Programme   :   Diploma in CE/ EE/ ME / MT
Programme Code :   01/02/04/05/15/16/18/19
Name of Course   :   Engineering Mechanics
Course Code   :   AM - 281

Teaching Scheme :

	Hours/Week	Total Hours
Theory	4	64
Practical	2	32

Evaluation Schemes :

		Progressive Assesment	Semester End Examination			
			Theory	Practical	Oral	Term Work
Duration	Two class tests, Each of 60 minutes		3 Hours	-	-	-
Marks		20	80	-	-	25

Course Rationale :

To find solutions to various practical problems, it is essential for the student to study and get acquainted with the various aspects in Statics and Dynamics. The fundamental concepts to be studied in this ciurse are required for study of strengh of materials, Mechanics of Structures and other course of Mechanical & Civil Engineering to be studied at higher level.

Course Objectives :

After studying this course, the student will be able to

I   Understand various concepts & principles in Engineering Mechanics
ii   Apply those principles for evaluating various problems coming across various fields of engineering.

Chapter No	Name of Topics / Sub Topic	Hrs	Weightage
1	**Introduction**	2	2
	1.1 Fundamental Concepts such as Fundamental Units, Deprived unit, system of unis, Scalars, Vectors.		
	1.2 Mechanics, Statics, Dynamics, Kinematics, Kinetics.		
	1.3 Gravity, Mass, Weight, Inertia, Newton's law of Gravitation and Newton's law of motion.		
2	**Resolution and composition of Forces**	8	12
	2.1 concept of force, unit force, graphical represntation, Principle of transmissibility.		
	2.2 System of forces, coplanar, non coplanar, concurrent non-concurrent, parallel.		
	2.3 Resolution of a force, resolved parts, orthogonal andnon-orthogonal components of a force.		
	2.4 Concept of composition & resultant of forces		
	2.5 Law of Paralleogram of forces, Triangle law of forces, Polygon law of forces.		
	2.6 Moment of a force, Varignon's Theorm, couple & characteristics of couple		
	2.7 Composition of Coplanar forces- Concurrent, parallel (like and unlike) non concurrent forces by analytical methods.		
3	**Equilibrium**	8	12
	3.1 Concepts of equilibrium, equilibrant, Relation between resultant & equilibrunt. Analytical conditions.		
	3.2 Equilibrium of coplanar concurrent forces, Lami's theorm and it's application.		
	3.3 Equilibrium of coplanar parallel and non concurrent forces.		
	3.4 Beams reaction - simply supported beams subjected to concentrated and distributed loads, beam suppoorted on roller and hinge supports, overhanging beams.		
4	**Centroid and Centre of Gravity**	6	8

	4.1 Concept of Centre of Gravity & Centroid.		
	4.2 Centroid of regular plane areas & compound areas consisting of regular plane areas. Centroid of hollow solids such as hollow cylinder, hollow cone hollow sphere.		
	4.3 Centre of gravity of simple solids-cylinder, cone, sphere etc. and C.G of compound solid objects made up of simple solids.		
5	Friction		
	5.1 Introduction to Friction.		
	5.2 Types of friction, laws of static friction, coefficient of friction, angle of friction and angle of repose.	8	10
	5.3 Equilibrium of body on horizontal & inclined planes.		
	5.4 Ladder friction.		
6	Kinetics		
	6.1 Concept of force,mass, accleration, momentum, impulse,& impact.		
	6.2 Types of friction, laws of static friction, coefficient of friction, angle of friction and angle of repose.	8	10
	6.3 Principles of conservation of momentum, principles - its application, recoil velocity of gun.		
7	Work, Power, Energy		
	7.1 Defination and units of work, graphical representation of work, work done by constant and variable force.		
	7.2 Energy, forms, law of conservation of energy, work energy principle and it's applications.	8	8
	7.3 Power- Defination, units.		
8	Simple Machines		
	8.1 defination of simple machine, mechanical advantage, velocity ratio,, efficiency,. Relation between them, friction in machines.		
	8.2 Reversbility, law of machine, max MA and max efficiency.	10	10
	8.3 study of machine - levers, pulleys, wheel and axle, screws, worm & worm wheel, winches, gears etc.		
	Total	58	72

List of Practicals / Experiments / Assignments :

Sr.No	Name of Experiment / Assignment	Hrs.
1	Law of polygon of Forces.	2
2	Law of Moments.	2
3	Lami's Theorem.	2
4	Beam Reactions.	2
5	Graphic Statics Two problems each on composition of concurrent and parallel forces.	6
6	Graphic statics- Two problems on beam reactions.	4
7	Centroid of regular and irregular Laminas	2
8	Determination of coefficient of friction for different surfaces.	2
9	To study various lifting machines - Differential axle and wheel, Worm and worm wheel, simple screw jack, Single purchase crab, Double purchase crab.	10
	Total	32

Instructional Strategy :

Sr.No	Topic	Instructional Strategy		
1	Introduction	Lect. Method, demonstration		
2	Resolution & composition of forces	Lect. Method, demonstration		
3	Equilibrium	Lect. Methods, Transparencies		
4	Graphic statics	Lect. Methods, Transparencies		
5	Centroid and centre of Gravity	Lecture, Demonstration & Discuss.		
6	Friction	Lect. Method, demonstration		
7	Kinetics	Lect. Method, demonstration		
8	Work, Power, Energy	Lect. Method, demonstration		
9	Simple lifting machines	Lect. Method, demonstration		

Text Books :

Sr.No	Author	Title	Publication
1	Junnarkar, Adavi	Applied Mechanics	Charotkar
2	Dafhe, Jamdar, Walawalkar	Applied Mechanics	Sarita Prakashan
3	Khurmi	Applied Mechanics	S.Chand

Refrence Books :

Sr.No	Author	Title	Publication
1	Beer & Jhonson	Vector Mechanics For Engineers.(Statics and Dynamics)	Mc- Graw Hill Co., USA
2	McLean & Nelson (Schaum's series)	Engineering Mechanics	Mc- Graw Hill Co., USA
3	Timoshenko & Young	Engineering Mechanics	Mc- Graw Hill Co., USA

Learning Resources : Books, Models.

