

Government Polytechnic, Mumbai

(Academically Autonomous Institute of Maharashtra Government)
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For 2017 onwards as
Students.

Programme : Civil Engineering

Second Semester

With effect from 2016-17 2017-18

Course code	Course Title	Teaching Hours				Credits	Examination Scheme					
		L	P	TU	Total		Theory		PR	OR	TW	Total
							TH	TS				
HU16102	Communication Skill	---	---	2	2	2				50*		50
SC16104	Engineering Physics	3	2	---	5	5	70	30			50	150
SC16108	Mathematics II	3	---	1	4	4	70	30				100
CE16201	Building Construction	3	4	---	7	7	70	30		50	25	175
AM16201	Engineering Mechanics	3	2	---	5	5	70	30		25*	25*	150
CE16202	Surveying	3	4	---	7	7	70	30		50*	25	175
CE16203	Building Drawing	1	4	---	5	5				50*	50	100
	TOTAL	16	16	3	35	35	350	150	100	125	175	900

Abbreviations: L - Theory Lecture; P-Practical; TU-Tutorial; TH-Theory Paper; TS-Term Tests (02); PR-Practical Exam; OR-Oral Exam; TW-Term Work.

* Indicates assessment by External Examiner

G.P.

Academic co-ordinator
Government Polytechnic Mumbai

17-3-17

Head of Department
(Civil Engineering)

P.P. Bahadur

Principal
Government Polytechnic Mumbai

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Academic Co-ordinator
G. P. Mumbai

ReSubmitted to
exam cell

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18/3/17

Programme : CE/ME/EC/CO/IF/IS/EE/LG/LT/RT									
Course Code: HU16102				Course Title: Communication Skills					
Compulsory / Optional: Compulsory									
Teaching Scheme and Credits				Examination Scheme					
TH	TU	PR	Total	TH	TS	PR	OR	TW	Total
	2	-	2	-	-	-	50*	-	50

*External Examiner

Rationale:

The medium of instruction in the technological field is English, so it is necessary for the students of Engineering and Technology to learn and express through English language. These students are the future technicians, must be able to face the interview, handle the questions and present them in a proper way, acquire confidence to participate in the group discussion, introduced with the modern communication technology and be able to use these Medias for effective communication.

Course Outcomes:

Student should be able to

CO1	Develop the ability of listening and conversation skills.
CO2	Learn the social etiquettes and manners.
CO3	Acquire the practical knowledge of interview.
CO4	Participate in group discussion.
CO5	Identify the need of public speech and new techniques of communication.
CO6	Enable the students to be a good team leader

Course Content Details:

Unit No	Topics / Sub-topics
1	Listening Skills : Importance of good listening, Types of listening, Effective listening, How to overcome the obstacles in good listening
2	Social etiquettes : Business ethics, Telephone / Mobile etiquettes, E-mail etiquettes, Table manners & respect, Small talk and punctuality
3	Conversation skills : How to begin the conversation, Proper use of body language, Tone, voice and pauses, Use of proper grammar and words, How to end the conversation
4	Interview Skills : Introduction, Types of Interview, Preparing for an interview, Mock interview

5	Group Discussion : Need and importance of group discussion, Emotional stability, Communication with knowledge, Logical conclusion, Role of moderator in the group discussion
6	Public Speech : Welcome Speech, Farewell Speech, Guest's introduction, Vote of thanks

Sr. No.	Unit	Experiment/Assignment	Approx. Hours
1	1	Development of listening skills.	02
2	1	Teacher will read out a passage thrice. And the students will listen carefully following the guidelines and answer the questions.	04
3	2	Presentation of conversation on telephone / mobile (2 students)	04
4	2	Presentation of table manners and etiquettes.	04
5	3	Conversation on the given situation	04
6	4	Mock interview (6 students)	04
7	5	Group Discussion (6 students + 1 moderator)	04
8	6	Public speech	01
9	6	Presentation of welcome and farewell speech	02
10	6	Guest's introduction speech and vote of thanks	02
Total			32

References/Books


Sr.No.	Author	Title	Publication
1	Meenakshi Raman Sangita Sharma	Communication Skills	Oxford Higher Education
2	Homai Pradhan D.S.Bhende Vijaya Thakur	Business Communication	Himalaya Publishing House
3	Curriculum Development Centre	A Course in Technical English	Somaiya Publications Pvt.Ltd.

Course Curriculum Development Committee:**a. Internal Faculty**

- 1) Smt. S.S. Kulkarni
- 2) Mrs. K.S. Pawar

b. External Faculty :- 1) Mr. Sandeep Barde


Academic Coordinator
(R.A. Patil)


Head of Department
(Science)
(Dr. A.U. Wasad)


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CO VS. PO Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
1	1	2	2	1	3	3	3	3	3	3
2	1	1	1	1	3	3	3	3	3	3
3	1	1	2	2	2	3	3	3	3	3
4	1	1	1	2	3	3	3	3	3	3
5	2	2	2	2	3	3	3	3	3	3
6	2	2	2	2	3	3	3	3	3	3

CO Vs PSO Matrix

Civil Engg.

CO/PSOs		PSO1	PSO2	PSO3
CO1	Develop the ability of listening and conversation skills.	1	2	3
CO2	Learn the social etiquettes and manners.	2	2	3
CO3	Acquire the practical knowledge of interview.	1	2	3
CO4	Participate in group discussion.	1	2	3
CO5	Identify the need of public speech and new techniques of communication.	2	2	3
CO6	Enable the students to be a good team leader	2	2	3

Unit Number and COs

Sr. No.	Unit No	Topic Title	COS
1	1	Listening	CO1
2	2	Social etiquettes	CO2
3	3	Conversation skills	CO1, CO6
4	4	Interview Skills	CO3
5	5	Group Discussion	CO4
6	6	Public Speech	CO5, CO6

Programme : Diploma in CE/EE/EC/ME/CO/IF/IS/LG/LT/RT Engineering									
Course Code: SC16104				Course Title: Engineering Physics					
Compulsory / Optional: Compulsory									
Teaching Scheme and Credits				Examination Scheme					
TH	TU	PR	Total	TH	TS	PR	OR	TW	Total
3	-	2	5	70 (3 Hrs.)	30	-		50	150


Rationale:

The subject is included under the category of science. The special feature of the subject is to develop the laboratory skill using principles of scientific phenomenon. This course will serve to satisfy the need of the technical student for his development in technical field. Deep thought is given while selecting the topics related to all programmes which will develop intellectual skills of the students. Ultimately the focus of the course is on psychomotor skill.

Course Outcomes:

After the completion of course, students will be able to

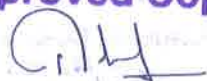
CO1	Know the physical quantities accurately, to measure using different instruments and to interpret the results from observations and calculations.
CO2	Know the physical properties of the various materials that are used by the engineer and to understand the principle and laws of physics.
CO3	Know the basic facts in Physics viz, force, elasticity, viscosity, surface tension, waves and light and to apply the knowledge to correlate the properties of materials, their engineering uses and applications.
CO4	Classify and develop laboratory skills including the use of variety of physics apparatus, the compilation of data, its interpretation and analysis.
CO5	Achieve refined presentation skills through the presentation of coherent and comprehensible written accounts of laboratory work.

