B.TECH, II SEMESTER

Credits	L	T	P	Course Code	Course Title	Category of Course
02	2	0	0	BSC 104	COMMUNICATIVE ENGLISH-II	BSC

UNIT I: Communication

Effective presentations, Business Etiquette, Cross-culture Communication, Professional communication

UNIT II: Grammar

Conditional Sentences, Modal Verbs, Linking Words.

UNIT III: Composition

Curriculum Vitae Writing, Business Letter Writing, Job Application Writing, Paragraph Writing, Report Writing.

UNIT IV: Short Stories

'The Luncheon' by Somerset Maugham,
'How much Land does a Man Need?' by Leo Tolstoy,
'The Night Train at Deoli' by Ruskin Bond.

UNIT V: Poems

'No Men are Foreign' by James Kirkup,
'If' by Rudyard Kipling,
'Where the Mind is without Fear' by Rabindranath Tagore.

Suggested Readings:

1. Communication Skills, Pushplata & Sanjay Kumar, Oxford University Press, India.
2. The Written Word, Vandana Singh, Oxford University Press, India.
3. Current English Grammar and Usage with Composition, R. P. Sinha, Oxford University Press, India.
4. Rodriques M. V., 'Effective Business Communication', Concept Publishing Company, New Delhi, 1992 reprint (2000).
5. Bansal, R K and Harrison J B, 'Spoken English' Orient Longman, Hyderabad.
6. Binod Mishra & Sangeeta Sharma, 'Communication Skills for Engineers and Scientists, PHI Learning Private Ltd, New Delhi, 2011.
7. Gartside L. 'Modern Business Correspondence, Pitman Publishing, London.

B.TECH, II SEMESTER

Credits	L	T	P	Course Code	Course Title	Category of Course
03	**3**	**0**	**0**	**BSC 105**	**ENGINEERING MATHEMATICS-II**	**BSC**

UNIT I

Coordinate Geometry of Three Dimensions: Equation of a sphere, Intersection of a sphere and a plane, tangent plane, Intersection of two spheres, orthogonality of two spheres, Right circular cone. Right circular cylinder.

UNIT II

Matrices: Rank of a matrix, Rank of matrix by reducing to normal forms, Consistency of systems of linear simultaneous equations and its solution, Eigen values and Eigen vectors, Cayley Hamilton theorem (without proof), Diagonalization of matrix.

UNIT III

Vector Calculus: Scalar and vector field, differentiation & integration of vector functions, Gradient, Divergence, Curl and Differential Operator, Line, Surface and volume Integrals.

UNIT IV

Application of Vector Calculus: Green's Theorem in a Plane, Gauss's and Stoke's Theorem (without proof) and their Applications. Fourier Series: Expansion of simple functions in Fourier Series, half range Fourier sine and cosine series, change of interval. Harmonic Analysis.

UNIT V

Differential Equations: Series Solutions of Second Order Linear Differential Equations with Variable Coefficients (Complementary Functions only), Partial Differential Equations of First Order : Lagrange's Form, Standard Forms, Charpit's Method .

Text and Reference books:

1. Advanced Engineering Mathematics, Erwin Kreyszig, Wiley 9th Edition.
2. Calculus and Analytical Geometry, Thomas and Finney, Narosa Publishing House N. Delhi.
3. A Text Book of Differential Equations, M.Ray and Chaturvedi, Students Friends & Co. Publisher, Agra.
4. Higher Engineering Mathematics, B.V.Ramana, Tata Mcgraw Hill.

B.TECH, II SEMESTER

Credits	L	T	P	Course Code	Course Title	Category of Course
03	**3**	**0**	**0**	**ESC 105**	**PROGRAMMING WITH ‘C’**	**ESC**

UNIT I

Introduction to Programming: Concept of algorithms, Flow Charts, Data Flow diagrams etc., Introduction to the Editing tools such as vi or MS-VC editors, Concepts of the finite storage, bits bytes, kilo, mega and gigabytes. Concepts of character representation, Number System & Binary Airthmatic.

UNIT II

Programming using C: The emphasis should be more on programming techniques rather than the language itself. The C Programming language is being chosen mainly because of the availability of the compilers, books and other reference materials.

