Rajiv Gandhi Proudhyogiki Vishwavidyalaya, Bhopal

Semester I (Set A)   Credit Based Grading System (CBGS) w.e.f. July 2017
Scheme of Examination
Bachelor of Technology B.Tech. (Common to all Disciplines)
Branches (CS, IT, EE, EX, EI, FT, AT, MI, BT & BM)
Subject wise distribution of marks and corresponding credits

S. No.	Subject Code	Subject Name & Title	Maximum Marks Allotted							Hours per week.			Total Credits	Remarks
			Theory			Practical								
			End Sem	Mid Sem. MST	Quiz, Assignment	End Sem.	Lab Work	Assignment /Quiz/Term paper	Total Marks	L	T	P		One credit refers to one hour teaching in theory, Tutorial and in practical.
1	BT-1001	Engineering Chemistry	70	20	10	30	10	10	150	3	1	2	6	
2	BT-1002	Mathematics-I	70	20	10	-	-	-	100	3	1		4	
3	BT-1003	English	70	20	10	30	10	10	150	3	1	2	6	
4	BT-1004	Basic Electrical and Electronics Engineering	70	20	10	30	10	10	150	3	1	2	6	
5	BT-1005	Engineering Graphics	70	20	10	30	10	10	150	3	1	2	6	
6	BT-1006	Workshop Practice	-	-	-	30	10	10	50	-	-	2	2	**Total Marks**
	Total		350	100	50	150	50	50	750	15	5	10	30	750

MST: Minimum of two mid semester tests to be conducted.   L: Lecture   T: Tutorial   P: Practical

Rajiv Gandhi Proudhyogiki Vishwavidyalaya, Bhopal

Semester I (Set-B)   Credit Based Grading System (CBGS) w.e.f. July 2017

Scheme of Examination

Bachelor of Technology B.Tech. (Common to all Disciplines)

Branches(AU, ME, IP, CE, IEM, TX, EC & CM)

Subject wise distribution of marks and corresponding credits

S. No.	Subject Code	Subject Name & Title	Maximum Marks Allotted							Hours per week.			Total Credits	Remarks
			Theory			Practical								
			End Sem	Mid Sem. MST	Quiz, Assignment	End Sem.	Lab Work	Assignment /Quiz/Term paper	Total Marks	L	T	P		One credit refers to one hour teaching in theory, Tutorial and in practical.
1	BT-2001	Engineering Physics	70	20	10	30	10	10	150	3	1	2	6	
2	BT-1002	Mathematics-I	70	20	10				100	3	1		4	
3	BT-2003	Basic Mechanical Engineering	70	20	10	30	10	10	150	3	1	2	6	
4	BT-2004	Basic Civil Engineering & Engineering Mechanics	70	20	10	30	10	10	150	3	1	2	6	
5	BT-2005	Basic Computer Engineering	70	20	10	30	10	10	150	3	1	2	6	
6	BT-2006	Language Lab	-	-	-	30	10	10	50	-	-	2	2	**Total Marks**
	Total		350	100	50	150	50	50	750	15	5	10	30	750

MST: Minimum of two mid semester tests to be conducted.   L: Lecture   T: Tutorial   P: Practical

Rajiv Gandhi Proudhyogiki Vishwavidyalaya, Bhopal

Semester II (Set-A) Credit Based Grading System (CBGS) w.e.f. July 2017
Scheme of Examination
Bachelor of Technology B.Tech. (Common to all Disciplines)
Branches(CS, IT, EE, EX, EI, FT, AT, MI, BT & BM)
Subject wise distribution of marks and corresponding credits

S. No.	Subject Code	Subject Name & Title	Maximum Marks Allotted							Hours per week.			Total Credits	Remarks
			Theory			Practical								
			End Sem	Mid Sem. MST	Quiz, Assignment	End Sem.	Lab Work	Assignment /Quiz/Term paper	Total Marks	L	T	P		One credit refers to one hour teaching in theory, Tutorial and in practical.
1	BT-2001	Engineering Physics	70	20	10	30	10	10	150	3	1	2	6	
2	BT-2002	Mathematics - II	70	20	10				100	3	1		4	
3	BT-2003	Basic Mechanical Engineering	70	20	10	30	10	10	150	3	1	2	6	
4	BT-2004	Basic Civil Engineering & Engineering Mechanics	70	20	10	30	10	10	150	3	1	2	6	
5	BT-2005	Basic Computer Engineering	70	20	10	30	10	10	150	3	1	2	6	
6	BT-2006	Language Lab	-	-	-	30	10	10	50	-	-	2	2	**Total Marks**
	Total		350	100	50	150	50	50	750	15	5	10	30	750

