Yielding devices, active isolation method.	10	22
	TOTAL	45	100

Text Book(s):

Text Book	Author	Publication
Earthquake Resistant Design of Structures" 1st edition	Pankaj Agrawal & Manish Sprikhande	Prentice Hall of India Pvt Ltd, New Delhi.
An Introduction to seismic Isolation	Skinner R I & Robinson W H	Isolation Jonn wiley & sons, New York.
Design for Earthquakes	Ambrose J S Vergun D	John Wiley & Sons INC, New York
Seismic Design of reinforced Concrete & Masonry buildings	Paulay T & Priestley M J N,	John Wiley & Sons, New York
Earthquake Resistant Concrete Structures	Penelis G G & Kappos A J	E & FN Son, UK
Relevant Indian Standard Earthquake coded	IS: 1893-2000, 13920-1993, 13828- 1993, 4326 -1996	Gov. of India

Web Material:

- NPTEL :: Civil Engineering – Introduction to Earthquake Engineering

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):

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

SECV4060	EARTHQUAKE ENGINEERING
CO1	Classify the earthquake and differentiate the magnitude and intensity of the earthquake.
CO2	Categorize the geography and tectonic features of India to facilitate earthquake severity.
CO3	Estimate the distress generation in the structural member due to earthquake wave propagation.
CO4	Evaluate the seismic performance behavior of RC frame structure and masonry structure.
CO5	Adapt base isolation techniques to control the adverse effect of the seismic waves.

Mapping of CO with PO

SECV4060	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1		1	1	3	3		1	1		3		1
CO 2		1	1	3	3		1	1		3		2
CO 3	2	3	3	3	3	3	3	3	1	2	2	2
CO 4	2	3	3	3	3	3	3	3	1	2	3	2
CO 5	3	3	3	3	3	3	3	3	1	3	3	2

Mapping of CO with PSO

SECV4060	PSO1	PSO2	PSO3
CO 1		1	3
CO 2		1	3
CO 3	3	3	3
CO 4	3	3	3
CO 5	3	3	3

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	Content	RBT Level
1	Introduction	1, 2
2	Seism tectonic / Seismic Environment of Indian Region	1, 2
3	Seismic effect on Structures & Seismic Design Philosophy	2, 3, 5, 6
4	Seismic Effects on Masonry Structures	2, 3, 5, 6
5	Seismic effect on Reinforced Concrete Building	2, 3, 4, 5, 6
6	Base Isolation System	2, 4, 6

P P Savani University
School of Engineering
Department of Civil Engineering

Course Code: SECV4910
Course Name: Project/Summer Internship
Prerequisite Cours/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	
-	05	-	05	-	-	100	00	-	-	100

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to

- have first-hand experience the real time situations in industrial scenario.
- get familiar with engineering applications in industrial spectrum
- learn to adapt themselves in professional scenario

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
	TOTAL	**100**

Course Outcome:
After completion of the course, the student will be able to

SECV4910	Project/Summer Internship
CO 1	Apply fundamental and disciplinary concepts and methods in ways appropriate to their principal areas of study.
CO 2	Determine the challenges and future potential for his/her internship organization in particular and the sector in general.

CO 3	Test the theoretical learning in practical situations by accomplishing the tasks assigned during the internship period.
CO 4	Apply various soft skills such as time management, positive attitude and communication skills during performance of the tasks assigned in internship organization.
CO 5	Analyze the functioning of internship organization and recommend changes for improvement in processes.

Mapping of CO with PO

SECV4910	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	1	3	3	3	3		3		2		2	3
CO 2		3	2	3	1	3	3	3	2		2	3
CO 3	1	3	3	3	3	3	3	3	2		2	3
CO 4		1	1	1	1	2	3	3	3	3		3
CO 5		2	1	2	2	2	3	3	3			3

Mapping of CO with PSO

SECV4910	PSO1	PSO2	PSO3
CO 1	3	1	3
CO 2	3	3	3
CO 3	3	3	2
CO 4	1	3	1
CO 5		3	3

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	**Content**	**RBT Level**
1.	Selection of Companies	3
2.	Company Information collection	3, 5, 6
3.	Report Writing	5, 6
4.	Presentation & Question-Answer	1, 2, 3, 4, 5, 6

P P Savani University
School of Engineering
Department of Civil Engineering

Course Code: SECV3592
Course Name: Prestressed Concrete
Prerequisite Course/s: Strength of Materials (SECV2011), Concrete Technology (SECV3030)

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	-	-	03	40	60	-	-	-	-	100

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to
- understand the basics of prestressing.
- understand the Manufacturing techniques of prestressed members.
- analyze and design members under different loading and boundary conditions.

Course Content:

Section I			
Module. No.	Content	Hours	Weightage in %
1.	**Introduction of Prestress Concrete** Basic Concepts of Prestressing, Historical Development of prestressing, Materials and systems for prestressing, Types of Prestressing, Advantages and Limitations of Prestressing.	07	16
2.	**Losses in Prestress** Introduction, Losses due to Friction, Losses due to Anchorage Slip, Losses due to Elastic Shortening, Time-Dependent losses due Creep, Shrinkage and Relaxation, Total immediate losses, Total Time-Dependent losses, Illustrative Examples.	04	06
3.	**Analysis of Members** Analysis of members, under axial load, analysis at transfer, analysis at service loads, analysis of ultimate strength, analysis of behaviour, analysis of member, under flexure, analysis at service loads based on stress concept based on force concept based on load balancing concept analysis of member under flexure, cracking moment kern point pressure line. Analysis of member under flexure analysis for ultimate strength variation of stress in steel condition at ultimate limit state, analysis of rectangular sections, analysis of flanged sections, analysis of partially prestressed sections.	06	14

4.	**Flexural Design of Prestressed concrete Members** Introduction, Types of Flexural Failures, Selection of concrete section and tendon profile, Strain Compatibility Method, Design of Pretensioned Beams, Design of Post-tensioned Beams, Design of Composite Prestressed Concrete Beams, Design of Simply supported Slabs, Camber, Deflection and Crack Control, End Block Design.	06	14
Section II			
Module No.	Content	Hours	Weightage in %
5.	**Analysis and Design for Shear and Torsion** Analysis for shear, stress in an uncracked beam, types of cracks, components of shear resistance, modes of failure effect of prestressing force design for shear, limit state of collapse for shear, maximum permissible shear stress, design of transverse reinforcement, detailing requirement for shear, design for shear, general comments, design steps, design of stirrups for flange. Analysis for Torsion: introduction stresses in an uncracked beam, crack pattern under pure torsion, components of resistance for pure torsion, modes of failure effect of prestressing force design for torsion, limit state of collapse for torsion, design of longitudinal reinforcement, design of transverse reinforcement, design for torsion, detailing requirements general comments, design steps.	07	16
6.	**Calculations of Deflection and Crack Width** Calculation of deflection, deflection due to gravity loads, deflection due to prestressing force, total deflection limits of deflection, determination moment of inertia limits of span-to-effective depth ratio, calculation of crack width method of calculations limits of crack width.	02	04
7.	**Transmission of Prestress** Transmission of prestress, introduction pre-tensioned members transmission length development length end zone reinforcement, transmission of prestress, post-tensioned members end zone reinforcement bearing plate.	03	07
8.	**Cantilever and Continuous Beams** Cantilever beams introduction, analysis determination of limiting zone cable profile, continuous beams, introduction analysis incorporation of moment due to reactions, pressure line due to prestressing force, continuous beams, concordant cable profile cable profiles, partially continuous beams, analysis at ultimate limit state, moment redistribution.	03	07

9.	**Special Topics** Composite sections introduction, analysis of composite sections, design of composite sections, analysis for horizontal shear transfer, one-way slabs, analysis and design ,two-way slabs, analysis features in modelling and analysis, distribution of moments to strips two-way slab checking for shear capacity, spandrel beams, anchorage devices, additional aspects compression members, analysis development of interaction diagram effect of prestressing force, circular prestressing, general analysis and design, prestressed concrete pipes, liquid storage tanks, ring beams, conclusion.	07	16
	TOTAL	45	100

Text Book(s):

Title	Author/s	Publication
Prestressed Concrete	N. Krishna Raju	Tata Mcgraw-Hill, 3rd Edition.
Design of Prestressed concrete structures	Lin T.Y. & H. Burns	John Wiley & Sons

Reference Book(s):

Title	Author/s	Publication
Prestressed Concrete Structures	P. Dayaratnam	Oxford & IBH 5th Edition.

