

**Gauhati University**  
**Faculty of Engineering**  
**Revised Syllabus and Course Structure for BE courses**  
**w.e.f July 2006**

**Assam Engineering College  
BE (Revised) course structure**

*Proposed and accepted for 2006 batch of BE admitted in July 2006*

**Break up of total marks and weightage**

Semester	Total marks	% weight		Marks Carried over	
		Normal entry	Lateral entry	Normal entry	Lateral entry
First	1100	10%		110	
Second	1200	10%		120	
Third	1150	20%	40%	230	460
Fourth	1150	20%	20%	230	230
Fifth	1150	70%	70%	805	805
Sixth	1150	70%	70%	805	805
Seventh	1200	100%	100%	1200	1200
Eighth	1100	100%	100%	1100	1100
	<b>Total cumulative marks</b>			<b>4600</b>	<b>4600</b>

## **1<sup>st</sup> and 2<sup>nd</sup> Semester**

**Branch:** Common to all branches**Year:** First year**Semester:** First

Sl. No.	Course No.	Subject	Periods			Evaluation Scheme					
			L	T	P	Sessional Exam			ESE	Subject Total	Credit
						TA	CT	Tot			
Theory											
1	PH101	Physics-I	3	1		30	20	50	100	150	4
2	CY102	Chemistry-I	3	1		30	20	50	100	150	4
3	MA103	Mathematics-I	3	1		30	20	50	100	150	4
4	CE104	Elements of Civil Engineering	3	1	3	30	20	50	100	150	4
5	HU105	Eng Communication and Tech report Writing	2			15	10	25	50	75	2
Practicals/Drawing/Design											
6	CE106	Engineering Graphics-I	1		3	30	20	50	100	150	4
7	CS107	Introduction to Computing		2	2	15	10	25	50	75	2
8	ME108	Workshop-I			3	50	50	100		100	2
9	PH101L	Physics-I Lab			3	10		10	40	50	2
10	CY102L	Chemistry-I Lab			3	10		10	40	50	2
Total			15	6	17						

**Total Marks: 1100****Total Periods: 38****Total Credits: 30***TA: teachers assessment**CT: Class Test**ESE: End Semester Exam***Notation followed while assigning course numbers:*****First two letters:*** The department offering the course:*PH:Physics; CY: Chemistry, MA: Maths; HU: Humanities; CE: Civil Engg; ME:Mech Engg;**IP: Industrial Production Engg. ; EE: Electrical Engg; IN: Instrumentation Engg.;**ET: Electronics Engg; CS: Computer Science; CH: Chemical Engg.****1<sup>st</sup> Digit:*** Semester in which the course is offered.***2<sup>nd</sup> Digit:*** Department for which the course is offered*0: the course is common to some branches; 1: CE; 2: ME; 3: IP; 4:EE; 5: INS; 6: ET; 7: CS; 8: ChE****3<sup>rd</sup> Digit:*** Serial number for the specific semester of the branch concerned***L :*** Denotes laboratory

**Branch:** Common to all branches

**Year:** First year

**Semester:** Second

Sl. No.	Course No.	Subject	Periods			Evaluation Scheme					
			L	T	P	Sessional Exam			ESE	Subject Total	Credit
						TA	CT	Tot			
1	PH201	Physics-II	3	1		30	20	50	100	150	4
2	CY202	Chemistry-II	3	1		30	20	50	100	150	4
3	MA203	Mathematics-II	3	1		30	20	50	100	150	4
4	ME204	Engg. Mechanics-I	2			15	10	25	50	75	2
5	CE205	Strength of Materials	2			15	10	25	50	75	2
6	EE206	Basic Electrical Engg -I	3	1		30	20	50	100	150	4
Practicals/Drawing/Design											
7	ME207	Engineering Graphics-II			4	30	20	50	100	150	4
8	ME208	Workshop-II			3	50	50	100		100	2
9	PH201L	Physics-II Lab			3	10		10	40	50	2
10	CY202L	Chemistry-II Lab			3	10		10	40	50	2
11	ME204L	Engg Mech-I Lab			2	15	10	25		25	1
12	CE205L	Strength of Materials Lab			2	15	10	25		25	1
13	EE206L	Basic Electrical Engg-I Lab			3	10		10	40	50	2
Total			16	4	20						

