Syllabus Book

Diploma Engineering (Mechanical Engineering)

P P Savani University

Institute of Diploma Studies

Effective From: 2024-25

Authored by: P P Savani University

CONTENT

FIRST YEAR DIPLOMA

P P SAVANI UNIVERSITY															
INSTITUTE OF DIPLOMA STUDIES															
TEACHING & EXAMINATION SCHEME FOR DIPLOMA ENGINEERING PROGRAMME AY:2024-25															
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	2	**5**	5	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	2	4	0	**6**	4	40	60	40	60	0	0	**200**
	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	**27**	**21**							**850**
2	IDSH1040	Engineering Mathematics	SH	3	0	2	**5**	5	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	Electrical & 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	**26**	**21**							**800**

P P Savani University
Institute of Diploma Studies

Department of Applied Science & Humanities

Course Code: IDSH1010
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	2	5	40	60	-	-	50	0	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the course:
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:

Section I			
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
Section II			
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** Basic concept of Mensuration, Area of Triangle, Square, Rectangle, Trapezium, Parallelogram, Rhombus and Circle surface, Volume of Cuboids, Cone, Cylinder and Sphere.	8	20

List of Tutorials:

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

Text Book:

Title	Author(s)	Publication
Advanced Mathematics for Polytechnic	Dr. N. R. Pandya	Macmillan Publication
Engineering Mathematics - 3rd Edition	Anthony croft & 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 Outcome(s):

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

IDSH1010	**FUNDAMENTALS OF MATHEMATICS**
CO1	Outlining logarithmic properties
CO2	Implement the concept of determent and matrices to solve science and engineering problems.
CO3	Presenting application of geometry
CO4	Establish the knowledge of coordinate geometry, and ability to solve engineering problems.

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

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

Module No	**Content**	**RBT Level**
1	Logarithm	1,2,3,5
2	Determination and Matrices	2,3,4,5
3	Trignometry	2,3,4,5,6
4	Co-ordinate geometry	2,3,5
5	Vectors	2,3,5
6	Mensuration	1,2,3,5

P P Savani University
Institute of Diploma Studies

Department of Applied Science & Humanities

Course Code: IDSH1020
Course Name: Engineering Physics
Prerequisite Course(s): Concept of Science up to 9th Standard

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:

- The student will demonstrate the ability to think in core concept of their engineering application by studying various topics involved in branch specific applications.
- The student will demonstrate the ability to use appropriate mathematical techniques and concepts to obtain quantitative solutions to problems in physics.
- In courses involving laboratory, the student will demonstrate the ability to collect and analyze data and to prepare coherent reports of his or her findings.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introductory concepts:** Need of measurement and unit in engineering and science, definition of unit, requirements of standard unit, systems of units-CGS, MKS and SI, fundamental and derived quantities and their units Definition of accuracy, precision and error, estimation of errors -absolute error, relative error and percentage error, rules and identification of significant figures. (Numerical on above topics)	08	18
2.	**Mechanics:** The concept of Force, Newton's 1st law of motion, Newton's 2nd law of motion, Newton's 3rd law of motion, Conservation of momentum, Applications of Conservation of linear momentum, Impulse. (Numerical on above topics)	07	15

3.	**Work, Energy and Power:** Work done by a constant force and a variable force, Kinetic energy, Work-energy theorem, Power, Notion of potential energy, Potential energy of a spring, Conservative forces, Conservation of mechanical energy (kinetic and potential energies), Non-conservative forces. (Numerical on above topics)	07	15
Section II			
4.	**Mechanical properties of solids:** Deforming force, Restoring force, Elastic and plastic body, Stress and Strain with their types, Elastic limit, Hooke's law, Young's modulus, Bulk modulus, Modulus of rigidity and Relation between them (no derivation), Stress- Strain diagram, Yield point, Ultimate stress, Breaking stress, Factor of safety. (Numerical on above topics)	08	18
5.	**Properties of fluids:** Pascal's law and its applications (hydraulic lift and hydraulic brakes), Viscosity, Stokes' law, terminal velocity, streamline and turbulent flow, critical velocity, Bernoulli's theorem and its applications, Surface energy and surface tension, angle of contact. (Numerical on above topics)	08	18
6.	**Heat transfer:** Introduction to thermodynamics, Temperature and Heat, Transmission of heat - Conduction, Convection and Radiation, Law of thermal conductivity, Coefficient of thermal conductivity and its S.I. unit, Heat capacity and Specific heat of materials, Celsius, Fahrenheit and Kelvin temperature scales and their conversion formula. (Numerical on above topics)	07	16

List of Practical:

Sr. No.	List of Practical	Hours
1.	To study about basic unit conversion and dimension analysis.	4
2.	To measure length and diameter of the given object using Vernier callipers.	2
3.	To measure the thickness of slit and diameter of wire with help of micrometer Screw Gauge.	2
4.	To determine the surface tension of water by capillary rise method.	4
5.	To Verify Ohm's Law by using an Ammeter & Voltmeter	2
6.	To determine the wavelength of sound produced (i) in an air column and the velocity of sound in air at room temperature using a resonance column and a tuning fork.	4
7.	To determine Young's modulus of a material of a beam by the method of bending of a beam.	4
8.	To determine the modulus of rigidity of the material of wire by dynamical method.	2
9.	To determine the value of 'g' by using a Simple Pendulum.	2
10.	Measurement of g: Use of a Kater's Pendulum.	2

11.	To measure the temperature of given material by any temperature measuring instrument.	2

Text Book:

Title	Author(s)	Publication
Basic physics for Diploma group -1	-	Atul Prakashan

Reference Books:

Title	Author(s)	Publication
Physics Part-I and II	Resnick and Haliday	Wiley Eastern Publication
Concept of Modern Physics	Arthur Beiser	Tata McGraw Hill
Concept of Physics	H C Verma	-
Fundamental of physics	Gomber & Gogia	Pradeep publications Jalandhar
NCERT Physics part 1 & 2	-	NCERT

Course Evaluation:

Theory:

- Continuous Evaluation Consist of Two Test Each of 30 Marks and 1 Hour of duration.
- 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 10 Marks.
- Internal Viva component of 10 Marks.
- Practical performance/quiz/drawing/test of 20 Marks during End Semester Exam.
- Viva/Oral performance of 10 Marks during End Semester Exam.

Course Outcome(s):

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

IDSH1020	ENGINEERING PHYSICS
CO 1	Identify physical quantities, different systems of units and make measurements with accuracy by minimizing different types of errors to solve real life relevant problems.
CO 2	Analyze type of motions and apply the knowledge to solve equation of motion and conservation of momentum principle to describe motion of rocket, recoil of gun etc.
CO 3	Define scientific work, energy and power and their units. Derive relationships for work, energy and power and solve related problems.
CO 4	Learn about the concept of elasticity, it's types and applications from engineering perspectives.
CO 5	Describe the properties of fluids, understand the concepts of viscosity and surface tension and their respective applications.
CO 6	Apply the knowledge of heat and thermodynamics needed for different engineering tasks.