Web Material Link(s):

- https://nptel.ac.in/courses/105106117/
- http://www.nptelvideos.in/2012/11/prestressed-concrete-structures.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.

Course Outcome(s):

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

SECV3592	Prestressed Concrete
CO1	Differentiate the advantages and limitations of prestressed concrete over reinforced concrete.
CO2	Assess the losses in prestress, short and long term deflection, flexural and shear strength of beam.
CO3	Analyze and design the prestressed beams for various critical conditions like shear, torsion, deflections.
CO 4	Apply and adapt modern prestressing methods of structural elements like beam and slab.

Mapping of CO with PO

SECV3592	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	1	3	2	1		3	1	1	2	3	2	3
CO 2	1	3	2	2	1	2			2	3	2	1
CO 3	1	3	2	2	1	2			2	3	2	1
CO 4	1	3	2	1	1	3	1	1	2	3	2	3

Mapping of CO with PSO

SECV3592	PSO1	PSO2	PSO3
CO 1	3	2	2
CO 2	3	2	2
CO 3	3	2	2
CO 4	3	3	3

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	Content	RBT Level
1	Introduction of Prestress concrete	1,2
2	Losses in Prestress	2,3
3	Analysis of members	4,5
4	Flexural design of prestressed concrete members	4,5,6
5	Analysis and design for shear and torsion	4,5,6
6	Calculation of deflection and crack width	4,5,6
7	Transmission of prestress	5,6
8	cantilever and continuous beams	4,5,6
9	special topics	2,3

P P Savani University
School of Engineering
Department of Civil Engineering

Course Code: SECV3612
Course Name: Soil Improvement Techniques & Geotextile Engineering
Prerequisite Course(s): Geology & Geotechnical Engineering (SECV2060), Soil Mechanics (SECV3011)

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	-	-	03	40	60	-	-	-	-	100

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to
- understand the different types of Ground Improvement techniques.
- understand type of technique use for different soil condition.
- evaluate the different properties of Soil including different tests for best suitable technique.
- analyze the functions of geotextile and its suitability.
- design different structures using geosynthetics according to various applications.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction** Need of Ground Improvement, Different methods of Ground improvement, General Principal of Compaction: Mechanics, field procedure, quality control in field. Ground Improvement in Granular Soil: In place densification by (i) Vibrofloatation (ii) Compaction pile (iii) Vibro Compaction Piles (iv) Dynamic Compaction (v) Blasting.	08	18
2.	**Ground Improvement in Cohesive Soil** Compressibility, vertical and radial consolidation, preloading methods. Types of Drains, Design of vertical Drains, construction techniques. Stone Column: Function Design principles, load carrying capacity, construction techniques, settlement of stone column foundation.	07	14
3.	**Soil Stabilization** Lime stabilization-Base exchange mechanism, Pozzolanic reaction, lime-soil interaction, line columns, Design of Foundation on lime columns. Cement stabilization: Mechanism, amount, age and curing. Fly-ash - Lime Stabilization, Soil Bitumen Stabilization.	08	18

Section II			
Module No.	Content	Hours	Weightage in %
4.	**Geotextile** Definitions, functions, properties, and application of Geotextiles, design of Geotextile applications. **Geomembrane** Definitions, functions, properties and applications of geomembranes, design of geomembranes applications, Geotextiles associated with geomembranes, testing on geotextiles, environmental efforts, ageing and weathering.	10	22
5.	**Soil Reinforcement** Mechanism, Types of reinforcing elements, reinforcement-soil interaction, Reinforcement of soil beneath the roads, foundation. Geosynthetics and their application.	08	18
6.	**Grouting in soil** Different types and properties, desirable characteristics, grouting pressure, grouting methods.	04	10
	TOTAL	45	100

Text Book(s):

Title	Authors	Publication
Ground Improvement Techniques	P. Purushothama Raj	Tata McGraw-Hill
Text Book On Engineering with Geotextiles	G. V. Rao and G. V. S. Rao	Tata McGraw-Hill

Reference Book(s):

Title	Author/s	Publication
Soil Mechanics	Karl Terzaghi	Chapman and Hall
Handbook on Geosynthetics and their applications	Sanjay Kumar Shukla	Thomas Telford, 2002
ASTM and Indian Standards on Geotextiles		

Web Material Link(s):

- https://nptel.ac.in/courses/105101143/
- https://onlinecourses.nptel.ac.in/noc17_ce08/
- https://nptel.ac.in/courses/105106052/

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):

After the completion of the course, the following course outcomes will be able to:

SECV3612	**Soil Improvement Techniques & Geotextile Engineering**
CO 1	Understand the need of ground improvement and its method.
CO 2	Analyse and compute different properties of geosynthetics.
CO 3	Outline the contribution of grouting materials and their influence on soils for greater load carrying capacity.
CO 4	Illustrate the various methods of ground improvement techniques to increase load bearing

Mapping of CO with PO

SECV3612	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1		1			1							
CO 2	1	1		1								
CO 3			1		1							
CO 4	1			1	1	2				1	1	

Mapping of CO with PSO

SECV3612	PSO1	PSO2	PSO3
CO 1	1		
CO 2	1		
CO 3		1	
CO 4	1		

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	Content	RBT Level
1.	Introduction	1, 2
2.	Ground Improvement in Cohesive Soil	1, 2
3.	Soil Stabilization	1, 2
4.	Geotextile & Geomembrane	1, 2, 4, 5
5.	Soil Reinforcement	2, 4, 3
6.	Grouting in soil	2

P P Savani University
School of Engineering
Department of Civil Engineering

Course Code: SECV4511
Course Name: Legal Aspects in Construction Practice
Prerequisite Course(s): Estimation & Costing (SECV3090)

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	-	-	03	40	60	-	-	-	-	100

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to
- study the various types of construction contracts and their legal aspects and provisions.
- study the tenders, arbitration, legal requirements, labor and human rights regulations.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction to Construction Law** Need for Legal Issues in Construction in the Indian Judicial System – Context of Construction Industry, Principles of a Contract, Indian Contract Act 1872 – Provisions for Construction Industry, Essentials of a Valid Contract, Types of Contracts, Alternate Contract Methods, Concept of Completion of a Contract, IT Law 2000 and its Influence on Construction Contract.	12	26
2.	**Construction Tendering Process** Introduction to Construction Process, Need for Tendering, Process of Tendering in Construction, Importance of Specifications and Estimates in Construction, Concept of Completion of the contract, Sub-Contracts and requirements, Tendering Models and Strategies, Prequalification of Bidders, Documents Forming a BID and a Contract, Agreements and Bonds in Tendering Process	10	24
Section II			
Module No.	Content	Hours	Weightage in %
3.	**Construction Administration** Duties and Responsibilities – Project Manager, Owner, Engineers and Contractors, Important Site Documents, Process of Building	06	13

