Syllabus Book

Diploma
(CV)

P P Savani University

School of Engineering

Effective From: 2021-22
Authored by: PP Savani
University

FIRST YEAR DIPLOMA

P P SAVANI UNIVERSITY

SCHOOL OF ENGINEERING

TEACHING & EXAMINATION SCHEME FOR B. TECH. CIVIL ENGINEERING PROGRAMME AY:2021-22

Sem	Course Code	Course Title	Offered By	Teaching Scheme					Examination Scheme						
				Contact Hours				Credit	Theory		Practical		Tutorial		Total
				Theory	Practical	Tutorial	Total		CE	ESE	CE	ESE	CE	ESE	
1	IDSH1010	Fundamentals of Mathematics	SH	3	0	1	**4**	4	40	60	0	0	50	0	**150**
	IDSH1020	Engineering Physics	SH	3	2	0	**5**	4	40	60	20	30	0	0	**150**
	IDME1010	Basics of Mechanical & Civil Engineering	ME	3	2	0	**5**	4	40	60	20	30	0	0	**150**
	IDCE1010	Computer Applications	CE	3	4	0	**7**	5	40	60	40	60	0	0	**200**
	IDME1020	Engineering Workshop	ME	0	2	0	**2**	1	0	0	50	0	0	0	**50**
	CFLS1030	Functional English-I	CFLS	2	0	0	**2**	2	40	60	0	0	0	0	**100**
						Total	**25**	**20**							**800**
2	IDSH1040	Engineering Mathematics	SH	3	0	1	**4**	4	40	60	0	0	50	0	**150**
	IDSH1050	Fundamentals of Chemistry	SH	3	2	0	**5**	4	40	60	20	30	0	0	**150**
	IDCV1010	Engineering Mechanics	CV	3	2	0	**5**	4	40	60	20	30	0	0	**150**
	IDIT1010	Introduction to Computer Programming	IT	3	4	0	**7**	5	40	60	40	60	0	0	**200**
	IDSH1060	Electronics Workshop	SH	0	2	0	**2**	1	0	0	50	0	0	0	**50**
	CFLS1040	Functional English-II	CFLS	2	0	0	**2**	2	40	60	0	0	0	0	**100**
						Total	**25**	**20**							**800**

P P Savani University
School of Engineering

Department of Science & Humanities

Course Code: DSSH1010
Course Name: Fundamentals of Mathematics
Prerequisite Course(s): Algebra, Geometry, Trigonometry till 9th 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	
3	0	1	4	40	60	-	-	50	0	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the course: To provide a comprehensive knowledge of basic mathematics essential for diploma students.
To help learners to

- Outlining logarithm properties.
- Implementing concepts of Determinants and Matrices for solving science and engineering problems.
- Presenting usefulness of trigonometry.
- acquire knowledge of co-ordinate geometry and ability to work with applications to Engineering Mathematics.

Course Content:

Module No.	Content	Hours	Weightage in %
1.	**Logarithm** Basic concept of logarithm, Rules and related examples, Applications of logarithm.	5	14
2.	**Determinants and Matrices** Basic concept of determinants and matrices, Addition and subtraction, Product, Inverse up to 3X3 matrix, Solution of simultaneous equations up to three variables, Applications of determinants and matrices.	9	18
3.	**Trigonometry** Basic concept of trigonometry, Units of angles (degree and radian), Allied & compound angles, Multiple–submultiples angles, Graph of sine and cosine, Periodic function, Sum and factor formulae, Inverse trigonometric function, Applications of trigonometry.	9	18
4.	**Co-ordinate geometry** Introduction, Point, Distance formula, Mid-point, Locus of a point, Straight lines, Slope of a line, Equation of a straight line, The general equation, Angle between two lines, Circle, Tangent and normal, Equation of tangent and normal.	6	15
5.	**Vectors** Basic concept of vector and scalar, Addition and subtraction, Product of vectors, Geometric meaning of scalar and vector product, Angle between two vectors, Applications of dot and cross product, Work done and moment of force.	8	15
6.	**Mensuration**	8	20

	Basic concept of Mensuration, Area of Triangle, Square, Rectangle, Trapezium, Parallelogram, Rhombus and Circle surface, Volume of Cuboids, Cone, Cylinder and Sphere.		

List of Tutorials:

Sr. No.	Name of Tutorial	Hours
1.	Logarithm-1	1
2.	Logarithm-2	1
3.	Determinants and Matrices-1	1
4	Determinants and Matrices-2	2
5.	Trigonometry-1	1
6.	Trigonometry-2	2
7.	Co-ordinate geometry-1	1
8.	Co-ordinate geometry-2	1
9.	Vectors-1	1
10.	Vectors-2	1
11.	Mensuration-1	1
12.	Mensuration-2	2

Text Book:

Title	Author(s)	Publication
Advanced Mathematics for Polytechnic	Dr.N.R. Pandya	Macmillan Publication
Engineering Mathematics - 3rd Edition	Anthony croft and others	Pearson Education Publication

Reference Book:

Title	Author(s)	Publication
Basic Mathematics	G.C. Patel and Ami C. Shah	Atul Prakashan
Applied Mathematics for Polytechnics - 10th Edition	H. K. Dass	H. K. Dass
Applied Mathematics	W. R.Neelkanth	Sapna Publication

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 20 marks.

Course Outcomes:
After the completion of the course, the student will be able to
- Use Logarithm for solving mathematical problems.

- The students are expected to acquire necessary background in Trigonometry to appreciate the importance of the geometric study as well as for the calculation and the mathematical analysis.
- the students are expected to acquire necessary background in Determinants and Matrices so as to appreciate the importance of the Determinants are the factors that scale different parameterizations so that they all produce same overall integrals, i.e. they are capable of encoding the inherent geometry of the original shape.

Department of Mechanical Engineering

Course Code: IDME1010
Course Name: Basics of Mechanical and Civil 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
- Acquire an inclusive knowledge of fundamental concept of Mechanical Engineering.
- Understand working of simple mechanical devices.
- Study and gain significance of Mechanical Engineering in various fields.
- Read and Interpret the building drawing
- Select different types of construction materials as per requirements

Course Content:

Module No.	Content	Hours
1.	**Introduction of Mechanical Engineering:** Introduction, Scope, Importance, Basic terminologies in mechanical engineering, Basic mechanical components used in routine, Pipe and pipe fittings, Hand tools, Power tools	04
2.	**Heat interactive equipment:** Heat transfer and its Modes, Boilers, Classification and Working, Concept of Accessories and Mountings – Types, Applications, Regulations and Safety requirements ,Prime movers, Meaning, Classification, Steam turbine working, Layout of thermal power plant , Working and applications, Internal combustion engines – Definition, Classification, Components, Working of two-stroke and four-stroke engines, S.I. and C.I. engines, Performance parameters of I.C. Engine	06
3.	**Power Transmission and Safety:** Power transmission: Importance, Modes, Types, Applications, Couplings in power transmission, Safety norms to be followed for preventing accidents and damage in power transmission	04
4.	**Hydraulic and pneumatic devices:** Concept of theory of fluid flow, general properties of fluid flow, Pumps, Water turbines, and Air compressors – working principle, types, parts, performance, troubles and remedies, applications, working principle and	04

	applications of hydraulic lift, hydraulic pump, and hydraulic jack	
5.	**Manufacturing processes:** Overview of manufacturing processes, Welding concept and overview, Types, Arc and Gas welding, Accessories and Consumables, Precautions and Safety during arc and gas welding, Gas cutting, Working setup, Accessories and Consumables, Safety aspects, Casting - Introduction, Applications.	04
6.	**Civil Engineering: An Overview** Introduction, Branches, Scope, Impact, Role of Civil Engineer, Unit of measurement, Unit conversion (Length, Area, Volume).	02
7.	**Civil Engineering Surveying:** Surveying & leveling (its importance and types), Necessity for leveling, Principals of surveying, Instrument/tools used for survey and level, Various methods of finding the field survey measurements, Chain and Compass Survey, Preparations of contour sheets/ plan using survey data., Procedure of leveling	07
8.	**Civil Engineering Drawing**: Types of building drawings, Abbreviation, conventions & symbols in civil drawing, building byelaws for planning of residential building and industrial building, Planning of simple residential and industrial building	05
9.	**Construction Materials**: Common construction materials such as cement, Brick, Stone, Timber, Steel and Concrete, Properties of each materials & their acceptable standards, Quality parameters of materials, Estimations and costing for simple structure (only the material cost)	05
10.	**Machine Foundations:** Criteria for machine foundation, Provisions for foundation design considerations in machine foundations, Factors to be considered while designing machine foundations such as type of soil, Design foundations for simple machine like lathe, compression press, universal testing machine, electric power hammer etc. BIS CODE of practice for machine foundations I.S.- 2974 - Part –I & II	04