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

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

Module No	**Content**	**RBT Level**
1	Introductory Concepts	3, 5
2	Mechanics	2, 4
3	Work, Energy and Power	1, 3
4	Mechanical properties of solids	2, 6
5	Properties of fluids	1, 5
6	Heat transfer	3, 4

P P Savani University
Institute of Diploma Studies

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	
02	04	00	04	40	60	40	60	00	00	200

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:

Section I			
Module No.	Content	Hours	Weightage in %
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	02	7
2.	**Heat interactive equipment:** Heat transfer and its Modes, Boilers, Classification and Working, Concept of Accessories and Mountings – Types, Applications, 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	05	13
3.	**Power Transmission and Safety:** Power transmission: Importance, Modes, Types, Applications, Couplings in power transmission, Safety norms to be followed for preventing accidents.	06	11
4.	**Hydraulic and pneumatic devices:**	05	11

	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.		
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, Casting - Introduction, Applications.	04	10
Section II			
6.	**Civil Engineering: An Overview** Introduction, Branches, Scope, Impact, Role of Civil Engineer, Unit of measurement, Unit conversion (Length, Area, Volume).	04	7
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	07	16
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	06	13
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)	06	12

List of Practical:

Sr. No.	Details of Practical	Hours
1.	Study of few selected boilers, accessories and mountings	02
2.	Numerical based on heat interactive equipment	02
3.	Study of power and motion transmission systems	04
4.	Numerical based on power transmission and safety	02
5.	Study of various pumps	04
6.	Numerical based on hydraulic and pneumatic devices	02
7.	Study and demonstration of basic machine tools	04
8.	Numerical based on manufacturing processes	02
9.	Machine parameters of wheel and differential axel apparatus	04
10.	Study and demonstration of basic mechanical equipment	04
11.	Unit Conversation Exercise	02
12.	Linear Measurement.	04
13.	Angular Measurement (Prismatic Compass)	04
14.	Angular Measurement (Surveyor Compass)	04
15.	Determine R.L of given point by Dumpy level without change point.	04

16.	Determine R.L of given point by Dumpy level with change point.	04
17.	Brick masonry bonds	04
18.	Aggregate experiments	02
19.	Brick masonry tests	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 & Levelling	S. B. Junnarkar and H. J. Shah	Laxmi Publication

Course Evaluation:

Theory:

- Continuous Evaluation Consist of Two Test Each of 30 Marks and 1 Hour of duration.
- 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 10 Marks.
- Internal Viva component of 10 Marks.
- Practical performance/quiz/drawing/test of 20 Marks during End Semester Exam.
- Viva/Oral performance of 10 Marks during End Semester Exam.

Course Outcome(s):

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

IDME1010	**BASICS OF MECHANICAL & CIVIL ENGINEERING**
CO 1	Know the principles and working of basic mechanical systems
CO 2	Comprehend importance of mechanical engineering in various fields of engineering
CO 3	Interpret about different civil engineering fields with an overview of building material
CO 4	Identify the scope of Civil engineering in the practical field of engineering

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

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

Module No	**Content**	**RBT Level**
1	Introduction to Mechanical Engineering	1, 2
2	Heat Interactive equipment	1, 2, 4
3	Power Transmission and Safety	1, 2, 4
4	Hydraulic and pneumatic devices	1, 2, 4
5	Manufacturing Processes	1, 2
6	Civil Engineering: An Overview	1, 2, 3

7	Civil Engineering Drawing	2, 3, 6
8	Construction Materials	1, 2, 3

P P Savani University
Institute of Diploma Studies

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.	08	15

	Installation of device drivers and other required software, need and method of backup.		
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.	06	14
Section II			
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	16

List of Practical(s):

Sr. No	List 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,	04

	Smart art, Chart in Microsoft word, Insert Hyperlink, Page number and textbox in word.	
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 the completion of the course, the following course outcomes will be able to:

IDCE1010	**COMPUTER APPLICATIONS**
CO 1	Learn and acquire basic knowledge about history of computer, functional role of different components of computer and memory architecture.
CO 2	Acquire the basic knowledge of computer hardware, software, role of operating system and other peripheral devices and their installation.
CO 3	Learn the concepts of Microsoft Office – Word, Excel, and PowerPoint and be able to work on them for better documentation and presentation.
CO 4	Recognize the role of network & related terminologies and internet.
CO 5	Identify the significance of multimedia and its utilization in various platforms.

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

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

Module No	**Content**	**RBT Level**
1	Basics of Computer system	1, 2
2	Computer Software	1, 2
3	Using MS-Word	2, 3
4	Using MS-Excel	2, 3, 4
5	Using MS-Powerpoint	2, 3
6	Multi Media, Internet Usage and Google Applications	2, 3, 5

P P Savani University
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
1.	**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.	-
2.	**Fitting shop:** Introduction of fitting shop, Safety, Making a job as per drawing including marking and performing other operations	-
3.	**Carpentry shop:** Introduction of carpentry shop, Safety, Making a job as per drawing including marking and performing other operations	-
4.	**Smithy shop:** Introduction of smithy shop, Safety, Making a job as per drawing including marking and performing other operations	-
5.	**Sheet metal shop:** Introduction of sheet metal shop, Safety, Making a job as per drawing including marking and performing other operations	
6.	**Pipe fitting:**	-

	Introduction of pipe fitting shop, Safety, understanding various pipe fitting tools and performing operations	
7.	**Machine Shop:** Introduction and demonstration of various machines like Lathe, Drilling, Grinding, Hack Saw Cutting etc.	-

List of Practical:

Sr. No.	List of Practical	Hours
1.	Introduction and Demonstration of Safety Norms and various shops.	02
2.	To Perform a Job of Fitting Shop.	04
3.	To Perform a Job of Carpentry Shop.	06
4.	To Perform a Job of Black Smithy shop.	06
5.	To Perform a Job of Sheet metal Shop.	04
6.	To Perform a Job of Plumbing Shop	04
7.	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 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 the completion of the course, the following course outcomes will be able to:

IDME1020	ENGINEERING WORKSHOP
CO 1	Understand the various measuring instruments and safety norms required in the workshop.
CO 2	Apply workshop trades such as welding, plumbing, drilling, grinding, fitting, and carpentry for preparation of job.
CO 3	Apply the use of machine tools, hand tools and power tools.

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

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

Module No	Content	RBT Level
1	Introduction and Demonstration of Safety Norms and Various Shops	1, 2, 3, 4
2	Fitting Shop	1, 2, 3
3	Carpentry Shop	1, 2, 3
4	Smithy Shop	1, 2, 3
5	Sheet metal shop	1, 2, 3
6	Pipe fittings	1, 2, 3
7	Machine Shop	1, 2, 3

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

Course Code: IDSH1040
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	2	5	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 %
	Section I		
1.	**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
2.	**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
3.	**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
	Section II		
4.	**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
5.	**Complex Number** Introduction, Mathematical Operations, Polar form, Modulus, Amplitude Farm, De Movire's Theorem.	6	18

6.	**Statistics** 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.	7	14

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 Outcome(s):

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

IDSH1040	**ENGINEERING MATHEMATICS**
CO1	Apply differentiation and integration for solving engineering problems and The cumulative effect of the original quality or equation is the integration.
CO2	Implementing statistical methods for solving real world problems.
CO3	Develop the ability to apply differentiation to significant applied problems.
CO4	Evaluate the limiting value of algebraic and trigonometric functions.
CO5	Represent complex numbers algebraically and geometrically for solving engineering related problems.

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

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

Module No	**Content**	**RBT Level**
1	Functions and Limits	1,2,3,5
2	Differentiation	2,3,4,5
3	Integration	2,3,4,5,6
4	Differential Equations of First order and First degree	2,3,5
5	Complex Number	2,3,5
6	Statics	1,2,3,5

P P Savani University
Institute of Diploma Studies

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 %
Section I			
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 buffer solution with	06	10

	examples, Application of pH in Industries.		
Section II			
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 the completion of the course, the following course outcomes will be able to:

IDSH1050	FUNDAMENTALS OF CHEMISTRY
CO1	Implement and evaluate quality control procedures.
CO2	Perform and validate laboratory procedures to conduct tests.
CO3	Improve industrial or chemical processes and laboratory equipment.
CO4	Prepare and purify compounds using standard chemical procedure.

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

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

Module No	Content	RBT Level
1	Atomic structures, molecular mass, acids and bases	1,2

2	Molecular Mass	1, 2,3
3	Chemical Bonding and Structure of Molecules	1, 2,3
4	Acids and Bases	2,3,4
5	Solutions	2,3,4
6	Colloids	2, 3, 4
7	Electrochemistry	1, 2, 5
8	Electrochemical Cell	1, 2, 5

P P Savani University
Faculty of Diploma Studies

Department of Mechanical Engineering

Course Code: IDCV1010
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:

Section I			
Module No.	**Content**	**Hours**	Weightage in %
1.	**Introduction Engineering Mechanics** Basic concepts: Definitions, Basic assumptions, Scalar & Vector quantities, Free, Forced and fixed vectors, Force System: Force, Classification & Representation,	04	09
2.	**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	10	22
3.	**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.	09	19
Section II			
4.	**Friction:** Introduction, Wet and Dry friction, Theory of Dry friction, Angle of friction, Angle of Repose, Cone of friction,	06	14

	Coulomb's laws of friction.		
5.	**Centre of Gravity:** Center of Gravity, Center of Mass and Centroid of curves, areas, volumes, Determination of centroid by integration, Centroid of composite bodies.	06	14
6.	**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	10	22

List of Practical:

Sr. No.	Details of Practical	Hours
20.	Coplanar Concurrent Forces	02
21.	Law of parallelogram	02
22.	Coplanar Non concurrent forces	02
23.	Lami's Theorem	02
24.	Coefficient of static friction	02
25.	Parallel force system	02
26.	Numerical practice on Force System	02
27.	Numerical practice on C.G.	02
28.	Numerical practice on M.I.	02
29.	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 the completion of the course, the following course outcomes will be able to:

IDCV1010	**ENGINEERING MECHANICS**
CO1	Apply fundamental principles of mechanics, equilibrium, statics reactions and internal forces in statically determinate beams.
CO2	Apply principles of statics to determine C.G and M.I of a different geometrical shape and Understand basics of friction and its importance.
CO3	Critically analyze problems and solve the problem related to mechanical elements and analyze the deformation behavior for different types of loads.

