Al Almaas Haider Charitable Trust

Al Haider College of Technology at Ranchi, Jharkhand

SYLLABUS OF

B. Tech in Electronic and Communication Engineering

Semester- II

AAHCT, Ranchi, Jharkhand

Al Haider College of Technology Department of Engineering

Faculty – Bachelor of Technology in Electronic and Communication Engineering

SEMESTER –II

Sr. No.	Name of the Subject	L-T-P	Credit	Contact Hours Per Week
1	Engineering Mathematics–II	3-1-0	4	3
2	Engineering Chemistry	3-0-0	3	3
	Programming for Problem Solving	3-0-0	3	3
3	Basic Electrical Engineering	3-1-0	4	3
	Engineering physics	3-1-0	4	3
4	Engineering Mechanics	3-0-0	3	3
	English for Communication	3-0-0	3	2
5	Constitution of India	0-0-0	0	2
	Practical			3
6	Engineering Chemistry Lab	0-0-1	1	
	Engineering Physics Lab	0-0-1	1	4
7	Basic Electrical Engineering Lab	0-0-1	1	4
	Programming for Problem Solving Lab	0-0-2	2	4
8	Engineering Mechanics Lab	0-0-1	1	2
	Engineering Graphics& Design	0-0-2	2	4
9	Workshop Practices	0-0-2	2	2
	TOTAL	12-2-5	19	45

Subject: Engineering Physics

Code: BTE22010

4 Credits | Semester II

Total Lecture: 60 Total Tutorial: 12

A. Introduction:

- To acquire fundamental knowledge about nature and its phenomena including quantitative expression.
- To enhance intellectual, computational, experimental, communication and analytical skills of the students Physics is necessary to satisfy the basic sciences requirement, as appropriate for various engineering disciplines

B. Course Outcomes: At the end of the course, students will be able to

[CO1]	Identify and understand the kinds of experimental results which are incompatible with classical Physics leading to the development of a quantum theory of matter and light.
[CO2]	Use basic concepts to analyze and design a wide range of semiconductor devices.
[CO3]	Understand & solve different types of wave equations.
[CO4]	Use the principles of optics to solve various complex engineering problems.
[CO5]	Use fundamental laws and relations to solve problems in electricity, electromagnetism

C. SYLLABUS

QUANTUM MECHANICS: Introduction to Quantum Physics, black body radiation, Explanation using the photon concept, Photoelectric effect, Compton effect, Wave-particle duality, De-Broglie hypothesis, Heisenberg's Uncertainty principle. Born interpretation for wave function, Free-particle wave function and wave-packets, Time-dependent and time-independent Schrodinger equation, particle in a box, Finite Potential barrier and tunnelling.
ELECTRONIC MATERIALS AND SEMICONDUTOR: Free electron theory, Energy bands in solids, E-k diagram, Direct and indirect band gaps, Types of electronic materials: metals, semiconductors, and insulators, Density of states, Occupation probability, Fermi level, and Effective mass.Intrinsic and extrinsic semiconductors, Dependence of Fermi level on carrier- concentration and temperature, Carrier generation and recombination, Carrier transport: diffusion and drift, p-n junction,
WAVES AND OSCILLATION: Simple harmonic motion, damped and forced simple

harmonic oscillator Mechanical and electrical simple harmonic oscillators,damped harmonic oscillator – heavy, critical and light damping, energy decay in a damped harmonic oscillator, quality factor, forced mechanical and electrical oscillators, electrical and mechanical impedance, resonance.
OPTICS AND LASER: Introduction to interference, Analytical treatment of interference, Displacement of fringes, Thin film, Wedge shaped film, Newton's Ring,Concept of diffraction, Fraunhofer and Fresnel diffraction, Fraunhofer diffraction at single slit, double slit, and diffraction grating, Limit of Resolution, Resolving power of grating,Introduction to interaction of radiation with matter, Stimulated and spontaneous emission, Einstein's coefficient, principles and working of laser: population inversion, pumping, types of laser: He-Ne laser, Ruby laser , application of lasers.
ELECTROMAGNETISM: Electric field and electrostatic potential for a charge distribution; Laplace's and Poisson's equations for electrostatic potential and uniqueness of their solution. Boundary conditions of electric field and electrostatic potential,Bio-Savart law, vector potential and calculating it for a given magnetic field; the equation for the vector potential and its solution for given current densities. Faraday's law of electromagnetic induction, Equation of continuity, displacement current, Maxwell's equation, Poyting theorem, Electromagnetic waves in free space, conducting and non-conducting medium

