B.Tech. SYLLABUS
(I and II Semester)

2009 -2010

NATIONAL INSTITUTE OF TECHNOLOGY
TIRUCHIRAPPALLI – 620 015
TAMILNADU, INDIA.

B.TECH. CURRICULUM FOR I & II SEMESTER 2009-10

SEMESTER-I

CODE	COURSE OF STUDY	L	T	P	C
HM101	Basic Course in Communicative English	3	0	0	3
MA101	Mathematics-1	3	0	0	3
PH101	Physics-1	2	0	3	3
CH101	Chemistry-1	2	0	3	3
ME101	Engineering Mechanics	3	0	0	3
CS101	Basics of programming	2	0	2	3
CC101	Energy and Environmental Engineering	2	0	0	2
MP101/ PR101	Engineering graphics / Workshop Practice	1 0	0 0	4 4	3 2
CF101	NSS/NCC/NSO	0	0	0	0
	Total	18/17	0	12	23/22

SEMESTER –II

CODE	COURSE OF STUDY	L	T	P	C
HM102	Professional Communication	3	0	0	3
MA102	Mathematics-II	3	0	0	3
PH102	Physics-II	3	0	3	4
CH102	Chemistry-II	3	0	3	4
BEI102	Basic Engineering-I	2	0	0	2
BEII102	Basic Engineering-II	2	0	0	2
BS102	Branch specific Course	2	0	0	2
PR101/ MP101	Workshop Practice / Engineering Graphics	0 1	0 0	4 4	2 3
CF102	NSS/NCC/NSO	0	0	0	0
	Total	18/19	0	10	22/23

B.TECH. CURRICULUM FOR I & II SEMESTER 2009-10

HM101 BASIC COURSE IN COMMUNICATIVE ENGLISH

Communication: An introduction - Its role and importance in the corporate world – Tools of communication – Barriers – Levels of communication.

Listening: Importance to listening in the corporate world - Listening process & practice – Exposure to recorded & structured talks, class room lectures – Problems in comprehension & retention – Note-taking practice – Listening tests.

Reading: Introduction of different kinds of materials: technical & non-technical – Different reading strategies: skimming, scanning, inferring, predicting and responding to content – Guessing from context – Note making – Vocabulary extension.

Speaking: Barriers to speaking – Building confidence & fluency – dialogue practice- Extempore speech practice – Speech assessment.

Writing: Effective writing practice – Effective sentences: role of acceptability, appropriateness, brevity & clarity in writing – Cohesive writing practice – Paragraph writing – Discourse writing.

Text Book

1. Meenakshi Raman and Sangeetha Sharma (2008) Technical *Communication*, Oxford University Press, New Delhi.

Reference Books

1. M. Ashraf Rizvi (2005*), Effective Technical Communication*, Tata McGraw-Hill, New Delhi.
2. Golding S.R. (1978), Common *Errors in English Language*, Macmillan.
3. Christopher Turk (1985), *Effective Speaking*, E & FN Spon, London

MA101 MATHEMATICS-I

Characteristic equation of a matrix –Eigen values and Eigen vectors – Properties of Eigen values – Diagonalization of matrix – Cayley-Hamilton Theorem (without proof) verification – Finding Inverse and Power of a matrix using it – Quadratic form – Definite and indefinite forms – Orthogonal reduction of quadratic form to canonical form.

Sequences of real numbers – Limit of a sequence – Convergent and divergent sequences– sub sequence- Cauchy's sequence – monotone convergence theorem (without proof)- Sequence with recurrence relations

Infinite series-Convergence Tests for positive term series – Comparison, Root, Ratio and Raabe's tests - Alternating series – Leibnitz's rule – Absolute and Conditional Convergence. Riemann rearrangement theorem (with out proof)-

Curvature – Radius, Centre and Circle of Curvature in Cartesian form –Evolute – Envelope of family of curves with one and two parameters – Functions of several variables - Partial

derivatives and Transformation of variables – Jacobian and its Properties- Maxima and Minima of function of two variables.

Double integral – Changing the order of Integration – Change of variables from Cartesian to Polar Coordinates – Area using double integral in Cartesian and Polar Coordinates – Triple integral – Change of Variables from Cartesian to Spherical and Cylindrical Coordinates – Volume using double and triple integrals.

Text Books

1. Kreyszig, E., Advanced Engineering Mathematics, 8th edition, John Wiley Sons, 2001.
2. Grewal, B.S., Higher Engineering Mathematics, 40th edition, Khanna Publications, Delhi, 2007.