MST: Minimum of two mid semester tests to be conducted.   L: Lecture   T: Tutorial   P: Practical

Rajiv Gandhi Proudhyogiki Vishwavidyalaya, Bhopal

Semester II (Set B)   Credit Based Grading System (CBGS) w.e.f. July 2017
Scheme of Examination
Bachelor of Technology B.Tech. (Common to all Disciplines)
Branches (AU, ME, IP, CE, IEM, TX, EC & CM)
Subject wise distribution of marks and corresponding credits

S. No.	Subject Code	Subject Name & Title	Maximum Marks Allotted							Hours per week.			Total Credits	Remarks
			Theory			Practical								
			End Sem	Mid Sem. MST	Quiz, Assignment	End Sem.	Lab Work	Assignment /Quiz/Term paper	Total Marks	L	T	P		One credit refers to one hour teaching in theory, Tutorial and in practical.
1	BT-1001	Engineering Chemistry	70	20	10	30	10	10	150	3	1	2	6	
2	BT-2002	Mathematics-II	70	20	10	-	-	-	100	3	1		4	
3	BT-1003	English	70	20	10	30	10	10	150	3	1	2	6	
4	BT-1004	Basic Electrical and Electronics Engineering	70	20	10	30	10	10	150	3	1	2	6	
5	BT-1005	Engineering Graphics	70	20	10	30	10	10	150	3	1	2	6	
6	BT-1006	Workshop Practice	-	-	-	30	10	10	50	-	-	2	2	**Total Marks**
	Total		350	100	50	150	50	50	750	15	5	10	30	750

MST: Minimum of two mid semester tests to be conducted.   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.TECH. Common	**Engineering Chemistry**	**BT- 1001**	**Theory**	**Practical**	
			Min."D"	**Min."D"**	**5.0**

Unit I
WATER - ANALYSIS, TREATMENTS AND INDUSTRIAL APPLICATIONS :
Sources, Impurities, Hardness & its units, Determination of hardness by EDTA method, Alkalinity & its determination, Boiler troubles (Sludge & Scale, Priming & Foaming, Boiler Corrosion, Caustic Embrittlement), Softening of water by Lime-Soda, Zeolite and Ion Exchange methods, Internal treatment methods of Boilers, Numerical problems based on softening methods, hardness and alkalinity.

Unit II
FUELS & COMBUSTION: Fossil fuels & classification, Calorific value & its types, Determination of calorific value by Bomb calorimeter Proximate and Ultimate analysis of coal and their significance, calculation of calorific value by Dulong's formula, Knocking, relationship between' knocking & structure of hydrocarbon, Octane number, Cetane number, combustion and it related numerical problems.

Unit III
A. LUBRICANTS: Introduction, Mechanism of lubrication, Classification of lubricants, significance & determination of Viscosity ,Viscosity Index, Flash & Fire Points, Cloud & Pour Points, Carbon Residue, Aniline Point, Acid Number, Saponification Number, SEN .
B. CEMENT: Manufacture of Portland Cement by wet process, Setting and hardening of cement, Preparation, properties and uses of Plaster of Paris.
Unit IV
POLYMERS & POLYMERISATION: Introduction, types of polymerisation, classification of polymers,
Natural & Synthetic Rubbers; Vulcanization of Rubber, Preparation,
properties & uses of the following polymers- Polythene, PVC, PMMA, Teflon, Poly acrylonitrile, PVA, Nylon 6, Nylon 6:6, Phenol formaldehyde, Urea – Formaldehyde, Buna N, Buna S.

Unit V
A. INSTRUMENTAL TECHNIQUES IN CHEMICAL ANALYSIS :
Lambert's and Beer's Law and its applications,
Introduction, Principle, Instrumentation and applications of IR & UV spectroscopy, Gas Chromatography & its applications.
B. REFRACTORIES: Introduction, classification and properties of refractories .

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 8 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) OH^- & CO_3^{--}
 (b) CO_3^{--} & 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.

