

GOVERNMENT COLLEGE OF TECHNOLOGY, COIMBATORE – 641 013
B.E. CIVIL ENGINEERING - PART TIME
2023 REGULATIONS - CURRICULUM
(Part Time Candidates admitted during 2023-2024 and onwards)

SECOND SEMESTER

Sl. No.	Subject Code	Course Title	CA Marks	End Sem. Marks	Total Marks	Hours/week			
						L	T	P	C
THEORY									
1	23PTC201	Construction Materials	40	60	100	3	0	0	3
2	23PTC202	Plane and Geodetic Surveying	40	60	100	3	0	0	3
3	23PTC203	Strength of Materials	40	60	100	3	0	0	3
4	23PTC204	Engineering Geology	40	60	100	3	0	0	3
PRACTICAL									
5	23PTC205	Materials Testing Laboratory	40	60	100	0	0	3	1.5
		TOTAL	200	300	500	12	0	3	13.5

23PTC201	CONSTRUCTION MATERIALS		SEMESTER II			
PREREQUISITES		CATEGORY	L	T	P	C
NIL		ES	3	0	0	3
Course Objectives	To learn the testing procedures and applications of materials used for building construction.					
UNIT – I	STONES, BRICKS AND TIMBER	9 Periods				
Stone as building material – Tests on stones – Deterioration of stone work – Bricks – Classification – Manufacturing of bricks – Tests on bricks – Timber – Classification – Seasoning – Defects in Timber – Particle boards.						
UNIT – II	LIME, CEMENT, AGGREGATES AND MORTAR	9 Periods				
Lime – Lime mortar – Cement – Manufacturing process – Bogue's Compounds – Types and Grades – Cement and Cement Mortar properties – Tests on Cement and Cement Mortar – Aggregates – Requirements of good aggregate – Classifications – Tests on aggregates.						
UNIT – III	CONCRETE	9 Periods				
Concrete – Ingredients – Manufacturing Process – Batching plants – Mixing – Transporting – Placing and Compaction of concrete – Curing and Finishing – Mix Design and Proportion – Tests on fresh and hardened concrete – Destructive, Semi-destructive and Non-destructive Testing on Concrete.						
UNIT – IV	OTHER CONSTRUCTION MATERIALS	9 Periods				
Steel – Types and Tests – Glass – Types and Applications – Floor Finish Materials – Roofing Materials – Paints and Varnishes – Constituents and types – Acoustic Materials – Pavement Materials – Water Proofing Materials – Sealants for joints.						
UNIT – V	MODERN CONSTRUCTION MATERIALS	9 Periods				
Composite Materials – Types and Applications – Fibre Reinforced Plastics – Polymer based building materials – Clay Products – Aluminum Products – Insulation Materials – Properties and Applications – Smart Materials – Sustainable building materials.						
Contact Periods:						
Lecture: 45 Periods Tutorial: 0 Periods Practical: 0 Periods Total: 45 Periods						

TEXT BOOK

1	<i>G.S.Birdie, T.D.Ahuja, "Building Construction and Construction Materials", Dhanpatrai publishing company, New Delhi, 2012.</i>
2	<i>Punmia.B.C, Ashok Kumar Jain and Arun Kumar Jain, "Building Construction", Laxmi Publications Pvt.Ltd., 2016.</i>

REFERENCES

1	<i>Varghese.P.C, "Building Materials", PHI Learning Pvt. Ltd, New Delhi, 2015.</i>
2	<i>Gambhir. M.L., & Neha Jamwal., "Building Materials, Products, Properties and Systems", Tata McGraw Hill Educations Pvt. Ltd, New Delhi, 2012.</i>
3	<i>Sushil Kumar, "Building Construction", Standard Publications, New Delhi, 2016.</i>
4	<i>Shetty, M.S & Jain, A.K, "Concrete Technology: Theory and Practice", S.Chand and Company Ltd, New Delhi, 2019.</i>

COURSE OUTCOMES: Upon completion of the course, the students will be able to:		Bloom's Taxonomy Mapped
CO1	Examine and compare the properties of most common and advanced building materials.	K2
CO2	Identify the appropriate quality of lime, cement, and aggregates.	K2
CO3	Demonstrate the specifications, production and testing methods of concrete.	K1
CO4	Recognize the characteristics and applications of construction materials.	K2
CO5	Select the suitable modern materials for construction.	K3