	Permissions, Provision for Scheduling delays and accelerations, Environmental Provisions for Construction Contracts		
4.	**Disputes and Liabilities in Construction** Major Sources of disputes in Construction, Delays – Types, Claims and Solutions, Labor Laws in India, Worker Compensation and Insurance Laws, Construction Liabilities and Litigations, Disputes in Land Development	08	17
5.	**Dispute Resolution in Construction** Dispute Resolution in Construction, Judicial Process in Dispute Resolution, Alternate Dispute Resolution Methods, Arbitration and Conciliation Act 1996, Importance of Arbitration in Construction, Arbitration Process, Arbitration Clause in Contracts	09	20
	TOTAL	45	100

Text Book(s):

Title	Author/s	Publication
Indian Contract Act 1872	-	Universal Law Publishing, New Delhi, India
Indian Arbitration and Conciliation Act,1996	-	Ministry of Law and Justice , Law literature Publication, India
Laws Relating to Building and Engineering Contracts in India	Gajaria G T	M.M.Tripathi Private Ltd., Bombay

Reference Book(s):

Title	Author/s	Publication
Gujrat B & C Code , 1986	Gopal Ranjan, Rao A.S. R	New age int. (p) ltd.
Contracts and the Legal Environment for Engineers and Architects	Joseph T. Bockrath	McGraw Hill, 2000
Construction Contracts	Jimmie Hinze	McGraw Hill

Web Material Link(s):

- https://nptel.ac.in/courses/105103097/

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):

After the completion of the course, the following course outcomes will be able to:

SECV4511	Legal Aspects in Construction Practice
CO 1	Recognize the rights and duties under various legal acts.

CO 2	Identify parties involved in contracts and the different types of contracts used in the construction industry
CO 3	Understand the tendering process.
CO 4	Practice using contracts for assigning roles and responsibilities.
CO 5	Understand the value of documentation and arbitration process in resolving construction disputes.

Mapping of CO with PO

SECV4511	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1						3	3	3	3	3	3	3
CO 2						3	3	3	3	3	3	3
CO 3						3	3	3	3	3	3	3
CO 4						3	3	3	3	3	3	3
CO 5						3	3	3	3	3	3	3

Mapping of CO with PSO

SECV4511	PSO1	PSO2	PSO3
CO 1	3	3	3
CO 2	3	3	3
CO 3	3	3	3
CO 4	3	3	3
CO 5	3	3	3

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	**Content**	**RBT Level**
1.	Introduction to Construction Law	1, 2
2.	Construction Tendering Process	1, 2
3.	Construction Administration	1, 2
4.	Disputes and Liabilities in Construction	1, 2
5.	Dispute Resolution in Construction	1, 2

P P Savani University
School of Engineering
Department of Civil Engineering

Course Code: SECV4531
Course Name: Road Safety Audit
Prerequisite Course(s): Basics of Transportation Engineering (SECV3070) and Highway and Traffic Engineering (SECV4041)

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	-	01	03	40	60	-	-	50	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to
- understand the role of road safety in planning the urban infrastructures design is discussed.
- be aware of importance of road safety aspects and environmental impacts for commissioning the highway project.
- give the idea for mitigation measures for improving traffic safety and environment.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Overview of road safety audit** Road Safety Audit, Road Defects as a Cause of Accidents, Road Safety Engineering, Limitations of Design Standards and International Consultants, Audit Team, Cost Implications, Problems & Issues	05	17
2.	**Conducting road safety audits** The Audit Process, Initiating the Audit, Providing the Background Information, Studying the Plans and Inspecting the Site, holding a Commencement Meeting with the Designer and Client, Undertake the Audit, Writing the Audit Report, holding a Completion Meeting, Writing the Responses Report, Follow-up.	06	20
3.	**The audit of road designs** Introduction, Feasibility Studies, Preliminary Design, Detailed Design, Pre-Opening Stage	04	13
Section II			
Module No.	Content	Hours	Weightage in %
4.	**Road Signs and Traffic Signals**	05	17

	Classification, Location of Signs, Measures of Sign Effectiveness, Types of Visual Perception, Sign Regulations, Sign Visibility, Sign Variables, Text Versus Symbols		
5.	**Road Marking** Role of Road Markings, Classification, Visibility. Traffic Signals: Need, Signal Face. Illumination and Location of Signals, Factors Affecting Signal Design, Pedestrians' Safety, Fixed and Vehicle Actuated Signals. Design of Signals, Area Traffic Control. Delineators, Traffic Impact Attenuators, Road Side Rest Areas, Safety Barriers, Traffic Aid Posts.	06	20
6.	**Engineering Measures** Speed Humps, Speed Bumps, Speed Tables, Speed Cushions; Community Awareness and Education (Speed Limits); Enforcement-Non-Physical Measures – Physical Measures	04	13
	TOTAL	30	100

List of tutorials:

Sr. No	Name of Tutorial	Hours
1	Collection of road accident data & analysis of collected data.	03
2	Collection of data regarding black spots on major highways including geometric details & Analysis of black spots data and suggest mitigation measures.	03
3	Collection of air quality data (emission level) and noise level data on problematic spots of highway and Analysis of collected data and suggest improvement measures.	03
4	Audit of Roadworks & Audit of Building Development,	02
5	Safety Review of Existing Roads.	02
6	Audit of Traffic Management Schemes	02
	TOTAL	15

Text Book(s):

Title	Author/s	Publication
Traffic Engineering and Transportation Planning	L. R. Kadiyali	Khanna Publishers
Fundamentals of Transportation Engineering	C. S. Papacostas	Prentice Hall India

Reference Book(s):

Title	Author/s	Publication
Highway Safety code	Indian Roads Congress	IRC: SP-44:1996
Road Safety Audit Manual	Indian Roads Congress	IRC: SP-88-2010

Web Material Link(s):

- http://morth-roadsafety.nic.in/index1.aspx?lsid=504&lev=2&lid=456&langid=1

- https://en.wikipedia.org/wiki/Road_safety_audit
- https://en.wikipedia.org/wiki/Road_signs_in_India
- https://en.wikipedia.org/wiki/Road_surface_marking

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.

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.
- Internal viva consists of 10 marks.
- Presentation/Report consists of 10 marks.

Course Outcome(s):

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

SECV4531	**ROAD SAFTY AUDIT**
CO 1	Discuss the overview of road safty audit.
CO 2	Explain the road safety audit process and road audit of designs.
CO 3	Discuss about road marking,road signs and traffic signals.
CO 4	Recognize engineering measures like speed bumps, speed limit etc.