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

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

Module No	**Content**	**RBT Level**
1	Introduction to Engineering Mechanics	1, 2
2	coplanar concurrent force system	1,2,3
3	coplanar non-concurrent force system	1,2,3,5
4	Friction	1,2,3,4,5
5	center of gravity	1, 2, 4, 5
6	Moment of inertia	2, 2, 4, 5

P P Savani University Institute of Diploma Studies

Department of Information Technology

Course Code: IDIT1010
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:

Section II			
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	07	15

	go-to statements, Ternary (?:) Operator. Looping: The while Statement, The Break Statement & The Do. While loop, The FOR loop, Jump within loops - Programs.		
Section II			
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 following course outcomes will be able to:

IDIT1010	**INTRODUCTION TO COMPUTER PROGRAMMING**
CO1	Understand foundation concepts, data representation, algorithms and coding methods in computer system.
CO2	Acquire the knowledge about programming language syntax.
CO3	Apply basic principles of imperative and structural programming to solve complex problems.
CO4	Able to develop, debug and test application programs.

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

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

Module No	**Content**	**RBT Level**
1	Introduction to Programming Language	1,2
2	Introduction to C, Constants, Variables and Data Types	1, 2,3
3	Operations, Expressions, and Managing I/O Operations	2, 3, 4, 6
4	Conditional Statements	2, 4, 5
5	Arrays	2. 4. 6
6	Strings	2, 4, 6
7	User-Defined Functions	2, 4, 6

P P Savani University
School of Engineering
Institute of Diploma Studies

Department of Science & Humanities

Course Code: IDSH1060
Course Name: Electrical & Electronics Workshop
Prerequisite Course(s): Concept of Science up to 9th Standard

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	00	00	20	30	0	0	50

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

- think in core concept of their engineering application by studying various topics involved in branch specific applications.
- identify basic fundamental electronic components in circuits.
- learn to use common electronic component on breadboard.
- understand components of instruments, terminology and applications.
- demonstrate the ability to collect and analyze data and to prepare coherent reports of his or her findings.

Sr. No.	List of Practical	Hours
1	To Understand & Draw the symbols of various electronic devices.	2
2	To identify resistors, capacitors using Different codes.	2
3	Verification of Truth tables of Logic Gates (NAND, NOR, EX-OR, AND, OR, NOT).	4
4	To study cathode ray oscilloscope and perform measurements.	4
5	To study digital multi-meter and perform testing of various components.	2
6	To study soldering- de-soldering techniques.	2
7	To study wiring diagram of ceiling Fan.	2
8	How Fluorescent Lights Work.	2
9	To study about stair case wiring two-way switch.	2
10	Explaining the function of Refrigerator and Air conditioner.	4
11	Explaining the core concept of power transmission.	4

Evaluation:

- Continuous Evaluation consists of performance of practical which will be evaluated out of

10marks for each practical and average of the same will be converted to 20 marks.

- Internal viva consists of 30 marks.

Course Outcome(s):

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

IDSH1060	**ELECTRICAL & ELECTRONIC WORKSHOP**
CO1	Recognize the basic rules for wiring and developing the ability to wire the discrete
CO2	Demonstrate the ability to think in core concept of their engineering application by studying various topics involved in branch specific applications.
CO3	Develop the ability to collect and analyze data and to prepare coherent reports of his or her findings.
CO4	Recognize the PCBs which is inserted in any of the electronic gadgets.

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

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

Module No	**Content**	**RBT Level**
1	Electronic components	1,2, 3, 4
2	Electronic Devices	1, 2,3, 4
3	Logic Gates	1, 2, 3, 5, 6
4	CRO	1, 2, 4, 5
5	Digital Multimeter	1, 2, 3, 4, 5
6	Soldering & Desoldering	1, 2, 3, 4, 5, 6
7	Wiring of ceiling fan	1, 2, 3, 4, 5, 6
8	Wiring of two switch	1, 2, 3, 4, 5, 6
9	Working of AC Refrigerator	1, 2, 3, 4, 5
10	Concept of Power transmission	1, 2, 3, 4, 5
11	Working of Fluorescent Light	1, 2, 3, 5, 6

SECOND YEAR DIPLOMA

P P SAVANI UNIVERSITY															
TEACHING & EXAMINATION SCHEME FOR DIPLOMA MECHANICAL PROGRAMME AY:2024-25															
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	IDME2010	Basics of Engineering Drawing	ME	2	4	0	6	4	50	0	100	0	0	0	150
	IDME2020	Thermodynamics	ME	3	4	0	7	5	40	60	40	60	0	0	200
	IDME2030	Material Science & Metallurgy	ME	3	2	0	5	4	40	60	20	30	0	0	150
	IDME2040	Theory of Machines	ME	3	4	0	7	5	40	60	40	60	0	0	200
	IDCV2031	Strength of Materials	CV	3	2	0	5	4	40	60	20	30	0	0	150
						Total	**30**	**22**							**850**
4	IDME2050	Engineering Contracting & Costing	SH	3	2	0	5	4	40	60	20	30	0	0	150
	IDME2060	Fluid Mechanics & Hydraulic Machines	ME	3	2	0	5	4	40	60	40	60	0	0	200
	IDME2070	Manufacturing Engineering - I	ME	3	4	0	7	5	40	60	40	60	0	0	200
	IDME2080	Thermal Engineering - I	ME	3	0	0	3	3	40	60	0	0	0	0	100
	IDME2090	Mechanical Drafting	ME	2	4	0	6	4	50	0	100	0	0	0	150
	CLSC2010	Universal Human Values	CLSC	2	0	0	2	2	100	0	0	0	0	0	100
						Total	**28**	**22**							**900**

P P Savani University

Institute of Diploma Studies

Department of Mechanical Engineering

Course Code: IDME2010
Course Name: Basics of Engineering Drawing
Prerequisite Course(s): None

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	50	00	100	00	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:

Section I			
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	11
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	12	25
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).	06	13
Section II			
1.	**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.	12	26
2.	**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	11	25

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 following course outcomes will be able to:

IDME2010	BASICS OF ENGINEERING DRAWING
CO 1	Know and understand “Drawing is a language of Engineers.”
CO 2	Interpret general assembly technical drawing.
CO 3	Create traditions and the strategies for Engineering Drawing.
CO 4	Evaluate basic and intermediate geometry.
CO 5	Apply the knowledge of principles of projections.
CO 6	Enhance their technical communication skill in the form of talkative drawings.

