Semester –III							
Course Code	**Category**	**Course Title**	**Hours / Week**			**Credits**	**Total Contact Hours/ Week**
			L	T	P	C	
A30506	PCC	Discrete Mathematics	3	0	0	3	3
A30007	BSC	Numerical Techniques &ProbabilityDistributions	3	1	0	4	4
A30513	PCC	Computer Organization & Architecture	3	1	0	4	4
A36201	PCC	Object Oriented Programming	3	0	0	3	3
A30228	ESC	Basic Electrical Engineering	3	0	0	3	3
A30229	ESC	Basic Electrical Engineering Lab	0	0	3	1.5	3
A36202	PCC	JAVA Lab	0	0	3	1.5	3
A30021	HSMC	Social Innovation in Practice	0	0	2	1	2
A30015	MC	Soft Skills & Professional Ethics	0	0	2	0	2
Total			**15**	**2**	**10**	**21**	**27**

Semester –IV							
Course Code	**Category**	**Course Title**	**Hours / Week**			**Credits**	**Total Contact Hours/ Week**
			L	T	P	C	
A36601	PCC	Machine Learning	3	1	0	4	4
A30511	PCC	Design & Analysis of Algorithms	3	1	0	4	4
A30516	PCC	Operating Systems	3	0	0	3	3
A30509	PCC	Database Management Systems	3	1	0	4	4
A30510	PCC	Database Management Systems Lab	0	0	3	1.5	3
A36602	PCC	Machine Learning Lab	0	0	4	2	4
A30517	PCC	Operating Systems Lab	0	0	3	1.5	3
A30016	MC	Gender Sensitization	0	0	2	0	2
A30022	MC	NCC/NSS	0	0	2	0	2
Total			**12**	**3**	**14**	**20**	**29**
Total Credits I year: 41							

(A30506) DISCRETE MATHEMATICS

B. Tech (CSE-AIML) III Semester

L	T	P	C
3	0	0	3

Unit-I

Sets, Relations and Functions: Operations and Laws of Sets, Cartesian Products, Binary Relation, Partial Ordering Relation, Equivalence Relation, Image of a Set, Sum and Product of Functions, Bijective functions, Inverse and Composite Function, Size of a Set, Finite and infinite Sets, Countable and uncountable Sets, Cantor's diagonal argument and The Power Set theorem, Schroeder-Bernstein theorem.

Unit-II

Principles of Mathematical Induction: The Well-Ordering Principle, Recursive definition, The Division algorithm: Prime Numbers, The Greatest Common Divisor: Euclidean Algorithm, The Fundamental Theorem of Arithmetic. Basic counting techniques-inclusion and exclusion, pigeon-hole principle, permutation and combination.

Unit-III

Propositional Logic: Syntax, Semantics, Validity and Satisfiability, Basic Connectives and Truth Tables, Logical Equivalence: The Laws of Logic, Logical Implication, Rules of Inference, The use of Quantifiers. Proof Techniques: Some Terminology, Proof Methods and Strategies, Forward Proof, Proof by Contradiction, Proof by Contraposition, Proof of Necessity and Sufficiency.

Unit-IV

Algebraic Structures and Morphism: Algebraic Structures with one Binary Operation, Semi Groups, Monoids, Groups, Congruence Relation and Quotient Structures, Free and Cyclic Monoids and Groups, Permutation Groups, Substructures, Normal Subgroups, Algebraic Structures with two Binary Operation, Rings, Integral Domain and Fields. Boolean Algebra and Boolean Ring, Identities of Boolean Algebra, Duality, Representation of Boolean Function, Disjunctive and Conjunctive Normal Form

Unit-V

Graphs and Trees: Graphs and their properties, Degree, Connectivity, Path, Cycle, Sub Graph, Isomorphism, Eulerian and Hamiltonian Walks, Graph Coloring, Coloring maps and Planar Graphs, Coloring Vertices, Coloring Edges, List Coloring, Perfect Graph, definition properties and Example, rooted trees, trees and sorting, weighted trees and prefix codes, Bi-connected component and Articulation Points, Shortest distances.

