

Deenbandhu Chhotu Ram University of Science & Technology, Murthal (Sonapat)

SCHEME OF STUDIES & EXAMINATIONS

B.Tech. 2nd YEAR (SEMESTER – IV: CIVIL ENGINEERING)

Choice Based Credit Scheme w.e.f. 2019-20 (applicable to the students admitted in 2018)

S. No.	Course No.	Course Title	Teaching Schedule			Marks of Class work	Examination Marks		Total	Credit	Duration of Exam
			L	T	P		Theory	Practical			
1	MC 201C OR MC 203C	ENVIRONMENTAL STUDIES (GROUP-A) OR CONSTITUTION OF INDIA (GROUP-B)	2	-	-	25	75	-	100	0	3
2	ME 222C	BASICS OF THERMAL ENGINEERING	2	1	-	25	75	-	100	3	3
3	MGT 201C	ENGINEERING ECONOMICS (common with CHE)	3	-	-	25	75	-	100	0	3
4	CE 202C	STRUCTURAL ANALYSIS - I	3	1	-	25	75	-	100	4	3
5	CE 204C	OPEN CHANNEL FLOW	3	1	-	25	75	-	100	4	3
6	CE206C	GEOMATIC ENGG	3	-	-	25	75	-	100	3	3
7	CE208C	TRANSPORTATION ENGINEERING - I	3	1	-	25	75	-	100	4	3
8	CE 210C	STRUCTURAL ANALYSIS - I LAB	-	-	2	25	-	75	100	1	3
9	CE 212C	OPEN CHANNEL FLOW LAB	-	-	2	25	-	75	100	1	3
10	CE 214C	GEOMATIC ENGINEERING LAB	-	-	2	25	-	75	100	1	3
11	CE216C	TRANSPORTATION ENGINEERING - I LAB	-	-	2	25	-	75	100	1	3
12	GFCE 202C	GENERAL FITNESS IN CIVIL ENGINEERING	-	-	-	-	-	75	75	-	3
Total			19	4	8	275	525	375	1175	22	

MOOC :

Human Resources and Development

Note:

- The students will be allowed to use non-programmable scientific calculator. However, sharing/exchange of calculator is prohibited in the examination.
- Electronics gadgets including Cellular phones are not allowed in the examination.
- Each student has to undergo Survey Camp of 2 weeks to be conducted by the Department during summer vacation and evaluation shall be carried out in the V Semester.
- For student admitted in B. Tech. 1st Semester (C-Scheme) in 2019 and all trailing students, Examinations and evaluation shall be conducted as per guidelines AICTE Examinations Reforms covering the entire syllabus. The students shall be made aware about the reforms.



(Common for all branches of B. Tech.)

L	T	P	Credits	
3	0	0	0	Class-work Marks: 25
				Exam Marks: 75
				Total Marks: 100
				Duration of Examination: 3 Hrs

Course Objectives:

To make students conscious citizens of India and well equip them to explain and understand the importance of constitution of the country

Course Contents:

**Unit I
Philosophy of Indian Constitution**

**Ideological Basis and Salient Features of Indian Constitution
Fundamental Rights & Duties of the Citizens
Directive Principles of State Policy**

Unit II

Nature and Dynamics of Indian Federalism

**Federalism: Theory and Practice in India
Federal Features of the Indian Constitution
Legislative, Administrative and Financial Relations between the Union and the States**

Unit III

Union and State Legislature

**Parliament: Composition, Functions and Working of the Parliamentary system
State Legislature: Composition and Functions of Vidhan Sabha/ Vidhan Parishad**

Unit IV

Centre and State: Executive and Judiciary

**President, Prime Minister and Council of Ministers
Governor, Chief Minister and Council of Ministers
Judiciary: Supreme Court; High Court**

Course Outcomes:

At the end of the course students will be able to

1. To understand basic features of the constitution and rights and duties of Indian citizens
2. To understand the basic structure of Centre and State Government



ME 222C BASICS OF THERMAL ENGINEERING

B. Tech. Semester – IV (Civil Engineering)

L	T	P	Credits
3	-	-	3

Class Work	: 25 Marks
Examination	: 75 Marks
Total	: 100 Marks
Duration of Examination	: 3 Hours

UNIT - I

Basic Concepts: concept of continuum, macroscopic approach; Thermodynamic systems-closed, open and isolated; state, path and process. Quasistatic process, work, modes of work, Zeroth law and temperature scales, concept of temperature and heat, ideal and real gases.

