DEENBANDHU CHHOTU RAM UNIVERSITY OF SCEINCE & TECHNOLOGY, MURTHAL

SONEPAT

SCHEME OF STUDIES & EXAMINATIONS

B.Tech in CIVIL ENGINEERING

Choice Based Credit System

(effective from Session 2018-19)

Deenbandhu Chhotu Ram University of Science & Technology, Murthal (Sonepat)
SCHEME OF STUDIES & EXAMINATIONS
B.Tech. 2nd YEAR (SEMESTER – III: 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/D		Theory	Practical			
1	MC 203C OR MC 201C	CONSTITUTION OF INDIA (GROUP-A) OR ENVIRONMENTAL STUDIES (GROUP-B)	2	-	-	25	75	-	100	0	3
2	ECE 209C	BASIC ELECTRONICS	2	-	-	25	75	-	100	2	3
3	BT 221C	BIOLOGY FOR ENGINEERS (common with BT and ME)	3	-	-	25	75	-	100	3	3
4	Maths	MATHS III (TRANSFORM AND DISCRETE MATHEMATICS	2	-	-	25	75	-	100	2	3
5	CE 201C	STRENGTH OF MATERIALS	3	1	-	25	75	-	100	4	3
6	CE 203C	SURVEYING	3	1	-	25	75	-	100	4	3
7	CE 205C	FLUID MECHANICS	3	1	-	25	75	-	100	4	3
8	CE 207C	BUILDING CONSTRUCTION AND MATERIALS	3	-	2	25	75	-	100	4	3
9	CE 209C	STRENGTH OF MATERIALS LAB	-	-	2	25		75	100	1	3
10	CE 211C	SURVEYING LAB	-	-	2	25		75	100	1	3
11	CE 213C	FLUID MECHANICS LAB	-	-	2	25		75	100	1	3
12	ECE 289C	BASIC ELECTRONICS LAB	-	-	2	25		75	100	1	3
Total			**21**	**3**	**10**	**300**	**600**	**300**	**1200**	**27**	

MOOC Humanities and Social Sciences

Note:

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

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

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

MC 201C Environmental Studies

(Common for all branches of B.Tech and B.Arch)

L	T	P/D	Credits			
3	--	--	0	Field Work	:	25Marks
				Examination(Theory/Practical)	:	75Marks
				Total	:	100 Marks
				DurationofExamination	:	3 Hours

UNIT I **10 lectures**

The Multidisciplinary Nature of Environmental Studies, .Introduction to Environment: Definition, Scope, and importance of environmental studies; need for public awareness.
Environmental Pollution: Definition, Cause and effects of: Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Role of an individual in prevention of pollution, Pollution case studies

UNIT- II **10 lectures**

Natural Resources: Water resources: over-utilization, floods, drought, dams-benefits and problems; Mineral resources: Use and exploitation, environmental effects; Food resources : changes caused by modern agriculture, fertilizer-pesticide problems, water logging, Energy resources : Growing energy needs, renewable and non renewable energy sources; Land resources : Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

UNIT –III **10 lectures**

Ecosystems and Biodiversity: Concept of an ecosystem, Structure and function, Energy flow, Ecological succession, ecological pyramids. Concept of Biodiversity, definition and types, Hot-spots of biodiversity; Threats to biodiversity, Endangered and endemic species of India, Conservation of biodiversity.

UNIT –IV **08 lectures + 05 lectures**

Social Issues and Environment: Water conservation, rain water harvesting, Environmental ethics: Issues and possible solutions. Climate change, global warming, acid rain, ozone layer depletion, Public awareness. Population growth, variation among nations, Family Welfare Programme.Human Population and the Environment - Population growth, Population explosion, Women and Child Welfare.

Field Work - Visit to a local area to document environmental assets—river/forest/grassland/hill/ mountain. Visit to a local polluted site—Urban/Rural/Industrial/Agricultural. Study of common plants, insects, birds. Study of simple ecosystems—pond, river, hill slopes, etc (Field work equal to 5 lecture hours)

Total : 43

COURSE OUTCOMES:

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

- Develop concepts of basic environmental factors.
- Introduce to the students the basic understanding of ecosystem and its structural and functional aspects and vast biodiversity
- Outline aspects of environmental issues.
- Understand the knowledge of energy resources and their environmental implications

REFERNCE BOOKS:

1. A Textbook of Environmental Studies by Asthana D.K. and Asthana Meera
2. Fundamental Concepts in Environmental Studies by Mishra D.D.
3. Environmental Studies by S.C Sharma M.P Poonia
4. Textbook of Environmental Studies for Undergraduate by ErachBharucha
5. Environmental Studies: Third Edition by R. Rajagopalan

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.

For student admitted in B. Tech. 1st Year (C-Scheme) in 2019 and all trailing students.

Examinations and evaluation of students shall be conducted as per guidelines AICTE Examinations Reforms covering the entire syllabus. The students shall be made aware about the reforms.

ECE 209C: BASIC ELECTRONICS

B. Tech. 2nd Year (Semester – III)

L	T	P	Credits			
1	-	--	1	Class Work	:	25 Marks
				Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

UNIT I

Diodes and Applications : Semiconductor Diode - Ideal versus Practical, Resistance Levels, Diode Equivalent Circuits, Load Line Analysis; Diode as a Switch, Diode as a Rectifier, Half Wave and Full Wave Rectifiers with and without Filters; Breakdown Mechanisms, Zener Diode – Operation and Applications.

UNIT II

*Special Semiconductor :*Opto-Electronic Devices – LEDs,LCD,Photo Diode ,Phototransistor,solar cell,Silicon Controlled Rectifier (SCR) – Operation, Construction,Characteristics, Ratings, Applications.

UNIT III

Transistor Characteristics : Bipolar Junction Transistor (BJT) –Construction, Operation, Common Base, Common Emitter and Common Collector Configurations, Operating Point, Transistor as Amplifiers and Oscillators; Field Effect Transistor (FET) – Construction, Characteristics of Junction FET, Depletion and Enhancement type Metal Oxide Semiconductor (MOS) FETs, Introduction to CMOS circuits.

