Millia Institute of Technology
Rambagh, Purnea

Affiliated to Bihar Engineering University, Patna

NAAC Accredited & ISO 9001:2015

SYLLABUS

Department of
Electronics & Communication Engineering

1st SEMESTER

Group B 1st & 2nd Sem (SESSION 2024-2025)

B.Tech in Electronics & Communication Engineering

SEMESTER –I

Sl. No.	Course Code	Course Title	Hours Per Week			Total Credits
			Lecture	Tutorial	Practical	
41.	100110	Engineering Physics	3	0	0	3
42.	100102	Engineering Mathematics-I	3	1	0	4
43.	100111	Programming for Problem Solving	3	0	0	3
44.	100106	Basic Electrical Engineering	3	0	0	3
45.	100112	Workshop Practices	2	0	0	2
46.	100115P	Swachha Bharat Mission (SBM)	0	0	2	1
47.	100110P	Engineering Physics Lab	0	0	2	1
48.	100111P	Programming for Problem Solving Lab	0	0	2	1
49.	100106P	Basic Electrical Engineering Lab	0	0	2	1
50.	100112P	Workshop Practices Lab	0	0	2	1
TOTAL						20

Course Code-100102 Engineering Mathematics–I 3 1 0 4

Unit- 1.0: Linear Algebra-I **7 hrs**

Elementary Row operations, Gauss -Jordan Method for finding the inverse of Matrix, Complex Matrix : Hermitian , Skew Hermitian and Unitary Matrix, Vector space, Sub Spaces, Linear dependence and Independences of Vectors, Linear Span, Basis, Dimension, Extension of basis of subspace, The rank of a matrix, Row and column space, Solvability of system of linear equations.

Unit- 2.0: Linear Algebra-II **7 hrs**

Linear Transformations, Kernel and Range of linear transformation, Matrix Representation of a linear transformation, Rank-Nullity Theorem, Eigen Value and Eigen Vectors, Properties of Eigen vectors, Eigen Bases, Orthogonal Transformation, Similarity Transformation, Matrix Diagonalization, Cayley- Hamilton Theorem.

Unit- 3.0: Calculus for single variable **7 hrs**

Inderminate form, L'Hospital Rule, Rolle's Theorem, Mean Value Theorem, Expansion of function (single variable), Taylor and Maclaurin Series, Riemann Integration, Riemann Sum, Improper Integrals, Beta and Gamma function and their properties.

Unit- 4.0 : Multivariable Calculus (Differentiation) **7 hrs**

Function with two or more variable, Limit, continuity and Partial differentiation, Total Differentiation

Taylor's series and Maclaurin's series for function with two variable, Jacobian, Maxima and Minima, Method of Lagrange's multiplier.

Unit-5.0: Multivariable Calculus (Integration) **7 hrs**

Double Integral, change of order of integration, Triple integral, Change of Variable in a Double and Triple Integrals, Change to polar coordinate, Change to cylindrical coordinate, Change to spherical polar coordinate, Application to area and volume using double and triple integral

Unit- 6.0: Vector Calculus **7 hrs**

Scalar and vector fields, Gradient, Directional derivative, Divergence, Curl and their properties, Line integral, Green's theorem in plane (without proof), Surface integral, Stoke's theorem (without proof), Volume Integral, Gauss-Divergence' theorem (without proof).

Test/ Reference:-

1. AICTE's Prescribed Textbook: Mathematics-I (Calculus & Linear Algebra), Reena Garg, Khanna Book Publishing Co. ISBN-10 9391505171
2. Advanced Engineering Mathematics, Chandrika Prasad & Reena Garg, Khanna Book Publishing Co., 2021. ISBN 10: 9386173522 / ISBN 13: 9789386173522.
3. Higher Engineering Mathematics, B.V. Ramana, Tata McGraw Hill New Delhi, 11th Reprint, 2010,ISBN-10 007063419X ISBN-13978- 0070634190.
4. Advanced Engineering Mathematics, SrkIyengar Rk Jain,Narosa,5thEdition,ISBN-10 81848756061
   SBN-13978-8184875607
5. Advanced Engineering Mathematics, Erwin Kreyszig, 9th Edition, John Wiley & Sons, 2006.

Course Code-100110 Engineering Physics 3 0 0 3
Unit- 1.0

1. Frame of Reference: **2 hrs**

Non-Inertial frame of reference, rotating coordinate system, centripetal and Coriolis acceleration and its application in weather system.