D. TEXTBOOKS

1. Concept of Modern Physics by Arthur Beiser: Publication: TMH
2. Elements of electromagnetics by Mathew N.O. Sadiku: Publication: Oxford University Press.
3. Introduction to electrodynamics by David J. Griffiths; Pub.: Pearson Education.
4. Optics by Ajoy Ghatak Pub; TMH
5. Fundamentals of Physics extended volume by Resnick, Halliday and Walker; Pub John Wiley & Sons. Inc. Asian Edition.
6. P. Bhattacharya, Semiconductor Optoelectronic Devices, Prentice Hall of India (1997).

E. REFERENCE BOOKS

1. Modern Physics by G. Aruldhas & P. Rajagopal; Pub: Prentice Hall of India.
2. Quantum Physics by H.C. Verma Pub.: Surya Publication.

Subject: Engineering Mathematics –II

Code: BTE22008

4 Credits |Semester II

Total Lecture: 60 Total Tutorial: 12

A. Introduction:

- To familiarize the prospective engineers with techniques in multivariate integration, ordinary and partial differential equations and complex variables.
- To equip the students to deal with advanced level of mathematics and applications that would be essential for their disciplines
- To equip the students with standard concepts and tools at an intermediate to advanced level

B. Course Outcomes: At the end of the course,

[CO1]	Remember the mathematical tools needed in the multiple integrals and their usage.
[CO2]	Understand the effective mathematical tools for the solutions of differential equations that model physical processes.
[CO3]	Demonstrate the tools of differentiation and integration of functions of a complex variable that are used in various techniques dealing with engineering problems.
[CO4]	Calculate the analytic function**.**
[CO5]	Evaluate complex integrals by using the Cauchy-Goursat integral theorem.

C. **SYLLABUS**

MULTIVARIABLE CALCULUS (INTEGRATION): Multiple Integration: Double integrals (Cartesian), change of order of integration in double integrals, Change of variables (Cartesian to polar), Applications: areas and volumes, Center of mass and Gravity. Triple integrals (Cartesian), orthogonal curvilinear coordinates, Simple applications involving cubes, sphere and rectangular parallelepipeds, Scalar line integrals, vector line integrals, scalar surface integrals, vector surface integrals, Theorems of Green, Gauss and Stokes
FIRST ORDER ORDINARY DIFFERENTIAL EQUATIONS: Exact, linear and Bernoulli's equations, Euler's equations, Equations not of first degree: solvable for p, solvable for y Equations solvable for x and Clairaut's equation
ORDINARY DIFFERENTIAL EQUATIONS OF HIGHER: Second-order linear differential equations with variable coefficients, method of variation of parameters, Cauchy-Euler equation Power series solutions; Legendre polynomials, Bessel functions of the first kind and

their properties
COMPLEX VARIABLE – DIFFERENTIATION: Differentiation, Cauchy-Riemann equations, Analytic functions, harmonic functions, finding harmonic conjugate, Elementary analytic functions (exponential, trigonometric, logarithm) and their properties, Conformal mappings, Mobius transformations and their properties.
COMPLEX VARIABLE – INTEGRATION: Contour integrals, Cauchy-Goursat theorem (without proof), Cauchy Integral formula (without proof), Liouville's theorem and Maximum , Modulus theorem (without proof) Taylor's series, zeros of analytic functions, singularities, Series; Residues, Cauchy Residue theorem (without proof), Evaluation of definite integral involving sine and cosine, Evaluation of certain improper integrals using the Bromwich

D. TEXT BOOKS

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.