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

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

Module No	**Content**	**RBT Level**
1	Introduction	1, 2
2	Orthographic projections of points and lines	1, 2, 3, 4, 5, 6
3	Projections of plane figures	1, 2, 3, 4, 5, 6
4	Projection of Solids	1, 2, 3, 4, 5, 6
5	Isometric projection	1, 2, 3, 4, 6

P P Savani University
Institute of Diploma Studies

Department of Mechanical Engineering

Course Code: IDME2020
Course Name: Thermodynamics
Prerequisite Course(s): --- IDME1010 – Basics of Mechanical & Civil 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	
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

- identify different aspects of thermodynamics and their application.
- interpret different laws of thermodynamics and their application to field and daily life.
- understand various gas laws and equations of state and their application.
- understand the role of entropy, exergy to the universe.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Basic Concepts of Thermodynamic** Classical and statistical thermodynamic approach, Thermodynamic: system, properties, states, processes, cycle & equilibrium, Concepts of: control volume and control surface, Specific heat capacity, Internal Energy, Enthalpy, Specific Volume, heat and work.	10	20
2.	**First and Second law of Thermodynamics** First law for a closed system undergoing a cycle and change of state, energy, PMM1, First law of thermodynamics for a non-flow and flow process. Limitations of first law of thermodynamics, Statements of second law of thermodynamics and their equivalence, PMM2, Carnot's theorem, Corollary of Carnot's theorem,	7	18
3.	**Entropy** Clausius theorem, property of entropy, Clausius inequality, entropy change in an irreversible process, principle of increase of entropy, entropy change for non-flow and flow processes, third law of thermodynamics, PPM3, Entropy change for phase changing process.	5	11
Section II			
4.	**Exergy** Energy of a heat input in a cycle, exergy destruction in heat transfer process, exergy of finite heat capacity body, exergy of closed and steady flow system, irreversibility and Gouy-Stodola theorem and its applications, second law efficiency	10	20

5.	**Vapour Power Cycles** Carnot vapor cycle, Rankine cycle, comparison of Carnot and Rankine cycle, carnot cycle efficiency, variables affecting efficiency of Rankine cycle.	7	16
6.	**Gas Power Cycles** Carnot, Otto and Diesel cycle, Dual cycle, Comparison of Otto, Diesel and Dual cycles, air standard efficiency, mean effective pressure, brake thermal efficiency, relative efficiency, Brayton cycle.	6	15

List of Practicals:

Sr No	Name of Practical	Hours
1.	To interpret comparison of heat and work and solution of basic numerical on heat and work interaction.	06
2.	To solve numerical on S.F.E.E and its application to engineering devices like boiler, heat exchanger, turbine compressor etc.	06
3.	To understand concept of heat engine, heat pump, and refrigerator based on second law of thermodynamics.	08
4.	To solve basic numerical on concept of Entropy.	08
5.	To solve numerical on vapour power cylces.	08
6.	To understand reheat cycle, regenerative cycle, reheat-regenerative cycle, feedwater heaters for rankine cycle.	08
7.	To solve numerical on gas power cycles.	08
8.	To understand effect of reheat, regeneration and intercooling on brayton cycle.	08

Text Book(s):

Title	Author/s	Publication
Engineering Thermodynamics	P.K. Nag	McGraw-Hill Education

Reference Book(s):

Title	Author/s	Publication
Fundamentals of Thermodynamics	Borgnakke & Sonntag	Wiley India (P) Ltd.
Thermodynamics - An Engineering Approach	Yunus Cengel & Boles	McGraw-Hill Education
Engineering Thermodynamics	Gordon Rogers & Yon Mayhew	Pearson Education Ltd.

Web Material Links:

- http://nptel.ac.in/courses/112105123/1

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:

- Circuits and charts for gas & vapour power cycle consists of 20 marks.
- Internal Viva consists of 20 marks.
- Viva/Oral performance consists of 60 marks during End Semester Exam.

Course Outcome(s):

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

IDME2020	**THERMODYNAMICS**
CO 1	Interpret basics terms of thermodynamics.
CO 2	Define and demonstrate laws of thermodynamics and its application.
CO 3	Interpret differentiate concept of entropy, energy and exergy and their application.

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

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

Module No	**Content**	**RBT Level**
1	Basic Concepts of Thermodynamics	1, 2
2	First and Second Law of Thermodynamics	1, 2, 3
3	Entropy	1, 2, 3, 5
4	Exergy	1, 2, 5
5	Vapour Power Cycles	1, 2, 5
6	Gas Power Cycles	1, 2, 5

P P Savani University
Institute of Diploma Studies

Department of Mechanical Engineering

Course Code: IDME2030
Course Name: Material Science & Metallurgy
Prerequisite Course(s): --- None

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 crystal structures and atomic bonds. Classification of ferrous metals and their properties.
- Describe non-ferrous metals, cutting tool materials and composites along with their properties. Principle of corrosion, their types and tis prevention methods along with the various surface engineering processes.
- Apply various parameters to understand the properties and composites of materials.
- Understand the phase diagrams of ferrous metals and alloys, composition and use of non-ferrous metals.
- Evaluate different methods of failure analysis and testing of materials.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Crystal Structures and Bonds** Unit cell and space lattice: Crystal system: The seven basic crystal systems; Crystal structure for metallic elements: BCC, FCC and HCP, Coordination number for Simple Cubic, BCC and FCC; Atomic radius: definition, atomic radius for Simple Cubic, BCC and FCC; Atomic Packing Factor for Simple Cubic, BCC, FCC and HCP, Simple problems on finding number of atoms for a unit cell. Bonds in solids: Classification - primary or chemical bond, secondary or molecular bond; Types of primary bonds: Ionic, Covalent and Metallic Bonds; Types of secondary bonds: Dispersion bond, Dipole bond and Hydrogen bond.	10	20
2.	**Phase Diagrams, Ferrous Metals and its Alloys** Isomorphs, eutectic and eutectoid systems.Iron-Carbon binary diagram; Iron and Carbon Steels; flow sheet for production of iron and steel; Iron ores – Pig iron: classification, composition and effects of impurities on iron; Cast Iron: classification, composition, properties and uses; Wrought Iron: properties, uses/applications of wrought Iron; comparison of cast iron, wrought iron and mild steel and high carbon steel; standard commercial grades of steel as per BIS and AISI. Alloy Steels – purpose of alloying; effects of alloying elements– Important	7	18

	alloy steels: Silicon steel, High Speed Steel (HSS), heat resisting steel, spring steel, Stainless Steel (SS): types of SS, applications of SS – magnet steel – composition, properties and uses.		
3.	**Non Ferrous Metals and Its Alloys** Properties and uses of aluminum, copper, tin, lead, zinc, magnesium and nickel, Copper alloys: Brasses, bronzes – composition, properties and uses; Aluminum alloys: Duralumin, hindalium, magnesium – composition, properties and uses; Nickel alloys: Inconel, Monel, nicPerome – composition, properties and uses.Anti-friction/Bearing alloys: Various types of bearing bronzes - Standard commercial grades as per BIS/ASME.	5	12
	Section II		
4.	**Failure Analysis & Testing of Materials** Introduction to failure analysis; Fracture: ductile fracture, brittle fracture; cleavage; notch sensitivity. fatigue; endurance limit; characteristics of fatigue fracture; variables affecting fatigue life; creep; creep curve; creep fracture. Destructive testing: Tensile testing; compression testing; Hardness testing: Brinell, Rockwell; bend test; torsion test; fatigue test; creep test. Non-destructive testing: Visual Inspection; magnetic particle inspection; liquid penetrant test; ultrasonic inspection; radiography.	12	26
5.	**Corrosion and Surface Engineering** Nature of corrosion and its causes; Electrochemical reactions; Electrolytes; Factors affecting corrosion: Environment, Material properties and physical conditions; Types of corrosion; Corrosion control: Material selection, environment control and design.Surface engineering processes: Coatings and surface treatments; Cleaning and mechanical finishing of surfaces; Organic coatings; Electroplating and Special metallic plating;Electro polishing and photo- etching ;– Conversion coatings: Oxide, phosphate and chromate coatings; Thin film coatings: PVD and CVD; Surface analysis; Hard-facing, thermal spraying and high-energy processes; Process/material selection. Pollution norms for treating effluents as per standards.	11	24

List of Practical:

Sr No	Name of Practical	Hours
1.	To understand construction and working of metallographic microscope.	06
2.	To study procedure of specimen preparation for microscopic examination and to carry out a specimen preparation.	06
3.	To understand what is micro examination, importance of micro examination and to study various ferrous, non-ferrous microstructures.	08
4.	To show the effect of different quenching media like Oil, Water and Brine on the hardness of medium carbon steel.	08
5.	To find out the effect of varying section size on hardenability of steel and obtain hardness distribution curves of hardened steel cross-section.	08
6.	To determine machine defects by dye -penetrant test and magnetic particle test.	08
7.	To determine the hardenability by Jominy end quench test.	08
8.	Study of different heat treatment processes- annealing, normalizing, hardening and tempering, surface and casehardening to improve	08

	properties of steel during processes and applications with the help of muffle furnace.	

