COURSE STRUCTURE

&

SYLLABUS

FOR FIRST YEAR
B.TECH PROGRAMME

BIJU PATNAIK UNIVERSITY OF TECHNOLOGY ORISSA,
ROURKELA

2007 - 2008

COURSE STRUCTURE & SYLLABUS FOR
FIRST YEAR B.TECH
PROGRAMME

1st Semester				**2nd Semester**			
Theory		*Contact Hrs.*	*Credit*	*Theory*		*Contact Hrs.*	*Credit*
		L-T-P				**L-T-P**	
BSCM 2101	Mathematics - I	3-1-0	4	BSCM 2102	Mathematics – II	3-1-0	4
BSCP 2101	Physics - I	3-0-0	3	BSCC 2101	Chemistry - I	3-0-0	3
	or				or		
BSCC 2101	Chemistry - I	3-0-0	3	BSCP 2101	Physics - I	3-0-0	3
BENG 1105	Basic Electronics	3-1-0	4	BENG 1102	Basic Electrical		
	or				Engineering	3-1-0	4
BENG 1102	Basic Electrical	3-1-0	4		or		
	Engineering			BENG 1105	Basic Electronics	3-1-0	4
HSSM 4101	Communicative	2-0-0	2	HSSM 4102		Business Comm.	
	English				in English	2-0-0	2
BENG 1103	Thermodynamics	3-0-0	3	BENG 1101	Mechanics	3-0-0	3
	or				or		
BENG 1101	Mechanics	3-0-0	2	BENG 1103	Thermodynamics	3-0-0	3
BCSE 3101	Programming in ‘C’	3-0-0	3	BCSE 3102	Data Structure Using ‘C’	3-0-0	3
			19				**19**
Practicals/Sessionals		*Contact Hrs.*	*Credit*	*Practicals/Sessionals*		*Contact Hrs.*	*Credit*
BENG 9101	Engineering Drawing – I	0-0-3	2	BENG 9102	Engineering Drawing – II	0-0-3	2
BCSE 9101	‘C’ Programming			BCSE 9102	Data Structure in ‘C’		
	Labarotary	0-0-3	2		Laboratory	0-0-3	2
BENG 9103	Workshop Practice – I	0-0-3	2	BENG 9104	Workshop Practice – II	0-0-3	2
BSCP 9101	Physics Laboratory /	0-0-3	2	BSCC 9101	Chemistry Laboratory /	0-0-3	2
BSCC 9101	Chemistry Laboratory			BSCP 9101	Physics Laboratory		
HSSM 9101	Communication	0-0-2	1	HSSM 9102	Communication	0-0-2	1
	Practice Laboratory-I				Practice Laboratory-II		
			9				**9**
	Total		**28**		**Total**		**28**
	Contact Hours		33		Contact Hours		33

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

BSCM 2101 MATHEMATICS - I (3-1-0)

The intent of the mathematics courses for engineering students is three fold (i) modeling : Converting given data of a physical situation into a mathematical form (ii) solving them by standard techniques and (iii) interpreting the results. It is expected that students should not only know different mathematical techniques but should also be conversnt with different applications.

Module 1 (10 Classes)
Calculus : Curve tracing, curvature, asymptotes
Ordinary Differential Equations : First order differential equations, separable equations exact differential equations, Bernoulli's equation application to electric circuits.

Module 2 (10 Classes)
Linear differential equations of second and higher order, homogeneous equation with constant co-efficients. Eular Cauchy equations, solution by undeterminated co-efficients, solution by variation of parameters, modeling of electric circuits.

Module 3 (10 Classes)
Series solution of differential equation : Power series method, Legendre's equation, Legendrer's polynomial. Bessel's equation, Bessel's functions $J_n(x)$

Module 4
Laplace transformation and its use in solving differential equations. Convolution, integral equations.

The course is covered by :

(i) Calculus : Gorakh Prasad :

(ii) Advance Engineering Mathematics – E. Kreyszig
John Wiley & sons Inc. – 8th edition
Chapter 1 (1.1 – 1.7)
Chapter 2 (2.1. – 2.10, 2.12)
Chapter 4 (4.1- 4.6)
Chapter 5 (5.1- 5.7)

BSCM 2102 MATHEMATICS II (3-1-0)

Module 1
Linear algebra : matrices, vectors, determinants and linear system of equations, matrices and linear system of equations, matrix eigen value problems, symmetric, skew symmetrics and orthogonal matrices.

Module 2
Complex matrices : Hermitian, skew hermitian and unitary matrices, Similarity of matrices. Vector differential calculus : grad, div, curl, vector integral calculus

Module 3
Line integrals, Green theorem : Surface integrals, Gauss theorem, Stockes theorem

Module 4
Fourier series : Fourier series, Expansions functions of any period, even and odd functions, half range expansion.