List of Practical:

Sr. No.	Details of Practical	Hours
1.	Study of few selected boilers, accessories and mountings	02
2.	Study of power and motion transmission systems	04
3.	Study of various pumps	02
4.	Study and demonstration of basic machine tools	04
5.	Study and demonstration of basic mechanical equipment	02
6.	Unit Conversation Exercise	02
7.	Linear Measurement.	04
8.	Angular Measurement (Prismatic Compass)	02
9.	Angular Measurement (Surveyor Compass)	02
10.	Determine R.L of given point by Dumpy level without change point.	04
11.	Determine R.L of given point by Dumpy level with change point.	02

Reference Book(s):

Title	Author/s	Publication
Elements of Mechanical engineering	P. S. Desai and S. B. Soni	Atul Prakashan

Theory of Machines	R. S. Khurmi and J. K. Gupta	S. Chand
Heat engine	Shah and Pandya	Charotar Publishing House
Hydraulic machines	Jagdish Lal	Metropolitan Book Company
Elements of Workshop	Hazara Chaudhary	Asia Publishing House
Text book on Surveying and Levelling	S. B. Junnarkar and H. J. Shah	Laxmi Publication

Course Evaluation:
Theory:
- Continuous evaluation consists of Unit tests and internal exam.
- End semester exam.

Practical:
- Continuous evaluation consists of performance of practical.
- Internal viva.
- Practical performance/ Quiz test

Course Outcome(s):
After the completion of the course, the students will able to
- Understand basics of mechanical systems
- Understand importance of mechanical systems/engineering in various fields.
- Understand various surveying methods used in civil engineering
- Understand basic requirements of civil engineering

Department of Computer Engineering

Course Code: IDCE1010
Course Name: Computer Applications
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
- familiarize with components of computer and basic operations of it.
- provide practical and hands-on experience of application used to create documents.
- introduce internet and its usage.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Basics of Computer System** Introduction and Characteristics, Generation, Classification, Applications, describe computer hardware and software, Identify I/O, Devices, describe functioning of CU, ALU and memory unit, differentiate various types of printers, Demonstrate various file handling operations, Introduction to Memory, Memory hierarchy, Primary memory and its type, Secondary memory, Classification of Secondary memory, Cache Memory and Virtual Memory.	08	20
2.	**Computer Software** Software concept Classification of Software, System software and Application Software, Overview of Operating System, Objectives and Functions of O.S, Types of Operating System, Batch Processing, Multiprogramming, Time Sharing OS, Features of DOS, Windows and UNIX, Programming Languages, Compiler, Interpreter, Computer Virus Different Types of computer virus, Detection and prevention of Virus Application of computers in different Domain. Installation of device drivers and other required software, need and method of backup.	08	15
3.	**Using MS-Word** Use basics text formatting features, manipulate text, use page Setup features, use spell and grammar utility, Work with graphics/ clipart, Create and manipulate table, use auto shapes and its formatting with text, Use Image and table formatting.	07	15

Sr. No		Hours
4.	**Using MS-Excel** Use basic formatting and data entry features, use formula and functions, Work with graphics, Create and manipulate charts, Use header and footer options, Setup page layout and print worksheet	07	20
5.	**Using MS - PowerPoint** Create new presentation and apply basic formatting features, use master slide, Create and manipulate table, Work with objects and clips, Work with video, Work with audio, use special effects, Use navigation and hyper linking, Custom Animation and Transitions	07	15
6.	**Multi Media, Internet usage and Google Applications** Introduction of Multimedia, Types of Multimedia, and Use of Multimedia in various platforms, Describe Internet, WWW and Web Browsers: Web Browsing software, Surfing the Internet, Chatting on Internet, Basic of electronic mail, Using Emails, Document handling, Network definition, Common terminologies: LAN, WAN, Node, Host, Workstation, bandwidth, Network Components: Severs, Clients, Communication Media. Introduction of Google Applications, Gmail, Google Drive, Docs, Spreadsheet	08	15

List of Practical(s):

Sr. No	Name of Practical	Hours
1.	Introduction to different hardware components of PC and Assembling of PC.	02
2.	Installation of OS and other Software. Partitions of Drive, Compression Utilities: WinZip, Defragmenting Hard, Formatting Hard disk, etc.	04
3.	Use accessories utilities of windows OS the User Interface, Using Mouse and Moving Icons on the screen, The My Computer Icon, The Recycle Bin, Status Bar, Start and Menu & Menu-selection, Running an Application, Windows Explorer Viewing of File, Folders and Directories, Creating and Renaming of files and folders, Opening and closing of different Windows, Control Panels, Setting the date and Sound, Create Users and password.	02
4.	Entering and editing text in document file. Apply formatting features on Text like Bold, Italics, Underline, font type, color and size, Apply features like bullet, numbering in Microsoft word.	04
5.	Create and manipulate tables, create documents, insert images, format tables, Smart art, Chart in Microsoft word, Insert Hyperlink, Page number and textbox in word.	04
6.	Create Event Registration Form and Resume in Microsoft word.	04
7.	Entering and editing data in worksheet, Fill Series, fill with formatting and without formatting Using Microsoft Excel.	02
8.	Create and manipulate Charts, Shape, Sparkline Charts, Clipart, and table.	04
9.	Filter Data Using Filter and advanced filter function with more than 2 conditions, Freeze row & Column in Microsoft Excel.	02

10.	Create Mark sheet, and Pay slips using Excel, Apply various formula and functions in the sheet.	06
11.	Print sheet using print area, Page setting, print titles, Adjusting margins, Page break, headers and footers.	02
12.	Basic operations of Power point, Create PPT and inset and delete slides in power point, Use of Master Slide in Presentation, Create Project presentations, Lecture presentations, Apply Custom animation & Transition. Apply basic formatting features in presentation like font, font size, font color, text fill, spacing and line spacing Formatting text boxes, word arts, styles bullet and numbering in Microsoft power point. Working with drawing tools, applying shape or picture styles, Applying object borders, object fill, object effects in Microsoft Power point.	16
13.	Working with video, Link to video and sound files using power point.	02
14.	Internet Searching, Browsers, Various functions of Browsers (Eg. Bookmark, Customize Settings), Study of components like switches, bridges, routers, Wi-Fi router,	02
15.	Introduction of Google application, Compose Gmail, File attachment, add signature.	02
16.	Demonstration of Google drive, Sharing File Using Google drive, Spreadsheet, Docs and Google slides	02

Reference Book(s):

Title	Author/s	Publication
Computer Course	R.Taxali	Tata McGraw Hills. New Delhi.
MS-Office for Dummies	Wallace Wang	Wiley India, New Delhi
Basic Computer Engineering	Petes S. J., Francis.	Tata McGraw-Hill Education, 2011

Web Material Link(s):
- http://www.digimat.in/nptel/courses/video/106104128/L01.html
- https://www.youtube.com/watch?v=3QiItmIWmOM

Course Evaluation:
Theory
- Continuous Evaluation Consist 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 the Course Coordinator.
- End Semester Examination will consist of 60 Marks Exam.

   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 component of 20 Marks.
- Practical performance/quiz/test of 30 Marks during End Semester Exam.
- Viva/Oral performance of 30 Marks during End Semester Exam.

Course Outcome(s):

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

- Design assemble and disassemble computer component.
- Use MS Office software for word-processing, data analysis and preparing presentation.
- Use Internet and Google Application for better documentation.

P P Savani University
School of Engineering
Institute of Diploma Studies

Department of Mechanical Engineering

Course Code: IDME1020
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	
00	02	00	01	00	00	50	00	00	00	50

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to
- Understand basic know-how of various hand tools and their use in different sections of manufacturing
- Understand the use of workshop practices in day to day industrial as well domestic life that help to dissolve the routine problems
- Build the understanding of the complexity of the industrial job, along with time and skills requirements of the job
- Learn about the safety measures to be taken while working in workshop.
- Learn about operation wise tool selection.

Course Content:

Module No.	Content	Hours
11.	**Introduction and Demonstration of Safety Norms and various shops:** Introduction to various shops / sections and workshop layouts, Safety norms to be followed in a workshop.	-
12.	**Fitting shop:** Introduction of fitting shop, Safety, Making a job as per drawing including marking and performing other operations	-
13.	**Carpentry shop:** Introduction of carpentry shop, Safety, Making a job as per drawing including marking and performing other operations	-
14.	**Smithy shop:** Introduction of smithy shop, Safety, Making a job as per drawing including marking and performing other operations	-
15.	**Sheet metal shop:** Introduction of sheet metal shop, Safety, Making a job as per drawing including marking and performing other operations	-
16.	**Pipe fitting:** Introduction of pipe fitting shop, Safety, understanding various pipe fitting tools and performing operations	-
17.	**Machine Shop:** Introduction and demonstration of various machines like Lathe,	-

	Drilling, Grinding, Hack Saw Cutting etc.	