Reference Books

1. Apostol, T.M. Calculus Volume I & II Second Edition, John Wiley & Sons (Asia) 2005.
2. Greenberg, M.D. Advanced Engineering Mathematics, Second Edition, Pearson Education Inc. (First Indian reprint), 2002
3. Strauss. M.J, Bradley, G.L. and Smith, K.J. Calculus, 3rd Edition, Prentice Hall, 2002.

PH101 PHYSICS - I

Waves and Oscillations : Traveling wave in one dimension – wave equation – examples – simple harmonic motion – examples: simple pendulum, LC circuit – damped oscillation – forced oscillation and resonance – origin of refractive index – dispersion.

Acoustics: Characteristics of musical sound – loudness – Weber-Fechner law – decibel – absorption coefficient – reverberation – reverberation time – Sabine's formula – acoustics of buildings – Ultrasonic production: Magnetostriction and piezoelectric methods – determination of velocity of ultrasonic waves (acoustic grating) – applications.

Thermodynamics : Mole – ideal gas – heat capacity – exact differential – first law – Meyer's relation – isothermal and adiabatic processes – work done – second law – Carnot engine – Carnot's theorem – Kelvin's scale of temperature – Clausius' theorem and entropy – first law revisited – statistical interpretations of temperature and entropy.

Crystallography : Crystalline and amorphous solids – system of crystals – symmetry operation – Miller indices – atomic radius – coordination number – atomic packing factor calculation – X-ray diffraction – powder photograph method.

Quantum Mechanics : Inadequacy of classical mechanics – wave and particle duality of radiation – de Broglie concept of matter waves – Heisenberg's uncertainty principle – Schrodinger's wave equation – interpretation of wave function – eigenvalues and eigenfunctions – superposition principle – particle confined in one dimensional infinite square well potential.

Text Books

1. V. Rajendran and A. Marikani, Material Science, Tata McGraw-Hill, 2004.
2. M.N. Avadhanulu, Engineering Physics, S. Chand & Co., 2007.

Reference Books

1. D. Halliday, R. Resnick and J. Walker, Fundamentals of Physics, 6th Edition, John Wiley and Sons, 2001.
2. F.S. Crawford Jr., Waves – Berkeley Physics Course Vol. 3, Tata McCraw-Hill, 2008.
3. A. Ghatak, Optics, 3rd edition, Tata McGraw-Hill, 2005.

Lab Experiments

1. Torsional pendulum
2. Sonometer – Frequency of turning fork.
3. Measurement of temperature using thermocouple
4. Thermal conductivity – Lee's disc method
5. Half shade polarimeter – determination of specific rotatory power
6. Determination of dispersive power of prism
7. Conversion of Galvanometer into ammeter and voltmeter

Reference

1. Physics Laboratory Manual, Department of Physics, NITT.

CH101 CHEMISTRY-I

Electrochemistry: Electrolytic and galvanic cells, EMF series, Nernst equation for electrode potential, cell EMF, its measurement and applications, Weston standard cell, hydrogen electrode, calomel electrode, glass electrode, reversible and irreversible cells, concentration cell, electrode (hydrogen gas electrode) and electrolyte concentration cell, concentration cell with and without transference, fuel cells, hydrox fuel cell.

Corrosion: Dry corrosion and wet corrosion, mechanisms, types of corrosion, DMC, DAC, stress, inter granular, atmospheric and soil corrosion, Factors affecting corrosion, protection from corrosion by metallic coatings, electroplating, electrolessplating and cathodic protection.

Organic Chemistry: Carbon-carbon bond properties, hybridization-sp^3, sp^2 and sp, homolytic and heterolytic cleavage of carbon-carbon bonds, S_N^1 and S_N^2, E_1 and E_2 reactions, Birch reduction, MPV reduction, Baeyer-Villiger oxidation, Oppenauer oxidation, aromatic nucleophilic substitution, benzyne mechanism, aromatic electrophilic substitution.

Thermodynamics: Entropy as a thermodynamic quantity, entropy changes in isothermal expansion of an ideal gas, reversible and irreversible processes and physical transformations, work and free energy functions, Helmholtz and Gibbs free energy functions, Gibbs-Helmholtz equation, Gibbs-Duhem equation, Clapeyron-Clausius equation and its applications, Van't Hoff isotherm and applications.

Fuels and Lubricants: Fuels - classification, examples and relative merits, types of coal, determination of calorific value of solid fuels, Bomb calorimeter, theoretical oxygen requirement for combustion, proximate and ultimate analysis of coal, manufacture of metallurgical coke, flue gas analysis, problems, Lubricants – definition, theories of lubrication, characteristics of lubricants – viscosity, viscosity index, oiliness, pour point, cloud point, flash point, fire point and carbon residue, additives to lubricants, manufacture of lube oil.

