

# **Rajiv Gandhi Proudhyogiki Vishwavidyalaya, Bhopal**

## **Scheme of Examination**

Bachelor of Engineering B.E. (Common to all Disciplines)

For the candidates admitted in session July 2010-2011 and onward

**I-Semester Set-A:** Applicable to Branches : IT, EC, EE, EX, IP, IEM, CM, BT, and BM

Subject wise distribution of marks and corresponding credits

S.No.	Subject Code	Subject Name & Title	Maximum Marks Allotted						Credits Allotted Subject wise			Total Credits	Remark
			Theory Slot			Practical Slot							
			End Sem.	Mid Sem. MST (Two tests average)	Quiz, Assignment	End Sem	Term work						
							Lab work & sessional	Assignment / quiz					
									L	T	P		
1	BE-101	Engineering Chemistry	70	20	10	30	10	10	3	1	2	06	: One credit refers to one hour teaching in theory, Tutorial and in practical. :32 hour workload per week corresponding to LTP
2	BE-102	Engineering Mathematics -I	70	20	10				3	1		04	
3	BE-103	Communication Skills	70	20	10	30	10	10	3	1	2	06	
4	BE-104	Basic Electricals & Electronics Engg.	70	20	10	30	10	10	3	1	2	06	
5	BE-105	Engineering Graphics	70	20	10	30	10	10	3	1	2	06	
6	BE-106	Work Shop Practice	-	-	-	30	10	10	-	-	2	02	Total Mark
		Total	350	100	50	150	50	50	15	05	10	30	750

**MST: Mid Semester Tests Taken at Least twice Per Semester**

**L: Lecture - T: Tutorial - P: Practical**

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## **Scheme of Examination**

Bachelor of Engineering B.E. (Common to all Disciplines)

For the candidates admitted in session July 2010-2011 and onward

**I-Semester Set-B:** Applicable to Branches : CS, EI/IC, CE, ME, FT, TX & AU

Subject wise distribution of marks and corresponding credits

S.No.	Subject Code	Subject Name & Title	Maximum Marks Allotted						Credits Allotted Subject wise			Total Credits	Remark
			Theory Slot			Practical Slot							
			End Sem.	Mid Sem. MST (Two tests average)	Quiz, Assignment	End Sem.	Term work		L	T	P		
							Lab work & sessional	Assignment / quiz					
1	BE-201	Engineering Physics	70	20	10	30	10	10	3	1	2	06	: One credit refers to one hour teaching in theory, Tutorial and in practical. :32 hour workload per week corresponding to LTP
2	BE-202	Energy, Environment, Ecology & Society	70	20	10				3	1		04	
3	BE-203	Basic Mechanical Engg.	70	20	10	30	10	10	3	1	2	06	
4	BE-204	Basic Civil Engg. & Engg. Mechanics	70	20	10	30	10	10	3	1	2	06	
5	BE-205	Basic Computer Engg.	70	20	10	30	10	10	3	1	2	06	
6	BE-206	Language Lab. & Seminars	-	-	-	30	10	10	-	-	2	02	Total Mark
		Total	350	100	50	150	50	50	15	05	10	30	750

MST: Mid Semester Tests Taken at Least twice Per Semester

L: Lecture - T: Tutorial - P: Practical

**Rajiv Gandhi Proudhyogiki Vishwavidyalaya, Bhopal**

w.e.f.-July-2010

Academic Session-2010-11

## Scheme of Examination

Bachelor of Engineering B.E. (Common to all Disciplines)

For the candidates admitted in session July 2010-2011 and onward

**II-Semester Set-B:** Applicable to Branches : CS, EI/IC, CE, ME, FT, TX & AU

Subject wise distribution of marks and corresponding credits

S.No.	Subject Code	Subject Name & Title	Maximum Marks Allotted						Credits Allotted Subject wise			Total Credits	Remark
			Theory Slot			Practical Slot							
			End Sem.	Mid Sem. MST (Two tests average)	Quiz, Assig- nment	End Sem.	Term work						
							Lab work sessional	Assignment / sessionals quiz					
									L	T	P		
1	BE-101	Engineering Chemistry	70	20	10	30	10	10	3	1	2	06	: One credit refers to one hour teaching in theory, Tutorial and in practical. :32 hour workload per week corresponding to LTP
2	BE-102	Engineering Mathematics -I	70	20	10				3	1		04	
3	BE-103	Communication Skills	70	20	10	30	10	10	3	1	2	06	
4	BE-104	Basic Electricals & Electronics Engg.	70	20	10	30	10	10	3	1	2	06	
5	BE-105	Engineering Graphics	70	20	10	30	10	10	3	1	2	06	
6	BE-106	Work Shop Practice	-	-	-	30	10	10	-	-	2	02	Total Mark
		Total	350	100	50	150	50	50	15	05	10	30	750

MST: Mid Semester Tests Taken at Least twice Per Semester

L: Lecture - T: Tutorial - P: Practical

# **Rajiv Gandhi Proudhyogiki Vishwavidyalaya, Bhopal**

## **Scheme of Examination**

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For the candidates admitted in session July 2010-2011 and onward