List of Practical:

Sr. No.	Details of Practical	Hours
12.	Introduction and Demonstration of Safety Norms and various shops.	02
13.	To Perform a Job of Fitting Shop.	04
14.	To Perform a Job of Carpentry Shop.	06
15.	To Perform a Job of Black Smithy shop.	06
16.	To Perform a Job of Sheet metal Shop.	04
17.	To Perform a Job of Plumbing Shop	04
18.	Introduction to Machine Tool	04

Reference Book(s):

Title	Author/s	Publication
Workshop Technology-I	Hazra and Chaudhary	Media promoters & Publisher private limited.
Workshop practice manual	K.Venkata Reddy	B.S.Publications
Mechanical workshop practice	K.C. John	PHI

Course Evaluation:
Practical:
- Continuous evaluation consists of performance of practical and internal viva.

Course Outcome(s):
After the completion of the course, the students will able to
- Understand basic know-hows of tool usage and safe working in workshop.
- Correlate industrial workings.
- Develop skills to work in industry.

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

Course Code: DSSH1040
Course Name: Engineering Mathematics
Prerequisite Course(s): Algebra, Geometry, Trigonometry till 9th 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	
3	0	1	4	40	60	-	-	50	0	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the course: To provide a comprehensive knowledge of basic mathematics essential for diploma students.
To help learners to
- This course is designed to give a comprehensive coverage at an introductory level to the subject of Functions and Limits, Differentiation, Integration and First Order Differential Equations.
- Recognize importance of differentiation and integration for solving engineering problems.

Course Content:

Module No.	Content	Hours	Weightage in %
7.	**Functions and Limits** Introduction, Function, Types of function, Classification of function, Limit of a function, Properties of limit, Standard limits, limit of trigonometric functions.	5	14
8.	**Differentiation** Introduction, Differentiation, Geometric meaning, Derivative using first principle, Derivative of standard functions, Working rules, Differentiation of composite function, Differentiation of parametric functions, Differentiation of implicit function, Derivative using logarithms, Successive differentiation, Applications of differentiation (Velocity, Acceleration, Maxima & Minima simple problems).	9	18
9.	**Integration** Introduction, Integration of standard functions, Integration by substitution, Integration by parts, Integration using partial fraction, Definite integrals, Theorem on definite integrals, Applications of Integration (Area and Volume simple problems).	9	18
10.	**Differential Equations of First order and First degree** Introduction, Formation of differential equations, Solution of differential equations, Separation of variables, Homogeneous equations, Exact Differential Equations, Integrating factor method, Linear differential equation.	9	18
11.	**Complex Number** Introduction, Mathematical Operations, Polar form, Modulus, Amplitude Farm, De Movire's Theorem.	6	18
12.	**Statistics**	7	14

	Introduction, Central tendency, Mean, Mean of discrete observations, Mean of grouped data, Step deviation method, Median, Median for grouped data, Mode, Standard deviation, Standard deviation for grouped data.		

List of Tutorials:

Sr. No.	Name of Tutorial	Hours
1.	Functions and Limits-1	1
2.	Functions and Limits-2	1
3.	Differentiation-1	1
4	Differentiation-2	2
5.	Integration-1	1
6.	Integration-2	2
7.	Differential Equations of First order and First degree-1	1
8.	Differential Equations of First order and First degree-2	2
9.	Complex Number-1	1
10.	Complex Number-2	1
11.	Statistics-1	1
12.	Statistics-2	1

Text Book:

Title	Author(s)	Publication
Advanced Mathematics for Polytechnic	Dr.N.R. Pandya	Macmillan Publication
Engineering Mathematics - 3rd Edition	Anthony croft and others	Pearson Education Publication

Reference Book:

Title	Author(s)	Publication
Applied Mathematics for Polytechnics - 10th Edition	H. K. Dass	H. K. Dass
Applied Mathematics	W. R.Neelkanth	Sapna Publication
Polytechnic Mathematics	Deshpande S P	Pune Vidyarthi Gruh Prakashan,1984
Polytechnic Mathematics	Prakash D S	S Chand,1985

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 20 marks.

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

- apply differentiation and integration for solving engineering problems.
- implementing statistical methods for solving real world problems.
- the cumulative effect of the original quantity or equation is the Integration
- Tell the difference between a resultant and a concurrent force to model simple physical problems in the form of a differential equation, analyze and interpret the solutions.

Department of Chemical Engineering

Course Code: IDSH1050
Course Name: Fundamentals of Chemistry
Prerequisite Course(s): --

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
● The student will understand the interdisciplinary nature of chemistry and to integrate knowledge of mathematics, physics and other disciplines to a wide variety of chemical problems.
● The student will understand the importance of the Periodic Table of the Elements, how it came to be, and its role in organizing chemical information.
● The student will acquire a foundation of chemistry of sufficient breadth and depth.

Course Content:

Module. No.	Content	Hours	Weightage in %
1.	**Atomic Structure, Molecular Mass, Acids and Bases** Atom Definition Fundamental particles of Atom their Mass, Charge and Location. Atomic number and Mass number, Definition Isotopes and Isobars with suitable examples. Formation of cation and anion by electronic concept of oxidation and reduction.	04	15
2.	**Molecular Mass** Molecule, Molecular Formula, Molecular Mass, Mole, Definition Simple calculations. Avogadro's Hypothesis – Relationship between Molecular Mass and vapour Density, Avogadro Number.	04	10
3.	**Chemical Bonding and Structure of Molecules** Chemical Bond, Valence, Valence Electrons, Bonding and Non Bonding Electrons, Lewis Symbols, Octet Rule. Definition, Condition for Formation of Ionic Bond, Factors Governing Formation of Ionic Bond, Metallic Bond, Covalent Bond and Co-ordinate Covalent Bond: Hydrogen Bonding,	06	15
4.	**Acids and Bases** Theories of Acids and Bases, Arrhenius Theory, Lowry – Bronsted Theory, Lewis Theory, Advantages of Lewis Theory, pH and pOH Definition, Numerical problems, Indicator, Definition and Examples, Buffer solution, Definition, Types of	06	10

		04	10
	buffer solution with examples, Application of pH in Industries.		
5.	**Solutions** Definition, Methods of expressing concentration of a solution Molarity, Molality, Normality, Mole fraction and Percentage Mass – Simple problems.	04	10
6.	**Colloids** True solution and Colloidal solution, Definition, Differences, Types of colloids – Lyophilic and Lyophobic colloids. Differences Properties, Tyndall effect, Brownian movement, Electrophoresis and Coagulation. Industrial applications of colloids, Smoke Precipitation by Cottrell's method, Purification of water, Cleansing action of soap, Tanning of leather and Sewage disposal.	06	15
7.	**Electrochemistry** Electrolyte definition, Strong and Weak electrolytes, Examples. Electrolysis definition, Mechanism, Industrial application of Electrolysis, Electroplating, Preparation of surface, Process Factors affecting the stability of the coating, Chrome plating, Electroless plating definition, Advantages of Electroless plating over electroplating , Applications of Electroless plating.	06	15
8.	**Electrochemical-Cell** Electrochemical Cell definition, Representation of a Cell, Single Electrode Potential definition, Galvanic Cell, Formation of Daniel Cell, Electrochemical Series, Definition and Significance, Electrolytic Concentration Cell definition and Formation.	06	10

List of Practical

Sr No	Name of Practical/Tutorial	Hours
1.	Using a chemical balance.	02
2.	Introduction to chemistry laboratory – Molarity, Normality, Primary, Secondary standard solutions, Volumetric titrations, Quantitative analysis, Quantitative analysis etc.	04
3.	Demonstration: Preparation of solutions of different concentrations	04
4.	Preparation of standard solution of Oxalic acid.	04
5.	Preparation of standard solution of Sodium Carbonate.	04
6.	Determination of strength of a given solution of Sodium Hydroxide by titrating it against standard solution of Oxalic acid.	04
7.	Determination of strength of a given solution of Hydrochloric acid by titrating it against standard Sodium Carbonate solution.	04
8.	Determination of temporary and permanent hardness in water sample using EDTA as standard solution.	02
9.	Conduct metric titration of strong acid vs. strong base	02

Text Book(s):

Title	Author/s	Publication
Text Book of Engineering Chemistry	Chawla S.	Dhanpat Rai & Co.