Text books:

1. Kenneth H. Rosen, Discrete Mathematics and its Applications, 7th Edition, Tata McGraw – Hill
2. Susanna S. Epp, Discrete Mathematics with Applications,4th edition, Wadsworth
Publishing Co. Inc.
3. C L Liu and D P Mohapatra, Elements of Discrete Mathematics A Computer OrientedApproach, 3rd Edition by, Tata McGraw – Hill.

Reference books:

1. J.P. Tremblay and R. Manohar, Discrete Mathematical Structure and It's Application toComputer Science", TMG Edition, TataMcgraw-Hill
2. Norman L. Biggs, Discrete Mathematics, 2nd Edition, Oxford University Press. Schaum's Outlines Series, Seymour Lipschutz, Marc Lipson,
3. Discrete Mathematics, Tata McGraw – Hill

Course Outcomes

On completion of the course students will be able to

1. Identify various types of Sets, Relations and Functions.
2. Apply Principle of Inclusion and Exclusion technique.
3. Describe various methods of Proving a logical statement.
4. Classify various Algebraic Structures.
5. State the properties of Graphs & Trees.

****END****

(A30007) NUMERICAL TECHNIQUES & PROBABILITY DISTRIBUTIONS
(Common to CE, ME, CSE, IT)

B. Tech (CSE-AIML) III Semester

L	T	P	C
3	1	0	4

UNIT-I: NUMERICAL METHODS-I

Solution of polynomial and transcendental equations: Bisection method, Iteration method, Newton-Raphson method and Regula-False method.

Interpolation: Finite differences, Forward differences, Backward differences, Central differences, Symbolic relations and separation of symbols, Interpolation using Newton's forward and backward difference formulae. Central difference interpolation, Gauss's forward and backward formulae, Lagrange's method of interpolation.

UNIT-II: NUMERICAL METHODS-II

Numerical integration: Trapezoidal rule, Simpson's 1/3rd and 3/8 rules.

Numerical Solutions of Ordinary Differential Equations -Taylor's series, Picard's method, Euler and modified Euler's methods, Runge-Kutta method of fourth order.

UNIT-III: LAPLACE TRANSFORMS

Laplace transform of standard functions, First shifting theorem, Laplace transforms of functions when they are multiplied and divided by't'. Laplace transforms of derivatives and integrals of function, Evaluation of integrals by Laplace transforms, Laplace transforms of special functions, Laplace transform of periodic functions. Inverse Laplace transform by different methods, Convolution theorem (without Proof), Solving ODEs by Laplace transform method.

UNIT- IV:

RANDOM VARIABLES & DISTRIBUTIONS

Random Variables: Discrete and continuous random variables.

Distributions: Binomial distribution, Poisson distribution and their Properties, Normal distribution, Sampling distribution of means (σ - known and unknown).

UNIT- V:TEST OF HYPOTHESIS

Test of hypothesis, Null hypothesis, Alternative hypothesis, Type-I & II errors, Critical region, Confidential interval for the mean & proportions. Test of

hypothesis for large samples, Single mean, Difference between the means, Single proportion and difference between the proportions. Test of hypothesis for Small samples, Confidence interval for the t- distribution, Tests of hypothesis t -test, F-test, χ2- test, goodness of fit.

TEXT BOOKS:

1. Higher Engineering Mathematics (36th edition) by B.S. Grewal, Khanna Publishers.
2. Fundamentals of Mathematical Statistics (11th Edition) by S.C. Gupta& VK Kapoor, Sultan Chand & Sons.