First Law of Thermodynamics: Concept of Internal energy, Specific heat capacities. Enthalpy, Energy balance for closed and open systems, Energy balance for steady- Flow Systems. Steady Flow Engineering Devices, Energy balance for Unsteady Flow.

UNIT - II

Second Law of Thermodynamics- Thermal energy reservoir, heat engines energy conversion, Kelvin's and Clausius Statements of second law, The Carnot cycle, the carnot theorem, The thermodynamic temperature scale, The Carnot heat engine and its efficiency, the Carnot refrigerator and heat pump, and its COP. Clausius Inequality, concept of entropy, principle of increase of entropy- availability, the increase of entropy principle, perpetual - motion machines, reversible and irreversible processes.

Entropy- Entropy change of pure substances, isentropic processes, property diagrams involving entropy, entropy change of liquids and solids, the entropy change of ideal gases, reversible steady-flow work, minimizing the compressor work, isentropic efficiencies of steady flow devices, entropy balance. Energy-a measure of work potential, including work potential of energy, reversible work and irreversibility, second law efficiency, concept of exergy change of a system, energy transfer by heat, work, and mass, concept of decrease of exergy principle and exergy destruction, energy balance: closed systems and control volume energy balance.

UNIT - III

Properties of Pure Substance- Thermodynamic properties of pure substance in solid , liquid and vapor phases; Phase rule; P-V, P-T, T-V, T-S, H-S diagrams; PVT surfaces; Thermodynamic properties of steam, use of standard thermodynamic tables and Mollier diagram; Elementary Calculations of work done and heat transfer in non-flow and flow processes.

Ideal and real gases -Ideal and real gases, and thermodynamic relations -Gas mixtures-properties of ideal and real gases, Equation of state, Avagadro's law, van der Waal's Equation of state, compressibility factor, compressibility chart; Dalton's law of partial pressure. Exact differential, T-D relations, Maxwell relations; Clausius-Clapeyron equation; Joule-Thompson coefficient

UNIT - IV

Power Cycles – vapor and combined power cycles, Carnot vapor cycle, Rankine cycle; ideal cycle for vapor power, the ideal reheat and regenerative and the simple second law analysis of vapor power cycles. Gas power cycles including basic considerations in the analysis of power cycles, the Carnot cycle and its value in engineering, overview of reciprocating engines, air standard assumptions, gasoline engine, Otto cycle.

B. Tech. (Civil Engg.) 2nd Year : Approved in 14th meeting of Academic Council held on 11.06.2019. Effective from Academic Session 2019-20 and applicable to all students admitted in 2018 and onwards.



Basics of air conditioning and refrigeration: Psychrometry, property calculations of air vapor mixtures, and psychrometric chart and Psychrometric process- sensible and latent heat exchange processes, adiabatic mixing, evaporative cooling. Basics of refrigeration: Refrigeration cycles, refrigerants and refrigerant property tables; Refrigerators and heat pumps; ideal reversed Carnot cycle and vapor compression refrigeration cycle, actual vapor compression refrigeration cycles, Heat pump systems, Gas refrigeration cycles, and basic absorption refrigeration systems.

TEXT BOOKS:

1. P K Nag , Engineering Thermodynamics , Tata McGraw Hill, New Delhi
2. Çengel, Thermodynamics-An Engineering Approach, Tata McGraw Hill, New Delhi.