Text Book(s):

Title	Author/s	Publication
A TextBook of Material Science & Metallurgy	O.P. Khanna	Dhanpat Rai and Sons
Material Science & Engineering	R.K. Rajput	S.K. Materials & Sons

Reference Book(s):

Title	Author/s	Publication
Material Science	R.S. Khurmi	S.Chand & Co. Ltd

Web Material Links:
http://nptel.ac.in/downloads/113106032/

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 solution of Practical 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.
- Performance/Problem solution/quiz/test of 15 Marks during End Semester Exam.
- Viva/Oral performance of 15 Marks during End Semester Exam.

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

IDME2030	MATERIAL SCIENCE & METALLURGY
CO 1	Interpret important mechanical properties and classification of engineering materials and metals.
CO 2	Define different heat treatment process used in industrial applications.
CO 3	Understand the solidification process of metals and alloys.
CO 4	Analyze different microstructure, crystallography and defects of cast iron and steel specimen.
CO 5	Identify different destructive & nondestructive testing methods used in the practical field and their applications.
CO 6	Understand the use powder metallurgy and their application to industries.

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

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

Module No	Content	RBT Level
1	Crystal Structures and Bonds	1, 2
2	Phase Diagrams, Ferrous Metals and its Alloys	1, 2, 4
3	Non-Ferrous Metals and its Alloys	1, 2, 4
4	Failure Analysis & Testing of Materials	1, 2

5	Corrosion and Surface Engineering	1, 2, 4

P P Savani University
Institute of Diploma Studies

Department of Mechanical Engineering

Course Code: IDME2040
Course Name: Theory of Machines
Prerequisite Course(s): --- None

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

- basics types of mechanism, degree of freedom, joints.
- about velocity and acceleration analysis for different mechanism.
- about kinematic analysis of cam and follower motion.
- about types of belts, ropes, chain and gears drives and its applications.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Basics of Mechanisms** Introduction, Mechanism and machine, Rigid and resistant body, Link, Kinematic pair, Types of motion, Degrees of freedom (mobility), Classification of kinematic pairs, Kinematic chain, Linkage, Mechanisms, Kinematic inversion, Inversions of slider crank chain, Synthesis of Mechanism, Double slider-crank chain, Quick return mechanism, Limiting Positions and Mechanical Advantage.	07	14
2.	**Cams & Followers** Concept; Definition and application of Cams and Followers; Classification of Cams and Followers; Different follower motions and their displacement diagrams like uniform velocity, SHM, uniform acceleration and Retardation; Drawing of profile of radial cam with knife-edge with and without offset with reciprocating motion (graphical method). Drawing of profile of radial cam with roller follower with and without offset with reciprocating motion (graphical method).	06	10
3.	**Power Transmission** Types of Drives – Belt, Chain, Rope, Gear drives & their comparison; Belt Drives - flat belt, V– belt & its applications; Material for flat and V-belt; Angle of lap, Belt length. Slip and Creep. Determination of Velocity Ratio, Ratio of tight side and slack side tension. Centrifugal tension and Initial tension; Condition for maximum power transmission (Simple numericals); Chain Drives – Advantages & Disadvantages; Selection of Chain & Sprocket wheels. Methods of lubrication; Gear Drives – Spur gear terminology. Types of gears and gear	09	18

	trains, their selection for different applications. Train value & Velocity ratio for compound, reverted and simple epicyclic gear train. Methods of lubrication. Law of gearing. Rope Drives – Types, applications, advantages & limitations of Steel ropes.		
Section II			
4.	**Flywheel and Governors** Flywheel - Concept, function and application. Turning moment diagram for single cylinder 4-Stroke I.C. Engine (no Numericals). Coefficient of fluctuation of energy, Coefficient of fluctuation of speed and its significance. Governors - Types and explanation with neat sketches (Centrifugal, Watt and Porter); Concept, function and applications & Terminology of Governors. Comparison between Flywheel and Governor.	05	14
5.	**Brakes Dynamometers, Clutches & Bearings** Function of brakes and dynamometers; Types of brakes and Dynamometers, Comparison between brakes and dynamometers. Construction and working of i) shoe brake, ii) Band Brake, iii) Internal expanding shoe brake iv) Disc Brake; Concept of Self Locking & Self energizing brakes; Numerical problems to find braking force and braking torque for shoe & band brakes; Construction and working of i) Rope Brake Dynamometer, ii) Hydraulic Dynamometer, iii) Eddy current Dynamometers. Clutches- Uniform pressure and Uniform Wear theories. Function of Clutch and its application; Construction and working of i) Single plate clutch, ii) Multiplate clutch, iii) Centrifugal Clutch iv) Cone clutch and v) Diaphragm clutch. (Simple numericals on single and Multiplate clutch); Bearings – i) Simple Pivot, ii) Collar Bearing, iii) Conical pivot. Torque & power lost in friction (no derivation). Simple numerical.	09	22
6.	**Balancing & Vibrations** Concept of balancing. Balancing of single rotating mass; Graphical method for balancing of several masses revolving in same plane; Concept and terminology used in vibrations, Causes of vibrations in machines; their harmful effects and remedies.	09	22

List of Practical:

Sr No	Name of Practical	Hours
1.	Study of Ackerman‟s Steering Gear Mechanism.	06
2.	To study various types of gears.	06
3.	To study various types of gear trains.	04
4.	To draw velocity diagram of slider crank mechanism.	04
5.	To draw acceleration diagram of four bar mechanism.	08
6.	To draw displacement diagram, velocity diagram & acceleration diagram of cam follower.	08
7.	Layout of cam profile for reciprocating knife edge follower	06
8.	Layout of cam profile for offset reciprocating roller follower	06
9.	Layout of cam profile for flat faced reciprocating follower	06
10.	Layout of cam profile for oscillating follower	06

Text Book(s):

Title	Author/s	Publication

Theory of Machines	S. S. Rattan	Tata McGraw Hill Education
Theory of Machines and Mechanisms	John J. Uicker, Gordon R. Pennock, Joseph E. Shigley	Oxford University Press

Reference Book(s):

Title	Author/s	Publication
Mechanism and Machine Theory	J.S Rao, R.V Dukkipati	Wiley Eastern Ltd.
Theory of Mechanism and Machine	Ghosh A., Malick A.K	East-West Pvt. Ltd.

Web Material Links:

- http://nptel.ac.in/courses/112104121/1

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 solution of Practical which will be evaluated out of 20 for each and average of the same will be converted to 20 Marks.
- Internal Viva consists of 20 marks.
- Viva/Oral performance consists of 60 marks during End Semester Exam.

Course Outcome(s):

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

IDME2040	THEORY OF MACHINES
CO 1	Demonstrate an understanding of the concepts of various mechanisms and pairs.
CO 2	Understand velocity and acceleration analysis of different mechanism.
CO 3	Design a layout of cam and follower for specific motion.
CO 4	Demonstrate an understanding of principle of gears.

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

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

Module No	Content	RBT Level
1	Basics of Mechanisms	1, 2
2	Cams & Followers	2, 3, 4, 5, 6
3	Power Transmission	1, 2, 3, 5
4	Flywheel and Governors	1, 2, 5
5	Brakes Dynamometers, Clutches and Bearings	1, 2, 4, 5
6	Balancing & Vibrations	1, 2, 3, 4, 5

P P Savani University
School of Engineering

Department of Civil Engineering

Course Code: IDCV2031
Course Name: Strength of Materials
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	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 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	**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.	08	16
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.	14	28
Section II			
1	**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	28

2	**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	28

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

IDCV2031	STRENGTH OF MATERIAL
CO 1	Apply mathematical knowledge to calculate the deformation behavior of simple structure.
CO 2	Critically analyze problem and solve the problem related to mechanical elements and analyze the deformation behavior for different types of loads
CO 3	Understand the different types of stresses and strains developed in the member subjected to axial, bending, shear & torsional effects.
CO 4	Understand the physical properties of materials

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

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

Module No	Content	RBT Level
1	Mechanical Properties of Materials	1, 2, 3, 5
2	Simple Stress and Strain	1, 2, 3, 4, 5
3	Shear Force and Bending Moment	1, 2, 3, 4, 6
4	Center of Gravity & Moment of Inertia	1, 2, 3, 4