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Course Content Details:

Unit No	Topics / Sub-topics
1	Physical Measurements and Units <p>1.1 Fundamental Physical quantities, examples.</p> <p>1.2 Derived physical quantities, examples.</p> <p>1.3 Definition and requirements of unit</p> <p>1.4 System of units, C. G. S., M. K. S. and S. I. units.</p> <p>1.5 Rules to write the unit and conventions of units and numerical.</p> <p>1.6 Error – Definition, types of errors and minimization of errors.</p>
2	Motions: <p>2.1 Linear motion –Definition, equation of motions: $v = u + at$, $s = ut + \frac{1}{2}at^2$, $v^2 = u^2 + 2as$ and numerical.</p> <p>2.2 Periodic motions- a) Oscillatory motion, b) Vibratory motion, c) Spin motion, d) S.H.M. (only definition and examples), e) Circular motion.</p> <p>2.3 Circular motion :</p> <p>a) Introduction of the terms: Time period, frequency, amplitude, wavelength, phase. Uniform circular motion, Radius vector, linear velocity, Angular velocity , Angular acceleration,</p> <p>b) Relation between linear velocity and angular Velocity, Radial or centripetal acceleration (derivation), Three equations of motion (no derivations) Centripetal and Centrifugal force, examples and applications.</p> <p>c) Banking of Roads, its necessity and applications. Numericals based on the topic</p>
3	General Properties of Matter: <p>3.1 Elasticity:</p> <p>3.1.1 Elastic, plastic and rigid substances, their examples.</p> <p>3.1.2 Types of deformations.</p> <p>3.1.3 Definition of elasticity, stress, strain and its types.</p> <p>3.1.4 Hooke's Law and elastic limit.</p> <p>3.1.5 Stress versus Strain curve when the wire is under continuously increasing stress, yield point, breaking point.</p> <p>3.1.6 Young's Modulus, bulk modulus and modulus of rigidity – Definition, explanation and numerical.</p>

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	<p>3.1.7 Factor of safety.</p> <p>3.1.8 Applications of elasticity.</p> <p>3.2 Viscosity :</p> <p>3.2.1 Concept and Definition of viscosity, velocity gradient.</p> <p>3.2.2 Newton's law of viscosity, Co-efficient of viscosity, unit of viscosity</p> <p>3.2.3 Stokes' law, terminal velocity, derivation of Stokes' formula.</p> <p>3.2.4 Streamline flow, turbulent flow, critical velocity, examples.</p> <p>3.2.5 Reynolds' number and its significance.</p> <p>3.2.6 Applications of viscosity and numerical.</p> <p>3.3 Surface Tension :</p> <p>3.3.1 Concept of surface tension.</p> <p>3.3.2 Adhesive and cohesive forces, examples.</p> <p>3.3.3 Laplace's Molecular theory of surface tension</p> <p>3.3.4 Angle of contact, its significance.</p> <p>3.3.5 Expression for surface tension by capillary rise method.</p> <p>3.3.6 Effect of impurity and temperature.</p> <p>3.3.7 Applications of surface tension.</p> <p>3.3.8 Numericals.</p>
4	<p>Sound and Acoustic :</p> <p>4.1 Sound Waves :</p> <p>4.1.1 Wave motion, types of waves – progressive, longitudinal and transverse waves.</p> <p>4.1.2 Characteristics of longitudinal and transverse waves and comparison.</p> <p>4.1.2 Free or natural vibrations and forced vibrations, resonance – definition and examples.</p> <p>4.1.3 Newton's formula for velocity of sound and Laplace's correction.</p> <p>4.1.4 Effect of temperature , pressure & humidity on velocity of sound and numerical.</p> <p>4.1.5 Determination of velocity of sound by resonance method.</p> <p>4.2 Acoustics :</p> <p>4.2.1 Definition of echo, reverberation , reverberation time and acoustic</p> <p>4.2.2 Sabine's formula for reverberation time no (derivation)</p> <p>4.2.3 Factors affecting acoustics of sound.</p> <p>4.2.4 Acoustical planning of building.</p> <p>4.2.5 Numericals.</p>

5	<p>Optics and Optical Fibers :</p> <p>5.1 Optics :</p> <ul style="list-style-type: none"> 5.1.1 Revision of reflection and refraction of light. 5.1.2 Laws of refraction, Snell's law. 5.1.3 Determination of refractive index. 5.1.4 Dispersion, dispersive power, Prism formula (no derivation) 5.1.5 Critical angle, Total internal reflection. Examples and applications. 5.1.6 Numericals. <p>5.2 Optical Fibers :</p> <ul style="list-style-type: none"> 5.2.1 Principle of propagation of light through optical fiber. 5.2.2 Structure of optical fiber. 5.2.3 Concept of numerical aperture and acceptance angle (formula). 5.2.4 Types of optical fiber. 5.2.5 Method of production of optical fiber. 5.2.6 Applications (electronics and medical) and comparison with electrical cable for communication.
6	<p>Nanotechnology, Laser and Ultrasonic:</p> <p>6.1 Nanotechnology :</p> <ul style="list-style-type: none"> 6.1.1 Introduction to nanotechnology. 6.1.2 Definition of nanoscale, nanometer and nanoparticles, nanotechnology. 6.1.3 Definition and examples of nanostructured materials. 6.1.4 Methods of production of nanomaterial- <ul style="list-style-type: none"> a. Top down approach. b. Bottom up approach. 6.1.5 Techniques for the measurement of nanoparticles. 6.1.6 Applications of nanotechnology in different fields - <ul style="list-style-type: none"> a. electronics, b. automobile, c. medical, d. textile, e. cosmetics, e. environmental, f. space and defense. <p>6.2 LASER and Ultrasonic :</p> <p>a) LASER</p> <ul style="list-style-type: none"> 6.2.1a) LASER introduction, 6.2.1b) Properties of laser, 6.2.1c) Spontaneous and stimulated emission, 6.2.1d) Population inversion, Optical pumping, 6.2.1e) Types of LASER, He-Ne Laser- construction and method of production. 6.2.1f) Applications of LASER.

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	b) Ultrasonic: 6.2.2a) Ultrasonic waves and infrasonic waves. 6.2.2b) Audible range of soundwave, 6.2.2c) Piezoelectric effect and magnetostriction effect. 6.2.2d) Methods for the production of ultrasonic wave (any one), 6.2.2e) Properties of ultrasonic wave. 6.2.2f) Applications for distance measurement, hidden flaws detection, signaling, drilling holes, metal cutting.
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Suggested Specifications Table with Hours and Marks (Theory):

Unit No	Topic Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
1	Physical Measurements and Units	6	2	2	4	8
2	Motion	8	2	4	2	12
3	General properties of matter	10	3	3	2	15
4	Optics and Fiber optics	8	3	3	2	12
5	Sound and Acoustics	6	3	3	2	8
6	Nano Technology, Laser and Ultrasonic.	10	3	3	2	15

Legends: R- Remember; U-Understand; A- Apply and above levels (Bloom's revised Taxonomy).

Notes: This specification table shall be treated as a general guideline and actual distribution of marks may slightly vary from table. But the questions from each topic should be asked as per marks weightage. Numerical questions are to be asked only if specified.

List of experiments/Assignments:

(Minimum **TEN** experiments should be completed by each student)

Sr. No.	Unit	Experiment/Assignment	Approx. Hours
1	1	To measure the dimensions of given objects and to determine their volume using Vernier caliper.	2
2	1	To measure the dimensions of given objects and to determine their volume using micrometer screw gauge.	2
3	2	To determine Acceleration due to gravity by simple pendulum	2
4	3	To determine coefficient of viscosity of liquid by Stokes' method.	2
5	3	To determine coefficient of viscosity of liquid by Poiseuille's method.	2
6	3	To determine the surface tension of liquid using capillary rise method.	2
7	3	To determine the Young's modulus of elasticity of wire using Young's apparatus.	2
8	4	To determine refractive index by pin method.	2

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9	4	To determine refractive index by total internal reflection.	2
10	4	To determine refractive index using spectrometer	2
11	5	To determine velocity of sound by resonance method.	2
12	5	To determine sound absorption coefficient of different materials.	2
13	6	Flaws detection using ultrasonic waves.	2
14	6	Experiments on LASER	2
15	6	To plot the characteristics of photo cell.	2
16	All	Showing Video on different applications related to units,	2
Total			32


Notes: If possible videos should be shown on different topics- especially on topics – LASER, Ultrasonic, TIR, Refractive index and on spectra.