**Total Marks: 1200**

**Total Periods: 40**

**Total Credits: 34**

*TA: teachers assessment*

*CT: Class Test*

*ESE: End Semester Exam*



# **Detailed Syllabus of 1<sup>st</sup> and 2<sup>nd</sup> semester**

**PH101 Physics-I (3-1-0) Credits:4**

**Theory: 100**

**Sessional:50**

**Time: 3 hours**

**Group-A : General Physics**

Angular momentum, Relation between torque and angular momentum

Simple harmonic motion, few examples, superposition

Relation between elastic constants, Energy of strained body, torsional balance, Bending of beam, Cantilever

Poiseulli's formula, Stoke's law, Bernoullis Equation

**GroupB : Heat**

1<sup>st</sup> and 2<sup>nd</sup> law of thermodynamics, Isothermal and adiabatic changes, Carnot engine,

Otto cycle, Carnot theorem, reversible and irreversible process, entropy, entropy of perfect gas and steam, thermodynamic temperature scale, Black body radiation, Stefan's law, Pyrometer.

**Optics**

Aberation in lenses, spherical aberration, remedy, chromatic aberration, achromatism, Interference Fresnel Biprism)

**Group C: Electricity and Magnetism**

Gauss's theorem and its applications, Poisson's and Laplaces equation, Lorentz force, Biot savart law & ampere's law, their application, L-C-R circuit.

Dia, para and ferromagnetism, hysteresis.

Laser (Basic principle and uses)



**CH102 Chemistry-I (3-1-0) Credits:4**

**Theory: 100**

**Sessional:50**

**Time: 3 hours**

**Unit-I**

**General Chemistry**

55 Marks

Quantum ideas for discussing atomic and molecular structure- chemical bonding; Molecular and Crystal structure-Covalent inorganic and Organic Compounds, ionic solids; hybridization, close packing of atoms and ions. Insulator and conductors-electronic structure and properties of solids.

Acid and bases- pH and pKa; Oxidation and Reduction, standard reduction Potential.

Laws and application of thermodynamics- phase Rule, critical behavior of substances, Chemical kinetics , catalysis, Electrolytic conduction and electrolysis

**Unit-II**

**Electrochemistry**

30 Marks

Electrochemical Cells- EMF of a cell, Electrodes, reference electrodes, ion-selective electrodes, glass electrodes, Commercial electrochemical cells and batteries: batteries-properties, classification, cell reactions and performance. Lead-acid battery, dry cell, Ni-cd battery, lithium battery, alkaline battery, Fuel cell.

Corrosion and material oxidation: Chemical and electrochemical corrosion, pitting and water line corrosion, passivation of surfaces, protective measures against corrosion-anodizing, galvanizing. Corrosion inhibition

**Unit-III**

**Chemistry in Everyday life**

15 Marks

Chemistry and modern society- general aspects; plastics, reinforced plastics and rubbers as materials for the production of household goods; Polymers in medicine and surgery; batteries for powering domestic appliances; Paints and dyes, Lubricants; adhesives; soaps and detergents; Oils and fats, Elements of Nutritional Chemistry; drugs and cosmetics

**Unit I: Differential Calculus:**

**30 Marks**

Successive derivatives, Leibniz's theorem, tangent and normal, derivative of arc length (Cartesian & Polar), Taylor's Series and Maclaurin's Series, expansion of functions, Asymptotes, curvature, curve tracing, Functions of two or more variables, Partial derivatives, Homogeneous function (Definition)

**Unit II: Integral**

**30 Marks**

**Calculus:**

Reduction formulae for indefinite integrals involving power of circular functions of x and Product of  $\sin^m x \cos^n x$ ; Deduction of

$$\int_0^{\pi/2} \sin^n x dx ; \int_0^{\pi/2} \cos^n x dx ; \int_0^{\pi/2} \sin^n x \cos^n x dx$$

Length of plane curves (Cartesian & Polar), Areas under Plane curves (Cartesian & Polar), Volume and surface area of solids of revolution of plane curves.