REFERENCE BOOKS:

1. Sonntag, Borgnakke and Van Wylen, Fundamentals of Thermodynamics, Wiley Sons, Singapore.
2. Moran M.J. and Shapiro H.N., Boettner, D.D. and Baily, M. Fundamentals of Engineering Thermodynamics, John Wiley & Sons, Singapore.
3. Jones and Dugan, Engineering Thermodynamics –, Prentice Hall, New Delhi.

Note:

1. In Semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attend only five questions selecting atleast one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

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MGT201C Engineering Economics

B.Tech. 2nd YEAR (SEMESTER –III)
Electronics & Communication Engineering

(Common with 3rd Semester Mech, CSE and 4th Semester Civil & Chemical Engg.)

L	T	P	Credits
3	0	0	3

Class Work	: 25
Examination	: 75
Total	: 100
Duration of Exam	: 3 Hours

Unit 1 (10 Lectures)

Concept of Economics- various definitions, nature of Economic problem, Micro and macro economics- their features and scope, production possibility curve, Relationship between Science, Engineering Technology and Economics. Utility: Concept and measurement of utility, Law of Diminishing Marginal Utility, Law of equi-marginal utility – its importance and practical applications.

Unit 2 (12 Lectures)

Demand: Concept, Individual and Market demand schedule, Law of demand, shape of demand curve. Elasticity of demand: Concept, measurement of elasticity of demand, factors affecting elasticity of demand, practical application of elasticity of demand. Various concepts of cost-Fixed cost, variable cost, average cost, marginal cost, money cost, real cost, opportunity cost. Shape of average cost, marginal cost, total cost etc. in short run and long run.

Unit 3 (12 Lectures)

Meaning of production and factors of production; Law of variable proportions, Law of Return to Scale, Internal and External economies and diseconomies of scale. Meaning of Market, Type of Market- perfect Competition, Monopoly, Oligopoly, Monopolistic competition (Main features of these markets).

Unit 4 (11 Lectures)

Supply and Law of Supply, Role of Demand & Supply in Price Determination and effect of changes in demand and supply on price. Nature and characteristics of Indian economy, privatization – meaning, merits and demerits. Globalisation of Indian economy – meaning, merits and demerits.

Text Books:

1. Ahuja H.L. "Micro Economic Theory" S. Chand Publication, New Delhi
2. Dewett K.K "Modern Economic Theory" S. Chand Publication, New Delhi
3. Jain T.R, Grover M.L, Ohri V.K Khanna O.P, "Economics for engineers" V.K. Publication, New Delhi
4. Dr. R.K. Agarwal & Rashmi Agarwal, " Principles and Applications of Economic", Pragati Prakashan.

Suggested Books:

1. Jhingan I. Jhingan M.L "Micro Economic Theory" S.Chand Publication, New Delhi
2. Chopra P.N "Principle of Economics" Kalyani Publishers, Delhi
3. Mishra S.K "Modern Micro Economics" Pragati Publication Mumbai.
4. Dwivedi D.N "Micro Economics " Pearson Education, New Delhi.

Course Outcomes: Upon successful completion of this course:

1. Students will acquire the skills to apply the basics of economics and cost analysis to engineering and take economically sound decision.

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CE 202C: STRUCTURAL ANALYSIS I

B. Tech. 2nd Year (Semester – IV)

L T P Credits
3 1 -- 4

Class Work : 25 Marks
Examination : 75 Marks
Total : 100 Marks
Duration of : 3 Hours
Examination

Course Outcomes :

At the end of the course, the student will be able to:

CO1	Identify the method of analysis for determinate and indeterminate structures.
CO2	Understand the importance of various methods for analyzing the different structural members.
CO3	Use of influence line diagram to solve various structural problems.
CO4	Understand the concept of Cables and suspension Bridges with different support conditions.

Prepare CO-PO/PSO Articulation Matrix, e.g.:

	PO1	PO2	PO3	PO4	PO6	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	3	1	3	1	1	2	1	2	2	3	2
CO2	3	3	2	2	1	1	2	1	2	2	3	2
CO3	2	2	3	3	1	1	2	1	2	2	3	2
CO4	2	2	2	3	1	2	2	2	2	2	3	2

UNIT I

Analysis of Dams, chimneys and Retaining Walls: Introduction, limit of eccentricity for no tension in the section, core of the section, middle third rule, wind pressure on chimneys.