UNIT IV

Operational Amplifiers and Applications covering, Introduction to Op-Amp, Differential Amplifier Configurations, CMRR, PSRR, Slew Rate; Block Diagram, Pin Configuration of 741 Op-Amp, Characteristics of Ideal OpAmp, Concept of Virtual Ground.

Text/Reference Books:

1. David. A. Bell (2003), *Laboratory Manual for Electronic Devices and Circuits*, Prentice Hall, India
2. Santiram Kal (2002), Basic Electronics- Devices, Circuits and IT Fundamentals, Prentice Hall, India
3. Thomas L. Floyd and R. P. Jain (2009), *Digital Fundamentals* by Pearson Education, 4. Paul B. Zbar, A.P. Malvino and M.A. Miller (2009), *Basic Electronics – A Text-Lab. Manual*, TMH
5. R. T. Paynter (2009), *Introductory Electronic Devices & Circuits, Conventional Flow Version,* Pearson

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

1. **Understand various characteristics of semiconductor diodes and apply them for generating new applications.**
2. **Have knowledge about special semiconductor diodes and their characteristics.**

3. **Understand various transistor characteristics and their applications for designing other circuits.**
4. **Have knowledge of basic op-amp characteristics and their applications.**

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.

For student admitted in B. Tech. 1st Semester (C-Scheme) in 2019 and all trailing students, Examinations and evaluation of students shall be conducted as per guidelines AICTE Examinations Reforms covering the entire syllabus. The students shall be made aware about the reforms.

EE221C **BIOLOGY for Engineers**

B.TECH. (Common with BT, ME & CE 3rd Semester and CHE, EE & EEE 4th Semester)
Choice Based Credit System (effective from Session 2019-20)

SEMESTER-IV

L	T	P	Credits		
				Field work	: 25
3	1	0	4	Exam Marks	: 75
				Total Marks	: 100
				Duration of Examination	3 Hrs

UNIT-I

Introduction: Significance of biology; why study biology ; Biological observation in history that led to the discovery of some major engineering basics(Brownian motion & origin of thermodynamics); Fundamental similarities and difference between science and engineering- human as the best machines, comparison between eye camera, flying of a bird and aircraft etc.

Classification: classification based on (a) cellularity- unicellular or a multicellular (b) Ultrastructure-prokaryotes or eukaryotes (c) Energy and carbon utilization- autotrophs and lithotrophs (d) Ammonia excretion –aminotelic, uricotelic (e) Habit- aquatic or terrestrial ; Molecular Taxonomy three major kingdoms of life.

Single-celled organism-Microorganism and Microbiology: concept of single called organism , species and strains; Identification and classification of microorganism ; Ecological aspects of single celled organism; Microscopy.

UNIT-II

Biomolecules: Molecules of the life –Monomeric unit and polymeric structure –sugar , starch and cellulose , Amino acid and proteins; Nucleotides and DNA/RNA;Two carbon unit and lipids.

Proteins and Enzymes: proteins structure and function ; Hierarchy in protein structure –primary , secondary , tertiary and quaternary structure; proteins as enzymes, transporters , receptors and structural elements; Enzymes classification and mechanism of action ; Enzymes catalysed reaction ; Enzyme kinetic and kinetic parameters;RNA catalysis

UNIT –III

Genetics: Genetics is to biology what Newtons law are to physics; model laws of genetics; concept of allele, recessiveness and dominance, segregation and independent assortment; Genetic material passes from parent to offspring ; Epistasis; Mapping of phenotype yto genes, gene/linkage mapping ; single gene disorder in human ; meiosis and mitosis.

Genes, Chromosomes and information transfer: DNA as genetic material ; Hierarchy of DNA structure single stranded to double stranded to nucleosomes to chromosomes; Moleculear basis of information transfer concept of genetic code ; Universality and degeneracy of genetic code.

UNIT-IV

Metabolism: Similarities between fundamental principles of energy transaction in physical and biological world; Thermodynamics as applied to biological system; Exothermic and endothermic versus endergonic and exergonic reaction; Concept of $K_{eq}$and its relation to standard free energy ; Spontaneity; APT as an energy currency; Glycolysis and Krebs cycle (breakdown of glucose to CO_2 to H_2O); Photosynthesis (synthesis of glucose from CO_2 toH_2O); Energy Yielding and energy consuming reaction; Concept of energy change.

TEXT BOOK:

1. Biology : a Gopal approach Campbell , N.A Reece, J.B Urry ,Lisa; Cain M.L Wasserman , S.A Minorsky,P.VJackson, R.B Person Education ltd
2. Outline of Biochemistry , conn E.E Stumpf, P.K Burening ,G; Doi, R.H;John Wiley and sons

REFERENCE BOOK:

1. Principles of Biochemistry(V Edition) by Nelson, D.L; and Cox, M.M.W.H Freeman and company.
2. Molecular Genetics (second Edition) stent G.S; Calender , R.W.H Freeman Company Distributed by satishkumarjain for CBS Publisher.
3. Microbiology , Prescott, L.M.J.P; Harley and CA Klein 1995, 2nd edition W.M.C Brown Publisher.

Note:

3. 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.
4. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

For student admitted in B. Tech. 1st Semester (C-Scheme) in 2019 and all trailing students, Examinations and evaluation of students shall be conducted as per guidelines AICTE Examinations Reforms covering the entire syllabus. The students shall be made aware about the reforms.

MATH 215C
MATHEMATICS-III
(Transform & Discrete Mathematics)
B.Tech. Semester-III (CE)
(w.e.f. Session 2018-2019)

L T P
2 0 0 (2 Credits)

Marks for External Exam: 75
Marks for Internal Exam : 25
Total : 100
Duration of Exam : 3 Hours

UNIT-I (9 Lectures)

Basic operations on sets, Cartesian products, disjoint union (sum), and power sets. Different types of relations, their compositions and inverses. Different types of functions, their composition and inverses.

UNIT-II (9 Lectures)

Syntax and semantics, proof systems, satistiability, validity, soundness, completeness, deduction theorem etc. Decision problems of propositional logic. Introduction to first order logic and first order theory. Basic counting techniques - inclusion and exclusion, pigeon-hole principle, permutation and combination.