Course covered by : Advance Engineering mathematics by E. Kreyszig, 8th Edition
Chapter 6 (6.1 – 6.7)
Chapter 7 (7.1 – 7.5)
Chapter 8 (8.1 – 8.4, 8.9 – 8.11)
Chapter 9 (9.1 – 9.9)
Chapter 10 (10.1 – 10.4)

BSCP 2101 PHYSICS - I (3-0-0)

This one - semester Physics core course is divided into three parts. The part - I covers oscillations, waves and wave optics; the part - II introduces some basic concepts in electromagentism and the part - III includes introductory aspects of Quantum mechanics.

PART - I
Unit - 1 (Oscillations and Waves)

The aim of this unit is to familiarize the students with basic features of different oscillatory systems and waves in general. The topics included in this unit should be treated qualitatively.

a) Oscillatory Systems : Simple harmonic oscillation, damped harmonic oscillation, forced vibration resonance, coupled oscillation.
b) Waves as periodic variation quantity in space and time, wave equation, longitudinal and tansverse waves, progressive and stationary waves. Examples of different waves.
c) Reflection and transmission of waves at boundary of two media, dispersion of polychromatic wave.

Unit - 2 (Interference)

The principle of superposition of waves is extended to the interference of light waves. Some systems for production of observable interference pattern are covered.

a) Superposition of waves : two - beam superposition, multiple beam superpostions, coherent and incoherent superposition.
b) Two source interference pattern (Young's double slit), intensity distribution; transverse section - straight fringe; longitudinal section - circular fringe.
c) Newton's rings, Determination of wavelength of light, refractive index of liquid.

Unit - 3 (Diffraction)

Diffraction of light waves at some simple obstacles are to be covered in this unit. Both Fresnel and Fraunhofer pattern are included.
a) Huygen's principle, Fresnel and Fraunhofer differaction, zone plate.
b) Fraunhofer diffraction due to a single slit.
c) Plane transmission grating - diffraction spectra, determination of wave length of light, dispersion.

Unit - 4
(Polarization)

The unit covers elementary features of polarization of light waves.
a) Polarization of tranverse waves, plane, circular, and elliptically polarized light. Polarization by reflection, refraction and scattering.
b) Double refraction; Nicol prism, Quarter - wave plate, half - wave plate - construction and use.
c) Production and analysis of circular and elliptically polarized light.
d) Optical rotation, sacharimeter, construction and use.

PART - II
Unit - 5 (Electromagnetism)

Students will be familiarized with some basic terms used in vector calculus prior to development of Maxwell's electromagnetic wave equations. No proof of theorems and laws included in this unit is expected - statement and interpretation should suffice.

Vector calculus : gradient, divergence, curl of vector field, Gauss divergence theorem, Stoke's theorem, Green's theorem.

Gauss' law of electrostatics in free space and in a medium, Electric displacement D, Magneticinduction B and magentic intensity H, Amperes circuital law, displacement current, Faraday's law of electromagentic induction.

Maxwell's electromagnetic equation in differential form and in integral form.

Unit - 6

Some aspects of propagation of em waves are to be covered in this unit.

Electromagnetic energy density, poynting vector, poynting theorem, vector potential and scalar potential. Electromagnetic wave equations for E and B, transverse nature and speed of em waves, wave equation in terms of scalar and vector potentials, propagation of em waves in ionized media.

PART - III

Unit - 7 (Quantum Physics)

This unit deals with elementary concepts of Quantum Physics and basic formulation to deal with physical systems.

1.	Need for Quantum Physics	-	Historical Overview :
	Particle Aspect of Radiation	-	Blackbody radiation, Photoelectric effect, Compton Scattering, Pair production.
	Wave Aspect of Particles	-	Matter waves : de. Broglie Hypothesis,
	Atomic Trasition and Spectroscopy	-	Bohr Model of Hydrogen Atom, Spectral lines.
	Heisenberg Uncertainty Principle : Statement & interpretation and examples.		
2.	Basic features of Quantum Mechanics	-	Transition from deterministic to probabilistic
	Sates of a system	-	Wave functions Probability Density, Superposition Principle. Observables and operators, Expectation values.
	Schrodinger equation time dependent and time independent wave packets.		

Unit - 8 (Application of Quantum Mechanics)

This unit deals with application of quantum Mechanics to specific problems.

Solutions of	-	One Dimensional Problems :
Free Particles	-	Continuous States
Potential Steps	-	Boundary conditions, Reflection, Transmission.
Potential Barrier	-	Tunneling
Infinite deep potential Well	-	Energy eiganvalue, eigenfunction

<u>Books Recommended</u>

1. Optics - A. K. Ghatak
2. Geometrical and Physical Optics - P. K. Chakraborty
3. Electricity & Magnetion - D. C. Tayal
4. Concepts of Modern Physics - A. Beiser
5. Quantum Mechanics, 3rd Edition, E. Merzbacher, John Wiley NY (1998).
6. Quantum Mechanics : Foundations and Applications, A. Bohm, 2nd Edition, Springer Verlag (1986)
7. Quantum Mechanics : Concepts and Applications, N. Zettli, John Wiley & Sons (2001)
8. Physics - I, B. B. Swain & P. K. Jena, Kitab Mahal, Cuttack

BSCC 2101 CHEMISTRY – I (3-0-0)

Module I
(To develop basic concepts of quantum mechanics and its applications in bonding)

1. Structure Bonding: Failure of classical mechanics, uncertainty principle, wave nature of particles, Schroedinger equation (need not be derived), interpretation of wave functions, Molecular Orbital theory of diatomic molecules and metallic bonding.