References/ Books:

Sr.No.	Name of Book	Author	Publisher
1	Applied Physics	Manikpure&Deshpan de	S.Chand& Company
2	Applied Physics	B.G.Bhandarkar	Vrinda Publication
3	Optics & Optical Fibers	BrijlalSubhramanya	
4	Engineering Physics	Gaur and S.L.Gupta	S.Chand& Company
5	Resnick and Halliday	Physics	Tata McGraw Hills
6	H.C.Varma	Physics part I & II	
7	D.S.Mathur	Properties of Matter	
8	Dr. A. U. Warad	Basic Physics	

Course Curriculum Development Committee:

- i. **Internal Faculty:-** Prof. A. V. Pagar
- ii. **External Faculty :-** Mrs. B. J. Choudhary


Academic Coordinator
(R. A. Patil)


Head of Department
(Science)
(Dr. A. U. Warad)


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CO Vs PO matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	2	2	1	1	-	-	-	-	-	-
CO2	1	2	2	1	-	-	-	-	-	-
CO3	3	2	2	3	-	-	-	-	-	-
CO4	2	2	3	1	-	-	-	-	-	-
CO5	1	1	1	-	-	1	-	-	-	-

CO Vs PSO matrix

Civil Engg:

CO/PSOs		PSO1	PSO2	PSO3
CO1	Know the physical quantities accurately, to measure using different instruments and to interpret the results from observations and calculations.	1	--	--
CO2	Know the physical properties in the various materials that are used by the engineer and to understand the principle and laws of physics.	--	--	--
CO3	Know basic facts in Physics viz, force, elasticity, viscosity, surface tension, waves and light and to apply knowledge to correlate the properties of materials, their engineering uses and applications.	1	--	--
CO4	Classify and develop laboratory skills including the use of variety of physics apparatus, the compilation of data, its interpretation and analysis.	--	1	--
CO5	Achieve refined presentation skills through the presentation of coherent and comprehensible written accounts of laboratory work.	--	1	--

Unit Number and COs

Sr. No.	Unit No.	Topic Title	COs
1	1	Physical Measurements and Units	CO1,CO4,CO5
2	2	Motion	CO1,CO3,CO4
3	3	General properties of matter	CO1,CO2,CO3,CO4
4	4	Optics and Fibre optics	CO2,CO3,CO4
5	5	Sound and Acoustics	CO2,CO3,CO4
6	6	Nano Technology, Laser and Ultrasonic.	CO2,CO3,CO4

Programme Code: CE/ME/ EE/IS/EC/CO/IF/RT									
Course Code:SC16108				Course Title: Mathematics-II					
Compulsory / Optional: Compulsory									
Teaching Scheme and Credits				Examination Scheme					
TH	TU	PR	Total	TH	TS	PR	OR	TW	Total
3	1	-	4	70 (3 Hrs.)	30	-	-	-	100

Rationale:

The study of mathematics is necessary to develop in the student, the skills essential for Studying engineering subjects. The subject is an extension of basic mathematics of first semester, which is a pre requisite, for engineering studies.

Course Outcomes:**Student will be able to:**

CO1	Define the basic principles of function, limits, derivatives, complex number and relations between two variables.
CO2	Apply rules, concept and properties to solve the problems.
CO3	Classify various types of statistical data.

Course Content Details:

Unit No	Topics / Sub-topics
1	1. <u>Function</u> 1.1 Concept of function, domain and range, 1.2 Type of functions (Only definitions).
2	2. <u>Limit</u> 2.1 Concept of limit 2.2 Limit of Algebraic, Trigonometric, Logarithmic and Exponential functions with simple example.
3	3. <u>Derivatives</u> 3.1 Definition of the derivative. 3.2 Derivatives of standard function.(No proof by first principle) 3.3 Differentiation of sum, difference, product and quotient of two or more functions 3.4 Differentiation of composite, inverse, implicit, parametric, exponential and logarithmic functions with simple example. 3.5 Second order derivative.
4	4 <u>APPLICATION OF DERIVATIVES</u> 4.1 Geometrical meaning of derivative 4.2 Tangents & Normals to the curve, 4.3 Maxima & minima of the functions 4.4 Radius of Curvature.

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5	5. <u>STATISTICS</u> 5.1 Basic definitions-raw data, variate, frequency, cumulative frequency 5.2 Classification of data, class interval, mid value, length of the interval 5.3 Measure of central tendency – (mean, median & mode) 5.4 Mean deviation, Standard deviation, Coefficient of variance
6	6. <u>Complex number</u> 6.1 Definition & Algebra of complex numbers 6.2 Geometrical representation of complex number 6.3 Modulus & amplitude of complex number 6.4 Polar form of complex number 6.5 De Moivre's theorem (no proof), roots of complex number 6.6 Exponential form of complex number, Circular & Hyperbolic functions of complex numbers, relation between Circular & Hyperbolic functions, real & imaginary parts of Circular & Hyperbolic functions
7	7. <u>Numerical Analysis</u> 7.1 Solution of Algebraic equations using – i) Bisectional method ii) Regular – Falsi method, iii) Newton- Raphson method 7.2 Solution of simultaneous equation (i) Gauss elimination method (ii) Jacobi's method (iii) Gauss-Seidal method

Suggested Specifications Table with Hours and Marks (Theory):

Unit No	Topic Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
1	Function	04	02	02	00	04
2	Limits	08	04	02	04	10
3	Derivatives	13	04	04	06	14
4	Application of derivatives	07	00	04	04	08
5	Statistics	12	04	04	06	14
6	Complex number	12	02	04	04	10
7	Numerical analysis	08	02	04	04	10
Total		48	18	24	28	70

Legends: R- Remember; U-Understand; A- Apply and above levels (Bloom's revised Taxonomy).

Notes: This specification table shall be treated as a general guideline and actual distribution of marks may slightly vary from table. But the questions from each topic should be asked as per marks weightage. Numerical questions are to be asked only if specified.

List of Tutorials:**Note:** 1) Tutorials are to be used to get enough practice.

2) Make group of 20 student and for each group minimum 10 problems are to be given.

Sr. No.	Unit	Tutorials	Approx. Hours
1	1	Function	01
2	2	Limits	02
3	3	Derivatives	01
4	3	Derivatives	02
5	3	Derivatives	01
6	4	Application of derivatives	01
7	5	Statistics	01
8	5	Statistics	02
9	6	Complex number	01
10	6	Complex number	02
11	7	Numerical analysis.	02
Total			16

References/ Books:


Sr.No.	Name of Book	Author	Publisher
1	Mathematics for polytechnic students	S.P. Deshpande	Pune VidyarthiGrahaPrakashan
2	Mathematics for polytechnic students (Volume I)	H. K. Das	S.ChandPrakashan
3	Companion to basic maths	G. V. Kumbhojkar	PhadkePrakashan
4	Applied Maths	N. Raghvendra Bhatt Late Shri R Mohan Singh	Tata McGraw Hill Publication


Course Curriculum Development Committee:**a. Internal Faculty**

- Miss.J.J.Ratnanai.
- Mr.V.S.Patil

b. External Faculty

- Prof. P. S. Dave


Academic Coordinator
(R. A. Patil)


Head of Department
(Science)
(Dr. A. V. Wasekar)


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Programme : Diploma in Civil Engineering									
Course Code: CE16201				Course Title: Building Construction					
Compulsory / Optional: Compulsory									
Teaching Scheme and Credits				Examination Scheme					
TH	TU	PR	Total	TH	TS	PR	OR	TW	Total
3	-	4	7	70 (3 Hrs.)	30	-	50	25	175

*External Examiner

Rationale:

Building construction is a core course in civil engineering. This course is intended for gaining useful knowledge with respect to facts, concepts, principles and procedures related to building construction system so that student can effectively plan, execute quality building construction work.