2. Oscillations: **3 hrs**

Harmonic Oscillator, Damped Harmonic motion – overdamped, critically Damped and lightly damped oscillators, Force Oscillators and Resonance.

Unit- 2.0

1. Optics: **4 hrs**

Huygens's Principle, Superposition of Waves and interference of Light by wave front-splitting and amplitude-splitting; Young's double slit experiment, Michelson interferometer, Fraunhofer diffraction from single slit and circular aperture, Diffraction Grating and their resolving power

2. LASER: **4 hrs**

Einstein's theory of matter-radiations interaction, Einstein's Coefficients (A and B), Amplification by population inversion, Different types of lasers – Gas Laser, Helium-Neon Laser, Solid State Laser (Ruby, Neodymium), Semiconductor Laser.

Unit- 3.0

1. Quantum Mechanics: **5 hrs**

Compton Effect, Photoelectric Effect, Wave Particle duality, de Broglie's hypothesis, Heisenberg's Uncertainty Principle, Wave function and wave packets, phase and group velocities, Schrodinger's Wave Equation, Normalization, Expectation values, Eigenvalues and Eigenfunction.

2. Applications in One dimensions: **2 hrs**

Application of Schrodinger Wave Equation for particle in one dimensional box – its wavefunction and eigenvalue of energy and momentum.

Unit- 4.0

1. Vector Calculus: **2 hrs**

Gradient, Divergence and Curl, Line, Surface and Volume integrals, Gauss's Divergence theorem and Stokes' theorem in Cartesian Coordinate.

2. Electrostatics: **4 hrs**

Gauss's Law and its applications, Divergence and Curl of Electrostatic fields, Electrostatic Potential, Boundary Conditions, Poisson's and Laplace's equations, Dielectrics, Polarization, Bound Charges, Electric displacement, Boundary Conditions in dielectrics.

Unit- 5.0

1. Magnetostatics: **4 hrs**

Lorentz force, Biot-Savart and Ampere's circuital laws and their applications, Divergence and Curl of Magneto static fields, Magnetic vector potential, Force and torque on a magnetic dipole, Magnetic Materials, Magnetization, Bound currents, Boundary conditions.

2. Electrodynamics and Electromagnetic Waves: **4 hrs**

Ohm's law, Motional EMF, Faraday's Law, Lenz's law, Self and mutual inductance, Energy stored in magnetic field, Maxwell's equations in vacuum and nonconducting medium, Continuity Equation, Poynting Theorem, Wave Equations: plain electromagnetic wave in vacuum and their transverse nature and Polarization.

Unit- 6.0

1. Introduction to Solids and Semi-Conductors: **3 hrs**

Free electron theory of metal, fermi level, Bloch's theorem for particle in a periodic Potential, Kroning-Penney model and origin of energy band.

2. Electronic Materials: **3 hrs**

Metals, semiconductors and insulators, intrinsic and extrinsic semiconductors,Carrier transport, diffusion and drift, P-N junction.

Test/ Reference:-

Course Code-100110P Engineering Physics Lab 0 0 2 1

Perform any 10 Experiments

1. Determination of the capacitance and permittivity of the given material.
2. Determination of e/m of electron.
3. Determination of Planck's constant and Photoelectric Work Function using Photoelectric cell.
4. Verification of inverse square law using photocell.
5. Determination of Wavelength of (He-Ne) LASER using Diffraction Grating Method.
6. Calculation of Energy Band Gap of a semiconductor.
7. Determination of Dielectric constant using resonance method.
8. Determination of Wavelength of Sodium light by measuring the diameter of the Newton's Ring.
9. Determination of curvature of convex surface of a lens by Newton's ring.
10. Verification of existence of Bohr's Energy level with Frank-Hertz apparatus.
11. Determination of the Earth's horizontal magnetic field intensity and magnetic Moment of a magnet by employing magnetometer.
12. Verification of Faraday's Law and Lenz's Law of Electromagnetic Induction.

Course Code-100111 Programming for Problem Solving 3 0 0 3

Unit- 1.0

Introduction to Programming **6 hrs**

Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.). Idea of Algorithm: steps to solve logical and numerical problems. Representation of Algorithm: Flowchart/ Pseudo code with examples. From algorithms to programs; source code, variables (with data types) variables and memory locations, Syntax and Logical Errors in compilation, object and executable code.