Specification Table :

Sr.No	Topic	Cognitive Levels			Total
		Knowledge	Comprehension	Application	
1	Introduction	2	...	...	2
2	Resolution & composition of forces	2	4	6	12
3	Equilibrium	2	2	8	12
4	Graphic Statics	4	4	...	8
5	Centroid and centre of Gravity	2	2	4	8
6	Friction	2	2	6	10
7	Kinetics	2	2	6	10
8	Work, Power, energy	2	2	4	8
9	Simple lifting machines	2	4	4	10
	Total	20	22	38	80

V-P

(R.S. Pathade)

Prepared By

(A.S.Zaropune)

CDC Incharge

(N.S.Kadam)

HOD (Metallurgy)

Programme	:	CE/ EE/ET/ME/M T/DDGM
Programme Code	:	01/02/03/04/05/08/21/22/23/24/15/16/17/18/19
Name of Course	:	Computer Fundamentals
Course Code	:	CM 286

Teaching Scheme:

	Hours /Week	Total Hours
Theory	1	16
Practical	2	32

Evaluation Scheme:

	Progressive Assessment	Semester End Examination			
		Theory	Practical	Oral	Term work
Duration	--	--	2 hours	--	2 hours
Marks	--	--	50	--	25

Course Rationale:

In this world of high speed computing it is essential for diploma in computer engineering students to know about device of computers, its operation and graphical base applications and latest technologies in the market. This course is designed for basic perspective for first year diploma students.

Course Objectives:

After studying this course, the student will be able to
1. Use computer system effectively.
2. Describe and use different application software's.
3. Use the basic functions of an operating system.
4. Use five essential utility programs.
5. Compare major OS like Linux and MS-Windows
6. Understand working of input output devices.
7. Understand working of secondary storage devices.
8. Set the parameter required for effective use of hardware combined with and application software's
9. Understand connectivity, internet multimedia and web

Course Content:

Chapter No.		Name of Topic/Sub topic	Hrs	Weight age
1		**Introduction to computer peripherals**	3	--
	1.1	Hardware: Input-output devices, CPU and general PC layout		
	1.2	Data storage devices: RAM, ROM, External storage – magnetic & USB		
2		**Introduction to system softwares**	3	--
	2.1	Operating systems: Introduction to various operating systems like DOS, Windows, Android, Unix, Linux.		
	2.2	Windows: working with Windows operating system		
	2.3	Utility software: Application and working of various utility softwares like Antiviruses, Internet browsers, Adobe reader, office suite, media players etc.		
3		**GUI Based Editing, Spreadsheets, Tables & Presentation**	8	--
	3.1	Application Software Common Features		
	3.2	Word Processors: Working with word processor for creating documents & drafts.		
	3.3	Spreadsheets :: Features Creating and Working with spread sheets		
	3.4	Presentation Graphics : Features .Working with Presentation Graphics to create presentations		
	3.5	Software suites Introduction to Data Base Management System-Microsoft Access.		
4		**Communication & Connectivity**	2	
	4.1	Introduction to communication systems: Telephone, fax, e-mails, messengers (chatting), voice messaging system (voice mail), video-conferencing system .		

List of Practical/Experiments/Assignments:

Sr. No.	Name of Practical/Experiment/Assignment	Hrs
1	Understanding computer layout and its peripherals.	2
2	Study of printing and scanning devices	2
3	Working with operating systems like windows XP and understanding the working environment (Desktop, My Computer, My Documents, Recycle bin, Programme files & control panel.)	2
4	Working with MS world (at least four programs including use of pictures/ clipart, wrd ar, shapes, tables, mail merging options)	6

5	Working with MS Excel (at least three programs including creating spreadsheets, performing arithmetic operations, creating charts & graphs).	6
6	Working with MS Powerpoint (at least three programs including creating simple presentation, use of hyperlinks, use of animation).	6
7	Page setting, page layout and printing Word, Excel & powerpoint documents.	2
8	Study of different types of networks and communication devices.	2
9	Internet practices: i)Getting started with internet, ii) Use of search engines iii)creating an email account, iv)E-travel & E-trading .	2
10	Assignment on cyber laws and ethics.	2
Total		32

Text Books:

Sr. No.	Author	Title	Publication
1	Timothy J. O. Leary and Linda I.O' Leary	Computing Essentials (Solving The Puzzles of It Literacy)	TMH
2	Vikas Gupta	Comdex Computer Course Kit	Dreamtech

Reference Books:

Sr. No.	Author	Title	Publication
1	P.K. Sinha	Computer Fundamentals	BPB
2	Henry C. Lucas, Jr.	Information Technology for Management	Tata McGraw Hill
3		Windows XP/2000/2003/ Vista Users Guide	Manuals

Mrs.Seema Kolhe (LCE)
Prepared By

(Prof A.S.Zanpure)
Member Secretary, PBOS

Prof.N.S.Kadam
Chairman, PBOS

Programme   : Diploma in ME/MT
Programme Code : 04 /05/18 /19
Name of Course : Electrical Technology
Course Code   : EE 282

Teaching Scheme:

	Hours /Week	Total Hours
Theory	03	48
Practical	02	32

Evaluation Scheme:

	Progressive Assessment	Semester End Examination			Term work
		Theory	Practical	Oral	
Duration	Two Class Tests each of 60 Min duration	03 Hrs	---	---	---
Marks	20	80	---	---	25

Course Rationale:

Every branch of engineering is related with electrical Engineering. Therefore every student is expected to know fundamentals of Electrical Engineering. From this pointof view, this course is introduced.

Course Objectives:

After studying this course, the student will be able to -
o Understand the basic and fundamental principle of Electrical engineering
o Know the various electrical circuit concepts used in higher-level courses.
o Know principle and construction of various electrical machines and transformers.
o Measure electrical quantity.

