

**B.Tech Computer Science & Engineering**  
(Batch 2020 Onwards)

**Semester: 2<sup>nd</sup>**

<b>S.No.</b>	<b>Course Code</b>	<b>Course Title</b>	<b>Credits</b>
01	BT 201	Mathematics II	4
02	BT 204	Basic Electrical Engineering	4
03	BT 205	Engineering Mechanics	3
04	BT 208 L	Basic Electrical Engineering Lab	1
05	BT 209	Business Communication & Presentation Skills	2
06	BT 210	Biology	4
07	BT 211	Object Oriented Programming	4
08	BT 212 L	Object Oriented Programming Lab	2
<b>Total Credits</b>			<b>24</b>

**Class : B. Tech 2<sup>nd</sup> Semester**  
**Branch: CSE**  
**Course Title: Mathematics II**  
**Course Code: BT 201**

<b>L</b>	<b>T</b>	<b>P</b>
<b>4</b>	<b>0</b>	<b>0</b>

### **Detailed Syllabus**

#### **Unit 1:**

Differential Equations – Differential equations of higher order, existence and uniqueness of solutions, general linear differential equation of order n, linear operators, fundamental theorem on linear differential equations, General solutions with constant coefficients (Distinct real roots and repeated real roots) and Initial Value Problem.

#### **Unit 2:**

Integral Calculus - Differentiation under the sign of integration. Double and triple integrals, change of order of integration, change of variables.

#### **Unit 3:**

Matrices - Introduction, Orthogonal and unitary matrices. Triangular matrices, symmetric and skew-symmetric matrices, singular matrices, rank of a matrix (normal form and triangular form), equivalent matrices, elementary transformations, Partitioning of Matrices.

#### **Unit 4:**

Inverse of a matrix, solution of simultaneous equations by elementary operations, Cramer's rule, normal form, Caley-Hamilton Theorem, Secular Equation, Eigen values and Eigen vectors of a matrix.

#### **References:**

1. Advanced Engineering Mathematics by E.Kreyzig.
2. Advanced Engineering Mathematics by H.K. Dass.
3. Ordinary and partial Differential equation, M.D.Raisingania, S.Chand.
4. Linear Algebra,Hoffmann&Kunze, Prentice-Hall.
5. Integral Calculus by Shanty Narayan.
6. Integral Calculus by Chopra and Kochher

#### **Learning Outcomes:**

At the end of the course the student will be able to:

- To acquire basic knowledge of differential calculus, Ordinary differential Equations and apply them to various Engineering Problems.
- To Acquire knowledge of Matrices, Eigen Values and apply them to various Engineering Problems

**Class : B. Tech 2<sup>nd</sup> Semester**  
**Branch: CSE**  
**Course Title: Basic Electrical Engineering**  
**Course Code: BT 204**

<b>L</b>	<b>T</b>	<b>P</b>
<b>4</b>	<b>0</b>	<b>0</b>

## **Detailed Syllabus**

### **Course Objective:**

To acquaint the students with the behavior of electric circuits with different excitations and to learn different techniques of AC and DC circuit analysis

### **Unit 1**

Electric Circuit Laws: Basic electric circuit terminology, Ohm's law, Kirchhoff's current law (KCL) and Kirchhoff's voltage law (KVL) circuit parameters (Resistance, Inductance and capacitance). Series and Parallel combinations of resistance, Inductance and capacitance, Meshloop Analysis, Nodal analysis.

### **Unit 2**

Energy Source: Ideal and practical voltage and current sources and their transformation. Dependent Sources: Dependent voltage sources and dependent current sources.

### **Unit 3**

D.C. Circuit Analysis: Power and energy relations, Analysis of series parallel d.c. circuits, Delta star (Y) Transformation, Loop and Nodal methods, Thevenin's, Norton's theorem, Maximum Power transfer theorem, Superposition theorem.

### **Unit 4**

A.C. Circuit Analysis: Basic terminology and definitions, Phasor and complex number representations, solutions of sinusoidal excited, RC circuits, power and energy relations in a c circuits, Applications of network theorems to a.c. circuits, Resonance in series and parallel circuits. Magnetically Coupled Circuits: Mutual inductance, Theory of magnetic circuits and electromagnetism. Transformers.

### **References:**

1. Toro V. Del, Principles of Electrical Engineering, Prentice- Hall International.
2. Hayt W.H. & J.E. Kemmerly, Engineering Circuit Analysis, McGraw Hill.
3. Electrical Technology by B.L Theraja, S.Chand group
4. Nagrath I.J., Basic Electrical Engineering, Tata cGraw Hill.
5. Fitzgerald A.E., D.E., Higginbotham &AGrabel, Basic Electrical Engineering, McGraw Hill.
6. Cotton H., Advanced Electrical Technology, Wheeler Publishing.
7. Electrical Engineering by Rizzoni.

