Syllabus Book

B. Tech.
(Civil Engineering)

P P Savani University

School of Engineering

Effective From: 2018-19

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:2019-20															
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
	SEPD1030	Communicative English	SEPD	1	2	0	3	2	50	0	20	30	0	0	100
						Total	**21**	**16**							**650**
2	SESH1080	Linear Algebra & Calculus	SH	3	0	2	5	5	40	60	0	0	50	0	150
	SESH1240	Electrical & Electronics Workshop	ME	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
	SEPD1020	Communication Skills	SEPD	1	2	0	3	2	50	0	20	30	0	0	100
						Total	**27**	**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	
2	0	2	4	40	60	-	-	50	0	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.	8	28
2.	**Sequence and Series-I** Convergence and Divergence, Comparison Test, Integral Test, Ratio Test, Root Test, Alternating Series, Absolute and Conditional Convergence.	6	20
Section II			
Module No.	Content	Hours	Weightage in %
1.	**Sequence and Series-II** Power series, Taylor and Macluarin series, Indeterminate forms and L'Hospitals Rule.	6	20
2.	**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	10	32

List of Tutorials:

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

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 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 student will be able to

- make use of concepts of limit, continuity and differentiability for analysing mathematical problems.
- use concepts of Limit, Derivatives and Integrals.
- examine series for its convergence and divergence.
- solve linear system using matrices.

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	00	05	40	60	40	60	00	00	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:**	14	30%

	Projection of Planes (Circular and Polygonal) with inclination to one Referral Plane and two Referral Planes; Concept of Auxiliary Projection Method.		
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%

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

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 student will able to

- know and understand “Drawing is a language of Engineers.”
- interpret general assembly technical drawing.
- create traditions and the strategies for Engineering Drawing.
- evaluate basic and intermediate geometry.
- apply the knowledge of principles of projections.
- develop their hallucination/imagination skills.
- enhance their technical communication skill in the form of talkative drawings.

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	
0	2	0	1	0	0	50	0	0	0	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.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction:** Introduction to Various Shops / Sections and Workshop Layouts, Safety Norms to be Followed in a Workshop.	-	-
2.	**Fitting Shop:** Introduction of Fitting Shop; Safety; Making a Job as per Drawing including Marking and other Performing Operations.	-	-
3.	**Carpentry and Drilling Shop:** Introduction of Carpentry Shop; Preparation of Job as per Drawing including Marking and other Performing Operations.	-	-
4.	**Sheet Metal Shop:** Introduction of Sheet Metal Shop; Preparation of Job as per Drawing including Marking and other Performing Operations	-	-
5.	**Smithy Shop:** Introduction of Sheet Metal Shop; Preparation of Job as per Drawing including Marking and other Performing Operations	-	-
6.	**Introduction to Machine Tools:**	-	-

	Introduction and Demonstration of various Machine Tools like Lathe, Drilling, Grinding, Hack Saw Cutting etc.		
7.	**Introduction to Welding & Plumbing:** Introduction and Demonstration of Welding process. Introduction and Demonstration of Plumbing Shop.	-	-

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

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 student will able to

- use various measuring instruments.
- know the importance of safety norms required in workshop.
- understand the application of various tools required for different operation.
- understand how to manufacture product from given raw material.
- know the use of machine tools, hand tools and power tools.

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	
3	2	0	4	40	60	20	30	0	0	150

CE: Continuous Evaluation, ESE: End Semester Exam

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

- 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 %
1.	**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
2.	**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
3.	**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

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.	02
9.	Determination of Young's Modulus of given material.	02
10.	Analysis of errors.	02

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 Satyabrata Chawdhary	New Central Book Agency
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 completion of the course, the student will be able to

- use appropriate mathematical techniques and concepts to obtain quantitative solutions to problems in physics & electrical.
- perform a literature search, to make use of appropriate computational of laboratory skill, and to make an effective written or oral presentation of the results of the project.

P P Savani University
School of Engineering

Center for Skill Enhancement and Professional Development

Course Code: SEPD1030
Course Name: Communicative English
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	
1	2	00	02	50	--	20	30	--	--	100

CE: Continuous Evaluation, ESE: End Semester Exam

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

- utilize their knowledge of grammar effectively for communicative purpose.
- learn language in authentic contexts.
- use English efficiently for routine.
- sharpen receptive skills for better comprehension by providing authentic resources.
- Enable themselves to express ideas clearly and accurately with fluent speaking & writing skills.
- gain confidence in speaking & writing English in an academic and professional context.
- analyze and improve pronunciation.

Course Content:

Module No.	Content	Hours	Weightage in %
1.	**Foundational Grammar & Vocabulary** • Functional use of pronoun, adjective, adverb, preposition, and conjunction • Narration of Past, Present and Future events • Vocabulary	03	20
2.	**Communicative English** • Phrases to express likes/dislikes, request, inquiry, order, predict, complain, question, answer, invite (accepting/ denying) • Idioms & Proverbs	04	30
3.	**Receptive Skills** • Introduction to Receptive Skills • Techniques/strategies of Reading • Techniques/strategies of Listening • Types of Listening Skills	04	25
4.	**Productive Skills** • Speech modulation and its importance • Phonetics and Transcription for effective pronunciation • Speaking in various contexts • Cohesion and Coherence/ Building Paragraphs	04	25

	• Technical Writing (Application/ Letter/ Review/ Report) • E-mail etiquettes		

List of Practical:

Sr. No	Name of Practical	Hours
1.	Introduction to Foundational Grammar & Vocabulary – Ice Breaker	02
2.	Foundational Grammar – practice of pronoun, adjective, adverb, preposition, and conjunction with context	02
3.	Foundational Grammar – Narrating past, present and future events	02
4.	Communicative English – exposure to structures & phrases to express various language functions	02
5.	Communicative English – practice of using idioms, proverbs & phrases to communicate effectively	02
6.	Communicative English – Role play for requesting, inquiring, ordering, predicting, complaining, questioning, answering, inviting (accepting/denying)	02
7.	Communicative English – Role play for Requesting, inquiring, ordering, predicting, complaining, questioning, answering, inviting (accepting/denying)	02
8.	Practice of reading through authentic resources – Summarizing and Paraphrasing.	02
9.	Practice of reading through authentic resources – Skimming and Scanning	02
10.	Comprehensive Listening: Note Taking and Note Making	02
11.	Comprehensive Listening: Summarizing and Paraphrasing	02
12.	Speech for Fluency – phonetics	02
13.	Conversational Skills	02
14.	Leave Application/ Request Letter/Business Letter	02
15.	Notice/Memo/Agenda/ Minutes	02

Reference Book(s):

Title	Author(s)	Publication
Communicative English	Dr. Anuradha, Dr. Minal Batra	Nirmal Publishing, First edition (2016)
Communicative Grammar of English	Geoffrey Leech, Jan Sartvik	Longman, 3rd edition (6 January 2003)
Advanced Skills for Communication in English: Book I	V. Jaya Santhi	New century book house
Engineers' Guide to Technical Writing	Kenneth G. Budinski	ASM International, 2001
Communication Skills	Parul Popat & Kaushal Kotadia	Pearson, 2015
Practical Techniques to Develop Communication Skills	Parul Popat & Kaushal Kotadia	Pothi Prakashan, 2015

Web Material Link(s):

- https://www.researchgate.net/publication/301351158_Advanced_Skills_for_Communication_in_English_Book_I
- https://anekawarnapendidikan.files.wordpress.com/2014/04/a-communicative-grammar-of-english-by-geoffrey-leech.pdf
- https://archive.org/details/FunctionalEnglish/page/n1
- https://www.talkenglish.com/grammar/grammar.aspx
- http://toefl.uobabylon.edu.iq/papers/itp_2015_3158553.pdf
- https://msu.edu/course/be/485/bewritingguideV2.0.pdf

- https://www.khanacademy.org
- http://www.kantakji.com/media/6494/t121.pdf

Course Evaluation:
Theory:

- Continuous Evaluation consists of two tests each of 30 marks and average of the same will be converted to 30 marks.
- There will be a submission consisting 10 marks as per the guidelines of course coordinator.
- Faculty Evaluation consists of 10 marks as per the guidelines provided by the Course Coordinator.

Practical:

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

Course Outcome(s):

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

- expand his/her vocabulary.
- use variety of sentence structures.
- use English effectively in academic and professional spectrum.
- enhance comprehensive listening.
- write English effectively with improved grammar and vocabulary.
- practice strategies for comprehensive reading in English.
- speak English fluently and efficiently.
- effectively use LSRW skills in English.

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	
3	0	2	5	40	60	-	-	50	0	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.	9	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.	7	15
3.	**Inner Product Space** Inner Product, Angle and Orthogonality, Orthogonal projection, Gram-Schmidt process and QR Decomposition, Least square decomposition, Change of basis.	7	15
Section II			
Module No.	Content	Hours	Weightage in %
1.	**Beta and Gamma function** Improper Integrals, Convergence, Properties of Beta and Gamma Function, Duplication Formula (without proof)	6	14
2.	**Fourier Series**	8	18

	Periodic Function, Euler Formula, Arbitrary Period, Even and Odd function, Half Range Expansion, Parseval's Theorem		
3.	**Curve tracing** Tracing of Cartesian Curves, Polar Coordinates, Polar and Parametric Form of Standard Curves, Areas and Length in Polar co-ordinates	8	18

List of Tutorial:

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

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 completion of the course, the student will be able to

- understand the concepts of Vector Space, Linear Transformation and inner product
- space.
- evaluate functions like Gamma, Beta functions & their relation which is helpful to evaluate some definite integral arising in various branch of engineering.
- understand the concept of Fourier series.

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	
0	2	0	1	0	0	50	0	0	0	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.	**2**
2	Understanding of Galvanometer, Voltmeter, Ammeter, Wattmeter and Multimeter	**2**
3	Understanding of breadboard connections	**2**
4	Drawing and wiring of basic circuits on breadboard	**2**
5	Verification of Ohm's law	**2**
6	Half wave, full wave using centre tap transformer and full wave bridge rectifier	**3**
7	Kirchhoff's laws (KVL,KCL).	**3**
8	Faraday's laws of Electromagnetic Induction and Electricity Lab	**4**
9	LDR characteristics	**2**
10	Study of CRO, measurement of amplitude (voltage) & time period (frequency)	**4**
11	PCB designing	**4**

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 20 marks.

Course Outcome(s):

- After completion of the course, the students will be able to design elementary combinational and sequential circuits.

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	
4	2	0	5	40	60	20	30	0	0	150

CE: Continuous Evaluation, ESE: End Semester Exam

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

- 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:** Types of Equipment- Functions, Uses. Hauling Equipment-Truck, Dumper, Trailer. Hoisting Equipment- Pulley, Crane, Jack, Winch, Sheave Block, Fork Truck. Pneumatic Equipment-Compressor.	04	08

	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 %
1.	**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	06
2.	**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	06
3.	**Basics of Steam Generators:** Introduction, Classification, Cochran, Lancashire and Babcock and Wilcox Boiler, Functioning of Different Mountings and Accessories	LAB	12
4.	**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	14
5.	**Power Transmission Elements:** Construction and Applications of Couplings, Clutches and Brakes, Difference Between Clutch and Coupling, Types of Belt Drive and Gear Drive	10	12

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

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 completion of the course, the student will be able to

- know the principles and working of basic mechanical systems.
- comprehend importance of mechanical engineering in various fields of engineering.
- know about different civil engineering fields with an overview of building material, building construction and recent developments in civil engineering.

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	
4	2	0	5	40	60	20	30	0	0	150

CE: Continuous Evaluation, ESE: End Semester Exam

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

- 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 behavior of structural element 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.	06	11
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.	08	13
3.	**Centroid and Centre of Gravity:**	08	13

	Centroid of Lines, Plane Areas and Volumes, Examples Related to Centroid of Composite Geometry, Pappus –Guldinus Theorems.		
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.	08	13
Section II			
Module No.	Content	Hours	Weightage in %
1.	**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.	4*	06
2.	**Simple Stress and Strain:** Definition of Stress and Strain, Tensile & Compressive Stresses: Shear and Complementary Shear Strains, Linear, Shear, Lateral, Thermal and Volumetric. Hooke's Law, Stresses and Strain in bars of Varying, Tapering & Composite Section, Principle of Superposition. Elastic Constant, Relation between Elastic Constants.	13	22
3.	**Shear Force and Bending Moment:** Introduction, Types of Loads, Supports and Beams, Shear Force, Bending Moment, Sign Conventions for Shear Force & Bending Moment. Statically Determinate Beam, Support Reactions, SFD and BMD for Concentrated Load and Uniformly Distributed Load, Uniformly Varying Load, Point of Contra-flexure.	13	22

*(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

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 End Semester Exam.

Course Outcome(s):

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

- understand fundamental principles of mechanics, equilibrium, statics reactions and internal forces in statically determinate beams.
- apply principles of statics for determine C.G and M.I of a different geometrical shape and Understand basics of friction and its importance.
- critically analyze problem and solve the problem related to mechanical elements and analyze the deformation behavior for different types of loads.
- understand the different types of stresses and strains developed in the member subjected to axial, bending, shear & torsional effects.
- understand the physical properties of materials.

P P Savani University
School of Engineering

Department of 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	
3	2	0	4	40	60	20	30	0	0	150

CE: Continuous Evaluation, ESE: End Semester Exam

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

- understand 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 %
1.	**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
2.	**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
3.	**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
4.	**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

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

 # 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 Outcomes:

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

- explore new emerging areas of the field.
- apply programming fundamentals to solve real time problems.

P P Savani University
School of Engineering

Center for Skill Enhancement and Professional Development

Course Code: SEPD1020
Course Name: Communication Skills
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	02	00	02	50	00	20	30	--	--	100

CE: Continuous Evaluation, ESE: End Semester Exam

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

- hone basic communication skills by exposing them to the key communication techniques.
- improvise comprehension and expressional skills which are required for personal, social, academic and professional environment.
- sharpen communication skills with reference to organizational structure.
- show the importance of team work and give practice in group communication with reference to group dynamics.