Unit- 2.0

Operators, Conditional Branching and Loops **8 hrs**

Arithmetic expressions/arithmetic operators, relational operators, logical operators, bitwise operators and precedence. Writing and evaluation of conditionals and consequent branching, Iteration and loops.

Unit- 3.0

Arrays and String **6 hrs**

Array declaration & initialization, bound checking arrays (1-d, 2-d), character arrays and strings.

Unit- 4.0

Function, Recursion and Pointers **9 hrs**

Functions (including using built in libraries), Parameter passing in functions, call by value, passing arrays to functions: Recursion, as a different way of solving problems. Example programs, such as Finding Factorial, Fibonacci series, Ackerman function etc. Idea of pointers, Defining pointers, Use of Pointers in self- referential structures, idea of call by reference.

Unit- 5.0

User defined Data Types and File handling **8 hrs**

Structure- defining, declaring, initializing; accessing structure members, processing of structure, array of structures, structures within structure, structure and function, type definition; Union— definition, declaration, accessing union members, initializing union. Introduction, file declaration, opening and closing a file, working with text and binary files, I/O operations on file, error handling, random access to files

Unit- 6.0

Basic Algorithms **5 hrs**

Searching, Basic Sorting Algorithms (Bubble, Insertion and Selection), Finding roots of equations, notion of order of complexity through example programs (no formal definition required)

Test/ Reference:-

1. Programming in ANSI C 4th Ed,E Balagurusamy, McGraw Hill Education India Private Limited, ISBN-978-9339219666, 7th Edition
2. The C Programming Language 2e,W. Kernighan / Dennis Ritchie,Pearson Education India, 978-9332549449, 2nd Edition
3. Computer Fundamentals and Programming in C,ReemaThareja,Oxford University Press, ISBN- 978-9354977893, 3rd Edition

Course Code-100115P Swatch Bharat Mission 0 02 1

Objectives:

1. Understanding the importance of cleanliness and sanitation: The course could aim to create awareness about the significance of cleanliness and sanitation in maintaining personal health, environmental sustainability, and community well-being. It could cover topics such as waste management, sanitation practices, and the impact of poor sanitation on public health.
2. Developing skills for effective waste management: The course could provide training on various waste management techniques, such as waste segregation, composting, recycling, and proper disposal of hazardous waste. It could also emphasize the importance of reducing waste generation and promoting sustainable waste management practices.
3. Promoting behavioural change towards cleanliness: The course could focus on influencing positive behavioural change among individuals and communities towards cleanliness. It could include modules on promoting good hygiene practices, creating awareness about the harmful effects of littering and open defecation, and encouraging responsible waste disposal habits.
4. Creating awareness about Swachh Bharat Mission initiatives: The course could provide information about the Swachh Bharat Mission initiatives and campaigns launched by the Government of India to promote cleanliness and sanitation, such as Swachh Survekshan, Swachh Bharat Abhiyan, and Clean India Campaign. It could also discuss the progress made, challenges faced, and future prospects of the Swachh Bharat Mission.
5. Engaging in community participation and advocacy: The course could emphasize the importance of community participation in the Swachh Bharat Mission and provide tools and strategies for engaging with local communities to promote cleanliness and sanitation. It could also encourage advocacy for policy changes and innovations to address sanitation-related issues at the community, regional, and national levels.
6. Pre-requisite: Nil
7. Course Outcome:
8. Increased awareness and knowledge about cleanliness and sanitation: Participants of the course may gain a deeper understanding of the importance of cleanliness and sanitation, including the impact on personal health, environmental sustainability, and community well-being. They may learn about various waste management techniques, hygiene practices, and the initiatives of the Swachh Bharat Mission.
9. Enhanced skills for effective waste management: Participants may acquire practical skills related to waste management, such as waste segregation, composting, recycling, and proper disposal of hazardous waste. They may also develop skills in reducing waste generation and promoting sustainable waste management practices in their communities or workplaces.
10. Positive behavioral change towards cleanliness: The course may influence participants to adopt positive behavioral changes towards cleanliness, such as avoiding littering, practicing good hygiene habits, and promoting responsible waste disposal. Participants may develop a sense of responsibility towards maintaining cleanliness in their surroundings and actively contribute towards creating a cleaner environment.
11. Increased community participation and advocacy: Participants may become actively engaged in community participation and advocacy efforts related to cleanliness and sanitation. They may collaborate with local communities, government bodies, and non-governmental organizations (NGOs) to raise awareness, implement cleanliness initiatives,

