



## **GOVERNMENT COLLEGE OF TECHNOLOGY**

(An Autonomous Institution Affiliated to Anna University)

Coimbatore - 641 013

**Curriculum & Syllabi**

**B. E. CIVIL ENGINEERING**

**(Working Professionals)**

**2025**

**Regulations**

**OFFICE OF THE CONTROLLER OF EXAMINATIONS**

**GOVERNMENT COLLEGE OF TECHNOLOGY**

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GOVERNMENT COLLEGE OF TECHNOLOGY, COIMBATORE - 641 013

## **B.E. CIVIL ENGINEERING (WORKING PROFESSIONALS)**

## 2025 REGULATIONS

## **FIRST SEMESTER**

Sl. No.	Course Code	Course Title	CA Marks	End Sem Marks	Total Marks	Hours/Week			
						L	T	P	C
<b>THEORY</b>									
1	23WPC1Z1	Applied Mathematics I (Common to Civil, Mech, EEE & ECE)	40	60	100	3	0	0	3
2	23WPC1Z2	Environmental Sciences and Engineering (Common to Civil, Mech, EEE & ECE)	40	60	100	3	0	0	3
3	23WPC103	Engineering Mechanics	40	60	100	3	0	0	3
4	23WPC104	Fluids Mechanics and Machinery	40	60	100	3	0	0	3
<b>PRACTICAL</b>									
5	23WPC105	Fluid Mechanics and Machinery Laboratory	60	40	100	0	0	3	1.5
<b>TOTAL</b>				<b>220</b>	<b>280</b>	<b>500</b>	<b>12</b>	<b>0</b>	<b>3</b>
									<b>13.5</b>

## SECOND SEMESTER

Sl. No.	Course Code	Course Title	CA Marks	End Sem Marks	Total Marks	Hours/Week				
						L	T	P	C	
<b>THEORY</b>										
1	25WPC201	Construction Materials	40	60	100	3	0	0	3	
2	25WPC202	Plane and Geodetic Surveying	40	60	100	3	0	0	3	
3	25WPC203	Strength of Materials	40	60	100	3	0	0	3	
4	25WPC204	Engineering Geology	40	60	100	3	0	0	3	
<b>PRACTICAL</b>										
5	25WPC205	Materials Testing Laboratory	60	40	100	0	0	3	1.5	
<b>TOTAL</b>				<b>300</b>	<b>280</b>	<b>500</b>	<b>12</b>	<b>0</b>	<b>3</b>	<b>13.5</b>

<b>25WPC1Z1</b>	<b>APPLIED MATHEMATICS I</b> <i>(Common to MECH, EEE &amp; ECE Branches)</i>	<b>SEMESTER I</b>
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<b>PREREQUISITES</b>		<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>				
<b>NIL</b>		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>				
<b>Course Objectives</b>	This course mainly deals with topics such as linear algebra, single variable calculus and numerical methods and plays an important role in the understanding of engineering science.								
<b>UNIT – I</b>	<b>LINEAR ALGEBRA</b>				<b>9 Periods</b>				
Consistency of System of Linear Equations, Eigenvalues and eigenvectors, Diagonalization of matrices by orthogonal transformation, Cayley-Hamilton Theorem, Quadratic form to canonical forms.									
<b>UNIT – II</b>	<b>DIFFERENTIAL CALCULUS</b>				<b>9 Periods</b>				
Radius of curvature, Centre of curvature, Circle of curvature , Evolutes of a curve, Envelopes									
<b>UNIT – III</b>	<b>INTEGRAL CALCULUS</b>				<b>9 Periods</b>				
Evaluation of definite and improper integrals, Applications: surface area and volume of revolution (Cartesian coordinates only).									
<b>UNIT – IV</b>	<b>NUMERICAL SOLUTION OF EQUATIONS</b>				<b>9 Periods</b>				
Algebraic and Transcendental equation: Fixed point iteration method, Bisection method, Newton-Raphson method, Simultaneous equation: Gauss elimination method, Gauss-Jordan method, Gauss Seidal method.									
<b>UNIT – V</b>	<b>NUMERICAL INTERPOLATION</b>				<b>9 Periods</b>				
Equal interval: Newton's forward and Backward difference interpolation formulae, Gauss forward and Backward difference interpolation formulae, Unequal interval: Lagrange's interpolation, Newton's divided difference interpolation.									
<b>Contact Periods:</b> <b>Lecture: 45 Periods      Tutorial: 0 Periods      Practical: 0 Periods      Total: 45 Periods</b>									

## TEXT BOOK

1	Veerarajan T., <b>Engineering Mathematics I</b> , Tata McGraw-Hill Education(India)Pvt. Ltd, New Delhi, 1 <sup>st</sup> edition 2017.
2	P. Kandasamy, K. Thilagavathy, K. Gunavathi, <b>Numerical Methods</b> , S. Chand & Company, 3rd Edition, Reprint 2013.