UNIT-III (9 Lectures)

Polynomials, Orthogonal Polynomials-Lagrange's, Chebysev Polynomials; Trigonometric Polynomials, LaplaceTransform, Properties of Laplace Transform, Laplace transform of periodic function. Finding inverse Laplace transform by different methods, solving ODEs by Laplace Transform method.

UNIT-IV (9 Lectures)

Fourier transforms: properties, methods, inverses and their applications.

Text Books:

1. C. L. Liu, Elements of Discrete Mathematics, 2nd Ed., Tata McGraw-Hill, 2000.
2. S. Lipschutz and M.L. Lipson, Schaum's Outline of theory and problems of Discrete Mathematics, 2nd Ed., Tata McGraw-Hill, 1999.
3. Erwin Kreyszig -Advanced Engineering Mathematics, 9th Edition, John' Wiley & Sons, 2006.
4. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.

Reference Books:

1. J.P. Tremblay and R.P. Manohar, Discrete mathematics with Applications to Computer Science, Tata McGraw-Hill, 1997.

2. R. C. Penner, Discrete Mathematics: Proof Techniques and Mathematical Structures, World Scientific, 1999.
3. Erwin Kreyszig -Advanced Engineering Mathematics, 9th Edition, John' Wiley & Sons, 2006.
4. S.S. Sastry, Engineering Mathematics, PHI, Vol. I & II.
5. Veerarajan T., Engineering Mathematics, Tata McGraw-Hill, New Delhi, 2008.

Course outcomes:

1. The students will understand different types of sets, relations and functions.
2. The students will understand Syntax and semantics, deduction theorem, decision problems of propositional logic and basic counting techniques: permutation and combination.
3. The students will be come across various Polynomials such as-Lagrange's, Chebysev Polynomials, Trignometric Polynomials.
4. The students will be able to solve various engineering mathematical problems using various transforms such as Laplace Transform and Fourier Transform.

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.

For student admitted in B. Tech. 1st Year (C-Scheme) in 2019 and all trailing students.

Examinations and evaluation of students shall be conducted as per guidelines AICTE Examinations Reforms covering the entire syllabus. The students shall be made aware about the reforms.

CE 201C STRENGTH OF MATERIALS
B. Tech. 2nd Year (Semester – III)

L	T	P	Credits
3	1	--	4

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

Course Outcomes :

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

CO1	Knowledge of various types of stresses and strains and their analysis
CO2	Analyze of forces on statically determinate beams
CO3	Analyze of deformations of statically determinate beams
CO4	Analyze of columns loaded axially and eccentrically.
CO5	Analyze the determinate trusses, thin cylinders and spheres.

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

	PO1	PO2	PO3	PO4	PO5	PO6	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	1	2	1	2	1	-	1	1	2	2	2
CO2	2	2	1	2	2	-	-	2	1	1	1	3	2
CO3	3	2	2	1	-	1	1	-	2	2	2	2	2
CO4	2	1	2	1	1	1	1	1	1	1	2	3	2
CO5	2	1	2	1	2	1	1	1	2	1	2	2	2

UNIT – I

Introduction: Concept of Equilibrium General Equilibrium equations, concept of free body diagrams , Concept of stress and strain, generalized Hooke's law, Stress-strain diagram of ductile and brittle material, compound and composite bars, thermal stresses, Analysis of Principal stresses and Strains, Mohr's stress circle, Relationship among elastic constants.

Shear force and Bending moment diagrams: Types of load on beam and frames, classification of beams, statically determinate and indeterminate problems, shear force and bending moment diagrams: simply supported, overhung and cantilever beams subjected to any combination of point loads, uniformly distributed and varying load and moment, relationship between load, shear force and bending moment.

UNIT – II

Theory of pure bending: Centroid of simple and built up section, second moment of area, derivation of flexural formula for straight beams, bending stress calculation for beams of simple and built up section, RCC beams.

Shear Stresses in Beams: Shear stress formula for beams, shear stress distribution in beams.

Slope & Deflection: Relationship between bending moment, slope & deflection, Mohr's theorem, moment area method, method of integration, Macaulay's method, calculations for slope and deflection of

(i) cantilevers and (ii) simply supported beams with or without overhang under concentrated load, Uniformly distributed loads or combination of concentrated and uniformly distributed loads.

UNIT – III

Torsion of Circular shafts: Basic assumptions, torsion formula, power transmitted by shafts, design of solid and Hollow shafts based on strength and stiffness.

Columns & Struts: Column under axial load, concept of instability and buckling, slenderness ratio, derivation of Euler's formulae for the elastic buckling load, Eulers, Rankine, Gordon's formulae Johnson's empirical formula for axial loading columns and their applications, eccentric compression of a short strut of rectangular & circular sections.

UNIT - IV

Strain energy: strainenergy under axial, bending, shear, torsion, gradual, sudden and impact loading, theories of failures

Analysis of determinate Trusses Introduction, determination of forces in member of trusses by method of joints, method of sections,Deflection of Joints of plane frames by castigliano's first theorem and unit load method.

Thin cylinder and Spheres: Introduction, stresses and strains in thin cylinders and spherical shell, volumetric change, wire wound thin cylinders, thin vessels subjected to internal pressure.

Text Books

1. Strength of Materials by G H Ryder, ELBS publishers
2 Elements of Strength of Materials by Timoshenko & Young, East- West Press, New Delhi
3 Mechanics of Materials by Beer and Johnston, Tata McGraw Hill.
4 Elementary Structural Analysis, Norris & Wilbur, McGraw Hill Publisher
5 Engineering Mechanics Shames

Reference Books

1. Strength of Materials by Sadhu Singh, Khanna Publishers
2. Basic Structural Analysis, C.S. Reddy, Tata McGraw Hill Publication.
3. Fundamentals of Solid Mechanics by M L Gambhir, Prentice Hall of India
4. Strength of Materials Ramamurtham and Narayanan, S. Chand & Co.
5. Fundamentals of Structural Analysis B D Nautiyal, New Age Publishers

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.

For student admitted in B. Tech. 1st Year (C-Scheme) in 2019 and all trailing students.