		Pvt. Ltd., Delhi, 2003.
Engineering Chemistry	Sharma B. K.	Krishna Prakashan Media (P) Ltd, Meerut.,2001

Reference Book(s):

Title	Author/s	Publication
Concise Inorganic Chemistry	J.D. Lee	Wiley India
Textbook of Engineering Chemistry (4th Edition)	R. Gopalan, D. Venkappaya, S. Nagarajan	Vikas Publishing house Ltd.

Web Material Link(s):
https://onlinecourses.nptel.ac.in/noc21_cy45/preview
https://nptel.ac.in/noc/courses/noc17/SEM2/noc17-cy03/

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

Course Outcome(s):
After completion of the course, the student will be able to
- understand the relevance of fundamentals and applications of chemical sciences and chemistry.
- have sound knowledge on Electrochemistry.
- be aware about the role of chemical engineer in various chemical industries.

P P Savani University
Faculty of Diploma Studies

Department of Mechanical Engineering

Course Code: IDCE1010
Course Name: Engineering 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

Objective(s) of the Course:
To help learners to
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 behavior of structural element under the influence of various loads.

Course Content:

Module No.	Content	Hours	Weightage in %
18.	**Introduction Engineering Mechanics** Basic concepts: Definitions, Basic assumptions, Scalar & Vector quantities, Free, Forced and fixed vectors, Force System: Force, Classification & Representation,	02	10
19.	**Coplanar Concurrent Force system** Force as a Vector, Composition of forces, Parallelogram Law, Resolution, Principle of Transmissibility of forces, Resultant of coplanar force system., Equilibrium of coplanar force system, Free body diagrams, Determination of reactions, Equilibrium of a body under three forces, Lami's theorem	12	20
20.	**Coplanar Non-Concurrent force systems:** Moment of a force, Vector representation, Moment for coplanar force system, Varignon's theorem, Couple, Vector representation, Resolution of a force into a force and a couple., force Systems: Coplanar Concurrent Force system and Coplanar Non-Concurrent force system.	12	20
21.	**Friction:** Introduction, Wet and Dry friction, Theory of Dry friction, Angle of friction, Angle of Repose, Cone of friction, Coulomb's laws of friction.	10	15
22.	**Centre of Gravity:** Center of Gravity, Center of Mass and Centroid of curves, areas, volumes, Determination of centroid by integration, Centroid of	10	15

	composite bodies.		
23.	**Moment of Inertia:** Definition of Moment of inertia of area, Perpendicular axis theorem and Polar moment of Inertia, Parallel axis theorem, Moment of inertia of simple areas by integration, Moment of Inertia of Composite Areas., Moment of Inertia of masses, Parallel axis theorem for mass moment of inertia, Mass moment of inertia of simple bodies by integration, Mass moment of inertia of composite bodies	14	20

List of Practical:

Sr. No.	Details of Practical	Hours
19.	Coplanar Concurrent Forces	02
20.	Law of parallelogram	02
21.	Coplanar Non concurrent forces	02
22.	Lami's Theorem	02
23.	Coefficient of static friction	02
24.	Parallel force system	02
25.	Numerical practice on Force System	02
26.	Numerical practice on C.G.	02
27.	Numerical practice on M.I.	02
28.	Numerical practice on Friction	02

Reference Book(s):

Title	Author/s	Publication
Applied Mechanics	S. B. Junnarkar & H. J. Shah	Charotar 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
Engineering Mechanics,	Meriam and Karaige,	Wiley-India

Course Evaluation:
Theory:
- Continuous evaluation consists of two tests each of 15 marks and 1 hour of duration.
- Submission of assignment which consists of solving 20 numerical and it carried 10 marks of evaluation.
- End semester examination will consist of 60 marks exam.

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 learning the course, the students should 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.

P P Savani University
Institute of Diploma Studies

Department of Information Technology

Course Code:
Course Name: Introduction to Computer Programming
Prerequisite Course (s): NA

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
- develop understanding of basic concepts that can be used in programming language.
- develop the algorithm as well as flowchart for particular problem.
- enforce logical thinking.
- understand the fundamentals of programming concepts and methodology.

Course Content:

Module No.	Content	Hours	Weightage in %
1.	**Introduction to Programming Language** Classification of Programming Languages, Generations of Programming Languages - Machine Language, Assembly Language, High-Level Language, 4GL.	04	10
2.	**Introduction to C, Constants, Variables and Data Types:** Features of C Language, the Structure of C Program, Flow Charts and Algorithms Types of Errors, Debugging, Tracing the Execution of the Program, Watching Variables Values in Memory. Character Set, C Tokens, Keyword and Identifiers, Constants and Variables, Data Types - Declaration and Initialization, User Define Type Declarations - Typedef, Enum, Basic Input, and Output Operations, Symbolic Constants, Overflow and Underflow of Data.	08	18
3.	**Operators, Expressions, 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 Associatively. Introduction to Reading a Character, Writing a Character, Formatted Input and Output.	06	15
4.	**Conditional Statements:** Decision Making & Branching: Decision Making with If and If - else Statements, Nesting of If-else Statements, The Switch and go-to statements, Ternary (?:) Operator. Looping: The while Statement, The Break Statement & The Do. While loop, The FOR loop, Jump within loops - Programs.	07	15

Sr. No		Hours	
5.	**Arrays:** Introduction, One-dimensional Arrays, Two-dimensional Arrays, Concept of Multidimensional Arrays.	07	14
6.	**Strings:** Declaring and Initializing String Variables, Arithmetic Operations on Characters, Putting Strings Together, Comparison of Two Strings, String Handling Functions.	06	14
7.	**User-Defined Functions:** Concepts of User-defined Functions, Prototypes, function Definition, Parameters, Parameter Passing, Calling a Function, Recursive Function, Macros and Macro Substitution	07	14

List of Practical:

Sr. No	Name of Practical	Hours
1.	Introduction to C programming environment, compiler, Linker, loader, and editor. C Program to display "HELLO PPSU"	04
2.	Working with basic elements of C languages (different input functions, different output functions, different data types, and different operators)	08
3.	Working with C control structures (if statement, if-else statement, nested if-else statement, switch statement, break statement, goto statement)	10
4.	Working with C looping constructs (for loop, while loop, do-while and nested for loop)	10
5.	Working with the array in C (1-D array, and 2-D array)	08
6.	Working with strings in C (input, output, different string inbuilt functions)	08
7.	Working with user-defined functions in C (function with/without return type, function with/without argument, function and array)	08
8.	Working with recursive function in C	04

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

Web Material Link(s):
- http://www.digimat.in/nptel/courses/video/106104128/L01.html
- https://www.youtube.com/watch?v=3QiItmIWmOM

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 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 20 marks.
- Internal viva consists of 20 marks.
- Practical performance/quiz/drawing/test consists of 30 marks during End Semester Exam.
- Viva/ Oral performance consists of 30 marks during End Semester Exam.

Course Outcome(s):
After the completion of the course, the student will be able to
- learn the fundamentals of programming.
- develop efficient programs with their own logic & capabilities.
- understand the syntax and semantics of the C language.
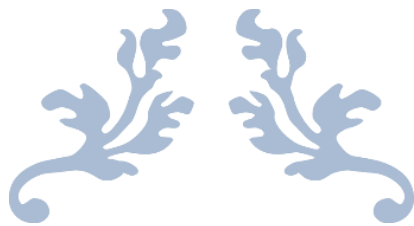
SECOND YEAR DIPLOMA

P P SAVANI UNIVERSITY

SCHOOL OF ENGINEERING

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

Sem	Course Code	Course Title	Offered By	Teaching Scheme					Examination Scheme						Total
				Contact Hours				Credit	Theory		Practical		Tutorial		
				Theory	Practical	Tutorial	Total		CE	ESE	CE	ESE	CE	ESE	
3	IDCV2010	Building Materials & Construction Technology	CV	2	4	0	6	4	40	60	0	0	0	0	**100**
	IDCV2020	Hydraulics	CV	3	2	0	5	4	40	60	20	30	0	0	**150**
	IDCV2031	Strength of Materials	CV	3	2	0	5	4	40	60	20	30	0	0	**150**
	IDCV2040	Surveying	CV	3	2	0	5	4	40	60	20	30	0	0	**150**
	IDME2010	Basics of Engineering Drawings	ME	2	4	0	6	4	50	0	40	60	0	0	**150**
						Total	**27**	**20**							**700**
4	IDCV2050	Concrete Technology	CV	2	4	0	6	4	40	60	20	30	0	0	150
	IDCV2060	Environment & Water Engineering	CV	3	2	0	5	4	40	60	20	30	0	0	150
	IDCV2072	Advanced Solid Mechanics	CV	3	0	2	5	5	40	60	0	0	50	0	150
	IDCV2080	Transportation Engineering	CV	3	2	0	5	4	40	60	20	30	0	0	150
	IDCV2090	Soil Mechanics	CV	3	2	0	5	4	40	60	20	30	0	0	150
						Total	**26**	**21**							**750**

