



Course Structure and Syllabus
for
First Year B. Tech. Programmes
(With effect from the Academic Year 2010-2011)



CHEMICAL ENGINEERING
CIVIL ENGINEERING
COMPUTER ENGINEERING
ELECTRICAL ENGINEERING
ELECTRONICS AND TELECOMMUNICATION ENGINEERING
INFORMATION TECHNOLOGY
MECHANICAL ENGINEERING
PETROCHEMICAL ENGINEERING

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY
LONERE – RAIGAD 402 103 MAHARASHTRA

Mechanical, Chemical and Petrochemical Engineering

Semester I				
Code	Course of Study	L	P	C
BH101	Basic Course in Communicative English	3	0	6
BH102	Engineering Mathematics – I	4	0	8
BH103	Engineering Physics – I	3	2	8
BH104	Engineering Chemistry – I	3	2	8
CL105/CL205	Basic Civil Engineering	2	0	4
ID106	Energy and Environmental Engineering	2	0	4
ME107/ME207	Engineering Graphics ***	1	4	6
XB108	Branch Specific Course*	3	0	6
XC109	NCC/NSS/Sports	0	0	0
Total		21	8	50
Semester II				
Code	Course of Study	L	P	C
BH201	Basic Course in Human Rights	2	0	4
BH202	Engineering Mathematics – II	4	0	8
BH203	Engineering Physics – II	3	2	8
BH204	Engineering Chemistry – II	3	2	8
EM205/EM105	Engineering Mechanics	3	0	6
ID206	Basic Electrical and Electronics Engineering	2	0	4
WS207/WS107	Workshop Practice	0	4	4
XA208	Branch Specific Programming and Softwares**	3	0	6
XC209	NCC/NSS/Sports	0	0	0
Total		20	8	48

*ME108 Introduction to Mechanical Engineering, for Mechanical Engineering Department

*CH108 Introduction to Chemical Engineering, for Chemical Engineering Department

*PC108 Introduction to Petrochemical Engineering, for Petrochemical Engineering Department

**ME208 Mechanical Engineering: Programming and Softwares, for Mechanical Engineering Department

**CH208 Chemical Engineering: Programming and Softwares, for Chemical Engineering Department

**PE208 Petrochemical Engineering: Programming and Softwares, for Petrochemical Engineering Department

*** Four Hours End Semester Examination

Civil Engineering

Semester I				
Code	Course of Study	L	P	C
BH101	Basic Course in Communicative English	3	0	6
BH102	Engineering Mathematics - I	4	0	8
BH103	Engineering Physics - I	3	2	8
BH104	Engineering Chemistry - I	3	2	8
ID105	Energy and Environmental Engineering	2	0	4
ME106/ME206	Basic Mechanical Engineering	2	0	4
ME107/ME207	Engineering Graphics	1	4	6
CL108	Introduction to Civil Engineering	3	0	6
XC109	NCC/NSS/Sports	0	0	0
Total		21	8	50
Semester II				
Code	Course of Study	L	P	C
BH201	Basic Course in Human Rights	2	0	4
BH202	Engineering Mathematics - II	4	0	8
BH203	Engineering Physics - II	3	2	8
BH204	Engineering Chemistry - II	3	2	8
EM205/EM105	Engineering Mechanics	3	0	6
ID206	Basic Electrical and Electronics Engineering	2	0	4
WS207/WS107	Workshop Practice	0	4	4
CL208	Civil Engineering: Programming and Softwares	3	0	6
XC209	NCC/NSS/Sports	0	0	0
Total		20	8	48

Electrical, Computer, Electronics and Telecommunication and Information Technology