Course Content:

Chapter No.		Name of Topic/Sub topic	Hrs	Weightage
1.		**Electrical Circuits:**		
	1.1	Introduction to electric power supply system, AC supply – single phase and three phase, DC supply		
	1.2	Concept of Electric Circuit, D.C. Current, A.C. Current, Ohm's Law		
	1.3	Resistances in series, Resistances in parallel, Equivalent Resistance .Simple Numericals	06	12
	1.4	Effect of Temperature on resistance of (Metal,Non metal and Alloy) ,Resistance temperature coefficient.		
2.		**Magnetic Circuit:**		
	2.1	Definition of magnetic flux, magnetic circuit, magneto motive force (MMF) reluctance, permeability, relative permeability, magnetic flux density. Simple Numericals		
	2.2	Magnetization curve (B-H Curve), Magnetic hysteresis, hysteresis loop.	04	10
	2.3	Production of mechanical force on current carrying conductor placed in magnetic field. Fleming's Left hand rule.(Simple numericals)		
	2.4	Comparison between electric circuit and magnetic Circuit.		
3.		**Electromagnetic Induction:**		
	3.1	Faradays laws of Electromagnetic Induction	04	06
	3.2	Statically (self & mutual) induced e.m.f & dynamically induced e.m.f		
	3.3	Lenz's law, Fleming's right hand rule.		
4.		**A.C. Fundamentals:**		
	4.1	Generation of single phase A.C.Voltage (Elementary Single Phase alternator), sinusoidal waveform & its graphical representation.		
	4.2	Definitions: Waveform, cycle time period, frequency, angular frequency, maximum value, r.m.s. Value, average value, peak factor, form factor.	08	14
	4.3	Concept of Phase & phase difference. Waveforms and phasor diagrams of R,L,C circuits. Waveforms and phasor diagrams RL,RC,RLC circuits (Voltage, Current, power, p.f. relations and phasor diagrams, no deviation)		
	4.4	Generation of three phase A.C. Voltage (Elementary 3-phase alternator)		
	4.5	Concept of phase sequence		
	4.6	Advantages of 3-phase supply over single-phase supply		
	4.7	Types of connection Star & Delta Relation between line and phase values of voltage and current in i) Star ii) Delta connected three phase balanced system.(No		

		derivation)		
5.		**Single phase Transformer**	02	06
	5.1	Definition, principle of working, construction, Types of transformer		
	5.2	E.M.F.equation, Transformation Ratio, Voltage Ratio, Simple Numericals.		
	5.3	Losses in transformer, efficiency, voltage regulation		
6.		**D.C. Motor:**	12	16
	6.1	Definition, principle of working and construction of. D. C. Motor. Concept of back emf, Necessity of starter		
	6.2	Types of D. C. Motors and their characteristics.		
	6.3	Applications of each type of D.C.motor.		
	6.4	Reversal and Speed control of D.C. Motors • Armature voltage speed control method • Field control method of speed control		
7.		**A.C. Motors**	12	16
	7.1	Three Phase induction motor: Principle & working, construction, types, slip speed, connection of three phase I.M. and reversal of rotation of I.M. applications.		
	7.2	Single phase induction motor: Working Principle, characteristics and applications of following single-phase induction motor- stepper motor, A.C.Servo Motor ,D .C. Servo Motor.		

List of Practical/Experiments/Assignments:

Sr. No.	Name of Experiment/Assignment	Hrs
1	To plot the B-H curve of a magnetic material	02
2	Demonstration of production of mechanical forces on current carrying conductor in magnetic field & verify Fleming's Left hand rule	02
3	Demonstration on Faraday's Laws of Electromagnetic Induction by using coil and magnet & verify Fleming's right hand rule.	02
4	To observe waveforms of ac voltage and current on CRO	02
5	To verify the relation between phase values and line values of voltages and currents in three phase Star & Delta connected balanced load.	04
6	To study the connection of D.C./A.C. Ammeter, D.C./A.C. voltmeter and wattmeter.	02
7	To perform speed control of D.C. shunt motor . a)Armature voltage speed control method b)Field control method of speed control	04
8	Study of nameplate of D.C. Motor and selection of for particular load.	02
9	Study of three point starter and its connection to D. C. shunt motor	04
10	Study of nameplate of three phase Induction Motor	02
11	To perform load test on three phase I.M. and plot the characteristics	04
12	Speed control of three phases I.M. By i) Supply voltage ii) by changing rotor resistance	02
13	Connection and reversal of rotation of following motors a)Stepper Motor b)Servo Motor	04

14	a)Determine the phase sequence of three phase supply b)Reversal of rotation of three phase Induction Motor	04

Note: Minimum any 12 practicals are to be performed.

Instructional Strategy:

Sr. No.	Topic	Instructional Strategy
1	Electrical Circuits	Lecture, Problem solving ,practical
2	Magnetic Circuits	Lecture, Problem solving ,practical
3	Electromagnetic Induction	Lecture, Problem solving ,practical
4	AC Fundamentals	Lecture, Problem solving ,practical
5	Transformer	Lecture, Problem solving ,practical
6	D.C.Motor	Lecture, Demonstration and working models, PPTs
7	A.C.Motor	Lecture, Demonstration and working models, PPTs

Text books

Sr. No.	Author	Title	Publication
1	B.L.Theraja	Electrical Technology Vol. I & II.	S. Chand & Co.