E. REFERENCE BOOKS

1. W. E. Boyce and R. C. DiPrima, Elementary Differential Equations and Boundary Value Problems, 9th Edn., Wiley India, 2009.
2. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010

Subject: Programming for Problem Solving

Code: BTE21259

3 Credits | Semester II

Total Lecture: 45 Total Tutorial: 9

A. Introduction:

- To understand concept of algorithm and programming
- To know various logical components and
- Syntax used in programming
- To learn different ways of transforming a real-world problem into a system problem

B. Course Outcomes: At the end of the course, students will be able to

[CO1]	Formulate simple algorithms for arithmetic and logical problems.
[CO2]	Test and execute the programs and correct syntax and logical errors and to implement conditional branching, iteration and recursion
[CO3]	Apply programming to solve matrix addition and multiplication problems and searching and sorting problems.
[CO4]	Use arrays, pointers and structures to formulate algorithms and programs
[CO5]	Decompose a problem into functions and synthesize a complete program using divide and conquer approach

C. SYLLABUS

FUNDAMENTALS OF INFORMATION TECHNOLOGY: Evolution of Computers, Generation and Classification of Computers Application of Computers, etc**.** Memory Hierarchy, RAM, ROM, Types of Secondary Storage Devices, etc.Information, Technology, Role of Information Technology, Information Technology and Internet and etc. **Introduction**, Evolution of the Internet, Basic Internet Terms, Getting Connected to the Internet, Internet Applications, Data over t h e Internet, Web Browser, Browsing Internet Using Internet Explorer, E-mail, search Engines, Instant Messaging. E-Commerce, Electronic Data Interchange, Smart Cards, Mobile Communication etc.
C FUNDAMENTALS, DECISION & LOOPING STATEMENTS: The C language. Phases of developing a running computer program in C. Data Concepts in C: Constants, Variables, Expressions, Operators, and Operator precedence in C. Different basic data types and their sizes. Managing input and output statements and sequential control statements. Decision-making statements (If-Else constructs). Loop control statements (While construct, Do While construct, For

construct)
ARRAYS, STRINGS &FUNCTIONS: One-dimensional Arrays: Declaration and Initialization. String variables, Reading and writing strings, Arithmetic operations on characters, Putting strings together, Comparison of two strings. Functions: The prototype declaration, Function definition. Function call: Passing arguments to a function (by value, by reference). Scope of variables. Recursive function calls, Tail recursion, Tree of recursion. Sorting problems: Selection sort, Insertion sort. Sorting in multidimensional arrays. Sorting in arrays. Search problems: Linear search and binary search. Recursive and iterative formulations.
POINTERS &STRUCTURE: Pointers: Declaring and dereferencing pointer variables. Pointer arithmetic. Accessing arrays through pointers. Pointer types, Pointer and strings. Structures in C: Motivation, examples, declaration, and use. Operations on structures. Passing structures as function arguments. Type defining structures.
LINKED LISTS & FILE HANDLING: Self-referential structures, Dynamic data structures, Linked lists with examples. File operations in C: Input, output, and error streams. Opening, closing, and reading from files. Searching through files using functions such as fseek (), ftell (), and rewind(). Programming for command line arguments

D. TEXTBOOKS

1. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill.
2. E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill.

E. REFERENCE BOOKS

1. Let us C, Yashwant Kanetkar, BPI publications
2. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India

English for Communication

Code: BTE22370

3 Credits | Semester II

Total Lecture: 45 Total Tutorial: 9

A. Introduction:

- To impart basic skills of Communication in English through intensive practice.
- Students of Engineering to enable them to enhance their communicative knowledge and soft skills.