**Unit III Differential equations:**

**28 Marks**

Solution of ordinary first order and first degree differential equation of the following forms: Homogeneous, reducible to homogeneous, Linear, reducible to linear, Exact, reducible to exact. ODE of 1<sup>st</sup> order but not of first degree, higher order linear equation with constant coefficients, Cauchy's homogeneous linear equation, simultaneous linear equations with constant Co-efficient.

**Unit IV Vector algebra:**

**12 Marks**

Triple product of vector and their applications.

**Texts/ references:**

- |                                     |   |
|-------------------------------------|---|
| 1. Differential Calculus            | B.C. Das & B.N. Mukhejee                                      |
| 2. Integral Calculus Ltd B.         | B. C. Das & U. N Dhar & Sons Pvt                              |
| 3. Calculus                         | James Stewart: Thomson books                                  |
| 4. A Text book of Vector algebra    | Shanti Narayan: S. Chand & CO.                                |
| 5. A text book of Engineering Maths | N.P Bali,<br>Dr. N. Ch. Narayan Iyenger<br>Laxmi Publication. |

**CE104 Elements of Civil Engineering(3-1-0) Credits:4**

**Theory: 100**

**Sessional:50**

**Time: 3 hours**

**Part A: \_\_\_\_\_ marks 50**

**I. Building Material:**

Historical development of Building Materials , Structural properties and classification. Properties and use (manufacturing process not required).

Ferrous Metals- Cast Iron, Wrought Iron, Steel.

Non- Ferrous Metals- Aluminium, Lead, Copper.

Alloys- Brass, Bronze, Gypsum, Plaster of Paris.

Common Materials- Stone, Sand, Lime, Bricks, Tiles, Cement, Timber, Plastics, Paints, Glass.

Materials Used for Damp proofing, Termite Proofing, Fire Protection, Thermal insulation, Acoustic Treatment, Road works.

**II. Building Construction:**

Development of construction, Order of Architecture, Modern Architecture.

Types of Buildings, Components of Building (Assam type, R.C.C.).

Water Supply, Sanitary and Electrical works in Buildings.

Fire and Earthquake safety in Building.

**Part B: \_\_\_\_\_ Marks 50**

**Surveying:**

Definition-Classification-General Principles Basic terms, Use of Survey.

Linear measurement-chain and tape- types- errors and correction, Numerical exercises.

Angular measurement using compass, Bearing & Meridian-types, measurement and computation, declination, Traversing with compass-closed & open, measurement and numerical exercise.

Introduction to Leveling, definition of basic terms, Level Book, entries, observation and reduction of Levels, Numerical problems.

Introduction to modern surveying equipments & techniques e.g., EDM & Total Station, Photogrammetry and Remote Sensing (Just indicative introduction), GPS.

**Highway Engineering:**

Classification of roads in India.

Ideal cross-section and related terms with sketches. Types of pavements- flexible, rigid and semi-rigid. Introduction to Earth, Gravel, WBM and Bituminous road.

Traffic control mechanisms- Divider, rotary, Road Sign.

**Books:**

Building Materials: Building materials: S K Duggal

Building materials: Rangwalla

Building Construction: Building Construction: B C Punmia

Estimation: Estimating and Costing(Civil engg) by G S Birdie

Surveying: Surveying and leveling: N N Basak; Tata McGraw Hill pub co.

Surveying, Vol-I: Dr K R Arora

Surveying Vol-II: Dr B C Punmia

Highway Engg by S K Khanna, CEG Josto; Nem Chand & Bros.