Analysis of Indeterminate Structures: Degree of static and kinematic indeterminacies, analysis of indeterminate beams, pin jointed frames, rigid frames and trusses by method of consistent deformation, effect of lack of fitness, temperature, method of least work, induced reactions on statically indeterminate beams, pin jointed frames, rigid frames and trusses due to yielding of supports, Analysis of two hinged and fixed arches.

UNIT II

Fixed and Continuous Beams: Analysis of fixed beams, continuous beams and propped cantilevers by moment-area theorem and strain energy method, fixed end moments due to different types of loadings, effects of sinking and rotation of supports, bending moment and shear force diagrams for fixed beams and propped cantilevers, slope and deflection of fixed beams, analysis of continuous beams by the three moment theorem (Clapeyron's theorem) due to different types of loadings.

UNIT III

Rolling Loads: Introduction to rolling loads and influence lines, Determination of shear force, bending moment at a section and absolute shear force and bending moment due to single point load, uniformly distributed load, several point loads etc.

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B. Tech. 2nd Year (Semester – IV)

L T P Credits
3 1 – 4

Class Work
Examination
Total
Duration
Examination

: 25 Marks
: 75 Marks
: 100 Marks
of : 3 Hours

COURSE OUTCOMES:

Students after studying this course will be able to -

1. Understand flow patterns through channels.
2. Measure the flow through channels, gates and spillways.
3. Understand the hydraulic jump pattern and its applications.
4. Select and utilize hydraulic machine correctly according to the circumstances.
5. Know the details and importance of various hydraulic machines.

	PO1	PO2	PO4	PO6	PO7	PO9	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	2	1	-	1	-	2	2	1	2	1
CO2	3	1	-	1	2	2	1	-	3	3	1
CO3	1	2	2	2	1	2	1	2	1	2	2
CO4	2	1	1	2	2	1	2	-	-	1	2
CO5	1	1	2	1	-	2	3	1	3	1	2

Unit I

Flow in Open Channels: Difference between pipe flow and channel flow, Types of channels, Classification of flows, Sub Critical and Supercritical Flows, Velocity distribution in channel.

Flow Measurement: Flow over notches and weirs, Pitot tube floats and current meters for velocity measurement, Flow over Spillways, Sluice gates, Freeoverfall flow.

Unit II

Unsteady flow and Hydraulic jump: Froude number and types of hydraulic jump, Applications Jumps in channels. Unsteady flow equation, Pre jump and post jump depths, length of Hydraulic Jump and energy dissipation, Surges.

Concepts of Specific energy and specific Force: Specific energy and specific curve, Momentum Equation in open channels, Specific force & specific force curve Critical depth and its computation.

Unit III

Gradually Varied Flow: Channel transitions, Non-uniform flow in open channels, Dynamic equation for GVF, Water surface profiles in channels of different slopes GVF flow computations, Design of Channels, Most efficient channel sections.

Unit IV

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Pumps and Turbines: Reciprocating pumps, their types, work done by single and double acting pumps. Centrifugal pumps, components and parts and working, types, heads of a pump-statics and manometric heads., Force executed by fluid jet on stationary and moving flat vanes., Turbines-classifications of turbines based on head and specific speed, component and working of Pelton wheel and Francis turbines, Cavitation.

Text Books:

1. K.G. Ranga Raju, "Flow Through Open Channels", Tata McGraw Hill, New Delhi.
2. F. M. Hendersen, "Open Channel Flow", McMillan, New York.

Reference Books:

1. K. Subramanya, "Flow in Open Channels", Tata McGraw Hill, New Delhi.
2. R. H. French, "Open-Channel Hydraulics", McGraw Hill Publishing Company, New York.