Semester I				
Code	Course of Study	L	P	C
BH101	Basic Course in Communicative English	3	0	6
BH102	Engineering Mathematics – I	4	0	8
BH103	Engineering Physics – I	3	2	8
BH104	Engineering Chemistry – I	3	2	8
EM105/EM205	Engineering Mechanics	3	0	6
ID106	Energy and Environmental Engineering	2	0	4
WS107/WS207	Workshop Practice	0	4	4
XB108	Branch Specific Course*	3	0	6
XC109	NCC/NSS/Sports	0	0	0
Total		21	8	50
Semester II				
Code	Course of Study	L	P	C
BH201	Basic Course in Human Rights	2	0	4
BH202	Engineering Mathematics – II	4	0	8
BH203	Engineering Physics – II	3	2	8
BH204	Engineering Chemistry – II	3	2	8
CL205/CL105	Basic Civil Engineering	2	0	4
ME206/ME106	Basic Mechanical Engineering	2	0	4
ME207/ME107	Engineering Graphics***	1	4	6
XA208	Branch Specific Programming and Softwares**	3	0	6
XC209	NCC/NSS/Sports	0	0	0
Total		20	8	48

- *EL108 Introduction to Electrical Engineering, for Electrical Engineering Department
- *CP108 Introduction to Computer Engineering, for Computer Engineering Department
- *EX108 Introduction to Electronics and Telecommunication Engineering, for Extc Department
- *IT108 Introduction to Information Technology for Information Technology Department
- **EL208 Electrical Engineering: Programming and Softwares, for Electrical Engineering Department
- **CP108 Computer Engineering: Programming and Softwares for Computer Engineering Department
- **EX108 Electronics and Telecommunication Engineering: Programming and Softwares, for Electronics and Telecommunication Engineering Department
- **IT108 Information Technology: Programming and Softwares, for Information Technology Department
- *** Four Hours End Semester Examination

Unit 1: Communication

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

Unit 2: Listening

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

Unit 3: Reading-1

Introduction of different kinds of materials: technical and non-technical – Different reading strategies: skimming, scanning, inferring, predicting and responding to content.

Unit 4: Reading-2

Guessing from context – Note making – Vocabulary extension.

Unit 5: Speaking

Barriers to speaking – Building confidence and fluency – dialogue practice - Extempore speech practice – Speech assessment.

Unit 6: Writing

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

Text Book

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

Reference Books

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

Unit 1: Linear Algebra - Matrices

Matrix operations, cofactors, normal form of a matrix, rank, Consistency, Eigen and eigen values, Cayley – Hamilton theorem

Unit 2: Differential Calculus

Successive differentiation, Leibnitz's theorem, Taylor's theorem, Maclaurin's Theorem

Unit 3: Vector Calculus

Differentiation of vectors, Curves in space, Velocity and acceleration, Tangential and normal acceleration

Unit 4: Applications of Vector and Scalar point functions

Vector operator del, Del applied to the Scalar point function – Gradient, Del applied to the Vector point functions – Divergence and Curl, Del applied twice to point function, Line Integral, Surface integral, Volume integral, Divergence theorem, Green's theorem, Stoke's theorem.

Unit 5: Integral Calculus

Double integral, Triple integral, Application to the area, volume, surface area, Moment of Inertia, Center of gravity

Unit 6: Infinite Series

Positive term series – Integral test, Comparison test, D'Alembert ratio test, Cauchy's root test, Raabe's test, Log Test, Alternating Series – Leibnitz rule, absolute and conditional convergence, power series

Text Books

- 1 Grewal B. S., *Higher Engineering Mathematics*, Khanna Publication, New Delhi.
- 2 Kreyszig E., *Advanced Engineering Mathematics*, Wiley Eastern Publication.

BH103

ENGINEERING PHYSICS I

(6 Credits)

Unit 1: Wave and Oscillations

Free oscillation, damped oscillation and forced oscillation and resonance. Examples, Longitudinal and transverse wave, wave equation.

Unit 2: Acoustics

Ultrasonic waves Piezoelectric effect, Magnetostriction effect and production of ultrasonic waves, Applications of Ultrasonic waves.

Unit 3: Optics

Interference in thin films, wedge shaped film and Newton's ring application of interference of light, Polarization of light, Methods for production of polarized light, Hygen's theory of double refraction, Laurent's half shade polarimeter, faraday effect, Kerr effect.