## REFERENCES

1	B.S.Grewal, <b>Higher Engineering Mathematics</b> , Khanna Publishers, 44 <sup>th</sup> Edition, 2021.
2	David C.Lay, <b>Linear Algebra and its Application</b> , Pearson Publishers, 6 <sup>th</sup> Edition, 2021.
3	Howard Anton, <b>Elementary Linear Algebra</b> , 11 <sup>th</sup> Edition, Wiley Publication, 2013.
4	Narayanan.S and Manicavachagom Pillai. T.K. – <b>Calculus Vol I and Vol II</b> , S.chand & Co, 6 <sup>th</sup> Edition, 2016.
5	S.S. Sastry, <b>Introductory methods of numerical analysis</b> , PHI, New Delhi, 5 <sup>th</sup> Edition, 2015.
6	Ward Cheney, David Kincaid, <b>Numerical Methods and Computing</b> , Cengage Learning, Delhi, 7 <sup>th</sup> Edition 2013.
7	Jain R.K. and Iyengar S.R.K., - <b>Advanced Engineering Mathematics</b> , Narosa Publicaitons, 8 <sup>th</sup> Edition, 2012.

<b>COURSE OUTCOMES:</b>		<b>Bloom's Taxonomy Mapped</b>
Upon completion of the course, the students will be able to:		
CO1	Use the essential tool of matrices and linear algebra in a comprehensive manner.	K3
CO2	Explain the fallouts of circle of curvature, evolute and envelops that is fundamental to application of analysis to Engineering problems.	K3
CO3	Interpret the integral calculus to notions of definite and to improper integrals. Apart from some other applications they will have a basic understanding of Beta and Gamma functions.	K3
CO4	Demonstrate understanding of common numerical methods and how they are used to obtain approximate solutions to polynomial and transcendental equations.	K3
CO5	Derive numerical methods for various mathematical operations and tasks, such as interpolation, differentiation, integration, the solution of linear and nonlinear equations.	K3

25WPC1Z2	ENVIRONMENTAL SCIENCE AND ENGINEERING (Common to MECH, EEE & ECE Branches)	SEMESTER I
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<b>PREREQUISITES</b>	<b>NIL</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

<b>Course Objectives</b>	The course is aimed at creating awareness among the students and also insemimates the critical ideas of preserving environment.				
<b>UNIT – I</b>	<b>ENVIRONMENTAL ENERGY RESOURCES</b>		<b>9 Periods</b>		
Food-effects of modern agriculture, fertilizers, pesticides, eutrophication & biomagnifications-Energy resources: renewable resources - Hydro Energy, Solar & Wind. Non-renewable resources – Coal and Petroleum - harnessing methods.					
<b>UNIT – II</b>	<b>ECO SYSTEM AND BIODIVERSITY</b>		<b>9 Periods</b>		
Eco system and its components - biotic and abiotic components. Biodiversity: types and values of biodiversity, hot spots of biodiversity, endangered and endemic species, conservation of biodiversity: In situ and ex situ conservation. Threats to biodiversity-destruction of habitat, habit fragmentation, hunting, over exploitation and man-wildlife conflicts. The IUCN red list categories.					
<b>UNIT – III</b>	<b>ENVIRONMENTAL POLLUTION</b>		<b>9 Periods</b>		
Air pollution, classification of air pollutants – sources, effects and control of gaseous pollutants SO <sub>2</sub> , NO <sub>2</sub> , H <sub>2</sub> S, CO, CO <sub>2</sub> and particulates. Water pollution - classification of water pollutants, organic and inorganic pollutants, sources, effects and control of water pollution. Noise pollution - decibel scale, sources, effects and control.					
<b>UNIT – IV</b>	<b>ENVIRONMENTAL THREATS</b>		<b>9 Periods</b>		
Global warming-measure to check global warming - impacts of enhanced Greenhouse effect, Acid rain- effects and control of acid rain, ozone layer depletion- effects of ozone depletion, disaster management - flood, drought, earthquake and tsunami.					
<b>UNIT – V</b>	<b>SOCIAL ISSUES AND ENVIRONMENT</b>		<b>9 Periods</b>		
Water conservation, rain water harvesting, e-waste management, Pollution Control Act, Wild life Protection Act. Population growth- exponential and logistic growth, variation in population among nations, population policy. Women and Child welfare programs. Role of information technology in human and health, COVID-19 - effects and preventive measures.					
<b>Contact Periods:</b> <b>Lecture:45 Periods      Tutorial: 0 Periods      Practical: 0 Periods      Total:45 Periods</b>					