Text Books

1. P.C. Jain and M. Jain, Engineering Chemistry, Dhanpat Rai Publishing Company (P) Ltd., New Delhi, 2007.
2. J. March, Advanced Organic Chemistry, Wiley Eastern, New Delhi, 1990.

Reference Books

1. R. Gopalan, D. Venkappayya and N. Sulochana, Engineering Chemistry, Vikas Publishing House, New Delhi, 2005.
2. J.C. Kuriacose, J. Rajaram, Chemistry in Engineering and Technology, Vol I & II, Tata McGraw Hill publishing Company Ltd, New Delhi, 1984.
3. P.W. Atkins, Physical Chemistry, Oxford University Press, 1998.

CHEMISTRY-I LAB

1. Percentage purity of bleaching powder
2. Percentage purity of washing soda
3. pH metric titration
4. Conductometric titration
5. Potentiometric titration
6. Determination of corrosion rate of mild steel in acid medium by weight loss method

Reference Book

1. Laboratory Manual, Department of Chemistry, NITT

ME101 ENGINEERING MECHANICS

Statics

Concurrent forces in a plane: Principles of Statics-Composition of forces-Equilibrium of concurrent forces in a plane-Method of projections-Equilibrium of three forces in a plane-Method of Moments – Friction

Parallel forces in a plane: Two parallel forces- General case of parallel forces in a plane-Center of parallel forces and center of gravity-Centroids of composite plane figures and curves – Distributed forces in a plane

General case of forces in a plane: Composition of forces in a plane-Equilibrium of forces in a plane

Force systems in space: Concurrent forces in space- method of projections, methods of moments-couples in space-parallel forces in space-center of parallel forces and center of gravity- general case of forces in space.

Dynamics

Rectilinear Translation: Kinematics of rectilinear motion-Principles of dynamics-Differential equation of rectilinear motion-Motion of particle acted upon by a constant force-D'Alembert's principle-Momentum and impulse-Work and energy- Ideal systems: conservation of energy- Impact

Curvilinear translation: kinematics of curvilinear motion- Differential equations of curvilinear motion-Motion of a projectile-D'Alembert's principle in curvilinear motion.

Rigid Body motion: Rotation of a rigid body about a fixed axis and Plane motion of a rigid body.

Text Books

1. Rajasekaran.S. & Sankara Subramanian.G., Engineering mechanics– statics and Dynamics, Vikas Publishing Comp, 2005
2. S. Timoshenko & D.H. Young 'Engineering Mechanics" McGraw Hill, 1995

Reference Books

1. Irving H.Shames, Engineering Mechanics – Statics and Dynamics, Pearson educations Forth edition, 2003.
2. Beer & Johnston, Vector Mechanics for Engineers, Vol.1 "Statics" and Vol.2 "Dynamics", McGraw Hill International Edition, 1995.
3. Suhas Nitsure, Engineering Mechanics, Technical Publications, Pune, 2007

CS101 BASICS OF PROGRAMMING (THEORY & LAB)

Introduction to computer systems-CPU-Memory –I/O Devices-Types of Computers – Generation of Computers –Recent trends in Software Technology

Overview of Operating System-Compilers-System software-MATLAB-SciLab

Introduction to C- Basic concepts: Keywords-Identifiers-Variables, Constants-Operator-statements-Decision making and looping-Branching. Functions-User defined functions-parameters-Call by value- Call by reference –Recursion- Arrays-Storage classes.

String manipulation – Pointers –array of pointers – Storage classes- Structures and Union – Array of Structures.

Introduction to Object Oriented Programming Concepts- Features –class- object- Inheritance-Overloading –Programming using basic concepts

Programming Exercises in C and C ++ using the above concepts.

Text Books

1. Byron And Gottfried, Programming in ANSI C, Schaum series, 2003
2. Robert Lafore, Object Oriented Programming, Tata McGraw Hill, 2001

CC101 ENERGY AND ENVIRONMENTAL ENGINEERING

Conventional Vs Non convectional power generation, Renewable and alternative energy trends in power generation in future.

Solar, Wind, Bioenergy, Ocean Thermal energy conversion (OTEC), Tidal, Fuel cell, Magneto Hydro Dynamics (MHD).

Thermo electric and thermionic generators – Principle and Application - Energy conservation and management- Industry, domestic, case studies.

Air pollution- sources- effects- control- air quality standards, air pollution act- measurement, Water pollution- effects- selection of process- Disposal of solid wastes.

Green house effect- Acid rain- Noise pollution – Thermal pollution- Pollution aspects of various power plants.

Text Books

1. Rai. G.D., Non conventional energy sources, Khanna Publishers, Delhi, 2006.
2. Gilbert M. Masters, Introduction to Environmental Engineering and Science, 2nd Edition, Prentice Hall, 2003.