Unit 4: Laser and Fiber optics

Principle of Laser, Spontaneous and stimulated emission – Einstein's co-efficient, Types of Laser and its applications, Total internal reflection, materials and types of optical fibers, numerical aperture, fiber optics communication principle and application.

Unit 5: Electron Optics

Motion of charged particles in electric field and magnetic field, Measurement of e/m by Thomson's Method, Millikan's Oil Drop method. Positive Rays, Bainbridge mass spectrograph.

Unit 6: Nuclear Physics and Quantum Mechanics

Nuclear reaction, q -value of Nuclear reaction, G.M.Counter. Duality of Matter, de-Broglie's wave, Electron Diffraction, Davisson and Germer's \bar{e} diffraction experiment, Heisenberg's Uncertainty Principle, Schrodinger's time dependent and time independent wave equation, Physical significance of wave function.

Text Books

- 1 M.N.Avadhanulu and P.G.Kshrisagar, *A Text of Engineering Physics*
- 2 R.K.Gaur and S.L.Gupta, *Engineering Physics*

Reference Books

- 1 D.Halliday, R.Resnick and J.Walker, *Fundamental of Physics*, Sixth Edition
- 2 F.S.Crawford Jr., *Waves – Berkeley Physics Courses*, Volume 3
- 3 A.Ghatak, *Optics*, Third Edition.

BH104

ENGINEERING CHEMISTRY – I

(6 Credits)

Unit 1: Fuels and Lubricants

Fuels: Introduction, classification of fuel, essential properties of fuel, characteristics of good fuel, solid fuels- wood and coal, various types of coal, analysis of coal – Proximate and Ultimate analysis, liquid fuel- refining of petroleum.

Lubricants: Introduction, types of lubrication, classification of lubricants, properties of lubricants.

Unit 2: Physical Properties in liquid state

Additive and Constitutive properties, Surface tension and its determination, Viscosity and its determination, Refractive index and their determination, Optical activity, Specific rotation, Polarimeter.

Unit 3: Chemical Bonding

Types of chemical bonds, Ionic bonding and its characteristics, factors affecting the formation of ionic bond, Born-Haber cycle for determination of lattice energy, the concept of Molecular Orbital theory, characteristics of bonding and antibonding molecular orbitals, formation of MO, bond order and stability of molecule, energy level sequence, MO diagram of H₂, O₂, etc. Hydrogen bonding.

Unit 4: Corrosion

Introduction, fundamental reason, electrochemical corrosion, direct chemical corrosion, factors affecting the rate of corrosion, types of corrosion- pitting corrosion, microbiological corrosion, stress corrosion, methods to minimize the corrosion – proper design, cathodic and anodic protection, metallic coating, organic coating.

Unit 5: Fundamentals of Organic Chemistry-1

Introduction, E₁ and E₂ reactions, Birch reduction, Oppenauer oxidation, Study of Aromatic compounds: Naphthalene, Anthracene.

Unit 6: Fundamentals of Organic Chemistry-2

Study of Heterocyclic compound: Pyridine and Quinolene. Manufacture of alcohol by fermentation process.

Text Books:

- 1 Bhal and Bhal, *Advanced Organic Chemistry*, S. Chand and Company, New Delhi, 1995.
- 2 Jain P. C. and Jain Monica, *Engineering Chemistry*, Dhanpat Rai and Sons, Delhi, 1992.

Reference Books:

- 1 Finar I. L., *Organic Chemistry* (Vol. I and II), Longman Gr. Ltd. and English Language Book Society, London.
- 2 Barrow G.M., *Physical Chemistry*, McGraw-Hill Publication, New Delhi.

Unit 1: Properties and uses of construction materials

Stones, bricks, cement, concrete and steel. Site selection for buildings.

Unit 2: Component of building

Foundation- Shallow and deep foundations

Unit 3: Brick and stone masonry

Plastering- Lintels, beams and columns- Roofs.