Examinations and evaluation of students shall be conducted as per guidelines AICTE Examinations Reforms covering the entire syllabus. The students shall be made aware about the reforms.

CE 203C: SURVEYING
B. Tech. 2nd Year (Semester – III)

L	T	P	Credits			
3	1	--	4	Class Work	:	25 Marks
				Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

COURSE OUTCOMES:

After completion of course the students will be able to

1. Know different methods and techniques used in surveying and the applications
2. Apply the concept of tachometry and levelling in surveying difficult and hilly terrains to obtain the topographical map of area.
3. To use survey instruments in carrying out survey, collect data, write reports and able to perform required calculations

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

UNIT – I

Introduction to Surveying: Definition, importance, Objectives, History of surveying and mapping, Importance, Maps and maps Numbering systems, Maps, Scale, Principles of survey, Classification of surveys, different techniques of surveying, Chain Surveying: Ranging, Chaining, Offsets, Errors in Chaining, Corrections to length measured with a tape

Compass surveying & Plane Table Surveying: Purpose of compass surveying, Comparison of compass surveying and chain surveying, Dip, Magnetic Declination, W.C.B., Q.B., and R.B Introduction to plane table surveying, principle, instruments, working operations, setting up the plane table, centering, leveling, Orientation, methods of plane table survey, danger circle, Lehmann's Rules, errors in plane tabling.

UNIT – II

Leveling: definitions of terms used in leveling, different types of levels, parallax, staves, adjustments, bench marks, classification of leveling, booking and reducing the levels, rise and fall method, line of collimation method, errors in leveling, permanent adjustments, Two peg test, reciprocal leveling, Corrections to curvature and refraction, cross sections and longitudinal leveling.

Trigonometric Leveling: Definitions & terms, curvature & refraction Methods: direct & reciprocal, eye and object correction, coefficient of refraction. **Contours:** Definition, representation of reliefs, horizontal equivalent, contour interval, characteristics of contours, methods of contouring, contour gradient, uses of contour maps.

UNIT – III

Tachometry: Definitions and terms used in tachometry, angular tachometry with staff vertical and staff inclined, Analytic lens theory, Tachometric field work, tangential method of tachometry, direct reading tachometer.

Theodolite Traversing: types of theodolities, measurement of angles, temporary and permanent adjustments, closed & open traverse, consecutive and independent co-ordinates, advantages & disadvantages of traversing closing error, Bowditch, Transit rules.

UNIT – IV

Triangulation: Triangulation systems, classification, strength of figure, selection of triangulation stations, grade of triangulation, field work of triangulation, triangulation computations, Introduction to EDM, Total Station and its working, survey adjustment and treatment of observation, adjustment of triangulation figures by method of least squares.

Curves: Definition, elements of a simple curve, different methods of setting out a simple circular curve, elements of a compound curve, reverse curves, introduction of transition curves, vertical curves and sight distances.

Text Books

1. Surveying volume 1 and 2 by S.K. Duggal, McGraw Hill Publishers, New Delhi
2. Surveying Vol. I and II by B.C. Punmia, Luxmi Publications, New Delhi
3. Syrveying and Levelling by R. Subramanian, Oxford University Press.
4. Plane Surveying by A.M. Chandra, New Age International Publishers

Reference Books

1. Surveying by N. Singh, Tata McGraw Hill, New Delhi.
2. A Text Book of Surveying by C.Venkataramiah, Universities Press, Hyderabad

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.

For student admitted in B. Tech. 1st Year (C-Scheme) in 2019 and all trailing students.

Examinations and evaluation of students shall be conducted as per guidelines AICTE Examinations Reforms covering the entire syllabus. The students shall be made aware about the reforms.

CE 205C: FLUID MECHANICS
B. Tech. 2nd Year (Semester – III)

L	T	P	Credits			
3	1	--	4	Class Work	:	25 Marks
				Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

COURSE OUTCOMES:

After completion of the course the students are able to -

1. Know the details of various types of flow and fluids properties.
2. Familiar with pressure measurements and flow measuring devices.
3. Apply the concept of stability of floating and submerged body.
4. Solve various problems related to fluid dynamics equations and types of losses in pipes.
5. Apply of concept of drag, lift and buoyancy on a fluid in real life.

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

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

UNIT - I

Scope& development of Fluid Mechanics Fluid properties – Density, Specific weight, Viscosity, Kinematic and Dynamic viscosity, Surface tension, Compressibility, Newtonian and Non Newtonian fluids, Types of fluids, capillary action. Kinematics of fluid motion, Classification of flow:, Continuity equations in Cartesian coordinates, Velocity Potential, Stream Function and Flow nets. Definitions of Reynolds Number, Froude Number, Mach Number, Weber Number and Euler Number.

UNIT - II

Fluid statics – Absolute and Gauge pressure, Measurement of pressure, Mechanical gauges, Barometers, Piezometers, Simple and Differential manometer, Inclined manometer, and Micro manometer. Hydrostatic forces on plane horizontal, Vertical and Inclined surfaces, Curved surface. Buoyant force, Archimedes principle, Metacentric height, Theoretical and Experimental determination of metacentric height. Stability of floating and submerged bodies, Dimensional Analysis and Dynamic Similitude, Buckingham's π-Theorem.

UNIT - III

Fluiddynamics and pipe flows – Euler's equation of motion, Bernoulli's equation and its limitations, Momentum equation, Energy and Momentum correction factors, Energy losses in pipe flows, Darcy-Weisbach equation, Estimation of friction factor, Loss at sudden expansion, contraction and bends, Pipe flow computations, Hydraulic gradient and total energy lines, Pipes in series and parallel. Flow measuring devices: Venturimeter and Orifice meters, etc.

UNIT - IV

Laminar flow- Navier stokes equation of motion (no derivation), Laminar flow through pipes, parallel plates, Couttee flow, Flow past a sphere, Stokes law.

Boundary layer Theory- development of boundary layer on a flat surface, boundary layer thickness, laminar and turbulent boundary layers, separation of boundary layer and methods for prevention.