Course Code-100106 Basic Electrical Engineering 3 0 0 3

Unit- 1.0 **8 hrs**

DC Circuit Analysis and Network Theorems: Concepts of Network, Active and Passive elements, voltage and current sources, concept of linearity and linear network, unilateral and bilateral elements. R L and C as linear elements. Source Transformation. Kirchhoff's Law, loop and nodal methods of analysis; star – delta transformation; Network Theorems: Superposition Theorem, Thevenin's Theorem, Norton's Theorem, Maximum Power Transfer Theorem. (Simple Numerical Problems)

Unit- 2.0 **5 hrs**

Magnetic Circuit: Magnetic circuit concepts, analogy between Electric & Magnetic circuits, Magnetic circuits with DC and AC excitation, Magnetic leakage. B-H curve, Hysteresis and Eddy Current losses, Magnetic circuit calculations.

Unit- 3.0 **8 hrs**

Steady State Analysis of Single-Phase AC Circuits: Sinusoidal, Square and Triangular waveforms–average and effective values, form and peak factors, concept of phasors, phasor representation of sinusoidally varying voltage and current. Analysis of series, parallel, and series – parallel RLC Circuits: Apparent, Active & Reactive Powers, Power factor, causes and problems of low power factor, power factor improvement. Resonance in Series and Parallel Circuits. (Simple Numerical Problems)

Unit- 4.0 **5 hrs**

Three Phase AC Circuits: Three Phase System – its necessity and advantages, meaning of phase sequence and star and delta connections, balanced supply and balanced load, line and phase voltage/ current relations, three phase power and its measurement. (Simple Numerical Problems)

Unit- 5.0 **10 hrs**

Introduction to DC Machines:Principal, Operation, Construction, and types of DC machines, e.m.f. equation of generator and torque equation of motor.

Single Phase Transformer: Principle of Operation, Construction, e.m.f. equation, losses in transformer, efficiency.

Three Phase Induction Motor:Principal, Operation, and Construction (Simple Numerical Problems)

Unit- 6.0 **6 hrs**

Soldering- Soldering and desoldering techniques, breadboard wiring, general-purpose PCB soldering/wiring.

Wiring-Types of residential and commercial wiring systems, general rules and guidelines for installation, loadcalculation and sizing of wire, rating of main switch, distribution board.

Test/ Reference:-

1. Basic Electrical Engineering, D.P. Kothari et al,McGraw-Hill Education 4th Edition,2019
2. Electrical and Electronic Technology Edward Hughes, 12th edition, 2016
3. Principles Electrical Engineering and Electronics, V.K Mehata, Rohit Mehta, S Chand and Company 2nd edition, 2015
4. Basic Electrical Engineering, J. B. Gupta, Katson Publication
5. A textbook of Electrical Technology B. L. Thereja, A. K. Thereja Vol. 1, 2, and 3 S Chand Publication

Perform any 10 Experiments

1. Verification of Kirchhoff's laws.
2. Verification of Superposition Theorem.
3. Verification of Thevenin's Theorem.
4. Verification of Norton's Theorem.
5. Verification of Maximum Power Transfer Theorem.
6. Measurement of power in 3 – Ø circuit by Two Watt meter method and determination of its power factor.
7. Star to Delta and Delta to Star conversion of the three circuit.
8. Determination of Efficiency by load test of a 1 – Ø Transformer.
9. To study the typical BHK house wiring
10. Study of safety precautions while working on electrical installations and necessity of earthing

Course Code-100112 Workshop Practices 2 0 0 2

Unit-1

Sheet Metal Working: 6 hrs

Sheet material: GI sheets, aluminium, tin plate, copper, brass etc; Tools: steel rule, vernier callipers, micrometer, sheet metal gauge, scriber, divider, punches, chisels, hammers, snips, pliers, stakes etc.; operations: scribing, bending, shearing, punching etc; Product development: hexagonal box with cap, funnel etc.

Unit-2

Joining: 6 hrs

Classifications of joining processes; Brazing, Soldering, and Mechanical Joints, Arc welding, Gas welding etc.