Unit 4: Roads

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

Unit 5: Surveying

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

Unit 6: Water Supply

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

Reference Books

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

Unit 1: Introduction to Mechanical Engineering: Thermal Engineering, Design Engineering, Manufacturing Engineering.

Unit 2: Introduction to Laws of Thermodynamics with simple examples pertaining to respective branches, IC Engines: Classification, Applications, 2 Stroke and 4 Stroke systems in IC Engines.

Unit 3: Automobiles: Transmission systems, Suspension system, Power Plant: Types of Power plant; Gas power plant, Thermal power plant, Nuclear power plant

Unit 4: Design Basics, Mechanisms, Factor of safety, materials and metallurgical considerations

Unit 5: Engineering materials, machine elements, Transmission, Fasteners, support systems

Unit 6: Manufacturing: Classification, introduction to Lathe machine, Drilling machine, Milling machine, metal joining, Metal forming, casting (A visit to Workshop for demonstration)

Reference Books:

Lecture notes prepared by Department of Mechanical Engineering.

Unit 1: Power Generation-1

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

Unit 2: Power Generation-2

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

Unit 3: Power Generation-2

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

Unit 4: Pollution-Air

Air pollution- sources- effects- control- air quality standards, air pollution act- measurement,

Unit 5: Pollution-Water

Water pollution- effects- selection of process- Disposal of solid wastes.

Unit 6: Pollution-General

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 and Conventional*, Khanna Publishers, Delhi, 2005.
- 2 Glynn Henry J., Gary W. Heinke, *Environmental Science and Engineering*, Pearson Education, Inc, 2004.

Unit 1: Drawing standard

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

Unit 2: 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

Unit 3: orthographic /Isometric projection

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. Isometric Projection and view of planes and simple solids.

Unit 4: Solids and sectioning

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.

Unit 5: Studies of surfaces

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.

Unit 5: Computer Aids

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. Natarajan, *A text book of Engineering Graphic*, Dhanalakshmi Publishers, Chennai, 2006.

REFERENCE BOOK

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

XB108/PC108 INTRODUCTION TO PETROCHEMICAL ENGINEERING (6 Credits)
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Unit 1: Origin, Formation and Composition of Petroleum

Origin and formation of Petroleum, Reserves and deposits of world, Indian Petroleum Industry Composition of Petroleum

Unit 2: Overview of Petroleum Refinery

Petroleum Refinery Processes and operations, Petroleum Refinery flow schemes, Definitions of Refining terms.

Unit 3: Introduction to Unit operations and Unit processes

Development of flow diagrams, Basic tools of Chemical Engineering Physico-Chemical Calculations

Unit 4: Chemical Process Calculations

Material and Energy Balances

Unit 5: Fluid flow and Heat Transfer

Principle and applications of flow of fluids and solids, Fundamental Laws for modes of Heat Transfer

Unit 6: Chemical Kinetics and Mass Transfer

Concept of Diffusion and Mass Transfer, Reaction rates and Chemical Kinetics

Text Books

- 1 S. K. Ghosal, S. K. Sanyal and S. Datta, *Introduction to Chemical Engineering*, TMH Book Company, 1998.
- 2 B. K. Bhaskara Rao, *Modern Petroleum Refining Processes*, Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi, 2005, Fourth Edition.
- 3 G.N. Sarkar, *Advanced Petroleum Refining*, Khanna Publishers, Delhi, First Edition, 1998.

XB108/ME108	INTRODUCTION TO MECHANICAL ENGINEERING	(6 Credits)
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Unit 1: Introduction

Role of Mechanical Engineering in industry and society, An historical overview of evolution of Mechanical Systems with examples

Unit 2: Materials and Manufacturing

Role of materials, engineering analysis and manufacturing with case studies, Basics of conventional design and manufacturing processes

Unit 3: Quality and Standards

Role of engineering measurements and quality standards

Unit 4: Mechanisms

Basics of novel mechanisms- Principles of working of machines which made the revolution, Traditional methods of design and analysis; Modern methods- case studies in mechanical design,

Unit 5: Thermal Systems

Principles of working of important thermal systems with examples, The role of basic thermal sciences in the design and analysis of mechanical systems,

Unit 6: Interfacing

Interface between Mechanical and Other Systems.