Drag and Lift – Definitions, Pressure drag and Friction drag, Stream line and Bluff bodies, Total drag, Drag at different Reynolds numbers, Profile drag. Drag characteristics of two dimensional bodies, Circulation, Lift and Magnus effect, Lift characteristics.

Text Books:

1. R. J. Garde and Mirajgaonkar, "Engineering Fluid Mechanics", Nem Chand & Brothers, Roorkee.
2. K L Kumar, "Engineering Fluid Mechanics", Eurasia Publishing House.
3. R.K. Bansal, "Fluid Mechanics and Hydraulic Machine", Laxmi Publications(P) Ltd. New Delhi.

Reference Book

1. H. Schlichting, "Boundary Layer Theory", McGraw Hill Publishing Company, New York.
2. Fox R. W. and McDonald, A T, "Introduction to Fluid Mechanics", John Wiley Wilson
3. Fluid Mechanics Through Problems, R J Garde,Nem Chand & Brothers, Roorkee
4. Hydraulics and Fluid Mechanics, P N Modi & S M Seth
5. Streeter, V L and Benjamin, W E , "Fluid Mechanics", McGraw Hill.

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.

For student admitted in B. Tech. 1st Year (C-Scheme) in 2019 and all trailing students.

Examinations and evaluation of students shall be conducted as per guidelines AICTE Examinations Reforms covering the entire syllabus. The students shall be made aware about the reforms.

CE 207C: BUILDING CONSTRUCTION AND MATERIALS

B. Tech. 2nd Year (Semester – III)

L	T	P	Credits			
3	--	2	4	Class Work	:	25 Marks
				Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Outcomes :

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

CO1	Develop the conceptual knowledge in building material and masonry.
CO2	Select appropriate material like cement, steel stones etc. in given field situation.
CO3	Develop awareness about latest building materials.
CO4	Understand the importance of drawings in Civil Engineering and will be able to draw the drawings of various structural and non-structural members.

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

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	2	1	1	2	2	2	2	2	2	2	3	2
CO2	2	1	2	2	2	3	2	2	2	1	2	2	3	2
CO3	2	2	2	2	2	2	2	-	1	1	1	2	3	2
CO4	2	2	2	1	2	1	-	1	2	2	2	2	3	2

UNIT - I

Bricks: Composition of good brick earth, harmful ingredient, manufacture of bricks, characteristics of good bricks, testing of bricks, classification of bricks as per IS 1077-1985.

Rocks and Stones: Classification of rocks, test for stones, characteristics of a good building stone, deterioration of stones, common building stones of India, comparison of the brick work and stone work.

Timber: Classification and identification of timber, defects in timber, characteristics of good timber, seasoning of timber and its methods, preservation of timber,

UNIT - II

Cement: Types, Manufacture, basic properties of cement compounds, grades, packing, storage, quality control and curing, additives, special cements, all testing as per IS.

Steel: Manufacture of steel, market forms of steel e.g. mild steel and HYSD steel bars, rolled steel sections, stainless steel mortars

Aggregates: Classification of Aggregates, Characteristics of Aggregate, Deleterious Materials and Organic Impurities, Soundness, Alkali-Aggregate Reaction, Thermal Properties of Aggregate, Fine Aggregate, Coarse Aggregate, Broken Brick Coarse Aggregate, Testing of Aggregates

UNIT - III

Masonry, stone masonry, basic terms, materials for stone masonry, classification, dressing of stones, joints in stone masonry, Brick Masonry, laying tools, basic terms, bonding of bricks, tools, inspection of brickwork, strength of brick work, Cavity walls, features, wall ties, construction of cavity wall, Lintels.

Construction equipment's: Modern equipment's used in the construction of multi storey buildings and bridges

UNIT - IV

Earthwork, Damp proof course: Points of its requirement in buildings, D.P.C. at Plinth level, in basement and roof tops etc., Basement & Retaining walls. Drawings.
Foundation types and suitability, spread, arch, combined, cantilevered, Raft, Grillage, Piles & wells, Footings in block cotton soil, IS Specifications and drawings.
Stairs & Stair cases: Suitability of location, stairs in multi-storeyed buildings, Residential and public buildings, dimensions, Requirements, classification, types of stairs, Lift & escalators, drawings.

Text Books

1. Building Materials by P C Varghese, PHI.
2. Engineering Materials, by S.C. Rangawala, Charotar Publishing House, Anand.
3. Building Construction by Sushil Kumar, Standard Publisher and Distributors.
4. Building Construction by B. C. Punima, Laxmi Publisher House

Reference Books

1. Engineering Materials, by Sushil Kumar, Metropolitan Press
2. Engineering Materials by N.C. Choudhary, Technical Publishers.
3. Materials Science, J.C. Anderson & KDB Lever, ELBS fifth Edn., 2004.
4. Indian Practical Civil Engg. Handbook, P N Khanna, Engineers Publishers, 2000.
5. National Building Code, B. I. S.

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.

For student admitted in B. Tech. 1st Year (C-Scheme) in 2019 and all trailing students.

Examinations and evaluation of students shall be conducted as per guidelines AICTE Examinations Reforms covering the entire syllabus. The students shall be made aware about the reforms.

CE 209C: STRENGTH OF MATERIALS LAB
B. Tech. 2nd Year (Semester – III)

L	T	P	Credits			
--	--	2	1	Class Work	:	25 Marks
				Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Outcomes :

At the end of the course, the student will be able to: **A student will be able to achieve the followings if he undergoes through this laboratory course**

CO1	Testing materials' properties
CO2	Suitability of structural steel
CO3	Understand flexural and torsional behavior

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

	PO1	PO2	PO3	PO4	PO5	PO6	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	2	1	1	2	1	1	-	1	-	2	3	2
CO2	2	1	2	1	1	-	1	2	1	1	2	3	2
CO3	3	2	2	1	-	1	1	-	2	2	2	3	3

List of Experiments:

1. To determine Rockwell hardness number of the specimen of steel/soft metal.
2. To determine Brinnel hardness number of the specimen of steel/soft metal.
3. To determine Vickers hardness number of the specimen of steel/soft metal.
4. To study the behavior of ductile material under tension on Universal Testing Machine
5. To study the behavior of brittle material under tension on Universal Testing machine
6. To study the behavior of brittle material under compressionon Universal Testing machine
7. To determine the modulus of rigidity of brass bar on torsion testing machine
8. To determine the impact strength of M.S./C.I. specimen on Izod impact testing machine.
9. To determine the impact strength of M.S./C.I. specimen on Charpy impact testing machine.
10. To determine Young's modulus of the material of a beam simply supported at the ends and carrying a concentrated load at the center.