P P Savani University
School of Engineering
Institute of Diploma Studies

Department of Civil Engineering

Course Code: IDCV2010
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	
02	04	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

- develop the conceptual knowledge in building materials.
- develop awareness about latest building materials.
- understand different types of technology used in construction works.
-

Course Content:

Module No.	Content	Hours	Weightage in %
1.	**Introduction:** Physical, Chemical and engineering properties of building materials. Applications of building materials, Alternative materials for the given items in building construction.	02	3
2	**Bricks:** Classification of brick, composition of brick, manufacture of brick, qualities of good brick, tests for bricks, comparison between clamp burning and kiln burning brick.	04	7
3	**Rocks & Stones:** Classification of rocks, sources of rocks, texture of rocks, Characteristics of stones, uses of stones, Standard requirement of stones.	04	7
4.	**Cement Concrete:** Types of Cement with their specific use, Engineering properties of cement, Field & Laboratory test of cement, Methods of storing the cement, Types of aggregate as per BIS, Requirement of aggregate, Engineering properties of aggregate, Test on aggregate.	04	7
5.	**Miscellaneous Construction Materials:** Plastics and PVC, Ceramic products, Paints and Varnish, Glass, Fiber, Steel, Concrete blocks. Timber, Lime.	04	7
6.	**Introduction of Construction Technology:** Civil engineering structures, Functions of various component of building & Other structures.	05	8

Sr. No.		Hours	
7.	**Foundations:** Classification and types of foundation, Selection types of foundation for required structure and as per situation, Foundation in black cotton soil, loose soils, etc., Failure in foundation precautions & remedial measures.	05	8
8.	**Construction Machinery:** Purpose, advantages & disadvantages, suitability of each. Ready mix concrete plant, Batch mix concrete plant.	02	3

List of Practical:

Sr. No.	Details of Practical	Hours
1.	Conduct local market survey for different civil engineering materials with respect to application, cost and quality	Assignment
2.	Sketches for Building Component, Types of Foundations, Lay out Plan, Brick & Stone Masonry,	10
2.	Determination of Shape and Size of Brick	02
3.	Determination of water absorption of brick	02
4.	Determination of Compressive strength test of brick	02
5.	Determination of Consistency of Standard Cement Paste	02
6.	Determination of Final & Initial Setting Time of Standard Cement Paste.	04
7.	Perform a sieve analysis test on given sample of fine aggregate	02
8.	Conduct field test on fine aggregate & coarse aggregate.	02
9.	Arrange filed visit at construction site where various construction activity is in progress.	04

Text Book(s):

Title	Author/s	Publication
Building Materials & Contraction	B. C.Punamia	Laxmi Publications
Building Construction	Sushil Kumar	Standard Publication

Reference Book(s):

Title	Author/s	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

Course Evaluation:
Theory:
- Continuous evaluation consists of Unit tests and internal exam.
- End semester exam.

Practical:
- Continuous evaluation consists of performance of practical.
- Internal viva.
- Practical performance/ Quiz test

Course Outcome(s):

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

- understanding about construction materials, building components.
- define the engineering properties relevant to civil engineering materials.
- study quality control tests on Cement, Brick & aggregate.
- getting a knowledge about various latest technology.

Department of Civil Engineering

Course Code: IDCV2020
Course Name: Hydraulics
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

- To introduce the importance of study of open channel flow, to give brief description on different types of flows and channels and hydraulic design principles of channels.
- To learn the fundamentals of Uniform and Non-Uniform flow in open channels.
- To give an idea about the gradually varied flow and rapidly varied flow and their equations and computations.
- To impart the knowledge on pumps and turbines

Course Content:

Module No.	Content	Hours	Weightage in %
1.	**Properties of Liquids** Scope and importance of hydraulics in Civil Engineering. Definition and properties of liquids-as mentioned in specific objectives Formulae of Dynamic viscosity, Surface tension and Kinematic Viscosity.	05	12
2.	**Liquid Pressure and its Measurement** Atmospheric pressure, gauge pressure and absolute pressure. Types of Pressure measuring instruments – Piezometer, Manometers- U- tube, Inverted U-tube and differential Manometer. Determination of the pressure of a flowing liquid given the readings on a piezometer, simple, differential and inverted differential manometers. Determination of Total and Centre of Pressure on Plane surface, on horizontal, vertical and inclined immersed Plane surfaces. (No derivation of formulae, problems only) Determination of Hinge reactions on lock gates.	10	22
3.	**Flow of Liquids** Types of flow-uniform flow, non-uniform flow,	8	18

	stream-line flow, turbulent flow, steady flow and unsteady flow. Energies of liquid in motion-Datum head- pressure head and velocity head- principle of continuity.-problems. Total energy of liquid in motion-Bernoulli's theorem (without proof) - limitations of Bernoulli's theorem.-problems. Practical applications of Bernoulli's theorem-pitot tube, orifice meter and venturi meter-problems on Veturimeter.		
4.	**Flow through orifices and mouthpieces** Definition of orifice and vena-contracta –types of orifices. Determination of discharge through small orifice Defines co-efficient of contraction, velocity and discharge. Relation between Hydraulic Coefficients - Cc, Cv, and Cd. And solves problems on hydraulic co-efficient. Large rectangular orifice-derivation of formula for discharge and states the equations for discharge through Submerged and partially submerged orifices. Problems on discharge through a large rectangular orifice, Submerged and Partially submerged orifices. Fully submerged and partially submerged orifices-explanation and formulae for discharge. Problems on determination of time of emptying of a prismatic tank by an orifice. Definition of Mouthpiece and Difference between orifices and mouthpieces, Different types of mouth pieces with their equations for discharge and determination of discharge through a mouth piece from the given details.	10	22
5.	**Flow over Notches & Weirs** Definition of notch, types of notches-rectangular, triangular and trapezoidal. Formulae for Determination of Discharge for the above notches. Problems on Determination of Discharge for the Notches. Definition of Weir-types of weirs, sharp-crested and broad crested weirs. Formulae for determination of Discharge over a sharp crested weir (Mathematical formula). Equations for Discharges for above Weirs with velocity of approach and end contractions .Determines the discharge over sharp crested and broad crested weirs under given conditions	06	13
6	**Flow thorough pipes** Major loss (loss of head due to friction) and minor	06	13

losses (Loss of head at entrance, loss of head due to sudden enlargement, loss of head due to sudden contraction, loss of head at exit of the pipe) - simple problems. Frictional loss in pipes - Chezy's formula and Darcy's formula (without Proof) – problems. Solves problems on a pipe flow under friction. Hydraulic gradient and total energy line. Discharge through parallel and compound pipes connected to a reservoir. Laminar and turbulent flow in pipes. Reynolds's number and critical velocity.

List of Practical:

Sr. No.	Details of Practical	Hours
1.	Determination of coefficient of discharge of a small orifice by constant head method and variable Head Method	02
2.	Determination of Cc of an orifice by finding Cv and Cd.	02
3.	Determination of coefficient of discharge of a mouthpiece by constant head method.	02
4.	Determination of coefficient of discharge of a triangular, rectangular and trapezoidal notches.	06
5.	Verification of Bernoulli's theorem	02
6.	Determination of coefficient of a discharge of a Venturi meter	02
7.	Determination of the coefficients of friction of pipe flow.	02
8.	Determination of Chezy's constant from flow through open channel.	02

Reference Book(s):

Title	Author/s	Publication
Hydraulics	R.S. Khurmi	S. Chand
Hydraulics	Rangwala	Laxmi Publication Pvt. Ltd.

Course Evaluation:
Theory:
- Continuous evaluation consists of Unit tests and Internal exam.
- End semester exam.

Practical:
- Continuous evaluation consists of performance of practical.
- Internal viva.
- Practical performance/ Quiz test

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

- To know the different types of flows and channels.
- To understand the performance of turbines and pumps.
- To make the student is expected to have thorough knowledge on the selection of turbines and pumps for practical purposes.