Reference Books

- 1 Lecture notes prepared by Department of Mechanical Engineering.
- 2 K. Venugopal (2005), *Basic Mechanical Engineering*, Anuradha Agencies.

XB108/EL108	INTRODUCTION TO ELECTRICAL ENGINEERING	(6 Credits)
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Unit 1: Introduction

History and major inventions in electrical engineering, scope and significance, sources of electrical engineering

Unit 2: Energy and Conversions

Concept of resistance and effect of temperature, Ohm's laws, forms of energy and their inter conversion

Unit 3: Basic concepts

Concept of direct and alternating quantities, instantaneous, peak average, R.M.S. values, peak factor, crest factor, phasor representation of alternating quantities, concept of real and reactive power, and power factor.

Unit 4: Magnetics

Study of magnetic circuits, magnetic field, and permeability, retentivity, and hysteresis, B-H curve, study of series and parallel magnetic circuit

Unit 5: Generation and Transmission

Introduction to generation, transmission, distribution power system, Introduction to three phase power system, and study of various power apparatus used in power system.

Unit 6: Computers and Electrical Engineering

Brief overview of software packages and laboratories in EEE department.

Reference:

Lecturer notes prepared by Department of Electrical Engineering.

XB108/CH108	INTRODUCTION TO CHEMICAL ENGINEERING	(6 Credits)
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Unit 1: Introduction

Introduction to Unit operations and Unit processes – Development of flow diagrams-Basic tools of Chemical Engineering

Unit 2: Process Calculations

Physio-Chemical Calculations. - Material and Energy Balances

Unit 3: Transport processes

Basic concepts of transfer processes, Principle and applications of Flow of Fluids and solids, Measuring devices, Heat Transfer.

Unit 4: Fundamentals of Mass Transfer and Kinetics

Mass Transfer, Chemical Kinetics, concepts of scale up,

Unit 5: Computer applications

Modeling and simulation, computers and their applications.

Unit 6: Resources and Production

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 Engineering*, TMH Book Company, 1998.
2. Anderson L.B and L.A. Wenzel, *Introduction to Chemical Engineering*, McGraw Hill Book Company, 1998.

Unit 1: Introduction to Civil Engineering

Role of Civil engineers in society, outstanding accomplishments of the profession, future trends,

Unit 2: Projects in Civil Engineering

Types of projects, stages of projects, Specifications and Scope.

Units 3: Structures

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

Unit 4 Construction Materials

Properties and uses of construction materials such as stones, bricks, cement, concrete and steel.

Unit 5: Buildings

Site selection for buildings – components of building foundation – shallow and deep foundations

Unit 6:

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.

Unit 1: Introduction

Basic model of computation, principle of mathematical induction,

Unit 2: Programming Basics

Notions of algorithms and programming, iteration and recursion

Unit 3: Programming Details-1

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

Unit 4: Programming Details-2

Features of block-structured languages, Functions and procedures, parameter passing

Unit 4: Programming styles

Top-down style and stepwise-refinement with concrete examples

Unit 6: Case Studies

Case studies with applications of programming

Text 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 Turing Omnibus: 66 Excursions in Computer Science)*, W.H. Freeman and Company, Revised edition, 1993.

XB108/EX108 INTRODUCTION TO ELECTRONICS AND TELECOMMUNICATION ENGINEERING

(6 Credits)

Unit 1: Introduction

History of major inventions in electronics and communication Engineering, Overview of various specializations in ECE,

Unit2: Basics of telecommunication

Basics of telecommunication infrastructure: Different types of channels, Bandwidth, power, range, interference, frequency reuse, fading

Unit 3: Industries and R& D

Industries and R &D institutions in India,

Unit 4 Future Scope

Career opportunities, Avenues for higher studies in India and abroad, In plant training, Internships, Distinguished alumni in India and Abroad.