**HU105 English Communication and Technical Report Writing (2-0-0)**

**Credits:2**

**Theory: 50**

**Sessional:25**

**Time: 1 1/2 hours**

**Part I: Grammar and Usage:**

**25 marks.**

1. i.. Sentence structures, ii. Tenses, iii. Determiners, iv. Negatives, v. Question patterns, vi. Narration, vii. Voice, viii. Phrases and Idioms, ix. Conjunctions and Relatives, x. Commands, requests obligation etc, xi. Adverbials, xii. Prepositions, xiii. Punctuations.
2. i. Composition and Comprehension.  
ii. Letter writing/ Paragraph writing or precis.
3. Poetry: a). Shakespeare by Matthew Arnold  
b). The Road not Taken - Robert Frost.
4. Prose:  
a) The White Stocking - D.H. Lawrence  
b) The Devoted Sons- Anita Desai

Books recommended:

1. Modern English Grammar and Usage- N. Krishnaswamy. (Macmillan)
2. A Remedial English Grammar for Foreign students- Wood (Macmillan).
3. A Practical English Grammar- Thomson & Martinet, O.U.P,
4. Read to Understand - Donald Dallas, O U. P.
5. For Prose and Poetry- Selections from English Poems and stories; Bhaskar Publications

**Part II. Technical Report Writing:**

**25 Marks**

- (1). Principles of professional communication and /Technical Report writing: classification of Technical reports; Structure and parts of technical Reports.
- (2). Mechanics of presentation of Technical Information, Forms, content and Language:  
General Procedure of Technical Report writing, Planning, Collection and Drafting.

**Sessionals: 25 marks:**

1. Class test on Grammar and Usage.
2. Home Assignments on Technical Report writing.

**CE106 Engineering Graphics-I (1-6-0) Credits:4**

**Theory: 100**

**Sessional: 100**

**Time: 4 hours**

**1. Drawing instruments:**

Handling and use.

**2. Lines and lettering:**

Types, thickness, shades dimensioning, familiarity with relevant IS codes.

**3. Scales:**

Reducing and increasing scales, representative fraction, types of scales-plain, diagonal, comparative, vernier and scale of chords.

**4. Curves used in engineering practices:**

Conic Section-ellipse, parabola and hyperbola normals and tangents to conic sections, cycloids, trochoid, epicycloids. hypocycloids. epitrochoid. hypotrochoid involutes. archimedean, spiral, logarithmic spiral, helix.

**5. Projections:**

Various types, orthographic projections. IS specifications, projection of points in different quadrants.

**6. Projection of line:**

Inclined one plane and parallel to other. Inclined to both planes, contained by a plane perpendicular to both planes, true length of a line and its inclination to reference plane, traces of a line.

**7. Projection of a plane:**

Traces of a plane, projection when a linear edge on the plane makes a given angle, the plane figure makes given angles, a line or edge and plane figure makes object angles. oblique planes.

**8. Projection of solids:**

Simple solids in different positions, axis perpendicular to a plane axis parallel to both planes, axis parallel to one plane and inclined to the other, axis inclined to both planes. axis or edges makes given angles the face of a solid makes given angles, spheres. sections of solids.

**9. Development of surfaces:**

Simple cases.

**Books:**

Elementary Engineering drawing; N D Bhatt, Pradeep Publications  
Engineering Drawing; M B Shah, B C Rana, Pearson education

**CS107 Introduction to Computing (0-0-2) Credits:2**  
**Practical: 50**  
**Sessional:25**

**Introduction:** Concept of hardware, software and firmware. Introduction to computer devices –such as keyboard, mouse, printers, disk, floppies, memory devices, I/O devices, file system etc. Concept of operating system –such as DOS, Windows, MAC-OS, LINUX, UNIX. (only user level description)

**Introduction to Computer Networks:** Brief description on LAN, WAN, e-mail, ftp, http, client server concept, world wide web, rlogin and other network services.