Reference Books

1. Rao S., Parulekar B.B., Energy Technology-Non conventional, Renewable & Conventional, Khanna Publishers, Delhi, 2005.
2. Glynn Henry J., Gary W. Heinke, Environmental science and Engineering, Pearson Education, Inc., 2004.

MP101 ENGINEERING GRAPHICS

Drawing standard SP46: Dimensioning, Lettering, type of lines, scaling conventions.

Geometrical constructions: Dividing a given straight line into any number of equal parts, bisecting a given angle, drawing a regular polygon given one side, special methods of constructing a pentagon and a hexagon

Introduction to orthographic projection, drawing orthographic views of objects from their isometric views - Orthographic projections of Points lying in four quarters, Orthographic projection of lines parallel and inclined to one or both planes. Orthographic projection of planes inclined to one or both planes

Types of solids, Projections of solids with axis perpendicular to HP, solids with axis perpendicular to VP, solids with axis inclined to one plane. Projection of spheres touching each other

Sectioning of solids: section planes perpendicular to one plane and parallel or inclined to other plane.

Intersection of surfaces: intersection of cylinder and cylinder, intersection of cylinder and cone, intersection of prisms.

Development of surfaces: Development of cylindrical and conical surfaces

Development of prisms.

Isometric Projection and view of planes and simple solids.

Introduction to computer aided drafting: introduction to computer aided drafting package to make drawings

TEXT BOOKS

1. N.D. Bhatt, Engineering Drawing, Charotar publishing House, 46th Edition, 2003.
2. K.V. Nataraajan, "A text book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 2006.

REFERENCE BOOK

1. K.Venugopal & V.Prabhu Raja, Engineering Graphics, New Age International (P) Limited, 2008.

PR101 WORKSHOP PRACTICE

Introduction to the use of tools and machinery in Carpentry, Welding, Foundry, Fitting and Sheet metal.

Carpentry

Wood sizing exercise in planning, marking, sawing, chiseling and grooving to make

1. Half lap joint
2. Cross lap joint

Welding

Exercise in arc welding for making

1. Lap joint
2. Butt joint

Foundry

Preparation of sand mould for the following

1. Flange
2. Anvil

Fitting

Preparation of joints, markings, cutting and filing for making
1. V- joint
2. T- joint

Sheet metal

Making of small parts using sheet metal

1. Tray
2. Funnel

HM102 PROFESSIONAL COMMUNICATION

Listening: Barriers to listening: Physical & psychological – Steps to overcome them – Purposive listening practice – Active listening and anticipating the speaker – Successful telephone etiquette.

Speaking: Fluency & accuracy in speech — Positive thinking – Improving self expression – Listener oriented speaking -Group discussion practice – Developing persuasive speaking skills - Use of technology in oral communication.

Reading: Speed reading practice – Transcoding: verbal and non-verbal – Eye-reading practice – Analytical and critical reading practice.

Writing: Corporate Correspondence – Formal and informal letters – Argument Writing practice – Perspectives in writing – Different registers - Tone in formal writing – Summary writing practice.

Study Skills: Reference Skills - Using a dictionary, glossary etc – Importance of contents page – Bibliography.

Text book

1. Barun K. Mitra, Effective Technical Communication, Oxford University Press, Delhi. 2006.

Reference Books

1. Shirley Taylor, Communication for Business, Longman, New Delhi, 1999.
2. Robert Gannon, Best Science Writing: Readings and Insights, University Press, Hyderabad, 2000.
3. Albert J. Harris, Edward R.Sipay, How to Increase Reading Ability, Longman, 1990.

MA102 MATHEMATICS-II

Exact differential equations - different methods of finding the Integrating factor — Clairaut's form– Singular solution – Applications – Newton's Law of Cooling – Growth and Decay problems.

Higher order linear differential equations with constant coefficients –Particular integrals for x^n e^{ax}, $e^{ax} \cos(bx)$, $e^{ax} \sin(bx)$ – Equation reducible to linear equations with constant coefficients using $x = e^t$ - Simultaneous linear equations with constant coefficients – Method of variation of parameters – Applications – Electric circuit problems.

Gradient, Divergence and Curl – Directional Derivative – Tangent Plane and normal to surfaces – Angle between surfaces –Solenoidal and irrotational fields – Line, surface and volume integrals – Green's Theorem, Stokes' Theorem and Gauss Divergence Theorem (all without proof) – Verification and applications of these theorems.

Analytic functions – Cauchy – Riemann equations (Cartesian and polar) –Properties of analytic functions – Construction of analytic functions given real or imaginary part –

Conformal mapping of standard elementary functions (z^2, e^z, sinz, cosz, , $z + \dfrac{k^2}{z}$) and bilinear transformation.