The course helps to learn building materials required for construction. It provides necessary knowledge about properties, uses of building materials.

Course Outcomes:

Student should be able to

CO1	Identify the types of structures and list out building components.
CO2	Select appropriate construction materials required for various building components.
CO3	Set the layout of the building structure on ground.
CO4	Classify types of foundations, masonry, doors, windows, lintels, arches, floors, roofs, finishing works.
CO5	Supervise various operations in construction of buildings of medium sized projects.

Course Content Details:

Unit No	Topics / Sub-topics
1	Building Structures And Components : 1.1 Types of Structures - Load bearing structures, Framed structures, composite structures 1.2 Components of building - 1.2.1 Substructure - foundation, Plinth, DPC and their functions 1.2.2 Superstructure - walls, Sill, lintel, Doors & Windows, Floor, roof, parapet, slab, beams, columns and their functions
2	Construction Materials : 2.1 Timber - Use of timber in different parts of building. Industrial timber 2.2 Plastics -Definition, advantages, use of typical plastics in construction. 2.3 Asbestos - Commercial forms of Asbestos with special reference to Asbestos roofing sheets, Asbestos cement pipe and their uses. 2.4 Polymers - use of polymers in construction.
3	Construction of sub structure : 3.1 Setting layout of building - Site clearance, Preparing job layout for load bearing structure and framed structure by centre line method and face line method. Precautions

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	<p>while marking layout on ground.</p> <p>3.2 Excavation of foundation, timbering and strutting for foundation trench, dewatering of foundation, tools and plants used for excavation.</p> <p>3.3.1 Foundation - Definition, Purpose, types, requirement of good foundation.</p> <p>3.3.2 Shallow foundations and its suitability - Wall footings, isolated column footing, combined column footing, stepped foundation, raft foundations.</p> <p>3.3.3 Deep foundations and its suitability - Pile foundation, well foundation and caisson.</p> <p>3.4 Foundation on black cotton soils - Precautions to be taken while constructing foundation in black cotton soil.</p>
4	<p>Construction of Superstructure :</p> <p>4.1 - Masonry Work :</p> <p>4.1.1 Stone masonry - Terms used in stone masonry- facing, backing, hearting, through stone, cornice etc. Type of stone masonry: Rubble masonry, Ashlar Masonry and their types. Requirements of good building stone, expansion joints in stone masonry their purpose.</p> <p>4.1.2 Brick masonry -Terms used in brick masonry- bond, joints, lap, frog, line, level and plumb. Bonds in brick masonry- header bond, stretcher bond, English bond and Flemish bond (half brick wall, one brick wall, one & half brick wall). Requirements of good brick masonry, expansion joints in brick masonry their purpose.</p> <p>4.1.3 Comparison between stone masonry and Brick Masonry.</p> <p>4.1.4 Tools and plants required for construction of stone masonry and brick masonry.</p> <p>4.1.5 Introduction to cavity wall, hollow concrete block masonry, composite masonry, fly ash brick masonry and light weight masonry.</p> <p>4.1.6 Scaffolding: Necessity, component parts and types of Scaffolding, Scaffolding and platforms used for multi storied building</p> <p>4.2 - Doors and windows :</p> <p>4.2.1 Door & window frames, location of Doors and Windows, various sizes of doors and windows for residential and public buildings.</p> <p>4.2.2 Types of doors: Panelled, glazed, flush, collapsible, revolving doors, rolling shutters, turnstile.</p> <p>4.2.3 Types of windows: Casement, Panelled, Steel, Aluminum, Sliding, louvered window, Grills and Ventilators.</p> <p>4.2.4 Fixture and Fastening for doors, windows Sill,</p> <p>4.2.5 lintel - types and function</p> <p>4.2.6 Arch – technical terms used, types and function.</p> <p>4.3 Vertical Communications :</p> <p>4.3.1 Introduction to vertical communications and its suitability: Stairs, lift/ Elevators, Escalators, Ramp, travelator.</p> <p>4.3.2 Terms used in stair- Step, riser, tread, flight, Winder, Kite step, landing, soffit, pitch, Newel posts, hand rail, balustrade, head room.</p> <p>4.3.3 Types of stairs: straight, quarter turn, half turn, open well, doglegged, spiral, bifurcated, circular, sketch and suitability, Requirements of good staircase, thumb rule for stair design.</p>
5	<p>Floors and Roofs :</p> <p>5.1 Classification of floors – basement, ground, mezzanine, upper (Purpose, location and use)</p>

	<p>5.2 Types of floors - Mud floor, wood floor, stone floor, concrete floor (construction and suitability).</p> <p>5.3 Types of floor finishes - Shahabad, Kota, marble, granite, kaddappa, ceramic, vitrified, marbonite, chequered tiles.</p> <p>5.4 Pavement blocks, tremix floors, skirting and dado</p> <p>5.5 Types of roofs - Pitched roofs and Flat roof : Terms used, lean to roof, king post truss, queen post truss, roofing tiles, their types and their suitability</p> <p>5.6 Comparison between pitched and flat roof. Self supporting roof, tensile sheet roof.</p>
6	<p>Finishing works :</p> <p>6.1 Plastering - Necessity, pre-construction preparation, single coat, double coat, rough finish, sponge finish, neeru finish, POP, pebble finish and stucco plaster. Precautions to be taken while plastering. Defects in plastering, methods for curing.</p> <p>6.2 Pointing - Necessity, types and procedure of pointing.</p> <p>6.3 Painting & coating - Necessity, selecting suitable material. Surface preparation for painting to wall, timber, steel. Types of painting white wash, colour wash, oil bound, distemper, plastic emulsion, oil paint, cement paint. Defects in painting. Number of coats in painting. Procedure for repainting after repairs. Surface preparation for steel for painting (SA grades of surface preparation SA1.5), thickness of coating and alcometer.</p>
7	<p>Form work and centering :</p> <p>7.1 Meaning of different terms, Necessity, materials used in form work and centering, stripping time of form work. Centering for beam, columns and slab.</p> <p>7.2 Requirements of goods form work.</p> <p>7.3 Form work release agents.</p>

Suggested Specifications Table with Hours and Marks (Theory):

Unit No	Topic Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
1	Building Structures And Components	04	02	02	-	04
2	Construction Materials	08	02	06	-	08
3	Construction of sub structure	10	04	08	06	18
4	Construction of Superstructure	12	06	06	08	20
5	Floors and Roofs	04	04	04	-	08
6	Finishing works	06	04	04	-	08
7	Form work and centering	04	02	02	-	04
Total		48	24	32	14	70

Legends: R- Remember; U-Understand; A- Apply and above levels (Bloom's revised Taxonomy).

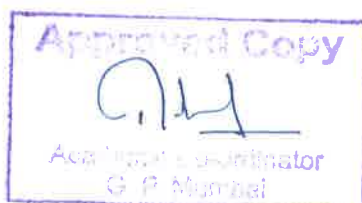
Notes: This specification table shall be treated as a general guideline and actual distribution of marks may slightly vary from table. But the questions from each topic should be asked as per marks weightage. Numerical questions are to be asked only if specified.