B. Course Outcomes: At the end of the course, students will be able to

[CO1]	Understanding the basics of communication represents the communication process and knowing the practical implementations in the workplace.
[CO2]	Understand verbal and non-verbal modes of communication effectively in practical situations
[CO3]	Analyze vocalics and basic grammar.
[CO4]	Create competence in reading and writing.
[CO5]	Evaluate the speaking process.

C. SYLLABUS

VOCABULARY BUILDING: 'Ancient Architecture in India' from prescribed textbook 'English for Engineers published by Cambridge University. Vocabulary: Synonyms and Antonyms Lexical set of words- Formation of hints with lexical set of words- Usage of Lexical sets in framing meaningful sentences. Standard Abbreviation in English.

IDENTIFYING COMMON ERRORS IN WRITING: Subject-verb agreement, Noun-pronoun agreement, Misplaced modifiers, Articles, Prepositions, Redundancies, Clichés

SELF DEVELOPMENT AND ASSESSMENT: Self-assessment, Awareness, Perception and Attitudes, Values and belief, Personal goal setting, career planning Self-esteem. Managing Time; Personal memory, Rapid reading,

ORAL COMMUNICATION : Public speaking, Group discussion, Oral; presentation, Interviews, Graphic presentation, Presentation aids, Personality Development Writing reports, project proposals, brochures, newsletters, technical articles, manuals, official notes, business letters, memos, progress reports, minutes of meetings, event report.

NATURE AND STYLE OF SENSIBLE WRITING: Business letters: Enquiry/claim complaint and order. Technical reports, Email writing, Technical articles, Writing reports, Paragraph writing, Techniques for writing precisely. Graphic presentation, Project proposals.

D. TEXTBOOKS

1. David F. Beer and David Mc Murrey, Guide to writing as an Engineer, John Willey. New York, 2004
2. Diane Hacker, Pocket Style Manual, Bedford Publication, New York, 2003. (ISBN 0312406843)
3. Shiv Khera, You Can Win, Macmillan Books, New York, 2003.
4. Raman Sharma, Technical Communications, Oxford Publication, London, 2004.
5. Dale Jungk, Applied Writing for Technicians, McGraw Hill, New York, 2004. (ISBN: 07828357-4)
6. Sharma, R. and Mohan, K. Business Correspondence and Report Writing, TMH New Delhi 2002.
7. Xebec, Presentation Book, TMH New Delhi, 2000.
8. English for Engineers, Cambridge university.

E. REFERENCE BOOKS

1. Practical English Usage. Michael Swan. OUP. 1995.
2. Remedial English Grammar. F.T. Wood. Macmillan.2007
3. On Writing Well. William Zinsser. Harper Resource Book. 2001 R4. AICTE Modal

Subject: Constitution of India

Code: BTE25095

0 Credits | Semester II

Total Lecture: 30 Total Tutorial: 6

A. Introduction:

- The objective of the Constitution of India is to establish a society where there are:
- Justice social, economic and political.
- Liberty - thought, expression, faith, belief and worship

B. Course Outcomes: At the end of the course, students will be able to

[CO1]	Understand the emergence and evolution of the Indian Constitution. Understand and analyse federalism in the Indian context
[CO2]	Understand and explain the significance of the Indian Constitution as the fundamental law of the land.
[CO3]	Exercise his fundamental rights in the proper sense at the same time identify his responsibilities in national building.
[CO4]	Analyse the Indian political system, the powers and functions of the Union, State and Local Governments in detail
[CO5]	Understand the Electoral Process, Emergency provisions and Amendment procedure.

C. SYLLABUS

INTRODUCTION: Constitution' meaning of the term, Indian Constitution: Sources and constitutional history, Features: Citizenship, Preamble, Fundamental Rights and Duties, Directive Principles of State Policy

UNION GOVERNMENT AND ITS ADMINISTRATION: Structure of the Indian Union: Federalism Centre-State relationship President: Role, power and position, PM and Council of ministers, Cabinet and Central Secretariat Lok Sabha, Rajya Sabha

STATE GOVERNMENT AND ITS ADMINISTRATION: Governor: Role and Position, CM and Council of Ministers State Secretariat: Organization, Structure and Functions.