   (No. of Lectures = 7)

2. Phase rule: One and two component systems : H_2O, S and Cd-Bi, Fe-C systems.

   (No. of Lectures = 5)

   (No. of Lectures = 4)

Module II
(To develop basic concepts about the rates of reactions and EMF, electrode potential and construction of various types of cells)

1. Reaction Kinetics & catalysis:
   Collision theory; order and molecularity; kinetics of zero, 1st and 2nd order reactions; activation energy, theory of absolute reaction rates, homogeneous and heterogeneous catalysis.

   (No of Lectures=7)

Module Iii
(To develop basic concepts of electrochemistry and solid state)

2. Electrochemistry:
   Electro chemical cells, EMF and free energy change of electrochemical reactions, electrode potentials and measurements with reference to standard hydrogen electrode and their application to redox processes, Measurement of EMF, determination of PH; dry cells, fuel cells and storage cells.

   (No. of Lectures=7)

3. Solid State: Crystal systems, Bravais lattices, closed packed structures, ionic solids, crystal defects including Schottky and Frenkel defects).

   (No. Of Lectures=4)

Module IV
(To develop the basic concepts of thermodynamics and its applications to chemical systems)

1. Physical, Chemical & Ionic Equilibrium : Physical equilibrium, Chemical equilibrium : Law of Mass action, relation between Kp & Kc, Expression for equilibrium constant, Lechatelier's principle.
   Ionic equilibrium : Ionisation of strong and weak electrolytes, pH, buffer solution, Ostwald dilution law, common ion effect.
2. The free energy concepts; applications to gases; Gibbs Helmholtz equation; free energy change and criterion of spontaneity of chemical reactions and chemical equilibrium.
   Physical, ionic and chemical equlibria.

   (No. of Lectures = 9)

Books:
Physical Chemistry by G.M. Barrow, 5th edition, Tata McGraw Hill, New Delhi 1992.
Physical Chemistry by P.W. Atkins, 5th/6th ed. Oxford.

BENG 1101 MECHANICS (3-0-0)

Module I (11 Hours)
Concurrent forces on a plane – composition, Resolution and equlibirium of concurrent coplanar forces, Methods of moment, Friction (ChapterI)

Parallel forcesin a plane – General case of parallel forces, Center of parallel forces and center of gravity- centrods of composite plane figure and curves (Chapter 2 –2.1 to 2.4)

Module II (11 hours)
General case of forces in a plane – composition and, equilibrium of forces in a plane – plane trusses – method of joints and method of sections, Principle of virtual work- equilibrium of ideal systems

Moments of inertia - Plane figure with respect to an axis in its plane and perpendicular to the plane – parallel axis theorem (chapter 3- 3.1 to 3.4, 5.1, Appendix A.1 to A.3)

Module III (11 Hours)
Reactilinear Translation – Kinematics – Principles of Dynamics - D' Alemberts Principle- Momentum and impulse- work and energy- impact (Chapter 6)

Module IV (7 Hours)
Curvilinear translation – Kinematics – equation of motion – projectile – D' Alembert's Principle for curvilinear motion

Kinetics of Rotation of rigid body (Chapter 7.1 to 7.4, 8.1)

Text Books
1. Engineering Mechanics : S Timoshenko & D.H Young ; 4th Edition (International Edition) McGraw Hill)

Reference Books
1. Fundamental of Engineering Mechanics (2nd Edition) : S. Rajesekharan & G. Sankara Subramanium ; Vikas Publishing House Pvt. Ltd.
2. Enineering Mechanics : K.L Kumar; Tata McGraw Hill

BENG 1105 BASIC ELECTRONICS (3-1-0)

Objective : As a First Course in Electronics it is intended to give an easy understanding of the World of Electronics - Semiconducting Materials and Basic Devices, Simple Circuits and Systems, a better appreciation of going digital and to generate a continued interest interest in the subject.