Cauchy's integral theorem, Cauchy's integral formula and for derivatives– Taylor's and Laurent's expansions (without proof) – Singularities – Residues – Cauchy's residue theorem – Contour integration involving unit circle.

Text Books

1. Kreyszig, E., Advanced Engineering Mathematics, 8th edition, John Wiley Sons, 2001.
2. Grewal, B.S., Higher Engineering Mathematics, 40th edition, Khanna Publications, Delhi, 2007.

Reference Books

1. Apostol, T.M. Calculus, Volume I & II, 2nd Edition, John Wiley & Sons (Asia), 2005.
2. Greenberg, M.D. Advanced Engineering Mathematics, 2nd Edition, Pearson Education Inc. (First Indian reprint), 2002.
3. Strauss. M.J, Bradley, G.L. and Smith, K.J. Calculus, 3rd Edition, Prentice Hall, 2002.

PH102 PHYSICS – II

Lasers and Fiber Optics : Spontaneous and stimulated emissions – Einstein's coefficients – population inversion and lasing action – coherence – properties and types of lasers – applications – Fermat's principle and Snell's law – optical fiber – numerical aperture – types of fibers – fiber optics communication principle – fiber optic sensors.

Conductors, Dielectrics and Magnetic Materials: Free electron theory (classical and quantum) – Fermi-Dirac statistics – band theory of solids – – dielectrics – types of polarization – internal field and Claussius-Mosotti equation – ferroelectric materials – magnetic materials – types and properties – domain theory – hard and soft magnetic materials – application – superconductivity and types – Meissner effect – high temperature superconductors – applications.

Advanced Materials : Liquid crystals – types – application as display devices – photonic crystals – nanomaterials (one, two and three dimensional) – physical properties and applications.

Materials Evaluation: Ultrasonic inspection – pulse echo method – liquid penetration technique – magnetic particle inspection – radiography – thermography – types of spectra – IR, UV and Visible spectroscopy – Raman spectra – NMR technique – applications.

Electrodynamics: Coulomb's law for distribution of charges – polarization and Gauss's law – electric current and equation of continuity – magnetic induction and Lorentz force – steady current and Biot Savart law – Ampere's law – magnetization and magnetic intensity – Faraday's law of induction – generalization of Ampere's law – Maxwell's equation – electromagnetic wave equation – propagation of EM waves in free space.

Text Books

1. V. Rajendran and A. Marikani , Material Science, Tata McGraw-Hill, 2004.
2. M.N. Avadhanulu, Engineering Physics, S. Chand & Co., 2007.

Reference Books

1. E.M. Purcell, Electricity and Magnetism – Berkeley Physics Course Vol. 2, Tata McGraw-Hill, 2008.
2. J.R. Reitz, F.J. Milford and R.W. Christy, Foundations of Electromagnetic Theory, 3rd edition, Narosa, 1979.

Lab Experiments

1. Determination of thickness of a thin wire – Air wedge
2. Determination of wavelength of mercury spectrum using Grating
3. Determination of Optical absorption coefficient of materials using laser
4. Determination of Numerical aperture of an optical fiber
5. (i) Determination of wavelength of laser using diffraction grating
   (ii) Characteristics of light dependent resistor (LDR)
6. Calibration of Voltmeter - Potentiometer
7. Nondestructive testing by Ultrasonic inspection
8. Field along the axis of a Circular coil

Reference

1. Physics Laboratory Manual, Department of Physics, NITT.

CH102 CHEMISTRY-II

Water: Sources, hard and soft water, estimation of hardness by EDTA method, softening of water, zeolite process and demineralization by ion exchangers, boiler feed water, internal treatment methods, specifications for drinking water, BIS and WHO standards, treatment of water for domestic use, desalination, reverse osmosis, electro dialysis.

UV-Visible Spectroscopy: Laws of absorption, deviation from Beer's law, origin of UV and visible spectra, colour in organic compounds, absorption by organic and inorganic molecules, Woodward-Fieser rules for calculating absorption maximum in dienes and α, β-unsaturated carbonyl compounds, chemical applications, photometric titrations.

Coordination Chemistry: Formation and types of metal complexes, EAN rule, 16 and 18 electron rule, crystal field theory, CFSE, magnetism and colour of transition metal ions, metal carbonyls - bonding and structure, Organometallic compounds in catalysis - hydrogenation, hydroformylation and polymerization, chemistry of hemoglobin, Bohr effect.

Phase Equilibria - The Phase Rule: Phase rule, statement and derivation, explanation of the terms, one component system - water, CO_2 and sulphur, two component alloy systems, thermal analysis, eutectics, Pb-Ag system, applications of eutectics, two component system giving rise to compound formation, Ca-Mg alloy system, two components forming solid solutions.