**II-Semester Set-A:** Applicable to Branches : IT, EC, EE, EX, IP, IEM, CM, BT, and BM

Subject wise distribution of marks and corresponding credits

S.No.	Subject Code	Subject Name & Title	Maximum Marks Allotted						Credits Allotted Subject wise			Total Credits	Remark
			Theory Slot			Practical Slot							
			End Sem.	Mid Sem. MST (Two tests average)	Quiz, Assign-ment	End Sem.	Term work		L	T	P		
							Lab work sessional	Assignment / quiz					
1	BE-201	Engineering Physics	70	20	10	30	10	10	3	1	2	06	: One credit refers to one hour teaching in theory, Tutorial and in practical. :32 hour workload per week corresponding to LTP
2	BE-202	Energy, Environment, Ecology & Society	70	20	10				3	1		04	
3	BE-203	Basic Mechanical Engg.	70	20	10	30	10	10	3	1	2	06	
4	BE-204	Basic Civil Engg. & Engg. Mechanics	70	20	10	30	10	10	3	1	2	06	
5	BE-205	Basic Computer Engg.	70	20	10	30	10	10	3	1	2	06	
6	BE-206	Language Lab. & Seminars	-	-	-	30	10	10	-	-	2	02	Total Mark
		Total	350	100	50	150	50	50	15	05	10	30	750

**MST: Mid Semester Tests Taken at Least twice Per Semester**

**L: Lecture - T: Tutorial - P: Practical**

## Course Content & Grade

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
B.E. Common	Engineering Chemistry	B.E.- 101	Theory	Practical	5.0
			Min.“D”	Min.“D”	

### Unit I

#### **WATER AND ITS INDUSTRIAL APPLICATIONS :**

Sources, Impurities, Hardness & its units, Industrial water characteristics, softening of water by various methods (External & Internal treatment), Boiler trouble causes, effect & remedies, Characteristics of municipal water & its treatment, Numerical problems based on softening methods.

### Unit II

#### **FUELS & COMBUSTION:**

Fossil fuels & classification, Calorific value, Determination of calorific value by Bomb calorimeter Proximate and Ultimate analysis of coal and their significance, calorific value Computation based on ultimate analysis data, Carbonization, Manufacturing of coke & recovery of by products. Knocking, relationship between' knocking & structure of hydrocarbon, improvement of anti knocking characteristics of IC engine fuels, Diesel engine fuels, Cetane number, combustion and it related numerical problems.

### Unit III

#### **A. LUBRICANTS:**

Introduction, Mechanism of lubrication, Classification of lubricants, Properties and Testing of lubricating oils, Numerical problems based on testing methods.

#### **B. CEMENT & REFRACTORIES:**

Manufacture , IS-code, Setting and hardening of cement, Refractory : Introduction, classification and properties of refractories .

### Unit IV

#### **HIGH-POLYMER :**

Introduction, types and classification of polymerization, Reaction. Mechanism, Natural & Synthetic Rubber; Vulcanization of Rubber, Preparation, Properties & uses of the following- Polythene, PVC, PMMA, Teflon, Poly acrylonitrile, PVA, Nylon 6, Nylon 6:6, Terylene, Phenol formaldehyde, Urea - Formaldehyde Resin, Glyptal, Silicone Resin, Polyurethanes; Butyl Rubber, Neoprene, Buna N, Buna S.

### Unit V

#### **A. INSTRUMENTAL TECHNIQUES IN CHEMICAL ANALYSIS :**

Introduction, Principle, Instrumentation and applications of IR, NMR, UV, Visible, Gas Chromatography, Lambert's and Beer's Law

#### **B. WATER ANALYSIS TECHNIQUES :**

Alkalinity, hardness ( Complexo-metric ), Chloride, Free chlorine, DO, BOD and COD, Numerical problems based on above techniques.

## Reference Books:

1. Chemistry for Environmental Engineering & Science- Sawyer, McCarty and Parkin – McGraw Hill, Education Pvt. Ltd., New Delhi
2. Engineering Chemistry - B.K. Sharma, Krishna Prakashan Media (P) Ltd., Meerut.
3. Basics of Engineering Chemistry - S. S. Dara & A.K. Singh, S. Chand & Company Ltd., Delhi
4. Applied Chemistry - Theory and Practice, O.P. Viramani, A.K. Narula, New Age International Pvt. Ltd. Publishers, New Delhi
5. Polymer Science – Ghosh, Tata McGraw Hill.
6. Engg. Chemistry –Shashi Chawla, Dhanpat Rai & company pvt. Ltd, Delhi.
7. Engg. Chemistry –Jain & Jain, Dhanpat Rai & company pvt. Ltd, New Delhi
8. A Text book of Engg. Chemistry- Agrawal, C.V, Murthy C.P, Naidu, A, BS Publication, Hyderabad.

## Engineering Chemistry Practical

**NOTE:** At least 10 of the following core experiments must be performed during the session.

### 1. Water Testing

- (i) Determination of Total hardness by Complexometric titration method.
- (ii) Determination of mixed alkalinity
  - (a)  $\text{OH}^-$  &  $\text{CO}_3^{2-}$
  - (b)  $\text{CO}_3^{2-}$  &  $\text{HCO}_3^-$
- (iii) Chloride ion estimation by Argentometric method.