P P Savani University
Institute of Diploma Studies

Department of Mechanical Engineering

Course Code: IDME2050
Course Name: Engineering Contracting & Costing
Prerequisite Course(s): --- None

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

- learn Machine hour rate and Process hour rate with different methods/ process.
- Understand Breakeven analysis analytically as well as graphically.
- learn estimation of cost for forging, welding and casting.
- understand cost estimation of machined parts.
- Learn the methods of preparation of budgeting and contracting.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction** Need, Scope & importance of ECC in industries, Difference between costing and estimating, Terminology associated with various cost elements and their classification, Terminology associated with overheads, their classification and allocation, Determination of selling price and catalogue price. Depreciation and obsolescence: Definition, types, different methods of calculating depreciation. Concept of machine hour rate (MHR) and process hour rate (PHR), method to calculate MHR and PHR for any process.	10	20
2.	**Break Even Analysis** Classification of costs as fixed and variable costs, Relationship between the costs and quantity of production, Definition of break even point (BEP), Procedure of construction of Break Even Chart, Assumptions made in constructing Break even chart, Calculation of BEP analytically and graphically, Margin of safety, its importance and its derivation, effect of changing various parameters on BEP, Basic Numericals.	7	18
3.	**Cost Estimation of Welding, Forging and Casting** Elements of Cost in Arc Welding, Factors affecting arc welding cost, Estimation of cost elements for consumables in arc welding, Cost terminology associated with forging shop, Procedure of calculating material cost of a product for forging	5	12

	shop, Procedure of estimating forging cost, Procedure of estimating cost of forging dies, Cost terminology associated with product in foundry shop, procedure of estimating cost of pattern making, procedure of estimating foundry cost.		
Section II			
4.	**Cost estimation of machined part** Terminology associated with machine shop estimation, procedure to estimate material cost, procedure of estimating cost of machined part for: (a) lathe operation (facing, turning, boring, drilling, grooving, threading), (b) drilling operations (drilling, reaming, tapping), (c) Shaping operations, (d) milling operations (face milling, side and face cutting, end milling, gear forming), (e) cylindrical grinding (plain).	10	20
5.	**Estimation of process cost** Understand importance of estimating various process costs, procedure and steps to estimate cost for following processes: (a) producing power using diesel generating set (cost/ hour and cost/ unit), (b) power produced at thermal power plants (cost/ unit), (c) pouch packaging (cost/ pouch), (d) heat exchanger, cooling or heating (cost/ hour),	7	15
6.	**Budgeting and contracting** Define budget and budgetary control, purpose of budget, various types of budget, Prepare simple budget given.	6	15

List of Practical:

Sr No	Name of Practical	Hours
9.	Collection of market rates for various consumables like diesel, welding rods, gas, cutting tools, electricity rates etc.	2
10.	Collection of finished parts from industries/ market/ scrap merchants consisting welded parts, casted parts, forged parts. Measure and prepare production drawings for all parts.	2
11.	Determine raw material volume of welded parts, estimate quantity of welding rod, determine material and consumables cost.	4
12.	Determine raw material volume for all casted parts (calculate input weight, cut weight, net weight, losses etc), prepare pattern drawings with all dimensions, estimate pattern cost, determine material and consumables costs.	2
13.	Determine raw material volume for all forged parts. Prepare die drawings for all parts, estimate dies cost, determine material and consumables costs,	4
14.	Estimate hourly rate of running diesel generating set. Show assumptions and steps followed to estimate the rate.	4
15.	Sketch the parts taken in design of machine elements under mini projects. Prepare process plan, estimate the material, consumables and manufacturing process.	4
16.	Estimate costs of parts and assembly and show the assumptions and steps followed to estimate the costs.	4
17.	Present the work including work distribution, photographs and movies of actual project work using power point presentation	4

Text Book(s):

Title	Author/s	Publication
Mechanical Estimating and Costing	Banga and sharma	Khanna Publishers

Reference Book(s):

Title	Author/s	Publication
Mechanical Estimating and costing	Shrimali and Jain	Khanna Publishers
Mechanical costing and estimation	Singh and Khan	Khanna Publishers
Learning package in ECC	NITTTR, Bhopal	NITTTR, Bhopal

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 solution of Practical 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.
- Performance/Problem solution/quiz/test of 15 Marks during End Semester Exam.
- Viva/Oral performance of 15 Marks during End Semester Exam.

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

IDME2050	ENGINEERING CONTRACTING & COSTING
CO 1	Calculate material cost of given component/ product.
CO 2	Identify and estimate elements of cost in various processes.
CO 3	Perform break even analysis to calculate break even quantity.
CO 4	Investigate the problem of cost and suggest their solution using cost reduction techniques.
CO 5	Interpret given model of balance sheet and profit loss account.
CO 6	Prepare simple engineering contracts.

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

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

Module No	Content	RBT Level
1	Introduction	1, 2, 4
2	Break Even Analysis	1, 2, 3, 5
3	Cost Estimation of Welding, Forging and Casting	1, 2, 3, 4, 5
4	Cost Estimation of machined part	1, 2, 3, 4, 5
5	Estimation of Process cost	1, 2, 3, 4, 5
6	Budgeting and Contracting	1, 2, 3, 4, 5

P P Savani University
Institute of Diploma Studies

Department of Mechanical Engineering

Course Code: IDME2060
Course Name: Fluid Mechanics & Hydraulic Machines
Prerequisite Course(s): -- None

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	40	60	00	00	200

CE: Continuous Evaluation, ESE: End Semester Exam

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

- Understand basic fundamentals of Fluid Mechanics, which is used in the applications of Aerodynamics, Hydraulics, Marine Engineering, Gas dynamics etc.
- understand the importance of flow measurement and its applications in Industries and to obtain the loss of flow in a flow system.
- understand fluid power and different major equipment which can produce power from fluid.
- learn about operation and use of different hydraulic machines like Hydraulic Crane, Hydraulic Ram, Hydraulic Lift, Hydraulic Jack, Accumulator, Intensifier etc.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Properties of Fluid and Pressure Measurement** Density, specific gravity, specific weight, specific volume, dynamic viscosity, surface tension, capillarity, vapour pressure, compressibility, Fluid Pressure & Pressure Measurement: Fluid pressure, pressure head, pressure intensity, concept of vacuum and gauge pressures, atmospheric pressure, absolute pressure, simple and differential manometers, Bourdon pressure gauge, concept of total pressure on immersed bodies, center of pressure, simple problems on manometers.	09	22
2.	**Fluid Flow** Types of fluid flows, path line and stream line, continuity equation, Bernouli's theorem, Principle of operation of venturimeter, Orifice meter and pitot tube, derivations for discharge, coefficient of discharge and numerical problems, laminar and turbulent flows, Darcy's equation and chezy's equation for frictional losses, minor in pipes, hydraulic gradient and total gradient line, Numerical problems to estimate major and minor losses.	07	18
3.	**Impact of Jets** Impact of Jet on fixed vertical flat plates, Impact of jet on curved-vanes with special reference to turbines & pumps, simple numerical on work done and efficiency.	06	14
Section II			

4.	**Hydraulic Turbines** Layout of hydroelectric power plant, features of hydroelectric power plant, classification of hydraulic turbines, selection of turbine on the basis of head and discharge available, construction and working principle of pelton wheel, Francis and Kaplan turbines, Draft tubes – types and construction, concept of cavitation in turbines, calculation of work done, Power, efficiency of turbines, unit quantities and simple numerical.	11	22
5.	**Centrifugal Pumps and Reciprocating Pumps** Principle of working and applications, types of casings and impellers, concept of multistage, Priming and its methods, cavitation, manometric head, work done, manometric efficiency, overall efficiency, Numericals on calculations of overall efficiency and power required to drive pumps, reciprocating pumps: construction, working principle and applications of single and double acting recriprocating pumps, concept of slip, negative slip, cavitation and separation.	12	24