Polymers: Related terms, nomenclature, functionality, classification, types of polymerization, mechanism of polymerization, molecular weight determination - viscometry, light scattering methods, industrial synthesis of polystyrene, polyethylene terephthalate and Nylon, applications of important polymers in industries and medicine, plastics - classification.

Text Books

1. P.C. Jain and M. Jain, Engineering Chemistry, Dhanpat Rai Publishing Company (P) Ltd., New Delhi, 2007.
2. W. Kemp, Organic Spectroscopy, Palgrave, New York, 2008.

Reference Books

1. J.E. Huheey, E.A. Keiter and R.L. Keiter, Inorganic Chemistry - Principles of Structure and Reactivity, Harper Collins College Publishers, New York, 1993.
2. R. Gopalan, D. Venkappayya and N. Sulochana, Engineering Chemistry, Vikas Publishing House, New Delhi, 2005.
3. J.C. Kuriacose, J. Rajaram, Chemistry in Engineering and Technology, Vol I & II, Tata McGraw Hill publishing Company Ltd, New Delhi, 1984.

CHEMISTRY II LAB

1. Estimation of total alkalinity in the given water sample
2. Estimation of carbonate, noncarbonated and total hardness in the given water sample
3. Estimation of dissolved oxygen in waste water
4. Estimation of Fe^{2+} by external indicator
5. Estimation of Fe^{3+} by spectrophotometer
6. Molecular weight determination by Oswald viscometer

Reference

1. Laboratory Manual, Department of Chemistry, NITT.

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BASIC ENGINEERING I

CV102 BASIC CIVIL ENGINEERING
(For Chemical, CSE, ECE, EEE, ICE, Mechanical, MME, Production)

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Properties and uses of construction materials - stones, bricks, cement, concrete and steel. Site selection for buildings- Component of building- Foundation- Shallow and deep foundations- Brick and stone masonry- Plastering- Lintels, beams and columns- Roofs.

Roads-Classification of Rural and urban Roads- Pavement Materials-Traffic signs and road marking-Traffic Signals

Surveying -Classification-Chain Survey-Ranging-Compass Survey-exhibition of different survey equipment.

Water Supply-Quality of Water-Wastewater Treatment units-Their functional utility- Need for conservation of water.

Reference Books

1. Sushil Kumar, Building Construction, Standard Publishers Distributors ,2001
2. S.C Rangwala, Building Materials, Charotar Publishing House, 1996.
3. Lecture notes prepared by Department of Civil Engineering, NITT.

BASIC ENGINEERING II

ME102 BASIC MECHANICAL ENGINEERING
(For Civil, CSE, ECE, EEE, ICE)

Introduction to Mechanical Engineering, Thermal Engineering, Design, manufacturing Engineering.
IC Engines – 2 Stroke and 4 stroke systems in IC Engines, Automobiles – Classification, Power plant, Transmission systems, Suspension system

Gas Turbines, Steam Turbines, Utility boilers, R & A/C system layout.

Engineering materials, machine elements, Transmission, Fasteners, Support systems.

Manufacturing, Classification, lathe, Drilling machines, Milling Machines, metal joining, metal forming, Casting.

Reference Books

1. Lecture notes prepared by Department of Mechanical Engineering, NITT.
2. K. Venugopal, Basic mechanical Engineering, Anuradha Agencies, 2005

BASIC ENGINEERING III

EE102 BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING
(For Chemical, Civil, Mechanical, MME, Production)

DC Circuits – Direct currents and voltages, power, Kirchhoffs Laws, batteries, DC machines-Construction, principle of operation and applications.

AC Circuits an transformers   - Alternating current and voltage, circuit elements R,L &C, Phasor Diagram, impedance, real and reactive power in single phase circuits, Single phase transformer – construction, principle of operation, Introduction to three phase systems.

AC machines – Synchronous and Induction machines - Construction, Principle of operation, and applications, introduction to brushless DC motor.

Basic Electronics – semiconductor devices – p-n junction diode, BJT, operational amplifiers - Principle of operation and applications, introduction to number systems and logic gates.

Signal measurement and processing – peak, RMS and average values, Data acquisition system- ADC, DAC – principles of operation.

Reference Books

1. Hughes revised by McKenzie smith with John Hilcy and keith Brown, Electrical and Electronics technology, 8th Edition, Pearson, 2006.
2. R.J.Smith, R.C.Dorf, Circuits devices and systems, 5th edition, John wiley and sons, 2001.
3. Malvino, A.P, Leach D.P and Gowtham Sha, Digital Principles and Applications, 6th Edison, Tata McGraw hill, 2007.
4. Vincent Del Toro, Electrical Engineering Fundamental, Prentice Hall India, 2002.