Course Content:

Module No.	Content	Hours	Weightage in %
1.	**Introduction to Communication Skills** • Concept and Process of Communication • Types of Communication • Principles of Effective Communication • Barriers to Communication	05	33
2.	**Interpersonal Organizational Communication** • Styles and Flows of Communication • Essentials of Organizational Communication • Kinesics, Proxemics and Chronemics	03	20
3.	**Team/ Group Dynamics and Leadership** • Types of Groups and Essentials of Group Work and Networking • Concept and Types of Leadership • Traits of an Effective Leader	03	20
4.	**Presentation Skills** • Modes, Means and Purposes of Presentation • Audience Analysis and Content Organization • Visual aids and Nuances of Delivery • Non Verbal Cues for Effective Presentation	04	27

List of Practical:

Sr. No	Name of Practical	Hours
1.	Introduction to Communication: An Ice Breaker	02
2.	Verbal/ Non-Verbal Communication Pros and Cons	02
3.	Principles of Communication	02
4.	Barriers to Communication	02
5.	Interpersonal Communication	02
6.	Organizational Communication	02
7.	Assertive Vs Aggressive Communication	02
8.	Group Dynamics: A Decision-Making Activity	02
9.	Group Dynamics Working together to achieve organizational vision	02
10.	Difference between Group Discussion and Debate	02
11.	Leadership: Holding a diverse Group Together	02
12.	Presentation Skills; Video Session	02
13.	Presentations by the student: Self-Peer-teacher assessment	02
14.	Presentations by the student: Self-Peer-teacher assessment	02
15.	Presentations by the student: Self-Peer-teacher assessment	02

Text Book(s):

Title	Author(s)	Publication
Practical Techniques to Develop Communication Skills	Parul Popat & Kaushal Kotadia	Pothi Prakashan, 2015

Reference Book(s):

Title	Author(s)	Publication
Communication Skills	Parul Popat & Kaushal Kotadia	Pearson, 2015
Communication Skills, Second Edition	Sanjay Kumar, Pushp Lata	Oxford University Press,2015
Communication Skills for Engineers	Sunita Mishra	Pearson, 2011
Effective Interpersonal and Team Communication Skills for Engineers	Clifford Whitcomb, Leslie E. Whitcomb	John Wiley & Sons, 2012

Web Material Link(s):

- http://www.mindtools.com/page8.html
- http://techpreparation.com/soft-skills.htm?gclid=CJf34fyQv5wCFdMtpAodjjX_tA
- http://lorien.ncl.ac.uk/ming/Dept/Tips/present/comms.htm

Course Evaluation:

Theory:

- Continuous Evaluation consists two tests each of 30 marks and average of the same will be converted to 30 marks.
- There will be a submission consisting 10 marks as per the guidelines of course coordinator.
- Faculty Evaluation consists of 10 marks as per the guidelines provided by the Course Coordinator.

Practical:

- Continuous Evaluation consists of Performance of Practical which should be evaluated out of 10 for each practical.
- Internal viva consists of 10 marks.
- Practical performance/quiz/drawing/test of 15 marks during End Semester Exam.
- Viva/Oral performance of 15 marks during End Semester Exam.

Course Outcome(s):

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

- follow the process of communication and its components in organizational context.
- express themselves and to participate in the classroom discussions and other such academic activities.
- comprehend whatever they receive from Informal Interactions with the family, teachers and friends; and from Formal Communications taking Place in Lectures, Laboratories and the like.
- enhance the teamwork and collaborative attitude.
- communicate effectively using suitable styles and techniques.
- able to participate in the group discussions and other such academic or academic support activities.
- use language effectively with reference to communication in groups and group behaviour.

SECOND YEAR B.TECH

P P SAVANI UNIVERSITY															
SCHOOL OF ENGINEERING															
TEACHING & EXAMINATION SCHEME FOR B. TECH. CIVIL ENGINEERING PROGRAMME AY: 2018-19															
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	CV	3	2	0	5	4	40	60	20	30	0	0	150
	SECV2041	Surveying	CV	3	2	0	5	4	40	60	20	30	0	0	150
	SEPD2010	Critical Thinking, Creativity & Decision Making	SEPD	2	0	0	2	2	40	60	0	0	0	0	100
	SEPD3040	Integrated Personality Development Course-I	SEPD	2	0	0	2	1	40	60	0	0	0	0	100
	SECV2910	Industrial Exposure	CV	2			0	2	0	0	100	0	0	0	100
						Total	**30**	**27**							**1050**
4	SESH2022	Numerical & Statistical Analysis	SH	3	0	2	5	5	40	60	0	0	50	0	150
	SECV2051	Determinate Structural Analysis	CV	4	0	1	5	5	40	60	0	0	50	0	150
	SECV2060	Geology & Geotechnical Engineering	CV	3	2	0	5	4	40	60	20	30	0	0	150
	SECV2080	Hands on Training on Modern Civil Engineering Equipment/Software	CV	0	2	0	2	1	0	0	50	0	0	0	50
	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
	SEPD3050	Integrated Personality Development Course-II	SEPD	2	0	0	2	1	40	60	0	0	0	0	100
	SEPD3030	Foreign Language (German)	SEPD	2			2	0	40	60	0	0	0	0	100
						Total	**31**	**24**							**1000**

P P Savani University
School of Engineering

Department of Science & Humanities

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

Teaching & Examination Scheme:

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

CE: Continuous Evaluation, ESE: End Semester Exam

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

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

Course Content:

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

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

List of Tutorials:

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

Text Book(s):

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

Reference Book(s):

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

Web Material Link(s):

1) http://nptel.ac.in/courses/111105035/

2) http://nptel.ac.in/courses/111106100/
3) http://nptel.ac.in/courses/111105093/
4) http://nptel.ac.in/courses/111108081/

Course Evaluation:

Theory:

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

Tutorial:

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

Course Outcomes:

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

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

P P Savani University
School of Engineering

Department of Civil Engineering

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

Teaching & Examination Scheme:

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

CE: Continuous Evaluation, ESE: End Semester Exam

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

- the stresses developed under the application of force.
- the effect of torsion on material.
- behavior of structural element under the influence of various stresses.

Course Content:

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

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

List of Practical:

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

Text Book(s):

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

Reference Book(s):

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

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests each of 30 marks and 1 Hour of duration, which will be converted to 30 marks.

- Faculty evaluation consists of 10 marks as per the guidelines provided by the course coordinator.
- End Semester Examination consists of 60 marks.

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

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

P P Savani University
School of Engineering

Department of Civil Engineering

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

Teaching & Examination Scheme:

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

CE: Continuous Evaluation, ESE: End Semester Exam

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

- develop the conceptual knowledge in building materials & Construction.
- select appropriate material in given field situation.
- develop idea about various building components.
- develop awareness about Smart building materials.

Course Content:

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

	aggregate. **Steel:** Classification of Ferrous materials(With Grade), Properties of Steel, Requirements of Steel, Uses of Steel for Construction **Admixtures:** Types of Admixture, Requirements of Admixtures, Use of Admixtures **Water:** Propertied of Water use for construction **Concrete:** Requirements of concrete, Properties of fresh and harden concrete, Types of concrete, Water-Cement ratio, Grades of concrete, Curing of concrete, Water-Cement ratio, Test on Concrete **Plain and Reinforced Concrete**: Pre -cast and cast -in -situ Construction		
5.	**Miscellaneous Construction Materials** Timber: Types of timber, Uses and application of timber, Defects in timber and wood, Seasoning, Wood products with specific uses Plastics and PVC, Ceramic products, Paints and Varnish, Materials for damp proofing, water proofing, Materials for anti-termite treatment, Glass and fiber, Materials used for false ceiling, Asbestos, Concrete blocks, Epoxy Materials, Fly Ash, Slag, Bitumen, Rubber, Geotextile Advance Concretes: Pervious, Light Transmitting, Floating	08	13
	Section II		
Module No.	Content	Hours	Weightage in %
1.	**Foundation** Function and requirements of a good foundation, Types of foundations, • **Shallow Foundations:** Types of Shallow foundation, Strip footing, Spread or isolated footing, Combined footing Strap, Mat or raft Foundation. • **Deep Foundation:** Caisson & Pile foundation	05	08
2.	**Super Structure** **Doors, Windows & Ventilators:** a) Doors: Location, technical terms, size, types, construction, suitability. b) Windows: Factors affecting selection of size, shape, location and no. of windows, types, construction, suitability, fixtures and fastenings. c) Ventilators: Ventilators combined with window, fan light **Stairs and Staircases:** Definition, technical terms, requirements of good stair, fixing of going and rise of a step, types of steps, classification, example – stair planning, elevators, escalators. **Floorings:** Introduction, essential requirements of a floor, factors affecting selection of flooring material, types of ground floors, brick, flag stone, tiled cement concrete, granolithic, terrazzo, marble, timber flooring, upper floor - timber, timber floor supported on RSJ flag stone floor resting on RSJ, jack arch floor, reinforced concrete floor, ribbed floor, pre-cast concrete floor. **Roofs and Roof Coverings:** Introduction, requirements of good roof technical terms, classification, types of roof coverings for pitched roof. A.C. sheet roofs – fixing of A.C. sheets, G.I. Sheets roofs, slates, flat roof – advantages, Dis-advantages, types of flat terraced roofing.	10	17
3.	**Masonry**	05	08

	Brick masonry: Technical terms, bonds in brick work- English bond, single & double Flemish bond, garden wall bond, raking bond, Dutch bond. **Stone masonry**: Technical terms, lifting appliances, joints, types – random (un-coursed) rubble, coursed rubble, dry rubble masonry, Ashlar masonry- Ashlar fine, chamfered fine. **Composite masonry**: Stone facing with brick backing, brick facing with concrete backing, Hollow concrete blocks and construction, AAC blocks **Cavity walls:** Brick cavity walls, position of cavity at foundation, roof and at opening levels.		
4.	**Miscellaneous** Wall Finishes: Plastering, pointing and painting **Temporary Works:** Timbering in trenches, types of scaffoldings, shoring, underpinning **Special Treatments:** Fire resistant, water resistant, thermal insulation, acoustical construction and anti -termite treatment. **Green building:** Definition, materials construction, rating system, case study	10	17

List of Practical:

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

Text Book(s):

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

Reference Book(s):

Title	Author/s	Publication

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

Web Material Link(s):

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

Course Evaluation:

Theory:

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

Practical:

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

Course Outcomes:

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

- understand various types of building materials, their properties and applications.
- understand components of Sub-structure and super structure, their classification and application.
- understand new concept and materials used for building.

P P Savani University
School of Engineering

Department of Civil Engineering

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

Teaching & Examination Scheme:

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

CE: Continuous Evaluation, ESE: End Semester Exam

Objectives of the Course:
To help learners to

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

Course Content:

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

	Sub- merged in Liquid, Total pressure and Centre of Pressure on Lock Gates.		
4.	**Fluid Kinematics** Steady and Unsteady Flow, Laminar and Turbulent Flow, Compressible and Incompressible Flow, One – two and three Dimensional Flow, Uniform and Non Uniform Flow, Rotational and Irrotational Flow, Stream Lines and Stream Function, Velocity Potential Function, Relation between stream and velocity potential function, Flow nets, Continuity Equation for 2D and 3D flow in Cartesian co-ordinates system, Source Flow, Sink Flow. Vortex flow	07	15
Section II			
Module No.	Content	Hours	Weightage in %
1.	**Fluid Dynamics** Newton's law of motion, Euler's Equation and its applications, Bernoulli's Equation and its applications, Momentum Equation, Pitot Tube, Determination of volumetric flow with pitot tube, Principle of Venturimeter, Pipe Orifice and Rotameter, Orifice and Mouthpieces, Classification of Orifices, Flow through an orifices, Flow through Mouthpiece, Classification of Notches and Weir, Flow through Weir, Flow through Notches, hydraulics Co-efficient (Cv, Cc, Cv).	10	25
2.	**Flow Through Pipes** Major and Minor Losses in Pipes, Losses in Pipe Fittings, Hydraulic Gradient line and Total energy line, Equivalent Pipes, Pipes in series and parallel, Syphon, Power transmission through pipe, Flow through Nozzle, Water Hammer in Pipes.	08	15
3.	**Forces on Submerged Bodies** Drag and Lift, Expression for Drag and Lift, Drag on Sphere and Cylinder, Development of Lift on a Circular Cylinder, Development of Lift on an Airfoil.	05	10

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

Sr No	Name of Practical	Hours
1.	Measurement of viscosity (Verification of Stokes law)	02
2.	Study of pressure measurement devices	02
3.	Hydrostatic force and center of pressure on flat/curved surfaces	02
4.	Determine metacentric height of floating body	02
5.	Verification of Bernoulli's Equation	02
6.	Study of Reynold's apparatus	02
7.	Measurement of velocity of flow using Pitot tube	02
8.	Calibration of Flow measuring devices: Venturimeter and Orificemeter	04
9.	Calibration and Discharge over Notches (V –notch, Rectangular notch, Trapezoidal notch)	04
10.	Determination of drag forced on immersed body	02
11.	Measurement of Friction factor for Different pipes. (Losses due to pipe fittings)	02
12.	Determination of Loss of Head Due To Sudden Enlargement	02

13.	Determination of Loss of Head Due To Sudden Contraction	02
14.	Determination of coefficients of an orifice (Cd, CC, Cv).	02
15.	Determine Co-efficient of Discharge by Rotameter.	02

Text Book(s):

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

Reference Books:

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

Web Material Link(s):

- http://nptel.ac.in/courses/112105171/1

Course Evaluation:

Theory:

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

Practical:

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

Course Outcome(s):

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

- understand fundamentals of fluids.
- analyze various flow problems and flow characteristics.
- determine major and minor losses through different pipes.
- apply the concept of fluid mechanics to design various systems.
- apply the concept of designing hydraulic structure & Irrigation system.

P P Savani University
School of Engineering

Department of Civil Engineering

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

Teaching & Examination Scheme:

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

CE: Continuous Evaluation, ESE: End Semester Exam

Objectives of the Course:
To help learners to

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

Course Content:

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

Section II

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

List of Practical:

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

Text Book(s):

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

Reference Book(s):

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

Web Material Link(s):

- http://nptel.ac.in/courses/105107122/2

- http://nptel.ac.in/courses/105104101/1
- http://nptel.ac.in/courses/105104101/

Course Evaluation:

Theory:

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

Practical:

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

Course Outcome(s):

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

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

P P Savani University
School of Engineering

Centre for Skill Enhancement & Professional Development

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

Teaching & Examination Scheme:

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

CE: Continuous Evaluation, ESE: End Semester Exam

Objectives of the Course:
To help learners to

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

Course Content:

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

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

Text Book (s):

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

Reference Book(s):

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

Course Evaluation:

Theory:

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

Course Outcomes:

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

- comprehend the concept and application of critical thinking as well as its applications.
- understand the critical thinking in context of creativity, logical arguments, moral reasoning.
- understand the application of critical thinking for social, academic, global and professional spectrum.
- correlate their thinking skills for better productivity and outcome-based tasks.
- be in a better position to apply 360^{o} analysis of the situation for decision making.

P P Savani University

Integrated Personality Development Course.

Course Code: SEPD3040
Course Name: IPDC-1

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
02	00	00	01	40	60	00	00	--	--	100

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

- provide students with a holistic education – focused on increasing their intelligence quotient, physical quotient, emotional quotient and spiritual quotient
- provide students with hard and soft skills, making them more marketable when entering the workforce
- educate students on their social responsibilities as citizens of India
- provide students with a value-based education which will enable them to be successful in their family, professional, and social relationships.
- teach self-analysis and self-improvement exercises to enhance the potential of the participants.