List of experiments/Assignments:

Sr. No.	Unit	Experiment/Assignment	Approx. Hours
1	1	To visit the institute building to study different components of building, types of Structures, etc.	04
2	2	Observing the models, specimen of building material kept in the model room for few building items. Report writing.	04
3	2	To visit construction material manufacturer / shops for availability of different construction materials in market & their rates. Report writing.	04
4	3	To set out Foundation Plan on ground for load bearing structure.	02
5	3	To set out foundation plan on ground for framed structure.	02
6	3,6	To visit building construction site to understand construction of substructure.	08
7	4	To visit building construction site to understand construction of super structure, plastering and painting work.	08
8	Sketches to be drawn on drawing sketch book :		
	4	a. Stone masonry - Uncoursed rubble, coursed rubble, Ashlar, random rubble and dry- stone masonry. (Elevation, sectional plan)	04
	4	b. Brick masonry - Plans & elevation of English bond and Flemish bond for one, one & half, two brick thick wall.	04
	4	c. Doors - Plan, elevation & section of fully panelled, glazed, flush, collapsible, revolving doors, rolling shutters.	04
	4	d. Window - elevation and section of a louvered window-centrally hung ventilator, glazed window and window with aluminum frame and sliding glass shutter.	04
	4	e. Stairs (Plans only) : straight, quarter turn, half turn, open well, doglegged, spiral, bifurcated, circular.	08
	5	f. Lean to roof, King post roof truss and queen post roof truss (elevations only).	04
9	7	Group activity of model making like scaffolding, formwork, centering. (Any one)	04
Total			64

References/ Books:

Sr. No.	Name of Book	Author	Publisher
1	Building Construction	Shushil Kumar	Standard Publishers New Delhi.
2	Building Construction	B. C. Punmiya	Laxmi Publication Pvt. Ltd. New Delhi.
3	Building Construction	ASTM Handbook	Allies bookstall Poona - 4 & Engineering Book publishes, Company Pune - 16.
4	Building Construction	HMT Handbook	Charotar Publishing House



Course Curriculum Development Committee:**a. Internal Faculty**

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ii. Mrs. S. M. Male

iii. Ms. M. S. Sorde

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Academic Coordinator
 15-3-17


Head of Department
(Civil Engineering)


Principal
Govt. polytechnic Mumbai

Course Name: - Building Construction**Course Code: - CE 16201****CO Vs PO matrix**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	2	2	2	1	-	-	1	-	2	1
CO2	2	1	2	2	-	1	1	1	2	1
CO3	2	2	2	2	-	-	-	2	1	-
CO4	1	2	1	3	-	-	-	-	2	1
CO5	2	1	1	-	1	1	1	2	3	2

CO Vs PSO matrix

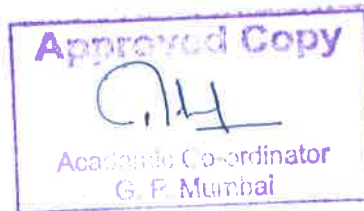
CO/POs		PSO1	PSO2	PSO3
CO1	Identify the types of structures and list out building components.	1	1	1
CO2	Select appropriate construction materials required for various building components.	1	-	1
CO3	Set the layout of the building structure on ground.	2	1	2
CO4	Classify types of foundations, masonry, doors, windows, lintels, arches, floors, roofs, finishing works.	1	1	1
CO5	Supervise various operations in construction of buildings of medium sized projects.	3	1	3

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Unit Number and COs

Sr. No.	Unit No.	Topic Title	COs
1	1	Building Structures And Components	CO1
2	2	Construction Materials	CO2,CO5
3	3	Construction of sub structure	CO1,CO2,CO3,CO4,CO5
4	4	Construction of Superstructure	CO1,CO2,CO4,CO5
5	5	Floors and Roofs	CO1,CO2,CO4,CO5
6	6	Finishing works	CO1,CO2,CO4,CO5
7	7	Form work and centering	CO2,CO5



Programme : Diploma in Civil/Mechanical/Electrical Engineering									
Course Code: AM16201				Course Title: Engineering Mechanics					
Compulsory / Optional: Compulsory									
Teaching Scheme and Credits				Examination Scheme					
TH	TU	PR	Total	TH	TS	PR	OR	TW	Total
3	-	2	5	70 (3 Hrs.)	30	-	25*	25*	150

* TW & OR shall be based on the practicals done during the semester

Rationale:

In day to day life we come across different structures and at times design of the structures analysis plays an important role. Perfect analysis is possible only when one knows the types and effect of forces acting on the structure. This subject provides knowledge about the different types of forces/loads and their effects while acting in different conditions/systems. It is a branch of Applied Science where laws of physics are applied to solve engineering problems. Broadly speaking Engineering Mechanics can be classified in two categories-Static and Dynamics. In this course, an attempt has been made to apply different laws of science to solve Statics and Dynamics problems. An attempt is also made to strengthen the knowledge of students, so as to make the path for applied technological subjects smoother and logical.

Course Outcomes:

Student should be able to

CO1	Identify the different forces & its effects on objects, motion of bodies, and friction with applications.
CO2	Apply the principles of equilibrium to Engineering problems
CO3	Compare & analyze the simple machines
CO4	Interpret the concept of centroid and centre of gravity
CO5	Analyze and solve the rectilinear & circular motion, work, energy and power problems

Course Content Details:

Unit No	Topics / Sub-topics
1	Simple Machines: 1.1 Definitions and formulae, if any, of simple machine, compound machine, load, effort, mechanical advantage, velocity ratio, input of a machine, output of a machine, efficiency of a machine, ideal machine, ideal effort and ideal load, load lost in friction, effort lost in friction

	<p>1.2 Analysis: Law of machine, maximum mechanical advantage and maximum efficiency of a machine, reversibility of a machine, condition for reversibility of a machine, self locking machine.</p> <p>1.3 Identification, use and velocity ratio for following simple machines : Simple axle and wheel, differential axle and wheel, Weston's differential pulley block, single purchase crab, double purchase crab, worm and worm wheel, geared pulley block, screw jack, calculation of mechanical advantage, efficiency</p>
2	<p>Force systems:</p> <p>2.1 Fundamentals and Force systems: Definitions of mechanics, Engineering mechanics, statics, dynamics, Kinetics, Kinematics, rigid body, classification of force system according to plane coplanar and non coplanar, sub classification of coplanar force system- collinear, concurrent, non concurrent, parallel, like parallel, unlike parallel, general etc. Definition of a force, S.I. unit of a force, representation of a force by vector and by Bow's notation method. Characteristics of a force, effects of a force, principle of transmissibility.</p> <p>2.2 Resolution of a force and Moment of a force: Definition, Method of resolution, along mutually perpendicular direction and along two given direction. Definition of moment, S. I. unit, classification of moments, sign convention, law of moments Varignon's theorem of moment and it's use, definition of couple, S.I. unit, properties of couple with example.</p>
3	<p>Composition of Forces:</p> <p>3.1 Analytical method: Definition of Resultant force, methods of composition of forces, Law of parallelogram of forces, Algebraic method for determination of resultant for concurrent and non concurrent, parallel coplanar force system.</p> <p>3.2 Graphical method: Space diagram, vector diagram, polar diagram, and funicular polygon. Resultant of concurrent and parallel force system only.</p>
4	<p>Equilibrium:</p> <p>4.1 Equilibrant and Lami's Theorem: Definition of equilibrant, relation between resultant and equilibrant, equilibrant of concurrent and non-concurrent force system. Analytical and graphical conditions</p>