8. Kothari D P and Nagrath I J, “Basic Electrical Engineering”, Tata McGraw Hill, New Delhi (1996).

9. Electrical Machines. By Bhattacharya.

**Learning Outcomes:**

At the end of the course student will be able to:

- To understand the basics about electrical circuits and the laws governing thereof.
- To understand the energy sources and their classification
- To understand the DC Circuit Laws
- To understand the AC Circuit Laws

**Class : B. Tech 2<sup>nd</sup> Semester**  
**Branch: CSE**  
**Course Title: Engineering Mechanics**  
**Course Code: BT 205**

<b>L</b>	<b>T</b>	<b>P</b>
<b>3</b>	<b>0</b>	<b>0</b>

### **Detailed Syllabus**

#### **Course Objective:**

The objective of this course is to provide an introductory treatment of engineering Mechanics to all the students of engineering, with a view to prepare a good foundation for taking up advance course in the area in the subsequent semesters.

**Unit 1:** Introduction Engineering Mechanics, Applications, Definition, Stress, Strain, Tensile and Compressive Stress, Shear Stress, Elastic Limit, Hook's Law, Poission's Ratio, Modulus of Elasticity, Modulus of rigidity, Bulk Modulus, Bar of uniform Strength, Temperature Stress, volumetric Strain.

**Unit 2:** Strain Energy, Elastic, Plastic and Rigid Members, Stress due to different types of axial loading, Gradually applied Loads, Suddenly applied loads, Impact load. Riveted Connections, Types of joints-Lap joint and Butt joint, Tearing Strength, Shearing Strength, Bearing Strength, Efficiency of Joint.

**Unit 3:** Center of Gravity, Lamina, Centroid of Uniform Lamina, Centroid of Various Shapes, Triangle, circle, Trapezium, Welding Connections, Process of Welding, Advantages of Welding Connection, Disadvantages of Welding Connections, Process of Soldering, Need of Soldering.

**Unit 4:** Introduction to Beams & Need, Cantilever, Simply Supported Beam, Fixed Beam, Continuous Beam, Generalization of Shear force and Bending Moment. Analysis of Framed Structure, perfect Frame, Deficient Frame, Analysis of Truss, Method of Joints.

#### **References:**

1. Khurmi RS(2015), Engineering Mechanics, S. Chand & Co.
2. Ramamurtham(2014) Strength of Materials, Dhanpat Rai Publishing Company.
3. Shanes & Rao (2006), Engeneering Mechanics, Pearson Edu.
4. Tayal A.K (2010), Engineering Mechanics, Umesh Publication.

#### **Learning Outcomes:**

At the end of the course student will be able to:

- To understand the basics about strength of different materials
- To understand about the several types of joints and their strength
- To Understand about the COG
- To understand about the welding connections and soldering

**Class : B. Tech 2<sup>nd</sup> Semester**  
**Branch: CSE**  
**Course Title: Basic Electrical Engineering Lab**  
**Course Code: BT 208 L**

<b>L</b>	<b>T</b>	<b>P</b>
<b>0</b>	<b>0</b>	<b>2</b>

### **List of practical's**

- Color Coding of resistors
- Working of multimeter
- Current division
- Voltage division
- Kirchoff's current law
- Kirchoff's voltage Law
- Simplification of a circuit
- Star-delta transformations
- Verification of Norton's Theorem
- Verification of Thevenians Theorem
- Superposition theorem

### **Learning Outcomes:**

Upon successful completion of the course , student should be able to:

- Analyze the behavior of different electric circuit parameters and have a thorough understanding of different types of energy sources.
- Analyze the different configurations of DC circuits using basic circuit laws like KVL, KCL and tools like mesh analysis and nodal analysis.

**Class : B. Tech 2<sup>nd</sup> Semester**  
**Branch: CSE**  
**Course Title: Business and Communication Skills**  
**Course Code: BT 209**

<b>L</b>	<b>T</b>	<b>P</b>
<b>2</b>	<b>0</b>	<b>0</b>

### **Detailed Syllabus**

#### **Course Objectives:**

The course aims to help the students do the following:

1. Improve reading comprehension skills through intensive and extensive reading
2. Summarize and paraphrase information in a text
3. Identify author's purpose and tone
4. Recognize and rectify common errors in grammar
5. Use punctuation to the best purpose
6. Make use of modals and active and passive voice appropriately
7. Learn the norms of academic and research writing
8. Learn the steps in report writing, along with the types and outline of reports
9. Get acquainted with the APA and MLA referencing styles

#### **Unit 1**

Role of communication in information age; concept and meaning of communication; skills necessary for technical communication; Communications in a technical organization; Listening, speaking, reading and writing as skills. Objectivity, clarity, precision as defining features of technical communication; Various types of business writing: Letters, reports, notes, memos; Language and format of various types of business letters.