#### TEXT BOOK:

1	Sharma J.P., “Environmental Studies”, 4 <sup>th</sup> Edition, University Science Press, New Delhi, 2016.
2	Anubha Kaushik and C.P.Kaushik, “Environmental Science and Engineering”, 7 <sup>th</sup> Edition, New age international publishers, New Delhi, 2021.

#### REFERENCES:

1	A k de, “Environmental Chemistry”, 8 <sup>th</sup> edition, New age international publishers, 2017.
2	G. Tyler miller and scott e. Spoolman, “Environmental Science”, cengage learning india pvt. Ltd., delhi, 2014.
3	Erach Bharucha, “Textbook of Environmental Studies”, Universities press (I) pvt, Ltd., Hyderabad, 2015.
4	Gilbert M. Masters, “Introduction to Environmental Engineering and Science”, 3 <sup>rd</sup> Edition, Pearson Education, 2015.

<b>COURSE OUTCOMES:</b>		<b>Bloom's Taxonomy Mapped</b>
Upon completion of the course, the students will be able to:		
CO1	Recognize and understand about the various environmental energy resources and the effective utility of modern agriculture.	K2
CO2	Acquire knowledge about the interaction of biosphere with environment and conservation methods of bio diversity.	K2
CO3	Be aware of the sources of various types of pollution, their ill effects and preventive methods.	K2
CO4	Identify and take the preventive measures to control the environmental threats and effects of Global warming, Ozone depletion, Acid rain, and natural disasters.	K2
CO5	Demonstrate an idea to save water and other issues like COVID -19.	K2

<b>PREREQUISITES :</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>NIL</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

<b>Course Objectives</b>	To expose the students to use the basic principles of mechanics in engineering applications.						
<b>UNIT – I</b>	<b>BASIC CONCEPTS OF FORCES</b>			<b>9 Periods</b>			
Basic Concepts and Principles of Forces– Laws of Mechanics – System of forces in Plane – Free body Diagrams- resultant of a force system – resolution and composition of forces – Lami’s theorem – moment of a force – physical significance of moment-Varignon’s theorem – resolution of a force and couple system– forces in space – addition of concurrent forces in space – equilibrium of a particle in space.							
<b>UNIT – II</b>	<b>STATIC AND DYNAMIC FRICTION</b>			<b>9 Periods</b>			
Frictional resistance – classification of friction- laws of friction – coefficient of friction-angle of friction – angle of repose — cone of friction –advantages-equilibrium of a body on a rough inclined plane – ladder friction – rope friction – wedge friction.							
<b>UNIT – III</b>	<b>PROPERTIES OF SECTION</b>			<b>9 Periods</b>			
Centroid and Centre of Gravity for simple & Composite sections– theorems of moment of inertia Determination of moment of inertia of various sections –Product of Inertia – Principal moment of inertia of plane areas.							
<b>UNIT – IV</b>	<b>BASICS OF DYNAMICS - KINEMATICS</b>			<b>9 Periods</b>			
Kinematics and kinetics – displacements, velocity and acceleration - Equations of motion – Rectilinear motion of a particle with uniform velocity, uniform acceleration, varying acceleration– motion under gravity – relative motion – curvilinear motion of particles – projectiles– angle of projection – range – time of flight and maximum height.							
<b>UNIT – V</b>	<b>BASICS OF DYNAMICS - KINETICS</b>			<b>9 Periods</b>			
Newton’s second law of motion – linear momentum – D’Alembert’s principle, Dynamic equilibrium – equation of particles- principle of work and energy – law of conservation of energy – Principle of impulse and momentum – Equations of momentum – Laws of conservation of momentum. Impact – Time of compression, restitution, collision – Co-efficient of restitution – types of impact – collision of elastic bodies by direct central impact and oblique impact – collision of small body with a massive body – Kinetic energy of a particle.							
<b>Contact Periods:</b> <b>Lecture: 45 Periods      Tutorial: 0 Periods      Practical: 0 Periods      Total: 45 Periods</b>							