Mapping of CO with PO

SECV4531	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1			1	1		2			3	3	2	1
CO 2			1	1		2			3	3	2	1
CO 3			1	1					3	3	2	1
CO 4			1	1	1				3	3	2	1

Mapping of CO with PSO

SECV4531	PSO1	PSO2	PSO3
CO 1	3	2	1
CO 2	3	2	1
CO 3	3	2	1
CO 4	3	2	1

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	Content	RBT Level
1	Overview of road safety audit	1, 2,3
2	Conducting road safety audits	1, 2,3,4
3	The audit of road designs	1, 2,4,5
4	Road Signs and Traffic Signals	1,2,4
5	Road Marking	1,2,3,5
6	Engineering Measures	1,2,3,4

P P Savani University
School of Engineering
Department of Civil Engineering

Course Code: SECV4543
Course Name: Software Tools in Structural Analysis and design
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	
01	04	-	03	-	-	50	50	-	-	100

CE: Continuous Evaluation, ESE: End Semester Exam

Objective of the Course:
To help learners to
- Analyze structural components like beams, truss
- Understand behavior of components by changing design and loading pattern
- Design beam column slab footing according to standards

Note: Students have to learn two software in the course

List of Theory/Practical:

Sr. No	Name of Theory/Practical	Hours
1.	Beam analysis	08
2.	Frame analysis	08
3.	Truss analysis	08
4.	Column analysis	08
5.	Slab analysis	06
6.	Staircase analysis	06
7.	Foundation analysis	08
8.	Shear wall analysis	08
	TOTAL	60

Text Book(s):

Title	Authors	Publication
Staad Pro V8i for Beginners	T.S. Sharma	Notion Press; 1 edition
Theory of Structures	S. Ramamrutham	Dhanpat Rai publishing company; ninth edition edition
Reinforced Concrete Design	Devdas Menon	McGraw Hill Education; 3 edition

Web Material Link(s):
- https://www.youtube.com/channel/UCSKDRIXmpja7b719rQhAw8Q/videos

Course Evaluation:

Theory:
Theory portion is supplementary teaching for hands on practice only.

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 30 marks.
- Manual verification of the software results consists of 10 marks.
- Internal viva consists of 10 marks.
- Practical performance/quiz/test consists of 30 marks during end semester exam.
- Viva/oral performance during end semester examination of 20 marks.

Course Outcome(s):
After the completion of the course, the student will be able to

SECV4543	**SOFTWARE TOOLS IN STRUCTURAL ANALYSIS AND DESIGN**
CO1	Understand the importance of analysis and design software in civil engineering industry.
CO2	Develop a model, analyze and design any structure like buildings, bridges, water tanks etc.
CO3	Design various structures to be economical, safe and durable against all critical conditions.
CO4	Differentiate the analysis and design outputs with the help of design software and manual calculations.

Mapping of CO with PO

SECV4543	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	3	3	3	3	2	1		3	3	3	3
CO 2	2	3	3	3	3	2	1		3	3	3	3
CO 3	2	3	3	3	3	2	1		3	3	3	3
CO 4	2	3	3	3	3	2	1		3	3	3	3

Mapping of CO with PSO

SECV4543	PSO1	PSO2	PSO3
CO 1	3	3	3
CO 2	3	3	3
CO 3	3	3	3
CO 4	3	3	3

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	**Content**	**RBT Level**
1	Beam analysis	1, 2, 3, 4
2	Column analysis	1, 2, 3, 4

3	Slab analysis	1, 2, 3, 4
4	Staircase analysis	1, 2, 3, 4
5	Foundation analysis	1, 2, 3, 4
6	Frame analysis	2, 3, 4, 5, 6
7	Truss analysis	2, 3, 4, 5, 6
8	Shear wall analysis	2, 3, 4, 5, 6

P P Savani University
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Department of Civil Engineering

Course Code: SECV4552
Course Name: Solid Waste Management
Prerequisite Course/s: Environmental Engineering (SECV3040), Water & Waste Water Engineering (SECV3101)

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	-	01	03	40	60	-	-	50	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to

- assess the activities involved for the proposed and determine the type, nature and estimated volumes of waste to be generated.
- identify any potential environmental impacts from the generation of waste at the site.
- recommend appropriate waste handling and disposal measures / routings in accordance with the current legislative and administrative requirements.
- categories waste material where practicable (inert material / waste fractions) for disposal considerations i.e. public filling areas / landfill.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Sources and Composition of Municipal Solid Waste** Introduction, Sources of Solid Waste, Types of Solid Waste, Composition of Solid Waste and its Determination, Types of Materials Recovered from MSW	03	10
2.	**Properties of Municipal Solid Waste** Physical Properties of Municipal Solid Waste, Chemical Properties of Municipal Solid Waste, Biological Properties of Municipal Solid Waste, Transformation of Municipal Solid Waste	03	10
3.	**Solid Waste Generation and Collection** Quantities of Solid Waste, Measurements and Methods to Measure Solid Waste Quantities, Solid Waste Generation and Collection, Factors affecting Solid Waste Generation Rate, Quantities of Materials Recovered from MSW.	04	13
4.	**Handling, Separation and Storage of Solid Waste**	05	17

	Handling and Separation of Solid Waste at Site, Material Separation by Pick in, Screens, Float and Separator Magnets and Electromechanical Separator and other Latest Devices for Material Separation. Waste Handling and Separation at Commercial and Industrial Facilities, Storage of Solid Waste at the Sources.		
Section II			
Module No.	Content	Hours	Weightage in %
5.	**Processing of Solid Waste** Processing of Solid Waste at Residence e.g. Storage, Conveying, Compacting, Shredding, Pulping, Granulating etc., Processing of Solid Waste at Commercial and Industrial Site.	04	13
6.	**Disposal of Municipal Solid Waste** Combustion and Energy Recovery of Municipal Solid Waste, Effects of Combustion, Undesirable Effects of Combustion, Landfill: Classification, Planning, Sitting, Permitting, Landfill Processes, Landfill Design, Landfill Operation, Use of Old Landfill, Differentiate Sanitary Land Fill and Incineration as Final Disposal System for Solid Waste, Biochemical Processes: Methane Generation by Anaerobic Digestion, Composting.	06	20
7.	**Hazardous Solid Waste** Definition, Identification and Classification of Hazardous Solid Waste, Characteristics Hazardous Waste Toxicity, Reactivity, Infectiousness, Flammability, Radioactivity, Corrosiveness, Irritation, Bio-Concentration, Genetic Activity, Explosiveness, Bio-Medical Waste.	05	17
	TOTAL	30	100

List of Tutorial:

Sr. No.	Name of Tutorial	Hours
1.	Survey the MSW of your locality and Identify its sources and write composition of MSW.	02
2.	Carryout sample survey of different localities in groups listing properties of municipal solid waste	02
3.	Survey your locality and based on it suggest methods of solid waste collection	02
4.	Survey your locality and based on it suggest suitable methods of handling, separation and storage of solid waste.	02
5.	Identify& discuss the methods of processing different types of solid waste (search internet for latest methods).	02
6.	Compare different methods of disposal of MSW. (search internet for latest methods)	02
7.	Identify methods of hazardous waste disposal during a site visit and follow safety precautions.	03
	TOTAL	15

Text Book(s):

Title	Author/s	Publication
Integrated solid waste management	George Tchobanoglous and Hillary theisen, Samuel Vigil	McGraw Hill

Reference Books(s):

Title	Author/s	Publication
Disposal and Recovery of Municipal Solid Waste	Arthur B. Gallion (2003)	CBS Publishers & Distributors
Solid Waste Management	Michael E Henstock Butterworths, Ann Arbor Science	
Manual on Municipal Solid waste management by Central Public Health and Environmental Engineering Organization, Government of India, New Delhi, 2000.		