REFERENCE BOOKS:

1. Advanced Engineering Mathematics (3rd edition) by R.K. Jain & S.R.K. Iyengar, Narosa Publishing House, Delhi.
2. Introductory Methods of Numerical Analysis, S.S. Sastry, 4h Edition, Prentce Hall of India Pvt. Ltd.
3. Advanced Engineering Mathematics (9th edition) by Erwin Kreyszig John Wiley & Sons Publishers.
4. Probability & Statistics by T.K.V. Iyengar, B. Krishna Gandhi & Others, 2015 Yr. Edition S. Chand.
5. Applied Mathematics for Engineers & Physicists (3rd edition) by Pipes & Harvill, McGraw Hill Internation Book company.

COURSEOUTCOMES:

On completion of the course students will be able to

1.Find the root of given equation and estimate unknown value using interpolation.

2.Find numerical solutions of ordinary differential equations.

3.Solve ordinary differential equations using Laplace transform.

4.Analyse random variables involved in probability models.

5.Test hypothesis for large and small samples.

END

(A30513) COMPUTER ORGANIZATION & ARCHITECTURE

B. Tech (CSE-AIML) III Semester

L	T	P	C
3	1	0	4

Unit-1

Functional blocks of a computer: CPU, memory, input-output subsystems, control unit. Instruction set architecture of a CPU – registers, instruction execution cycle, RTL interpretation of instructions, addressing modes, instruction set. Case study – instruction sets of some common CPUs

Unit-II

Data representation: signed number representation, fixed and floating-point representations, character representation. Computer arithmetic – integer addition and subtraction, ripple carry adder, carry look-ahead adder, etc. multiplication – shift-and-add, Booth multiplier, carry save multiplier, etc. Division restoring and non-restoring techniques, floating point arithmetic.

Unit-III

Introduction to x86 architecture. CPU control unit design: hardwired and micro-programmed design approaches, Peripheral devices and their characteristics: Input-output subsystems, I/O device interface, I/O transfers – program controlled, interrupt driven and DMA, privileged and non-privileged instructions, software interrupts and exceptions. Programs and processes – role of interrupts in process state transitions, I/O device interfaces – SCII, USB

Unit-IV

Pipelining: Basic concepts of pipelining, throughput and speedup, pipeline hazards. Parallel Processors: Introduction to parallel processors, Concurrent access to memory and cache coherency

Unit-V

Memory organization: Memory interleaving, concept of hierarchical memory organization, cache memory, cache size vs. block size, mapping functions, replacement algorithms, write policies.

Text books:

1. "Computer Organization and Design: The Hardware/Software Interface", 5th Edition by David A. Patterson and John L. Hennessy, Elsevier.
2. "Computer Organization and Embedded Systems", 6th Edition by CarlHamacher, McGraw Hill Higher Education.

Reference books:

1. "Computer Architecture and Organization", 3rd Edition by John P. Hayes, WCB/McGraw- Hill
2. "Computer Organization and Architecture: Designing for Performance", 10th Edition by William Stallings, Pearson Education.
3. "Computer System Design and Architecture", 2nd Edition by Vincent P. Heuring and Harry F. Jordan, Pearson Education.

Course Outcomes

On completion of the course students will be able to

1. Describe basic computer organization
2. Explain the design of Control Unit.
3. Illustrate Data representation in computer's memory
4. Describe Input-Output, Memory Organization.
5. Distinguish between RISC and CISC Instruction Set.

END

(A36201) OBJECT ORIENTED PROGRAMMING

B. Tech (CSE) III Semester

L	T	P	C
3	0	0	3

Unit-I

Introduction to Object Oriented Programming: Need for Object Oriented Programming - Characteristics of Object-Oriented Languages, Objects, Overloading, Overriding Functions and Object Polymorphism, Inheritance, Abstraction, Interfaces, java introduction & language fundamentals

Packages: Defining, Creating and Accessing a Package, Understanding Class path, Importing Packages

Unit-II

Inner Classes: Use of Inner Classes, Local Inner Classes, Anonymous Inner Classes, Static Inner Classes, Example.

Exception Handling: Dealing with Errors, Benefits of Exception Handling, The Classification of Exceptions, Exception Hierarchy, Checked Exceptions and Unchecked Exception, Usage of Try, Catch, Throw, Throws, and Finally, Re-Throwing Exceptions, Exception Specification, Built in Exceptions, Creating Own Exception Sub Classes.