Reference books

Sr. No.	Author	Title	Publication
1	Edvard Hughes	Electrical Technology	Pearson Education
2	H.Cotton	Electrical Technology	CBC,Delhi
3	V.N.Mittle	Basic Electrical Engineering	Tata McGraw Hill

Specification table:

Sr. No.	Topic	Cognitive levels			Total
		Knowledge	Comprehension	Application	
1	Electrical Circuits	06	04	02	12
2	Magnetic Circuits	04	04	02	10
3	Electromagnetic Induction	02	04	00	06
4	AC Fundamentals	08	04	02	14
5	Transformer	02	02	02	06
6	D.C.Motor	06	04	04	16
7	A.C.Motor	06	04	04	16

(Smt.V.L.Munde)

Prepared By

(Shri. A.S.Zanpure)

Secretory PBOS

Mrs.N.S.Kadam

Chairman PBOS

GOVERNMENT POLYTECHNIC, PUNE
(An Autonomous Institute of Govt. of Maharashtra)

Programme	:	Diploma in ME / MT
Programme Code	:	04/ 05 /18/19
Name of Course	:	Elements of Electronics Engineering
Course Code	:	ET 285

Teaching Scheme:

	Hours /Week	Total Hours
Theory	03	48
Practical	02	32

Evaluation Scheme:

	Progressive Assessment	Semester End Examination			
		Theory	Practical	Oral	Term work
Duration	Two class tests, each of 60 minutes	3 hrs.	--	--	--
Marks	20	80	--	--	25

Course Rationale:
This course will be useful in understanding of construction, working and applications of semiconductor devices and circuits.

Course Objectives:
After studying this course, the student will be able to

- Explain construction, working, characteristics and applications of semiconductor devices and circuits.
- Build and test the circuits

Course Content:

Chapter No.	Name of Topic/Sub topic		Hrs	Marks
1.	Semiconductor devices			
	1.1	1 Semiconductor theory Types : 1] intrinsic Semiconductor 2] Extrinsic semiconductor - P – type and N - type semiconductor. **PN junction diode:** Diode symbol, Working, Barrier voltage, depletion region, Junction Capacitance, Forward & reverse Characteristics.	15	20

	1.2	**Zener diode :** Diode symbol, Working, Forword & reverse Characteristics Avalanche & zener breakdown.		
	1.3	**Rectifier :** Defination , Classification Half wave and Full wave Rectifier: circuit diagram, working, comparison, merits and demerits. Filters, necessity, types , comparison, merits, demerits		
	1.4	**Transistor :** construction, symbol, operating principle, characteristics, configurations, comparison between CB, CE, CC ,applications		
	1.5	**FET:** Classification of FET : Construction, symbol, operating principle, characteristics, and applications of JFET.		
	1.6	**SCR :** Symbol, their construction, working, characteristics, applications		
2.	**Oscillator**			
	2.1	Block diagram, Barkhausan Criteria for sustained oscillations, Oscillatious in LC tank circuit; Classification: LC and RC. Classification of RC Oscillator: Working of RC Phase shift & Wein Bridge Oscillator. Clasification of LC Oscillator: Working of Hartley, Colpitts, and Crystal Oscillator.	07	12
3.	**Digital Fundamentals**			
	3.1	Number systems: Decimal, Binary, Hexadecimal, Octal.		
	3.2	Basic logic gates: AND, OR, NOT, NAND, NOR, EXOR symbols, IC numbers and Truth Table.	07	12
	3.3	Boolean Algebra: Fundamentals of Boolean algebra, Basic laws De Morgan's theorem,		
4.	**Linear ICs,**			
	4.1	OP AMP. IC 741, symbol, pin diagram, ideal and typical characteristics, Applications such as Inverting , Non Inverting amplifier, Difference amplifier, adder, substractor, Integrator, differentiator. (using closed loop system)	07	12
5.	**Instrumentation**			
	5.1	CRO: Cathode Ray Tube, Oscilloscope Block diagram, operation, oscilloscope specifications, Applications.	05	12

	5.2	Function generator, Block diagram, operation, specifications, applications		
6.	**Transducer**			
	6.1	Definition, Selection criteria of Transducer. **Classification:** Active, Passive, Primary, Secondary, Mechanical, Electronic, Analog, Digital, Resistive, Capacitive, Inductive Transducers. **Construction, Operation, Applications :** LVDT, RTD, Thermocouple , Photoelectric, Piezoelectric Transducers,	07	12
Total			48	80

L.sist of Practicals/Experiments/Assignments:

Sr. No.	Name of Practical/Experiment/Assignment	Hrs
1.	Plot V-I characteristics of P-N junction diode.	02
2.	Study of Half wave and Full wave rectifier with and without filter.	02
3.	Plot the i/p and o/p characteristics in CE configurations.	02
4.	Plot the characteristics of FET.	02
5.	Plot the characteristics of SCR.	02
6.	Study of Hartley and Colpitts oscillator.	02
7.	Study of RC phase shift and Wein Bridge.	02
8.	Study of logic gates and verifications of logic gates.	02
9.	Verification of De Morgan's theorem.	02
10.	Study of Inverting and Non Inverting Amplifier.	02
11.	Study of Adder, Substractor.	02
12.	Study of Integrator and Differentiator.	02
13.	Study of C.R.O.	02
14.	Study of Function generator.	02
15.	Study of Transducers.	02
Total		30

Instructional Strategy:

Sr. No.	Topic	Instructional Strategy
1.	Semiconductor devices.	Classroom teaching and laboratory work.
2.	Digital fundamentals.	Classroom teaching and laboratory work.
3.	Linear IC's.	Classroom teaching and laboratory work.
4.	Oscillator.	Classroom teaching and laboratory work.
5.	Instrumentation.	Classroom teaching and laboratory work.
6.	Transducer.	Classroom teaching and laboratory work.