	of equilibrium for concurrent, non-concurrent and parallel force system, free body and free body diagram. Statement and explanation of Lami's theorem, Application of Lami's theorem for solving various engineering problems.
5	<p>Friction:</p> <p>5.1 Definition:</p> <p>Friction, limiting frictional force, coefficient of friction, angle of friction, angle of repose, relation between angle of friction, angle of repose and coefficient of friction. Cone of friction, types of friction, laws of friction, advantages and disadvantages.</p> <p>5.2 Equilibrium of body on Horizontal and inclined plane:</p> <p>Equilibrium of body on horizontal plane subjected to horizontal and inclined force. Equilibrium of body on inclined plane subjected to forces applied parallel to the plane only. Concept of ladder fraction.</p>
6	<p>Centroid and Centre Of Gravity:</p> <p>6.1 Centroid:</p> <p>Definition of centroid. Moment of an area about an axis. Centroid of basic geometrical figures such as square, rectangle, triangle, circle, semicircle and quarter circle. Centroid of composite figure with not more than three geometrical figures.</p> <p>6.2 Center of gravity:</p> <p>Definition, center of gravity of simple solids such as cylinder, sphere, hemisphere, cone, cube, and rectangular block. Centre of gravity of composite solids with not more than Two simple solids. (Hollow solids are not expected.)</p>
7	<p>Dynamics</p> <p>7.1 Rectilinear motion:</p> <p>Velocity, average velocity, uniform velocity, speed, displacement, acceleration, retardation, motion under uniform acceleration & V-T diagram</p> <p>7.2 Curvilinear motion:</p> <p>Simple circular motion, Angular displacement, Angular velocity, Angular acceleration and retardation</p> <p>7.3 Work, power & energy:</p> <p>Workdone, force-displacement diagram Workdone in stretching the compound spring, Torque, workdone by torque.</p>

	I.H.P., B.H.P. of engine - Equation of H.P. in terms of torque and R.P.M. - Engineering Problems on it. Kinetic and potential energy & Engineering problems on it
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Simple numerical problems on all topics

Suggested Specifications Table with Hours and Marks (Theory):

Unit No	Topic Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
1	Simple Machines	06	02	04	04	10
2	Force Systems	06	02	02	04	08
3	Composition of forces	06	02	02	04	08
4	Equilibrium	06	02	02	04	08
5	Friction	06	02	04	04	10
6	Centroid and Centre Of Gravity	06	04	04	00	08
7	Dynamics	12	04	06	08	18
Total		48	18	24	28	70

Legends: R- Remember; U-Understand; A- Apply and above levels (Bloom's revised Taxonomy).

Notes: This specification table shall be treated as a general guideline and actual distribution of marks may slightly vary from table. But the questions from each topic should be asked as per marks weightage. Numerical questions are to be asked only if specified.

List of experiments/Practicals:

Sr. No.	Unit	Experiment	Approx. Hours
1	1	To find MA, VR, Efficiency, Ideal Effort, Effort lost in friction for various loads and establish law of machine. Calculate maximum efficiency and also check the reversibility of machines for the following: a. Differential axle and wheel b. Single purchase crab or Double purchase crab c. Weston's differential pulley block or worm geared pulley block d. Simple Screw jack	10
2	2	Verify law of moments.	02

3	4	Verify law of polygon of forces	02
4	4	Verify of Lami's theorem	02
5	4	Verify the Equilibrium of parallel forces – simply supported beam reactions	04
6	3	Graphical solutions for the following on A4 Size Graph Paper a. Concurrent force system : Two problems b. Parallel force system : Two problems Engineering/Numerical problems on work, power and energy	12
Total			32



Notes: If possible an industrial visit should be arranged or videos should be shown of different applications of this course.

References/ Books:

Sr. No.	Author	Title	Publisher
01	R.S.Khurmi	Engineering Mechanics	S. Chand & Company Ltd.
02	Shames and Rao	Engineering Mechanics	Pearson Education.
03	R.C.Hibbeler	Engineering Mechanics	Pearson Education.
04	S. Ramamrutham	Applied Mechanics	Dhanpat Rai & Sones, Delhi.

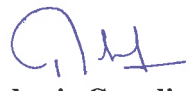
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b. External Faculty

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Academic Coordinator
(R. A. Patil)


Head of Department
(Civil Engineering)


Principal
Govt. Polytechnic Mumbai

Course Name:- Engineering Mechanics

Course Code:-AM16201

CO Vs PO matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO 1	3	3	3	3	1	1	1	1	1	3
CO 2	3	3	3	2	1	1	1	1	1	2
CO 3	3	3	3	3	1	2	1	1	1	3
CO4	2	2	1	1	1	1	1	1	1	1
CO5	2	1	1	1	1	1	1	1	1	1

CO Vs PSO matrix

Civil Engineering

CO/PSOs		PSO1	PSO2	PSO3
CO 1	Identify the different forces & its effects on objects, motion of bodies, and friction with applications.	3	3	1
CO 2	Apply the principles of equilibrium to Engineering problems	3	2	1
CO 3	Compare & analyze the simple machines	3	3	1
CO4	Interpret the concept of centroid and centre of gravity	3	2	1
CO5	Analyze and solve the rectilinear & circular motion, work, energy and power problems	3	2	1

Unit Number and COs

Sr. No.	Unit No.	Topic Title	COs
1	1	Simple Machines	1,2,3
2	2	Force Systems	1,2
3	3	Composition of forces	1,2
4	4	Equilibrium	1,2
5	5	Friction	1,2
6	6	Centroid and Centre Of Gravity	1,2,4
7	7	Dynamics	1,5

Programme : Diploma in Civil Engineering									
Course Code: CE16202				Course Title: Surveying					
Compulsory / Optional: Compulsory									
Teaching Scheme and Credits				Examination Scheme					
TH	TU	PR	Total	TH	TS	PR	OR	TW	Total
3	-	4	7	70 (3 Hrs.)	30	50*	--	25	175

*External Examiner

Rationale:

This is core technology subject, which is intended to teach the students core facts, concepts, principles, procedures in surveying and levelling. With this knowledge and skill, he will be able to choose appropriate surveying and levelling methods depending upon requirement to carry out survey work in Building Construction system, Transportation Engineering system, Environmental Engineering system and Irrigation Engineering system etc. It will also equip him while serving as investigator for design department, supervisor on the site of work, draftsman in the drawing office and estimator in the estimation office. A systematic study of this core subject along with the knowledge of different instruments will be very much useful to Diploma holder who is an important man on the field.

Course Outcomes:


Student should be able to

CO1	Operate survey instruments like tapes, compass, plane table, planimeter & level.
CO2	Carry out survey to locate details over a property/estate & find out its area.
CO3	Find out the reduced levels and difference in elevations between different points/objects/places.
CO4	Plot & prepare survey plans/maps & sections.

Course Content Details:

Unit No	Topics / Sub-topics
1	Introduction 1.1 Definition of surveying 1.2 Objects of surveying 1.3 Uses of surveying 1.4 Principles of surveying 1.5 Classification of survey – Primary and Secondary, primary - plane and geodetic; Secondary - Based on instruments used, Nature of field, objects of survey, methods employed. 1.6 Conventional symbols in survey plans/maps such as cutting, embankment, marshy land, road, railway, stream, river, bridge, tunnel, fencing, orchard, Cultivated land, transmission line, places of worship, etc.
2	Linear Measurement 2.1 Study and use of instruments for linear measurements Metric chain, Measuring Tapes and its types (metallic, steel and invar tape), least count of all tapes, laser meter. 2.2 Ranging- Definition, methods-Direct and indirect (Reciprocal) ranging, Ranging rods.