P P Savani University
School of Engineering

Department of Civil Engineering

Course Code: IDCV2031
Course Name: Strength of material
Prerequisite Course/s: Engineering Mechanics (IDCV1010)

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	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 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:

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.	03	
1.	**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.	14	20
2.	**Shear Force and Bending Moment** Introduction, Types of loads, supports and beams, Shear force, Bending Moment, Sign conventions for shear force & Bending moment. Statically determinate beam, support reactions, SFD and BMD for concentrated load and uniformly distributed load, uniformly varying load, Point of contra-flexure.	14	20
3.	**Center of Gravity & Moment of Inertia** Centroid of lines, plane areas and volumes, Examples related to centroid of composite geometry, Pappus –Guldinus theorems, Parallel and Perpendicular axis theorems, Polar moment of inertia, Radius of gyration of areas, Examples related to moment of inertia of composite geometry.	14	20

Text Book(s):

Title	Author/s	Publication
Mechanics of Structures	S.B Junarkar	Charotar Publishing House

Strength of Materials & Mechanics of Structures	Dr. B.C. Punmia	Laxmi Publications (p) Ltd.

Reference Book(s):

Title	Author/s	Publication
Strength of Material	Singer and Pytel	Harper Collins Publishers.
Elements of Strength of Materials	Timoshenko & Young	Mc Graw Hill Book Co

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Compressive Strength Test	02
2.	Impact Test (Izod)	02
3.	Impact Test (Charpy)	02
4.	Tensile Strength Test	02
5.	Rockwell Hardness Test	02
6.	Brinnal's Hardness Test	02
7.	Tutorials	02
8.	Tutorials	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 consists of 15 marks during End Semester Exam.

Course Outcome(s):

After completion of the course, the student will be able to
- apply mathematical knowledge to calculate the deformation behavior of simple structure.
- critically analyze problem and solve the 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
Institute of Diploma Studies

Department of Civil Engineering

Course Code: IDCV2040
Course Name: Surveying
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	05	40	60	20	30	00	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

- Define various survey terminology and carry out necessary corrections for errors.
- Comprehend the principle, purpose, equipment, and error corrections in a plane table and theodolite surveying.
- Gather skill towards modern surveying instrument with knowledge of the purpose and different methods.

Course Content:

Module No.	Content	Hours	Weightage in %
24.	**Theodolite Survey:** Introduction, definitions, vernier transit theodolite, temporary and permanent adjustment of theodolite, measuring horizontal and vertical angles, methods of traversing, closing error, computation of latitudes and departure, check in closed and open traverse, balancing of traverse.	07	15
25.	**Trigonometric Levelling:** Principle and necessity of Trigonometric levelling, Indirect levelling, Heights and distances, Methods, Direct levelling on steep ground.	05	12
26.	**Tachometric Survey:** Introduction, purpose, Principle, Instruments, Methods of tachometry, Stadia constants, Field work in tachometry, Reduction of readings, Errors, and precisions.	06	14
27.	**Curves:** Introduction, classification of curves, elements of a simple circular, designation of curve, methods of setting out a simple circular curve, elements of a compound and reverse curves, transition curve, types of transition curves, combined curve, types of vertical curves.	06	14
28.	**Plane table Surveying:** Objectives, principles and use of plane table surveying, instruments & accessories used in plane table surveying, Statements of two point and three point problem, errors in plane table surveying and their corrections, Precautions in plane table surveying.	07	15

29.	**Geodetic Surveying:** Introduction, triangulation, principle and uses of triangulation, triangulation systems and its classification, well-conditioned triangles, strength of figure, selection of triangulation stations and their inter-visibility, stations marks, signals, towers and scaffolds, base line, site selection and base line measurement, tape corrections, the base net, extension of base line, satellite station and reduction to Centre.	07	15
30.	**Modern Surveying Instruments:** Introduction, electromagnetic spectrum, electromagnetic distance measurement, types of EDM instruments, electronic digital theodolites, total station, digital levels, scanners for topographical survey, global positioning system.	06	14

List of Practical:

Sr. No.	Details of Practical	Hours
1.	To determine the horizontal angle by using transit Theodolite	02
2.	To determine the Vertical angle by using transit Theodolite	02
3.	To measure included angles between various points around the instrument station.	02
5.	Tacheometry Survey Project	02
6.	Setting out simple circular curve by different methods	02
7.	Plane table traversing by intersection methods Setting out combined curve (Transition - Circular – Transition)	02
8.	Plane table traversing by radiation methods	02
9.	Plane table traversing by intersection methods	02
10.	Introduction to modern surveying Instruments.	02

Reference Book(s):

Title	Author/s	Publication
Surveying and Levelling, Vol-I	B.C. Punmia	Laxmi Publication
Surveying, Vol. I	K.R.Arora	Standard Book House Publication
Surveying and Levelling Vol. I	Sanjay Mahajan	Satya Prakashan Publication

Course Evaluation:
Theory:
- Continuous evaluation consists of Unit tests and internal exam.
- End semester exam.

Practical:
- Continuous evaluation consists of performance of practical.
- Internal viva.
- Practical performance/ Quiz test

Course Outcome(s):
After the completion of the course, the students will able to
- Understand importance of mechanical systems/engineering in various fields.
- Understand various surveying methods used in civil engineering
- Understand basic requirements of civil engineering.

P P Savani University
School of Engineering
Institute of Diploma Studies

Department of Mechanical Engineering

Course Code: IDME2010
Course Name: Basics of Engineering Drawing
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	04	00	06	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 language and familiarize with Indian Standards related to engineering drawings
● Develop drafting and sketching skills, application of drawing equipment's.
● Read various engineering curves, projections and dimensioning styles.

Course Content:

Module No.	Content	Hours	Weightage in %
1.	**Introduction** BIS SP-46, Drawing Instruments and their uses, Letters and numbers – Standard Sizes and Layout of drawing sheets-Types of lines and their applications- Different types of Dimensioning techniques, Scale (reduced, enlarged & full size), plain scale and diagonal scale, Geometrical constructions.	04	14
2.	**Orthographic projections of points and lines:** Introduction to orthographic projection, First angle and Third angle method, their symbols. Conversion of pictorial view into Orthographic Views – object containing plain surfaces, slanting surfaces, slots, ribs, cylindrical surfaces. Projections of points Projections of lines in different quadrants, inclinations, True lengths of the lines projections on auxiliary planes	10	34
3.	**Projections of plane figures:** Different cases of plane figures (of different shapes) making different angles with one or both reference planes and lines lying in the plane figures making different given angles (with one or both reference planes).	05	15
4.	**Projection of solids:** Types of Solid. Projection of Cone, Cylinder, Prism &pyramids. Simple cases when solid are placed in different positions Axis faces and tines lying in the faces of the solid making given angles.	06	22
5.	**Isometric projection:** Introduction to isometric projections. Isometric scale and Natural scale. Isometric view and isometric projection. Illustrative problems related to objects containing lines, circles and arcs shape only	05	15

List of Practical:

Sr No	Name of Practical	Hours

1.	Letters and numbers, Dimensioning techniques, Scale (reduced, enlarged & full size), plain scale and diagonal scale, Geometrical constructions.	02
2.	Orthographic projections of points and lines:	15
3.	Projections of plane figures	15
4.	Projection of solids	12
5.	Isometric projection	16

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, which will be converted to 30 marks.
- Faculty evaluation consists of 20 marks as per the guidelines provided by the course coordinator.

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 30 Marks.
- Practical performance/quiz/drawing/test of 50 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
Institute of Diploma Studies

Department of Civil Engineering

Course Code: IDCV2050
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	
02	04	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 the properties of Fresh Concrete, & manufacturing process of concrete.
- Understand the properties of hardened concrete, factors affecting Elasticity, creep & Shrinkage in concrete.
- Understand the concept of mix design of concrete& its importance in estimation of composition of materials.
- Know various types of special concretes & its application.