Course Content & Grade

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
B.TECH. Common	**Mathematics - I**	**BT- 1002**	**Theory**	**Practical**	
			Min."D"	**Min."D"**	**5.0**

COURSE OBJECTIVE:
The objective of this foundational course is to review mathematical concepts already learnt in higher secondary. This course will also introduce fundamentals of mathematical functions, derivatives and aspects of calculus to students.

COURSE CONTENT:
Recapitulation of Mathematics: Basics of Differentiation, Rolle's and Lagranges Theorem, Tangents and Normals, Indefinite Integral (Substitution, Integration using Trigonometric Identity & Integration by Parts & Definite Integral).

Ordinary Derivatives & Applications: Expansion of functions by Maclaurin's & Taylor's Theorem (One Variable), Maxima and Minima of functions of two variables, Curvature (Radius, Center & Circle of Curvature for Cartesian Coordinates), Curve Tracing.

Partial Derivatives & Applications: Definition, Euler's Theorem for Homogeneous Functions, Differentiation of Implicit Functions, Total Differential Coefficient, Transformations of Independent Variables, Jacobians, Approximation of Errors.

Integral Calculus: Definite Integrals as a Limit of Sum, Application in Summation of series, Beta and Gamma functions (Definitions, Relation between Beta and Gamma functions, Duplication formula, Applications of Beta & Gama Functions).

Applications of Integral Calculus: Multiple Integral (Double & Triple Integrals), Change of Variables, Change the Order of Integration, Applications of Multiple Integral in Area, Volume, Surfaces & Volume of Solid of Revolution about X-Axis & Y-Axis.

COURSE OUTCOMES
The curriculum of the Department is designed to satisfy the diverse needs of students. Coursework is designed to provide students the opportunity to learn key concepts of mathematical functions, partial derivatives as well as fundamentals and applications of integral calculus.

EVALUATION
Evaluation will be continuous an integral part of the class as well through external assessment.

REFERENCES

Michael Greenberg, Advanced Engineering Mathematics, Second Edition, Pearson Education, 2002(Indian Edition).

B.V. Rammana, Higher Engineering Mathematics, Tata McGraw Hill Publishing Company, 2007.

Potter, Goldberg & Edward, Advanced Engineering Mathematics, Oxford University Press.

S. S. Shastry, Engineering Mathematics, PHI Learning

C.B. Gupta, Engineering Mathematics I & II, McGraw Hill India, 2015

Course Content & Grade

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even
B.TECH. Common	**English**	**BT- 1003**	**Theory**	**Practical**	
			Min."D"	Min."D"	5.0

COURSE CONTENT:

Unit-I
Grammar: Applied Grammar and usage, Parts of Speech, Articles, Tenses, Subject-Verb Agreement, Prepositions, Active and Passive Voice, Reported Speech: Direct and Indirect, Sentence Structure, Punctuation. Vocabulary Development: Using Dictionary and Thesaurus, Synonym, Antonym, Homophones.

Unit-II
Communication: Introduction, Meaning and Significance, Process of Communication, Oral and Written Communication, 7 c's of Communication, Barriers to Communication and Ways to overcome them, Importance of Communication for Technical students.

Unit-III
Nonverbal Communication and listening skills: nonverbal communication, cross cultural communication, communicating through visuals, listening, types of listening, active listening, barriers to listening, improving listening skills.

Unit-IV
Developing Writing Skills: Planning, Drafting and Editing, Precise Writing, Précis, Technical definition and Technical description. Report Writing: Features of writing a good Report, Structure of a Formal Report, Report of Trouble, Laboratory Report, Progress Report.

Unit-V
Business Correspondence: Importance of Business Letters, Parts and Layout; Application, Contents of good Resume, guidelines for writing Resume, Calling/ Sending Quotation, Order, Complaint, E-mail and Tender.