**Text Book:**

1	<i>F.B. Beer and E.R. Johnson, “Vector Mechanics for Engineers”, Tata Mc.Graw Hill Pvt Ltd, 11<sup>th</sup> Edition, 2013.</i>
2	<i>Rajasekaran S &amp; Sankara Subramanian, “Fundamentals of Engineering Mechanics”, Vikas Publishing House Pvt Ltd. 3<sup>rd</sup> Edition, 2017.</i>

**REFERENCES:**

1	<i>S. Timoshenko and Young, “Engineering Mechanics”, McGraw Hill, 4<sup>th</sup> Edition, 2017.</i>
2	<i>Bansal R.K, “A Text Book of Engineering Mechanics”, Laxmi Publications, 2015.</i>
3	<i>R.C. Hibbeler, “Engineering Mechanics”, Prentice Hall of India Ltd, 14<sup>th</sup> Edition, 2017.</i>
4	<i>Dr.N.Kottiswaran “Engineering Mechanics”Sri Balaji Publications,2017.</i>

<b>COURSE OUTCOMES:</b>		<b>Bloom's Taxonomy Mapped</b>
Upon completion of the course, the students will be able to:		
CO1	Familiarize the principles and Concepts of Mechanics	K3
CO2	Calculate the friction force acting on a plane under various conditions.	K2
CO3	Determine the centre of gravity and moment of inertia for different sections.	K2
CO4	Predict the Rectilinear and curvilinear motion of particles.	K3
CO5	Evaluate the dynamics of particles using kinetic principles.	K3

25WPC104	FLUID MECHANICS AND MACHINERY	SEMESTER I
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PREREQUISITES		L	T	P	C				
NIL		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>				
<b>Course Objectives</b>	To impart knowledge on properties and behaviour of fluid at static and dynamic conditions and also study the performance of turbines and pumps								
<b>UNIT – I</b>	<b>FUNDAMENTALS OF FLUID STATICS</b>				<b>9 Periods</b>				
Dimensions and Units - Properties of fluids - Density, specific gravity, viscosity, surface tension, capillarity, elasticity, compressibility, vapour Pressure - Fluid statics – Pascal's Law - Pressure measurement - Piezometer and Manometers – Hydrostatic forces on plane and curved surfaces									
<b>UNIT – II</b>	<b>FLUID KINEMATICS AND DYNAMICS</b>				<b>9 Periods</b>				
Classification of fluid flow – Continuity equation - one dimensional and three dimensional –Velocity potential and stream functions - Energy equation – Euler's and Bernoulli's equation – Applications - Venturimeter, Orifice meter and Pitot tube									
<b>UNIT – III</b>	<b>FLOW THROUGH CONDUITS AND BOUNDARY LAYER THEORY</b>				<b>9 Periods</b>				
Laminar flow between parallel plates – laminar flow in pipes - Hagen Poiseuille equation for flow through circular pipes - Turbulent flow in pipes – Darcy - Weisbach formula for flow through circular pipes - Boundary layer - Definition - Boundary layer thickness - Displacement, energy and momentum thickness									
<b>UNIT – IV</b>	<b>IMPACT OF JETS AND PUMPS</b>				<b>9 Periods</b>				
Impulse momentum Principle- impact of Jet – force exerted by a jet on normal, inclined and curved surfaces for stationary and moving vanes- Angular momentum principle- construction of velocity vector diagrams. Pump- Classification of pumps - Centrifugal pump - reciprocating pump – Work done and efficiency									
<b>UNIT – V</b>	<b>HYDRAULIC TURBINES</b>				<b>9 Periods</b>				
Turbines - classification – construction – working principles and design of Pelton wheel and Francis Turbines – work done and efficiency – specific speed – operating characteristics.									
<b>Contact Periods:</b>									
<b>Lecture: 45 Periods</b>	<b>Tutorial: 0 Periods</b>	<b>Practical: 0 Periods</b>	<b>Total: 45 Periods</b>						