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Verification of Bernouli's theorem.	06
2.	Determination of coefficient of discharge of venturimeter.	06
3.	Determination of coefficient of discharge, coefficient of contraction and coefficient of velocity of orificemeter.	06
4.	Determination of coefficient of friction of flow through pipes.	06
5.	Determination of force exerted by the jet of water on the given vane.	06
6.	Determination of minor losses of flow through pipes.	06
7.	Calibration of pressure gauge using dead weight pressure gauge tester.	06
8.	Trial on recriprocating pump to determine overall efficiency.	06
9	Trial on pelton wheel to determine overall efficiency.	06
10	Trial on Francis/ Kaplan turbine to determine overall efficiency.	06

Text Book (s):

Title	Author/s	Publication
Fluid Mechanics & Hydraulic Machines	S.S. Rattan	Khanna Publishing House, Delhi
Hydraulic, fluid mechanics & Fluid machines	Modi P.N. and Seth S.M.	Standard book house, New delhi
One Thousand Solved problems in fluid mechanics	K. Subramanya	Tata McGraw Hill

Reference Book(s):

Title	Author/s	Publication
Hydraulic, fluid mechanics & fluid machines	S. Ramamrutham	Dhanpat Rai and Sons
Fluid Mechanics and Hydraulic machines	R.K. Bansal	Laxmi Publications, New Delhi

Web Material Links:

- https://nptel.ac.in/courses/112104117/
- 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 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 solution of Practical which will be evaluated out of 20 for each and average of the same will be converted to 20 Marks.
- Internal Viva consists of 20 marks.
- Viva/Oral performance consists of 60 marks during End Semester Exam.

Course Outcome(s):

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

IDME2060	**FLUID MECHANICS & HYDRAULIC MACHINES**
CO 1	Understand fundamentals of fluids.
CO 2	Analyze various flow problems and flow characteristics.
CO 3	Determine major and minor losses through different pipes.
CO 4	Apply the concept of fluid mechanics to design various system.
CO 5	Analyze complete performance of Hydraulic Turbines Experimentally and Theoretically.
CO 6	Understand working and construction of different Fluid Machines. apply the principles of Fluid Statics and Fluid Kinematics to various Fluid Machines

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

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

Module No	**Content**	**RBT Level**
1	Properties of Fluid and Pressure Measurement	1, 2, 3, 5
2	Fluid Flow	1, 2, 3, 5
3	Impact of Jets	1, 2, 3, 4, 5
4	Hydraulic Turbines	1, 2, 5
5	Centrifugal and Reciprocating pumps	1, 2, 5

P P Savani University
Institute of Diploma Studies

Department of Mechanical Engineering

Course Code: IDME2070
Course Name: Manufacturing Engineering - I
Prerequisite Course(s): -- IDME2030 – Material Science & Metallurgy

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
- understand the manufacturing science using conventional methods.
- understand various manufacturing techniques.
- understand the relevance and importance of the Different manufacturing techniques and real-life application in industry.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Casting** Patterns-Material used, types, Patterns allowances, Cores, Core allowances. Moulds-Mould materials, Types of sand ,Mounding processes Sand moulding ,Pit moulding, machine moulding .Shell moulding.Melting practice. Types of furnaces with specific applicationCupola furnace, Electric arc furnace. Casting principle and operation,Special casting processes. viz die casting, centrifugal casting, Investment casting. Casting defects.	09	22
2.	**Forging** Forging Processes–Drop forging, Upset forging ,Die forging or press forging.Types of dies- Open Die, Closed Die(Single Impression and Multi-impression) Closed die Forging operations- Fullering ,Edging, Bending, Blocking, Finishing,Forge able material and forge ability, Forging temperature, Grain flow in forged parts, Types of Press sand hammers.	07	18
3.	**Rolling and Extrusion** Principles of rolling and extrusion. Hot and cold rolling.Types of rolling mills Different sections of rolled parts, Methods of extrusion–Direct ,Indirect ,backward &impact Extrusion, Hot extrusion, Cold extrusion Advantages, disadvantages and applications.	06	16
Section II			
4.	**Press Working** Types of presses and Specifications. Press working	11	22

	operations- Cutting, bending, drawing, punching, blanking, notching, lancing, Die set components. -punch and die shoe, guide pin, bolster plate,stripper, stock guide ,feedstock ,pilot.Punch and die Clearances for blank in gland piercing, effect of clearance.		
5.	**Welding** Classification. Gas welding techniques.Types of welding flames. Arc Welding–Principle, Equipment, ApplicationsShielded metal arc welding. Sub merged arc welding. TIG/MIG welding. Resistance welding- Spot welding, Seam welding, Projection welding, Welding defects. Brazing and soldering: Types, Principles, Applications.	12	22

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Moulding & Casting of (i) Connecting rod, (ii) solid bearing, (iii) V-Pulley/ Gear Pulley	02
2.	Preparation of two piece patterns, cope and drag patterns, gated patterns etc.	04
3.	Arc welding (i) Lap joint, (ii) Butt Joint, (iii) T-Joint	04
4.	Study of straight polarity and reverse polarity on quality of weld	04
5.	Gas welding (i) Lap joint, (ii) Butt Joint	04
6.	Spot welding (i) Lap joint	04
7.	Simple products by sheet metal working such as ducts of T-shape.	04
8.	Open die forging of mild steel to prepare chisel, hexagonal rods, etc.	04

Text Book(s):

Title	Author/s	Publication
Elements of workshop Technology – Volume I & II	S.K. Hajra Chaudary, Bose & Roy	Media Promoter sand publishers limited
Production Technology – Volume I & II	O.P. Khanna and Lal	
Production Technology	Jain & Gupta	Khanna Publishers

Reference Book(s):

Title	Author/s	Publication
Introduction to manufacturing processes	Jhon A. Schey	McGraw Hills International
Manufacturing Technology	M. Aduthan and A.b. Gupta	New Age International
Workshop Technology	Jain & Gupta	Raghuwansi Khanna Publishers

Web Material Links:

- http://nptel.iitm.ac.in/courses/Webcoursecontents/IIT%20Kharagpur/Manuf%20Proc%20II/New_index1.html
- https://nptel.ac.in/courses/112107145

Course Evaluation:

- 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 solution of Practical which will be evaluated out of 20 for each and average of the same will be converted to 20 Marks.
- Internal Viva consists of 20 marks.
- Viva/Oral performance consists of 60 marks during End Semester Exam.

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

IDME2070	**MANUFACTURING ENGINEERING - I**
CO 1	Interpret important mechanical properties and classification of traditional manufacturing process.
CO 2	Define different forming process and its application in industry for shaping products.
CO 3	Understand the press working operation with its application in industry. identify different welding operation and techniques for welding different alloys.

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

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

Module No	**Content**	**RBT Level**
1	Casting	1, 2, 3, 6
2	Forging	1, 2, 3
3	Rolling and Extrusion	1, 2, 3
4	Press Working	1, 2, 5, 6
5	Welding	1, 2, 5, 6

P P Savani University
Institute of Diploma Studies

Department of Mechanical Engineering

Course Code: IDME2100
Course Name: Thermal Engineering - I
Prerequisite Course(s): -- IDME1010 – Basics of Mechanical & Civil Engineering, IDME2020 - Thermodynamics

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	04	40	60	00	00	00	00	100

CE: Continuous Evaluation, ESE: End Semester Exam

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

- identify functions of various components of Internal Combustion Engine and related performance parameters.
- interpret the differences between Air standard, Fuel air and Actual cycle.
- understand the rating of fuels, Calorific value and their findings.
- explore combustion processes of S.I and C.I engine in detail.
- clarify the concepts of refrigeration and air-conditioning
- explore the different types of refrigeration and air conditioning methods
- understand the difference between VAR and VCR System.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Sources of Energy** Brief description of energy Sources: Classification of energy sources - Renewable, Non-Renewable; Fossil fuels, including CNG, LPG.Solar Energy: Flat plate and concentrating collectors & its applications (Solar Water Heater, Photovoltaic Cell, Solar Distillation).Wind Energy; Tidal Energy; Ocean Thermal Energy; Geothermal Energy; Biogas, Biomass, Bio-diesel; Hydraulic Energy, Nuclear Energy; Fuel cell.	06	14
2.	**Internal Combustion Engines** Assumptions made in air standard cycle analysis; Brief description of Carnot, Otto and Diesel cycles with P-V and T-S diagrams. Internal and external combustion engines. classification of I.C. engines; neat sketch of I.C. engine indicating component parts; Function of each part and materials used for the component parts - Cylinder, crank case, crank pin, crank, crank shaft, connecting rod, wrist pin, piston, cooling pins cylinder heads, exhaust valve, inlet valve.Working of four-stroke and two-stroke petrol and diesel engines; Comparison of two stroke and four stroke engines; Comparison of C.I. and S.I. engines; Valve timing and port timing diagrams for four stroke and two stroke engines..	08	19