Course Content:

Module No.	Content	Hours	Weightage in %
1.	**Introduction:** Definition of concrete, brief introduction to properties of concrete, advantages of concrete uses of concrete in comparison to other building materials.	05	11
2.	**Water:** Introduction, qualities of of water, Use of Sea Water for Mixing Concrete Mixes	04	9
3.	**Admixtures:** Types of admixtures – mineral and chemical admixtures.	04	9
4.	**Proportioning of concrete:** Object of proportioning of concrete, controlled concrete and ordinary concrete. Strength required for various types of concrete mixes. Methods of concrete mix design, fineness modulus method, water cement ratio. Importance of water quality.	08	18
5.	**Properties of concrete:** Quality control of concrete, workability, tests on workability, factors affecting workability, segregation, bleeding properties of concrete in the hardened state strength, toughness, durability, hardness impermeability and dimensional changes admixtures, accelerators and retarders and their use. Concreting under special conditions, cold weather concreting and hot weather concreting.	08	18
6.	**Durability of concrete:** Factors affecting durability, permeability of concrete, Sulphate attack, thermal properties and fire resistance, expansion and contraction joints, repair of cracks.	06	13
7.	**Tests on hardened concrete** – Compressive strength, split tensile strength, flexural strength, non-destructive testing of concrete	05	11
8.	**Special purpose concrete:** Introduction to ready mix concrete, high strength concrete, light weight concrete, fibre reinforced concrete. Ferrocement and its uses.	05	11

List of Practical:

Sr. No.	Details of Practical	Hours

4.	To determine standard consistency of cement	02
5.	To determine initial and final setting time of cement	02
6.	To determine grading zone and fineness modulus of fine aggregate	02
5.	To determine the gradation of coarse aggregate	02
6.	To determine specific gravity and water absorption of fine aggregate	02
7.	To determine specific gravity and water absorption of coarse aggregate	02
8.	To determine bulk density of coarse aggregate and fine aggregate	02
11.	To determine flakiness and elongation index of coarse aggregate	02
12.	To determine the concrete mix proportion by Indian standard Recommended method IS 10262-2009	02

Reference Book(s):

Title	Author/s	Publication
Concrete Technology	M.S Shetty	S.Chand & Company Ltd.
Concrete Technology	Aminul Laskar	Laxmi Publications
Concrete Technology	M L Gambhir	Tata Mc-Graw-Hill

Course Evaluation:

Theory:
- Continuous evaluation consists of Unit tests and internal exam.
- End semester exam.

Practical:
- Continuous evaluation consists of performance of practical.
- Internal viva.
- Practical performance/ Quiz test

Course Outcome(s):

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

- Outline the importance of testing of cement and its properties.

- Summarise the concept of workability and testing of concrete.
- Describe the properties of hardened concrete

P P Savani University
School of Engineering
Institute of Diploma Studies

Department of Civil Engineering

Course Code: IDCV2060
Course Name: Environment 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	0	04	40	60	20	30	0	0	150

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

- test raw water as per the standard practices.
- prepare lay out plan and maintain sewer-networks.
- maintain the pipe-network for water Sewage disposal effectively.
- plan and implement house plumbing work effectively.

Course Content:

Module No	Content	Hours	Weightage in %
1.	**Introduction** Water Treatment & distribution of treated water, Sewage Treatment, Industrial Wastewater Treatment	06	13
2.	**Water Treatment Plant & Distribution System** Collection of water sample, Water analysis: Physical, Chemical and Bacteriological, Treatment plant, Location, Unit/Process to be adopted, Detention period, Size of Units, Requirement of chemicals for treatment process, Efficiency of Treatment Unit/Process Requirement of Disinfectant Types of reservoirs for treated water, Determination of storage capacity of reservoir, Types of distribution system	12	27
3.	**Sewage Treatment Process & Design** Necessity of Sewage Treatment, Sample collection, Properties of sewage, Location of Treatment Plant, Design period, Layout of Treatment Plant, Miscellaneous treatment methods, Design Component of sewage treatment plant, Advance Treatment of wastewater	10	22
4.	**Design of Sewer** Sources of sewage, Factors affecting sanitary sewer, Storm water calculation (Rational method/Empirical method), Velocity of flow from sewer, Method of design of sewer	08	18
5.	**Industrial Wastewater Treatment** Water pollution by industrial waste, Industrial effluent Characteristics, Industrial effluent standards for disposal into stream and on land, Industrial wastewater treatments. Dairy ,Pulp and Paper mill, Dyeing Industry, Pharmaceutical Industry	09	20

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

Suggested Student Activities
- Visit nearby Water treatment plant for design point of view.
- Visit nearby wastewater treatment plant for design point of view.
- Visit nearby industries and understand the process and point of wastewater generation.

Evaluation:
- 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 20 marks
- Internal viva consists of 30 marks

Course Outcome:

After completion of the course, the student will be able to
- demonstrate the ability to think in core concept of their engineering application by studying various topics involved in branch specific applications
- develop the ability to collect and analyse data and to prepare coherent reports of his or her findings

P P Savani University
School of Engineering
Institute of Diploma Studies

Department of Civil Engineering

Course Code: IDCV2072
Course Name: Structural Analysis
Prerequisite Course/s: Engineering Mechanics (IDCV1010), Strength of Materials (IDCV2031)

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	00	00	50	0	150

CE: Continuous Evaluation, ESE: End Semester Exam

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

Course Content:

Module No	Content	Hours	Weightage in %
1.	**Fixed Beam** Explain determinate and indeterminate beam with examples, Difference between fixed beam and simply supported beam, SF diagram for fixed beam subjected to Central point load, UDL on entire span, Central point load and UDL on entire span, Fixed End Moment (FEM) by moment area method subjected to Central point load, UDL on entire span, Central point load and UDL on entire span, BM diagram for fixed beam subjected to, Central point load, UDL on entire span, Central point load and UDL on entire span	10	22
2.	**Continuous Beam** Explain theorem of three moment (Clayperon's theorem), Use theorem of three moment for a continuous beam of two spans and two equations only, With only central point load on each span, With full UDL on each span, With central point load on one span and full UDL on other span, With central point load and full UDL combined on each span, Problems to draw SF and BM diagrams for each case.	7	16
3.	**Moment Distribution Method (MDM)** Explain stiffness factor, Explain distribution of moment, Explain carryover moment, FEM for span subjected to central point load and full UDL, Use of MDM for a continuous beam of not more than three spans, With only central point load on each span, With full UDL on each span, With central point load on one span and full UDL on other span, With central point load and full UDL combined on each span, Problems to draw SF and BM diagrams for each case.	10	22
4.	**Slope And Defelction** Concept Of Slope And Deflection With Relation To Each Other. Location For Minimum & Maximum Slope And Deflection For Cantilever And Simply Supported With Uniform Loading. Formula For A Maximum Slope And Deflection For A Cantilever Beam With Point Load At Free End. U.D.L. On Entire Span. Point Load Including U.D.L. On Entire Span. Calculate Problems Based On Explain Formula For Maximum Slope And Deflection For A Simply Supported Beam With Central Point Load, U.D.L. On Entire Span. Central Point Load With U.D.L. On Entire Span.	8	18
5.	**Principal Planes and Principal Stresses** Concept of compound stress, Concept of complimentary shear stress, Normal and tangential stress on an inclined plane due to Normal stresses acting at right angles to each other, Normal stresses acting at right angles to each other along with shear stresses, Define principal plane and principal stress, Formula to find principal planes and principal stresses, Problems based on	10	22

	Mohr's circle method, Selection of axis for the stresses Graphical concept of normal and tangential stresses Position of different planes on space diagram and Mohr's circle Diagram, Mohr's circle for different stress conditions Manipulation of required result in the form of stresses, Determination of normal, tangential and resultant stresses from Mohr's circle, Location of principal plane and value of principal stresses.		

List of Tutorial:

Sr. No	Tutorial	Hours
1	Fixed Beam	6
2	Continuous Beam	6
3	Moment Distribution Method (MDM)	6
4	Slope And Deflection	6
5	Principal Planes and Principal Stresses	6

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.

Course Outcomes:
After completion of the course, the student will be able to
- apply mathematical knowledge to calculate the deformation behaviour of simple structure.
- critically analyse problem and solve the problem related to CIVIL elements and analyse the deformation behaviour 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
Institute of Diploma Studies

Course Code: IDCV 2080
Course Name: 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	
3	2	0	4	40	60	20	30	0	0	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the course: To provide a comprehensive knowledge of basic mathematics essential for diploma students.
To help learners to

- To introduce the principles and practice of transportation engineering which focuses on Traffic and Transportation Engineering and Highway Engineering.
- To introduce the recent advancements in the field of Sustainable Urban Development, Traffic Engineering and Management, Systems Dynamics Approach to Transport Planning, Highway Design and Construction, Economic and Environment Evaluation of Transport Projects.
- To know how to be efficient of Transport Engineers.