MODULE - I (11 Lectures)
1. In troduction of Modern Electronics : Signals, Frequency Spectrum, Analogue and Digital Signals, Amplifiers, Digital Logic Inverter, ICs.
2. Basic Electronics Semiconductor Concepts : Intrinsic Semiconductor Materials, Energy levels; Mobility, Conductivity; n-and p-type, Concept of hole, Mojority and Minority Carriers, Mechanism of Current flow.
3. Semiconductor Diode : p-n junction, Forward - Bias Condition, Reverse - Bias Condition, V-I Characterstic, Diode Equation, Zener region, Silicon Vrs. Germanium, DC Resistance levels, AC Resistance, Simplified Equivalent Circuits of a Diode, Diode Specification Sheets. Application of Diode as Rectifier, Clamper, Clipper and Detector.

MODULE - II (12 Lectures)

4. Bipolar Junction Transistors : Transistor Construction, Transistor operation; Common - Emitter Configuration, V - I Characterstics, Biasing, Load Line DC analysis, Transistor specification sheets. Transistor Testing. Small Signal Analysis, Analysis of CE Amplifier and Emitter follower. Frequency response of amplifier.
5. Field - Effect Transistors : Structure and Principle of operation of the Enhancement - Type and Depletion - Type MOSFETS. V - I Characterstics, DC - Biasing, Load - line, DC Analysis, Small Signal Equivalent Circuit Model, Basic Configuration of Single Stage IC, MOS amplifier, The CMOS Common - Source and Common - Drain amplifiers analysis.
   CMOS Digital, Logic Inverter, Voltage Transfer Characterstics, Current flow and Power Dissipation.

MODULE - III (11 Lectures)

6. Feedback Amplifiers and Oscillators : Types of feedback, Advantages of Negative feeback, Barkhausen Criterion of Oscillation, Crystal Oscillator.
7. Operational Amplifiers : The Ideal Op Amp, Inverting and Non - Inverting configurations, Equivalent Circuit model, Op amp application in Integration, Differentiation and Summing Circuits, Op Amp as Differential Amplifier, CMRR.
8. Digital Electronics : Boolean Algebra, Binary Arithmatics, Hexa - Decimal Numbers and their Conversion, Logic Gates : AND, OR, NAND, NOR, EX - OR, Their Realisation, General idea about Adder, Multiplier, Multiplexer Memories, Flip Flops, Shift Registers, Counters and DA and AD Converters.

MODULE - IV (8 Hours)

9. Principle of Communication : Basics of Modulation and Demodulation Techniques. AM system. Basics of Digital Communication Techniques; Sampling, Quantization, AD & DA Conversions, Digital Modulation PCS System, General idea about Noise.

10. Electronic Instruments : Oscilloscope, Time Base, Displaying a Waveform in Oscilloscope, Digital Multimeter.
11. Fibre Optics Communication : A Simplified fibre optic communicaton, system; Principle of operation advantages : enormous bandwidth, noise immunity, high data rate.

TEXT BOOKS:

1. Electronic Devices Circuit Theory - by Rober L. Boylestad Eight Edition, PHI.
   Selected portion from Chapters 1, 2, 3, 4, 8 and 11, 17 and 21.
2. Microelectronic Circuits by A. S. Sedra and Kenneth C. Smith Fourth Edition, Oxford University Press.
   Selected portions of Chapters 1, 2, 5, 8.
3. Digital Foundation by Thoma L. Floyd, 8th Edition. Selection potions.

REFERENCE BOOKS :

1. Integrated Electronics Analogue and Digital Circuits and Systems by Millman and Halkias.
2. Digital Design by M.Morris Mavo, 3rd Edition, LPE.

BENG 1102 BASIC ELECTRICAL ENGINEERING (3-1-0)

OBJECTIVES

This is a foundation course to understand basic principles underlying behaviour of “Electric circuits, Electric Power apparatus, generation, transmission, distribution and utilization of electric energy.

MODULE – i

I. **DC Networks**: Kirchoff's law, node and mesh analysis, delta–star and star-delta conversions. Superposition principle, Thevenin and Norton's theorem Transcients, in R-L, R-C circuits with d.c. excitation.

(6 Lectures)

II. **Single Phase AC Circuits**: Single phase EMF generation, average and effective values of sinusoids, j operations, complex presentation of impedances, phasor diagrams, power factor, power in complex notation, solution of series and parallel circuits. Introduction to resonance in series RLC circuit.

(6 Lectures)

MODULE – ii

III. **Three Phase AC Circuit:** Three phase EMF generation, delta and star connection, Line and Phase quantities. Solution of 2- phase circuits with balanced load. Power in 3-phase balanced circuits.

(5 Lectures)

IV. **Magnetic Circuits:** B-H Curve, Hysteresis, Permeability and reluctance, solution of simple magnetic circuits, Hysteresis and Eddy current losses.

(4 Lectures)

MODULE – iii

V. **Transformers:** Construction and Principle of operation of single phase transformer, EMF equation, single phase autotransformer.

(4 Lectures)

VI. **DC Machines:** Principle of Operation of generator and motor, EMF equation, methods of excitation. Speed equation of d.c. motor, speed control of d.c. shunt motor.