3.	**I.C. Engine Systems** Fuel system of Petrol engines; Principle of operation of simple and Zenith carburettors; Fuel system of Diesel engines; Types of injectors and fuel pumps. Cooling system - air cooling, water cooling system with thermo siphon method of circulation and water cooling system with radiator and forced circulation (description with line diagram). Comparison of air cooling and water cooling system. Ignition systems – Battery coil ignition and magneto ignition (description and working). Comparison of two systems; Types of lubricating systems used in I.C. engines with line diagram; Types of governing of I.C. engines – hit and miss method, quantitative method, qualitative method and combination methods of governing; their applications; Objective of super charging.	08	14
Section II			
4.	**Performance of I.C. Engines** Brake power; Indicated power; Frictional power; Brake and Indicated mean effective pressures; Brake and Indicated thermal efficiencies; Mechanical efficiency; Relative efficiency. Performance test; Morse test; Heat balance sheet; Methods of determination of B,P., I.P. and F.P. Simple numerical problems on performance of I.C. engines.	10	24
5.	**Air Compressors, Refrigeration & Air-Conditioning** Types of air compressors; Single stage reciprocating air compressor - its construction and working (with line diagram) using P-V diagram; Multi stage compressors – Advantages over single stage compressors; Rotary compressors: Centrifugal compressor, axial flow type compressor and vane type compressors. Refrigeration; Refrigerant; COP; Air Refrigeration system: components, working & applications; Vapour Compression system: components, working & applications. Air conditioning; Classification of Air-conditioning systems; Comfort and Industrial Air-Conditioning; Window Air-Conditioner; Summer Air-Conditioning system, Winter Air-Conditioning system, Year-round Air-Conditioning system.	13	29

Text Book(s):

Title	Author/s	Publication
Introduction to Renewable Energy	Vaughn Nelson	CRC Press
Thermal Engineering	P.L. Ballaney	Khanna Publishers, 2002
A Course in Thermal Engineering	S. Domkundwar & C.P. Kothandaraman	Dhanpat Rai

Reference Book(s):

Title	Author/s	Publication
Thermal Engineering	R.S. Khurmi and J.K. Gupta	S.Chand & Co.
Thermal Engineering	Er. R . K. Rajput	Laxmi Publications Pvt. Ltd

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.

Tutorial:
- End Semester Exam Viva consists of 50 marks.

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

IDME2080	**THERMAL ENGINEERING – I**
CO 1	Measure and test the different performance parameters of I. C engine.
CO 2	Define the role and importance of fuel supply system for various engine.
CO 3	Understand the concepts & types of ignition and governing systems used for I.C Engine.
CO 4	Clarity of concepts of air-condition and idea about different conditioning systems.
CO 5	Use of refrigeration in industrial application with types.

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

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

Module No	**Content**	**RBT Level**
1	Sources of Engineering	1, 2
2	Internal Combustion Engines	1, 2, 4, 5
3	I.C. Engine Systems	1, 2, 4, 5
4	Performance of I.C. Engines	1, 2, 3, 5
5	Air Compressors, Refrigeration & Air-Conditioning	1, 2, 3, 4, 5

P P Savani University
Institute of Diploma Studies

Department of Mechanical Engineering

Course Code: IDME2090
Course Name: Mechanical Drafting
Prerequisite Course(s): -- IDME2010 – Basics of Engineering Drawing

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	50	00	100	00	00	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

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

- understand different drafting symbols used in industry.
- learn the layouts for weld, pipe and duct and its application relevant to industry.
- understand the assembly drawings and prepare bill of materials.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Drafting Symbols** Machining symbol and its interpretation, Geometrical symbols and its interpretation, Other drafting symbols like threading, dowels, pins, ribs, bearings, etc, notes in drawing like heat treatment conditions, surface conditions, assembly notes, etc. (All symbols as per BIS).	02	06
2.	**Welded Joints, Piping & Duct Layouts** Weld symbols as per BIS -813/ ASME (Primary symbols & supplementary symbols), Weld nomenclature, weld dimensions, welding drawing interpretations (like simple heat exchangers, pressure vessels, etc.), Pipe-types, standards and designation methods, pipe line symbol as per passing fluid air, gas, water etc. Piping fitting symbols, pipe line diagram, Interpretation of process flow diagram & piping isometrics & pipe schedule chart, ducts-types and applications, duct layout.	12	43
3.	**Details & Assembly** Importance and difference of drawings, detail drawing from given assembly, assembly drawings from given details, preparing bill of material (part lists).	08	25
Section II			
4.	**Fasteners** Detachable & permanent fasteners, sketches of threads (square, acme, knuckle, internal-external threads, left hand - right hand threads, single & multi start threads), sketches of studs (cap screws, machine screws, set screws), sketches of bolts & nut (hexagonal square), sketches of rivets (snap, pan,	11	13

	countersunk, conical), sketches of keys.		
5.	**Development of surfaces** Importance of development of surfaces, drawing of development of surfaces of prism, pyramid, cylinder and cone – independent, sectioned and combination.	12	13

List of Practical:

Sr No	Name of Practical	Hours
1.	Draw various drafting symbols: threading, machining, geometrical, welding, piping.	04
2.	Surface development: Draw development of surface prism, pyramid, cylinder and cone – independent, sectioned and combination – Total 4 problems.	04
3.	Penetration and Intersection: Draw the intersection curves – 4 problems (prism into prism, cylinder into cylinder, cylinder into prism, cone into cylinder), with varied dimensions.	12
4.	Weld Joint Assembly: Draw the weld joint drawing with weld symbols and nomenclature. Take minimum 3 parts for weld joint assembly.	12
5.	Piping layout: Prepare piping layout for given application/ situation with piping symbols and nomenclature. Also prepare isometric piping layout for the same problem.	12
6.	Details: Draw the details of all parts for the assembly selected and sketched as student activity.	08
7.	Assembly: Draw the assembly of all parts drawn for Sr No. 5. This includes minimum ones sectional view and also the parts list.	08

Text Book(s):

Title	Author/s	Publication
Engineering Drawing	N.D. Bhatt	Charotar Publishing House, Anand
Engineering Drawing	K.R. Gopalakrishna	Subhash Publications, Bangalore
Engineering Drawing	P.J. Shah	S.Chand, New Delhi

Reference Book(s):

Title	Author/s	Publication
Machine Drawing	P. Sidheswar, P. Kannaiah & VVS Sastry	Tata-McGraw Hill Publishing Co. Ltd – New Delhi
Fundamentals of Engineering Drawing	Warren J. Luzadder	Prentice-hall of India Pvt. Ltd-New Delhi
Westernmann Table, Revised to Indian Standards	Jutz, Scharkus	New age international publishers

Web Material Links:
https://nptel.ac.in/courses/112107145

Course Evaluation:
Theory:

- Continuous evaluation consists of two tests each of 20 marks and 1 hour of duration and average of the same will be converted to 20 marks.

- Faculty evaluation consists of 30 marks as per the guidelines provided by Course Coordinator.

Practical:
- Practical performance/quiz/drawing/test of 50 marks during End Semester Exam.
- Viva/Oral performance of 50 marks during End Semester Exam.

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

IDME2090	**MECHANICAL DRAFTING**
CO 1	Acquire basic knowledge of various drafting symbols.
CO 2	Conduct various experiments on surface development.
CO 3	Understand the different types of welding symbols, pipe fitting symbols and duct layout.
CO 4	Demonstrate an ability to assembly drawing.

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

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

Module No	**Content**	**RBT Level**
1	Drafting Symbols	1, 2, 4, 5
2	Welded Joints, Piping & Duct Layouts	1, 2, 4, 5
3	Details & Assembly	1, 2, 3, 4, 5
4	Fasteners	1, 2, 4, 5
5	Development of Surfaces	1, 2, 4, 5, 6