#### TEXT BOOKS :

1	<i>P.N.Modi and S.M.Seth, "Hydraulics and Fluid Mechanics, Including Hydraulic Machines", Standard Book House, New Delhi, 2019.</i>
2	<i>R.K.Bansal, "Fluid Mechanics and Hydraulic Machines", Laxmi Publications (P) Ltd., New Delhi, 2018.</i>

#### REFERENCES :

1	<i>R.K.Rajput, "A Text Book of Fluid Mechanics and Hydraulic Machines", S.Chand and Company, New Delhi,2015.</i>
2	<i>K.L.Kumar, "Engineering Fluid Mechanics", Eurasia Publishing House (P) Ltd., New Delhi, 2018.</i>
3	<i>Jagdish Lal, "Fluid Mechanics &amp; Hydraulic With Computer Applications", Tata McGraw Hill, New Delhi , 2008.</i>

4	<i>M.K.Natarajan ‘Principles of Fluid Mechanics’, Anuradha Agencies, VidyalKaruppur, Kumbakonam, 2008.</i>
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<b>COURSE OUTCOMES:</b>		<b>Bloom's Taxonomy Mapped</b>
Upon completion of the course, the students will be able to:		
CO1	Identify the properties of fluids and fluid statics.	K2
CO2	Apply the continuity equation, Euler's equation and Bernoulli's equation for solving fluid flow problems.	K3
CO3	Examine the fluid flow behaviour for laminar and turbulent flows and also determine boundary layer thickness	K3
CO4	Apply the momentum principle for the determination of hydrodynamic forces	K3
CO5	Acquire knowledge in selection and design of turbines based on head and discharge requirements.	K3

25WPC105	FLUID MECHANICS AND MACHINERY LABORATORY	SEMESTER I
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PREREQUISITES	L	T	P	C
NIL	0	0	3	1.5

Course Objectives	To impart knowledge in solving problems occurring in pipes due to losses, the verification of Bernoulli's theorem and its applications and conducting performance tests on different types of pumps and turbines.
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#### **LIST OF EXPERIMENTS:**

1. Determination of Darcy's friction factor
2. Verification of Bernoulli's Theorem
3. Determination of coefficient of discharge of Venturimeter / Orifice meter
4. Flow over Notches
5. Flow through Mouthpiece
6. Performance Study of Centrifugal pump
7. Performance Study of reciprocating pump
8. Load test on Pelton wheel
9. Load test on Francis turbine

#### **Contact Periods:**

**Lecture: 0 Periods      Tutorial: 0 Periods      Practical: 45 Periods      Total: 45 Periods**

COURSE OUTCOMES:		Bloom's Taxonomy Mapped
Upon completion of the course, the students will be able to:		
CO1	Solve different problems in pipes due to losses.	K3
CO2	Verify the Bernoulli's theorem and its applications.	K3
CO3	Can carry out flow measurement through notches	K3
CO4	Do performance tests on different types of pumps.	K3
CO5	Do performance tests on different types of turbines.	K3

<b>25WPC201</b>	<b>CONSTRUCTION MATERIALS</b>	<b>SEMESTER II</b>
<b>PREREQUISITES</b>		<b>L T P C</b>
	<b>NIL</b>	<b>3 0 0 3</b>
<b>Course Objectives</b>	To learn the testing procedures and applications of materials used for building construction.	
<b>UNIT – I</b>	<b>CONVENTIONAL MATERIALS AND PROPERTIES</b>	<b>9 Periods</b>
History of building materials-Conventional building materials-Aggregates-Natural aggregates-Artificial Aggregates-Water- Requirements of water used in construction works-Steel-New and advanced materials -Eco friendly and green construction materials- Energy efficient and sustainable building materials.		
<b>UNIT – II</b>	<b>CEMENTITIOUS MATERIALS AND MORTAR</b>	<b>9 Periods</b>
Cement - Types and Grades-Water cement ratio-Hydration of cement- Setting of cement-Bogue's Compounds- Tests on Cement. Supplementary cementitious materials-Pozzolanic materials-Fly ash-Types-Ground Granulated blast furnace slag- Silicafume- Natural Pozzolans. Cement Mortar properties-Tests on Cement Mortar.		
<b>UNIT – III</b>	<b>PROTECTIVE MATERIALS AND COATINGS</b>	<b>9 Periods</b>
Damp proof-Water proof-Termite proof –Pest control in buildings-Heat insulating materials-Sound insulating materials. Paints-Characteristics of ideal paint-Types of paints-Distemper-Varnishes.		
<b>UNIT – IV</b>	<b>FLOOR FINISH AND ROOFING MATERIALS</b>	<b>9 Periods</b>
Floor Finish Materials – Wood- stone (marble, granite, slate) –porcelain tiles- Ceramic Tiles-Glazed tiles-Thermal care tiles-properties- selection criteria. Types of roofing materials- fibre reinforced sheets-Insulated roofing sheets-False ceiling-Materials used for false ceiling.		
<b>UNIT – V</b>	<b>METALLIC, PLASTIC AND COMPOSITE MATERIALS</b>	<b>9 Periods</b>
Aluminum Products–Properties and Applications. Plastics –Characteristics –PVC –UPVC- Doors and windows, Water tanks-CPVC-PVC materials used in water supply, sanitary and electricity plumbing- Standards as per BIS. Elevation and façade materials- Types of materials used—Insulated glass, Aluminum composite panels, Fibre cement, Wood Plastic composites, cladding- types.		
<b>Contact Periods:</b> <b>Lecture:45 Periods      Tutorial: 0 Periods      Practical:0 Periods      Total: 45 Periods</b>		