Course Content:

Lecture No.	Content	Hours	Weightage in %
1.	• Remaking Yourself - Restructuring Yourself.	02	50
2.	• Remaking Yourself - Power of Habit.	02	
3.	• Remaking Yourself -Developing Effective Habits.	02	
4.	• Learning from Legends - Tendulkar and Ratan Tata	02	
5.	• From House To Home Affectionate Relationship	02	
6.	• Facing Failures - Factors Affecting Failures.	02	50
7.	• Facing Failures - Failures are not Always Bad.	02	
8.	• Facing Failures - Insignificance of Failures.	02	
9.	• Facing Failures - Failures can be Overcome.	02	
10.	• Learning from Legends - Yogiji Maharaj and Nelson Mandela.	02	

Course Evaluation:

Theory:

- Continuous Evaluation consists of 40 marks. There will be a mid-term exam which will assess the current progress of students, it assessed out of 20 marks and will be equivalent to 20 marks of the Continuous Course Evaluation (CCE). There will be a submission consisting 10 marks as per the guidelines of course coordinator and average of the attendance consisting 10 marks (minimum 60 percentage attendance is required).
- End semester exam (ESE) part A 30 marks and part B 30 marks.

Course Outcome(s)

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

- have gained a greater sense of social responsibility
- have gained marketable hard and soft skills that would directly apply to their future careers
- have gained greater insight and ability to navigate their family, social, and professional relationships along with difficult situations which may arise in their life
- have a broader sense of self-confidence and a defined identity
- have greater value for living a moral and ethical life based on principles taught in the course

P P Savani University
School of Engineering

Department of Civil Engineering

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

Teaching & Examination Scheme:

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

CE: Continuous Evaluation, ESE: End Semester Exam

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

Outline of the Course:

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

Course Evaluation:

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

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

Report Writing Guidelines

A. Report Format:

1. Title Page (to be provided by the respective supervisor)

The title page of the project shall give the following information in the order listed:

- Full title of the project as approved by the Mentor;
- The full name of the student/Group of students with enrollment number;
- The qualification for which the project is submitted;
- The name of the institution to which the project is submitted;
- The month and year of submission.

2. Project Certification Form
   [The form should be duly filled signed by the supervisors.]
3. Acknowledgements
   [All persons (e.g. supervisor, technician, friends, and relatives) and organization/authorities who/which have helped in the preparation of the report shall be acknowledged.]
4. Table of Contents/Index with page numbering
5. List of Tables, Figures, Schemes
6. Summary/abstract of the report.
7. Introduction/Objectives of the identified problem
8. Data Analysis and Finding of Solution
9. Application of the identified solution
10. Future Scope of enhancement of the Project and Conclusion
11. "Learning during Project Work", i.e. "Experience of Journey during Project Duration"
12. References(must)
13. Bibliography
14. Annexures (if any)

B. Guideline for Report Formatting:

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

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	00	02	05	40	60	00	00	50	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

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

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

Course Content:

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

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

List of Tutorial:

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

Text Book(S):

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

Reference Book(s):

Title	Author/s	Publication

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

Web Material Link(s):

- http://nptel.ac.in/courses/111106094/
- http://nptel.ac.in/courses/111106084/
- http://nptel.ac.in/courses/111105035/
- http://nptel.ac.in/courses/111101003/
- http://nptel.ac.in/courses/111105090/

Course Evaluation:

Theory:

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

Tutorial:

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

Course Outcome(s):

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

- derive numerical solution of linear and non-linear system of equation.
- acquire knowledge of finite differences, interpolation, numerical differentiation and numerical integration.
- select appropriate method to collect data and construct, compare, interpret and evaluate data by different statistical methods.
- apply concept of probability in decision making, artificial intelligence, machine learning etc.

P P Savani University
School of Engineering

Department of Civil Engineering

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

Teaching & Examination Scheme:

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

CE: Continuous Evaluation, ESE: End Semester Exam

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

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

Course Content:

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

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

Text Books:

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

Reference Bookss:

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

Web Material Link(s):

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

Course Evaluation:

Theory:

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

Tutorial:

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

Course Outcome(s):

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

- apply principles of statics to determine reactions & internal forces in statically determinate structures.
- determine displacements of statically determinate structures.
- determine stresses due to axial & eccentric loading.
- determine strain energy stored in a body.
- determine stresses in thin cylinders and spherical vessels.

P P Savani University
School of Engineering

Department of Civil Engineering

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

Teaching & Examination Scheme:

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

CE: Continuous Evaluation, ESE: End Semester Exam

Objective of the Course:
To help learners to

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

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

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

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Moisture Content	2
2.	Visual identification and specific gravity	2
3.	Sieve Analysis	2
4.	Liquid and Plastic Limit Test	4
5.	Shrinkage limit Test	2
6.	In-situ Density-Core Cutter & Sand Replacement method	4
7.	Permeability Test: Constant and Variable Head	4
8.	Study of rock specimen.	4
9.	Study of Strike and dip using models.	4

10.	Case study: Geologic problems encountered during civil engineering projects.	2

Text Book(s):

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

Reference Book(s):

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

Web Material Links:

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

Course Evaluation:

Theory:

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

Practical

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

Course Outcome(s):

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

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

P P Savani University
School of Engineering

Department of Civil Engineering

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

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
00	02	00	01	00	00	50	0	00	00	50

CE: Continuous Evaluation, ESE: End Semester Exam

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

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

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Electronic Theodolite** Wild T-1000 Theomat, Wild T-2000 Theomat, Wild T-2000 S Theomat.	05	17%
2.	**Elect0ronic Distance Measurement** Introduction, EM waves, EDM instruments: The geodimeter, Tellurometer, Distometer, Total Station.	05	17%
3.	**Minor Instruments** Hand level, Abney level, Indian pattern clinometers, Burel hand level, Foot rule clinometers, Ceylon ghat tracer, Fennel's clinometers, The peantagraph, The sextant.	03	10%
4.	**Precise Leveling Instrument** Introduction, Wild N-3 precision level, The cooke S-500 precise level, Engineer's precise level, Fennel's precise level, Field procedure for precise leveling.	03	10%
5.	**Special Instrument** Introduction, The site square, Auto level, Transist level, Mountain compass transist, Burnton Universal pocket transist.	03	10%
6.	**Theory of Errors** Introduction, types of errors, definitions, laws of accidental errors, laws of weights, theory of least squares, rules for giving weights and	05	17%

	distribution of errors to the field observations, Normal equation, Adjustments: Triangle, Angle and Station.		
7.	**GIS, GPS and RS:** **GIS**: Introduction, Subsystem, Hardware, Data, representation of data, Raster and Vector data, Map overlay analysis, Selective software, Applications. **RS**: Introduction, Process, EM spectrum, Sensor system, energy interaction with earth surface, Applications. **GPS**: Introduction, Segments, Survey techniques, Applications.	06	19%

List of Practical:

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

Text Book(s):

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

Reference Book(s):

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

Web Material Link(s):

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

Course Evaluation:

Practical:

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

Course Outcomes:

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

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

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	00	04	40	60	20	30	00	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objectives of the Course:
To help learners to

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

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Building Planning** Introduction to buildings, Classification of buildings, Principles of building planning, Principles of architecture composition, Standard conventional signs and symbols & abbreviations, ISI nomenclature: Size of scale, standard method of dimensioning	04	10
2.	**Building Bye Law** Introduction, Necessities, Importance, Standards for residential buildings, Different building by–laws, Provision of bye laws as per local authority, standards for industrial, public, commercial and institutional buildings.	08	18
3.	**Residential Building Planning** Minimum size requirement, Line diagram, Detail drawing, :plan, elevation, section, Preparing working drawing of residential building: detached, semidetached, row houses and apartments with scale proportion, open spaces standard as per permissible F.S.I. , Building services like water supply, drainage, electrification etc. for modern buildings, Auto CAD application in planning.	07	12
4.	**Perspective Drawing**	03	10

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

List of Practical:

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

Text Book(s):

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

Reference Book(s):

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

Web Material Links:

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

Course Evaluation:

Theory:

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

Tutorial:

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

Course Outcomes:

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

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

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	00	04	40	60	20	30	00	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

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

- understand basics of modern concrete.
- use mineral and chemical admixtures.
- understand the material properties of concrete with emphasis on its durability.
- design the required concrete mix based on the field conditions.

Course Content:

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

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

List of Practical:

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

Text Book(s):

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

Reference Book(s):

Title	Author/s	Publication
Concrete Structure, Material and Properties	P.K. Mehta	Prantice Hall Inc.

Cement based composites: Materials, Mechanical Properties and Performance	A.M. Brandt	E & FN Spon.

Web Material Link(s):

- https://onlinecourses.nptel.ac.in/noc18_ce20/preview
- https://onlinecourses.nptel.ac.in/noc18_ce21/preview

Course Evaluation:

Theory:

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

Practical:

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

Course Outcome(s):

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

- thoroughly understand the concrete production process.
- understand how each additive affects the properties of the concrete.
- be able to design a required concrete mix.

P P Savani University

Integrated Personality Development Course

Course Code: SEPD3050
Course Name: IPDC-2

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
02	00	00	01	40	60	00	00	--	--	100

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

- provide students with a holistic education – focused on increasing their intelligence quotient, physical quotient, emotional quotient and spiritual quotient.
- provide students with hard and soft skills, making them more marketable when entering the workforce.
- educate students on their social responsibilities as citizens of India
- provide students with a value-based education which will enable them to be successful in their family, professional, and social relationships.
- teach self-analysis and self-improvement exercises to enhance the potential of the participants.

Course Content:

Lecture No.	Content	Hours
1.	Remaking Yourself Restructuring Yourself.	02
2.	Essentials of Profession Writing a Resume	02
3.	Financial Wisdom Basics of Financial Planning.	02
4.	Financial Wisdom Financial Planning Process.	02
5.	From House to Home Listening & Understanding.	02
6.	From House to Home Forgive & Forget.	02
7.	From House to Home Bonding the Family.	02
8.	Soft Skills Networking, Decision making & Leadership	02

9.	Soft Skills Teamwork, Harmony & Adaptability.	02
10.	Mass Management Project Management.	02
11.	My India My Pride Glorious Past (Part -1)	02
12.	My India My Pride Glorious Past (Part -2)	02
13.	My India My Pride Present Scenario.	02
14.	My India My Pride An Ideal Citizen-1	02
15.	My India My Pride An Ideal Citizen-2	02

Course Evaluation:
Theory:

- Continuous Evaluation consists of 40 marks. There will be a mid-term exam which will assess the current progress of students, it assessed out of 20 marks and will be equivalent to 20 marks of the Continuous Course Evaluation (CE). There will be a submission consisting 10 marks as per the guidelines of course coordinator and average of the attendance consisting 10 marks (minimum 60 percentage attendance is required).
- End semester exam (ESE) section I (30 marks) and section II (30 marks).

Course Outcome(s):

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

- have gained a greater sense of social responsibility.
- have gained marketable hard and soft skills that would directly apply to their future careers.
- have gained greater insight and ability to navigate their family, social, and professional relationships along with difficult situations which may arise in their life.
- have a broader sense of self-confidence and a defined identity.
- have greater value for living a moral and ethical life based on principles taught in the course.

P P Savani University
School of Engineering

Center for Skill Enhancement and Professional Development

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

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
02	00	00	0	40	60	00	00	00	00	100

CE: Continuous Evaluation, ESE: End Semester Exam

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

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

Course Content:

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

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

7.	• Practice of Listening	2	-
8.	• Practice of Reading	2	-

Text Book(s):

Title	Author/s	Publication
Namaste German	Yoshita Dalal	Yoshita Dalal

Reference Book(s):

Title	Author/s	Publication
Fit in Deutsch	Hueber	Goyal Publication

Web Material Link(s):

- https://www.youtube.com/watch?v=iGovllrEsF8&list=PLRps6yTcWQbpoqIOCmqMeI1HLnLIRmO_t
- https://www.youtube.com/watch?v=GwBfUzPCiaw&list=PL5QyCnFPRx0GxaFjdAVkx7K9TfEklY4sg

Course Evaluation:

Theory:

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

Course Outcome(s):

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

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

THIRD YEAR B.TECH

P P SAVANI UNIVERSITY															
SCHOOL OF ENGINEERING															
TEACHING & EXAMINATION SCHEME FOR B. TECH. CIVIL ENGINEERING PROGRAMME AY:2019-20															
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
	SEPD3010	Professional Communication & Soft Skills	SEPD	1	2	0	3	2	0	0	50	50	0	0	100
	SECV3910	Summer Training	CV	4			0	4	0	0	100	0	0	0	100
	SEPD3030	Foreign Language-II	SEPD	2			2	0	40	60	0	0	0	0	100
		Elective-I	CV	2	2	0	4	3	40	60	20	30	0	0	150
						Total	**30**	**28**							**1050**
6	SECV3062	Structural Design - I	CV	3	0	2	5	5	40	60	0	0	50	0	150
	SECV3070	Basics of Transportation Engineering	CV	3	2	0	5	4	40	60	20	30	0	0	150
	SECV3082	Irrigation & Hydraulic structures	CV	3	0	0	3	3	40	60	0	0	0	0	100
	SECV3090	Estimation & Costing	CV	3	0	2	5	5	40	60	0	0	50	0	150
	SECV3101	Water & Waste Water Engineering	CV	3	2	0	5	4	40	60	20	30	0	0	150
	SEPD3020	Corporate Grooming & Etiquette	SEPD	1	2	0	3	2	0	0	50	50	0	0	100
	SEPD3030	Foreign Language (German)	SEPD	2			2	2	40	60	0	0	0	0	100
						Total	**28**	**25**							**900**

Offered from Sem.	Course Code	Course Name	Offered By	Teaching Scheme					Examination Scheme						
				Contact Hours				Credit	Theory		Practical		Tutorial		Total
				Theory	Practical	Tutorial	Total		CE	ESE	CE	ESE	CE	ESE	
5	SECV3620	Software Tools in Structural Analysis	CV	2	2	0	4	3	0	0	100	0	0	0	100
	SECV3630	Civil Engineering Material Testing & Market Survey	CV	1	4	0	5	3	0	0	100	0	0	0	100
	SECV3512	Advanced Structural Mechanics	CV	3	0	0	3	3	40	60	0	0	0	0	100
	SECV3521	Engineering Environmental Sustainability	CV	2	0	1	3	3	40	60	0	0	20	30	150
	SECV3531	Environmental Laws for Engineers	CV	3	0	0	3	3	40	60	0	0	0	0	100
	SECV3541	Experimental Methods in Construction Materials & Research	CV	3	0	0	3	3	40	60	0	0	0	0	100
	SECV3551	Urban Planning	CV	2	0	1	3	3	40	60	0	0	20	30	150
6	SECV3561	Computational Watershed Hydrology	CV	3	0	0	3	3	40	60	0	0	0	0	100
	SECV3572	Environmental Geotechnology	CV	3	0	0	3	3	40	60	0	0	0	0	100
	SECV3581	Hydrology & Climate Change	CV	3	0	0	3	3	40	60	0	0	0	0	100
	SECV3592	Prestressed Concrete	CV	3	0	0	3	3	40	60	0	0	0	0	100
	SECV3602	Soil Dynamics	CV	2	0	1	3	3	40	60	0	0	20	30	150
	SECV3612	Soil Improvement Techniques & Geotextile 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: 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	00	05	40	60	20	30	00	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

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

- understand about the shear and compaction parameters of soil.
- understand the basic properties and strength nature of various soils and their settlement behavior 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.	08	13
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.	10	17
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.	12	20
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.	08	13
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,	10	17
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.	12	20

List of Practical:

Sr. No	Name of Practical	Hours
9.	Proctor Compaction Test	02
10.	CBR Test	02
11.	Consolidation /Oedometer test	02
12.	Direct Shear Test	02
13.	Unconfined Compression Test	02
14.	Demonstration of Triaxial test	02
15.	Free swell potential	02
16.	Tutorials on shear strength of Soil	02
17.	Tutorials on Consolidation of Soil	02
18.	Tutorials on Earth Pressure	04
19.	Tutorials on Shallow foundation	04
20.	Tutorials on Pile Foundation	04

Text Book(s):

Title	Author/s	Publication
Soil Mechanics & Foundation Engineering (SI Units)	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 completion of the course, the student will be able to

- analyses soil parameters based on application and need of project site.
- understand about the soil testing procedures, experimentation techniques and related issues. simulation of mechanics on soil as a material to understand its behavior before failure and estimating its permissible values.
- understand the details of foundations, its selection procedures as per soil conditions and various modifications available for various degrees of loads.