(4 lectures)

VII. **Three phase Introduction Motor:** Construction and principle of operation, types; slip torque characteristics.

(3 Lectures)

VIII. Introduction to single-phase Introduction Motor.

(1 Lecture)

MODULE – IV

IX. **Electrical Measuring Instruments :** DC PMMC instruments extension of range. Moving iron ammeters and voltmeters, Dynamometer wattmeters, Energymeter.

(4 Lectures)

X. **Power supply systems :** Principle of generation – thermal, hydel and nuclear. Transmission and distribution of electric energy.

(2 Lectures)

XI. Industrial Applications of Electrical Energy.

(1 Lecture)

TEXT BOOKS AND REFERENCE :-

1. Edward Hughes (revised by Ian McKenzie Smith). "Electrical & Electronics Technology" Pearson Education Limited. Indian Reprint 2002.
   Chapters 3,4,7,10, 11,12,13,14,34,35,39,41,47
2. H. Cotton " Advanced Electricakl Technology" Issac Pitman, London, 1967.
3. S. Parker Smith : " Problems in Electrical Engineering" Asia Publications, 1995.

HSSM 4101 COMMUNICATIVE ENGLISH (2-0-0)

Objectives

This is a practice-oriented, need-based, functional-communicative course. It seeks to develop the student's skills of communication in listening, speaking and writing. Reading, though formally not included, is still a recommended activity. The

student is advised to cultivate the habit of reading newspapers, magazines and books in a free, extensive manner to consolidate the skills already achieved. A more interactive process of teaching/learning is called for in order to achieve the skills of effective communication.

Specific Objectives The course attempts to

a) Familiarize the student with the sounds of English in a nutshell, particularly long and short vowels, some consonants, stress and intonation.
b) Provide adequate listening and speaking practice so that the learner can speak with ease, fluency and reasonable clarity in common everyday situations and on formal occasions.
c) Use grammar in meaningful contexts.
d) Things with words, i.e to perform functions like ordering, requesting, inviting and so on

Unit-I Communication (6 hours)

1.1 Verbal and non-verbal spoken and written
1.2 Language functions-descriptive, expressive and social
1.2 To inform, enquire, attract, influence , regulate and entertain
1.3 Bias-free and plain English
1.4 Formal and informal style

Unit-2 Communicative Grammar (9 hours)

2.1 Time, tense and aspect
2.2 Verbs of states and events
2.3 Statements, questions and responses
2.4 Omission of information
2.5 Expressing emotion and attitude: hope, pleasure, disappointment, regret, approval, surprise.

Unit-3 The Sounds of English (9 hours)

1.1 Length of vowels-Long vowels/ / I:, a:,).,U:, 3: / as in feel, card, court, food and first respectively.
1.2 Short vowels / e, x, n / as in pen, bag, and sun respectively
1.3 Consonants / f, v, Q, x, s, z,————————/ as in fine, vast, thought, them, sosng, zoo, shame, pleasure and judge respectively.
1.4 Stress pattern
1.5 Intonation-Rising and falling
1.6 Friendly communication- greetings, farewells, introductions, thanks, apologies, regrets, good wishes, congratulations, condolences, offers.

Unit- 4 Doing things with words (6 hours)

1.1 To ask for information, help, permission
1.2 To instruct, command, request, accept, refuse, prohibit, persuade, promise.

Books:

1. Geoffrey Leech and Jan Svartvik, Longman, A communicative Grammar of English,
2. J.D. O'connor, Better English Pronunciation, Cambridge University Publication
3. J.K. Chand and B.C.Das, A Millennium Guide to writing and Speaking English, Friends' Publishers
4. John Sealy, Oxford Guide to Writing and Speaking, OUP.

HSSM 4102 BUSINESS COMMUNICATION IN ENGLISH (2-0-0)

Objectives:The objectives are to prepare the student to

(a) Produce written communication of different forms such as paragraph, report, letter, etc.

(b) Make notes/ Summarize from a given passage
(c) Organise Meetings, prepare agenda, draft resolutions and write minutes.
(d) Make presentations and face interviews.
(e) Document sources and prepare bibliographies.
(f) The objectives of managerial oral communication; Improving the facility of oral communication. Both Transmission and reception in six managerial situations such as.
(i) Information sharing (ii) Conversation (iii) Interview 9iv) Committee (v) Negotiation (vii) Presentation.

Module-I_ WRITING-I (7 hours)
1.1 Paragraph writing – topic sentence, cohesion and coherence – sentence linkers (so, but, however etc.)
1.2 Preparation of a business report – writing a business proposal – format, length, structure

Module-II WRITING-II (7 hours)
2.1 Preparing notes – writing business letters and E-Mail messages
2.2 Documentation: References, notes and bibliographies.

Module-III WRITING-III (7 hours)
3.1 Writing a curriculum vitae (both chronological and functional) along with an application for a job.
3.2 Public relations – concept and relevance – PR in a business organisation – handling the media.