Example of some simple C program. Concept of variables, program statements and function calls from the library (Print f for example)

UNIT III

Operation Using C: C data types, int, char, float etc., C expressions, arithmetic operation, relational and logic operations, C assignment statements, extension of assignment of the operations. C primitive input output using getchar and putchar, exposure to the scanf and printf functions, C Statements, conditional executing using if, else. Optionally switch and break statements may be mentioned.

UNIT IV

Iterations and Subprograms

Concept of loops, example of loops in C using for, while and do-while. Optionally continue may be mentioned. One dimensional arrays and example of iterative programs using arrays, 2-d arrays Use in matrix computations. Concept of Sub-programming, functions Example of functions. Argument passing mainly for the simple variables.

UNIT V

Pointers and Strings: Pointers, relationship between arrays and pointers Argument passing using pointers Array of pointers. Passing arrays as arguments.

Strings and C string library.

Structure and Unions. Defining C structures, passing strings as arguments Programming examples.

Text and Reference Books:

1. Yashwant Kanetkar, “Let us C”, BPB Publications, 2nd Edition, 2001.

2. Herbert Schildt, “C:The complete reference”, Osbourne Mcgraw Hill, 4th Edition, 2002.

3. Raja Raman, “Computer Programming in C”, Prentice Hall of India, 1995.
4. Kernighan & Ritchie, “C Programming Language”, The (Ansi C Version), PHI, 2nd Edition.

B.TECH, II SEMESTER

Credits	L	T	P	Course Code	Course Title	Category of Course
03	**3**	**0**	**0**	**ESC 106**	**BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING**	**ESC**

UNIT - I

Elementary concepts of DC electric circuits: Basic Terminology including voltage, current, power, resistance, emf; Resistances in series and parallel; Current and Voltage Division Rules; Capacitors & Inductors: V-I relations and energy stored. Ohms Law and Kirchhoff's laws-Problems; Star-delta conversion (resistive networks only-derivation not required)-problems.

Analysis of DC electric circuits: Mesh current method - Matrix representation - Solution of network equations. Node voltage methods-matrix representation-solution of network equations by matrix methods. Numerical problems.

UNIT –II

Magnetic Circuits: Basic Terminology: MMF, field strength, flux density, reluctance - comparison between electric and magnetic circuits- Series and parallel magnetic circuits with composite materials, numerical problems.

Electromagnetic Induction: Faraday's laws, problems, Lenz's law- statically induced and dynamically induced emfs - Self-inductance and mutual inductance, coefficient of coupling

Alternating Current fundamentals: Generation of alternating voltages-Representation of sinusoidal waveforms: frequency, period, Average, RMS values and form factor of waveforms-Numerical Problems.

UNIT - III

AC Circuits: Phasor representation of sinusoidal quantities. Trigonometric, Rectangular, Polar and complex forms. Analysis of simple AC circuits: Purely resistive, inductive & capacitive circuits; Inductive and capacitive reactance, concept of impedance. Average Power Power factor. Analysis of RL, RC and RLC series circuits-active, reactive and apparent power. Simple numerical problems.

Three phase AC systems: Generation of three phase voltages; advantages of three phase systems, star and delta connections (balanced only), relation between line and phase voltages, line and phase currents- Numerical problems

UNIT - IV

INTRODUCTION TO SEMICONDUCTOR DEVICES: Evolution of electronics – Vacuum tubes to nano electronics. Resistors, Capacitors and Inductors (constructional features not required): types, specifications. Standard values, color coding. PN Junction diode: Principle of operation, V-I characteristics, principle of avalanche breakdown. Bipolar Junction Transistors: PNP and NPN structures, Principle of operation, relation between current gains in CE, CB and CC, input and output characteristics of common emitter configuration.

UNIT - V

Basic Electronic Circuits and Instrumentation: Rectifiers and power supplies: Block diagram description of a dc power supply, Working of a full wave bridge rectifier, capacitor filter (no analysis), working of simple zener voltage regulator. Amplifiers: Block diagram of Public Address system, Circuit diagram and working of common emitter (RC coupled) amplifier with its frequency response, Concept of voltage divider biasing. Electronic Instrumentation: Block diagram of an electronic instrumentation system.

Introduction To Communication Systems: Evolution of communication systems – Telegraphy to 5G. Radio communication: principle of AM & FM, frequency bands used for various communication systems, block diagram of super heterodyne receiver, Principle of antenna – radiation from accelerated charge. Mobile communication: basic principles of cellular communications, principle and block diagram of GSM.