LOCAL ADMINISTRATION: District's Administration head: Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation Panchayati raj: Introduction, PRI: Zila Panchayat, Elected officials and their roles, CEO Zila Panchayat: Position and role, Block level: Organizational Hierarchy (Different

departments), Village level: Role of Elected and Appointed Officials, Importance of grass root democracy

ELECTION COMMISSION: Election Commission: Role and Functioning, Chief Election Commissioner and Election Commissioners State Election Commission: Role and Functioning, Institute and Bodies for the welfare of SC/ST/OBC and women

D. TEXTBOOKS

1. Indian Polity' by Laxmikanth
2. Indian Administration' by Subhash Kashyap

E. REFERENCE BOOKS

1. Indian Constitution' by D.D. Basu
2. Indian Administration' by Avasti and Avastin

Subject: Engineering Physics Lab

Code: BTE21261

Credits | Semester II

Total Lecture: 30

A. Introduction:

- To study the use of physical principles and analysis in various fields of engineering and technology.
- To supplement the theoretical knowledge gained in the lecture by hands-on experience with the equipment.
- This will develop a scientific temper and help to apply the basic concepts and principles in solving engineering problems.
- Demonstrate an ability to make physical measurements & understand the limits of precision measurement.

B. Course Outcomes: At the end of the course, students will be able to

[CO1]	Understand the calculation of specific resistance of wire by Carey Foster bridge
[CO2]	Calculate the thermal conductivity of poor conductors
[CO3]	Measure resonance frequency and quality factor of LCR Circuit & RC circuit with AC current
[CO4]	Understand the characteristics of transistors, and photoelectric cells and determine operational parameters associated with their performance.
[CO5]	Work with laboratory sodium light and lasers. Understand the method to measure the wavelength of the light emitted from a laser and Sodium light.

C. SYLLABUS

S. No.:	Name of Experiments
1	To determine the Planck's constant using LED.
2	To study various types of losses that occur in optical fibers and measure loss in dB of two optical patch cords
3	To study the series and parallel resonance with LCR Circuits
4	To determine V-I Characteristics of P-N Junction Diode
5	To the Charge to mass (e/m) ratio of Electron by Lorentz Force Apparatus
7	To determine the number of lines per centimetre of the plane diffraction grating by using sodium light
8	To find the wavelength of sodium light using Fresnel's biprism
9	To determine input & output characteristics of a PNP Junction Transistor in CE and CB configuration.

10	To determine input & output characteristics of an NPN Junction Transistor in CE and CB configuration.

D. TEXT BOOKS

1. A Text Book of Engineering Physics Practical by Dr. Ruby Das, C.S. Robinson, Dr. Rajesh Kumar & Prashant Kumar Sahu; Pub University Science Press
2. Fundamentals of Physics extended volume by Resnick, Halliday and Walker; Pub John Wiley & Sons. Inc. Asian Edition.

E. **REFERENCE BOOKS:**

1. Advanced level Physics Practical, Michael Nelson and Jon M. Ogborn, Heinemann Educational Publishers.
2. Engineering Practical Physics, S. Panigrahi & B. Mallick,2015, Cengage Learning India Pvt. Ltd.

Subject: Programming for Problem Solving Lab

Code: BTE21262

Credits- 2 | Semester II

Total Lecture: 60

A. Introduction:

- To work with an IDE to create, edit, compile, run and debug programs
- To analyze the various steps in program development.
- To develop programs to solve basic problems by understanding basic concepts in C like operators, control statements etc.

B. Course Outcomes: At the end of the course, students will be able

[CO1]	**F**ormulate simple algorithms for arithmetic and logical problems. To translate the algorithms to programs (in C language).To test and execute the programs and correct syntax and logical errors.
[CO2]	Program for solving simple numerical method problems, namely rot finding of function, differentiation of function and simple integration.
[CO3]	Decompose a problem into functions and synthesize a complete program using divide and conquer approach.
[CO4]	Analyze the complexity of problems, modularize the problems into small modules and then convert them into programs.