P P Savani University
School of Engineering

Department of Civil Engineering

Course Code: SECV3022
Course Name: Indeterminate Structural Analysis
Prerequisite Course(s)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	00	01	05	40	60	00	00	50	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

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

1.	**Analysis of Statically Indeterminate Structures by Direct Stiffness Method** Application to beams, plane frames, truss, errors in analysis and fabrication of trusses because of temperature changes.	11	18
2.	**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
3.	**Approximate Methods of Indeterminate Structural Analysis** Indeterminate trusses, industrial frames, building frames.	07	12

List of Tutorials:

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

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 completion of the course, the student will be able to
- apply equilibrium and compatibility equations to determine response of indeterminate structures.
- determine displacements and internal forces of statically indeterminate structures by classical, iterative and matrix methods.
- determine internal forces and reactions and indeterminate structures subjected to moving loads.

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	00	04	40	60	20	30	00	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

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

- 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	08	13

	micrometeorology of air area – Introducing artificial methods of 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	9
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	7

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	04

	samples	
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	02
6.	Determination of residual chlorine.	02
7.	Determination of optimum coagulant dose by jar test	02
8.	Determination of sulphate content	02
9.	Determination of chlorides content	02
10.	Determination of fluoride content	02
11.	Determination of suspended, settle able, volatile and fixed solids	02
12.	Determination of turbidity by using nephelometer	02
13.	Water microorganism analysis	02
14.	Presumptive test for coliform bacteria	02

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 completion of the course, the student will be able to

- know the basics, importance, and methods of water supply.
- study the various sources and properties of water.
- understand the various methods of conveyance of water.
- learn the objectives and methods of water treatment and to study the features and function of different water treatment units.

P P Savani University
School of Engineering

Department of Civil Engineering

Course Code: SECV 3051
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	00	02	05	40	60	00	00	50	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

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

- 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 %
5.	**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
6.	**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
7.	**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 %
1.	**Hydroelectric Power** Low, Medium and High head plants, Power house components, Hydel schemes.	04	10
2.	**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
3.	**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

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.

Course Outcome(s):

Aftercompletion of the course, the student will be able to

- compute infiltration rate and capacity.
- measure runoff from a catchment.
- compute mean precipitation from a catchment.
- calculate peak flood flow.
- determine reservoir capacity using mass curve.
- compute dependable flow using flow duration curve for the requirement of irrigation, power generation etc.
- understand idea about reservoir sedimentation and its control.
- understand measures of water conservation to battle drought.

P P Savani University
School of Engineering

Centre for Skill Enhancement & Professional Development

Course Code: SEPD3010
Course Name: Professional Communication & Soft Skills
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	02	00	02	00	00	50	50	00	00	100

CE: Continuous Evaluation, ESE: End Semester Exam

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

- understand multifaceted Professional Speaking Process.
- learn the writing etiquettes for professional purposes.
- gain basic knowledge, skills and the right attitude to succeed in future professional working environment.
- develop confidence, enhance their professional communication ability in civilized, harmonized manner.
- sharpen communication skills with reference to organizational structure.
- expose themselves to the modern modes of communication.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Self-Management & Career Building** • Self-Evaluation, discipline and criticism • SWOT analysis to identify personal strength/ weakness • Planning & Goal setting • MBTI test for self-analysis • Profiling on Online Platforms	01	07
2.	**Interpersonal Organizational Communication** • Interpersonal Behavioral Skills • Understanding empathy and comprehend other's opinions/ points of views, Managing Positive and negative emotions • Healthy and Unhealthy expression of emotions. • Mutuality, Trust, Emotional Bonding and handling situation in interpersonal relationship	04	25

3.	**Professional Communication (Speaking) - I** • Professional Communication and Rhetorics • Art of Telephonic Conversation • Public Speaking	03	18
Section II			
1.	**Professional Communication (Speaking) – II** • Group Discussion (Concept, importance, Methods, Dos and Don'ts, Paralinguistic and Nonverbal Etiquettes) • Personal Interview (Concept, Importance, Methods, Dos and Don'ts, Type, Paralinguistic and Nonverbal Etiquettes)	03	20
2.	**Professional Communication (Writing)** • Cover Letter and Resume Building • E mail writing • Report Building • Technical/ Academic Writing (Reference/ citation/ plagiarism)	04	30

List of Practical:

Sr. No	Name of Practical	Hours
1.	SWOT analysis & Profiling	04
2.	MBTI Test	02
3.	Interpersonal Organizational Communication	02
4.	Group Discussion	04
5.	Personal Interview	04
6.	Cover Letter and Resume	06
7.	E mail and Report Writing	04
8.	Technical Academic Writing	04

Reference Book(s):

Title	Author/s	Publication
Professional Communication	Sheekha Shukla	2010, WordPress
Professional Communication Skills	Rajesh Kariya	Paradise Publication, Jaipur
Soft Skills and Professional Communication	Petes S. J., Francis.	Tata McGraw-Hill Education, 2011
Effective Communication and Soft Skills	Nitin Bhatnagar	Pearson Education India
Behavioural Science: Achieving Behavioural Excellence for Success	Dr. Abha Singh	John Wiley & Sons, 2012
The Hard Truth about Soft Skills	Klaus, Peggy, Jane Rohman & Molly Hamaker	London: Harper Collins

Course Evaluation:
Practical

- Continuous Evaluation consists of performance of practical to be evaluated out of 10 marks for each practical and average of the same will be converted to 30 marks.
- Internal viva consists of 20 marks.
- Practical performance/quiz/drawing/test/submission consists of 25 marks during End Semester Exam.
- Viva/Oral performance consists of 25 marks during End Semester Exam.

Course Outcome(s):

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

- understand the importance self-analysis for career building.
- learn tactics of communication in professional/ organizational ambience.
- master the art of conversation and public speaking.
- expose themselves for placement processes.
- develop writing etiquettes pertaining to placement and organizational context.

P P Savani University
School of Engineering

Department of Civil Engineering

Course Code: SECV3910
Course Name: Summer 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	
00	00	00	04	00	00	100	00	00	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
	Grand 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:

15. 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.

16. Project Certification Form
    [The form should be duly filled signed by the supervisors.]
17. 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.]
18. Table of Contents/Index with page numbering
19. List of Tables, Figures, Schemes
20. Summary/abstract of the report.
21. Introduction/Objectives of the identified problem
22. Data Analysis and Finding of Solution
23. Application of the identified solution
24. Future Scope of enhancement of the Project and Conclusion
25. "Learning during Project Work", i.e. "Experience of Journey during Project Duration"
26. References(must)
27. Bibliography
28. 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

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	00	02	05	40	60	00	00	50	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

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

- understand basics of modern concrete.
- understand various design philosophy 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.	05	12
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, analysis examples of singly reinforced, doubly reinforced, flanged sections, shear strength and development length.	05	12
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-	06	13

	calculation of deflection (theoretical method), cracking in structural concrete members, calculation of deflections and crack width.		
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.	06	13
	Section II		
Module No.	Content	Hours	Weightage in %
1.	**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.	08	18
2.	**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.	05	12
3.	**Design of Footings** Introduction, loads for footing, design basis for limit state method, design of isolated rectangular footing for axial load and uniaxial moment, design of pedestal.	06	13
4.	**Design of Stair Cases** General features, types of stair case, loads on stair cases, effective span as per IS code provisions, distribution of loading on stairs, design of stair case with waist slabs.	04	7

List of Tutorial(s):

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

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 completion of the course, the student will be able to

- design basic structural elements like slab, beams, columns and foundation etc. using steel and concrete as materials.
- design basic structural elements slab, beams, columns and foundation etc. using limit state approach.

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	02	00	04	40	60	20	30	00	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

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

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

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.	05	11%
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.	06	13%
3.	**Railway Engineering** Introduction: History, Indian railways, recent developments, different gauges, requirements of an ideal alignment.	06	13%
4.	**Railway components** rails, sleepers, ballast, types of sleepers and ballast.	06	13%

Section II			
Module No.	Content	Hours	Weightage in %
1.	**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.	07	16%
2.	**Bridge Engineering** Introduction**:** History, components, classification, types, requirements. Culverts and causeway: Layout plan, advantages and disadvantages, site suitability and selection criteria.	05	11%
3.	**Tunnelling** Classification of tunnels, Site Investigation & Planning Location of bridges and tunnels, Criteria for selection of site – Alignment – Hydrological, geological & Geotechnical investigations.	06	13%
4.	**Docks and Harbors Engineering** General, classification, requirements, planning and different components of port.	04	10%

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

List of Practical:

Sr. No	Name of Practical	Hours
1.	General aspects of highway engineering	02
2.	Site visit of highways	04

3.	Los Angeles Abrasion Test / Deval Abrasion Test	02
4.	Aggregate crushing Test	02
5.	Aggregate Impact Test	02
6.	Flakiness Index and Elongation Index Test for Aggregate	02
7.	General aspects of railway engineering	02
8.	Site visit for railway engineering	04
9.	General discussion about various tests regarding bitumen	04
10.	Videos lectures about functioning of TBM machine	02
11.	Construction video of making of docks and harbor.	02
12.	Repot on Cost analysis of various modes of transportation	02

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 of 15 marks during End Semester Exam.

Course Outcome(s):

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

- understand about highway planning and its classification.
- know about importance and working of different traffic control devices.
- conduct different types of Traffic Surveys.
- explain the reasons of accidents and their preventive measures.
- design of traffic signals at intersections and rotary intersection.
- aware of various traffic regulation and control devices.

P P Savani University
School of Engineering

Department of Civil Engineering

Course Code: SECV3082
Course Name: Irrigation & Hydraulic Structure
Prerequisite Course(s)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	00	00	03	40	60	00	00	00	00	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 %
1.	**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
2.	**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
3.	**Water Logging** Definition, causes, Reclamation, Drainage principles and practice, Indian case study and prevention.	04	10

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 completion of the course, the student will be able to

- understand the irrigation methods and duty-delta relation for crops.

- calculate Net Irrigation Requirement (NIR), Field Irrigation Requirement (FIR) and Gross Irrigation Requirement (GIR).
- calculate the pressure at key points of sheet piles and floor thickness for a weir/barrage using Khosla's theory.
- plot seepage line of earthen dam with corrections at entry and exit.
- calculate forces on gravity dam.
- design a lined irrigation canal.
- understand functions of regulating and cross drainage works.

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	00	02	05	40	60	00	00	50	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

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

- 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.	06	13
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.	06	13
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	24

Section II			
Module No.	Content	Hours	Weightage in %
1.	**Estimation of Civil Works** 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.	23	51

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 10 marks.
- Internal viva consists of 10 marks.
- 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 students will be able to

- explain types of estimate and duties of an estimator.
- undertake rate analysis of civil engineering works.
- determine the rates of various items of civil works.
- calculate estimated cost of civil construction projects.
- evaluate the actual value of any property.

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	00	04	40	60	20	30	00	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to
- 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 %
1.	**Sanitation System** 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.	08	18
2.	**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
3.	**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

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

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 student will be able to

- select appropriate treatment to raw water useful for domestic as well as construction purpose.
- maintain the pipe-network for water supply and sewage disposal effectively.
- calculate and estimate the impurities present in water used for domestic as well as construction works.
- prepare lay out plan and maintain water distribution and sewer-networks.
- test raw water as per the standard practices.
- plan and implement house plumbing work effectively.

P P Savani University
School of Engineering

Centre for Skill Enhancement & Professional Development

Course Code: SEPD3020
Course Name: Corporate Grooming & Etiquette
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	02	00	02	00	00	50	50	00	00	100

CE: Continuous Evaluation, ESE: End Semester Exam

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

- learn corporate and professional structure and mannerisms.
- acquire self-development skills to balance casual and formal situation.
- polish their personal skills for apt behavior in the context of corporate structure.
- develop adequate Skill set required for the workplace.
- become aware about the professional etiquettes and tactics to follow them.

Course Content:

Section – I			
Module No.	Content	Hours	Weightage in %
4.	**Corporate Grooming** • Introduction to corporate culture • Corporate Expectations • Need of Self-Grooming to the Corporate Expectations • Understanding and importance of Professionalism	03	25
5.	**Personal Skills** • Behavioral skills • Language Skills • Knowledge Skills • Problem Solving Skills • Developing professional attitude	04	25
Section – II			
1.	**Management Skills** • Self-management • Time management • Work life balance	04	25
2.	**Organizational Etiquettes** • General Workplace Etiquettes • Presentation Etiquettes • Meeting Etiquettes	04	25

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Corporate Grooming (Video session/ Role Play/ Skit)	04
2.	Personal Skills (Games/ Quiz/ Activities)	08
3.	Management Skills (Management Activities/ Video Sessions)	06
4.	Organizational Etiquettes (Case Study/ Activities/ Video Sessions)	06
5.	Computer Assisted Activities of Corporate Grooming	06

Reference Book(s)

Title	Author/s	Publication
Grooming and Etiquette for Corporate Men and Women	John Chibaya Mbuya	2009
Effective Communication Skills for Public Relations	Andy Green	Kogan Page, 2006
Personality Development and Soft Skills	Barun Mitra	Oxford University Press, 2016
The EQ Edge: Emotional Intelligence and Your Success	Stein, Steven J. & Howard E. Book	Wiley & Sons, 2006.
Cross Cultural Management: Concepts and Cases	Madhavan	Oxford University Press, 2016
Corporate Grooming and Etiquette	Sarvesh Gulati	Rupa Publications India Pvt. Ltd., 2012
Behavioural Science: Achieving Behavioural Excellence for Success	Dr. Abha Singh	John Wiley & Sons, 2012

Course Evaluation:

Practical:

- Continuous Evaluation consists of performance of practical to be evaluated out of 10 marks for each practical and average of the same will be converted to 30 marks.
- Internal viva consists of 20 marks.
- Practical performance/quiz/drawing/test/submission consists of 25 marks during End Semester Exam.
- Viva/Oral performance consists of 25 marks during End Semester Exam.