GOVERNMENT POLYTECHNIC, PUNE
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Text Books:

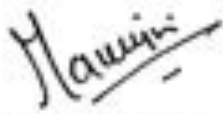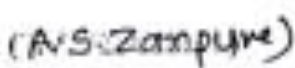| Sr. No	Author	Title	Publication
1.	V.K. Mehata	Principle of Electronics	TMH.
2.	R.S.Sedha	Applied Electronics	TMH.
3.	B.L.Theraja.	Basic Electronics.	S.Chand.
4.	Ramakant Gaikwad	Linear Integrated Circuits	PHI
5.	R P Jain	Modern Digital Electronics	TMH
6.	H.S. Kalsi	Electronics Instrumentation	TMH

Reference Books:

Sr. No	Author	Title	Publication
1.	Mottershed	Electronics Devices and Circuits.	PHI
2.	Milmann Halkies	Electronics Devices and Circuits.	TMH

Learning Resources: Reference Books, Data Manual

Specification Table:

Sr. No.	Topic	Cognitive Levels			Total
		Knowledge	Comprehension	Application	
1.	Semiconductor Devices	10	06	04	20
2.	Oscillators	04	06	02	12
3.	Digital Fundamentals	06	04	02	12
4.	Linear I C 's	06	04	02	12
5.	Instrumentation	06	04	02	12
6.	Transducers	06	04	02	12
Total		38	28	14	80

Prepared By :

(N.S.Bakade.)	(N.S.Zanpure)	(N.S.Kadam)
Lect. In E &TC	Member Secretary, PBOS	Chairman, PBOS

Programme	:	Diploma in CE/ ET/ME/ MT
Programme Code	:	01/ 03/04 /05/21/24/15/18/19
Name of Course	:	Engineering Graphics
Course Code	:	ME 281

Teaching Scheme:

	Hours /Week	Total Hours
Theory	02	32
Practical	04	64

Evaluation Scheme:

	Progressive Assessment	Semester End Examination			
		Theory	Practical	Oral	Term work
Duration	Two class tests, each of 90 minutes	4 hrs.	--	--	--
Marks	20	80	--	--	25

Course Rationale:

Engineering drawing is the graphical language. It is used by engineers, designers, planners, supervisors and also the workers to express their thoughts, ideas and concepts. The expression by drawing is very accurate, precise and brief. At a glance one can understand detailed description of any part to be manufactured or a dam to be built or an electric circuit to be used. For all technicians through understanding of principles of engineering drawing (Graphic Skills) is essential.

Course Objectives:

After studying this course, the student will be able to
- Draw various engineering curves.
- Incorporate Indian Standards in drawings.
- Sketch various orthographic and isometric views.
- Draw all different views from given components vis-à-vis.
- Draw free hand sketches.

Course Content:

Sr. No.	Name of Topic/Sub topic		Hrs	Weightage
1.	**Introduction of Drawing Instruments, Lines, Letters etc.**			
	1.1	Use of different drawing equipments.		
	1.2	Type of letters.	02	--
	1.3	Conventions of lines.		
	1.4	Scales.		

2.	Curve and Tangential Exercises			
	2.1	Geometrical constructions and tangential exercises.		
	2.2	To draw an ellipse by concentric circle method.		
	2.3	To draw a parabola by : i) Directrix focus method.		
	2.4	To draw a hyperbola by : i) Directrixfocus method.	04	12
	2.5	To draw involute of circle, Regular polygon such as pentagon		
	2.6	To draw a cylindrical helix (limited to two turns)		
	2.7	To draw cycloid, epicycloids and hypocycloid.		
3.	Orthographic Projections			
		Introduction to orthographic projections first and third angle method of projection. Conversion of simple pictorial view, Dimensioning technique.	05	12
4.	Sectional Orthographic Projections			
		Introduction, converting the given pictorial view into sectional views.	03	12
5.	Isometric Views			
	7.1	Isometric scale and isometric views of simple objects.	04	14
	7.2	Isometric views of rectangular, cylindrical objects, Slots on sloping surface.		
6.	Projection of Line			
	6.1	Line inclined to one plane and parallel to another plane	02	06
7.	Projection of Planes			
	7.1	Surface planes inclined to one plane and perpendicular to another plane.	04	08
8.	Projection of Solids			
	8.1	Axis inclined to one plan only Concept of true length of regular solids such as Cylinder, Prism Cone and Pyramid, cube and tetra hedron	06	08
9.	Free Hand Sketches			
	9.1	Fasteners, temporary threaded fasteners, locking arrangement, Foundation Bolts.	02	08
Total			32	80

List of Practicals / Experiments/Assignments:

Sr. No.	Name of Experiment/Assignment	Hrs
Six sheets on topics covered in the syllabus.		
1.	Line letters and numbers. (Sheet No.1)	06
2.	Engineering curves and tangential exercises. Any four problems (Sheet No.2)	06
3.	Orthographic projection, Sectional views. One on each (Sheet No.3)	16
4.	Projection of lines, planes. Two problems each (Sheet No.4)	12
5.	Projection of solids.Two problems (Sheet No. 5)	
6.	One sheet Isometric projection. Minimum Two Problems. (Sheet No.5)	16
7.	Free hand sketches.Any Eight elements (Sheet No.6)	08
Total		64

Instructional Strategy:

Sr. No.	Topic	Instructional Strategy
1.	Introduction to Drawing instruments lines letters etc.	Classroom teaching and Demonstration.
2.	Curves and tangential exercises	Demonstrations and classroom teaching.
3.	Orthographic projection	Use of models and classroom teaching.
4.	Sectional orthographic projection	Use of models, transparencies and classroom teaching.
5.	Isometric views	Classroom teaching, self study and assignments.
6.	Projection of lines.	Classroom teaching and assignments.
7.	Projection of planes.	Classroom teaching and use of models.
8.	Projection of solids	Classroom teaching and use of models.
8.	Free hand sketches	Classroom teaching and assignments & use of Models.

Text Books:

Sr. No	Author	Title	Publication
1.	N.D. Bhatt	Elementary Engg. Drawing (Including plan and solid geometry)	Charotar Publication, Anand.
2.	Mali, Chaudhari	Engineering Drawing	VrindaPrakashan, Jalgaon

Reference Books:

Sr. No	Author	Title	Publication
1	N.D. Bhatt	Geometrical and Machine Drawing	Charotar Publication, Anand.
2	--	I.S. 696 Latest version	B.I.S.
3	Curriculum Development Centre, TTTI, Bhopal	A Workbook in Engineering Drawing	Somaiyya Publication Pvt. Ltd., Mumbai
4	--	SP 46 – 1988	B.I.S.
5	G.R. Nagpal	Machine Drawing	--
6	K. Venugopal	Engineering Drawing and Graphics + AutoCAD	New Age International Publishers.