C. SYLLABUS

S. No.:	**Name of Experiments**
1	Write a C program to find sum and average of three numbers. Write a C program to find the sum of individual digits of a given positive integer
2	Write a C program to generate the first n terms of the Fibonacci sequence Write a C program to generate prime numbers between 1 to n. Write a C program to check if the given number is Armstrong or not
3	Write a C program to check whether the given number is perfect or not Write a C program to check whether the given number is strong or not.
4	Write a C program to find the roots of a quadratic equation. Write a C program to perform arithmetic operations using a switch statement.

5	Write a C program to find the factorial of a given integer using a non-recursive function Write a C program to find the factorial of a given integer using a recursive function
6	Write a C program to find the GCD of two integers by using a recursive function. Write a C program to find the GCD of two integers by using a non-recursive function
7	Write a C program to find the largest and smallest number in a list of integers. Write a C program to Sort the Array in an Ascending Order. Write a C program to find whether the given matrix is symmetric or not.
8	Write a C program to perform the addition of two matrices. Write a C program using the function to perform the multiplication of two matrices.
9	Write a C program to use the function to insert a sub-string in to given main string from a given position. Write a C program to swap the values of two variables using (i) Call by value (ii) Call by reference
10	Write a C program using user-defined functions to determine whether the given string is palindrome or not. Write a C program that displays the position or index in the main string S where the substring T begins, or - 1 if S doesn't contain T
11	Write a C program to count the number of lines, words and characters in a given text. Write a C program to find the sum of integer array elements using pointers
12	a) Write a C Program to Calculate Total and Percentage marks of a student using structure

D. TEXTBOOKS

1. C Programming and Data Structures, P. Padmanabham, Third Edition, BS Publications
2. Computer programming in C.V. Rajaraman, PHI Publishers.
3. C Programming, E. Balagurusamy, 3rd edition, TMH Publishers.

E. REFERENCE BOOKS

1. C Programming, M.V.S.S. N Venkateswarlu and E. V. Prasad, S. Chand Publishers.
2. Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publishers.

Subject: Engineering Workshop Practice

Code: BTE22267

Credits | Semester II

Total Lecture: 60

A. Introduction:

- To understand basic engineering processes for manufacturing and assembly
- To understand, identify, select and use various marking, measuring, holding, striking and cutting tools and equipment
- To understand and interpret job drawings, produce jobs, and inspect the job for specified dimensions.

B. **Course Outcomes:** At the end of the course, students will be able to

[CO1]	Acquire skills in basic engineering practice to identify, select and use various marking, measuring, and holding, striking and cutting tools & equipment and machines
[CO2]	Understand job drawing and complete jobs as per specifications in the allotted time
[CO3]	Inspect the job for the desired dimensions and shape
[**CO4**]	Operate, and control different machines and equipment adopting safety practices

C. SYLLABUS

S. No.:	**Name of Experiments**
1	To make a V- fitting from the given two M.S pieces.
2	To make a T- lap joint
3	To Make a tray by using GI sheet as per given Drawing
4	To make a Butt joint using the given two M.S pieces by arc welding.
5	To make the taper turning operation in cylindrical piece of required angle on lathe machine.
6	To make an internal thread using tap M10x1.5
7	Machining a block on shaper machine.
8	To make a step turning operation on cylindrical M.S. work piece using lathe machine.

D. TEXTBOOKS

1. Workshop Technology Vol-I, II, III Hajra Choudry., Media Promotors and Publishers P Ltd.
2. Manufacturing Technology vol 1 by P.N. Rao Mc. Grow Hill.

E. REFERENCE BOOKS

1. Workshop technology by R.S. Raghuwanshi. Dhanpat Ray & co
2. Workshop technology by R.S. Khurmi &J. K. Gupta S. Chand Co.