### 2. Fuels & lubricant testing:

- (i) Flash & fire points determination by
  - a) Pensky Martin Apparatus,
  - b) Abel's Apparatus,
  - c) Cleveland's open cup Apparatus.
  - d) Calorific value by bomb calorimeter
- (ii) Viscosity and Viscosity index determination by
  - a) Redwood viscometer No.1
  - b) Redwood viscometer No.2
- (iii) Proximate analysis of coal
  - a) Moisture content
  - b) Ash content
  - c) Volatile matter content
  - c) Carbon residue
- (iv) Steam emulsification No & Anline point determination
- (v) Cloud and Pour point determination of lubricating oil

### 3. Alloy Analysis

- (i) Determination of percentage of Fe in an iron alloy by redox titration using N-Phenyl anthranilic acid as internal indicator.
- (ii) Determination of Cu and or Cr in alloys by Iodometric Titration.
- (iii) Determination of % purity of Ferrous Ammonium Sulphate & Copper Sulphate.

w.e.f.-July-2013

Academic Session-2013-14

### Course Content & Grade

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
B.E. Common	Engineering Mathematics - I	B.E.- 102	Theory	Practical	
			Min. "D"	-	5.0

#### **Unit I**

##### **DIFFERENTIAL CALCULUS :**

Expansion of functions by Maclaurin's and Taylor's theorem. Partial differentiation, Euler's theorem and its application in approximation and errors, Maxima and Minima of function of two variables, Curvature : Radius of curvature, centre of curvature.

#### **Unit II**

##### **INTEGRAL CALCULUS :**

Definite Integrals : Definite Integrals as a limit of a sum , its application in Summation of series, Beta and Gamma Functions , Double and Triple Integrals, Change of Order of Integration, Area, Volume and Surfaces using double and triple Integral.

#### **Unit III**

##### **DIFFERENTIAL EQUATIONS :**

Solution of Ordinary Differential Equation of first order and first degree for Exact differential Equations, Solution of Ordinary Differential Equation of first order and higher degree (solvable for p, x and y, Clairaut's Equation), Linear Differential Equations with Constant Coefficients, Cauchy's Homogeneous differential Equation, Simultaneous differential Equations, Method of Variation of Parameters

#### **Unit IV**

##### **MATRICES :**

Rank, Solution of Simultaneous equation by elementary transformation, Consistency of System of Simultaneous Linear Equation, Eigen Values and Eigen Vectors, Cayley-Hamilton Theorem and its Application to find the inverse

#### **Unit V**

Algebra of Logic, Boolean Algebra, Principle of Duality, Basic Theorems, Boolean Expressions and Functions. Elementary Concept of Fuzzy Logic

Graph Theory : Graphs, Subgraphs, Degree and Distance, Tree, cycles and Network,

#### **References:**

- ( i ) Advance Engg. Mathematics. By Ramana, Tata McGraw hill.
- (ii) Higher Engineering Mathematics by BS Grewal, Khanna Publication
- (iii) Advance Engineering Mathematics by D.G.Guffy
- (iv) Engineering Mathematics by S S Sastri. P.H.I.
- (v) Mathematics for Engineers by S.Arumungam, SCITECH Publication
- (vi) Advanced Engineering Mathematics by Erwin Kreyszig, Wiley India

### Course Content & Grade

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
<b>B.E. Common</b>	<b>Communication Skills</b>	<b>B.E.- 103</b>	<b>Theory</b>	<b>Practical</b>	
			<b>Min.“D”</b>	<b>Min.“D”</b>	<b>5.0</b>

#### **Unit I - Languages and skills of communication**

Linguistic techniques, Modern usages, Reading comprehension, English phonetic symbols/sounds, Oral presentation, Audition Communication, Processes of Communication, Verbal and Non Verbal Communication, Barriers to Communication.

#### **Unit II - Application of linguistic ability**

Writing of definitions of Engineering terms, Objects, Processes and Principles (Listening) Topics of General Interest, Reproduction from business, daily life, travel, health, buying and selling, company structure, systems etc.

#### **Unit III - Letter Writing:**

Applications, Enquiry, Calling quotations, Tenders, Order and Complaint.

#### **Unit IV**

Precise Writing, Noting and drafting, Technical Description of simple engineering objects and processes (writing), Report writing, precise writing, Note writing, Slogan writing comment, Speech advertising.

#### **Unit V**

Writing Technical reports of the type of observation report, Survey report, Report of trouble, Laboratory Report and Project Report on the subjects of engineering. (Speaking ) Vocabulary, Presentations, Demonstrations, Conversation – Telephone media, socializing, cultural events, debates, speech.

#### **Communicative Language Lab. BE 103**

MARKS : 50

Course objective : The language lab focuses on the production and practice of sounds of English through audio – visual aids and Computer software. It intends to enable the students to speak English correctly with confidence and intends to help them to overcome their inhibitions and self – consciousness while speaking in English.



**Topics to be covered in the Language laboratory sessions :**

1. Basic Grammar & Vocabulary (Synonyms /Antonyms, Analogies, sentence completion, correctly spelt words, idioms, proverbs, common errors).
  2. phonetic symbols and pronunciation.
  3. Listening skills (Including Listening Comprehension )3
  4. Reading Skills (Including Reading Comprehension )
  5. Writing Skills (Including structuring resume and cover letter )
  6. Speaking Skills
  7. Body Language
  8. Oral Presentation : Preparation and delivery using audio – visual aids with stress n body language and voice modulation (Topic to be selected by the teacher.)
- Final Assessment Should be based on Assignment, presentation and interview.

**Reference Books :-**

1. Business Correspondence and Report Writing - By Sharma; TMH.
2. Living English Structure – By W.S. Allen; Longmans.
3. English Grammar – Ehrlich, Schaum Series; TMH.
4. Spoken English for India – By R.K. Bansal and IB Harrison Orient Longman.
5. New International Business English – by Joans and Alexander; OUP.
6. Effective Technical Communication – Rizvi; TMH.