**Program Development and Programming Languages:** Brief discussion on different types of programming languages. Definition of algorithm and computer programming. Introduction to C language, Programming in C language, identifiers, data types, operators in C language. Header and Library files. Simple program using assignment statements.

**Flow Charts:** Use of Flow Charts. Symbols and their uses.

**Introduction to Editing Tools:** vi or MS-VC editors.

**Conditional Control statements:** if, nested if, switch-case etc.

**Loop Control statements:** for, while, do-while etc.

**Arrays: Definition** and example of arrays. Single dimension and multi dimensional arrays.

**Functions:** Type of functions, function definition, function prototype, declaration, function calling. Formal argument & actual argument. Parameter passing technique, UDF & Library function.

**Recommended Books:**

1. *Programming in C (Tata McGraw Hill) –Gatterfried*
2. *C in depth (bpb) –S K Srivastava.*
3. *Programming in C (Tata McGraw Hill) –E Balaguruswamy.*
4. *Introduction to C Programming –.Jayashree.*

**PHY 101L Physics Practicals-I (0-0-4) 2 Credits**  
**Total Marks 50 (40+10)**

1. DETERMINE THE YOUNG'S MODULUS OF THE WIRE BY USING SEARLE' APPARATUS.
2. DETERMINE THE RESISTANCE OF THE GIVEN GAL VANOMETER BY USING A POST OFFICE BOX.
3. DETERMINE THE RIGIDITY MODULUS OF THE MATERIAL OF THE GIVEN ROD BY STATICAL METHOD.
4. DETERMINE THE RATIO OF E.M.F. OF TWO CELLS BY USING A POTENTIOMETER.
5. DETERMINE THE TEMPERATURE CO-EFFICIENT OF THE MATERIAL OF THE GIVEN RESISTANCE BY USING A METRE BRIDGE.
6. FIND THE CO-EFFICIENT OF VISCOSITY OF WATER BY CAPILLARY FLOW METHOD.
7. DETERMINE THE POWERS OF THE GIVEN LENSES (ONE CONCAVE & ONE CONVEX) BY USING AN OPTICAL BENCH.
8. FIND THE MOMENT OF INERTIA OF THE GIVEN SOLID ABOUT ITS OWN AXIS BY USING THE M.I. TABLE.
9. DETERMINE THE HORIZONTAL COMPONENT OF EARTH'S MAGNETIC FIELD BY USING MAGNETOMETER.

## SECOND SEMESTER

**PH201 Physics-II (3-1-0) Credits:4**

**Theory: 100**

**Sessional:50**

**Time: 3 hours**

### Optics

Diffraction —Single slit, transmission grating

Polarization, double refraction, Nichol's prism

Hour -7

### Accoustics

Accoustics of buildings, Sabine's formula, Sound recording and reproduction, Ultrasonics.

### X-Ray & Solid State Physics

X-ray Spectra, Moseley's law, Space lattice, Unit cell, Miller indices,

Origin of energy bands, classification of solids.

Hour : 2+6

### Atomic Physics

Vector atom model, Pauli's exclusion principle Natural and artificial radioactivity, Nuclear reactions, fission and fusion, Nuclear reactor.

Hour- 8

### Quantum Mechanics

Failure of classical concepts, De- Broglie hypothesis, Uncertainty principles, Wave Packets.

Phase and Group velocities.

Hour-3

### Special theory of Relativity

Gallilean Transformation, Lorentz transformation, Length contraction and time dilation.

Hrs-3

### Electronics

Characteristics of Triode, Valve, Triode as amplifier and oscillator, Basic transistor Circuit.

