Millia Institute of Technology
Rambagh, Purnea

Affiliated to Bihar Engineering University, Patna

NAAC Accredited & ISO 9001:2015

SYLLABUS

Department of Computer Science & Engineering

1st SEMESTER

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

B.Tech in Computer Science Engineering
SESSION 2024-2028

SEMESTER –I

Sl No.	Course Code	Course Title	Hours Per Week			Total Credits
			Lecture	Tutorial	Practical	
1.	100110	Engineering Physics	3	0	0	3
2.	100102	Engineering Mathematics-I	3	1	0	4
3.	100111	Programming for Problem Solving	3	0	0	3
4.	100115P	Swachha Bharat Mission (SBM)	0	0	2	1
5.	100113	IT Workshop	2	0	0	2
6.	100114	Basic Electronics Engineering	3	0	0	3
7.	100110P	Engineering Physics Lab	0	0	2	1
8.	100111P	Programming for Problem Solving Lab	0	0	2	1
9.	100113P	IT Workshop Lab	0	0	2	1
10.	100114P	Basic Electronics Engineering Lab	0	0	2	1
TOTAL						20

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

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-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.

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

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

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

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-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-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

Unit- 1.0

PC HARDWARE(6 lectures):

Identification of the peripherals of a computer, components in a CPU and its functions. Block diagram of the CPU along with the configuration of each peripheral. Functions of Motherboard. Assembling and Disassembling of PC. Installation of OS. Basic Linux commands.

Unit- 2.0

INTERNET(4 lectures)

Web Browsers, Access of websites, Surfing the Web, Search Engines, Customization of web browsers, proxy settings, bookmarks, search toolbars, pop-up blockers. Antivirus types, Protection from various threats.

Unit- 3.0

MICROSOFT WORD(4 lectures)

Overview of MS word features. Usage of Hyperlink, Symbols, Spell Check, Track Changes. Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word. Using Word to create Project Certificate, Project Abstract, News Letter, Resume.

Unit- 4.0

LaTeX(6 lectures)

Word Orientation: Overview of LaTeX and tool word: Importance of LaTeX and MS office or equivalent (FOSS) tool Word as word Processors, Details of the four tasks and features that would be covered in each, Using LaTeX and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word.

Using LaTeX and Word to create a project certificate. Features to be covered:- Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both LaTeX.

Creating project abstract Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Creating a Newsletter: Features to be covered:- Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

Unit- 5.0

MICROSOFT EXCEL(4 lectures)

Overview of Excel Features Excel formulae & Functions, conditional formatting, Charts, Hyper linking, Renaming and Inserting worksheets, Data Analysis functions. Creating a Scheduler (Features: - Gridlines, Format Cells, Summation, auto fill, Formatting) Calculating GPA (Features: - Cell Referencing, Formulae and functions in excel.

Unit- 6.0

MICROSOFT POWER POINT(4 lectures)

Overview of PowerPoint features, Insertion of images, slide transition, Custom animation, Hyperlinks.

Test/ Reference:-

1. The Complete Computer upgrade and repair book, Cheryl A Schmidt, 3rd edition, WILEY Dream tech
2. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
3. PC Hardware – A, Handbook – Kate J., Chase PHI
4. LaTeX Beginner's Guide, Stefan Kottwitz, Packt Publishing

Unit- 1: PC Hardware

Task 1: Identify the peripherals of a computer, components in a CPU and its functions. Different types of printer.

Task 2: Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video would be given as part of the course content.

Unit 2:

Task 1: Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

Task 2: Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot with both Windows and Linux. Lab instructors should verify the installation and follow it up with a Viva.

Task 3: Different commands of DOS and Linux.

Unit- 3:Internet & World Wide Web

Task1: Orientation & Connectivity Boot Camp: Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

Task 2: Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.

Task 3: Search Engines & Netiquette: Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors by the student.

Task 4: Cyber Hygiene: Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to customize their browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

Unit- 4.0: LaTeX

Task 1 – Word Orientation: The mentor needs to give an overview of LaTeX and tool word: Importance of LaTeX and MS office or equivalent (FOSS) tool Word as word Processors, Details of the four tasks and features that would be covered in each, Using LaTeX and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word.