TEXT BOOKS:

1. D P Kothari and I J Nagrath, “Basic Electrical Engineering”, Tata McGraw Hill, 2010.
2. D C Kulshreshtha, “Basic Electrical Engineering”, Tata McGraw Hill, 2010.
3. ChinmoySaha, Arindham Halder and Debarati Ganguly, Basic Electronics - Principles and Applications, Cambridge University Press, 2018.
4. M.S.Sukhija and T.K.Nagsarkar, Basic Electrical and Electronics Engineering, Oxford University Press, 2012.
5. Wayne Tomasi and Neil Storey, A Textbook On Basic Communication and Information Engineering, Pearson, 2010.

REFERENCE BOOKS:

1. Del Toro V, “Electrical Engineering Fundamentals”, Pearson Education.
2. T. K. Nagsarkar, M. S. Sukhija, “Basic Electrical Engineering”, Oxford Higher Education.
3. Hayt W H, Kemmerly J E, and Durbin S M, “Engineering Circuit Analysis”, Tata McGraw-Hill
4. Hughes, “Electrical and Electronic Technology”, Pearson Education.
5. V. N. Mittle and Arvind Mittal, “Basic Electrical Engineering,” Second Edition, McGraw Hill.
6. Parker and Smith, “Problems in Electrical Engineering”, CBS Publishers and Distributors.
7. S. B. Lal Seksena and Kaustuv Dasgupta, “Fundamentals of Electrical Engineering”, Cambridge University Press.
8. Anant Agarwal, Jeffrey Lang, Foundations of Analog and Digital Electronic Circuits, Morgan Kaufmann Publishers, 2005.
9. Bernard Grob, Ba sic Electronics, McGraw Hill.

10. A. Bruce Carlson, Paul B. Crilly, Communication Systems: An Introduction to Signals and Noise in Electrical Communication, Tata McGraw Hill, 5th Edition.

B.TECH, II SEMESTER

Credits	L	T	P	Course Code	Course Title	Category of Course
03	**3**	**0**	**0**	**ESC 107**	**ENGINEERING MECHANICS**	**ESC**

UNIT-I

Introduction of Engineering Mechanics: Basic concepts System of Forces- Coplanar Concurrent Forces - Components in Space - Resultant- Moment of Forces and its Application Couples and Resultant of Force System - Equilibrium of System of Forces- Free body diagrams- Equations of Equilibrium of Coplanar Systems and Spatial Systems.

UNIT –II

Friction: Types of friction - Limiting friction - Laws of Friction - static and Dynamic Frictions - Motion of Bodies - Wedge, Screw jack and differential Screw jack.

Transmission of Power: Belt Drivers - Open, Crossed and compound belt drives -length of belt - tensions - tight side - slack side - Power transmitted and condition for maximum power.

UNIT -III

Center of Gravity & Moment of Inertia: Centroids - Theorem of Pappus- Centroids of Composite figures - Centre of Gravity of Bodies - Area moment of Inertia: - polar Moment of Inertia - Transfer - Theorems - Moments of Inertia of Composite Figures - product of Inertia - Transfer Formula for product of Inertia.

UNIT -IV

Kinematics: Rectilinear and Curve linear motion - Velocity and Acceleration - Motion of a Rigid Body - Types and their Analysis in Planar Motion.

Kinetics: Analysis as a particles and Analysis as a Rigid Body in Translation - Central Forces of motion - Equations of Plane Motion - Fixed Axis Rotation - Rolling Bodies - Work-Energy Method - Equation for Translation - Work-Energy application to Particle Motion, Connected System- Fixed axis Rotation and Plane Motion.

UNIT -V

Mechanical Vibrations: Definitions, Concepts - Simple Harmonic motion - free vibrations - Simple and compound pendulums - torsional vibrations.

Shear Force & Bending Moment Diagrams & Trusses: Support Reactions, Shear force and bending moment Diagram for Cantilever & simply supported beam with concentrated, distributed load.

Text and Reference books::

1. R. C. Hibbler – Engineering Mechanics: Statics & Dynamics.
2. R.K. Rajput, Engineering Mechanics S.Chand & Co.
3. Engineering Mechanics - Schaum's series - McGrawHill Publications.