Hour-3

### **Books: for Physics-I and Physics-II**

1. Engineering Physics – P V. Naik.
2. Engineering Physics - Uma Mukherjee.
3. Engineering Physics - R. K. Gaur & S. Gupta.
4. A Text Book on Engineering Physics — B. L. Theraja.
5. Physics- part I & II — Resnick Haliday.
6. A Treatise on Heat — Saha & Srivastava.
7. General properties of matter — D. S. Mathur.
8. Principles of acoustics — Basudev Ghosh.
9. Introduction to special Relativity — J. H. Smith.
10. Introduction to Special Relativity — Robert Resnick.
- II. Electricity & Electronics — D. C. Tayal.
12. Electricity & Magnetism — Brijjal & Subramanayam.
13. Quantum Mechanics — Powell & Craseman.
14. Quantum Mechanics — Pauling & Wilson.



1. DETERMINE THE RADIUS OF CURVATURE OF A CONVEX LENS USING NEWTON'S RING.
  
2. DETERMINE THE VALUE OF MECHANICAL EQUIVALENT OF HEAT 'J' USING JOULE'S CALORIMETER (APPLY RADIATION CORRECTION).
  
3. DETERMINE THE SPECIFIC HEAT OF THE GIVEN LIQUID BY THE METHOD OF COOLING.
  
4. DETERMINE THE ANGLE OF THE PRISM AND THE ANGLE OF MINIMUM DEVIATION AND THEN THE REFRACTIVE INDEX OF THE MATERIAL OF THE PRISM.
  
5. MEASURE THE CURRENT FLOWING THROUGH AN EXTERNAL CIRCUIT WITH THE HELP OF A STANDARD CELL AND A POTENTIOMETER.
  
6. DETERMINE THE SPECIFIC RESISTANCE OF THE MATERIAL OF THE GIVEN WIRE USING A METER BRIDGE (APPLY END CORRECTION).
  
7. COMPARE THE VALUE OF TWO RESISTANCES BY USING A POTENTIOMETER.
  
8. DETERMINE THE TEMPERATURE CO-EFFICIENT OF A PLATINUM WIRE BY USING A METER BRIDGE.
  
9. DETERMINE THE REFRACTIVE INDEX OF A LIQUID BY USING A PLANE MIRROR AND CONVEX LENS.

**CH202 Chemistry-II (3-1-0) Credits:4**

**Theory: 100**

**Sessional:50**

**Time: 3 hours**

Unit-I

**Organic-inorganic Compounds and Combustion of fuels 50 marks**

Organic Compounds and their importance: - Synthetic and Natural Polymers-formation, properties and applications, biodegradability of polymers; conductive polymers.

Carbohydrates, nucleic acids, proteins. Natural products and ideas about their isolation and characterization

Elementary ideas about co-ordination and organometallic compounds, their properties and applications

Introduction to bio-organic and bio-inorganic chemistry

Combustion- heat of reaction, calculation of energy changes in chemical reactions.

Unit-II

**Materials and their properties 25 marks**

Introduction to magnetic, electrical and optical properties of materials.

Glasses and plastics; Electronic materials- semiconductors and superconductors- applications.

Ceramics and refractories; Zeolites and clays- structure and applications.

Cements- composition, setting and hardening of cement.

Composites- composition, strength and durability; dielectrics. Organic materials- Liquid crystals

Introduction to nanomaterials and nanotechnology

Unit-III

**Biochemistry and Biotechnology 25 Marks**

Principles and selected aspects of biochemical phenomena.

Introduction to biotechnology- connections with chemistry. Applications of computers and information technology; drugs – their discovery and action- bioinformatics and cheminformatics

**MA203 Mathematics-II (3-1-0) Credits:4**

**Theory: 100**

**Sessional:50**

**Time: 3 hours**

**Unit I: Differential Calculus: .**

**25 Marks**

Euler's Theorem on homogeneous function, derivatives of Composite functions, total derivatives, Jacobians, Taylor's theorem for a function of two variables, Maxima & Minima, Lagrange's method of undetermined multipliers, Errors and approximations, Tangent Plane and normal to a surface.

**Unit 2: Integral Calculus: .**

**25 Marks**

Differentiation under integral sign (Leibniz's rule), multiple integrals, Areas and Volumes by double and triple integrals, Improper integrals, Beta and Gamma functions.