#### **Unit 2**

Oral Presentation and professional speaking: Basics of English pronunciation; Elements of effective presentation; Body Language and use of voice during presentation; Connecting with the audience during presentation; Projecting a positive image while speaking; Planning and preparing a model presentation; Organizing the presentation to suit the audience and context; Basics of public speaking; Preparing for a speech

#### **Unit 3**

Career Oriented Communication: Resume and biodata: Design & style; Applying for a job: Language and format of job application. Job Interviews: purpose and process; How to prepare for interviews; Language and style to be used in interview; Types of interview questions and how to answer them;

#### **References:**

1. Fred Luthans, Organizational Behaviour, McGraw Hill
2. Lesikar and petit, Report writing for Business
3. M. Ashraf Rizvi, Effective Technical Communication, McGraw Hill
4. Wallace and masters, Personal Development for Life and Work, Thomson Learning
5. Hartman Lemay, Presentation Success, Thomson Learning
6. Malcolm Goodale, Professional Presentations
7. Farhathullah, T. M. Communication skills for Technical Students
8. Michael Muckian, John Woods, The Business letters Handbook

9. Herta A. Murphy, Effective Business Communication

10. MLA Handbook for Writers of Research Papers

**Learning Outcomes:**

At the end of the course student will be able to:

- Distinguish main idea(s) from supporting details and distinguish fact from opinion
- Identify author's purpose and tone
- Summarize and paraphrase information in a text
- Write a professional email
- Write a job cover letter
- Write a résumé with its essential elements
- Write a project proposal with its essential elements.
- Greet others, introduce him/herself, and initiate small talks fluently and confidently.
- Express opinions and effectively show agreement and disagreement with the opinions of others.
- Participate and be sufficiently understood in group discussions
- Prepare for interviews by demonstrating learning and verbal and non-verbal communication skills during mock interview



**Class : B. Tech 2<sup>nd</sup> Semester**  
**Branch: CSE**  
**Course Title: Biology**  
**Course Code: BT 210**

<b>L</b>	<b>T</b>	<b>P</b>
<b>4</b>	<b>0</b>	<b>0</b>

### **Detailed Syllabus**

#### **Unit 1**

Introduction Science and Engineering, Biology, Applications of Biology, Biological Classification, Kingdom Monera, Kingdom Protista, Kingdom Fungi, Kingdom Plantae, Kingdom Animalia , Viruses

#### **Unit 2**

Cell: The Basic Unit of Life What is a Cell?, Basic Properties of Cells , An Overview of Cell , Prokaryotic Cells, Eukaryotic Cells , Cell Cycle and Cell Division, M Phase , Meiosis , Cell Differentiation

#### **Unit 3**

Biochemistry and Molecular Analysis Chemical Composition of Living Forms, Analysis of Chemical Composition, Carbohydrates, Amino acids and Proteins , Nucleic Acids , Lipids , Nature of Bonding and Qualitative Tests

#### **Unit 4**

Genetics Mendelian Law, Mendel's Laws of Inheritance, Gene Interaction , Multiple Alleles , Chromosomal , Theory of Inheritance, Linkage , Recombination (Crossing Over) , Chromosome Mapping , Genetic Disorders.

#### **Learning Outcomes:**

At the end of the course student will be able to:

- Understand the Biological classification of Several Kingdoms.
- To understand the basic properties of several types of cells
- To understand the basic chemical composition of living farms
- To understand the basic concepts of Genetics

Class : B. Tech 2<sup>nd</sup> Semester  
Branch: CSE  
Course Title: Object Oriented Programming  
Course Code: BT 211

L	T	P
4	0	0

### Detailed Syllabus

#### Course Outcomes:

- To explore the principles of Object Oriented Programming (OOP).
- To understand object-oriented concepts such as data abstraction, encapsulation, inheritance, dynamic binding, and polymorphism.
- To use the object-oriented paradigm in program design.
- To lay a foundation for advanced programming.
- Provide programming insight using OOP constructs

#### **Unit I:**

**Classes and Objects:** Need of Object-Oriented Programming (OOP), Object Oriented Programming Paradigm, Basic Concepts of Object-Oriented Programming, Benefits of OOP, C++ as object oriented programming language. C++ Programming- C++ programming Basics, Data Types, Structures, Enumerations, control structures, Arrays and Strings, Class, Object, class and data abstraction, class scope and accessing class members, separating interface from implementation, controlling access to members. Functions- Function, function prototype, accessing function and utility function, Constructors and destructors, Copy Constructor, Objects and Memory requirements, Static Class members, data abstraction and information hiding, inline function.