Note: Seven experiments are to be performed from the above list. Remaining three experiments should be performed as designed & set by the concerned Institution as per the scope of the syllabus.

CE 211C: SURVEYING LAB

B. Tech. 2nd Year (Semester – III)

L	T	P	Credits			
--	--	2	1	Class Work	:	25 Marks
				Examination	:	75 Marks
				Total	:	100Marks
				Duration of Examination	:	3 Hours

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

1. use conventional surveying tools such as chain/tape, compass, plane table, level in the field of civil engineering applications such as structural plotting and highway profiling
2. apply the procedures involved in field work using advanced surveying equipment and to work as a surveying team
3. take accurate measurements, field booking, plotting and adjustment of errors can be understood

	PO1	PO2	PO4	PO9	PSO1	PSO2	PSO3
CO1	3	2	2	2	1	2	1
CO2	1	3	1	-	-	3	1
CO3	3	3	2	1	1	2	1

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

List of Experiments

1. Chain Survey of an area
2. Leveling Exercises.
3. Measurement of vertical and horizontal angles with Theodolite.
4. Tachometric Survey
5. Tachometric Constants.
6. Two point / three point problem.
7. Plane table survey of an area.
8. Setting out a simple circular curve by different methods.
9. Setting out transition curve.
10. Measurements with Total Station.

Note: Ten experiments are to be performed in the Semester taking atleast seven experiments from the above list. Remaining three experiments should be performed as designed & set by the concerned Institution as per the scope of the syllabus.

CE 213C: FLUID MECHANICS LAB
B. Tech. 2nd Year (Semester – III)

L	T	P	Credits			
--	--	2	1	Class Work	:	25 Marks
				Examination	:	75 Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

LABORATORY OUTCOMES: upon successful completion of this course, it is expected that students will be able to:

1. Understand the flow calculation through orifice meter and venturimeter
2. Understand the application of Bernoulli equation
3. Use appropriate type of flow measuring devices.
4. Know various types of losses in pipe flow

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

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

List of Experiments

1. Verification of Bernoulli's Theorem.
2. Calibration of Venturimeter.
3. Calibration of an orifice meter.
4. Determination of Coefficients of Contraction, Velocity and Discharge of a circular orifice.
5. Determination of friction factor for pipes.
6. Visualization of laminar and turbulent flow and estimating critical Reynold's number.
7. Determination of metacentric height of a ship model.
8. To measure the velocity distribution over a flat surface in a wind tunnel and to determine the Reynold's no. and boundary layer thickness along the plate.
9. To measure the pressure distribution around a cylinder in a wind tunnel and to calculate the coefficient of drag at different Reynold's number.

Note: Students are required to complete at least eight experiments from the above list.

ECE 289C: BASIC ELECTRONICS LAB

B. Tech. 2nd Year (Semester – III)

L	T	P	Credits			
--	--	2	1	Class Work	:	25 Marks
				Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Experiment I: To conduct laboratory Session covering, Identification, Specifications, Testing of R, L, C Components (Colour Codes), Potentiometers, Switches (SPDT, DPDT and DIP), Bread Boards and Printed Circuit Boards (PCBs);

Experiment II: To conduct laboratory Session covering Identification, Specifications, Testing of Active Devices – Diodes, BJTs, JFETs, MOSFETs, Power Transistors, SCRs and LEDs.

Experiment III: To study the operation of Digital Multi Meter, Function / Signal Generator, Regulated Power Supply (RPS), Cathode Ray Oscilloscopes; Amplitude, Phase and Frequency of Sinusoidal Signals using Lissajous Patterns on CRO; (CRO);

Experiment IV: To examine the experimental Verification of PN Junction Diode Characteristics in A) Forward Bias B) Reverse Bias, Zener Diode Characteristics and Zener Diode as Voltage Regulator, Input and Output Characteristics of BJT in Common Emitter (CE) Configuration.

Experiment V: To study Drain and Transfer Characteristics of JFET in Common Source (CS) Configuration.

Experiment VI: Study of Half Wave and Full Wave Rectification, Regulation with Filters, Gain and Bandwidth of BJT Common Emitter (CE) Amplifier.

Experiment VII: To study Op-Amp Applications – Adder, Subtractor, Voltage Follower and Comparator; Op-Amp Applications – Differentiator and Integrator, Square Wave and Triangular Wave Generation.

Experiment VIII: To study Truth Tables and Functionality of Logic Gates – NOT, OR, AND, NOR, NAND, XOR and XNOR Integrated Circuits (ICs).

Experiment IX: To verify Truth Tables and Functionality of Flip-Flops – SR, JK and D Flip-Flop ICs.

Experiment X: To study Serial-In-Serial-Out and Serial-In-Parallel-Out Shift operations using 4-bit/8-bit Shift Register ICs; Functionality of Up-Down / Decade Counter ICs.

Note: Seven experiments are to be performed from the above list. Remaining three experiments should be performed as designed & set by the concerned Institution as per the scope of the syllabus.

B.Tech (Semester III/IV)
MC203C Constitution of India

(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**
3. **To get acquainted with the nature of parliamentary form of Government**
4. **To have knowledge of the executive and judiciary powers in Indian democratic set-up**

Scheme of End Semester Examinations (Major Test):

1. The duration of examinations will be three hours.
2. Nine questions of 15 marks each will be set out of which the students will have to attempt five questions in all.
3. First question of 15 marks will be compulsory. It will cover all the four units of the syllabus. The nature of the questions in each unit will depend upon the nature of content therein. The questions may have sub-parts with marks assigned against each.
4. Question No 02 to 09 of 15 marks each will be set from the four units of the syllabus --- two from each unit.
5. In addition to first compulsory question the students will have to attempt four more questions, selecting one from each unit.