**Unit 3: Vector Calculus: .**

**25 Marks**

Differentiation of vector functions, scalar and vector fields, gradient of a Scalar functions, directional derivative, Divergence and curl of a vector point function, physical interpretation of gradient, divergence and curl, properties of grad, div & curl; Repeated operation by  $\nabla$ ; Integrations of vector functions, Line, surface and Volume integrals, Theorems of Gauss, Stokes and Green.

**Unit 4: Fourier series:**

**10 Marks**

Fourier series expansion of  $f(x)$  in  $c < x < c + 2\pi$ , Dirichlet's conditions, Fourier series for discontinuous functions, change of intervals, half range series.

**Unit 5: Analytical solid geometry: .**

**15 Marks**

Straight lines, coplanar lines and the equations of the common plane, shortest distance between two skew lines, sphere and circle, standard equations cone, cylinder, conicoids.

**Texts/ References:**

1. Advanced Engg Maths	E. Kreyszig	Wiley eastern Ltd
2. .	Peter V. O'Neil	Thomson Books
3. A Text book on Engg Maths	Bali, lyenger	Laxmi Publication
4. Higher Engg Maths	B. S. Grewal	Khanna Publishers
5. Calculus	James Stewart	Thomson Books

ME 204 Engineering Mechanics-I (2-0-0) Credits:2

Theory: 50

Sessional:25

Time: 1 1/2 hours

- I) Forces and Moments: Force, Moment and Couple, Resultant of forces, Forces in space. Equilibrium, FBD , General equations of equilibrium, Analysis of forces in perfect frames. Brief introduction to vector approach.
- 2) Center of gravity and moment of inertia: Center of gravity of axes, volume and composite bodies: Area moment of inertia and mass moment of inertia for plane figures and bodies.
- 3) Friction: Introduction to dry friction. laws of friction, friction of simple machines- inclined planes, Screw jacks.
- 4) Kinetics of rigid bodies: Plane motion, force, mass. acceleration. work and energy. Impulse and momentum, rotational motion - centrifugal force. torque, angular motion and acceleration, angular momentum, Virtual work

**Reference books:**

- 1) Engineering Mechanics –by S Timoshenko & D H Young. McGraw Hill Int.
- 2) Engineering Mechanics by R S Khurmi. S Chand & Co.
- 3) Engineering Mechanics –by R K Bansal. Laxmi Publication (P) Ltd
- 4) Engineering Mechanics –by K L Kumar. McGraw Hill Publishing Co.
- 5) Engineering Mechanics by Hibbler

## CE 205 STRENGTH OF MATERIAL

(2-0-0) Credits:2

Theory: 50

Sessional:25

Time: 1 1/2 hours

### 1. Simple stress and strain:

Tensile, compressive and shear stress, Hook's law. Young's modulus, Poisson's ratio, elastic constants and their relationship.

### 2. Generalised stress and strain:

Analysis of plane stress and plane strain, Mohr's circle of stress and strain.

### 3. Beam:

Definition of bending moment and shear force. Simple problem of bending stress and shear stress in different sections.

### 4. Hoop stress:

Thin cylinders and thin shells.

### 5. Torsion:

Torque. Shear stress, Power transmission, Strength of shaft or torsional rigidity, Combined bending & torsion.

### 6. Columns and struts:

Elastic buckling concept, theory of crippling load for different end conditions, crippling load, slenderness ratio, Euler's Formula.