23PTC202		PLANE AND GEODETIC SURVEYING		SEMESTER II			
PREREQUISITES			L	T	P	C	
NIL			3	0	0	3	
Course Objectives	To understand the basic principle and concepts of different surveying methods to calculate various measurements using survey instruments.						
UNIT – I	INTRODUCTION, LEVELLING AND CONTOURING	9 Periods					
Definition- Principles - Classification – Field and Office work – Scales – Conventional Signs. Basic Terms - Types of Level – Fundamental Axes - Levelling staff – Bench Marks – Temporary and Permanent Adjustments – Types of Levelling - Curvature and Refraction correction –Reciprocal Levelling–Calculation of Areas and Volumes. Contouring– Characteristics and Uses of Contours –Methods of contouring.							
UNIT – II	THEODOLITE SURVEYING	9 Periods					
Theodolite–types–Terms–Temporary and Permanent Adjustments–Measurement of Horizontal Angles by Repetition and Reiteration – Closing Error and Distribution – Omitted measurements.							
UNIT – III	CURVES AND HYDROGRAPHIC SURVEYING	9 Periods					
Simple curves-Elements-Setting out of curves-Linear and angular methods. Shore line survey–Sounding–Equipment– Methods of Locating.							
UNIT – IV	TRIANGULATION	9 Periods					
Triangulation-classification –Routine- Intervisibility -Signals and Towers. Trigonometrical Levelling - Geodetical observations-Curvature correction- Refraction correction – Axis signal correction–Difference in elevation.							
UNIT – V	MODERN SURVEYING INSTRUMENTS	9 Periods					
Total Station-Principle-classification-working. Drone Surveying – Introduction - Applications. GPS-Developments –Basic Concepts–Segments –Applications. DGPS – Introduction.							
Contact Periods:							
Lecture: 45 Periods Tutorial: 0 Periods Practical: 0 Periods Total: 45 Periods							

TEXT BOOK:

1	<i>Punmia B.C, Ashok K Jain, Arun K Jain. “Surveying, Vol. I &II”, Lakshmi Publications, 2022.</i>
2	<i>Basak N.N, “Surveying and Levelling”, Tata McGraw-Hill, Publishing Company, 2nd edition, 2014.</i>

REFERENCES:

1	<i>Kanetkar.T.P, and Kulkarni.S.V, “Surveying and Levelling, Vol. I & II”, Pune Vidyarthi Griha Prakashan,2014.</i>
2	<i>Bhavikatti S.S, “Surveying and Levelling, Vol.I&II”, I.K. International Pvt. Ltd., 2016.</i>
3	<i>Duggal S.K. “Surveying, Vol.I&II”, Tata McGraw-Hill Publishing Company,2017.</i>
4	<i>Charles D Ghilani, Paul R Wolf., “Elementary Surveying”, PrenticeHall,2012.</i>
5	<i>Chandra A.M., “Plane Surveying”, New Age International Pvt. Ltd, 2015.</i>

COURSE OUTCOMES:		Bloom's Taxonomy Mapped
On completion of the course, the students will be able to:		
CO1	Apply different survey method, Interpret level data using different types of levelling techniques and plot contour map by various contouring methods.	K3
CO2	Determine the horizontal distances, vertical distances and area by using theodolite.	K3
CO3	Set out the curves using survey instruments and apply the principles of hydrographic surveying.	K3
CO4	Execute triangulation method, Trigonometric levelling to find horizontal distance, difference in elevation and area.	K3
CO5	Apply modern surveying principles and techniques in civil engineering applications.	K3

COURSE ARTICULATION MATRIX:

a) CO and PO Mapping															
COs/POs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	3		2					1		2	2		2	2
CO2	3	3		2					1		2	2		2	2
CO3	3	3		2					1		2	2		2	2
CO4	3	3		2					1		2	2		2	2
CO5	3	3		2					1		2	2		2	2
23PT C202	3	3		2					1		2	2		2	2