4. Engineering Mechanics by S.Timashenko, D.H. Young and J.V. Rao
5. Engineering Mechanics: N.H.Dube

B.TECH, II SEMESTER

Credits	L	T	P	Course Code	Course Title	Category of Course
03	**3**	**0**	**0**	**BSC 106**	**ENGINEERING CHEMISTRY**	**BSC**

UNIT I

Atomic and Molecular Structure: Molecular orbital's of diatomic molecules. Band theory of solids. Liquid crystal and its applications. Point defects in solids. Structure and applications of Graphite and Fullerenes. Concepts of Nano-materials and its application.

UNIT II

Spectroscopic techniques and Applications: Elementary idea and simple applications of Rotational, Vibrational, Ultravoilet & Visible and Raman spectroscopy.

UNIT III

Electrochemistry Nernst Equation and application, relation of e.m.f. with thermodynamic functions (ΔH, ΔF and Δ S). Lead storage battery.

Corrosion; causes, effects and its prevention.

Phase Rule and its application to water system.

UNIT IV

Water Analysis; Hardness of water, Techniques for water softening (Lime-soda, Zeolite, Ion exchange resin and Reverse osmosis method). Fuels: classification of fuels, Analysis of coal, Determination of calorific value (Bomb calorimeter and Dulong's methos).

UNIT V

Polymer; Basic concepts of polymer-Blend and composites, Conducting and biodegradable polymers. Preparation and application of some industrially important polymers (BunaS, Buna-N, Neoprene, Nylon-6, nylon-6,6 and Terylene). General methods of synthesis of organometallic compounds (Grignard reagent) and their applications.

REFERENCE BOOKS:

1. University Chemistry By B.H. Mahan
2. University Chemistry By C.N.R. Rao
3. Organic Chemistry By I.L. Finar
4. Physical Chemistry By S. Glasstone
5. Engineering Chemistry By S.S. Dara
6. Polymer Chemistry By Fre W., Billmeyer

B.TECH, II SEMESTER

Credits	L	T	P	Course Code	Course Title	Category of Course
01	**0**	**0**	**2**	**ESC 108**	**BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LAB**	**ESC**

LIST OF EXPERIMENTS

ELECTRICAL EXPERIMENTS

1. To study working principle of Fluorescent Tube Light.

2. To study working of single phase Induction motor & vary its speed by single phase Auto-Transformer.

3. To prepare connections of Ceiling Fan & vary its speed by regulator.

4. To study working of three phase Induction motor & vary its speed by three phase Auto-Transformer.

5. To study Stair – Case wiring.

6. To study Thevenin & Nortons Theorem

7. To study & verify Superposition Theorem

8. To study & verify Maximum power Transfer Theorem.

9. To study speed control of D.C motor.

10. To study open circuit & short circuit test of single phase Transformer.

11. To study power measurement by two wattmeter method.

12. To study the frequency response of series RLC circuit.

ELECTRONICS EXPERIMENTS

1) Study of Multimeter and measuring electrical quantities with the help of multimeter.

2) To observe sine wave, square wave, triangular wave and ramp wave forms on the C.R.O and to measure the frequency of waveforms.

3) To obtain the V-I characteristics of PN Junction diode.

4) To obtain the V-I characteristics of Zener diode.

5) To observe waveform at the output of half wave rectifier with and without filter capacitor. To measure DC voltage, DC current, ripple factor with and without filter capacitor.

6) To observe waveform at the output of full wave rectifier with and without filter capacitor. To measure DC voltage, DC current, ripple factor with and without filter capacitor.

7) To observe waveforms at the output of clipper and clamper circuits.

8) To obtain common emitter characteristics of NPN/PNP transistor.

9) To obtain common base characteristics of NPN/PNP transistor.

10) Verify the truth table of AND, OR, NOT, NOR and NAND gates.

B.TECH, II SEMESTER

Credits	L	T	P	Course Code	Course Title	Category of Course
01	**0**	**0**	**2**	**ESC 109**	**ENGINEERING DRAWING LAB**	**ESC**

UNIT - I

Introduction: Drawing Instruments and their uses, BIS conventions, Lettering, dimensioning Line conventions and free hand practicing.

UNIT - II

Orthographic Projections: Introduction, Definitions - Planes of projection, reference line and conventions employed, Projections of points in all the four quadrants, Projections of straight lines (located in First quadrant/first angle only), True and apparent lengths, True and apparent inclinations to reference planes. Projections of plane surfaces–triangle, square, rectangle, rhombus, pentagon, hexagon and circle, planes in different positions by change of position method only.