Web Material Link(s):

- http://www.moef.nic.in/legis/hsm/mswmhr.html
- http://www.cyen.org/innovaeditor/assets/Solid%20waste%20management.pdf
- http://www.ilo.org/oshenc/part-vii/environmental-pollution-control/item/514
- www.houstontx.gov/solidwaste
- www.epa.gov/tribalmsw/
- www.unc.edu/courses/2009spring/.../SolidWasteIndiaReview2008.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 the course coordinator.
- End Semester Examination consists of 60 marks.

Tutorial:

- Continuous Evaluation consists of performance of Film Appreciation, Literature Review, Area Appreciation which will be evaluated out of 10 for each 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 Outcome(s):

SECV4552	SOLID WASTE MANAGEMENT
CO 1	Understand the various sources responsible for solid waste generation.
CO 2	Determine the quantity of waste generated and quality of solid waste.
CO 3	Adopt the various separation processes used for segregation of waste

CO 4	Develop the management of waste handling and separation methods in commercial and industrial buildings.

Mapping of CO with PO

SECV4552	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1												
CO 2											1	
CO 3				1								
CO 4			1			2	2				1	

Mapping of CO with PSO

SECV4552	PSO1	PSO2	PSO3
CO 1			
CO 2			
CO 3	1		
CO 4	1		1

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	Content	RBT Level
1	Sources and Composition of Municipal Solid Waste	2
2	Properties of Municipal Solid Waste	2
3	Solid Waste Generation and Collection	1, 2
4	Handling, Separation and Storage of Solid Waste	1, 2
5	Processing of Solid Waste	1, 2
6	Disposal of Municipal Solid Waste	2
7	Hazardous Solid Waste	2

P P Savani University
School of Engineering
Department of Civil Engineering

Course Code: SECV4561
Course Name: Traffic Engineering: Operation & Control
Prerequisite Course/s: Basics of Transportation Engineering (SECV3070)

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	-	01	03	40	60	-	-	50	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to

- design field traffic surveys and generate the data of interpretation and analysis.
- apply capacity and level of service analysis for highways.
- design signalized and rotary intersection.
- plan provision of various signs and design regulations for traffic facilities.
- gain knowledge about highly efficient traffic flow through ample research and innovative design efforts.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction** Scope Functions and Administration, Traffic Issues in Indian Cities.	02	06
2.	**Traffic Studies and Analysis** Road-user Characteristics, Vehicle Characteristics, Traffic Flow Characteristics, Different Traffic Studies and Analysis for Volume, Speed and Delays, Origin and Destination, Parking and Accident, Presentation & Interpretation, Traffic Forecasting.	07	24
3.	**Traffic Geometrics** Basic Geometric Elements, Design of Intersections, Rotary Intersections, Grade Separated Intersections, Design of Parking and Terminal Facilities.	06	20
Section II			
Module No.	Content	Hours	Weightage in %
4.	**Traffic Flow Study**	08	26

	Vehicular Stream Models, Car Following Model, Q- K -V Models, Highway Capacity, Level of Service, Shock Wave Phenomenon, Queuing.		
5.	**Traffic Control, Regulation & Management** Traffic Control, Regulations & Management for Vehicles, Drivers and Flow, Traffic Control Devices, Markings, Signage, Signals, Channelization, Design of Traffic Signal System, Urban Traffic Management Techniques, Street Lighting, Introduction to Intelligent Transportation System.	07	24
	TOTAL	30	100

List of Tutorial:

Sr. No.	Name Practical/tutorial	Hours
1.	General aspects of traffic engineering	01
2.	Design of rotary intersection	04
3.	Design of traffic signals	02
4.	Traffic Volume studies, Mixed traffic problem study, speed studies & case study to traffic problem solution.	06
5.	General aspects of traffic signals and boards	02
	TOTAL	15

Text Book(s):

Title	Author/s	Publication
Highway Engineering	Dr. S.K. Khanna and Dr. C.E. G. Justo	Nem Chand & Bros., Roorkee
Traffic Engineering and Transport Planning	L.R. Kadiyali	Khanna Publishers, Delhi
Metropolitan Transportation Planning	John W Dickey	Tata McGraw-Hill
Principles of Highway Engineering and Traffic Analysis	Fred L	John Wiley

Reference Book(s):

Title	Author/s	Publication
Highway Engineering	L.R. Kadiyali	Khanna Publishers, New Delhi
Principles, Practice & Design of Highway Engineering	S.K. Sharma	S. Chand & Co., New Delhi.

Web Material Link(s):

- https://nptel.ac.in/courses/105103097/
- https://nptel.ac.in/courses/105103097/25

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests each of 30 marks and of 1 Hour duration and average of the same 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 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.
- Viva/ Oral performance of 15 marks.

Course Outcome(s):

After the completion of the course, the following course outcomes will be able to:

SECV4561	**TRAFFIC ENGINEERING: OPERATION AND CONTROL**
CO 1	Understand about highway planning and its classification.
CO 2	Describe the importance and working of different traffic control devices.
CO 3	Explain different types of traffic surveys.
CO 4	Observe the reasons of accidents and their preventive measures.
CO 5	Evaluate and design of traffic signals at intersections and rotary intersection.

Mapping of CO with PO

SECV4561	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1			1			2			2	2		1
CO 2			1			2			2	2		1
CO 3			2	2					3	2		1
CO 4			1	1	1				3	2	1	1
CO 5			2	1					1	2		1

Mapping of CO with PSO

SECV4561	PSO1	PSO2	PSO3
CO 1	2		1
CO 2	2		1
CO 3	3		1
CO 4	3		1
CO 5	3		1

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	Content	RBT Level
1	Introduction	1,2
2	Traffic Studies and Analysis	1,2,4,5,6
3	Traffic Geometrics	1,2,3,4,5,6
4	Traffic Flow Study	1,2,4,5
5	Traffic Control, Regulation & Management	1,2,4,5

P P Savani University
School of Engineering
Department of Civil Engineering

Course Code: SECV4571
Course Name: Urban Infrastructure Engineering & Management
Prerequisite Course(s): Building & Town Planning (SECV2090)

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	-	01	03	40	60	-	-	50	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to

- understand infrastructure organizations.
- prepare infrastructure master plan.
- schedule infrastructure project activities.
- prepare project development plan.
- prepare tender documents for infrastructure project contract.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Infrastructure** Definitions of Infrastructure, Governing Features, Historical Overview of Infrastructure Development in India, Infrastructure Organizations & Systems.	05	17
2.	**Infrastructure Planning** Typical Infrastructure Planning Steps, Planning and Appraisal of Major Infrastructure Projects, Screening of Project Ideas, Life Cycle Analysis, Multi-criteria Analysis for Comparison of Infrastructure Alternatives, Procurement Strategies, Scheduling and Management of Planning Activities, Infrastructure Project Budgeting and Funding, Regulatory Framework, Sources of Funding.	10	33
Section II			
Module No.	Content	Hours	Weightage in %
3.	**Project Management in Construction** Introduction to Project Management Processes - Initiating, Planning, Executing, Controlling, and Closing Processes; Project Integration	08	27

	Management - Project Plan Development, Project Plan Execution, and Overall Change Control; Project Scope Management - Initiation, Scope Planning, Scope Definition, Scope Verification, and Scope Change Control.		
4.	**Contracts and Management of Contracts** Engineering Contracts and its Formulation, Definition and Essentials of a Contract, Indian Contract Act 1872, Types of Contracts and Clauses for Contracts, Preparation of Tender Documents, Issues Related to Tendering Process, Awarding Contract.	07	23
	TOTAL	30	100