1 – Slight, 2 – Moderate, 3 – Substantial

23PTC203	STRENGTH OF MATERIALS		SEMESTER II				
PREREQUISITES			CATEGORY	L	T	P	C
ENGINEERING MECHANICS			ES	3	0	0	3
Course Objectives	<ul style="list-style-type: none"> To learn the basics of shear and bending stresses and evaluate complex stress problems. To understand the behaviour of beams in bending and twisting. To impart knowledge on different methods of finding deflection of beam. To get the concepts on analysis of stresses in cylinders and columns. 						
UNIT – I	SIMPLE AND COMPLEX STRESSES		9 Periods				
<p>Simple Stresses: Axial Members - Deformation, strain, simple stress, Elastic constants - Compound Bars – Thermal Stresses</p> <p>Compound Stresses: Two mutually Perpendicular direct stresses – Principal Planes and Principal Stresses –Two-Dimensional Stress System – Mohr’s circle</p>							
UNIT – II	BEAMS		9Periods				
<p>Beams under bending: Beams and Bending – supports and loads - Shear Force and Bending Moment Diagrams for determinate beams – Relationship between rate of Loading, Shear Force and Bending Moment – Point of Contra Flexure.</p> <p>Bending and shear stresses: Bending Stress – Combined Direct and Bending Stresses - Shearing stress.</p>							
UNIT – III	DEFLECTION OF BEAMS		9 Periods				
<p>Deflection of beams: Deflection Curve – Differential Equation – Double Integration Method – Macaulay’s Method – Conjugate Beam Method.</p>							
UNIT – IV	TORSION AND CYLINDERS		9 Periods				
<p>Torsion: Torsion of Circular and Hollow Shafts –Elastic Theory of Torsion - Stresses and Deformation in Circular Solid and Hollow Shafts – Stepped Composite Shafts – Combined Bending Moment and Torsion on Shafts –Power Transmitted to a Shaft – Shafts in Series and Parallel.</p> <p>Thin Cylinders: Hoop and Longitudinal stresses – Volumetric Strain.</p>							
UNIT – V	COLUMNS AND THEORIES OF ELASTIC FAILURE		9 Periods				
<p>Columns: Theory of Columns. - eccentric load – Slenderness Ratio – End Conditions – Buckling Load for Columns- Euler’s Theory – Assumptions and Limitations – Rankine’s Formula – Combined bending and axial load.</p> <p>Theories of Elastic Failure: Failure theories – Factor of Safety – Graphical Representation of Theories for Two Dimensional Stress System.</p>							
<p>Contact Periods: 45 Periods</p> <p>Lecture: 45 Periods Tutorial: 0 Periods Practical: 0 Periods Total: 45 Periods</p>							

TEXT BOOK

1	Rajput R.K. “ Strength of Materials (Mechanics of Solids) ”, S.Chand & company Ltd., New Delhi, 7 th edition, 2018.
2	Vaidyanathan.R, Perumal.P and Lingeswari.S, “ Mechanics of Solids and Structures, Volume I ”, Laxmi Publications Pvt Ltd, Chennai, 2017.

REFERENCES

1	Ferdinand Beer, E.Russell Johnston and John Dewolf, “ Mechanics of Materials ”, Mc Graw Hill Education, 2015
2	Daniel Schodek and Martin Bechthold, “ Structures ”, Pearson India Education Services Pvt Ltd, 2015
3	Singh. D.K., “ Strength of Materials ”, Ane Books Pvt Ltd., New Delhi, 2021.
4	Beer. F.P. & Johnston. E.R. “ Mechanics of Materials ”, Tata McGraw Hill, 8 th Edition, New Delhi 2019.

COURSE OUTCOMES: On completion of the course, the students will be able to:		Bloom’s Taxonomy Mapped
CO1	Describe the fundamental concepts of stress, strain and principal stresses.	K2
CO2	Plot shear force and bending moment diagrams and determine bending stress distribution in beams.	K3
CO3	Determine the deflection of beams.	K3
CO4	Analyze the shaft subjected to twisting.	K3
CO5	Identify the stresses in cylinders, behavior of columns and theory of elastic failures.	K3