## Course Content & Grade

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
B.E. Common	Electrical & Electronics Engineering	B.E.- 104	Theory	Practical	5.0
			Min.“D”	Min.“D”	

### Unit I

**Electrical circuit analysis-** Voltage and current sources, dependent and independent sources, source conversion, DC circuits analysis using mesh & nodal method, Thevenin's & superposition theorem, star-delta transformation. 1-phase AC circuits under sinusoidal steady state, active, reactive and apparent power, physical meaning of reactive power, power factor, 3-phase balanced and unbalanced supply, star and delta connections.

### Unit II

**Transformers-**Review of laws of electromagnetism, mmf, flux, and their relation, analysis of magnetic circuits. Single-phase transformer, basic concepts and construction features, voltage, current and impedance transformation, equivalent circuits, phasor diagram, voltage regulation, losses and efficiency, OC and SC test.

### Unit III

**Rotating Electric machines-** Constructional details of DC machine, induction machine and synchronous machine, Working principle of 3-Phase induction motor, Emf equation of 3-Phase induction motor, Concept of slip in 3-Phase induction motor, Explanation of Torque-slip characteristics of 3-Phase induction motor, Classification of self excited DC motor and generator.

### Unit IV

**Digital Electronics-**Number systems used in digital electronics, decimal, binary, octal, hexadecimal, their complements, operation and conversion, floating point and signed numbers, Demorgan's theorem, AND, OR, NOT, NOR, NAND, EX-NOR, EX-OR gates and their representation, truth table, half and full adder circuits, R-S flip flop, J-K flip flop.

### Unit V

**ELECTRONIC COMPONENTS AND CIRCUITS-** Introduction to Semiconductors, Diodes, V-I characteristics, Bipolar junction transistors (BJT) and their working, introduction to CC, CB & CE transistor configurations, different configurations and modes of operation of BJT, DC biasing of BJT.

## **References:**

1. Vincent Del Toro, Electrical Engineering Fundamentals, PHI Learning, II Edition
2. S.Ghosh, Fundamentals of Electrical and Electronics Engineering, PHI, II Edition.
3. Millman, Halkias & Parikh, Integrated Electronics, Mc Graw Hill, II Edition
4. Nagrath & Kothari, Basic Electrical Engineering, III Edition TMH.
5. J.S. Katre, Basic Electronics Engg, Max Pub. Pune.
6. Hughes, Electrical and Electronic Technology, Pearson Education IX Edition

## **PROGRAMME : BE Electrical and Electronics Engineering**

### **Course: BE104 Electrical and Electronics Engineering**

## **List Of Experiments**

1. Verifications of Thevenin's Superposition theorem.
2. Study of Transformer, name plate rating, determination of ratio and polarity.
3. Determination of equivalent circuit parameters of a single phase transformer by O.C. and S.C. tests and estimation of voltage regulation and efficiency at various loading conditions and verification by load test.
4. Separation of resistance and inductance of choke coil.
5. Measurement of various line & phase quantities for a 3-phase circuit.
6. Identification of different Electronics components.
7. Observing input and output waveforms of rectifiers.
8. Transistor application as amplifier and switch.
9. Verification of truth table for various gates.

## Course Content & Grade

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
B.E. Common	Engineering Graphics	B.E.- 105	Theory	Practical	
			Min.“D”	Min.“D”	5.0

### Unit I

**Scales:** Representative factor, plain scales, diagonal scales, scale of chords.

**Conic sections:** Construction of ellipse, parabola, hyperbola by different methods; Normal and Tangent.

**Special Curves:** Cycloid, Epi-cycloid, Hypo-cycloid, Involute, Archimedean and logarithmic spirals.

### Unit II

**Projection:** Types of projection, orthographic projection, first and third angle projection,

**Projection of points and lines,** Line inclined to one plane, inclined with both the plane, True Length and True Inclination, Traces of straight lines.

### Unit III

**Projection of planes and solids:** Projection of Planes like circle and polygons in different positions; Projection of polyhedrons like prisms, pyramids and solids of revolutions like cylinder, cones in different positions.

### Unit IV

**Section of Solids:** Section of right solids by normal and inclined planes; Intersection of cylinders.

**Development of Surfaces:** Parallel line and radial - line method for right solids.

### Unit V

**Isometric Projections:** Isometric scale, Isometric axes, Isometric Projection from orthographic drawing.

**Computer Aided Drafting (CAD):** Introduction, benefit, software's basic commands of drafting entities like line, circle, polygon, polyhedron, cylinders; transformations and editing commands like move, rotate, mirror, array; solution of projection problems on CAD.

### References

1. Visvesvaraya Tech. University; A Premier on Computer Aided Engg drawing; VTU Belgaum
2. Bhatt N.D.; Engineering Drawing, Charotar
3. Venugopal K.; Engineering Graphics; New Age
4. John KC; Engg. Graphics for Degree; PHI.
5. Gill P.S.; Engineering Drawing; kataria
6. Jeyapoovan T.; Engineering drawing & Graphics Using AutoCAD; Vikas
7. Agrawal and Agrawal; Engineering Drawing; TMH

8. Shah MB and Rana BC; Engg.drawing; Pearson Education
9. Luzadder WJ and Duff JM; Fundamental of Engg Drawing; PHI
- 10 Jolhe DA; Engg. Drawing an Introduction; TMH
- 11 Narayana K.L.; Engineering Drawing; Scitech

**List of Practical:**

Sketching and drawing of geometries and projections based on above syllabus

**Term work:** A min. of 30 hand drawn sketches (on size A4 graphic sketch Book) plus 5 CAD-printouts on size A4 sheets plus 10 sheets of size A2 or 6 sheets of size A1, (50% marks to be allotted for this record + 25% marks for attendance +25%marks for Teachers Assessment)