Learning Resources: Video cassettes No. 122, 123 of G.P.P. Library

Specification Table:

Sr. No.	Topic	Cognitive Levels			Total
		Knowledge	Comprehension	Application	
1.	Introduction to Drawing instruments lines letters etc.	--	--	--	--
2.	Curve and Tangential exercises	12	--	--	12
3.	Orthographic Projection	--	12	--	12
4.	Sectional orthographic projection	--	12	--	12
5.	Isometric views	--	--	08	08
6.	Projection of lines.	--	12	--	12
7.	Projection of planes.	--	--	12	12
8.	Projection of solids	06	--	--	06
9.	Free hand sketches	06	--	--	06
Total		24	36	20	80

Prepared By :

(D. P. Khadse)   (A.S.Zanpuve)   (N.S.Kadam)
   L.M.E.   Member Secretary, PBOS   Chairman, PBOS

Programme	:	Diploma in MT
Programme Code	:	05/19
Name of Course	:	Elements of Mechanical Engineering
Course Code	:	ME286

Teaching Scheme:

	Hours /Week	Total Hours
Theory	03	48
Practical	02	32

Evaluation Scheme:

	Progressive Assessment	Semester End Examination			
		Theory	Practical	Oral	Term work
Duration	Three class tests, each of 60 minutes	3 Hrs.	--	--	--
Marks	20	80	--	--	25

Course Rationale:

Metallurgy Engineers often come across various engg. components for selection of materials and manufacturing processes .They are required to know basic principles of working of different machines and equipments. They are also required to look after the maintenance of the machines .It is therefore necessary for them to know how to interpret the assembly drawings, component drawings in order to carry out any engineering work.

Course Objectives:

The student will be able to

- To draw proportionate free hand drawing of casting etc.
- To develop the ability to read the drawing.
- To get familiar with various conventional representation.
- To understand working principles of heat transfer.
- To understand the working principal of compressor pumps etc.
- To use the instruments for measuring pressure, velocity, flow.
- To specify the tolerances and finish required for various components.

Course Content:

Chapter No.		Name of Topic/Sub topic	Hrs	Weightage
1		**Advance Sectional Orthographic view**	13	18
	1.1	Types of sections: Conventional, revolved, removed, partial, offset.		
	1.2	Crankshaft, Engine body, camshaft, flywheel.		
	1.3	Pump body, pulley, gear, flanged coupling, bearing.		
2		**Blue Print Reading**	09	14
	2.1	Machine symbols, surface finish.		
	2.2	Specification on drawing such as material hardness, heat treatment, micro structure.		
	2.3	Simple assembly containing six parts.		
3		**I.C.Engine working**	04	10
	3.1	Classification of I.C.engine, construction.		
	3.2	Working of 2 stroke and 4 stroke I.C.engine		
4		**Pumps and Compressors**	08	12
	4.1	Pumps: Classification, Construction, Working, application.		
	4.2	Compressors: Classification, working of reciprocating, rotary, roots blower, vacuum pumps.		
5		**Heat transfer**	06	10
	5.1	Modes of heat transfer, calculations of heat transfer for given condition,		
	5.2	Simple problems on conduction, convection, radiation.		
	5.3	Heat exchangers.		
6		**Power Transmission Device**	06	10
	6.1	Belt- Open and cross belt, Flat belt and V belt. Chain Drives.		
	6.2	Gears- Spur, Helical, Bevel, Worm. Gear Terminology- circular pitch, module, addendum, dedendum, pressure angle.		
	6.3	Comparison, advantages & disadvantages of different drives.		
	6.4	Power screws.		
7		**Introduction to Auto CAD**	02	06
		Total	48	80

List of Practical/Experiments/Assignments:

Sr. No.	Name of Practical/Experiment/Assignment	Hrs
1	Advance orthographic views-one sheet.	06
2	Drawing one assembly and its details.	04
3	Free hand sketches one sheet on I.C. engine parts.	04
4	Demonstration of I.C. engine parts.	02
5	Demonstration of Pumps	02
6	Demonstration of Compressor	02
7	Calculation of heat transfer for a furnace.	02
8	Demonstration of various Power Transmission devices.	04
9	Simple drawing on Auto CAD	06
	Total	**32**

Instructional Strategy:

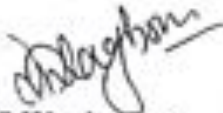| Sr. No.	Topic	Instructional Strategy
1	Advance Sectional Orthographic view	Lecture and transparencies
2	Blue Print Reading	Lecture
3	I.C.Engine working	Lecture and demonstration
4	Pumps and Compressors	Lecture and practical
5	Heat transfer	Lecture
6	Power Transmission Device	Lecture and demonstration
7	Introduction to Auto CAD	Lecture and demonstration

Reference Books:

Sr. No	Author	Title	Publication
1	N.D.Bhatt	Machine Drawing	Chartor Publishing House
2	Kamat Rao	Machine Drawing	Jeevandeep Prakashan
3	Khurmi	Hydraulic Machinery	S.Chand Co Ltd.,New Delhi
4	Patel Karmachandani	Heat Engine	Ahcarya Publication
5	Jagadish Lal	Hydraulic Machinery	Metropolitan Publishers
6	S.P.Sukhatme	Heat Transfer	Tata Mc Graw Hill
7	Ratan	Theory of Machine	
8	Mahajan	Mechanism	

Learning Resources: O.H.P / Transparencies, Charts.