Unit-3

Pattern Making and Foundry Practice: 6 hrs

Pattern material: wood, cast iron, brass, aluminium, waxes etc.; Types of patterns: split, single piece, match plate etc; Tools: cope, drag, core, core prints, shovel, riddle, rammer, trowel, slick, lifter, sprue pin, bellow, mallet, vent rod, furnace etc. Moulding sands: green sand, dry sand, loam sand, facing sand etc., Sand casting: Sand preparation, mould making, melting, pouring, and cleaning

Unit-4

Fitting Shop 10 hrs

Introduction to Fitting; Fitting Tools: Files and their classification, Holding Tools, Cutting Tools, Measuring and Marking Tools, Thread Making Tools, Various Fitting Power Tools; Methods Of Filing: Cross Filling and Draw Filing, Other associated operations Marking. Sawing and Chipping; Safety and Precautions in Fitting Shop.

Unit-5

Carpentry Shop 7 hrs

Introduction to Carpentry Shop; Types of Wood; Seasoning of Wood: Ty[es of Seasoning Methods; Defects in wood; Structure of Wood; Car[entry Tools; Measuring Tools, Marking Tools, Cutting Tools, Planning Tools, Drilling and Boring Tools, Holding Tools, Striking Tools, Auxiliary tools and materials used in Carpentry; Wood working Processes; Carpentry joints; wood Working Machines: Wood Working Lathe, Circular Saw, Thickness Planer, Band sawSafety and precautions in Carpentry Shop.

Unit-6

Smithy Shop 5 hrs

Introduction to Smithy Sho; Forging Tools and Equipment; Forging Operations: Drawing, Upsetting, Swaging, Punching, Drifting, Fullering, Bending; Hot Working Processes: Rolling, Drop Forging, Press Forging, Hot Extrusion, Hot Drawing, Cold Working Process, Safety and Precautions in Smithy Shop.

Test/ Reference:-

1. Hajra Choudhury S.K., Hajra Choudhury A.K. And Nirjhar Roy S.K., "ElementsOf Workshop Technology", Vol. I 2008 And Vol. Ii 2010, Media PromotersAnd Publishers Private Limited, Mumbai.
2. Kalpakjian S. And Steven S. Schmid, "Manufacturing Engineering AndTechnology", 4th Edition, Pearson Education India Edition, 2002.
3. Gowri P. Hariharan And A. Suresh Babu,"Manufacturing Technology – I"Pearson Education, 2008.
4. Roy A. Lindberg, "Processes And Materials Of Manufacture", 4th Edition,Prentice Hall India, 1998.
5. Rao P.N., "Manufacturing Technology", Vol. I And Vol. Ii, Tata McgrawhillHouse, 2017.

Course Code-100112P Workshop Practices Lab 0 0 2 1

Perform all Experiments

List of Practical:

1. Learn and apply of different fitting tools –like work holding, marking, measuring, cutting, finishing and miscellaneous. Student will also prepare the report with sketch, specifications and applications of fitting tools demonstrated.
2. Prepare one simple and another male-female type fitting jobs as per given drawings- 2 jobs
3. Learn and apply of different tin smithy tools. Student will also prepare the report with sketch, specifications and applications of tin smithy tools demonstrated.
4. Learn and apply of welding equipments and making minimum one model.
5. Learn and apply of foundry tools and making minimum one model.
6. Learn and apply of carpentry tools and making minimum one model.
7. Learn and apply of Sheet Metal tools and making minimum one model.
8. Learn and apply of Lathe Tools & operations for making a job.
9. Learn and apply the application of measuring tools.
10. Learn and apply any casting process for making a model

Course Code-100111P Programming for Problem Solving Lab 0 0 2 1

Perform any 10 Experiments

1. Tutorial 1: Problem solving using computers:
   Lab1: Familiarization with programming environment
2. Tutorial 2: Variable types and type conversions:
   Lab 2: Simple computational problems using arithmetic expressions
3. Tutorial 3: Branching and logical expressions:
   Lab 3: Problems involving if-then-else structures
4. Tutorial 4: Loops, while and for loops:
   Lab 4: Iterative problems e.g., sum of series
5. Tutorial 5: 1D Arrays: searching, sorting:
   Lab 5: 1D Array manipulation
6. Tutorial 6: 2D arrays and Strings
   Lab 6: Matrix problems, String operations
7. Tutorial 7: Functions, call by value:
   Lab 7: Simple functions
8. Tutorial 8 &9: Numerical methods (Root finding, numerical differentiation, numerical integration):
   Lab 8 and 9: Programming for solving Numerical methods problems
9. Tutorial 10: Recursion, structure of recursive calls
   Lab 10: Recursive functions
10. Tutorial 11: Pointers, structures and dynamic memory allocation
    Lab 11: Pointers and structures
11. Tutorial 12: File handling:
    Lab 12: File operations