**Practical Marks to be allotted based on written test and viva.**

**Note:** To cover above syllabus, each Institute must have CAD software and a computer lab (6 to 12 hrs/month/student).

## Course Content & Grade

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
B.E. Common	Work Shop Practice	B.E.- 106	Theory	Practical	
			-	Min.“D”	5.0

### Unit I

Introduction: Manufacturing Processes and its Classification, Casting, Machining, Plastic deformation and metal forming, Joining Processes, Heat treatment process, Assembly process. Powder Metallurgy, introduction to computers in manufacturing. Black Smithy Shop

Use of various smithy tools. Forging operations: Upsetting, Drawing down, Fullering, Swaging, Cutting down, Forge welding, Punching and drafting.  
Suggested Jobs : Forging of chisel., forging of Screw Driver

### Unit II

Carpentry Shop:

Timber : Type, Qualities of timber disease, Timber grains, Structure of timber, Timber, Timber seasoning, Timber preservation .Wood Working tools: Wood working machinery, joints & joinery. Various operations of planing using various carpentry planes sawing & marking of various carpentry joints.

Suggested Jobs :Name Plate ,Any of the Carpentry joint like mortise or tennon joint

### Unit III

Fitting Shop:

Study and use of Measuring instruments, Engineer steel rule, Surface gauges caliper, Height gauges, feeler gauges, micro meter. Different types of files, File cuts, File grades, Use of surface plate, Surface gauges drilling tapping Fitting operations: Chipping filling, Drilling and tapping.Suggested Jobs :Preparation of job piece by making use of filling, sawing and chipping , drilling and tapping operations.

### Unit IV

Foundry:

Pattern Making: Study of Pattern materials, pattern allowances and types of patterns. Core box and core print, .Use and care of tools used for making wooden patterns.

Moulding:

Properties of good mould & Core sand, Composition of Green , Dry and Loam sand. Methods used to prepare simple green and bench and pit mould dry sand bench mould using single piece and split patterns.

### Unit V

Welding: Study and use of tools used for Brazing, Soldering, Gas & Arc welding. Preparing Lap & Butt joints using gas and arc welding methods, Study of TIG & MIG welding processes . Safety precautions.

### Reference Books:

1. Bawa HS; Workshop Practice, TMH
2. Rao PN; Manufacturing Technology- Vol.1& 2, TMH
3. John KC; Mechanical workshop practice; PHI
4. Hazara Choudhary; Workshop Practices -, Vol. I & II.
- 5 Jain. R.K. Production Technology -

## Course Content & Grade

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
<b>B.E. Common</b>	<b>Engineering Physics</b>	<b>B.E.- 201</b>	<b>Theory</b>	<b>Practical</b>	
			<b>Min. "D"</b>	<b>Min. "D"</b>	<b>5.0</b>

### **Unit I**

#### **Quantum Physics**

Group and particle velocities & their relationship. Uncertainty principle with elementary proof and applications (determination of position of a particle by a microscope, non existence of electron in nucleus, diffraction of an electron beam by a single slit). Compton scattering. Wave function and its properties, energy and momentum operators, time dependent and time independent Schrödinger wave equation. Application of time independent Schrödinger wave equation to particle trapped in a one dimensional square potential well (derivation of energy eigen values and wave function)

### **Unit II**

#### **Wave Optics**

Interference: Fresnel's biprism, Interference in thin films (due to reflected and transmitted light), interference from a wedge shaped thin film, Newton's rings and Michelson's interferometer experiments and their applications. Diffraction at single slit, double slit and n-slits (diffraction grating). Resolving power of grating and prism. Concept of polarized light, Brewster's laws, Double refraction, Nicol prism, quarter & half wave plate.

### **Unit III**

#### **Nuclear Physics**

Nuclear liquid drop model (semi empirical mass formula), nuclear shell model, Linear Particle accelerators: Cyclotron, general description of Synchrotron, Synchrocyclotron, and Betatron. Geiger-Muller Counter, Motion of charged particles in crossed electric and magnetic fields. Uses of Bainbridge and Aston mass Spectrographs.

### **Unit IV**

#### **Solid State Physics**

Qualitative discussion of Kronig Penny model (no derivation), Effective mass, Fermi-Dirac statistical distribution function, Fermi level for Intrinsic and Extrinsic Semiconductors, Zener diode, tunnel diode, photodiode, solar-cells, Hall effect.

Superconductivity: Meissner effect, Type I and Type II superconductors, Di-electric polarization, Complex permittivity, dielectric losses

### **UNIT V**

#### **Laser and Fiber Optics**

Laser: Stimulated and spontaneous processes, Einstein's A & B Coefficients, transition probabilities, active medium, population inversion, pumping, Optical resonators, characteristics of laser beam. Coherence, directionality and divergence. Principles and working of Ruby, Nd:YAG, He-Ne & Carbon dioxide Lasers with energy level diagram. Fundamental idea about optical fiber, types of fibers, acceptance angle & cone, numerical aperture, V-number, propagation of light through step index fiber (Ray theory) pulse dispersion, attenuation, losses & various uses.

Applications of lasers and optical fibers.