4. Meeting and presentation (9 hours)
1.1 Organising a meeting, preparing an agenda, chairing a meeting drafting resolutions, writing minutes.
1.2 Making an oral Presentation
1.3 Facing an interview

Books Prescribed

1. (John Sealy) Oxford Guide to Writing and Speaking English, OUP.
2. (Bovee et al) Business Communication Today Pearson Education.
3. (Rovi and Rai) Business Communication,
4. (J.V. Cilanilam) More Elective Communication, Sage Publications.
5. (J.K. Chand and B. C. das) A Millennium Guide to Writing and Speaking, (Friencs Publishers)
6. The Chicago manual of style (Part 2 Section 15) Prentice-Hall of India.
7. (Sushil Bahl) Business communication Today, Sage Publications.

BENG 1103 THERMODYNAMICS (3-0-0)

Module-I (9 classes)
1. Basic Concepts and Definitions: Scope of Thermodynamics, Macroscopic and Microscopic approaches; Definition of Fixed mass (closed systems) and Control volume (open system), Properties (extensive and intensive), State and its representation on a property diagram, Process and its representation, Cyclic process (or cycle) and its representation, Characteristics of properties (point and path functions); Reversible and irreversible processes; Thermal, Mechanical and Chemical equilibrium, Thermodynamic equilibrium, Zeroth Law of Thermodynamics and Temperature, Measurement of temperature and calibration of thermometers, the ideal gas temperature scale; Measurement of pressure, Bourdon pressure gage and manometers, Gage and absolute pressures.
2. p-v-Telations of pure substances : Definition of a pure substance, p-V-T-surfaces and planes for pure substance, specific volumes of saturated liquid, wet vapour, and superheated vapour. Introduction to steam tables with respect

to specific volume, pressure, and temperature. Ideal gases and their p-V-T relation, real gases and gas mixtures.

Module-II (7 classes)

3. Energy and mass interactions: Work interaction (definition and calculation), Different modes of work; Heat Interaction; Mass interaction of control volumes.

4. First Law of Thermodynamics:

   (i) Formal statement (using cyclic processes), First law for processes of fixed masses (closed systems) and introduction of internal energy as a thermodynamic property, First law for control volumes (open systems) and introduction of enthalpy, as a thermodynamic property; Definition of specific heats and their use in calculation of internal energy and enthalpy with emphasis on ideal gases.

Module-III (7 classes)

   (ii) Application of First Law to different processes of fixed masses (closed systems) and control volumes (open systems, only steady and uniform flow need be considered). Use of steam tables in finding internal energy and enthalpy of steam at different conditions, Calculations for gases with ideal gas assumption.

Module-IV (7 classes)

5. Second Law of Thermodynamics : Kelvin- Planck and Clausius statements of Second Law, Reversible and irreversible engines and their efficiency, Thermodynamic temperature scale, definition of entropy and its calculation for various processes of pure.

Recommended Text Book : Engineering Thermodynamics By P. K. Nag, Publisher: TMH

Recommended Reference Books:

1. Engineering Thermodynamics By Van Wylen and Sontag.
2. Engineering Thermodynamics By M. Achuthan, Publisher: PHI
3. Fundamentals of Engineering Thermodynamics By E. Rathakrishnan, Publisher: PHI

BCSE 3101 PROGRAMMING IN 'C' (3-0-0)

Module I: Introduction to computers (4 hrs)

Evolution of computers, processor families - Intel, Motorola, AMD series, basic concepts of computer organisations, CPU, memory, RAM, ROM, EPROM, I/O units such as hard disk, floppy disk, CD ROM/Writer, scanner, printers, keyboards, power supplies etc.

Module II: Number Representation in computers (4 hrs)

Binary Representation of numbers, integers ,floating point numbers, negative number representation , Arithmatic operations, addition, substraction, multiplication, division, overflow and underflow exceptions.

Module III: Introduction to programming and programming languages (4 hrs)

Evolution of programming languages, flow charts, strutured programming, the complilation process, object code, source code, executable code, operating systems, interpretators, linkers, loaders etc.

Module IV: C Language Fundamentals (4 hours)

Character set, Identifiers, Keywords, Data Types, Constatnt and Variables, Statements, Expressions, Operators, Precedence of operators, Input - output Assignments, Control structures, Decision making and Branching, Decision making & looping.

Module V: Arrays and Strings (4 hrs)
One dimensional, Multidimensional and their applications, Declarations, Manipulation & String-handling functions

Module VI: C Functions (6 hrs)
Monolithic vs Modular programs, User defined vs standard functions, formal vs Actual arguments, Functions category, function prototypes, parameter passing, Recursion, Storage Classes : Auto, Extern, Global, Static.