Unit 5: Library

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

Unit 6: Departmental Facilities

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 Electronics and Telecommunication Engineering.

EM105/EM205

ENGINEERING MECHANICS

(6 Credits)

Unit 1: 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

Unit 2: Forces in plane

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

Unit 3: Forces in space:

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.

Unit 4: 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

Unit 5: Curvilinear translation

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

Unit 6: Rigid Body motion

Rotation of a rigid body about a fixed axis and plane motion of a rigid body.

Text Books

- 1 Rajasekaran.S. and Sankara Subramanian.G., *Engineering Mechanics – Statics and Dynamics*, Vikas Publishing Comp, 2005
- 2 S. Timoshenko and 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 and 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.

XB108/IT108	INTRODUCTION TO INFORMATION TECHNOLOGY	(6 Credits)
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Unit 1: Introduction to the world of Computers

Overview, Introduction to computers: Generation of computers, Software and hardware, Types of computers, Computer networks and Internet.

Unit 2: The System Unit: Processing and Memory

Overview, Data and program representation, Inside the system unit, Working of CPU, Making computers faster and better now and in the Future. Storage systems characteristics, Magnetic disk systems, Optical disk systems, Flash memory systems, Other types of storage systems.

Unit 3: Input and Output

Overview, Keyboards, Pointing devices, Scanners, Readers and Digital cameras, Audio input, Display devices, Printers, Audio output.

Unit 4: System Software: Operating Systems and Utility Programs

Overview, System software and Application software, The operating system, Operating systems for Desktop PCs and servers, Operating systems for handheld PCs and other devices, Operating systems for larger computers, Utility programs.

Unit 5: Introduction to Application Software

Overview, Basics of application software, Word processing concepts, Spreadsheet concepts, Database concepts, Presentation graphics concepts, Graphics and multimedia concepts, Other types of application software.

Unit 6: Computer Networks and the Internet

Introduction to networks, Networking and communications applications, Types of networks, Data transmission over network, networking standards and communication protocols, Networking hardware.

Text Books

- 1 Deborah Morley and Charles S. Parker, *Fundamentals of Computers*, Cengage Learning, India edition, 2009.
- 2 Peter Norton, *Introduction to Computers*, 6th edition, Tata McGraw Hill publication, 2008.
- 3 Alexis Leon and Mathews Leon, *Fundamentals of Information Technology*, Vikas Publication, Chennai.

Reference Books

1. Francis Scheid, *Theory and Problems of Introduction to Computer Science*, Schaum's Outline Series, Tata McGraw Hill publication.
2. *Information Technology: Tools and Application*, Ed. UPTEC Computer Consultancy Limited, Elsevier Publication, 2004.

WS107/WS207	WORKSHOP PRACTICE	(4 Credits)
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Unit 1: Carpentry/Pattern Making

- A. Wood sizing exercises in planning, marking, sawing, chiseling and grooving to make half lap joint and cross lap joint
- B. Demonstration of power operated tools related to Carpentry skills

Unit 2: Fitting/Plumbing

- A. A job involving cutting, filing to saw cut, filing all sides and faces, corner rounding, drilling and tapping on M. S. plates.
- B. Demonstration on use of plumbing tools and preparation of plumbing line involving fixing of water tap and use of elbow, tee, union and coupling, etc.
- C. Demonstration of power operated tools related to Fitting skills

Unit 3: Sheet Metal Working

- A. Making a small parts using GI sheet involving development, marking, cutting, bending, brazing and soldering operations- i)Tray ii) Funnel
- B. Demonstration of power operated tools related to sheet metal works

Unit 4: Welding

- A. Exercise in MMA welding to make a square butt joint

- B. Exercise in resistance (spot) welding to make a lap joint
- C. Demonstration of power operated tools related to Welding skills

Unit 5: Machine Shop

Demonstration of step turning of a Mild Steel cylindrical job using center lathe

Instructions to the student:

Each student is required to maintain a 'workshop diary' consisting of drawing / sketches of the jobs and a brief description of tools, equipment, and procedure used for doing the job.