MP101 ENGINEERING GRAPHICS

Drawing standard SP46: Dimensioning, Lettering, type of lines, scaling conventions.

Geometrical constructions: Dividing a given straight line into any number of equal parts, bisecting a given angle, drawing a regular polygon given one side, special methods of constructing a pentagon and a hexagon

Introduction to orthographic projection, drawing orthographic views of objects from their isometric views - Orthographic projections of Points lying in four quarters, Orthographic projection of lines parallel and inclined to one or both planes. Orthographic projection of planes inclined to one or both planes

Types of solids, Projections of solids with axis perpendicular to HP, solids with axis perpendicular to VP, solids with axis inclined to one plane. Projection of spheres touching each other

Sectioning of solids: section planes perpendicular to one plane and parallel or inclined to other plane.

Intersection of surfaces: intersection of cylinder and cylinder, intersection of cylinder and cone, intersection of prisms.

Development of surfaces: Development of cylindrical and conical surfaces

Development of prisms.

Isometric Projection and view of planes and simple solids.

Introduction to computer aided drafting: introduction to computer aided drafting package to make drawings

TEXT BOOKS

1. N.D. Bhatt, Engineering Drawing, Charotar publishing House, 46th Edition, 2003.
2. K.V. Nataraajan, A text book of Engineering Graphics, Dhanalakshmi Publishers, Chennai, 2006.

REFERENCE BOOKS

2. K. Venugopal and V.Prabhu Raja, Engineering Graphics, New Age International (P) Limited, 2008.

PR101 WORKSHOP PRACTICE

Introduction to the use of tools and machinery in Carpentry, Welding, Foundry, Fitting and Sheet metal.

Carpentry

Wood sizing exercise in planning, marking, sawing, chiseling and grooving to make
1. Half lap joint
2. Cross lap joint

Welding

Exercise in arc welding for making

1. Lap joint
2. Butt joint

Foundry

Preparation of sand mould for the following

1. Flange
2. Anvil

Fitting

Preparation of joints, markings, cutting and filing for making

1. V- joint
2. T- joint

Sheet metal

Making of small parts using sheet metal

1. Tray
2. Funnel

BRANCH SPECIFIC COURSES

BS102 (CL) INTRODUCTION TO CHEMICAL ENGINEERING

Introduction to Unit operations and Unit processes – Development of flow diagrams-Basic tools of Chemical Engineering Physio-Chemical Calculations. - Material and Energy Balances - Principle and applications of Flow of Fluids and solids - Heat Transfer. - Mass Transfer. - Chemical Kinetics.- Measuring Devices.- Basic concepts of transfer processes - concepts of scale up , modeling and simulation Computers and their Applications. - Natural Resources and their Utilization. -. Pollution and its Abatement. Case studies on Refineries, Cement plants, paper and pulp , Textile and Ceramic Industries.

Text Books

1. S.K. Ghosal, S.K., Sanyal and S. Datta, Introduction to Chemical Engg., TMH Book Company, 1998.
2. Anderson L.B and L.A. Wenzel, Introduction to Chemical Engg., McGraw Hill Book Company, 1998.

BS102 (CE) INTRODUCTION TO CIVIL ENGINEERING

Role of Civil engineers in society, outstanding accomplishments of the profession, future trends, Types of projects, stages of projects, Specifications and Scope.

State of the art lectures on structures, Transportation, Water Resources, Environment, geotechnical, and GIS / GPS / RS, Introduction to geology.

Properties and uses of construction materials such as stones, bricks, cement, concrete and steel. Site selection for buildings – components of building foundation – shallow and deep foundations – brick and stone masonry – plastering – lintels, beams and columns – roofs.

Reference Books

1. Sushil kumar, Building construction, Standard Publishers, 2001
2. Rangwals, S.C, Building materials, Charotar Publishing house, 1996.

BS102 (CS) INTRODUCTION TO COMPUTER SCIENCE AND ENGINEERING

Basic model of computation, principle of mathematical induction, notions of algorithms and programming, iteration and recursion

Imperative style of programming, Functional style of programming, correctness and efficiency

Features of block-structured languages, Functions and procedures, parameter passing, Top-down style and stepwise-refinement with concrete examples

Text Books and Reference books

1. Subhashis Banerjee, S.Arun Kumar, D.Dubhashi: Introduction to Computer Science Manuscript.
2. Harold abelson and Gerald Sussman, Structure and Interpretation of Computer Programs, MIT Press, 1985.
3. R.J.Dromey, How to solve it by computer, Prentice Hall India Series
4. A.K. Dewdney, New Turing Omnibus (New Turning Omnibus: 66 Excursions in Computer Science), W.H. Freeman & Company, Revised edition, 1993.