Books Recommended:
1. 'Technical Communication : Principles and practice', Meenakshi Raman and Sangeeta Sharma (Oxford)
2. 'Effective Business Communication', Krizan and merrier (Cengage learning)
3. 'Business Correspondence and Report Writing' R.C. Sharma and Krishna Mohan, (Tata Mcgraw Hill)
4. 'Speaking and Writing for Effective Business Communication', Francis Soundararaj (Macmillan)
5. Effective Technical Communication', M Arshaf Rizvi (Tata Mcgraw Hill)
6. 'Contemporary Business Communication', Scot Ober (biztantra)
7. 'Communication for Business –a practical approach', Shirley Taylor(Pearson Education)
8. 'A Practical English Grammar', A.J. Thomson and A.V. Martinet, (Oxford IBH publication)

Communicative Language Laboratory :

Course objective : The language laboratory focuses on the practice 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 and Vocabulary (Synonyms/ Antonyms, Analogies, sentence completion, correctly spelt words, idioms proverbs, common errors).
2. Listening Skills (Including Listening Comprehension)
3. Reading Skills ((Including Reading Comprehension)
4. Writing Skills.
5. Speaking Skills.
6. Body Languages.
7. Oral Presentation: Research and Planning, Structure and Style, Preparation and delivery using Audio –Visual aids with stress on body Language and Voice modulation. (Topic to be selected by the teacher.)

Final Assessment should be based on assignment, assessment, presentation and interview of each candidate.

Course Content & Grade

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
B.TECH. Common	**Basic Electrical and Electronics Engineering**	**BT- 1004**	**Theory**	**Practical**	
			Min."D"	**Min."D"**	**5.0**

Unit- I :
D.C. Circuits: Voltage and current sources, dependent and independent sources, Units and dimensions, Source Conversion, Ohm's Law, Kirchhoff's Law, Superposition theorem, Thevenin's theorem and their application for analysis of series and parallel resistive circuits excited by independent voltage sources, Power & Energy in such circuits. Mesh & nodal analysis, Star Delta transformation & circuits.

Unit – II :
1- phase AC Circuits: Generation of sinusoidal AC voltage, definition of average value, R.M.S. value, form factor and peak factor of AC quantity , Concept of phasor, Concept of Power factor, Concept of impedance and admittance, Active, reactive and apparent power, analysis of R-L, R-C, R-L-C series & parallel circuit
3-phase AC Circuits: Necessity and advantages of three phase systems, Meaning of Phase sequence, balanced and unbalanced supply and loads. Relationship between line and phase values for balanced star and delta connections. Power in balanced & unbalanced three-phase system and their measurements

Unit – III : Magnetic Circuits: Basic definitions, magnetization characteristics of Ferro magnetic materials, self inductance and mutual inductance, energy in linear magnetic systems, coils connected in series, AC excitation in magnetic circuits, magnetic field produced by current carrying conductor, Force on a current carrying conductor. Induced voltage, laws of electromagnetic Induction, direction of induced E.M.F.
Single phase transformer- General construction, working principle, e.m.f. equation, equivalent circuits, phasor diagram, voltage regulation, losses and efficiency, open circuit and short circuit test

Unit IV:
Electrical Machines: Construction, Classification & Working Principle of DC machine, induction machine and synchronous machine. Working principle & 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. Types of losses occurring in electrical machines. Applications of DC machine, induction machine and synchronous machine.

Unit V :
Basic Electronics: Number systems & Their conversion used in digital electronics, Demorgan's theorem, Logic Gates, half and full adder circuits, R-S flip flop, J-K flip flop. 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

Course outcomes : The final outcome of the subject will result into an enhancement in understanding the basic concepts of Core Electrical Engineering subjects. The topics covered under this subject will help to enhance the basic understanding of Electrical machines and power systems.

Evaluation : Evaluation will be continuous and integral part of the class followed by final examination.

References
1. *D.P. Kothari & I.J. Nagrath, Basic Electrical Engineering, Tata McGraw Hill, latest edition.*
2. *S.N. Singh , Basic Electrical Engineering, P.H.I.,2013*
3. *Rajendra Prasad, Fundamentals of Electrical Engineering, Prentice Hall,2014*
4. *M.S. Sukhija, T. K. Nagsarkar, Basic Electrical and electronics engineering, Oxford University press,2012*
5. *C.L. Wadhwa, Basic Electrical Engineering. New Age International.*
6. *B.L. Theraja & A.K Theraja Textbook of Electrical Technology - Vol. 1, S. Chand Publication*
7. *E. Hughes & I.M. Smith Hughes Electrical Technology Pearson*
8. *Vincent Del Toro Electrical Engineering Fundamentals*

Course Content & Grade

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
B.TECH. Common	Engineering Graphics	BT -1005	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, Involutes, Archimedeanand 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. Jeyopoovan 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 Assessmen