#### **Unit II:**

**Polymorphism and Inheritance:** Operator Overloading- concept of overloading, operator overloading, Overloading Unary Operators, Overloading Binary Operators, Data Conversion, Type casting (implicit and explicit), Pitfalls of Operator Overloading and Conversion, Keywords explicit and mutable. Inheritance- Base Class and derived Class, protected members, relationship between base Class and derived Class, Constructor and destructor in Derived Class, Overriding Member Functions, Class Hierarchies, Inheritance, Public and Private Inheritance, Levels of Inheritance, Multiple Inheritance, Ambiguity in Multiple Inheritance, Aggregation, Classes Within Classes. Polymorphism- concept, relationship among objects in inheritance hierarchy, abstract classes, polymorphism.

#### **Unit III:**

**Virtual Functions:** Virtual Functions- Pointers- indirection Operators, Memory Management: new and delete, Pointers to Objects, A Linked List Example, accessing Arrays using pointers, Function pointers, Pointers to Pointers, A Parsing Example, Debugging Pointers, Dynamic Pointers, smart pointers, shared pointers, Case Study : Design of Horse Race Simulation. Virtual Function- Friend Functions, Static Functions, Assignment and Copy Initialization, this Pointer, virtual function, dynamic binding, Virtual destructor.

## **Unit IV:**

**Templates and Exception handling:** Templates- function templates, Function overloading, overloading Function templates, class templates, class template and Non-type parameters, template and inheritance, template and friends Generic Functions, Applying Generic Function, Generic Classes, The typename and export keywords, The Power of Templates. Exception Handling- Fundamentals, other error handling techniques, simple exception handling Divide by Zero, rethrowing an exception, exception specifications, processing unexpected exceptions, stack unwinding, constructor, destructor and exception handling, exception and inheritance.

**Files and Streams:** Data hierarchy, Stream and files, Stream Classes, Stream Errors, Disk File I/O with Streams, File Pointers, and Error Handling in File I/O, File I/O with Member Functions, Overloading the Extraction and Insertion Operators, memory as a Stream Object, Command-Line Arguments, Printer output, Early vs. Late Binding.

**Standard Template Library:** Standard Template Library, Overview of Standard Template Library, Containers, Algorithms, Iterators, Other STL Elements, Container Classes, General Theory of Operation, Vectors.

### **References:**

- Robert Lafore, “Object Oriented Programming in Turbo C++”, Galgotia Publications,
- Balagurusamy, “Object Oriented programming with C++”, Tata McGraw Hill.
- Bjarne Stroustrup, “The C++ programming Language”, Addison Wesley,
- Booch, “Object Oriented Analysis and Design with Applications, Addison Wesley
- Chair H. Pappas & William H. Murray, “The Complete Reference Visual C++”, TMH.

### **Learning Outcomes:**

On completion of the course, student will be able to:

- Analyze the strengths of object oriented programming
- Design and apply OOP principles for effective programming
- Develop programming application using object oriented programming language C++
- Percept the utility and applicability of OOP.

Class : B. Tech 2<sup>nd</sup> Semester  
Branch: CSE  
Course Title: Object Oriented Programming Lab  
Course Code: BT 212 L

<b>L</b>	<b>T</b>	<b>P</b>
<b>0</b>	<b>0</b>	<b>4</b>

### Detailed Syllabus of Practical's

#### Course Objectives:

- The student should be able to explain the fundamental properties of the C++ language.
- The student should be able to combine the elements of the C++ language in developing structured programs.
- The student should be able to demonstrate the skills necessary to correctly compile, debug, and test programs in C++.

#### List of Practical's:

<b>Unit</b>	<b>Topics</b>
1.	Function overloading and default arguments in C++
2.	Simple class design in C++, namespaces, object creation
3.	Class design in C++ using dynamic memory allocation
4.	Constructors and destructors
5.	Operator overloading and friend functions
6.	Overloading assignment operator and type conversions
7.	Inheritance, run time polymorphism and virtual functions
8.	Template design in C++
9.	Interface and abstract classes
10.	Exception handling
11.	File handling in C++

#### Learning Outcomes:

At the end of the course student will be able to:

- Apply C++ features to program design and implementation
- Explain object-oriented concepts and describe how they are supported by C++
- Use C++ to demonstrate practical experience in developing object-oriented solutions
- Analyse a problem description and design and build object-oriented software using good coding practices and techniques
- Use common software patterns in object-oriented design and recognise their applicability to other software development contexts.