Mosule VII: Pointers (6 hrs)
Pointer variable and its importance, Pointer Arithmetic, passing parameters by reference

Module VIII: Structures, Union and File handling (8 hrs)
Declaration of structures, pointer to pointer, pointer to structure, ponter to function, unions, dynamic memory allocations, unions, file management

Books :
1. E. Balaguruswamy “Programming in C”, Tata McGraw Hill
2. H. Schildt, “C The Complete Reference” , Tata McGraw Hill
3. Y. Kanetkar, “Let us C”, BPB Publications.

BCSE 3102 DATA STRUCTURE USING ‘C’ (3-0-0)

Development of Algorithms : Notations and Analysis. Storage structures for arrays - sparse matrices - structures and arrays of structures. Stacks and Queues: Representations and applications.
Linked Lists : singly linked lists - Linked stacks and queues - operations on Polynomials - Linked Dictionary - Doubly Linked Lists - Circularly Linked Lists. Dynamic storage management - Garbage collection and compaction.
Binary Trees : Binary Search Trees - General Trees - Tree Traversing - Operations on Binary Trees - Expression Manipulations - Symbol Table construction - Height Balanced Trees.
Graphs : Representation of Graphs - Path Matrix - BFS, DFS – Bi-connected Graphs - Topological sort - Shortest path problems. Strings - Representation - Manipulations - Pattern Matching.
Sorting Techniques : Selection, Bubble, Insertion, Merge, Heap, Quick, Radix and address calculation. Linear searching - Binary Searching . Hash Table Methods.

Module 1 (8 hrs)
Development of Algorithms : Notations and Analysis. Storage structures for arrays - sparse matrices - structures and arrays of structures. Stacks and Queues: Representations and applications.

Module 2 (8 hrs)
Linked Lists : singly linked lists - Linked stacks and queues - operations on Polynomials - Linked Dictionary - Doubly Linked Lists - Circularly Linked Lists. Dynamic storage management - Garbage collection and compaction.

Module 3 (8 hrs) :
Binary Trees : Binary Search Trees - General Trees - Tree Traversing - Operations on Binary Trees - Expression Manipulations - Symbol Table construction - Height Balanced Trees.

Module 4 (16 hrs)
Graphs : Representation of Graphs - Path Matrix - BFS, DFS – Bi-connected Graphs - Topological sort - Shortest path problems. Strings - Representation - Manipulations - Pattern Matching.

Sorting Techniques : Selection, Bubble, Insertion, Merge, Heap, Quick, Radix and address calculation. Linear searching - Binary Searching . Hash Table Methods.

Text Books :
1. Data Structures in C by Tanenbaum.
2. Fundamentals of Data Structure by Sahany

Reference Book : Data Structures, by Tremblay and Sorenson.

BENG 9101 ENGINEERING DRAWING - I (0-0-3)

Concept of Orthographic Projection, First-Angle Projection, Projections of Points, Projections of Straight Lines, Projections of Planes, Projections of Solids, Intersection of Surfaces, Development of Surfaces, Isometric Projection

Text : Engineering Drawing by N.D. Bhatt & V.M. Panchal, Charotar Publishing House, Anand
Ch – 8, 9, 10, 12, 13, 15, 16 & 17

BENG 9102 ENGINEERING DRAWING - II (0-0-3)

Sectional Views of Solids, Full section, half section, Screw threads, Screw Fasteners, Cutter Joints and Knuckle Joints, Rivets and Riveted Joints, Pulley, Introduction to Computer-Aided Drafting

Text : Engineering Drawing by N.D. Bhatt & V.M. Panchal, Charotar Publishing House, Anand
Ch – 5, 7, 8, 9, 12, 15 & 20

BCSE 9101 'C' PROGRAMMING LABORATORY (0-0-3)

Introduction to OS : Linux/Unix, DOS, Windows, vi editor, Shell Programming (on Unix),file handling, directory structures, file permissions, creating and editing simple C programme, compilation and execution.
C programming on variables and expression assignment, simple arithmatic Loops, If-else, Case statements, break, continue, goto
Single & Multidimensional arrays
Functions, recursion, file handling in C
Pointers, address operator, declaring pointers and operatons on pointers
Address of an array, structures, pointer to structure, dynamic memory allocation

BCSE 9102 DATA STRUCTURE IN 'C' LABORATORY (0-0-3)

Stack : Problems of stack, evaluation of Arithmatic expressions in Infix, prefix, post fix forms.
Queue : Problems of queue, circular queues, insertion and deletion on queues.
List : Problems on single linked list, doubly linked list with list operations, circular list
Trees : Creation of Binary trees, determination of depth of binary tree, counting nodes, tree traversals, balanced tree
Graphs : Problems on graphs, Breadth First Search, Depth First Search
Heap : Problems on Heaps, Operations on heaps, Heap Sort, Priority Queues
Searching and Sorting Algorithm : Problems on Binary Sarch, selection sort, Quick sort, Bubble sort, merger sort,

BENG 9103 Workshop Practice - I (0-0-3)

Carpentry Practice : Use of Carpentry tools and making a joint such as Dovetail Joint, or Mortise & Tennon Joint or making stool.
Fitting Practice : Use of hand tools in fitting, Preparing a male and female joint of M.S. or making a paper weight of M.S.