Note:

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UNIT – IV

Data analysis: Image Interpretation Elements, Keys and Aids. Basic Instrumentation. Visual analysis of data

Photogrammetry: Aerial and terrestrial, applications, types and geometry of aerial photograph, flight planning, relief displacement, Stereoscopy, photogrammetric mapping, Mosaics

Text Books

1. Geomatic Engineering, Manoj K Arora, RC Badjatiya, Nem Chand & Bros.
2. Remote Sensing and Image Interpretation, by Lillisand, T.M. & Kiefer R.W., John Wiley and Sons.
3. Introduction to Remote Sensing, by Campbell, J.B. Taylor and Francis.
4. Principles of Geographic information systems, Burrough, P.A and MacDonnel, R.a , Oxford University press
5. Concepts and Techniques of GIS, C.P.Lo, Albert K.W. Yeung, PHI

Reference Books

1. Digital Remote Sensing, by Nag. P. & Kudrat, M. Concept Publication Company.
2. Remote Sensing and Photogrammetry – Principles and Applications, by Jhanwar, M.L. and Chouhan, T.S. VigyanPrakashan, Jodhpur.

Note:

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CE 208C: TRANSPORTATION ENGINEERING – I

B. Tech. 2nd Year (Semester – IV)

L	T	P	Credits
3	1	--	4

Class Work :	25 Marks
Examination :	75 Marks
Total :	100 Marks
Duration of Examination:	3 Hours

COURSE OUTCOMES:

After completion of this course students will be able to

1. Develop skills of highway material testing and carryout construction and maintenance procedures.
2. Design road geometrics for various types of highways.
3. Design rigid and flexible pavements.
4. Conduct various traffic engineering studies and design traffic facilities.

CO-PO/PSO Articulation Matrix, e.g.:

	PO1	PO2	PO4	PO6	PO7	PO8	PO9	PO11	PSO1	PSO2	PSO3
CO1	-	-	3	1	1	1	-	1	1	3	2
CO2	3	3	-	1	-	-	-	1	1	3	-
CO3	3	3	-	-	1	2	-	1	1	3	-
CO4	2	2	3	2	1	-	1	1	1	3	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) "-": no correlation

UNIT – I

Highways development Planning: Introduction, Different modes of transport, Development of Transport System, Phased development of Roads in India. Highway Surveys & Alignment, Design, Drawings, Estimates & Project Report.

Highway materials and testing: sub grade, sub base and base course materials, bituminous materials, testing of soil, aggregate and bitumen.

UNIT – II

Geometric Design of Highways: Introduction, Highways Classification, Right of way, Land width, width of formation, width of pavement, Sight Distances, camber, horizontal and vertical Road Curves, Transition Curves.

Design of Pavements: Types of pavements, Factors affecting design of pavements, wheel load factor, Climatic Factors, Structure of Flexible pavement, Function of various components of Flexible pavement,

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Influence Lines: Construction of Influence lines for reaction, shear forces and bending moment for simply supported, overhanging and compound beams, influence lines for girders with floor beams, Influence lines for forces in members of frames.

UNIT IV

Arches: Introduction, Analysis of two hinged, two hinged and fixed arches, spandrel braced arches, Influence lines for horizontal thrust, shear force and bending moment for three hinged and two hinged arches.

Cables and suspension Bridges: Introduction, shape of a loaded cable, cable carrying point loads and UDL, cables with ends at different level, cable subjected to temperature stresses, suspension bridge with two hinged and three hinged stiffening girders, influence lines.