UNIT - III

Projections of Solids (First Angle Projection Only): Introduction, Definitions – Projections of right regular tetrahedron, hexahedron (cube), prisms, pyramids, cylinders and cones in different positions.

UNIT - IV

Sections And Development of Lateral Surfaces of Solids: Introduction, Section planes, Sections, Section views, Sectional views, Apparent shapes and True shapes of Sections of right regular prisms, pyramids, cylinders and cones resting with base on HP.

UNIT - V

Isometric Projection (Using Isometric Scale Only): Introduction, Isometric scale, Isometric projection of simple plane figures, Isometric projection of tetrahedron, hexahedron(cube), right regular prisms, pyramids, cylinders, cones, spheres, cut spheres.

TEXT AND REFERENCE BOOKS:

1. Engineering Drawing - N.D. Bhatt & V.M. Panchal, 48th edition, 2005-Charotar Publishing House, Gujarat
2. Engineering graphics for degree - K.C. John, 2nd Edition, 2009 – PHI Learning Private Limited.
3. Engineering Graphics - K.R. Gopalakrishna, 32nd edition, 2005- Subash Publishers Bangalore
4. Engineering Graphics and Drafting :P.S. Gill, Milenium Edition, S.K. Kataria and Sons.

B.TECH, II SEMESTER

Credits	L	T	P	Course Code	Course Title	Category of Course
01	**0**	**0**	**2**	**ESC 110**	**PROGRAMMING WITH C LAB**	**ESC**

List of Experiments:

1. Write a program to produce ASCII equivalent of given number
2. Write a program to find divisor or factorial of a given number.
3. Write a program to evaluate the following algebraic expressions after reading necessary values from the user
   (ax+b)/(ax-b)
   2.5 log x-cos 30+ | x^2-y^2|+sqrt (2xy)
   (x^5+10x^4+8x^3+4x+2
4. Write a program to find sum of a geometric series
5. Write a program to cipher a string
6. Write a program to check whether a given string follows English capitalization rules
7. Write a program to find sum of the following series
   1+ 1/2+ 1/3 +________+1/20
8. Write a program to search whether a given substring exist in an input string or not and then delete this string from input string.
9. Write a recursive program for tower of Hanoi problem
10. The fibonacci sequence of numbers is 1,1,2,3,5,8……. Based on the recurrence relation
    F(n)=F(n-1)+F(n-2)for n>2
    Write a recursive program to print the first m Fibonacci number
11. Write a menu driven program for matrices to do the following operation depending on whether the operation requires one or two matrices
    a) Addition of two matrices
    b) Subtraction of two matrices
    c) Finding upper and lower triangular matrices
    d) Trace of a matrix
    e) Transpose of a matrix
    f) Check of matrix symmetry
    g) Product of two matrices.
12. Write a program that takes two operands and one operator from the user perform the operation and then print the answer
13. Write a program to print the following outputs:

```
        1                                    1
2    2                                  2    2
3    3    3                          3    3   3
4    4    4    4                   4   4    4  4
5    5    5    5    5            5   5    5   5  5
```

14. Write functions to add, subtract, multiply and divide two complex numbers (x+iy) and (a+ib) Also write the main program.

15. Write a menu driven program for searching an sorting with following options:-

a) Searching (1) Linear searching

(2) Binary searching

b) Sorting (1) Insersection sort

(2) Selection sorting

16. Write a program to copy one file to other, use command line arguments.

17. Write a program to mask some bit of a number (using bit operations)

18. An array of record contains information of managers and workers of a company. Print all the data of managers and workers in separate files.

B.TECH, II SEMESTER

Credits	L	T	P	Course Code	Course Title	Category of Course
01	**0**	**0**	**2**	**BSC 108**	**ENGINEERING CHEMISTRY LAB**	**BSC**

List of Experiments

1. Determination of alkalinity in the given water sample.

2. Determination of temporary and permanent hardness in water sample using EDTA.

3. Determination of iron content in the given solution by Mohr's method.

4. Determination of viscosity of given liquid.

5. Determination of surface tension of given liquid.

6. Determination of chloride content in water sample.

7. Determination of available chlorine in bleaching powder.

8. Determination of pH by pH-metric titration.

9. Preparation of Phenol-formaldehyde and Urea-formaldehyde resin.

10. Determination of Cell constant and conductance of a solution.

11. Determination of rate constant of hydrolysis of esters.

12. Verification of Beer's law.