Recommended Readings:

1. **Austin G.,** ***The Indian Constitution: Corner Stone of a Nation*****, New Delhi: Oxford University Press, 1966**
2. **Basu D.D.,** ***An Introduction to the Constitution of India*****, New Delhi: Prentice Hall, 1994**
3. **Kothari R.,** ***Politics in India*****, New Delhi: Orient Language, 1970**
4. **Siwach J.R.,** ***Dynamics of Indian Government andPolitics*****, New Delhi: Sterling Publishers, 1985**
5. **Bhambhri C.P.,** ***The Indian State--FiftyYears*****, New Delhi: Shipra, 1997**
6. **Ghai U.R.,** ***IndianPoliticalSystem*****, Jalandhar: New Academic Publishing Company, 2010**

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.

For student admitted in B. Tech. 1st Semester (C-Scheme) in 2019 and all trailing students, Examinations and evaluation of students shall be conducted as per guidelines AICTE Examinations Reforms covering the entire syllabus. The students shall be made aware about the reforms.

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. Quasisatic 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.

Basics of air conditioning and refrigeration: Psychrometry, property calculations of air vapor mixtures, and psychometric chart and Psychometric 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.

REFERNCE 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.

For student admitted in B. Tech. 1st Year (C-Scheme) in 2019 and all trailing students.

Examinations and evaluation of students shall be conducted as per guidelines AICTE Examinations Reforms covering the entire syllabus. The students shall be made aware about the reforms.

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, Internet and External economics and diseconomies of scale. Meaning of Market, Type of Marker– perfect Competition, Monopoly, Oligopoly, Monopolistic competition (Main features of these markers).

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 Ecomomic Theory" S. Chand Publication, New Delhi
2. Dewett K.K "Modern Ecomomic 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 1. Jhingan M.L"Micro Ecomomic 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.

2. Acquaint the student with the basic economic concepts and their operational significance.
3. Stimulate the student to think systematically and objectively about cotemporary economic problems.
4. In Decision making with the availability of limited resources in the organization these concepts will act as a guiding tool.

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.

For student admitted in B. Tech. 1st Year (C-Scheme) in 2019 and all trailing students.

Examinations and evaluation of students shall be conducted as per guidelines AICTE Examinations Reforms covering the entire syllabus. The students shall be made aware about the reforms.

CE 202C: STRUCTURAL ANALYSIS I

B. Tech. 2nd Year (Semester – IV)

L	T	P	Credits			
3	1	--	4	Class Work	:	25 Marks
				Examination	:	75Marks
				Total	:	100Marks
				Duration of Examination	:	3 Hours

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, windpressure on chimneys.

Analysis of Indeterminate Structures: Degree of static andkinematic indeterminacies, analysis of indeterminate beams, pin jointed frames, rigid frames and trusses by method ofconsistent deformation, effect of lack of fitness, temperature, method of least work, induced reactions onstatically 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 proppedcantilevers by moment-area theorem and strain energy method, fixed end moments due to differenttypes of loadings, effects of sinking and rotation of supports, bending moment and shear force diagrams forfixed beams and propped cantilevers, slope and deflection of fixed beams, analysis of continuousbeams by the three moment theorom (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 sectionand absolute shear force and bending moment due to single point load, uniformly distributed load, several
point loads etc.

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 linesfor 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 differentlevel, cable subjected to temperature stresses, suspension bridge with two hinged and three hingedstiffening 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

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.

For student admitted in B. Tech. 1st Year (C-Scheme) in 2019 and all trailing students.

Examinations and evaluation of students shall be conducted as per guidelines AICTE Examinations Reforms covering the entire syllabus. The students shall be made aware about the reforms.

CE 204C : OPEN CHANNEL FLOW

B. Tech. 2nd Year (Semester – IV)

L	T	P	Credits			
3	1	--	4	Class Work	:	25 Marks
				Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	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

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:

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.

For student admitted in B. Tech. 1st Year (C-Scheme) in 2019 and all trailing students.

Examinations and evaluation of students shall be conducted as per guidelines AICTE Examinations Reforms covering the entire syllabus. The students shall be made aware about the reforms.

CE 206C: GEOMATICS ENGINEERING

B. Tech. 3rd Year (Semester – IV)

L	T	P	Credits			
3	-	--	3	Class Work	:	25 Marks
				Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

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

UNIT – IV

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

Photogrammetry: Aaerial 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,AlbertK.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:

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.

For student admitted in B. Tech. 1st Year (C-Scheme) in 2019 and all trailing students.

Examinations and evaluation of students shall be conducted as per guidelines AICTE Examinations Reforms covering the entire syllabus. The students shall be made aware about the reforms.

CE 208C: TRANSPORTATION ENGINEERING – I

B. Tech. 2nd Year (Semester – IV)

L	T	P	Credits
3	1	--	4

Class Work : 25 Marks
Examination : 75Marks
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,

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 scrappers; 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

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.

For student admitted in B. Tech. 1st Year (C-Scheme) in 2019 and all trailing students.

Examinations and evaluation of students shall be conducted as per guidelines AICTE Examinations Reforms covering the entire syllabus. The students shall be made aware about the reforms.

CE 210C: STRUCTURAL ANALYSIS-I LAB

B. Tech. 2nd Year (Semester – IV)

L	T	P	Credits			
--	--	2	1	**Class Work**	:	**25 Marks**
				Examination	:	**75 Marks**
				Total	:	**100 Marks**
				Duration of Examination	:	**3 Hours**

Course Outcomes :

At the end of the course, the student will be able to: **A student will be able to achieve the followings if he undergoes through this laboratory course**

CO1	Knowledge of theorems and experiments.
CO2	understand analytical and practical behavior of the members.
CO3	understand computer applications for programming.

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

	PO1	PO2	PO3	PO4	PO5	PO6	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	1	1	2	1	2	1	2	2	3	2
CO2	3	3	1	2	1	1	1	1	1	2	3	2
CO3	2	2	1	1	3	1	1	2	1	2	3	2

List of Experiments:

1. To verify Betti's Law
2. To determine the flexural rigidity (EI) of a given beam.
3. To verify Moment-Area Theorems for slope and deflection of a beam.
4. To study the behavior of different types of struts.
5. To determine the elastic displacement of curved members.
6. To determine the horizontal displacement of the roller end in a curved beam.
7. To make computer programs for theoretical verification of the above experiments.