## TEXTBOOK

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

## REFERENCES

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

<b>COURSE OUTCOMES:</b> Upon completion of the course, the students will be able to:		<b>Bloom's Taxonomy Mapped</b>
<b>CO1</b>	Examine and compare the properties of most common and advanced building materials.	K2
<b>CO2</b>	Identify the appropriate quality of cementitious materials and properties of mortar.	K2
<b>CO3</b>	Gain Knowledge in protective materials.	K1
<b>CO4</b>	Select the suitable flooring and roofing materials.	K2
<b>CO5</b>	Recognize the characteristics and applications of plastic and composite materials.	K3

<b>25WPC202</b>	<b>PLANE AND GEODETIC SURVEYING</b>	<b>SEMESTER II</b>												
<b>PREREQUISITES</b>				<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>							
<b>NIL</b>				<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>							
<b>Course Objectives</b>	To understand the basic principle and concepts of different surveying methods to calculate various measurements using survey instruments.													
<b>UNIT – I</b>	<b>INTRODUCTION, LEVELLING AND CONTOURING</b>				<b>9 Periods</b>									
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.														
<b>UNIT – II</b>	<b>THEODOLITE SURVEYING</b>				<b>9 Periods</b>									
Theodolite–types–Terms–Temporary and Permanent Adjustments–Measurement of Horizontal Angles by Repetition and Reiteration – Closing Error and Distribution – Omitted measurements.														
<b>UNIT – III</b>	<b>CURVES AND HYDROGRAPHIC SURVEYING</b>				<b>9 Periods</b>									
Simple curves – Elements-Setting out of curves-Linear and angular methods. Shore line survey– Sounding–Equipment– Methods of Locating.														
<b>UNIT – IV</b>	<b>TRIANGULATION</b>				<b>9 Periods</b>									
Triangulation-classification –Routine- Intervisibility -Signals and Towers. Trigonometrical Levelling - Geodetical observations-Curvature correction- Refraction correction – Axis signal correction–Difference in elevation.														
<b>UNIT – V</b>	<b>MODERN SURVEYING INSTRUMENTS</b>				<b>9 Periods</b>									
Total Station-Principle-classification-working. Drone Surveying – Introduction - Applications. GPS- Developments –Basic Concepts–Segments –Applications. DGPS – Introduction.														
<b>Contact Periods:</b>														
<b>Lecture: 45 Periods</b>		<b>Tutorial: 0 Periods</b>		<b>Practical: 0 Periods</b>		<b>Total: 45 Periods</b>								