Course Outcome(s):

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

- understand the importance of professional etiquettes and ways to improve the same.
- gain the knowledge and practice of skill sets required in corporate set up.
- learn personal management skills in the organizational context.
- develop an awareness about the corporate etiquettes.

P P Savani University
School of Engineering

Department of Civil Engineering

Course Code: SECV3620
Course Name: Software Tools in Structural Analysis
Prerequisite Course: --

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
02	02	-	03	-	-	100	-	-	-	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

List of Theory/Practical:

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

Any Five practical shall be conducted

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 40 marks.
- Manual verification of the software results consists of 20 marks.
- Internal viva consists of 20 marks.
- Practical performance/quiz/test consists of 20 marks.

Course Outcomes:

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

- analyze and design components of a structure.
- understand the importance of software in civil engineering

P P Savani University
School of Engineering

Department of Civil Engineering

Course Code: SECV3630
Course Name: Civil Engineering Material Testing & Market Survey
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	
1	4	0	3	0	0	100	0	0	0	100

CE: Continuous Evaluation, ESE: End Semester Exam

Objective of the Course:

To help learners to

- exposure to the material testing procedure.
- provide knowledge on mechanical behavior of materials.
- acquaint with the experimental methods to determine the mechanical properties of materials.
- understand the quality of materials.
- assess the likely performance of the material in a particular service condition.

Course Content:

Sr. No	Name of Practical
1.	Field test on Bricks with market survey
2.	Field test on Tiles with market survey
3.	Field test on Steel with market survey
4.	Field test on Cement with market survey
5.	Field test on Sand with market survey
6.	Labor Rate Survey with market survey
7.	Rebound Hammer test
8.	Ultrasonic Pulse Velocity test
9.	Fatigue test – Study of testing machine.
10.	Bending test on wooden beams.
11.	Standard Penetration Test
12.	Plate Load Test

Note: A minimum of 08 experiments are mandatory.

Web Material Links:

- https://www.youtube.com/watch?v=V00jYK0zSt4
- https://www.youtube.com/watch?v=MFZ18Ed4HI8
- https://www.youtube.com/watch?v=wBqv4ApVeIs

- https://www.youtube.com/watch?v=TSgiOpPTiJU
- https://www.youtube.com/watch?v=DGkA9pzLNyg
- https://www.youtube.com/watch?v=30pt2g7Y_YQ

Practical:

- Continuous evaluation consists of performance of practical which should be evaluated out of 10 for each practical in the next turn and same will be converted to 100 marks.

Course Outcome:

After learning the course the students should be able:

- To know about different civil engineering fields with an overview of building material, building construction and recent developments in civil engineering.

P P Savani University
School of Engineering

Department of Civil Engineering

Course Code: SECV3630
Course Name: Civil Engineering Material Testing & Market Survey
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	00	03	00	00	100	00	00	00	100

CE: Continuous Evaluation, ESE: End Semester Exam

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

- exposure to the material testing procedure.
- provide knowledge on mechanical behavior of materials.
- acquaint with the experimental methods to determine the mechanical properties of materials.
- understand the quality of materials.
- assess the likely performance of the material in a particular service condition.

Course Content:

Sr. No	Name of Practical
1.	Field test on Bricks with market survey
2.	Field test on Tiles with market survey
3.	Field test on Steel with market survey
4.	Field test on Cement with market survey
5.	Field test on Sand with market survey
6.	Labor Rate Survey with market survey
7.	Rebound Hammer test
8.	Ultrasonic Pulse Velocity test
9.	Fatigue test – Study of testing machine.
10.	Bending test on wooden beams.
11.	Standard Penetration Test
12.	Plate Load Test

Note: A minimum of 08 experiments are mandatory.

Web Material Link(s):

- https://www.youtube.com/watch?v=V00jYK0zSt4
- https://www.youtube.com/watch?v=MFZ18Ed4HI8
- https://www.youtube.com/watch?v=wBqv4ApVeIs
- https://www.youtube.com/watch?v=TSgiOpPTiJU
- https://www.youtube.com/watch?v=DGkA9pzLNyg
- https://www.youtube.com/watch?v=30pt2g7Y_YQ

Practical:

- Continuous evaluation consists of performance of practical which should be evaluated out of 10 marks for each practical and same will be converted to 100 marks.

Course Outcome(s):

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

- know about different civil engineering fields with an overview of building material, building construction and recent developments in civil engineering.

P P Savani University
School of Engineering

Department of Civil Engineering

Course Code: SECV3512
Course Name: Advanced Structural Mechanics
Prerequisite Course(s)s: Engineering Mechanics (SECV1030), Strength of Material (SECV2011)

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
03	00	00	03	40	60	00	00	00	00	100

CE: Continuous Evaluation, ESE: End Semester Exam

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

- have a good grasp of all the fundamental issues in these advanced topics in structural analysis.
- have a good understanding of how standard software packages function.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Review of Basic Concepts in Structural Analysis** Structural elements (structural elements, joints and supports, stability, rigidity and static indeterminacy, kinematic indeterminacy), loads (direct actions, indirect loading), response (equilibrium, compatibility, force-displacement relations) levels of analysis, analysis of statically determinate structures (trusses, beams, frames), applications of principle of virtual work and displacement-based and force-based energy principles, deriving stiffness and flexibility coefficients.	03	06
2.	**Review of Analysis of Indeterminate Structures** Force methods: Statically indeterminate structures (method of consistent deformations, theorem of least work). Displacement Methods: Kinematically indeterminate structures (slope-deflection method, moment distribution method).	04	09
3.	**Matrix Concepts and Matrix Analysis of Structures** Matrix, vector, basic matrix operations, rank, solution of linear simultaneous equations, eigenvalues and eigenvectors, coordinate systems, displacement and force transformation matrices, Contra-gradient principle, element and structure stiffness matrices, Element and structure flexibility matrices, equivalent joint loads, stiffness and flexibility approaches.	06	13

4.	**Matrix Analysis of Structures with Axial Elements** Introduction: Axial stiffness and flexibility, stiffness matrices for an axial element (two d.o.f), plane truss element (four d.o.f) and space truss element (six d.o.f), One-dimensional axial structures: Analysis by conventional stiffness method (two d.o.f per element) and reduced element stiffness method (single d.o.f),Analysis by flexibility method, Plane trusses: Analysis by conventional stiffness method (four d.o.f per element) and reduced element stiffness method (single d.o.f),Analysis by flexibility method, Space trusses: Analysis by conventional stiffness method (six d.o.f per element) and reduced element stiffness method (single d.o.f).	10	22
Section II			
Module No.	Content	Hours	Weightage in %
1.	**Matrix Analysis of Beams and Grids** Conventional stiffness method for beams: Beam element stiffness (four d.o.f), generation of stiffness matrix for continuous beam, dealing with internal hinges, hinged and guided-fixed end supports, accounting for shear deformations, Reduced stiffness method for beams: Beam element stiffness (two d.o.f), dealing with moment releases, hinged and guided-fixed end supports, Flexibility method for fixed and continuous beams: Force transformation matrix, element flexibility matrix, solution procedure, (including support movements), Stiffness method for grids: Introduction, torsional stiffness of grid element and advantage of torsion release, analysis by conventional stiffness method using grid element with six d.o.f, analysis by reduced stiffness method (three d.o.f per element).	08	18
2.	**Matrix Analysis of Plane and Space Frames** Conventional stiffness method for plane frames: Element stiffness (six d.o.f), generation of structure stiffness matrix and solution procedure, dealing with internal hinges and various end conditions, Reduced stiffness method for plane frames: Element stiffness (three d.o.f), ignoring axial deformations, dealing with moment releases, hinged and guidedfixed end supports, Flexibility method for plane frames: Force transformation matrix, element flexibility matrix, solution procedure (including support movements), Ignoring axial deformations, Stiffness method for space frames: Introduction, element stiffness matrix of space frame element with 12 d.o.f and 6 d.o.f, coordinate transformations, analysis by reduced stiffness method (six d.o.f per element).	06	14
3.	**Analysis of Elastic Instability and Second-Order Effects** Effects of axial force on flexural stiffness: Review of buckling of ideal columns, Flexural behaviour and stiffness, measures for beam-columns - braced and unbraced, under axial compression, Solution by slope deflection method: Slope deflection equations for prismatic beam columns using stability functions, Modifications for pinned and	06	13

	guided-fixed-end conditions, Fixed end moments in beam-columns, Solution by matrix method: Stiffness matrix for prismatic beam, column element, estimation of critical elastic buckling loads, second-order analysis.		
4.	**Introduction to Finite Element Method:** Introduction, Discretisation of a structure, Displacement functions, Truss element, Beam element, Plane stress and Plane strain, Triangular elements.	02	05

Text Book(s):

Title	Author/s	Publication
Advanced Structural Analysis	Devdas Menon	Narosa Publishing House
Matrix Analysis of Structures	Asslam Kassimali	Brooks/Cole Publishing Co., USA.

Reference Book(s):

Title	Author/s	Publication
Structural Analysis	Devdas Menon	Narosa Publishing House, 2008.
Structural Analysis: A Unified Classical and Matrix Approach	Amin Ghali, Adam M Neville and Tom G Brown	Sixth Edition, 2007, Chapman & Hall.

Web Material Link(s):

- https://nptel.ac.in/courses/105106050/1

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.

Course Outcome(s):

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

- explore and understand advanced topics like Finite Element Method.
- create advanced programs for analysis.

P P Savani University
School of Engineering

Department of Civil Engineering

Course Code: SECV3521
Course Name: Engineering Environmental Sustainability
Prerequisite Course(s): Environmental Science (SECV1010)

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
02	00	01	03	40	60	00	00	20	30	150

CE: Continuous Evaluation, ESE: End Semester Exam

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

- create proper understanding about Constitutional provision for Environmental Protection.
- provide the information about various Environmental Laws and their evolution in India.
- make students aware about the major Acts and Rules for preventing and controlling the pollution.
- provide the information about Notifications under Environmental Protection Act.
- provide the knowledge about Regulation and Control rules and also about management and handling rules.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Principles of Sustainable Development** History and emergence of the concept of Sustainable Development, Environmental issues and crisis, Resource degradation, Greenhouse gases, Desertification, Social insecurity, Industrialization, Globalization and Environment.	03	10
2.	**Sustainable Development and International Contribution** Components of sustainability, Complexity of growth and equity, International Summits, Conventions, Agreements, Transboundary issues, Action plan for implementing sustainable development, Moral obligations and Operational guidelines.	06	20
3.	**Socio-economic Sustainable Development Systems** Socio-economic policies for sustainable development, Strategies for implementing eco-development programs, Sustainable development through trade, Economic growth, Carrying Capacity, Public participation, The National Green Tribunal Act, 2010.	06	20
Section II			

Module No.	Content	Hours	Weightage in %
1.	**Agenda for Future Global Sustainable Development** Role of developed countries in the sustainable development of developing countries, Demographic dynamics and sustainability, Integrated approach for resource protection and management.	05	17
2.	**Types of Energy** (Conventional, Non-Conventional and Renewable) Alternative energy sources, Economics and sustainability Introduction.	04	13
3.	**Regulation and Control rules** Regulation and Control rules for Noise Pollution, Regulation and Control rules for Ozone depleting substances. **Management and Handling rules** Management and Handling rules for bio medical waste, Management and Handling rules for plastic waste, Management and Handling and transboundary movement rules for Hazardous waste.	06	20

List of Tutorial(s):

Students have to write 10 questions from each module within the 15 Hours.

Sr. No	Name of Tutorial	Hours
1.	Principles of Sustainable Development:	02
2.	Sustainable Development and International Contribution	02
3.	Socio-economic Sustainable Development Systems	02
4.	Agenda for Future Global Sustainable Development	02
5.	Types of Energy	01
6.	Management and Handling rules	01
7.	Prepare a detail report on any Environmental Problem	05

Text Book(s):

Title	Author/s	Publication
Environmental Law & Policy in India	Armin Rozencaranz; Shyam Divan & Marhta L	Tripathi publications, 1999

Reference Book(s):

Title	Author/s	Publication
Handbook of Environmental Laws, Guidelines, Compliance & Standards, Vol 1 & 2		Environ-Media, Karad, India, 1997
Environment and pollution Laws containing Acts & Rules	S.K Mohanty	
Water (Prevention & Control of Pollution) Act; 1974 & its amendments 1978; 1988	Das Braja M	Thomson Asia Pvt. Ltd
Air (Prevention & Control of Pollution) Act; 1981 & its amendments	P. Purushothama Raj	Pearson Education.
Environmental Protection Act; 1986 & its amendments		

Web Material Link(s):

- https://www.cmu.edu/cee/research/eess-research.html

- http://www.mdpi.com/2071-1050/4/9/2270/pdf
- https://engineering.tufts.edu/article-tags/environmental-sustainability
- https://www.rmit.edu.au/study-with-us/engineering/environmental-and-sustainable-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.

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 10 marks.
- A detailed report on any Environmental Problem consisting of 10 marks.
- Quiz/drawing/test consists of 10 marks during End Semester Exam.
- Viva consists of 20 marks during End Semester Exam.

Course Outcome(s):

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

- understand about constitutional provision for environmental protection information about various environmental laws and their evolution in India.
- understand about major acts and rules for preventing and controlling the pollution.
- understand about notifications under environmental protection act.
- understand the regulation and control rules and about management and handling rules.