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	2.3 Chaining-Procedure on plane and sloping ground. Correction of linear measurement for incorrect length of chain/tape. (Simple problems)
3	Chain and Cross Staff Surveying 3.1 Chain triangulation–Survey stations and their selections, survey lines, base lines, check lines, tie lines. Taking offsets, long and short offsets, degree of precision in the measurement of offsets. Obstacles in chaining, methods to overcome them. 3.2 Cross staff-types, use. Optical square- Principle, types, use. Establishing a perpendicular, locating the foot of the perpendicular from an offset point. 3.3 Chain and cross staff survey – calculation of areas from the recorded observations.
4	Chain and Compass Survey 4.1 Prismatic Compass- Principle, Components, construction and use. 4.2 Bearing of lines – Meridian-True, Magnetic, Arbitrary, True bearing, Magnetic bearing and arbitrary bearing. Magnetic declination, dip of needle. Bearing of a line- Fore bearing, back bearing, Whole circle and quadrant bearing system, reduced bearing, conversion of bearing, finding included angle from bearing. 4.3 Compass traversing-Open and close traverse. Traversing methods – included angle method, entering the readings in field books, calculations of included angle and checks for corrections. Local attraction – reasons, precautions to be taken to avoid the local attraction, correction of bearing due to local attraction. Plotting of traverse, graphical adjustments for closing errors by Bowditch Rule.
5	Levelling 5.1 Definitions – level surface, level line, horizontal line, vertical line, datum surface, reduced level. Bench mark and its types, temporary, permanent, GTS, Arbitrary. 5.2 Auto level – components, line of sight, line of collimation, bubble tube axis, temporary adjustments, Levelling staff –Types 5.3 Terms used in levelling – fore sight, back sight, intermediate sight, change point, height of collimation. 5.4 Calculation of reduced levels – height of collimation method and rise and fall method, arithmetic checks, computation of missing readings. 5.5 Classification of leveling – simple levelling, differential levelling, fly levelling with single and double checks, Profile levelling and cross sectioning. 5.6 Sources of errors in levelling, precautions to eliminate the errors.
6	Plane Table Surveying 6.1 Principles of plane table survey. Accessories of plane table 6.2 Setting of plane table, centering and leveling. Orientation- Back sighting and Magnetic meridian. 6.3 Methods of plane table surveying – Radiation, intersection, traversing & resection. 6.4 Merits and demerits of plane table surveying. 6.5 Situations where plane table survey is preferred
7	Area Measurements 7.1 Polar Planimeter- Study, construction, use, Zero circle, numerical problems on area calculations. 7.2 Digital Planimeter- Study, use. Area measurement.

Suggested Specifications Table with Hours and Marks (Theory):

Unit No	Topic Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
1	Introduction	04	04	04	00	08
2	Linear Measurement	04	02	04	00	06
3	Chain and Cross Staff Surveying	06	00	04	04	08
4	Chain and Compass Survey	10	02	04	06	12
5	Levelling	12	06	06	08	20
6	Plane Table Surveying	08	04	06	00	10
7	Area Measurements	04	02	00	04	06
Total		48	20	28	22	70

Legends: R- Remember; U-Understand; A- Apply and above levels (Bloom's revised Taxonomy).

Notes: This specification table shall be treated as a general guideline and actual distribution of marks may slightly vary from table. But the questions from each topic should be asked as per marks weightage. Numerical questions are to be asked only if specified.

List of experiments/Assignments:

Sr. No.	Unit	Experiment/Assignment	Approx. Hours
1	2	Direct ranging and Reciprocal ranging.	2 hrs
2	2	Measurement of distances with chain and tape.	2 hrs
3	3	Chain and cross staff survey for finding out area of given field.	4 hrs
4	4	Calculation of included angles from the observed fore and back bearings.	4 hrs
5	4	Measuring fore bearings and back bearings of 5-6 sided polygon, identifying the station affected by local attractions and calculations of corrected bearings.	4 hrs
6	5	Simple levelling, recording the readings in levelling book, reduction of levels and arithmetic checks.	4 hrs
7	5	Differential levelling- precise recording in level book, reduction of levels and arithmetic checks including inverted staff readings.	2 hrs
8	5	Carrying bench marks from one point to another about 100 meters away by fly levelling with double check.	2 hrs
9	6	Plotting an area by radiation method of plane table survey.	4 hrs
10	6	Plotting an area by intersection method of plane table survey.	4 hrs
11	7	Measurement of Area of irregular figure by Polar Planimeter.	2 hrs
12	7	Measurement of Area of irregular figure by Digital Planimeter.	2 hrs
13	7	Introduction to softwares used in area measurement.	4 hrs
Total			40

List of Projects:

Sr. No.	Unit	Project	Approx. Hours
1	3	Chain and Compass traverse survey- A closed traverse of 5-6 sides for an enclosed building. Calculation of included angles, locating details and plotting them on a full imperial drawing sheet.	8 hrs
2	5	Profile levelling- Running a longitudinal section for a length of about 250 m with cross sections at 30m or 20 m centre to centre. The length of cross section may be 20m or 40 m on either side with staff readings at 10m interval. Spot levels should be taken at every 10m along the base line, plotting the L section and cross section on a full size imperial sheet.	8 hrs
3	6	Plane table survey – for minimum 5 side traverse enclosing building, showing all details like road, compound etc., using method of radiation and intersection on a full imperial drawing sheet. (Sheet to be drawn by each student separately)	8 hrs
Total			24

References/ Books:

Sr. No.	Name of Book	Author	Publisher
1	Surveying I and II	Punmia B.C.	Laxmi publication New Delhi
2	Surveying Vol. I	Kanetkar and Kulkarni	Pune Vidyarthi Gruha
3	Surveying	Gajare V.S	Nirali Prakashan Mumbai
4	Surveying	J.R. Muley	Vrinda Publication Jalgaon

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ii. Ms. M. S. Sorde

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i. Mrs. S. S. Kasulla (Lecturer, G.P. Thane)

ii. Mrs. Vijaya Bangale (SL Lecturer, VJTI, Matunga)

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Head of Department
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G. P. Mumbai

Course Name: - Surveying

Course Code: - CE16202

CO Vs PO matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	-	-	-	1	-	-	-	2	1	1
CO2	2	3	3	2	1	-	1	2	2	1
CO3	2	3	3	2	1	-	1	2	2	1
CO4	-	2	3	2	1	1	-	-	-	1

CO Vs PSO matrix

CO/POs		PSO1	PSO2	PSO3
CO1	Operate survey instruments like tapes, compass, plane table, planimeter & level.	3	-	1
CO2	Carry out survey to locate details over a property/estate & find out its area.	2	1	2
CO3	Find out the reduced levels and difference in elevations between different points/objects/places.	2	1	2
CO4	Plot & prepare survey plans/maps & sections.	1	2	1

Unit Number and COs

Sr. No.	Unit No.	Topic Title	COs
1	1	Introduction	CO2, CO4
2	2	Linear Measurement	CO1, CO2, CO4
3	3	Chain and Cross Staff Surveying	CO1, CO2, CO4
4	4	Chain and Compass Survey	CO1, CO2, CO4
5	5	Levelling	CO2, CO3, CO4
6	6	Plane Table Surveying	CO1, CO2, CO4
7	7	Area Measurements	CO2, CO4

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Programme : Diploma in Civil Engineering									
Course Code: CE16203				Course Title: Building Drawing					
Compulsory / Optional: Compulsory									
Teaching Scheme and Credits				Examination Scheme					
TH	TU	PR	Total	TH	TS	PR	OR	TW	Total
1	-	4	5	-	-	50*		50	100

*External Examiner

Rationale:

Drawing is a universal language of Engineers. It is a means of communication between owner, architect, engineer and contractor. An Engineer must be well conversant with drawings. It is the language through which Engineers can communicate with skilled, semiskilled and unskilled labours. The students have to use this subject to develop ability to read, understand and prepare drawings, to use it for different subjects during diploma course. Student will be taught to draw building structures and its various parts using conventions and symbols as per IS 962. Civil Engineer has to convert design parameters, process details into pictorial views. Therefore it is required to understand and prepare the drawings and interpret the drawings, so that, the work can be executed. Civil engineer should be competent to convert his ideas into the drawing. Drawings are essential for drafting specifications and tender documents. The knowledge of this course is useful for building construction, estimating and costing, design of structure, surveying, and projects.