Smithy Practice : Making a Hexagonal headed blank for Bolt.

BENG 9104 WORKSHOP PRACTICE – II (0-0-3)

Welding Practice : Gas welding & Electric Arc welding Practice.
A joint such as a Lap Joint, a T-joint or a Butt Joint is to be prepared or to make furniture.
Machining : (i) Stepped cylindrical Turning of a job and Thread-cutting in lathe.
(ii) Shaping
(iii) Milling

BSCP 9101 PHYSICS - I LABORATORY (0-0-3)

A student is expected to perform ten experiments form the list given below.

1. Determination of Young's modulus by Searle's method.
2. Determination of Rigidity modulus by static method.
3. Determination of surface tension by capillary rise method.
4. Determination of acceleration due to gravity by Bar / Kater's pedulum.
5. Determination of thermal conductivity by Lee's method.
6. Determination of wave length of light by Newton's rin apparatus.
7. Determination of grating element of a diffraction grating.
8. Plotting of charactersitic curve of a PN junction diode.
9. Plotting of charactersitic curves of BJT.
10. Verfication of laws of vibration of string using sonometer.
11. Determination of wavelength of laser source by diffraction rating method.
12. Study of Hall effect.
13. Study of RC circuit.
14. Study of a power source - output imedence.
15. Study of photoemission.

BSCC 9101 CHEMISTRY LABORATORY – I (0-0-3)

(ANY TEN EXPERIMENTS MAY BE DONE)

01. Determination of amount of sodium hydroxide and sodium carbonate in a mixture
02. Determination of total hardness of water by EDTA method.
03. Estimation of calcium in limestone
04. Determination of percentage of available chlorine in a sample of bleaching powder.
05. Preparation of Phenolphthalein.
06. Preparation of Aspirin.
07. Preparation of buffer solution and determination of pH of a buffer solution.
08. Standardization of $KMnO_4$ using sodium oxalate.
09. Determination of Ferrous iron in Mohr's salt by potassium permanganate.
10. Determination of partition coefficients of iodine between benzene and water.
11. Determination of rate constant of acid catalysed hydrolysis reaction.
12. Determination of concentration of a coloured substance by spectrophotometer.
13. Determination of dissolved Oxygen in a sample of water.
14. Determination of viscosity of a lubricating oil by Red wood viscometer.
15. Determination of Flash point of a given oil by Pensky_Marten's flash point approach.

HSSM 9101 COMMUNICATION PRACTICE LABORATORY - I (0-0-2)

Some tasks

1. Make a list of nonverbal communication
2. How is body language casually conditioned?
3. Take passages of descriptive, expressive and social functions and analyse them.
4. Expressive (exposing feelings) language in English and your mother-tongue

5. Make a list of sexist language (e.g. poetess, chairman)
6. Mentally retarded should be replaced by mentally challenged. Make a list of similar expressions
7. Say formulais expressions (Thank you, sorry, hallo, that's right) with proper Intonation.
8. Make a list of words which should be avoided because they sound pompous. Which words would you use instead of them.
9. How to express pleasure, regret, approval ?
10. Time and tense are not the some. Give same examples.
11. Take similar vowels and consonants and practice them in pairs of words
12. Practice, stress and intonation in connected speech.
13. Conversation practice in familiar situations (Play the role of a tailor and a customer, for example)
14. Ask for specific information (can you tell me where the railway station is ?)
15. Making a request (can I barrow your scooter, please ?)
16. Asking for permission (Do you mind if I smoke ?)
17. Say the following pairs of words

    a) Beg, bag, full, fool, sit, seat, same, shame, judge, jazz, major, measure.
    b) Progress as noun verb, similarly, object, record, supplement, perfect (adj), perfect (v.)
    c) Say the following words with correct stress. teacher college, village, building, ago, above, apart, accuse, advice, education, examination, individual (The list is only illustrative and not exhaustive).

HSSM 9102 COMMUNICATION PRACTICE - LABORATORY - II (0-0-2)

Some tasks:

1. Write a paragraph with the topic sentence "Protection of environment should not be at the cost of development". Identify the supporting details and sentence connectors.
2. Make notes from a given passage.
3. Prepare a short bibliography on the list of books prescribed in this course.
4. Write a letter complaining to a firm, which supplied deflective computers.
5. Write a functional CVof your own.
6. prepare an agenda of Mock meeting.
7. Imagine that you are chairing the meeting. How would you go about it ?
8. How would you propose a vote of thanks?
9. Make an oral presentation on a new product your company has brought out/ make a seminar presentations.
10. Make a checklist for preparing for an interview.
11. Hold a mock job interview.
12. Prepare the agenda for a meeting you are organizing.
    (The list is only illustrative and not exhaustive).