Text Books

1. Elementary Structural Analysis, Norris & Wilbur, McGraw Hill Publisher,
2. Basic Structural Analysis, C.S. Reddy, Tata McGraw Hill Publication.
3. C K WANG, "Intermediate Structural Analysis" McGraw Hill Publisher

Reference Books

1. Structural Analysis (A unified approach), D.S. Parkash Rao, University Press.
2. Theory of structures, Punmia and Jain, Luxmi Publications.
3. Structural Analysis Thandvamoorthy TS Oxford University Press
4. Structural Analysis Devdas Menon Narosa Publishing House

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CE 206C: GEOMATICS ENGINEERING

B. Tech. 3rd Year (Semester – IV)

L T P Credits
3 - - 3

Class Work : 25 Marks
Examination : 75 Marks
Total : 100 Marks
Duration of : 3 Hours
Examination

COURSE OUTCOMES:

On completion of the course, the students will be able to:

1. Understand basics of advanced surveying techniques in different fields of civil engineering
2. Know the basics interaction of EMR
3. Be familiar with the data processes and analysis of RS Data
4. Figure out the use of Photogrammetry in surveying

	PO1	PO2	PO4	PO6	PO7	PO11	PSO1	PSO2	PSO3
CO1	3	-	-	1	1	1	-	2	1
CO2	1	3	1	2	1	1	1	3	1
CO3	2	3	2	1	-	1	1	2	1
CO4	2	2	3	2	2	-	1	3	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) "-": no correlation

UNIT – I

Introduction to Geomatic Engineering, GIS, GPS, DEM, DTED, Large scale mapping, small scale mapping, Components of GIS, Application of GIS in civil engineering
Remote Sensing, Fundamentals, EMS, RS System, Active and Passive radiation – Electromagnetic Radiation – Nomenclature, Reflectance, Transmission and Absorption, Thermal Emission – Plank's formula, Stefan – Boltzman Law, Wein's Displacement Law; Emissivity – Kirchoff's Law, Characteristics of Solar Radiant Energy, Application of remote sensing to various engineering fields

UNIT – II

Interaction of EMR with Atmosphere – Scattering, Refraction, Absorption, Transmission. Atmospheric Windows.

Interaction of EMR with Earth Surface – Spectral Reflectance Curves. Interaction of earth surface with EM radiation in visible, NIR, TIR and Microwave regions. Idealised & Real sequence of remote sensing.

UNIT – III

Sensors and Platforms: Platforms, Orbital characteristics, Storage and Retrieval of data. IRS satellite systems – Introduction, Stages of development, Sensors, Types of scanning system

Data Processing: Initial data statistics. Pre-processing – Atmospheric, Radiometric and Geometric corrections, Image Histogram, Classification of images

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design of flexible pavements by G.I. & CBR methods, stresses in rigid pavements, design of rigid pavements by IRC method.

UNIT – III

Traffic Studies: Road user characteristics, Importance of traffic studies, spot speed, speed and delay and origin and destination studies. Vehicular flow models. Stream variables: Spacing and concentration, headway and flow, mean speed. Time distance diagram of flow. Traffic operations and control devices, intelligent transport systems.

Road Safety Audits: Road Safety Audits: Safety concerns in highway projects, Systems approach, various stages of Safety Audit, Preparation of Audit Reports.

UNIT – IV

Highway construction: road types--earth roads, gravel roads, WBM/WMM/BBM base courses, GSB, surface treatments, premix carpet, mastic asphalt, DBM, bituminous concrete and cement concrete roads. Construction methods of bituminous and cement concrete roads, Modern Construction Equipments: earthwork, roadwork and lifting equipments: Excavators, Loaders, Dozers, Graders and scrapers; Milling Machine, Modern Paver, Compactor; Tower Crane, Tractor Crane.

Maintenance: Introduction, Maintenance of Earth, gravel, WBM, GSB, WMM Roads, Bituminous Roads, Maintenance of berms, Side Slopes, Pavement edge and draining work. Failures of flexible and rigid pavements: Maintenance, evaluation and its strengthening.

Text Books

1. Highway Engineering by Khanna and Justo, Nem Chand & Brothers, Roorkee
2. Highway Engineering by L.R. Kadyali, Nem Chand & Brothers, Roorkee

Reference Books

1. Highway Engineering by Oglesby and Hews
2. Transportation Engineering by G.V. Rao, Tata McGraw Hill Publisher, New Delhi
3. Principles of Pavement Design by E.J. Yodder
4. Traffic Engineering by Matson, Smith & Hurd

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