Unit-III

Multithreading: Difference Between Multiple Processes and Multiple Threads, Thread States, Creating Threads, Interrupting Threads, Thread Priorities, Synchronizing Threads, Inter-Thread Communication, Producer Consumer Pattern.

File I/O: Streams-Byte Streams, Character Streams, Text Input /Output, Binary Input/output, File Management using File Class

Unit-IV

Collection Framework in Java: Introduction to Java Collections, Overview of Java Collection Frame Work, Generics, Commonly used Collection Classes-Array List, Vector, Hash Table, Stack, Enumeration, Iterator, String Tokenizer, Random, Scanner, Calendar and Properties.

Connecting to Database: JDBC Type I To IV Drivers, connecting to a Database, querying a Database and Processing the Results, Updating Data With JDBC.

Unit-V

GUI Programming with Java: Introduction to Scala and Swing, Hierarchy for Swing and Scala Components, ContainersJFrame, JApplet, JDialog, JPanel, Overview of Some Swing Components, JButton, JLabel, JTextfield, JTextarea, Simple Swing Applications, Layout Management- Layout Manager Types- Border Grid and Flow. Event Handling: Events, Event Sources, Event Classes, Event Listeners, Relationship Between Event Sources and Listeners, Delegation Event Model, Examples: Handling a Button Click, Handling Mouse Events, Adapter Classes.

Textbooks

1.Java Fundamentals: A Comprehensive Introduction, Herbert Schildt and Dale Skrien, TMH.

2.Programming Development in Java, BarbaraLiskov, Addison-Wesley

References

1. Data Abstraction and Problem Solving with Java: Walls and Mirrors by Frank M. Carrano and Janet J. Prichard

2. Java for Programming, P.J. Dietel Pearson Education

3. Object Oriented Programming through Java, P. Radha Krishna, and Universities Press.

4. Thinking in Java, Bruce Eckel, Pearson Education

5. Programming in Java, S. Malhotra and S. Choudhary, Oxford University Press

Course Outcomes

On completion of the course students will be able to

1. Describe the characteristics of Object-Oriented Programming Languages.
2. Illustrate Java Exception Handling Mechanism
3. Develop applications using Java Multi-Thread Concept.
4. Use Java Collection Framework
5. Design GUI applications using Java Swings.

END

(A30228) BASIC ELECTRICAL ENGINEERING

B. Tech (CSE-AIML) III Semester

L	T	P	C
3	0	0	3

UNIT-1

DC Circuits: Circuit Concept–R-L-C parameters–Voltage and Current sources Ohm's law ,Kirchhoff's laws, types of sources, source transformations, V-I relation for passive elements ,series parallel circuits, star- delta and delta –star transformations, mesh and nodal analysis, network theorems –super position, thevenin's, maximum power transfer theorem, simple problems.

UNIT-2

AC Circuits: Representation of sinusoidal waveforms, waveforms and basic definitions, RMS and Average values of the alternating quantity, form factor and peak factor, phasor representation of alternating quantities, the 'j' operator and phasor algebra, Analysis of AC circuits with single basic network elements. Single phase series circuits. Three phase circuits –phase sequence, star and delta connection, relation between line and phase voltage and currents in a balanced system.

UNIT-3

DC Machines:

DC Generators -Principle and operation, constructional details, types, EMF equation, DC Motor- Principle and operation, Principle and operation, types, Torque equation, Losses and Efficiencyin DC Generators and Motors, Speed control of DC Motors

UNIT-4

Transformer:

Single phase transformer-Principle and operation, construction details, Ideal transformer andpractical transformer, equivalent circuit, losses, OC and SC Test, Efficiency and Regulation, simple problems. Three phase transformer-Classification.

UNIT-5

AC Machines:

Three phase induction Motor: Generation of rotating magnetic field, Principle and operation, constructional details, types, Concept of slip, significance of torque slip

characteristic, problemson slip, rotor frequency, rotor EMF and Torque. Principle and operation of Alternator, Singlephase induction motors – Classification.