**Reference Books: -**

1. Optics By Ghatak, TMH
2. Engineering Physics- V. S. Yadava, TMH
3. Optics by Brijlal and Subhraminayan.
4. Engineering physics by M.N. Avadhanulu and. S. Chand & Co.(2004)
5. Atomic and Nuclear physics by Brijlal and Subraminiyan.
6. Concepts of Modern Physics- Beiser, TMH
7. Solid State Physics by Kittel ,Wiley India
8. Fundamentals of Physics-Halliday, Wiley India

**List of suggestive core experiments: -**

1. Biprism, Newton's Rings, Michelsons Interferometer.
2. Resolving Powers –Telescope, Microscope, and Grating.
3. G.M. Counter
4. Spectrometers-R.I., Wavelength, using prism and grating
5. Optical polarization based experiments: Brewster's angle, polarimeter etc.
6. Measurements by LASER-Directionality, Numerical aperture, Distance etc.
7. Uses of Potentiometers and Bridges (Electrical)..
8. Experiments connected with diodes and transistor.
9. Measurement of energy band gap of semiconductor.
10. To study Hall effect.
11. Solar cell.
- 12.To find the width of a single slit by a He-Ne Laser.
13. To determine the numerical aperture (NA) of an Optical Fibre.
14. To determine Planck's constant.
15. Other conceptual experiments related to theory syllabus.



### Course Content & Grade

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
<b>B.E. Common</b>	<b>Energy , Environment , Ecology &amp; Society</b>	<b>B.E.- 202</b>	<b>Theory</b>	<b>Practical</b>	
			<b>Min.“D”</b>	<b>-</b>	<b>5.0</b>

#### **Unit –I**

**Energy-** Sources of Energy : Renewable & Non Renewable, Fossil fuel, Biomass Geothermal, Hydrogen, Solar, Wind, hydal, nuclear sources.

#### **Unit –II**

**Ecosystem** – Segments of Environment: Atmosphere, hydrosphere, Lithosphere, biosphere. Cycles in Ecosystem – Water, Carbon, Nitrogen. Biodiversity: Threats and conservation,

#### **Unit –III**

##### **Air Pollution & Sound Pollution -**

Air Pollution: Air pollutants, classification, (Primary & secondary Pollutants) Adverse effects of pollutants. Causes of Air pollution chemical, photochemical, Green house effect, ozone layer depletion, acid Rain.

Sound Pollution: Causes, controlling measures, measurement of sound pollution (deciblage), Industrial and non – industrial.

#### **Unit –IV**

**Water Pollution**– Water Pollution: Pollutants in water, adverse effects. Treatment of Domestic & Industrial water effluent.

**Soil Pollution** – Soil Profile, Pollutants in soil, their adverse effects, controlling measures.

#### **Unit –V**

**Society, Ethics & Human values**– Impact of waste on society. Solid waste management (Nuclear, Thermal, Plastic, medical, Agriculture, domestic and e-waste). Ethics and moral values, ethical situations, objectives of ethics and its study . Preliminary studies regarding Environmental Protection Acts , introduction to value education, self exploration, sanyam & swasthya.

#### **References:**

1. Harris, CE, Prichard MS, Rabin’s MJ, “Engineering Ethics”; Cengage Pub.
2. Rana SVS ; “Essentials of Ecology and Environment”; PHI Pub.
3. Raynold, GW “Ethics in information Technology”; Cengage.
4. Svakumar; Energy Environment & Ethics in society; TMH
5. AK De “Environmental Chemistry”; New Age Int. Publ.
6. BK Sharma, “Environmental Chemistry” ; Goel Publ. House.
7. Bala Krishnamoorthy; “Environmental management”; PHI
8. Gerard Kiely, “Environmental Engineering” ; TMH
9. Miller GT JR; living in the Environment Thomson/cengage
10. Cunningham WP and MA; principles of Environment Sc; TMH
11. Pandey, S.N. & Mishra, S.P. Environment & Ecology, 2011, Ane Books , Pvt. Ltd, New Delhi
12. Joseph, B. Environmental Studies, 2009 Tata Mcgraw Hill, Edu India Ltd. New Delhi.
13. Gour R.R, Sangal, R &Bagaria, G.P. , Excel Books, A-45, Naraina Phase-I ,New Delhi.- 110028

### Course Content & Grade

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
<b>B.E. Common</b>	<b>Basic Mechanical Engineering</b>	<b>B.E.- 203</b>	<b>Theory</b>	<b>Practical</b>	
			<b>Min. "D"</b>	<b>Min. "D"</b>	<b>5.0</b>

#### **UNIT- 1**

**Materials:** Classification of engineering material, composition of cast iron and carbon steels on iron-carbon diagram and their mechanical properties; Alloy steel and their applications; stress-strain diagram, Hooks law and modulus of elasticity. Tensile, shear, hardness and fatigue testing of materials.

#### **UNIT-2**

**Measurement:** Temperature, pressure, velocity, flow, strain, force and torque measurement, concept of measurement error & uncertainly analysis, measurement by Vernier caliper, micrometer, dial gauges, slip gauges, sine-bar and combination set; introduction to lath, drilling, milling and shaping machines.

#### **UNIT-3**

**Fluids:** Fluid properties, pressure, density and viscosity; pressure variation with depth, static and kinetic energy; Bernauli's equation for incompressible fluids, viscous and turbulent flow, working principle of fluid coupling, pumps, compressors, turbines, positive displacement machines and pneumatic machines. Hydraulic power & pumped storage plants for peak load management as compared to base load plants.

#### **UNIT-4**

**Thermodynamics:** First and second law of thermodynamics; steam properties, steam processes at constant pressure, volume, enthalpy & entropy, classification and working of boilers, efficiency & performance analysis, natural and induced draught, calculation of chimney height. Refrigeration, vapor absorption & compression cycles, coefficient of perform (COP), refrigerant properties & eco friendly refrigerants.