Course Outcomes:

Student should be able to

CO1	Draw the conventions, signs and symbols.
CO2	Use appropriate scale for different building drawings.
CO3	Know and apply basic rules & bylaws governing the planning of building and calculate different areas such as plinth area, floor area, built-up area, carpet area.
CO4	Draw developed plan, elevation, section, site plan based on given line plan.
CO5	Draw perspective drawing of object.

Course Content Details:

Unit No	Topics / Sub-topics
1	Introduction : 1.1 Purpose of drawing, primary requirements of good drawing. Conventions as per IS 962:1989. 1.2 Symbols for different materials such as earthwork, brickwork, stonework, concrete, woodwork etc. used in civil engineering construction, graphical symbols for door and window, Abbreviations, symbols for sanitary and electrical installations. Symbols for room furnishing such as kitchen platform, sink, bed, wardrobe, door opening etc. 1.3 Types of lines- visible lines, centre line, hidden line, section line, dimension line, extension line, pointers, arrow head or dots, Appropriate lettering and numbering. 1.4 Types of scale- Monumental, Intimate, criteria for Proper Selection of scale for various types of drawing

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	1.5 Different types of drawing - preliminary drawing, working drawing, location drawing, layout plans, site plans, submission drawings.
2	Principles of Planning : 2.1 Principles of Planning of buildings such as aspect, prospect, orientation, privacy, circulation, grouping, roominess, furniture requirements, sanitation, elegance, economy. 2.2 Space requirement and norms for minimum dimension of different units in the residential and public buildings. 2.3 Rules and building bylaws of plan sanctioning authority for residential and public building regarding plot area, built up area, super built up area, plinth area, carpet area, floor area, FAR (Floor Area Ratio) / FSI, Volume plot ratio. 2.4 Line plans for residential building of minimum three rooms including w/c, bath and staircase as per principles of planning. 2.5 Line plans for public building-school building, primary health centre, hospital building, bank, post office, hostel, canteen, Restaurant, Industrial building with monitor roof.
3	Agencies in Building Construction work : 3.1 Functions of different agencies involved in construction work such as owner, Project Manager, Geotechnical Engineer, Architects, Structural Engineer, Contractor, Promoter, Quantity surveyor, Supervisor, HVAC services, Arbitrator, Safety Engineer, QA/QC team, Third party Audit.
4	Drawing for Buildings : 4.1 Residential building - Development of line plan, drawing of plan, elevation, sections, site plan, location plan, foundation plan, preparing schedule of openings, construction notes, Area statement and other details, checklist of quality control for drawing. 4.2 Public Building - Data required for planning public building such as Library, community centre, post office, high school, primary health centre, market, hospital, bank, hostel and their line plans only. 4.3 Measured drawing, Submission drawing and working drawing and its significance.
5	Perspective Drawing : 5.1 Definition, Types of perspective , terms used in perspective drawing , principles used in perspective drawing. 5.2 One Point and Two Point Perspective of small objects such as steps, monuments, pedestals etc.

Suggested Specifications Table with Hours and Marks (Practical):

Unit No	Topic Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
1	Introduction	02	04	-	-	04
2	Principles of Planning	02	04	04	-	08
3	Agencies in Building Construction work	02	-	04	-	04



4	Drawing for Buildings	08	02	02	20	24
5	Perspective Drawing	02	02	-	08	10
Total		16	12	10	28	50

Legends: R- Remember; U-Understand; A- Apply and above levels (Bloom's revised Taxonomy).

Notes: This specification table shall be treated as a general guideline and actual distribution of marks may slightly vary from table. But the questions from each topic should be asked as per marks weightage. Numerical questions are to be asked only if specified.

List of experiments/Assignments:

Sr. No.	Unit	Experiment/Assignment	Approx. Hours
1	1	Draw various types of lines, graphical symbols for materials, doors, windows, sanitary and water supply installations, electrical installations, abbreviations as per IS 962:1989 location for bed, sofa, dining table with chairs, wardrobe etc. (on A3 paper)	06
2	4	To draw line plans of at least five public buildings on graph paper	10
3	4	Submission drawing, to the scale 1:100 of single storied Load bearing Residential Building (2BHK with Flat Roof and staircase showing developed plan, elevation, section passing through Stair or W.C. and Bath, site plan (1:200), area statement, schedule of openings, construction notes.	10
4	4	Submission drawing, to the scale 1:100, of (G+1) Residential Building Framed Structure (2 BHK with attached toilet to 1 bedroom showing the position of European type WC pan) showing developed plan, elevation, section passing through staircase, site plan (1:200), foundation plan (1:50), area statement, schedule of openings.	16
5	4	Tracing of submission drawing of (G+1) Residential Building Framed Structure sheet no. 4	04
6	4	Measured Drawing of small residential building or flat with minimum two rooms, kitchen, sanitary block consisting of plan, elevation, section, opening schedule, site plan, construction notes.	10
7	5	One point and Two Point Perspective Drawing of small objects - steps, monuments, pedestals (any one) scale 1:50.	08
Total			64

References/ Books:

Sr. No.	Name of Book	Author	Publisher
1	Building Drawing	Shah, Kale, Patki	Tata McGraw Hill, New Delhi
2	Planning and Design of building	Y.S.Sane	Allies bookstall Poona - 4 & Engineering Book publishes, Company Pune - 16.
3	Civil Engineering Drawing	Malik & Mayo	New Asian Publishers, Nai Sadak, New Delhi - 6
4	IS code 962:1989		



Course Curriculum Development Committee:**a. Internal Faculty**

- i. Dr. S. S. Motling
- ii. Mrs. S. M. Male
- iii. Ms. M. S. Sorde

b. External Faculty

- i. Mr. K. V. Kelgandre (Sr. Lecturer, K.J.S.Polytechnic, Vidya Vihar)
- ii. Mrs. Vijaya Bangale (Lecturer, VJTI, Matunga)


Academic Coordinator

15-3-17


Head of Department
(Civil Engineering)


Principal
Govt. polytechnic Mumbai

Course Name: - Building Drawing

Course Code: - CE 16203

CO Vs PO matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	-	-	-	3	-	-	-	-	-	1
CO2	-	-	-	2	-	-	1	-	2	2
CO3	1	1	2	-	-	-	1	-	-	-
CO4	1	1	3	-	-	-	-	-	-	1
CO5	-	-	3	-	-	-	-	-	-	-

CO Vs PSO matrix

CO/POs		PSO1	PSO2	PSO3
CO1	Draw the conventions, signs and symbols.	-	2	-
CO2	Use appropriate scale for different building drawings.	-	2	-
CO3	Know and apply basic rules & bylaws governing the planning of building and calculate different areas such as plinth area, floor area, built-up area, carpet area.	1	2	1
CO4	Draw developed plan, elevation, section, site plan based on given line plan.	3	3	2
CO5	Draw perspective drawing of object.	3	1	1

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Unit Number and COs

Sr. No.	Unit No.	Topic Title	COs
1	1	Introduction	CO1
2	2	Principles of planning	CO3
3	3	Agencies in Building Construction work	-
4	4	Drawing for Buildings	CO1,CO2,CO3,CO4
5	5	Perspective Drawing	CO1, CO2,CO5

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