BS102 (EE) INTRODUCTION TO ELECTRICAL AND ELECTONICS ENGINEERING

History and major inventions in electrical and electronics Engineering, Scope and significance of electrical and electronics Engineering in the real world.

Sources of electrical energy, basics of energy conversion, power apparatus used in power generation, transmission and distribution, Power apparatus used in various industries.
Basic ideas about utility supply, electrical tariff, energy audit and importance of energy saving.

Introduction to different types of electrical circuits, house wiring, electronic circuits for signal processing, specifications for electronic components.

Brief overview of various software packages and laboratories in EEE department, electronic testing and measuring equipments.

Reference

Lecture notes prepared by department of EEE, NITT.

BS102 (EC) INTRODUCTION TO ELECTRONICS AND COMMUNICATION ENGINEERING

History of major inventions in electronics & communication Engineering, Overview of various specializations in ECE, Basics of telecommunication infrastructure: Different types of channels, Bandwidth, power, range, interference, frequency reuse, fading

Industries and R&D institutions in India, Career opportunities, Avenues for higher studies in India and abroad, In plant training, Internships, Distinguished alumni in India and Abroad.

Introduction to library facility in department, central library and other institutes, National and International journals, Accessing digital library: Science direct and IEEE Explore, e-books and learning resources in the intranet and internet

Brief overview of different laboratories in ECE dept., Electronic test and measurement equipments, Energy sources, Specification for electronic components, Mini projects, Technical report preparation and presentation

Reference

Lecture notes prepared by department of ECE, NITT.

BS102 (IC) INSTRUMENTATION AND CONTROL ENGINEERING

Introduction to the program, subjects of study and its relevance, Opportunities for training, placement and for higher studies

Objectives, general concepts, terminologies, types and basic block diagrams of control and Instrumentation system

Case study: Introduction to Instrumentation and Control in Thermal Power Plants.

Text Books

1. Doebelin E.O, measurement systems: Application and Design, 4th Edison, McGraw Hill, Newyork, 2003.
2. Richard Dorf and Robert bishop, Modern control system, 10th Edition, Pearson Education 2005.

BS102 (ME) INTRODUCTIONS TO MECHANICAL ENGINEERING

Role of mechanical engineering in industry and society An historical overview of evolution of mechanical systems with examples - Role of materials, engineering analysis and manufacturing with case studies Basics of conventional design manufacturing processes - Role of engineering measurements and quality standards Basics of novel mechanisms - Principles of working of revolutionary machines . Traditional methods of design and analysis - Modern methods - case studies in mechanical design Principles of working of important thermal systems with examples. The role of basic thermal sciences in the design and analysis of mechanical systems Interface between mechanical and other systems.

BS102 (MT) INTRODUCTION TO METALS AND MATERIALS

Historical perspective, scope of materials science and of materials engineering – Role of metals in civilization and in wars – rise and fall of emperors who conquered world - Metallurgy and materials of India – Damascus sword – Delhi iron Pillar etc.,

Metals and Materials - Classification - Properties - Mechanical, electrical, thermal, magnetic, optical, decorative and its applications. Illustrative examples of practical uses of materials.

Modern materials – bio and nano materials - role of metals and materials in aerospace, traditional Indian medicines - telecommunications

Text Books

1. R.K.Rajput, Engineering materials and Metallurgy, S. Chand & Co, New Delhi, 2006.
2. Transactions of Indian institute of Metals, Special issue on Non ferrous materials – Heritage of India, Vol 59, No 6, 2006.
3. C.P.Pooler and F.J.Owens, Introduction to nano technology, Wiley student edition, 2003.
4. Sujata V Bhat, Bio Materials, Narosa Publishing house, New Delhi, 2004.

BS102 (PR) INTRODUCTION TO PRODUCTION ENGINEERING

Role of a Production Engineer, Types of Industries, Types of production, Functions in manufacturing, Organization and information processing in manufacturing, Selection of manufacturing Process, Introduction to engineering materials.

Introduction to plant layout, Types of plant layout, Safety aspects, Costs in manufacturing, Unit Cost of Production, Maintenance of industrial systems.

Introduction to Computer integrated manufacturing, Trends in manufacturing, Future automated factory, Human workers in the future automated factory, social impact.

Text Book

1. Groover M.P. Fundamentals of Modern Manufacturing, Materials, Processes and Systems, John Wiley, 2006.

Reference Books

1. Kalpakijian, Manufacturing Technology Addison Wesley Publishing Company, England, 2003.
2. B.S. Nagendra Parashar, R.K. Mittal, Elements of Manufacturing Process, PHI, 2003.
3. Ravi Shankar, Industrial Engineering and Management, Galgotia Publication, 2000.

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