P P Savani University
School of Engineering

Department of Civil Engineering

Course Code: SECV3531
Course Name: Environmental Laws for Engineers
Prerequisite Course(s): Global Environmental Challenges & Management (SECV1050)

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
03	00	00	03	40	60	00	00	00	00	100

CE: Continuous Evaluation, ESE: End Semester Exam

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

- understand various Environmental laws.
- understand various National and International Environmental laws.
- understand environmental Impact Policies.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction to Environmental Law** Introduction to environmental law and Overview of Environment & Law, Origin of Environmental Law, Concept of Law & Policy, Sustainable Development and Environment, Understanding Climate Change and its processes CDP, CDMs and Carbon Off Setting.	04	8
2.	**National Environmental Law and policy** **Introduction to National Environmental Laws** Environmental Law and the Indian Constitution, Other Laws and Environment (IPC, Cr.PC, Torts), Protection Act, 1986. **Law and Policy Frameworks related to Forest and Wildlife** The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 and Forest Conservation Act, 1980, Panchayats Extension to Scheduled Areas (PESA) Act 1996 Wildlife Protection Act, 1972, Coastal Regulation Zone & Coastal Regulation Management., Land Acquisition Act, 1894, Tenure & Property Rights and Community Rights, Introduction to displacement and rehabilitation, Displacement and Environment Concerns.	10	22
3.	**Environment Impact & Policy** Introduction to Environmental Impact Assessment, EIA Infrastructure Projects & Environment, Introduction to	09	20

	Environmental Public, Hearing (EPH) & Processes, Introduction to displacement and rehabilitation Displacement and Environmental Concerns. **Environmental Disasters** Introduction to Environmental Disasters, Oil Spills & Gas Leaks Marine Pollution Industrial Accidents.		
Section II			
Module No.	Content	Hours	Weightage in %
1.	**International Environmental Law and Policy** Emergence of International Environmental Law, Fundamental, Principles and Application of International Environmental Law, Introduction to Trade & Environment, Right to Environment as Human Right, International Humanitarian Law and Environment, Environment and Conflict Management, UNFCCC & Kyoto Protocol, Treaty on Antarctic & Polar Regions – 1961, UN Convention of Law of the Sea and Regional Seas Convention, Law on International Watercourses.	10	24
2.	**Introduction to Environment and IPR** Environment and IPR, Traditional Knowledge and Environment, International Convention for the Protection of New Varieties of Plants (UPOV Convention).	06	13
3.	**International Environmental Organizations and Dispute Settlement** Nature and Origin of International Environmental Organisations, (IEOs), International Environmental Organizations and Negotiations, MEAs and Dispute Settlement Mechanisms.	06	13

Text Book(s):

Title	Author/s	Publication
Environmental Law & Policy in India	Armin Rozencaranz; Shyam Divan & Marhta L Noble	Tripathi publications, 1999

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 2) Education.

Web Material Link(s):

- http://pages.mtu.edu/~jwsuther/erdm/env_law.pdf
- https://www.crcpress.com/Environmental-Law-for-Engineers-and-Geoscientists/Aston/p/book/9781566705752

- https://onlinelibrary.wiley.com/doi/abs/10.1002/9781119304418.ch3

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 completion of the course, the student will be able to

- understand about the Constitutional provision for Environmental Protection.
- get Information about various Environmental Laws and their evolution in India.
- get knowledge of major Acts and Rules for preventing and controlling the pollution.
- get information about Notifications under Environmental Protection Act.
- get knowledge about Regulation and Control rules and also about management and handling rules.

P P Savani University
School of Engineering

Department of Civil Engineering

Course Code: SECV3541
Course Name: Experimental Methods in Construction Materials & Research
Prerequisite Course(s): Building Materials & Construction Technology (SECV2020)

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
03	00	00	03	40	60	00	00	00	00	100

CE: Continuous Evaluation, ESE: End Semester Exam

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

- develop basic understanding about operational research and methodology for construction.
- use advanced mathematical concepts to optimize and improved civil engineering problems.
- understand the link between mathematics applications to real world civil engineering problems.
- enable the students for using linear programming in civil engineering application.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Operations Research** Use of Operations Research in Civil Engineering and Managerial Decision-making process. Introduction to Optimization Techniques and their application in Engineering Planning, Design and Construction. Various models; Objective function and constraints, convex and concave functions, regions and sets.	08	18
2.	**Dynamic Programming** Multi stage decision processes, Principle of optimality, Recursive equation, Application of D.P. Non-Linear Programming: Single variable unconstrained optimization – Local & Global optima, Uni-modal Function- Sequential Search Techniques: Dichotomous, Fibonacci, Golden Section methods.	08	18
3.	**Correlation Analysis** Correlation types, co-efficient. Bi-variate Frequency Distribution, Scatter Diagram, Correlation Analysis, Practical applications in civil engineering projects. Regression Analysis: Regression and Multivariate Analysis, Multiple Regression Analysis Nonlinear Regression. Use of regression analysis in Construction Projects.	06	14
Section II			

Module No.	Content	Hours	Weightage in %
1.	**Multivariable Optimization without constraints** The gradient vector and Hessian Matrix, Gradient techniques, steepest ascent/decent technique, Newton's Method. Multivariable optimization with equality constraints-Lagrange Multiplier Technique.	07	14
2.	**Simulation** Simulation – Types, case studies in construction using simulation Techniques, simulation software's used. Griffi's waiting line Method, Concept of Downtime Cost of Equipment, Cox and Nunally Model, Failure Cost Profile (FCP), LID.	08	18
3.	**Applications** Queuing Theory, Simulation, Sequencing model – n jobs through 2, 3 and M machines, Replacement models, Games Theory, Use of mathematical models based on probabilistic and statistical methods, Simulation in risk identification, analysis and mitigation of project risks. EOQ in civil Engineering, Sensitivity analysis, ABC analysis.	08	18

Text Book(s):

Title	Authors	Publication
Engineering Optimization Theory & Practice	S.S. Rao	Wiely, India
Engineering Optimization—Methods and Applications	Ravindran	Wiely, India

Reference Book(s):

Title	Author/s	Publication
Operations Research	J.K.Sharma	Laxmi publication
Quantitative Techniques in Management	N.D.Vohra	Tata McGraw-Hill Publishing Company
Principles of Construction Management	R.Pilcher	Tata McGraw-Hill International
Operations Management	Ravindrav, Philip & Solberg	Wiley, India
Operations Research: Principles and Practice	Hamdy A. Taha	Pearson
Principles of Operations Management	H. M. Wangner	Prentice hall
Operation Research	Hira and Gupta	S.Chand

Web Material Link(s):

- https://nptel.ac.in/courses/121106007/

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 completion of the course, the student will be able to

- apply mathematical concepts for analyzing complex data.
- demonstrate knowledge of statistical methods and queuing theory and its applications in science and construction engineering.
- demonstrate skills to use modern construction engineering tools, software and equipment.
- identify, formulate, plan and schedule construction engineering projects.

P P Savani University
School of Engineering

Department of Civil Engineering

Course Code: SECV3551
Course Name: Urban Planning
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	
2	-	1	3	40	60	-	-	20	30	150

CE: Continuous Evaluation, ESE: End Semester Exam

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

- study the elements of physical infrastructure and its management.
- study the basic principles of urban transport planning and infrastructure.
- understand development issues.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
6.	**Role of Infrastructure in Development** Elements of Infrastructure (physical, social, utilities and services); Basic definitions, concepts, significance and importance; Data required for provision and planning of urban networks and services; Resource analysis, provision of infrastructure, and land requirements; Principles of resource distribution in space; Types, hierarchical distribution of facilities, Access to facilities, provision and location criteria, Norms and standards, etc.	08	26
7.	**Metro and Mega Cities: Problems and Issues** Growth trends and processes, characteristics, problems, concepts and concerns of urban sustainability, issues related to diversity and unintended growth, economic, social and environmental sustainability, quality of life, inclusivity and equity, climate change, transit-oriented development, participatory planning. Inner city – issues and problems, approach to development.	07	24

Section II			
Module No.	Content	Hours	Weightage in %
1.	**Planning and Management of Water, Sanitation and Storm Water** sources of water, treatment and storage, transportation and distribution, quality, networks, distribution losses, water harvesting, recycling and reuse, norms and standards of provision, institutional arrangements, planning provisions and management issues; Sanitation – points of generation, collection, treatment, disposal, norms and standards, grey water disposal, DEWATS, institutional arrangements, planning provisions and management issues. Storm water – rainfall data interpretation, points of water stagnation, system of natural drains, surface topography and soil characteristics, ground water replenishment, storm water collection and disposal, norms and standards, institutional arrangements, planning provisions and management issues.	08	26
2.	**Transport Infrastructure Planning, Management and Design:** Role of transport, types of transport systems, evolution of transport modes, transport problems and mobility issues; Urban form and Transport patterns, land 15 20 use – transport cycle, concept of accessibility; Hierarchy, capacity and geometric design elements of roads and intersections; Basic principles of Transport infrastructure design; Traffic and transportation surveys and studies, traffic and travel characteristics; Urban transport planning process – stages, study area, zoning, data base, concept of trip generation Transport, environment and safety issues; principles and approaches of traffic management, transport system management.	07	24

List of Tutorial:

Sr. No.	Name of Tutorial /Exercise	Hours
10.	**Film Appreciation (Individual Assignment):** Films related to city development and socio-economic issues will be screened for students. The purpose of these films is to educate the students' understanding of various development issues and to absorb them in the planning practice. At the end of the film, a discourse around the film will also be held. After viewing the films, each student is expected to write about its main focus, city / region context, its applicability to Indian environment by answering the given questions in not more than half a page.	04
11.	**Literature Review (Individual Assignment):** Each student is expected to read the article given from a journal / book and write a summary of not more than a page (250 words only) highlighting the problem, approach, methodology, analysis, how the author arrived at the conclusion and its	05

	relevance to Indian context. There will be a negative marking for writing the same text as in the original (that is copying from the original text given to them).	
12.	**Area Appreciation (Group Assignment):** The aim of the area appreciation exercise is to enable the students to understand and contextualize the location of the area in relation to the city, zone and area in which the particular place is situated. This is done in relation to the socio-economic, spatial and cultural characteristics of that city, zone, location, etc. The main purpose is to make the students appreciate the locational attributes of land parcels for future development in a city. Due to the size of the area, this exercise is done in groups of students being assigned to a particular area. The following planning issues at area level should be identified: • Review of the Master Plan / Zonal / Area plan in relation to the selected areas. • Appreciation / Analysis of ward level data. • Perception of areas in terms of legal / illegal / authorized / unauthorized, Slums, Urban Aesthetics. • Social Categorizations of people - Type of population living, people's perception about area and its planning problems.	06

Text Book(s):

Title	Author/s	Publication
Urbanization and urban systems in India	R. Ramachandran (1991)	Oxford University Press

Reference Books(s):

Title	Author/s	Publication
The Urban Pattern 5th edition	Arthur B. Gallion (2003)	CBS Publisher & Distributors
Urban and Regional Development Plans Formulation & Implementation Guidelines (2014)		Ministry of Urban Affairs & Employment, Govt. of India, New Delhi
Approaches to Planning: Introducing Current Planning Theories, Concepts and Issues	Ernest R. Alexander (1992)	Philadelphia: Gordon and Breach Science Publishers

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.

Tutorial:

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

Course Outcome(s):

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

- understand the planning process, theory and practice and its role in planning of cities.
- appreciate of the role of historical developments in planning and its evolution and trace these influences on the current situation.
- understand the institutional mechanisms involved in urban planning.
- develop capacity to understand multiple often conflicting factors to be balanced in planning for an urban area.

P P Savani University
School of Engineering

Department of Civil Engineering

Course Code: SECV3561
Course Name: Computational Watershed Hydrology
Prerequisite Course(s): Hydrology & Water resource management (SECV3050)

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
03	00	00	03	40	60	00	00	00	00	100

CE: Continuous Evaluation, ESE: End Semester Exam

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

- understand concept of watershed management.
- evaluate Watershed Energy Balance.
- understand concept of drought management, soil erosion, rainwater harvesting and watershed modelling.
- develop concept for watershed planning.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction of Computational Watershed Hydrology** Introduction and Concept of watershed management, water in the 21st century as watershed management. Hydrology dimensional analysis and unit conversions. Watersheds and water balance, Meteorology and precipitation Interception, Watershed Energy Balance, Watershed Energy Balance ET: Evaporation & Transpiration.	10	20
2.	**Watershed Modelling** Standard modeling approaches and classification, system concept for watershed modeling, overall description of different hydrologic processes, modeling of rainfall runoff process, subsurface flows and groundwater flow.	08	18
3.	**Integrated Watershed Management and Soil Erosion Modelling** Introduction to integrated approach, conjunctive use of water resources, rainwater harvesting. Soil erosion estimation, Soil erosion.	05	12
Section II			
Module No.	Content	Hours	Weightage in %

1.	**Runoff** Generation, Stream Networks & Hydrographs, Riparian & Hyporheic Zones, Water Quality, Ecohydrology.	05	11
2.	**Water Resource Protection/Management Areas** Strategies for identifying critical protection areas - where we need to focus our efforts. Use of field methods, computer models and geographic information systems (GIS) to map (delineate) watersheds, wetlands, wellhead protection areas and aquifer boundaries. Discussion of accepted field survey methods, verification requirements, and controversies surrounding mapping water resource boundaries.	09	21
3.	**Field Trip** Report of visit and learning outcome.	08	18

Text Book(s):

Title	Author/s	Publication
Watershed management: Guidelines for Indian Conditions	E.M. Tideman	Omega Scientific Publishers
Watershed Planning & Management	Dr. Rajvir Singh	Yash Publishing House

Reference Book(s):

Title	Author/s	Publication
Hydrology and the Management of Watersheds	Kenneth N. Brooks ,Peter F. Ffolliott	John Wiley & Sons
Hydrology and Soil Conservation Engineering	Ghanshyam Das	Prentice Hall India
Watersheds - Processes, Assessment and Management	Pau A. Debarry	John Wiley & Sons
Watershed Models	V.P. Singh & Donald K. Frevert	Taylor & Francis
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/105101002/
- https://nptel.ac.in/courses/105101010/16

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 completion of the course, the student will be able to

- apply concepts in watershed management planning and designing.
- read hydrograph and calculate runoff.
- understand water quality issues, soil erosion, rainwater harvesting and watershed modeling.

- plan storm water management and drought management.
- generate computer models and able to use geographic information systems (GIS) to map watersheds.

P P Savani University
School of Engineering

Department of Civil Engineering

Course Code: SECV3572
Course Name: Environmental Geotechnology
Prerequisite Course(s)s: Soil Mechanics (SECV3011), 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	00	00	03	40	60	00	00	20	30	100

CE: Continuous Evaluation, ESE: End Semester Exam

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

- explain the effects of pollutants in soil properties.
- awareness about the adverse effects of soil and ground water contaminants.
- analyse and apply the various techniques for remediation of the contaminant.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Soil Contamination & Contaminant's Movements in Soil** Introduction to Geo environmental engineering, Sources, production and classification of waste, Factors governing soil-pollutant interaction, Contaminant transport in sub surface, Advection, Diffusion, Dispersion.	07	15
2.	**Groundwater Contamination Water Quality Standard** Sources of contamination, Hydro chemical behavior of contaminants, Trace metals - Trace non-metals, Nitrogen, organic substances, Measurement of parameters, Velocity, Dispersivity - chemical partitioning.	09	20
3.	**Site Selection & Disposal of Waste** Characterization of land fill sites, Waste characterization, Stability of landfills, Current practice of waste disposal, Criteria for geotechnical construction on sanitary landfills, Passive containment systems-leachate contamination- land fill gases and their properties, landfill gas monitoring systems.	07	15

Section II			
Module No.	Content	Hours	Weightage in %
1.	**Impact of Environmental Issues** Environmental effects caused by pile driving and their control, Dynamic response of soil under environmental stress, Contribution of environmental stress such as hazardous waste, Acid rain, tree cutting etc. to mechanism of landslides.	06	14
2.	**Remediation of Contaminants from Soil and Ground Water** Contaminant transformation: sorption, biodegradation, ion exchange, precipitation, Incineration, Exsitu and insitu remediation, Solidification, bio–remediation, soil washing, electro kinetics, soil heating, verification, bio venting, Ground water remediation – pump and treat, air sparging, reactive well.	08	18
3.	**Use of Geosynthetics in Geo-environmental Design** Introduction of Geosynthetics, Application of geo-synthetics in solid waste management, Uses of Geosynthetics for current Environmental issues.	08	18

Text Book(s):

Title	Author/s	Publication
Geoenvironmental Engineering: Site Remediation, Waste Containment, and Emerging Waste Management Technologies	Sharma H.D. and Reddy K.R.	John Wiley & Sons, Inc., USA, 2004.