TEXT BOOKS:

1. Basic concepts of Electrical Engineering, PS Subramanyam, BS Publications.
2. Basic Electrical Engineering, S.N. Singh, PHI.

REFERENCE BOOKS:

1. Basic Electrical Engineering, Abhijit Chakrabarthi, Sudiptanath, Chandrakumar Chanda, Tata-McGraw- Hill.
2. Principles of Electrical Engineering, V. K Mehta, Rohit Mehta, S. Chand Publications.
3. Basic Electrical Engineering, T.K. Nagasarkar and M.S. Sukhija, Oxford University Press.
4. Fundamentals of Electrical Engineering, RajendraPrasad, PHI.
5. Basic Electrical Engineering by D.P. Kothari, I.J. Nagrath, McGraw-Hill.

Course Outcomes

On completion of the course, students will be able to

1. Apply Kirchoff 's Laws & network reduction techniques.
2. Explain AC fundamentals of single & three phase circuits,
3. Categorize DC machines, operation and its characteristics, with the help of tests and speed control methods.
4. Acquire the knowledge of operation and performance Analysis of transformers
5. Analyze three phase induction motor operation with their characteristics & acquire the knowledge of alternators and single-phase Induction motors.

****END****

(A30229) BASIC ELECTRICAL ENGINEERING LAB

B. Tech (CSE-AIML) III Semester

L	T	P	C
0	0	3	1.5

PART A:

1. Verification of KCL and KVL.
2. Verification of Superposition theorem
3. Verification of Maximum power transfer theorem.
4. Verification of Thevenin ‘s theorem.
5. Time Response of First Order RC/RL Network for periodic, non-sinusoidal inputs- timeconstant and steady state error determination

PART B:

1. Magnetization characteristics of D.C. Shunt generator.
2. Speed control of DC motor.
3. Swinburne ‘s Test on DC shunt machine.
4. Brake test on DC shunt motor.
5. OC and SC tests on Single-phase transformer.
6. Brake test on 3-phase Induction motor.
7. Load Test on single phase Transformer

Note: Any 10 of the above experiments are to be conducted.

Course Outcomes

On Completion of the course, students will be able to

1. Verify KCL & KVL.
2. Verify different theorems.
3. Analyze time response of RC/RL networks.
4. Acquire the knowledge of different tests conducted on DC machines
5. Acquire the knowledge of performance of single-phase transformers and Three PhaseInduction Motors

END

(A36202) JAVA LAB
(Common to CSE-CS, CSE-AI&ML)

B. Tech (CSE-AIML) III Semester

L	T	P	C
0	0	3	1.5

Week 1:

1. Write a java program that works as a simple calculator for the +,-,*,/,% operations using classes and objects in java.
2. Write a java program to find result of a given arithmetic expression? (EX: if you given arithmetic expression like 10+20-24*4/2-4.5= it should print 7.5)

Week 2:

3. Write a program to demonstrate the following
i) Super, Final ii) Single inheritance iii) Multi –level inheritance
4. Write a program to demonstrate the usage of method overriding, calling super class constructor in derived class.

Week 3:

5. Write a java program to create an abstract class named **shape** that contains two integers and an empty method named printarea (). Provide three classes named Rectangle, Triangle and Circle such that each one of these classes extends the class Shape. Each one of the classes contains only the method printarea () that prints the area of the given shape.

Week 4:

6. Write a program to demonstrate method overloading and constructor overloading.
7. Write a program to demonstrate polymorphism using interface (interface in package P1 and class in package P2)

Week 5: Exception handling in java

8. Implement pre-defined exceptions
9. Implement user defined exceptions

Week 6:

10. Develop a scala and swing component in java that displays a simple message.

11. Write a java program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, num1 and Num2. The division of Num1 and Num2 is displayed in the result fields when the division button is clicked. If Num1 or Num2 were not an integer, the program should throw a Number Format Exception. If Num2 were Zero the program should throw an Arithmetic Exception. Display the exception in a message dialog box.