### Books:

1. Strength of materials: S Ramamrutham; Dhanpat Rai Publishing Company
2. A Text Book of Strength of Materials.; Dr R K Bansal; Laxmi Publications (P) Ltd.
3. Strength of materials; L C Singal and N D sharma; Modern Publishers
4. Strength of Materials; L S Srinath, Prakash Desayi, N srinivasa Murthy, sanatha Ramu
5. strength of Materials, S Subramanian; Oxford University Press

**EE 206 Basic Electrical Engineering-I (3-1-2) Credits:4**

**Theory: 100**

**Sessional:50**

**Practical:50**

**Time: 3 hours**

**1. DC networks:** Definitions of active, passive, linear non-linear circuit elements and networks. Kirchoff's laws. Nodal and mesh analysis. Voltage and current sources. Network theorems – superposition. Thevenin's, Norton's and maximum power transfer.

**2. Single phase AC circuits:** Waveforms of alternating voltages and currents, instantaneous, average and rms values, form factor and peak factor, forms of representation of alternating quantities, concept of phasor and phasor diagrams, concept of lead and lag, reactances and impedances, AC circuits- resistive, inductive, capacitive, R-L, R-C and R-L-C, series, parallel and series-parallel combinations, impedance triangle, admittance, active and reactive power and power factor.

**3. Magnetic circuits:** Definitions of mmf, flux, flux-density and reluctance, comparison between electric and magnetic circuits, series, parallel and series-parallel circuits and their solutions, energy stored in a magnetic circuit, lifting magnets, electromagnetic induction, self and mutual inductance, hysteresis and eddy current losses.

**4. Three-phase AC circuits:** Concept of three-phase AC, connections, phase and line values in star and delta connections, solutions of simple 3-ph balanced circuits with resistive and reactive loads, 3-ph power, phase sequence.

**5. Instrumentants:** Classification of instruments, essentials of indicating type instruments- deflecting torque, controlling torque, damping, types of indicating instruments, MC and MI type ammeters and voltmeters, extension of range- use of shunts and multiplier, errors and compensation.

**6. Basics of electrical installations:** Domestic wirings, types of cables (names only), types of wiring eg. Cleat, CTS, conduit, metal sheathed, casing and capping; circuit layouts- single-phase AC mains to DB; 3-ph connections; accessories, main switch, ceiling rose, fuse, MCB etc. Testing of a wiring installation, the Megger; earthing – Purpose and methods; lamps -filament, fluorescent tube and its connection and operation. Indian Electricity Rules regarding electrical installation.

**7. Electronics:** The p-n junction diode. V-I characteristics under forward and reverse bias conditions; avalanche breakdown. Diode as a rectifier- half wave and full wave rectifier circuits; ripples in output waveform- ripple factor; introduction to filters. The zener diode and its application as voltage regulator.

**Recommended books:**

1. Basic Electrical Engineering – Nagrath
2. Basic Electrical Engineering – Mittle
3. B. E.E .. science – – – – Sahadev and Rana.
4. Electro Technology – – – – Cotton.
5. A Text book of Electrical Technology – Theraja.

**ME 207 Engineering Graphics-II (0-0-4) 2 Credits**  
**Theory 100**  
**Sessional 50**

- 1. Principles of graphics:** Review of scales, lines, Dimensioning, placing of dimensions, arrangement of dimensions. common features of dimensions, conventional representations of different materials.
- 2. Orthographic projection:** Orthographic projection of standard machine elements. conversion of pictorial views into Orthographic views and vice-versa (1<sup>st</sup> and 3<sup>rd</sup> angle projection systems). Sectional views.
- 3. Isometric projection:** Isometric axes and scales, isometric projection of plane figures, cube prism, pyramids, cylinder, Cone, sphere. Charts, graphs. monograms, semi—long and double-long graphs, Rectilinear charts, flowchart.
- 4. Perspective projection:** Visual ray method, Vanishing point method, Perspective projection of simple objects.
- 5. Graphical representations of information:** Bar charts, Pie charts. rectilinear chart'. triangular chart, polar charts. semi-log and log—log graphs. Nomography, Concurrency chars, alignment charts. BIS and ISO conversion.
- 6. Free hand sketches:** of common machine elements Pictorial 3D sketches)

Reference Books: 1. Engineering drawing —by N D Batt  
2. Machine drawing by N D Batt