Specification Table:

Sr. No.	Topic	Cognitive Levels			Total
		Knowledge	Comprehension	Application	
1	Advance Sectional Orthographic view	06	--	12	18
2	Blue Print Reading	04	04	06	14
3	I.C.Engine working	04	--	06	10
4	Pumps and Compressors	04	08	--	12
5	Heat transfer	05	--	05	10
6	Power Transmission Device	04	02	04	10
7	Introduction to Auto CAD	04	02	--	06
	Total	**31**	**16**	**33**	**80**

Prof.D.S.Waghmare
Prepared By

(Prof.A S Zampure)
Secretary, PBOS

Prof.N.S.Kadam
Chairman, PBOS

Programme   :   Diploma in MT
Programme Code   :   05/19
Name of Course   :   Advanced Physics
Course Code   :   SC283

Teaching Scheme:

	Hours /Week	Total Hours
Theory	03	48
Practical	02	32

Evaluation Scheme:

	Progressive Assessment	Semester End Examination			
		Theory	Practical	Oral	Term work
Duration	Three class tests, each of 60 minutes	3Hrs.	--	--	--
Marks.	20	80	--	--	25

Course Rationale:

This subject deals with preliminary ideas about the concepts of plasma, laser, microscopy and superconductivity to give industrial applications of these concepts. It will also make the students to think logically and solving problem analytically. Further these concepts can be applied for various applications.

Course Objectives:

After studying this course, the student will be able to
- Understand the role of Advanced Physics in engineering field.
- Think in scientific manner and apply the knowledge gained in different situations.

Course Content:

Chapter No.		Name of Topic/Sub topic	Hrs	Weigh tage
1		**Metallurgical Microscope (Optics)**		
	1.1	Revision: types of lenses & image formation by lenses.	06	16
	1.2	Magnification & power of lens - Definition, formula. Aperture of lens, Numerical Aperture.		
	1.3	Lens aberrations– Spherical, chromatic, coma, astigmatism (no derivations). Minimization of aberration. Achromatic, apochromatic, semi apochromatic lenses.		
	1.4	Revision of simple & compound microscope. Metallurgical microscope– construction & ray diagram.		
	1.5	Eyepieces- Huygens & Ramsden.		
	1.6	Objective- oil immersion objective, properties, N.A., R.P.		
2		**Electronic Microscopy**		
	2.1	Terminology- De Broglie's hypothesis.	02	05
	2.2	Electron microscope; principle, construction, working & applications, comparison with optical microscope.		
	2.3	Types of electron microscopes- Working & application of scanning (SEM), transmission (TEM).		
3		**LASER**		
	3.1	Terminology- Atomic excitation, critical potential, excitation potential, optical pumping, population inversion, spontaneous & stimulated emission (revision).	04	06
	3.2	Working & application- Emission of laser using energy level diagram.		
	3.3	Production of Gas & Ruby LASER.		
	3.4	LASER coating & industrial applications.		
4		**X-Rays**		
	4.1	Origin of X-rays, diffraction of x-ray's, Bragge's law and crystal structure, crystal systems with examples.	04	06
	4.2	Methods for the determination of crystal structure- single crystal and powder method.		

5		Spectroscopy		
	5.1	Revision on different types of spectrum.		
	5.2	Terminology- spectral analysis, types of spectra- lines, band & continuous & its origin.	04	05
	5.3	Application - spectra, types of spectrometers.		
6		Temperature Measuring Devices		
	6.1	Laws-Introduction of radiation, Stefan's Boltzman's law, Newton's law, Kirchhof's law, Wein's law.		
	6.2	Differentiate between the thermometry & pyrometry, Change of properties.		
	6.3	Classification of pyrometer: (1) Distance type (2) Contact type. Contact type pyrometer: A) Thermocouple- Seeback effect, Thomson effect, Peltier effect, base metal & nobel metal thermocouple. Thermoelectric series Calibration of important thermocouple. B) Resistance pyrometer- construction, working, accuracy & application. Distant type pyrometer: A) Disappearing filament optical pyrometer- principle, construction, working, accuracy. B) Total radiation pyrometer- principle, construction, working, accuracy.	09	12
	6.4	Bimetalic thermometer: principle, construction, working & application.		
7		Plasma Physics		
	7.1	Concept, properties, formation, occurrence & production of plasma, application of plasma in various area- 1) Welding – plasma arc welding, key hole welding. 2) Coating- use of plasma in coating application. 3) Nitriding- Plasma nitriding.	03	05
8		Magnetism and Superconductivity		
	8.1	Revision on type of magnets & definitions, susceptibility, permeability, hysterisis, retentively, coercivity, area under hysterisis loop & work done. Loss of energy by hysterisis.	07	12

	8.2	Hard & soft magnetic materials & its relation using hysterisis loop, properties & uses of magnets. Memory cores, permanent magnets, magnetic insulators.		
	8.3	Superconductivity Phenomena, critical temperature, Messner's effect, superconducting materials, type1 & type 2, destruction of superconductivity.		
9	**Interference**			
	9.1	Corpuscular theory, Huygens theory, types of wavefronts, super imposition of waves.	05	09
	9.2	Phenomena of interference, Constructive & destructive types, conditions for stationary interference pattern, flatness testing, wedge shape film, measurement of diameter of microscopic objects, Newton's rings, measurement of radius, refractive index, wavelength.		
10	**Thin Film**			
	10.1	Thin film, thin film deposition methods, Vacuum deposition, sputtering.	04	04
	10.2	Chemical vapor deposition (CVD), Chemical bath deposition (CBT) - principle & comparison, thickness measurement.		
		Total	48	80

List of Practicals/Experiments/Assignments: (Any Ten)

Sr. No.	Name of Practical/Experiment/Assignment	Hrs
1	Ray diagrams of different types of microscopes.	02
2	Measurement of unknown temperature using thermocouple.	02
3	Determination of refractive index & dispersive power using spectrometer.	02
4	Measurement of wavelength using spectrometer.	02
5	To determine the surface tension using traveling microscope.	02
6	To determine radius of curvature of convex surface using Newton's ring method.	02