List of Tutorial:

Sr. No	Name of Tutorial	Hours
1.	Prepare infrastructure master plan	03
2.	Schedule infrastructure project activities	04
3.	Prepare project development plan	04
4.	Prepare tender documents for infrastructure project contract	04
	TOTAL	15

Text Book(s):

Title	Author/s	Publication
Infrastructure Planning Handbook: Planning, Engineering, and Economics	A. S. Goodman and M. Hastak	McGraw-Hill, New York, 2006.
Infrastructure planning	J. Parkin and D. Sharma	Thomas Telford, London, 1999

Reference Book(s):

Title	Author/s	Publication
Projects: Planning, Analysis, Selection, Financing, Implementation, and Review	P. Chandra	Tata McGraw-Hill, New Delhi, 2009
Computer-based Construction Project Management	T. Hegazy	Prentice Hall, New Jersey, 2002

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests each of 30 marks and of 1 Hour duration and average of the same 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.
- Internal viva consists of 10 marks.
- Presentation consists of 10 marks.

Course Outcome(s):

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

SECV4571	URBAN INFRASTRUCTURE ENGINEERING & MANAGEMENT
CO1	Understand the infrastructure development in India and also be able to know the various infrastructure organizations.
CO2	Explain the infrastructure planning criteria and various norms of planning and also know the various budget and funding sources.
CO3	Judge the project management is done with proper planning and execution.
CO4	Understand the importance of contracts and its types.
CO5	Examine the tendering process for the project.

Mapping of CO with PO

SECV4571	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	1	2	2	1	3	2	3	3	3	3		3
CO 2	1	2	2	1	3	2	3	3	3	3	3	3
CO 3	1	2	2	1	3	2	3	3	3	3	3	3
CO 4	1	2	2	1	3	2	3	3	3	3	3	3
CO 5	1	2	2	1	3	2	3	3	3	3	3	3

Mapping of CO with PSO

SECV4571	PSO1	PSO2	PSO3
CO 1	3	2	2
CO 2	3	2	2
CO 3	3	2	2
CO 4	3	2	2
CO 5	3	2	2

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	Content	RBT Level
1	Infrastructure	1,2,3
2	Infrastructure Planning	1,2,3,6
3	Project Management in Construction	2,3,6,6
4	Contracts and Management of Contracts	1,2,3

P P Savani University
School of Engineering
Department of Civil Engineering

Course Code: SECV4582
Course Name: Waste Water Treatment
Prerequisite Course/s: Environmental Engineering(SECV3040), Water & Waste Water Engineering(SECV3101)

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	-	01	03	40	60	-	-	50	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to
- understand about the different water treatment process.
- get knowledge about disposal of treated effluents and advanced methods.
- understand reusing and recycling of treated effluents.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction** Objectives and need of Advanced Waste-Water Treatment - Classification of Treatments.	05	17
2.	**Nutrient Removal** Nitrogen Removal: Nitrification, Denitrification Simultaneous nitrification and denitrification Phosphorus Removal: Introduction, Phosphorus removal by Chemical Precipitation, Principles of process, Chemicals applied, Chemistry of phosphorus precipitation, Process configuration, Phosphorus removal by Biological Precipitation: Principles of the process, Microorganisms involved in the process, Process configurations	04	13
3.	**Membrane Filtration** Membrane Process Terminology, Membrane Process Classification and operation- Microfiltration, Ultrafiltration, Nano filtration, Reverse Osmosis, Electrodialysis Membrane Configurations: Plate-and-frame module, Spiral-wound module, Tubular module, Hollow-fiber module Membrane Fouling: Modes of membrane fouling, Control of membrane fouling Application of membrane processes:	06	20

	Microfiltration, Ultrafiltration, Nano filtration, Reverse Osmosis.		
Section II			
Module No.	Content	Hours	Weightage in %
4.	**Adsorption & Ion-exchange** Adsorption: Type of adsorbents Development of adsorption isotherms, Freundlich, Langmuir, BET Activated carbon adsorption, Granular carbon adsorption. Ion Exchange: Fundamentals and types of Ion Exchange Resins, Theory of Ion Exchange Applications: Removal and recovery of heavy metals, Removal of nitrogen, Removal of phosphorus, Organic chemical removal.	04	13
5.	**Membrane Bio Reactor** Introduction MBR Process Description: Membrane Bioreactor with Membrane Module Submerged in the Bioreactor, Membrane Bioreactor with Membrane Module Situated Outside the Bioreactor, MBR System Features, Membrane Module Design Considerations, Applications in Industrial Wastewater Treatment and Municipal Wastewater.	05	17
6.	**Electrochemical Wastewater Treatment Processes** Introduction, Electro-coagulation: Factors affecting Electrocoagulation, Electrode materials, Reactor configurations. Electro-floatation: Factors affecting electro floatation Comparison with other technology, Reactor configurations. Electro-oxidation: Electro oxidation process, Reactor configurations.	06	20
	TOTAL	30	100

List of Tutorial:

Sr. No	Name of Tutorial	Hours
1.	Performance of at least 5 Practical based on selected sample and submission of report.	15

Text Book(s):

Title	Author/s	Publication
Wastewater Engineering: Treatment and Disposal	Metcalf and Eddy	T.M.H. Edition, New Delhi
Manual on Water Supply & Treatment	-	CPH & Env. Engg. Organization
Environmental Engineering	H. S. Peavy, D. R. Rowe & G. Tchobanoglous	Mc Graw Hill Int., New Delhi

Reference Book(s):

Title	Author/s	Publication
Water supply and sanitary engineering	G. S. Birdie and J. S. Birdie	Dhanpatrai Publication

Water supply and wastewater engineering	B. S. N Raju	Tata McGraw hill, New Delhi
Environmental engineering volume 1 and 2	S. K. Garg	Khanna publisher

Web Material Link(s):

- https://nptel.ac.in/courses/105105178/
- https://nptel.ac.in/courses/105106119/
- https://nptel.ac.in/courses/105105048/

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 5 suitable practical/tutorial based on selected sample which will be evaluated out of 10 marks for each practical and average of the same will be converted to 20 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 the completion of the course, the following course outcomes will be able to:

SECV4582	**Waste Water Treatment**
CO1	Understand the need of various advanced water treatment processes.
CO2	Select or construct appropriate treatment schemes to remove certain pollutants present in water or wastewater.
CO3	Apply the knowledge of nutrients removal using advanced wastewater treatment processes design
CO4	Learn about method adopted for heavy metal removal.
CO5	Illustrate wastewater treatment systems for rural areas. explain the applicability of natural systems for treatment of wastewater.