Course Content:

Module No.	Content	Hours	Weightage in %
13.	**Introduction of Highway Engineering:** Importance of Highway transportation: importance organizations like Indian roads Congress, Ministry of Surface Transport, Central Road Research Institute. Functions of Indian Roads Congress, IRC classification of roads, Organisation of state highway department	4	7
14.	**Road Geometrics** : Glossary of terms used in geometric and their importance, right of way, formation width, road margin, road shoulder, carriage way, side slopes, kerbs, formation level, camber and gradient, Design and average running speed, stopping and passing sight distance, Necessity of curves, horizontal and vertical curves including transition curves and super elevation, Methods of providing super elevation	6	10
15.	**Highway Construction Materials:** Difference types of road materials in use: soil, aggregates, and binders, Function of soil as highway Subgrade California Bearing Ratio: methods of finding CBR valued in the laboratory and at site and their significance, Testing of aggregates: Abrasion test, impact test, crushing strength test, water absorption test & soundness test.	6	10
16.	**Highway Constructions and Maintenance :** Purpose of road drainage-Surface and sub-surface drainage-Typical cross-section of highway in cutting and embankment. Water bound macadam roads-Materials used- Maintenance of W.B.M road – Machinery used in the construction-Construction procedure. Bitumen – Properties – Tests on Bitumen (Flash Point and consistency tests) – Bitumen roads-Different types-Surface dressing interface treatments-seal coat, tack coat, prime coat –Full grout and semi grout-premix-methods-Construction procedure. Cement concrete roads-Longitudinal joints-Transverse joints-Construction joints-Construction of concrete roads-Machinery used for construction.	6	7
17.	**Introduction and permanent way of Railways:** Importance of Railways-Gauges-Classification of rails based on gauges. Structure of permanent way-Different types of rails-requirements of a good rail. Rail joints-Types of joints-Requirements of a good rail joint-Fixtures and fastenings of rails-coning of wheels. Sleepers-Definition-Functions-Types of sleepers–characteristics of a good sleeper- Spacing of sleepers-Sleeper density. Ballast-Definition-Function –Characteristics of good ballast	8	
18.	**Station yards and Maintenance of Railways**:	6	7

	General description and sketches for turnout –general layout of a simple left-hand and right-hand turnout and different crossings. General idea with sketches of station yards. Marshalling yard, goods yard, passenger yard, and loco yard. Maintenance of track-Duties of P.W.I (permanent way inspector)		
19.	**Bridges, Culverts and Causeways:** Bridges-Classification -Selection of site for a bridge. 6.2 Defines waterway, Afflux, vertical clearance, linear waterway, freeboard for bridges and culverts-Economical span-Scour depth. 6.3 Definition and Functions of pier, abutment, wing wall and approaches. 6.4 Deck and Through bridges-Sketches and suitability of different types of bridges – Masonry bridges – R.C.C beam and slab bridges, Plate girder bridges, prestressed concrete bridges, steel trussed bridges and suspension Bridges. 6.5 Sketches and suitability of different culverts- slab culverts, pipe culverts and box culverts-Types of cause ways – Low level causeway and high-level causeway.	9	

List of Practical:

Sr. No.	Details of Practical	Hours
29.	To determine the Specific gravity and water absorption of an aggregate sample.	02
30.	To determine crushing value of an aggregate sample.	02
31.	To determine impact value of an aggregate sample.	02
32.	To determine the abrasion value of coarse aggregate by using Los Angles machine.	02
33.	To determine the shape test of aggregate	02
6.	To determine the Penetration test of bituminous materials	02
7.	To determine Ductility test of bituminous materials	02
8.	To determine Softening point of bitumen materials	02
9.	To determine Specific gravity of bitumen materials.	02
10.	To determine Viscosity test of bitumen materials.	02

Text Book:

Title	Author(s)	Publication
Highway Engineering	S.K.Khanna & C.E.G. Justo	Nem Chand & Bros

A course on Highway engineering	S.P.Bindra	Dhanpat Rai Publications
Railway Engineering	S.C. Rangawala	Charotar publications
Bridge Engineering	S.C. Rangawala	Charotar publications
Highway Engineering	S.C. Rangawala	Charotar publications

Reference Book:

Title	Author(s)	Publication
A Text Book Of Transportation Engineering	S.P.Chandola	S. Chand
Principles, practices & design of Highway Enginnering.	S.K. Sharma	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.

Course Outcomes:

After the completion of the course, the student will be able to
- To understand the principles of Highway geometrics design as per IRC standards.
- To understand Types of pavements & Materials required for highway construction.
- Perform geometric design for the Highway& Basic concept of Pavement design.
- Solve problems of railway track geometrics, train resistance, points and crossings, Signaling and control system.
- Compute economical spans, hydraulic design of bridge and carry out erection and maintenance of bridge.

P P Savani University
School of Engineering
Institute of Diploma Studies

Department of Civil Engineering

Course Code: IDCV2090
Course Name: Soil 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

Objective(s) of the Course:

To help learners to

- develop the conceptual knowledge in building materials.
- develop awareness about latest building materials.
- understand different types of technology used in construction works.
-

Course Content:

Module No.	Content	Hours	Weightage in %
1.	**Introduction:** History, List structures where soil is used as construction material, Soil-formation in Geological cycle, State the types of failures due to soil in Civil Engineering structure, General characteristics of different types of soils, Overview of different types of soils in Gujarat / India.	01	2
2	**Index Properties & Interrelationship:** Three phase diagram, State three constituents of soil, Sketch showing three i. phases of soil, Assumptions in drawing a ii. phase diagram, Properties of soil like Density, Field density, Dry density, Saturated density, Void ratio,	06	10

		Porosity, Specific Gravity , Degree of saturation, Moisture content, Density Index, Different Soil relation ships		
3	**Soil Classification:** Classification of soil (Grain size) as per Indian Standard, Basis /criteria of classification , Mechanical Analysis of soil, Difference between course grained and fine grained Soil on the basis of range of grain size and engineering properties, Sieves designation as per I.S. code Coarse & Fine Sieve analysis sedimentation analysis, Grading Curves and different coefficients i.e. CU and CC, Clay, silt, sand and gravel as per particle size, Consistency Limits like Liquid limit, Plastic limit, Shrinkage, Limit and Plasticity Index	06	10
4.	**Compaction:** Compaction and its Application, Effects of compaction on different soil properties like permeability, shear strength, soil settlements-stability of embankments, Maximum dry density and O.M.C., Typical compaction curve, Optimum moisture content (OMC), Maximum dry density (MDD), Proctor test, Light compaction, Heavy compaction test, Light compaction test on a given soil sample, Factors affecting compaction like water content, nature of soil (fine or course grained), Grading of soil, compaction energy, thickness of layer, Compaction and Consolidation, Role of O.M.C in the field, Methods of Field Compaction & various Equipment for compaction	05	8
5.	**Permeability & Seepage:** Permeable and Impermeable soils, Permeability and Impermeability, Flow of water through pipe and Through soil, Factors affecting the permeability, The factors affecting permeability i. of soil, Factors used to control the permeability of soil to desired extent in various Civil engineering structures, Methods to find Coefficient of Permeability, Constant Head Method, Falling Head Method, Coefficient of permeability, Seepage pressure, Quick sand condition, Flow net, its characteristics and application.	06	10

	Shear Strength: Definition, Define: (a) Cohesion (b) internal friction (c) Shear strength, Coulomb's law for shear strength S = C+ σn tanφ, Shear strength of soil, Different shear tests used to determine shear strength of soil in laboratory, Procedure of direct shear test (Box shear test), Types of soil C-soil, φ-soil, C-φ soil., Draw failure envelope by drawing Mohr's circle from the data obtained during direct shear test, Calculate the values C and φ, From the failure envelope, direct shear test on soil	06	10
6.			
7.	**Bearing Capacity of soil:** Bearing capacity of soil, Net Bearing capacity, Safe Bearing Capacity, Ultimate Bearing Capacity, Bearing Capacity of various soil, Methods – Plate Load Test, Penetration Test & using C – Φ parameters for determining bearing capacity of soil and to improve bearing capacity of soil. Foundation on soils of various bearing Capacity, Liquefaction, Definition, Occurrence & effect Effects of Liquefaction Remedial for Liquefaction.	06	10
8.	**Soil Investigation & Exploration:** Purposes of exploration of soil, Planning of exploration program, Soil samples and collection, Field penetration Test:SPT, Introduction to geophysical methods.	03	5

List of Practical:

Sr. No.	Details of Practical	Hours
1.	Visual identification and specific gravity	2
2.	Oven Drying	
3.	Sieve Analysis	2
4.	Hydrometer Analysis	2
5.	Liquid Test	2
6.	Plastic Limit Test	2
7.	Shrinkage limit Test	2
8.	In-situ Density-Core Cutter	4
9.	Sand Replacement method	2
10.	Permeability Test: Constant and Variable Head	4
11.	Soil Compaction Test	4

Text Book(s):

Title	Author/s	Publication
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

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	J. Ross Publishing

Course Evaluation:

Theory:

- Continuous evaluation consists of Unit tests and internal exam.
- End semester exam.

Practical:

- Continuous evaluation consists of performance of practical.
- Internal viva.
- Practical performance/ Quiz test

Course Outcome(s):

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

- understanding about construction materials, building components.
- define the engineering properties relevant to civil engineering materials.
- study quality control tests on Cement, Brick & aggregate.
- getting a knowledge about various latest technology.