Reference Book(s):

Title	Author/s	Publication
Geoenvironmental Engineering, Principles and Applications	Reddi L.N. and Inyang, H. I	Marcel Dekker Inc. New York, 2000
Geoenvironmental Engineering, Contaminated Soils, Pollutant Fate, and Mitigation	Yong, R. N	CRC Press, New York, 2001
Principles and Applications of Time Domain Electrometry in Geoenvironmental Engineering	Mohamed, A. M. O	Taylor and Francis, New York, 2006

Web Material Link(s):

- http://textofvideo.nptel.ac.in/105102160/lec2.pdf
- https://www.researchgate.net/publication/284754784_Environmental_geotechnology_an_Indian_perspective
- https://www.researchgate.net/publication/294491630_Environmental_issues_in_geotechnical_engineering
- https://www.issmge.org/filemanager/technical_committees/26/TC215/Environmental_Geotechnics.pdf
- https://www.icevirtuallibrary.com/doi/10.1680/envgeo.14.00047

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 completion of the course, the student will be able to

- understand the need for the solid waste management.
- analyse the soil contamination concentration and type.
- monitor and analyse quality of ground water.
- suggest the steps for remediation of soil and groundwater.
- design the landfill site.

P P Savani University
School of Engineering

Department of Civil Engineering

Course Code: SECV3581
Course Name: Hydrology & Climate Change
Prerequisite Course(s): Hydrology & Water resource management (SECV3050)

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
03	00	00	03	40	60	00	00	00	00	100

CE: Continuous Evaluation, ESE: End Semester Exam

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

- develop basic understanding about precipitation, infiltration, evapotranspiration, hydrograph, capacity of reservoir.
- create understanding about features of various types of dam.
- understand the climate system.
- being aware of the impact of climate change on society.
- understand of adaptation in relation to water and climate change.
- describe current energy politics and energy systems related to climate change.

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.	06	13
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: Occurrence, Darcy's law, well hydraulics, well losses, Yield, Pumping and recuperation test.	05	11
3.	**Reservoir**	07	15

	Types, Investigations, Site selection, Zones of storage, Safe yield, Reservoir capacity, Reservoir sedimentation and control. Introduction to Dams: Introduction and types of dams, spillways and ancillary works, Site assessment and selection of type of dam, Information about major dams and reservoirs of India. Hydroelectric Power**:** Low, Medium and High head plants, Power house components, Hydel schemes.		
4.	**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.	05	11
Section II			
Module No.	Content	Hours	Weightage in %
1.	**Introduction** Atmosphere, Weather and Climate, Climate Parameters, Temperature, Rainfall, Humidity, Wind, Global Ocean Circulation, El Nino And Its Effect, Carbon Cycle.	03	6
2.	**Elements Related to Climate Change** Green House Gases, Total Carbon Dioxide Emissions By Energy Sector, Industrial, Commercial, Transportation, Residential, Impacts, Air Quality, Hydrology, Green Space, Causes Of Global And Regional Climate Change, Changes In Patterns Of Temperature, Precipitation And Sea Level Rise, Greenhouse Effect.	06	14
3.	**Impacts of Climate Change** Effects of Climate Changes on Living Things, Health Effects, Malnutrition, Human Migration, Socioeconomic Impacts- Tourism, Industry and Business, Vulnerability Assessment- Infrastructure, Population and Sector, Agriculture, Forestry, Human Health, Coastal Areas.	06	14
4.	**Mitigating Climate Change** IPCC Technical Guidelines for Assessing Climate Change Impact And Adaptation, Identifying Adaption Options, Designing And Implementing Adaption Measures, Surface Albedo Environment reflective Roofing And Reflective Paving Enhancement Of Evapotranspiration, Tree Planting Program, Green Roofing Strategies, Energy Conservation In Buildings, Energy Efficiencies, Carbon Sequestration.	07	16

Text Book(s):

Title	**Author/s**	**Publication**

Engineering Hydrology	K. Subramanya	Tata McGraw Hill Pub. Co. New Delhi.
Climate Change – An Indian Perspective	Dash Sushil Kumar	Cambridge University Press India Pvt. Ltd

Reference Book(s):

Title	Author/s	Publication
Engineering Hydrology	C.S.P. Ojha, R, Berndtsson and P. Bhunya	Oxford University Press, New Delhi
Environmental Hydrology	Ward, A.D., Trimble, S. W	Lewis Publishers, CRC Press
Hydrology: An Environmental Approach	Watson and Burnett,	CRC Press
Earth's Climate-Past and Future	Ruddiman W. F.	Freeman W.H. And Company
Global Warming and Climate Change Vol. I and II	Velma. I. Grover	Science Publishers

Web Material link(s):

- http://en.wikipedia.org/wiki/Hydrology
- https://www.sciencedirect.com/science/article/pii/S2405880717300158
- https://en.vedur.is/about-imo/news/nr/2910
- https://en.wikipedia.org/wiki/Climate_change_mitigation
- http://thegreenplan.ie/blog/2016/6/14/elements-of-climate-change

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 completion of the course, the student will be able to

- develop an insight into carbon cycle, physical basis of the natural greenhouse effect, including the meaning of the term radiative forcing, climate change, global warming and measures to adapt and to mitigate the impacts of climate change.
- understand on the growing scientific consensus established through the IPCC as well as the complexities and uncertainties.
- plan climate change mitigation and adaptation projects including the use of alternate fuels and renewable energy.

P P Savani University
School of Engineering

Department of Civil Engineering

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

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
				Theory		Practical		Tutorial		
Theory	Practical	Tutorial	Credit	CE	ESE	CE	ESE	CE	ESE	Total
03	00	00	03	40	60	00	00	00	00	100

CE: Continuous Evaluation, ESE: End Semester Exam

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

- understand 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, early attempts of prestressing, brief history, development of building materials, definitions, advantages of prestressing, limitations of prestressing, types of prestressing, source of prestressing force, external or internal prestressing pre-tensioning or post-tensioning, linear or circular prestressing, full limited or partial prestressing uniaxial, biaxial or multiaxial prestressing, prestressing systems and devices, pre-tensioning introduction, stages, advantages, disadvantages, devices jacks anchoring devices, harping devices, post-tensioning introduction, stages advantages disadvantages, devices, anchoring devices sequence of anchoring jacks couplers grouting constituents of concrete, aggregate ,cement, water, admixtures, hardened concrete, strength of concrete, stiffness of concrete, durability of concrete, high performance concrete, allowable stresses in concrete, hardened concrete, stress-strain curves for concrete, creep of concrete, shrinkage of concrete, properties of grout, codal provisions, prestressing steel, introduction	07	16

	forms of prestressing steel, types of prestressing steel, properties of prestressing steel, stress-strain curves for prestressing steel, relaxation of steel durability fatigue, codal provisions.		
2.	**Losses in Prestress** Notations, geometric properties, load, variable losses in prestress, elastic shortening, pre-tensioned axial members, pre-tensioned bending members, post-tensioned axial members, post-tensioned bending members, losses in prestress: friction anchorage slip force variation diagram, creep of concrete, shrinkage of concrete, relaxation of steel, total time-dependent loss.	03	07
3.	**Analysis of Members** Analysis of members, under axial load, analysis at transfer, analysis at service loads, analysis of ultimate strength, analysis of behavior, 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, analysis of un-bonded post-tensioned beams analysis of behavior.	07	16
4.	**Design of Members** Design of Members, calculation of demand, design of members for axial tension: design of prestressing force, analysis of ultimate strength design of member for flexure, calculation of moment demand, preliminary design, design of sections for flexure, final design, final design for type 1 members, special case design of sections for flexure, final design of type 2 members, design of sections for flexure , choice of sections, determination of limiting zone post-tensioning in stages design of sections for flexure, Magnel's graphical method detailing requirements for flexure detailing requirements for shear detailing requirements for torsion.	06	11
Section II			
Module No.	Content	Hours	Weightage in %
1.	**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	07	16

	reinforcement, design of transverse reinforcement, design for torsion, detailing requirements general comments, design steps.		
2.	**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
3.	**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
4.	**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.	3	7
5.	**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 modeling 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.	7	16

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 completion of the course, the student will be able to

- compute stresses due to prestressing.
- assess losses in prestress, short- and long-term deflection, flexural and shear strength of beam.
- design pre-tensioned and post-tensioned beam.

P P Savani University
School of Engineering

Department of Civil Engineering

Course Code: SECV3602
Course Name: Soil Dynamics
Prerequisite Course(s)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	
02	00	01	03	40	60	00	00	20	30	150

CE: Continuous Evaluation, ESE: End Semester Exam

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

- give a broad perspective of the concepts and theories of soil dynamics.
- highlight the issues involved in the design of geotechnical structures in the seismic environment.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction** Scope and objective, Nature and types of dynamic loading, Importance of soil dynamics.	02	7
2.	**Vibration Theory** Vibration of elementary systems, Degrees of freedom, Undamped and damped free and forced vibrations, Forced vibrations due to support motions, Rotating mass and constant force oscillators, Non-harmonic forced vibrations; Duhamel's integral, Introduction to Fourier transform, Introduction to two and multi degrees of freedom systems Response spectra.	08	27
3.	**Dynamic Soil Properties** Stiffness, Damping and plasticity parameters of soil and their determination (laboratory testing, intrusive and non-intrusive in-situ testing), Correlations of different soil parameters, Liquefaction (basics, evaluation and effects).	05	16

Section II

Module No.	Content	Hours	Weightage in %
1.	**Soil Improvement Techniques** Basic concept of soil improvement due to dynamic loading, Various methods; Mitigation of liquefaction.	03	10
2.	**Dynamic Soil-Structure Interaction** Behaviour of shallow underground foundations due to dynamic loads, Response of pile foundations under dynamic loads, Design aspects for earth retaining structures subjected to dynamic loads, Slope stability due to dynamic loads, Behaviour of subgrade soil due to cyclic loads of railway, runway.	08	27
3.	**Pile Foundations** One dimensional wave equation for analysing pile driving, response of single and pile groups under dynamic loading, Pile response in liquefied sites.	04	13

Text Book(s):

Title	Author/s	Publication
Soil Dynamics	Shamsher Prakash	Mc Graw-Hill Book Company

Reference Book(s):

Title	Author/s	Publication
Principles of Soil Dynamics	Braja M. Das	PWS-KENT Publishing Company
Dynamics of Bases and Foundations	D. D. Barkan	McGraw-Hill Book Company

Web Material Link(s):

- https://nptel.ac.in/courses/105101005/
- http://wwwmdp.eng.cam.ac.uk/web/library/enginfo/textbooks_dvd_only/soilmechs/SoilDynamics.pdf
- https://www.researchgate.net/publication/258454882_An_Introduction_to_Soil_Dynamics
- https://www.springer.com/in/book/9789048134403

List of Tutorial(s):

Students have to write 10 questions from each module within the 15 hours.

Sr. No.	Name of Tutorial	Hours
1.	Vibration theory	03
2.	Dynamic Soil Properties	03
3.	Soil Improvement Techniques	03
4.	Dynamic Soil-Structure Interaction	03
5.	Wave Propagation	03

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 tutorial which will be evaluated out of 10 marks for each tutorial and average of the same will be converted to 10 marks.
- Internal viva/Presentation consists of 10 marks.
- Quiz /test consists of 15 marks during End Semester Exam.
- Viva/ Oral performance consists of 15 marks during End Semester Exam.

Course Outcome(s):

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

- design foundations and isolation systems subjected to different kinds of vibrations.
- determine dynamic properties of soils by using laboratory and non-destructive field tests.
- assess the liquefaction potential of a given site.

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	00	00	03	40	60	00	00	00	00	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 %

1.	**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
2.	**Soil Reinforcement** Mechanism, Types of reinforcing elements, reinforcement-soil interaction, Reinforcement of soil beneath the roads, foundation. Geosynthetics and their application.	08	18
3.	**Grouting in soil** Different types and properties, desirable characteristics, grouting pressure, grouting methods.	04	10

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 completion of the course, the student will be able to

- identify the type of soil improvement techniques and their relevance in geotechnical field.
- understand the mechanism of formation of different soil improvement methods.
- analyze and compute different properties of geosynthetics.
- apply the knowledge for designing the structures using Geosynthetic materials. .

FOURTH YEAR B.TECH

P P SAVANI UNIVERSITY															
SCHOOL OF ENGINEERING															
TEACHING & EXAMINATION SCHEME FOR B. TECH. CIVIL ENGINEERING PROGRAMME AY: 2019-20															
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	20	30	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
	SECV4041	Highway & Traffic Engineering	CV	3	2	0	5	4	40	60	20	30	0	0	150
	SEPD4010	Creativity, Problem Solving & Innovation	SEPD	3	0	0	3	3	40	60	0	0	0	0	100
	SECV4910	Industrial Training	CV	4			0	4	0	0	100	0	0	0	100
		Elective-III		2	2	0	4	3	40	60	20	30	0	0	150
						Total	**24**	**26**							**900**
8	SECV4020	Project	CV	22			22	22	0	0	200	300	0	0	500
						Total	**22**	**22**							**500**

P P SAVANI UNIVERSITY																
SCHOOL OF ENGINEERING																
TEACHING & EXAMINATION SCHEME FOR FOURTH YEAR B.TECH. CIVIL ENGINEERING PROGRAMME (ELECTIVE COURSES)																
Sem	Course Code	Department Elective Course Name	Offered By	Teaching Scheme				Credit	Examination Scheme						Total
				Contact Hours					Theory		Practical		Tutorial		
				Theory	Practical	Tutorial	Total		CE	ESE	CE	ESE	CE	ESE	
7	SECV4511	Legal Aspects in Construction Practice	CV	2	0	1	3	3	40	60	0	0	20	30	150
	SECV4521	Project Control & Life Cycle Execution of Constructed Facilities	CV	2	0	1	3	3	40	60	0	0	20	30	150
	SECV4531	Road Safety Audit	CV	2	0	1	3	3	40	60	0	0	20	30	150
	SECV4552	Solid Waste Management	CV	2	0	1	3	3	40	60	0	0	20	30	150
	SECV4561	Traffic Engineering: Operation & Controls	CV	2	0	1	3	3	40	60	0	0	20	30	150
	SECV4571	Urban Infrastructure Engineering & Management	CV	2	0	1	3	3	40	60	0	0	20	30	150
	SECV4582	Advanced Waste Water Treatment	CV	2	2	0	4	3	40	60	0	0	20	30	150
	SECV4591	Modern Transportation system	CV	2	0	1	3	3	40	60	0	0	20	30	150

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	00	02	05	40	60	00	00	20	30	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	8	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

List of Tutorials:

Sr. No	Name of Tutorial	Hours
1.	Bolted and welded connections	02
2.	Tension members	03
3.	Compression members	03
4.	Column base & slab base	03
5.	water tank	02
6.	Roof truss	02

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 10 marks.
- Internal viva consists of 10 marks.
- Drawing sheet of tutorials consists of 15 marks during End Semester Exam.
- Viva/ Oral performance consists of 15 marks during End Semester Exam.