Mapping of CO with PO

SECV4582	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1		3	2	3	3		3					3
CO 2	1	3	3	3	3		3					3
CO 3	1	3	3	3	3		3					3
CO 4	1	3	3	3	3		3					3
CO 5	2	2	3	2	1		2					1

Mapping of CO with PSO

SECV4582	PSO1	PSO2	PSO3
CO 1	3	3	3
CO 2	3	2	3
CO 3	3	2	3
CO 4	3	2	3
CO 5	3	3	3

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	**Content**	**RBT Level**
1.	Introduction	2
2.	Nutrient Removal	2
3.	Membrane Filtration	2
4.	Adsorption & Ion-exchange	2
5.	Membrane Bio Reactor	2
6.	Electrochemical Wastewater Treatment Processes	2

P P Savani University
School of Engineering
Department of Civil Engineering

Course Code: SECV4601
Course Name: Urban Transportation Planning
Prerequisite Course/s: Basics of Transportation Engineering (SECV3070)

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	-	-	03	40	60	-	-	-	-	100

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to
- Impart the knowledge of urban transportation system.
- Developing analytical and comprehensive approach to select appropriate mode of transportation.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Urban transportation systems planning** Introduction to transportation systems planning, various modes of transportation and comparisons, urban transportation system planning process, use and evaluation of various models.	04	08
2.	**Transportation Surveys** Concept of study area, zoning, compare the strengths and limitations of different types of transportation survey, prepare inventory of transport facilities.	09	20
3.	**Trip Generation and Distribution** Concept and purpose of trip generation, describe the factors affecting the trip generation and attraction rates, concept and methods of trip distribution.	10	22
Section II			
Module No.	Content	Hours	Weightage in %
4.	**Modal Split** Modal split: in the transport process planning problem and factors affecting modal split, trip characteristics in urban areas: household characteristics, zonal characteristics, network characteristic	11	25

5.	**Transportation Plan Preparation** Definitions: corridor, corridor traffic forecasting, corridor traffic study, count, segment, point, segment capacity, screen line, corridor identification, mass transit system, urban mass rapid transit system, rail based transit –metro, Light rail transit system (LRT), Mono rail, Sky rail,Road based transit – Bus rapid transit system (BRTS), Electric trolley bus, commuter Bus / City Bus.	11	25
	TOTAL	45	100

Text Book(s):

Title	Author/s	Publication
Traffic Engineering and Transport Planning	L. R Kadiyali	Khanna Publisher
Traffic Planning and Design	S.C. Saxena	Dhanpat Rai Publication
Principles of urban transportation system planning	B.G.Hutchinson	McGraw-Hill

Reference Books(s):

Title	Author/s	Publication
Metropolitan Transportation Planning	W. Dickey	Tata McGraw-Hill

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 the course coordinator.
- End Semester Examination consists of 60 marks.

Course Outcome(s):

After the completion of the course, the following course outcomes will be able to:

SECV4601	URBAN TRANSPORTATION PLANNING
CO 1	Understand transportation project planning and development planning process, and land use planning.
CO 2	Discuss about different types of transportation surveys, travel demand modelling.
CO 3	Evaluate trip generation, trip distribution, modal split and trip assignment analysis.
CO 4	Discuss about different urban mass transit systems their merits and limitations.

Mapping of CO with PO

SECV4601	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1			1						3	2		1
CO 2			1						3	2		1
CO 3									3	2		1

CO 4			1						3	2		1

Mapping of CO with PSO

SECV4601	PSO1	PSO2	PSO3
CO 1	2		1
CO 2	2		1
CO 3	3		1
CO 4	3		1

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	**Content**	**RBT Level**
1	Urban transportation systems planning	1, 2,3
2	Transportation Surveys	1, 2
3	Trip Generation and Distribution	1, 2,4,5
4	Modal Split	1,2,3,4,5
5	Transportation Plan Preparation	1,2

P P Savani University
School of Engineering
Department of Civil Engineering

Course Code: SECV4611
Course Name: Modern Transportation Planning
Prerequisite Course/s: Basics of Transportation Engineering (SECV3070)

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		01	03	40	60	-	-	50	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to

- reduce the impact of peripherality by improving external links to the north east by rail, road, sea and air.
- enhance the efficiency of the transport networks.
- ensure whole-life, long-term value of transport networks, in capital and running.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction** Historical Development of Transport in India, 20-year Road Plans, National Transport Policy Recommendations, IRC, CRRI, Vision 2021, NHDP, PMGSY. Characteristics of Different Modes of Transport and their Integration and Interactions, Impact on Environment.	05	16
2.	**Planning of railway** Passenger and Goods Terminals, Layout, Passenger Facilities, Traffic Control.	04	14
3.	**Airport Planning** Requirements and components. Design of Runway and Taxiway, Apron, Parking Configuration, Terminal Requirements, Airport Marking and Lighting, Air Traffic Control.	06	20
Section II			
Module No.	Content	Hours	Weightage in %
4.	**Intelligent Transportation Systems** Introduction to Intelligent Transportation Systems (ITS) – Definition of ITS and Identification of ITS Objectives, Historical	05	17

	Background, Benefits of ITS - ITS Data collection techniques – Detectors, Automatic Vehicle Location (AVL), Automatic Vehicle Identification (AVI), Geographic Information Systems (GIS), Video Data Collection.		
5.	**ITS functional areas** Advanced Traffic Management Systems (ATMS), Advanced Traveler Information Systems (ATIS), Commercial Vehicle Operations (CVO), Advanced Vehicle Control Systems (AVCS), Advanced Public Transportation Systems (APTS), Advanced Rural Transportation Systems (ARTS).	03	10
6.	**ITS User Needs and Services** Travel and Traffic Management, Public Transportation Management, Electronic Payment, Commercial Vehicle Operations, Emergency Management, Advanced Vehicle Safety Systems, Information Management.	04	13
7.	**Automated Highway Systems** Vehicles in Platoons, Integration of Automated Highway Systems, ITS Programs in the World, Overview of ITS Implementations in Developed Countries, ITS in Developing Countries.	03	10
	TOTAL	30	100

List of Tutorial:

Sr. No.	Tutorial	Hours
1.	Introduction	02
2.	Planning of railway	02
3.	Airport Planning	02
4.	Intelligent transportation systems	02
5.	ITS functional areas	02
6.	ITS User Needs and Services	02
7.	Automated Highway Systems	03
	TOTAL	15

Text Book(s):

Title	Author/s	Publication
Traffic Engineering and Transport Planning	L. R Kadiyali	Khanna Publisher
Smart Transportation Systems	Qu, X., Zhen, L., Howlett, R., Jain, L.C. (Eds.)	Springer
Railway Engineering	Satish Chandra, M. M. Agarwal	Oxford
Airport Planning	S.R.Rangwala	Charotar Publication
Intelligent transportation system	Pradipkumar Sarkar, Amitkumar Jain	PHI Publication

Reference Books(s):

Title	Author/s	Publication
Advanced Transportation System	Milan Janić Butterworths,	Springer

Web Material Link(s):

- https://frame-online.eu/wp-content/uploads/2014/10/PlanningGuide.pdf
- https://www.transport.gov.scot/media/36472/a21-modern-transport-system.pdf
- https://jalopnik.com/the-ten-most-advanced-transportation-systems-in-the-wor-1729614271
- https://www.kontron.com/blog/mobility/modern-transport-system

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 the course coordinator.
    - End Semester Examination consists of 60 marks.

Tutorial:

- Continuous Evaluation consists of performance of Film Appreciation, Literature Review, Area Appreciation which will be evaluated out of 10 for each 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.
- Viva/Oral performance of 15 marks.

After the completion of the course, the following course outcomes will be able to:

SECV4611	MORDEN TRANSPORTATION PLANNING
CO 1	Describe the environmental impacts of transport activities, and their importance.
CO 2	Compare the railway and airport planning.
CO 3	Explain about intelligent transport systems and its uses.
CO 4	Describe the integration of automated highway system in developing countries.