### TEXT BOOK:

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

### REFERENCES:

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

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

25WPC203	STRENGTH OF MATERIALS	SEMESTER II
PREREQUISITES		L T P C
ENGINEERING MECHANICS		3 0 0 3
Course Objectives	<ul style="list-style-type: none"> <li>• To learn the basics of shear and bending stresses and evaluate complex stress problems.</li> <li>• To understand the behavior of beams in bending and twisting.</li> <li>• To impart knowledge on different methods of finding deflection of beam.</li> <li>• To get the concepts on analysis of stresses in cylinders and columns.</li> </ul>	
UNIT – I	SIMPLE AND COMPLEX STRESSES	9 Periods
<b>Simple Stresses:</b> Axial Members - Deformation, strain, simple stress, Elastic constants - Compound Bars – Thermal Stresses <b>Complex Stresses:</b> Two mutually Perpendicular direct stresses – Principal Planes and Principal Stresses – Two-Dimensional Stress System – Mohr's circle		
UNIT – II	BEAMS	9 Periods
<b>Beams under bending:</b> 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. <b>Bending and shear stresses:</b> Bending Stress – Combined Direct and Bending Stresses - Shearing stress.		
UNIT – III	DEFLECTION OF BEAMS	9 Periods
<b>Deflection of beams:</b> Deflection Curve – Differential Equation – Double Integration Method – Macaulay's Method – Conjugate Beam Method.		
UNIT – IV	TORSION AND CYLINDERS	9 Periods
<b>Torsion:</b> 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. <b>Thin Cylinders:</b> Hoop and Longitudinal stresses – Volumetric Strain.		
UNIT – V	COLUMNS AND THEORIES OF ELASTIC FAILURE	9 Periods
<b>Columns:</b> 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. <b>Theories of Elastic Failure:</b> Failure theories – Factor of Safety – Graphical Representation of Theories for Two Dimensional Stress System.		
<b>Contact Periods:</b> Lecture: 45 Periods      Tutorial: 0 Periods      Practical: 0 Periods      Total: 45 Periods		

## TEXTBOOK

1	Rajput R.K. "Strength of Materials (Mechanics of Solids)", S.Chand & company Ltd., New Delhi, 7 <sup>th</sup> 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, “ <b>Mechanics of Materials</b> ”, Mc Graw Hill Education, 2015
2	Daniel Schodek and Martin Bechthold, “ <b>Structures</b> ”, Pearson India Education Services Pvt Ltd, 2015
3	Singh. D.K., “ <b>Strength of Materials</b> ”, Ane Books Pvt Ltd., New Delhi, 2021.
4	Beer. F.P. & Johnston. E.R. “ <b>Mechanics of Materials</b> ”, Tata McGraw Hill, 8 <sup>th</sup> Edition, New Delhi 2019.

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

<b>25WPC204</b>		<b>ENGINEERING GEOLOGY</b>	<b>SEMESTER II</b>								
<b>PREREQUISITES</b>											
<b>NIL</b>			<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>					
<b>Course Objectives</b>	To understand the importance of geological knowledge such as earth, minerals, rocks and apply Geological Knowledge in projects such as dams, tunnels, bridge constructions.										
<b>UNIT – I</b>			<b>GENERAL GEOLOGY</b>				<b>9 Periods</b>				
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.											
<b>UNIT – II</b>			<b>MINERALOGY</b>				<b>9 Periods</b>				
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.											
<b>UNIT – III</b>			<b>PETROLOGY</b>				<b>9 Periods</b>				
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.											
<b>UNIT – IV</b>			<b>STRUCTURAL GEOLOGY</b>				<b>9 Periods</b>				
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.											
<b>UNIT – V</b>			<b>GEOLOGICAL INVESTIGATIONS</b>				<b>9 Periods</b>				
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											
<b>Contact Periods:</b> <b>Lecture:45 Periods      Tutorial: 0 Periods      Practical:0 Periods      Total: 45 Periods</b>											

### TEXT BOOK

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

### REFERENCES

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

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

25WPC205	MATERIALS TESTING LABORATORY	SEMESTER II		
PREREQUISITES		L T P C		
	NIL	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.			
<b>LIST OF EXPERIMENTS</b>				
<ol style="list-style-type: none"> <li>1. Mechanical properties of tor steel rod</li> <li>2. Tension and compression test on springs.</li> <li>3. Test on Bricks: Visual observation, Compression test, Water absorption test and Efflorescence test</li> <li>4. Hardness test on different metals.</li> <li>5. Deflection test on simply supported beams.</li> <li>6. Deflection test on cantilever beams.</li> <li>7. Bending test on rolled steel joist</li> <li>8. Flexure test on tiles</li> <li>9. Compression test on Concrete Blocks.</li> <li>10. Demonstration on behaviour of columns</li> </ol>				
<b>Contact Periods:</b> <b>Lecture:0 Periods      Tutorial: 0 Periods      Practical:45 Periods      Total: 45 Periods</b>				

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