Task 2: Using LaTeX and Word to create a project certificate. Features to be covered:- Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both LaTeX.

Task 3: Creating project abstract Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Task 4: Creating a Newsletter: Features to be covered:- Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

Unit- 5.0 :

Excel Orientation: The mentor needs to tell the importance of MS office or equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the four tasks and features that

Course Code-100114 Basic Electronics Engineering 3 0 0 3

Unit- 1.0

Semiconductor diode **9 hrs**

Intrinsic and extrinsic types, energy band in intrinsic and extrinsic Semiconductor, equilibrium carrier concentration Direct and indirect band-gap semiconductor. Ideal diode Construction, p-n junction under open circuit, drift, and diffusion current, built in potential, forward bias, and reverse bias condition. Effect of temperature, static and dynamic resistance, breakdown mechanism in diode, Junction capacitance. Zener diode Working, VI characteristics Light emitting Diode, Photodiode, Solar cell.

Unit- 2.0

Diode Applications **7 hrs**

Half wave rectifiers, Full wave rectifiers & Rectifier with filters, Zener diode application as voltage regulator, Clipping and Clamping circuits, Voltage doubler (includes numerical on rectifier, filter, and Zener regulator)

Unit- 3.0

Bipolar Junction Transistor **8 hrs**

BJT introduction: Construction, Symbol, and types (PNP and NPN), working of BJT, BJT configuration and characteristics, Load line analysis, Operating point, Need for Biasing, different Biasing circuits, Bias stability. BJT as a switch &Amplifier, low frequency small signal model of BJT, CE amplifier with and without feedback

Unit- 4.0

Field Effect Transistor **6hrs**

General characteristics of FET; Comparison between FET & BJT; JFET: Construction, Principle of Operation, Shockley equation. Outputand transfer characteristics; Depletion & Enhancement Type MOSFET: Construction, Principle of operation. Output and transfer characteristics;

Unit- 5.0

Operational Amplifier **6 hrs**

Block diagram of an Operational amplifier, schematic symbol, characteristics of an ideal and practical operational amplifier, concept of virtual ground, Inverting and non-inverting amplifier, voltage follower, adder, subtractor, integrator and differentiator.

Unit- 6.0

Fundamental of Digital Electronics **6 hrs**

Introduction to number system: octal, Hexadecimal, Binary numbers, Binary addition using 1's and 2's complement method. logic gates, Universal gates, Boolean Algebra, De Morgan's theorems, Simplification, and realization of Boolean expression using basic gates and NAND gates.

Test/ Reference:-

6. Electronic Device & Circuit theory Boylestad and Nashelsky Pearson
7. Electronic Principles Albert Malvino & Davis J. Bates TMH
8. Digital logic and computer design M. Morris Mano PHI
9. Electronic Devices and Circuit David A Bell Oxford
10. Microelectronic Circuit: Theory and Application Sedra and Smith Oxford

Course Code-100114P Basic Electronics Engineering Lab 0 0 2 1

Perform any 10 Experiments

14. Study of Cathode Ray Oscilloscope (CRO) (a) Measurement of amplitude, time period and frequency of unknown continuous signals.
15. Identification of active and passive component.
16. Study the characteristics of P-N junction diode under (a) Forward bias, and (b) Reverse bias.
17. Study of clipping circuits and clamping circuits.
18. To recognize a half -wave rectifier and full-wave rectifier using sinusoidal voltage.
19. Study of Full wave rectifier using Capacitor filter.
20. To recognize voltage regulator using Zener diode.
21. Study of the input and output characterization of common base (CB) bipolar junction transistor.
22. Study the input and output characterization of common emitter (CE) bipolar junction transistor.
23. Study the output and transfer characteristics of JFET (Junction field effect transistor)
24. Study of operational amplifier as (i) Inverting (ii) Non-inverting amplifier.
25. Study of operational amplifier as (i) Integrator (ii) Differentiator.
26. Construction and verification of all other gate (AND, OR, NOT, XOR) using only a) NOR gate b) only NAND gate.