Text Books:

Experimental Methods in Structural Mechanics Kukreja C B andSastry V V

Note:

1. **Seven experiments are to be performed in the Semester.**

CE 212C: OPEN CHANNEL FLOW LAB

B. Tech. 2nd Year (Semester – IV)

L	T	P	Credits			
--	--	2	1	**Class Work**	:	**25 Marks**
				Examination	:	**75 Marks**
				Total	:	**100 Marks**
				Duration of Examination	:	**3 Hours**

Outcomes—

Students will be able to-

1. Perform various applications of Froude no.
2. Determine the open channel flow pattern.
3. Know about calibration of venturimeter, current meter etc.
4. Effects of various types of roughness coefficients in a channel.

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

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

List of Experiments:

1. To determine Manning's co-efficient of roughness for the rough bed of a given flume.
2. To measure the velocity distribution in a rectangular channel by Prandtl Pitot tubeand to determine the energy correction factors
3. To study the flow through a horizontal contraction in a rectangular open channel.
4. To calibrate a current meter
5. To study the formation of hydraulic jump in a horizontal rectangular open channel (Measurement of Froude no. and energy loss)
6. To study the flow over a hump in a channel bed.
7. To study the pressure distribution along the spillway surface for different heads.
8. To calibrate a broad-crested weir and to study the pressure distribution along its surface.
9. To calibrate a venturi flume.
10. To study the flow under a sluice gate and formation of hydraulic jump at different Froude no.

Note: Ten experiments are to be performed in the Semester taking atleast seven experiments from the above list. Remaining three experiments should be performed as designed & set by the concerned Institution as per the scope of the syllabus.

CE 214C: GEOMATICS ENGINEERINGLAB

B. Tech. 2nd Year (Semester – IV)

L	T	P	Credits			
--	--	2	1	**Class Work**	**:**	**25 Marks**
				Examination	**:**	**75 Marks**
				Total	**:**	**100 Marks**
				Duration of Examination	**:**	**3 Hours**

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	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	-	1	2	1	3	2
CO2	3	3	2	1	-	1	3	-
CO3	1	1	1	2	1	-	1	2
CO4	2	2	3	1	1	1	3	1

List of Experiments

1. Study of Aerial photographs.
2. Study and image interpretation of remote sensing data.
3. Introduction to CAD/GIS/Image Processing software
4. Study of digital image characteristics such as:
   - DN value,
   - Histogram,
   - Color image generation,
   - Simple Image enhancement,
   - On-screen digitization from images,
   - Area computation,
   - Geo-registration of images etc.

Note: The students will perform all above mentioned experiments.However, some more experiments may be performed as designed & set by the concerned Institution as per the scope of the syllabus.

CE 216C : TRANSPORTATION ENGINEERING-I LAB

B. Tech. 3rd Year (Semester – IV)

L	T	P	Credits			
--	--	2	1	Class Work	:	25 Marks
				Examination	:	75 Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

COURSE OUTCOME

After completion of this course students will be able to

1 Learn testing procedure for determination of mechanical properties of highway materials.

2 Perform various traffic studies.

3 Acquire basic ability of Accident Analysis.

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

	PO1	PO2	PO4	PO9
CO1	-	-	3	-
CO2	1	2	3	2
CO3	1	2	3	-

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

List of Experiments:

1. To test toughness of road Aggregates by Impact Test (CO-1)
2. To test hardness of aggregates by Los Angles Abrasion Test (CO-1)
3. To perform Crushing Strength Test on Aggregates (CO-1)
4. To identify grade of bitumen using Penetration Test. (CO-2)
5. To test the ductility of bitumen using Ductility test. (CO-2)
6. To test water absorption and specific gravity of road aggregates using density basket. (CO-1)
7. To find out Softening Point of Bitumen. (CO-2)
8. To find out Flash & fire point of bitumen. (CO-2)
9. To determine spot speed of traffic by radar speedometer and endoscope. (CO-3)
10. To conduct CBR test on samples of subgrade. (CO-3)
11. To perform classified traffic Volume count on a road section. (CO-3)
12. Study of Fir Performa and analysis of data extracted from FIR. (CO-4)

GFCE 202C GENERAL FITNESS FOR CIVIL ENGINEERING

B. Tech. Semester – IV (Civil Engineering)

L	T	P	Credits	Examination	:	75Marks
-	--	--	-	Total	:	75 Marks

The purpose of this course is to inculcate a sense of professionalism in a student along with personality development in terms of quality such as receiving, responding, temperament, attitude and outlook. The student efforts will be evaluated on the basis of his/ her performance / achievements in different walks of life.

A Faculty Counselor will be attached to a group of students which will remain associated with him /her during the entire period of the degree program in the University. Each faculty member will serve as a faculty counselor. They will act like a local guardian for the students associated with him / her and will help them in terms of career guidance, personal difficulties.

A. The student will present a written report before the committee with following in view:

The student will present before the committee his/her achievements during the current academic session in the form of a written report highlighting followings:

I. Academic Performance (10 Marks)

II. Extra Curricular Activities / Community Service, Hostel Activities **(10 Marks)**

III Technical Activities / Industrial, Educational tour **(10 Marks)**

IV Sports/games **(10 Marks)**

A student will support his/her achievement and verbal & communicative skill through presentation before the examiners. **(15 Marks)**

C. Faculty Counselor Assignment **(20 Marks)**

It will be the duty of the student to get evaluated by respective faculty counselor and to submit the counselor assessment marks in a sealed envelope to the committee.

A counselor will assess the student which reflects his/her learning graph including followings:

Discipline throughout the year

Sincerity towards study

How quickly the student assimilates professional value system etc.

University Departments:

1 Chairperson of the Department Chairman
2 Senior Most Faculty Counselor Member
3 Vice- Chancellor's Nominee Member

Affiliated Colleges:

1 Director/Principal Chairman
2 Head of the Department/Sr. Faculty Member
External Examiner to be appointed by the University Member