#### **UNIT-5**

**Reciprocating Machines:** Steam engines, hypothetical and actual indicator diagram; Carnot cycle and ideal efficiency; Otto and diesel cycles; working of two stroke & four stroke petrol & diesel IC engines

**Reference Books:-**

1. Narula; Material Science; TMH
2. Agrawal B & CM; Basic Mechanical Engg. Wiley India
3. Nag PK, Tripathi et al; Basic Mechanical Engg; TMH
4. Rajput; Basic Mechanical Engg;
5. Sawhney GS; Fundamentals of Mechanical Engg; PHI
6. Nakra and Chaudhary; Instrumentation & measurement; TMH
7. Nag PK; Engineering Thermodynamics; TMH
8. Ganesan; Combustion Engines; TMH

**List of Suggestive core Experiments(Please Expand it)**

1. Tensile testing of standard mild steel specimen.
2. Experiments on Bernoulli's theorem.
3. Flow measurements by ventury and orifice meters.
4. Linear and angular measurement using, Vernier; micrometer, slip gauge, dial gauge and sine-bar.
5. Study of different types of boilers and mountings.
6. Experiment on mini-boiler (50 Kg/Hour)
7. To find COP of a refrigeration unit.
8. Study of different IC engines & measurement of B.H.P. using rope/belt dynamometer.
9. Analysis of exhaust gases on petrol, diesel & biodiesel engines.

## Course Content & Grade

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every semester
B.E. Common	Basic Civil Engineering & Engineering Mechanics	B.E.- 204	Theory	Practical	
			Min.“D”	Min.“D”	5.0

### Unit I

#### **Building Materials & Construction**

Stones, bricks, cement, lime, timber-types, properties, test & uses, laboratory tests concrete and mortar Materials: Workability, Strength properties of Concrete, Nominal proportion of Concrete preparation of concrete, compaction, curing.

Elements of Building Construction, Foundations conventional spread footings, RCC footings, brick masonry walls, plastering and pointing, floors, roofs, Doors, windows, lintels, staircases – types and their suitability

#### **Unit – II Surveying & Positioning:**

Introduction to surveying Instruments – levels, theodolites, plane tables and related devices.

Electronic surveying instruments etc. Measurement of distances – conventional and EDM methods, measurement of directions by different methods, measurement of elevations by different methods. Reciprocal leveling.

#### **Unit –III Mapping & Sensing:**

Mapping details and contouring, Profile Cross sectioning and measurement of areas, volumes, application of measurements in quantity computations, Survey stations, Introduction of remote sensing and its applications.

### **Engineering Mechanics**

#### **Unit - IV**

Forces and Equilibrium: Graphical and Analytical Treatment of Concurrent and non-concurrent Co- planner forces, free Diagram, Force Diagram and Bow's notations, Application of Equilibrium Concepts: Analysis of plane Trusses: Method of joints, Method of Sections. Frictional force in equilibrium problems

#### **Unit – V**

Centre of Gravity and moment of Inertia: Centroid and Centre of Gravity, Moment Inertia of Area and Mass, Radius of Gyration, Introduction to product of Inertia and Principle Axes.

Support Reactions, Shear force and bending moment Diagram for Cantilever & simply supported beam with concentrated, distributed load and Couple.

**Reference Books:**

1. S. Ramamrutham & R.Narayanan; Basic Civil Engineering, Dhanpat Rai Pub.
2. Prasad I.B., Applied Mechanics, Khanna Publication.
3. Punmia, B.C., Surveying, Standard book depot.
4. Shesha Prakash and Mogaveer; Elements of Civil Engg & Engg. Mechanics; PHI
5. S.P, Timoshenko, Mechanics of structure, East West press Pvt.Ltd.
6. Surveying by Duggal – Tata McGraw Hill New Delhi.
7. Building Construction by S.C. Rangwala- Charotar publications House, Anand.
8. Building Construction by Grucharan Singh- Standard Book House, New Delhi
9. Global Positioning System Principles and application- Gopi, TMH
10. R.C. Hibbler – Engineering Mechanics: Statics & Dynamics.
11. A. Boresi & Schmidt- Engineering Mechines- statics dynamics, Thomson' Books
12. R.K. Rajput, Engineering Mechanics S.Chand & Co.

**List of suggestive core Experiments:**

Students are expected to perform minimum ten experiments from the list suggested below by preferably selecting experiments from each unit of syllabus.

**S.No. Title**

1. To perform traverse surveying with prismatic compass, check for local attraction and determine corrected bearings and to balance the traverse by Bowditch's rule.
2. To perform leveling exercise by height of instrument or Rise and fall method.
3. To measure horizontal and vertical angles in the field by using Theodolite.
4. To determine (a) normal consistency (b) Initial and Final Setting time of a cement Sample.
5. To determine the workability of fresh concrete of given proportions by slump test or compaction factor test.
6. To determine the Compressive Strength of brick .
7. To determine particle size distribution and fineness modulus of coarse and fine Aggregate.
8. To verify the law of Triangle of forces and Lami's theorem.
9. To verify the law of parallelogram of forces.
10. To verify law of polygon of forces
11. To find the support reactions of a given truss and verify analytically.
12. To determine support reaction and shear force at a given section of a simply Supported beam and verify in analytically using parallel beam apparatus.
13. To determine the moment of inertia of fly wheel by falling weight method.
14. To verify bending moment at a given section of a simply supported beam.