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
			Theory	Practical	
B.TECH. Common	Work Shop Practice	BT- 1006	-	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 planning 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.TECH. Common	**Engineering Physics**	**BT- 2001**	**Theory**	**Practical**	
			Min."D"	**Min."D"**	**5.0**

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 lght), 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 acceleratos: 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 Auston 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. Engineering Physics- Purnima Swarup Khare, Laxmi Publication
2. A Text Book of Engg Physics – N. Gupta & S.K. Tiwary , Dhanpat Rai & Co. , Delhi
3. Concepts of Modern Physics- Beiser, TMH
4. Solid State Physics by Kittel ,Wiley India
5. Engineering Physics-Fundamentals and Modern Applications – by Purnima Swarup Khare, Infinity Press Publications

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 s single slit by f He-Ne Laser.
13. To determine the numeral aperture (NA) of a Optical Fibre.
14. To determine plank'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.TECH. Common	Mathematics - II	BT- 2002	Theory	Practical	
			Min."D"	Min."D"	5.0

COURSE OBJECTIVE:
The objective of this foundational course is to review mathematical concepts already learnt in higher secondary. This course deep understanding of matrix, differential equations as well as a strong sense of how useful the subject can be in other disciplines of learning.

COURSE CONTENT:
Matrices & Linear Systems: Rank of a Matrix (By reducing it to Elementary Transformation, Echelon & Normal Forms), Solution of Simultaneous equations by Elementary Transformation Methods, Consistency & Inconsistency of Equations, Eigen Values & Eigen Vectors, Cayley- Hamilton Theorem..

Ordinary Differential Equations-I: First-order differential equations (Separable, Exact, Homogeneous, Linear), Linear differential Equations with constant coefficients.

Ordinary Differential Equations-II: Homogeneous linear differential equations, Simultaneous linear differential equations. Second-Order Linear Differential Equations with Variable Coefficients: Solution by Method of Undetermined Coefficients, ByS Known Integral, Removal of First Derivative, Change of Independent Variable and Variation of Parameters.

Partial Differential Equations-I: Definition, Formulation, Solution of PDE (By Direct Integration Method & Lagranges Method), Non-Linear Partial Differential Equation of First order {Standard I, II, III & IV), Charpit's General Method of Solution Partial Differential equations.

Partial Differential Equations-II: Partial Differential Equations with Constant Coefficients (Second and Higher Orders Homogeneous and Non- Homogeneous equations), Partial differential Equations Reducible to equations with constant coefficients, The Method of Separation of Variables.

COURSE OUTCOMES
The curriculum of the Department is designed to satisfy the diverse needs of students. Coursework is designed to provide students the opportunity to learn key concepts of matrix, differential equations and their applications.

EVALUATION
Evaluation will be continuous an integral part of the class as well through external assessment.

REFERENCES

Dean G. Duffy, Advanced Engineering Mathematics with MATLAB, CRC Press, 2013.

E. Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons Inc.

Michael Greenberg, Advanced Engineering Mathematics, Second Edition, Pearson Education, 2002 (Indian Edition).

B.V. Rammana, Higher Engineering Mathematics, Tata McGraw Hill Publishing Company, 2007.

Shanti Narayan, A Course of Mathematical Analysis. S. Chand & Co. Delhi.

Marwaha, Introduction to Linear Algebra, PHI Learning.

Course Content & Grade

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
B.TECH. Common	Basic Mechanical Engineering	BT- 2003	Theory	Practical	
			Min."D"	Min."D"	5.0

Unit I :
Materials : Classification of engineering material, Composition of Cast iron and Carbon steels, Iron Carbon diagram. Alloy steels their applications. Mechanical properties like strength, hardness, toughness , ductility, brittleness , malleability etc. of materials , Tensile test- Stress-strain diagram of ductile and brittle materials ,Hooks law and modulus of elasticity, Hardness and Impact testing of materials, BHN etc.

Unit II:
Measurement: Concept of measurements, errors in measurement, Temperature, Pressure, Velocity, Flow strain, Force and torque measurement, Vernier caliper, Micrometer, Dial gauge, Slip gauge, Sine-bar and Combination set.

Production Engineering: Elementary theoretical aspects of production processes like casting, carpentry, welding etc   Introduction to Lathe and Drilling machines and their various operations.

Unit III :
Fluids : Fluid properties pressure, density and viscosity etc. Types of fluids , Newton's law of viscosity , Pascal's law , Bernoulli's equation for incompressible fluids, Only working principle of Hydraulic machines, pumps, turbines, Reciprocating pumps .