23PTC204		ENGINEERING GEOLOGY		SEMESTER II			
PREREQUISITES		L	T	P	C		
NIL		3	0	0	3		
Course Objectives	To understand the importance of geological knowledge such as earth, minerals, rocks and apply Geological Knowledge in projects such as dams, tunnels, bridge constructions.						
UNIT – I	GENERAL GEOLOGY	9 Periods					
Interrelationship between Geology and civil engineering – Branches of Geology – Earth Structure and composition – Geological processes – Weathering – work of rivers, sea, wind and their Engineering significance- Earthquakes –Earthquake Zones in India - Volcanoes – Ground water – Origin, Occurrence, Properties of rock – Geological work of ground water – Importance in Civil Engineering.							
UNIT – II	MINERALOGY	9 Periods					
Elementary knowledge on symmetry elements of important Crystallographic systems – Physical properties of minerals – Study of the following rock forming minerals – Quartz family, Felspar family, Augite, Hornblende, Biotite , Muscovite, Calcite, Garnet. Ore minerals - Haematite, Magnetite, Bauxite, Graphite, Magnesite – Clay minerals – Properties and Engineering significance.							
UNIT – III	PETROLOGY	9 Periods					
Formation and Classification of rocks and their distinctive properties – Description, Occurrence, Engineering properties and Distribution of the following rocks – Igneous rocks – Granite, Syenite, Diorite, Gabbro, Pegmatite, Dolerite and Basalt. Sedimentary rocks- Sandstone, Limestone, shale, Conglomerate, and Breccia – Metamorphic rocks – Quartzite, Marble, Slate, phyllite, Gneiss and schist.							
UNIT – IV	STRUCTURAL GEOLOGY	9 Periods					
Attitude of beds Dip and Strike - Uses of Clinometer compass – Outcrops – Geological maps – their uses – Structural features – Folds, Faults, Unconformities and Joints – their significance on engineering constructions.							
UNIT – V	GEOLOGICAL INVESTIGATIONS	9 Periods					
Geophysical investigations – Seismic and electrical resistivity methods – Aerial Photo and satellite imageries-Interpretation of remote sensing data-Exploration for ground water – Geological investigations pertaining to Dam and Reservoir, Tunnels and Road cuttings – Landslides – causes and prevention – Sea erosion and coastal protection.							
Contact Periods:							
Lecture: 45 Periods Tutorial: 0 Periods Practical: 0 Periods Total: 45 Periods							

TEXT BOOK

1	Parbin Singh, <i>“Engineering and General Geology”</i> , Eighth Revised Edition S.K.Kataria & Sons New Delhi. 2015
2	Varghese, P.C., <i>“Engineering Geology for Civil Engineering”</i> PHI Learning Private Limited, New Delhi, 2012.

REFERENCES

1	F.G.Bell. <i>“Fundamentals of Engineering Geology”</i> , B.S. Publications. Hyderabad 2011
2	N. Chenna Kesavulu. <i>“Textbook of Engineering Geology”</i> , Macmillan India Ltd., 2009.
3	Venkatareddy. D. <i>“Engineering Geology”</i> , Vikas Publishing House Pvt. Ltd. 2010
4	KVGK Gokhale, <i>“Principles of Engineering Geology”</i> , BS Publications, Hyderabad 2011.

COURSE OUTCOMES: On completion of the course, the students will be able to:		Bloom's Taxonomy Mapped
CO1	Understand the internal structure of earth and its relation to volcanism and the various geological agents.	K1,K2
CO2	Identify the properties and uses of Minerals.	K1
CO3	Understand the formation and Engineering properties of rocks.	K1,K2
CO4	Apply fundamental knowledge in structural geology like fault, fold and Joints	K1,K2
CO5	Knowledge in design and construction of major civil engineering structures.	K1,K2

COURSE ARTICULATION MATRIX:

a) CO and PO Mapping														
COs/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	2						1						1	2
CO2	2												1	1
CO3	2					1				1			1	1
CO4		1		2		1	1	2		1	1	1	1	1
CO5		1	1	2	1	2	2	2		1	1	1	1	2
23PTC204	2	1	1	2	1	1	1	2	-	1	1	1	1	1
1 – Slight, 2 – Moderate, 3 – Substantial														

23PTC205	MATERIALS TESTING LABORATORY				SEMESTER III				
PREREQUISITES					CATEGORY	L	T	P	C
NIL					ES	0	0	3	1.5
Course Objectives	To deal with experimental determination and evaluation of mechanical characteristics and behaviour of construction materials and to familiarize experimental procedures and common measurement instruments, equipment and devices.								
*LIST OF EXPERIMENTS									
<ol style="list-style-type: none"> 1. Mechanical properties of tor steel rod as per IS Code 1786 (2008) 2. Weight per running metre of steel rod 3. Tension and compression test on springs. 4. Test on Bricks: Visual observation, Compression test, Water absorption test and Efflorescence test as per IS 3495-1 to 4 (1992) 5. Hardness test on different metals. 6. Deflection test on simply supported beams (for different metals). 7. Deflection test on cantilever beams (for different metals). 8. Bending test on rolled steel joist 9. Flexure test on tiles 10. Compression test on Hollow/Concrete Blocks 									
Contact Periods:									
Lecture: 0 Periods Tutorial: 0 Periods Practical: 45 Periods Total: 45 Periods									

COURSE OUTCOMES:		Bloom's Taxonomy Mapped
On completion of the course, the students will be able to:		
CO1	Determine the tensile strength of materials	K3
CO2	Obtain bending properties of structural materials	K3
CO3	Determine the hardness properties of the materials	K3
CO4	Predict the compressive strength of the materials	K3