Course Outcome(s):

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

- understand steel structure characteristics under application of loads.
- design bolt connection of angle section to gusset plate & welded connection of angle section to gusset plate, lacing system (single or double) for built up column , batten system for built up column, laterally restrained simply supported beam, purlin made up angle section, slab base foundation under axially loaded column made up of single h section.
- analyze and design axially loaded tension member made up of angle section, strut made up of angle section, axially loaded column.
- calculate dead load, live load and wind load on panel points of a roof truss as per IS-875-1984 and design of water tank.

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	00	00	03	40	60	00	00	00	00	100

CE: Continuous Evaluation, ESE: End Semester Exam

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

- develop a 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**	06	14

	Organizational Set up, Classification of work, Execution of work, Book Keeping, Measurement Book, Store Procedure, Mode of Payments, Public works Accounting System.		
Section II			
Module No.	Content	Hours	Weightage in %
1.	**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
2.	**Tenders** Tender Notices, Types, Tender Procedures, Drafting Model Tenders, E-Tendering - Digital Signature Certificates, Encrypting, Decrypting, Reverse Auctions.	05	10
3.	**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

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

- learn the purpose and importance of valuation.
- understand and work on tenders.
- analyze and apply industry professional knowledge.
- analyze and synthesize property data to undertake an evidenced based market analysis.
- analyze and synthesize property data and trends to determine property value for a commercial or specialized property.

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	00	01	04	40	60	00	00	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 %
1.	**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
2.	**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
3.	**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

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

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

- understand the different construction management techniques and application of different construction equipment.
- learn concept of construction management and different job layout.
- develop concepts related with construction management & equipment management.

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	00	04	40	60	20	30	00	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

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

- 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 %
5.	**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
6.	**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
7.	**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

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

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

- understand about highway planning and its classification.
- know about importance and working of different traffic control devices.
- conduct different types of Traffic Surveys.
- explain the reasons of accidents and their preventive measures.
- design of traffic signals at intersections and rotary intersection.
- aware of various traffic regulation and control devices.

P P Savani University
School of Engineering

Center for Skill Enhancement and Professional Development

Course Code: SEPD4010
Course Name: Creativity, Problem Solving & Innovation
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	00	00	03	40	60	00	00	00	00	100

CE: Continuous Evaluation, ESE: End Semester Exam

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

- achieve expertise with the technicalities of creativity and problem solving.
- advance an assertiveness for innovation.
- advance creative thinking skills using shaft of learning components leading to understanding of plans of creativity, problem solving and innovation
- discuss uses of the concepts of creativity and problem-solving skills in personal, social, academic, and profession life.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction to Creativity, Problem Solving and Innovation** • Definitions of Problem Solving, Creativity and Innovation • Need for Problem Solving and Innovation & Scope of Creativity • Types and Styles of Thinking • Strategies to Develop Creativity, Problem Solving and Innovation Skills	08	17
2.	**Questioning and Learning** • Introduction to Questioning, Learning and Visualization and its Strategies • Sources and Methods of Questioning and Learning • Finding Perspective, Visualizing thinking • Mind Mapping	07	16
3.	**Creative Thinking and Problem Solving** • Need of Creative Thinking	08	17

	• Cracking Creativity - Reversals, Reversing Perspective, seeing all sides, Looking in other world, • Finding what you are not looking for and following up • Fishbone Diagram • SCAMPER Technique		
Section II			
Module No.	Content	Hours	Weightage in %
1.	**Logic and Reasoning** • Basic Concept of Logic • Divergent Vs Convergent Thinking, Inductive Vs Deductive Thinking • Fusion of Ideas for Problem Solving • Moral Reasoning • Improvisation	08	17
2.	**Practices of Playing** • Collaboration and Brainstorming • The Spirit of Koinonia • QFT Model • Connecting the Unconnected • Making Novel Combinations	07	16
3.	**Review Strategies for Creative problem-solving methods** • A Heuristic Technique • Problem-Solving Strategies: Why Bother? • Five Building Blocks as per Fogler & LeBlanc • Strategy for Critical Thinking for Choosing • Lateral Thinking • Six Thinking Hats by Edward De Bono • Design Thinking	07	17

Text Book(s):

Title	Author/s	Publication
Thinker Toys	Michael Michalko	Random House Publication 2006
Crackling Creativity, The Secrets of Creative Genus	Michael Michalko	Ten Speed Press 2001

Reference Book(s):

Title	Author/s	Publication
Zig Zag, The Surprising Path to Greater Creativity	R Keith Sawyer	Jossy-Bass Publication 2013
De Bono's Thinking Course	Edward De Bono	Penguin Publication 1994
Six Thinking Hats	Edward De Bono	Penguin Publication 1999
How to Mind Map	Tony Buzan	Thorsons Publication 2002
The Myths of Innovation	Scott Berkum	Berkun Publication 2010
Creative confidence: Unleashing	Tom Kelly and David	William Collins Publication

the creative Potential within Us all	Kelly	2013
The all Laughed	Ira Flatow	Harper Publication 1992
The Ultimate Lateral & Critical Thinking Puzzle book	Paul Sloane, Des MacHale & M.A. DiSpezio	Sterling Publication 2002

Course Evaluation:

Section	Module No.	Evaluation Criteria	Marks
1	1	Group Activity on Brainstorming	15
	2	Mind Mapping Activity	10
	3	Chart Preparation on 'Practicality of Fishbone Diagram'	15
		Group presentation on 'SCAMPER Technique & its applications'	10
2	1	Group Presentation on Critical Analysis of a Govt. scheme/ policy/ budget (merit/ demerit, pros/cons etc)	15
	2	Group Discussion/ Debate/ Elocution	10
	3	Problem Solving Activity (Individual)	10
		Presentation (Learning Outcomes)	15
		Grand Total	**100**

Course Outcome(s):

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

- establish creativity in their day to day actions and educational output.
- solve all types of problems with an optimistic and an impartial attitude.
- reflect innovatively and work towards problem solving in a tactical way.
- initiate different and advanced practices in their selected field of profession.

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	
02	00	01	03	40	60	00	00	20	30	150

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.	07	23
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	08	27
Section II			
Module No.	Content	Hours	Weightage in %
1.	**Construction Administration**	04	13

	Duties and Responsibilities – Project Manager, Owner, Engineers and Contractors, Important Site Documents, Process of Building Permissions, Provision for Scheduling delays and accelerations, Environmental Provisions for Construction Contracts		
2.	**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	05	17
3.	**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	06	20

List of Tutorials:

Sr. No	Name of Tutorial	Hours
1.	Contract Methods	03
2.	Tendering Process	03
3.	Construction Administration	03
4.	Disputes and Liabilities in Construction	03
5.	Dispute Resolution in Construction	03

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.

Tutorial:

- Continuous Evaluation consists of tutorial submission which will be evaluated out of 10 marks for each practical and average of the same will be converted to 20 marks.
- Report Submission/case studies consists of 15 marks during End Semester Exam.
- Viva/ Oral performance consists of 15 marks during End Semester Exam.

Course Outcome(s):

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

- analyze legal aspect of construction project.
- understand about the various types of construction contracts and their legal aspects and provisions.
- understand the details and different types of contracts in construction, arbitration and legal aspects and its provision.

P P Savani University
School of Engineering

Department of Civil Engineering

Course Code: SECV4521
Course Name: Project Control and Life Cycle Execution of Constructed Facilities
Prerequisite Course(s): Construction Management & Equipment (SECV4030)

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
02	00	01	03	40	60	00	00	20	30	150

CE: Continuous Evaluation, ESE: End Semester Exam

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

- to gain different viewpoints on project management for construction.
- understand the framework by which project managers are able to measure their progress.
- utilize technology tools for communication, collaboration, information management, and decision support.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
8.	**Application of Statistical Methods in Construction** **Probability:** Probability Theory and its Importance: Definition of Probability, Rules of Probability, Random Variable. Probability Distribution. Mean or Expectation of Random Variable. Properties of Mean of Expectation **Sampling:** Sampling and Sampling Distribution: Probability Samples, Non-probability Samples, Sample Random Sampling, other Sampling Schemes, Sampling Distribution and Standard Error, some Sampling and Quality control. Use of Concepts of Standard Deviation, Coefficient of Variance, Range in Quality Control of Concreting and Similar such Activities	08	26
9.	**Work Study** Definition, Objectives, Basic Procedure, Method Study and Work Measurement, Work Study Applications in Civil Engineering, Method Study, Definition, Objective, Procedure for Selecting the Work, Recording Facts, Symbols, Flow Process Charts, Multiple Activity Charts, String Diagrams, Work Measurement, Time and Motion Studies, Concept of Standard Time and Various Allowances, Time Study, Equipment	07	24

	Performance Rating, Activity Sampling, Time-Lapse, Photography Technique, Analytical Production Studies		
Section II			
Module No.	Content	Hours	Weightage in %
1.	**Safety Engineering** Causes of Accidents on Various Sites, Safety Measures and Safety Policies to be Adopted, Determination of Safety Parameters, Personal Protective Equipment. Workmen Compensation Act, Minimum Wages Act, Type of Industrial Hazards-Nature, Causes and Control Measures, Hazard Identifications and Control Techniques, HAZOP, FMEA, FMECA, Cost of Construction Injuries-Legal Implications, Safety Organization –Safety Policy, Safety Record Keeping, Safety Culture, Safety and First Line Supervisors, Middle Managers, Top Management Practices, Sub contractual obligation, Project Coordination and Safety Procedure	08	26
2.	**Work Study** Definition, Objectives, Basic Procedure, Method Study and Work Measurement, Work Study Applications in Civil Engineering, Method Study, Definition, Objective, Procedure for Selecting the Work, Recording Facts, Symbols, Flow Process Charts, Multiple Activity Charts, String Diagrams. C) Work Measurement – Time and Motion Studies, Concept of Standard Time and Various Allowances, Time Study, Equipment Performance Rating. Activity Sampling, Time-Lapse, Photography Technique, Analytical Production Studies	07	24

List of Tutorials:

Sr. No.	Tutorial	Hours
13.	Introduction	02
14.	Planning of railway	02
15.	Airport Planning	02
16.	Intelligent transportation systems	02
17.	ITS functional areas	02
18.	ITS User Needs and Services	02
19.	Automated Highway Systems	03

Text Book(s):

Title	Author/s	Publication
Applied Statistics and Probability for Engineers	Montgomery and Runger	Wiley, India
Construction Project planning & Scheduling	Charles Patrick	Pearson, 2012

Reference Books(s):

Title	Author/s	Publication
Construction Planning, Equipment and methods	Peurifoy	Tata McGraw Hill Publication
Quality Control and Total Quality Management	P. L. Jain	Tata Mcgraw Hill Publ

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.

Practical/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):

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

- utilize technology tools for communication, collaboration, information management, and decision support.
- implement general business concepts, practices, and tools to facilitate project success.
- apply appropriate legal and ethical standards.
- appraise the role of project management in organization change.

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)

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
02	00	01	03	40	60	00	00	20	30	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 %

1	**Road Signs and Traffic Signals** Classification, Location of Signs, Measures of Sign Effectiveness, Types of Visual Perception, Sign Regulations, Sign Visibility, Sign Variables, Text Versus Symbols	05	17
2	**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
3	**Engineering Measures** Speed Humps, Speed Bumps, Speed Tables, Speed Cushions; Community Awareness and Education (Speed Limits); Enforcement- Non-Physical Measures - Physical Measures	04	13

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

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.

Practical/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):

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

- give the idea for mitigation measures for improving traffic safety and environment.
- be aware of importance of road safety aspects.
- design & planning various road geometrics.
- environmental impacts for commissioning the highway project.

P P Savani University
School of Engineering

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	00	01	03	40	60	00	00	20	30	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	04	13
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** 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.	04	14
Section II			
Module No.	Content	Hours	Weightage in %
1.	**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
2.	**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
3.	**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

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

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.

Practical/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):

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

- understand the municipal solid waste management systems with respect to its physical properties, and associated critical considerations in view of emerging technologies.
- understand the method for solid waste collection, transportation, redistribution and disposal.

P P Savani University
School of Engineering

Department of Civil Engineering

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

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
02	00	01	03	40	60	20	30	00	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 %
1.	**Traffic Flow Study** Vehicular Stream Models, Car Following Model, Q- K -V Models, Highway Capacity, Level of Service, Shock Wave Phenomenon, Queuing.	08	27
2.	**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	23

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

List of Practical/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

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

Course Outcome(s):

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

- understand about highway planning and its classification.
- know about importance and working of different traffic control devices.
- conduct different types of Traffic Surveys.
- explain the reasons of accidents and their preventive measures.
- design of traffic signals at intersections and rotary intersection.
- aware of various traffic regulation and control devices.

P P Savani University
School of Engineering

Department of Civil Engineering

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

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
02	00	01	03	40	60	00	00	20	30	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 %
1.	**Project Management in Construction** Introduction to Project Management Processes - Initiating, Planning, Executing, Controlling, and Closing Processes; Project	08	27

	Integration 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.		
2.	**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

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

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

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

Course Outcome(s):

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

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

P P Savani University
School of Engineering

Department of Civil Engineering

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

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
02	00	01	03	40	60	00	00	20	30	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: Microfiltration, Ultrafiltration, Nano filtration, Reverse Osmosis.	06	20

Section II			
Module No.	Content	Hours	Weightage in %
1.	**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
2.	**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
3.	**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

List of Practical:

Sr. No	Name of Tutorial/Practical	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 completion of the course, the student will be able to

- design the water supply and wastewater treatment systems.
- determine the treatment efficiency of treatment units.
- understand the treatment required for waste water.

P P Savani University
School of Engineering

Department of Civil Engineering

Course Code: SECV4591
Course Name: Modern Transportation System
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	00	01	03	40	60	00	00	20	30	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 %
1.	**Intelligent Transportation Systems**	05	17

	Introduction to Intelligent Transportation Systems (ITS) – Definition of ITS and Identification of ITS Objectives, Historical Background, Benefits of ITS - ITS Data collection techniques – Detectors, Automatic Vehicle Location (AVL), Automatic Vehicle Identification (AVI), Geographic Information Systems (GIS), Video Data Collection.		
2.	**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
3.	**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
4.	**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

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

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 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

- outline the energy and environmental impacts of transport activities, and their importance.
- identify the key points of relevant legislation and targets relating to vehicle emissions.
- understand that both technical and behavioral changes have a role in achieving transport sustainability.