### Course Content & Grade

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
<b>B.E. Common</b>	<b>Basic Computer Engineering</b>	<b>B.E.- 205</b>	<b>Theory</b>	<b>Practical</b>	
			<b>Min.“D”</b>	<b>Min.“D”</b>	<b>5.0</b>

#### **UNIT I**

**Computer:** Definition, Classification, Organization i.e. CPU, register, Bus architecture, Instruction set, Memory & Storage Systems, I/O Devices, and System & Application Software. Computer Application in e-Business, Bio-Informatics, health Care, Remote Sensing & GIS, Meteorology and Climatology, Computer Gaming, Multimedia and Animation etc.

**Operating System:** Definition, Function, Types, Management of File, Process & Memory.  
Introdcution to MS word, MS powerpoint, MS Excel

#### **UNIT II**

Introduction to Algorithms, Complexities and Flowchart, Introduction to Programming, Categories of Programming Languages, Program Design, Programming Paradigms, Characteristics or Concepts of OOP, Procedure Oriented Programming VS object oriented Programming.

Introduction to C++: Character Set, Tokens, Precedence and Associativity, Program Structure, Data Types, Variables, Operators, Expressions, Statements and control structures, I/O operations, Array, Functions,

#### **UNIT III**

Object & Classes, Scope Resolution Operator, Constructors & Destructors, Friend Functions, Inheritance, Polymorphism, Overloading Functions & Operators, Types of Inheritance, Virtual functions.  
Introduction to Data Structures.

#### **UNIT IV**

**Computer Networking:** Introduction, Goals, ISO-OSI Model, Functions of Different Layers. Internetworking Concepts, Devices, TCP/IP Model. Introduction to Internet, World Wide Web, E-commerce

**Computer Security Basics:** Introduction to viruses, worms, malware, Trojans, Spyware and Anti-Spyware Software, Different types of attacks like Money Laundering, Information Theft, Cyber Pornography, Email spoofing, Denial of Service (DoS), Cyber Stalking, ,Logic bombs, Hacking Spamming, Cyber Defamation , pharming Security measures Firewall, Computer Ethics & Good Practices, Introduction of Cyber Laws about Internet Fraud, Good Computer Security Habits,

#### **UNIT V**

**Data base Management System:** Introduction, File oriented approach and Database approach, Data Models, Architecture of Database System, Data independence, Data dictionary, DBA, Primary Key, Data definition language and Manipulation Languages.

**Cloud computing:** definition, cloud infrastructure, cloud segments or service delivery models (IaaS, PaaS and SaaS), cloud deployment models/ types of cloud (public, private, community and hybrid clouds), Pros and Cons of cloud computing

## List of Experiment

01. Study and practice of Internal & External DOS commands.
02. Study and practice of Basic linux Commands – ls, cp, mv, rm, chmod, kill, ps etc.
03. Study and Practice of MS windows – Folder related operations, My-Computer, window explorer, Control Panel,
04. Creation and editing of Text files using MS- word.
05. Creation and operating of spreadsheet using MS-Excel.
06. Creation and editing power-point slides using MS- power point
07. Creation and manipulation of database table using SQL in MS-Access.
- 08.WAP to illustrate Arithmetic expressions
09. WAP to illustrate Arrays.
10. WAP to illustrate functions.
11. WAP to illustrate constructor & Destructor
12. WAP to illustrate Object and classes.
13. WAP to illustrate Operator overloading
14. WAP to illustrate Function overloading
15. WAP to illustrate Derived classes & Inheritance
16. WAP to insert and delete and element from the Stack
17. WAP to insert and delete and element from the Queue
18. WAP to insert and delete and element from the Linked List

### Recommended Text Books:

1. Fundamentals of Computers : E Balagurusamy, TMH
2. Basic Computer Engineering: Silakari and Shukla, Wiley India
3. Fundamentals of Computers : V Rajaraman, PHI
4. Information Technology Principles and Application: Ajoy Kumar Ray & Tinku Acharya PHI.

### Recommended Reference Books:

1. Introduction of Computers : Peter Norton, TMH
2. Object Oriented Programming with C++ :E.Balagurusamy, TMH
3. Object Oriented Programming in C++: Rajesh K.Shukla, Wiley India
4. Concepts in Computing: Kenneth Hoganson, Jones & Bartlett.
5. Operating Systems – Silberschatz and Galvin - Wiley India
6. Computer Networks:Andrew Tananbaum, PHI
7. Data Base Management Systems, Korth, TMH
8. Cloud Computing, Kumar, Wiley India

### Course Content & Grade

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
B.E. Common	Communicative Language	B.E.- 206	Theory	Practical	
			-	Min.“D”	5.0

#### Course objective:

This course intends to impart practical training in the use of English Language for Communicative purposes and aims to develop students' personality through Language Lab.

#### **Topics to be covered in the Language laboratory sessions:**

1. Introducing oneself, family, social roles, personal image design, building relationships, body language, concept of time and space.
2. Public Speaking and oral skills with emphasis on conversational practice, Role plays, extempore speech, JAM (Just a minute sessions), describing objects and situations, giving directions, debate, telephonic etiquette.
3. Reading Comprehension: Intensive reading skills, rapid reading, and reading aloud (Reading material to be selected by the teacher).
4. Translation from English to Hindi and vice versa.
5. Oral Presentation: preparation and delivery (Topic to be selected by the teacher.)

#### **Assessment Criterion:**

Oral Presentation	10
Assignment	20
Viva Voice	20