7	To determine the temperature coefficient of resistance using platinum resistance thermometer.	02
8	Measurement of pole strength of magnet.	02
9	Non destructive testing – LPT/MPT.	02
10	Plotting Hysterisis loop & to determine coercivity & retentivity.	02
11	Study of crystals using models.	02
12	Ultrasonic testing.	02
13	Visit.	02
	Total	**32**

Instructional Strategy:

Sr. No.	Topic	Instructional Strategy
1	Metallurgical Microscope	Lecture method
2	Electron Microscopy	Lecture method
3	Laser	Lecture method
4	X-rays	Lecture method
5	Spectroscopy	Lecture method
6	Temperature Measuring Devices	Lecture method
7	Plasma Physics	Lecture method
8	Magnetism & Superconductivity	Lecture method
9	Interference	Lecture method
10	Thin film	Lecture method

Reference Books:

Sr. No	Author	Title	Publication
1	R.K. Gaur & S. L. Gupta	Engineering Physics	Dhanpal Rai & Sons Publications, Delhi
2	Kehl	Principles of Metallographic Laboratory Practice	
3	M.S. Kotgire	Physics for Engineering Material Science	New Age International Publisher
4	A. S. Vasudeva	Engineering Physics	S. K. Karia & Sons, Delhi
5	M.R. Shrinivasan	Perspective of Modern Physics	Mc Graw Hills Book Co.
6	Garfield Shrager	Introductory Material Science	Mc Graw Hills Book Co.
7	Guy	Elements of Physical Metallurgy	
8	A. Beiser	Concepts of Modern Physics	Dhanpal Rai & Sons Publications, Delhi.
9	M. Aditan & A. B. Gupta	Manufacturing Technology	Newage International
10	Subramanim & Brigelal	Text Book of Optics	S. Chand & Co.

Learning Resources: Charts, Black Board, Television, Internet, Educational CD's, Models, Experimentation, Diagram Demonstration, Visit.

Specification Table:

Note: Figures in the bracket indicate the marks for which question will be set to account for internal options.

Sr. No.	Topic	Cognitive Levels			Total
		Knowledge	Comprehension	Application	
1	Metallurgical Microscope	8(12)	4(6)	4(6)	16(24)
2	Electron Microscopy	3(5)	0	2(2)	5(7)
3	Laser	3(5)	0	3(4)	6(9)
4	X-rays	3(4)	2(3)	1(2)	6(9)
5	Spectroscopy	2(4)	2(2)	1(2)	5(8)
6	Temperature Measuring Devices	6(9)	4(6)	2(3)	12(18)
7	Plasma Physics	3(5)	0	2(2)	5(7)
8	Magnetism & Superconductivity	5(8)	3(5)	4(5)	12(18)
9	Interference	4(7)	3(3)	2(3)	9(13)
10	Thin film	2(3)	1(2)	1(1)	4(6)
	Total	39	19	22	80

Mrs.Y.D.Bhide
Prepared By

(A S Zampure)
Secretary, PBOS

Mrs.N.S.Kadam
Chairman, PBOS

Programme : Diploma in CE/ME/MT/EE
Programme Code : 01/04/05/21/24/15/18/19
Name of Course : Workshop Practice
Course Code : WS281

Teaching Scheme:

	Hours/Week	Total Hours
Theory	NIL	NIL
Practical	04	64

Evaluation Scheme:

	Progressive Assessment	Semester End Examination		Oral	Term Work
		Theory	Practical		
Duration	---	---	---	---	---
Marks	---	---	---	---	50

Course Rationale: To make the students conversant with the use of various workshop tools used in smithy, carpentry, fitting, welding ,plumbing and sheet metal shops.

Course Objectives:

After studying this course, the student will be able to
- Interpret the assigned job drawing.
- Identify various tools used in different shops of Work shop.
- Select appropriate tool set to perform a specific job.
- Acquire skills to use various tools.
- Take care and maintain the tools.
- Do practices in respective trades.
- Adopt safe practices during working.

List of Practicals/Experiments/Assignments:

Sr. No.	Name of topic/Subtopic	Hrs.
1	Demonstration of job involving minimum three operations. e.g. Upsetting, Drawing Down, Bending, Setting down.	08
2	One carpentry job involving carpentry joints and wood turning.	14
3	One fitting job involving Marking, Filing, Sawing, Drilling, Tapping.	14
4	One welding job involving welding joints.	14
5	One job in plumbing of pipe threading and pipe joints.	06
6	One job in sheet metal	08
	Total	64

Instructional Strategy :

Sr. No.	Topic	Instructional strategy
1	Smithy and forging	Explanation, Demonstration, exhibition of Models/Samples pieces.
2	Carpentry	
3	Fitting and filling	
4	Welding	
5	Plumbing	
6	Sheet Metal	

Reference Books :

Sr. No.	Author	Title	Publication
1	S. K. Hajara Chaudhari A.K. Hajara Chaudhari	Elements of Workshop Technology - Vol. I	Media Promoters and Publishers Pvt. Ltd., Mumbai-7
2	V. Kapoor	Workshop Practice Manual	Dhanpat Rai and Sons, New Delhi-32
3	B.S. Raghuwanshi	A course in Workshop Technology Vol.- I	Dhanpat Rai and Sons, New Delhi-32

Learning resources: Demonstration kit, charts, models/sample pieces and books.

Specification Table :

Sr. No	Topic	Knowledge	Imitation	Manipulation	Perfection	Total
1	Smithy and forging	5	---	---	---	5
2	Carpentry	3	2	3	2	10
3	Fitting and filling	3	2	3	2	10
4	Welding	3	2	3	2	10
5	Plumbing	3	2	3	2	10
6	Sheet Metal	5	---	---	---	5
	Total	25	25	25	25	50

Prepared By

(C. Y. Shingan)
Workshop
Superintendent

(A S. Zampure)
Member Secretary,
PBOS

(N.S.Kadam)
Chairman, PBOS