Unit IV:
Thermodynamics : Thermodynamic system, properties, state, process, Zeroth, First and second law of thermodynamics, thermodynamic processes at constant pressure, volume, enthalpy & entropy.

Steam Engineering : Classification and working of boilers, mountings and accessories of boilers, Efficiency and performance analysis, natural and artificial draught**,** steam properties, use of steam tables.

Unit V:
Reciprocating Machines :
Working principle of steam Engine, Carnot, Otto, Diesel and Dual cycles P-V & T-S diagrams and its efficiency, working of Two stroke & Four stroke Petrol & Diesel engines. Working principle of compressor.

Reference Books:
1- Kothandaraman & Rudramoorthy, Fluid Mechanics & Machinery, New Age .
2- Nakra & Chaudhary , Instrumentation and Measurements, TMH.
3- Nag P.K, Engineering Thermodynamics , TMH .
4- Ganesan , Internal Combustion Engines, TMH .
5- Agrawal C M, Basic Mechanical Engineering ,Wiley Publication.
6- Achuthan M , , Engineering Thermodynamics ,PHI.

List of Suggestive Core Experiments:
Theory related Eight to Ten experiments including core experiments as follows:
1- Study of Universal Testing machines.
2- Linear and Angular measurement using, Micrometer, Slip Gauges, Dial Gauge and Sine-bar.
3- Study of Lathe Machine.
4- Study of Drilling Machines.
5- Verification of Bernoulli's Theorem.
6- Study of various types of Boilers.
7- Study of different IC Engines.
8- Study of different types of Boilers Mountings and accessories.

Course Content & Grade

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
B.TECH. Common	**Basic Civil Engineering & Engineering Mechanics**	**BT- 2004**	**Theory**	**Practical**	
			Min."D"	**Min."D"**	**5.0**

APPLIED MECHANICS:

1. FORCES AND EQUILIBRIUM :Graphical and Analytical Treatment of concurrent and nonconcurrent coplanar forces, force diagrams and Bow's notations, application to simple engineering structures and components, method of joints, method of sections for forces in members of plan frames and trusses.

2. CENTRE OF GRAVITY AND MOMENT OF INERTIA: Centroid of plane figures and centre of gravity of masses and forces, moment of inertia of area and mass, radius of Gyration, principle axes of sections and principle of inertia.

3. SIMPLE LIFTING MACHINES: Laws of machines, reversible and irreversible machines, velocity ratio, limiting values of mechanical advantage and efficiency of machines, various types of simple machine.

SURVEYING AND FIELD WORK:
1.   Linear measurements : Chain and Tape Surveying, Errors, Obstacles, Booking and Plotting, Calculation of Areas.
2.   Angular Measurements : Bearing, Prismatic Compass, Local Attraction, Bowditch's Rule of correction, traverse open and closed, plotting of traverse, accuracy and precision.
3.   Levelling : Types of Levels, Levelling Staff, Measurements, recording, curvature and refraction correction, reciprocal levelling, sensitivity of level.
4.   Contours : Properties, uses, plotting of contours, measurement of drainage and volume of reservoir.
5.   Measurement of area by planimeter.

BUILDING MATERIALS :
1.   Bricks : Manufacturing, field and laboratory test, Engineering properties.
2.   Cement : Types, physical properties, laboratory tests
3.   Concrete and Mortar Materials : Workability, Strength Properties of Concrete, Nominal Proportion of Concrete, Preparation of Concrete, Compaction Curving.
      Mortar : Properties and Uses.

SESSIONAL WORK :
Practical work will be based on syllabus of surveying and Applied Mechanics & Materials.

Reference Books:
1. S. Ramamrutam & 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 stricture, 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.

Course Content & Grade

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
B.TECH. Common	**Basic Computer Engineering**	BT- 2005	**Theory**	**Practical**	
			Min."D"	Min."D"	5.0

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.TECH. Common	**Language Laboratory**	**BT- 2006**	**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 Laboratory .

Topics to be covered in the Language laboratory sessions:
1. Introducing oneself, family, social roles.
2. Public Speaking and oral skills with emphasis on conversational practice, 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. To write a book review. Standard text must be selected by the teacher.
5. Role plays: preparation and delivery topic to be selected by teacher/faculty.