Mapping of CO with PO

SECV4611	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	1	3	3	3	3	3	3		1	1	3	3
CO 2	1	3	3	3	3	3	3		1	1	3	3
CO 3	1	3	3	3	3	3	3		2	1	3	3
CO 4	1	3	3	3	3	3	3		2	1	3	3

Mapping of CO with PSO

SECV4611	PSO1	PSO2	PSO3
CO 1	3	2	3
CO 2	3	2	3
CO 3	3	2	3
CO 4	3	2	3

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	Content	RBT Level
1	Introduction	1, 2,4
2	Planning of railway	1, 2,6
3	Airport Planning	1, 2,4,5
4	Intelligent Transportation Systems	1,2,3,4,6
5	ITS functional areas	1,2,4,6
6	ITS User Needs and Services	1,2,3,6
7	Automated Highway Systems	1,2,4

P P Savani University
School of Engineering
Department of Civil Engineering

Course Code: SECV4621
Course Name: Repair, Rehabilitation & Non-Destructive Testing
Prerequisite Course/s - Concrete Technology (SECV2110)

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	-	-	03	40	60	-	-	-	-	100

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to

- learn various distress and damages to concrete and masonry structures
- understand the importance of maintenance of structures
- study the various types and properties of repair materials
- assess the damage to structures using various tests
- learn the importance and methods of substrate preparation
- learn various repair techniques of damaged structures, corroded structures

Course Content:

Section I			
Module	Content	Hours	Weightage in %
1.	**Introduction** Overview of distress, deterioration in concrete structures, Scenario of distressed structures world over, Need for repairs and upgrading of structures, General introduction to process (Road-map) to a durable concrete repair.	04	08
2.	**Deterioration of concrete** Chemical composition of concrete, permeability and transport, processes, corrosion of reinforcement and prestressing steel in concrete, carbonation, chloride attack, alkali-silica reaction, freeze-thaw attack, sulphate attack, acid attack, effect of fire and high temperatures and seawater attack, cracking, weathering, biological processes.	11	24
3.	**Conditional/damage assessment & Evaluation of structures** Structural assessment: Conditional evaluation / Structural Appraisal of the structure –Importance, objective & stages, Conditional/damage assessment procedure, Preliminary & Detailed investigation, Scope, Objectives, Methodology & Rapid visual inspection of structures	08	18

	Damage Assessment allied Tests (Destructive, Semi-**destructive, Non-destructive:** Field & laboratory testing procedures for evaluating the structure for strength, corrosion activity, performance & integrity, durability, Interpretation of the findings of the tests		
Section II			
Module	Content	Hours	Weightage in %
4.	**Repairs, rehabilitation and Retrofitting** Repair materials, Criteria for durable concrete repair, Methodology, performance requirements, repair options, selection of repair materials, Preparatory stage of repairs, Different types of repair materials & their application, types of repair techniques. Retrofitting/Strengthening: Need for retrofitting, Design philosophy of strengthening structures, Techniques available for strengthening including conventional and advanced techniques. Seismic retrofit of concrete structures: Deficiencies in structure requiring seismic retrofit, Design philosophy, Techniques to enhance the seismic resistance of structures, advanced techniques for making seismic resistant structures	11	25
5.	**Allied topics: Protection & maintenance of structures** Importance of protection & maintenance, Categories of maintenance, Building maintenance. Corrosion mitigation techniques to protect the structure from corrosion. Long term health monitoring / Structural health monitoring (SHM)– Definition and motivation for SHM, Basic components of SHM and its working mechanism, SHM as a tool for proactive maintenance of structures	11	25
	TOTAL	45	100

Text Book(s):

Title	**Author/s**	**Publication**
Concrete Technology-Theory and Practice	Shetty. M. S.	S. Chand and Company
Repair and Rehabilitation & Minor works of building	Varghese. P.C	Prentice Hall India Pvt Ltd
Rehabilitation of Concrete Structures	Vidivelli. B	Standard Publishes Distribution

Reference Book(s):

Title	**Author/s**	**Publication**
Structural Health Monitoring, Repair and Rehabilitation of Concrete Structures	. Ravishankar. K. Krishnamoorthy. T. S	Allied Publishers
. Hand book on Seismic Retrofit of Buildings	CPWD and Indian Buildings Congress	Narosa Publishers,

Concrete Structures, Protection, Repair and Rehabilitation	Dodge Woodson.	Butterworth- Heinemann, Elsevier

Web Material Link(s):

- 1. http://www.icri.org
- 2. http://www.nbmcw.com

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.

Course Outcome(s):

After the completion of the course, the following course outcomes will be able to:

SECV4621	**Repair, Rehabilitation & Non-Destructive Testing**
CO 1	Understanding the processes behind the distress and deterioration of concrete structure.
CO 2	Interpret and decide various Non-Destructive testing for Damage assessment.
CO 3	Express Structural health monitoring and its importance.
CO 4	Simulate the methods of Retrofitting and Rehabilitation for structure.

Mapping of CO with PO

SECV4621	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1			1	1								
CO 2				1						1		
CO 3		1	1	1								
CO 4		1					1					

Mapping of CO with PSO

SECV4621	PSO1	PSO2	PSO3
CO 1	1		
CO 2	1		
CO 3	2		
CO 4	**S**		

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	**Content**	**RBT Level**
1.	Introduction	2
2.	Deterioration of concrete	2
3.	Conditional/damage assessment & Evaluation of	3, 4, 5

	structures:	
4.	Repairs, rehabilitation and Retrofitting	1, 2
5.	Allied topics: Protection & maintenance of structures	1, 2, 3

P P Savani University
School of Engineering
Department of Civil Engineering

Course Code: SECV4930
Course Name: Project/Training
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	
-	12	-	12	-	-	200	300	-	-	500

CE: Continuous Evaluation, ESE: End Semester Exam

Outline of the Course:

Project

- The project will be aligned with the aims of the engineering programme and its areas of specialization and shall be based on the recent trends in technology.
- The student shall carry out a comprehensive project at relevant academic / R&D / industrial organization.
- The student is required to submit a project report based on the work carried out.

Training

- The aim of this course is to use the internship experience to enable students to develop their engineering skills and practices.
- The student will be placed in industry/organization for 12 to 18 weeks and assessed for academic credit.
- The students may select industry on their own or one which is offered by institute.
- Students are expected to experience a real-life engineering workplace and understand how their engineering and professional skills can be utilized in industry.
- The student is required to submit a project report based on the work carried out.

Course Outcome(s):

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

SECV4930	**Project/Training**
CO 1	Discriminate the theoretical learning with practice and integrate knowledge for engineering applications
CO 2	Integrate real time industry exposure and experience
CO 3	Manage the challenging projects for commercial, societal and environment benefit.
CO 4	Evaluate the importance of planning, documentation, punctuality and work ethics.
CO 5	Formulate the documentation of the work which is carried out on site with industry standards.

Mapping of CO with PO

SECV4930	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	3	3	3	3	3	3	3	3	3	3	3
CO 2	2	3	3	3	3	3	3	3	3	3	3	3
CO 3	2	3	3	3	3	3	3	3	3	3	3	3
CO 4	2	3	3	3	3	3	3	3	3	3	3	3
CO 5		2	3	3	3	3	3	3	3	3	3	3

Mapping of CO with PSO

SECV4930	PSO1	PSO2	PSO3
CO 1	3	3	3
CO 2	3	3	3
CO 3	3	3	3
CO 4	3	3	3
CO 5	3	3	3

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	Content	RBT Level
1	Project/Training	1,2,3,4,5,6