Week 7:

12. Write a java program that implements a multi-thread application that has three threads. First thread generates random integer every 1 second. if the generated value is even, second thread computes the square of the number and prints. If the generated value is odd, the third thread will print the value of cube of the number

Week 8:

13. Write a java program to demonstrate Generic class and generic methods
14. Write a java to perform string operations using sting buffer class and its methods.

Week 9:

15. Write a java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with ―Stop‖ or ―ready‖ or ―Go‖ should appear above the buttons in selected color initially, there is no message shown.

Week 10:

16. Write a java program that loads names and phone numbers from a text file where the data is organized as one line per record and each field in a record are separated by a tab(\t). it takes a name or phone number as input and prints the corresponding other value from the hash table (hint: use hash tables).

Week 11:

17. Write a java program that connects to a data base using JDBC and does add, delete, modify and retrieve operations.

Week12

18. Implement the week 10 program with database instead of a text file.
19. Write a java program that takes tab separated data (one record per line) from a text file and inserts them into a database.

Textbooks

1. Java Fundamentals- A Comprehensive introduction, Herbert schildt and Dale skrien, TMH.
2. Programming Development in Java, Barbara Liskov, Addison-Wesley

References

1. Java for programming, P.J. Dietel Pearson education (OR) Java: How to Program P.J. Dietel and H.M. Dietel, PHI
2. Data Abstraction and Problem Solving with Java: Walls and Mirrors by Frank M. Carrano and Janet J. Prichard
3. Object Oriented Programming through java, P. Radha Krishna, Universities Press.
4. Thinking in Java, Bruce Eckel, Pearson Education
5. Programming in Java, S. Malhotra and S. Choudhary, Oxford University Press

Course Outcomes

On completion of the course students will be able to

1. Write & execute programs using JAVA Programming Language Syntax
2. Use Java API functions to write and execute programs for problem solving.
3. Demonstrate the usage of Java Exception handling mechanisms.
4. Write and execute Java applications using Java String Buffer Class
5. Design Java Applications using JAVA GUI components and test them by execution.

****END****

(A30021) SOCIAL INNOVATION IN PRACTICE

(Common for all branches)

	L	T	P	C
B. Tech (CSE-AIML) III Semester	**0**	**0**	**2**	**1**

UNIT 1

Identify community issues to be addressed, Requirements Analysis: Extensive User requirements analysis, Generating effective System Requirement document.

UNIT 2

Social Innovation – Case Studies

Presentation of the case studies with a focus on impact and vision on society.

UNIT 3

Process of Social Innovation

Prompts – identifying needs, Proposals – generating ideas, Prototyping – testing the idea in practice,

UNIT 4

Sustaining-developing a business model, Scaling and diffusion-growing social innovations, Systematic change.

UNIT 5

Report writing, Documentation and Panel presentation

Reference Books:

1. Requirements Analysis: From Business Views to Architecture; David C. Hay; Prentice Hall Professional
2. Social Enterprises: An Organizational Perspective edited; Benjamin Gidron, YeheskelHasenfeld; Palgrave Macmillan
3. Social Enterprise Law: Trust, Public Benefit and Capital Markets By Dana Brakman Reiser & Steven A. Dean

Course Outcomes:

On Completion of the course, the students will be able to

1. Summing up several social issues to be addressed
2. Analyse the feasibility and economical factors
3. Develop a scalable business model.

END

(A30015) SOFT SKILLS & PROFESSIONAL ETHICS

B. Tech (CSE-AIML) III Semester

L	T	P	C
0	0	2	0

UNIT-I:
Business Communication Skills:
English Language Enhancement the Art of Communication.

UNIT-II:
Intrapersonal & Interpersonal Relationship Skills:

- Intrapersonal Relationships
- Interpersonal Relationships – To be an Effective Team Player

UNIT-III:
Campus to Company:

- Corporate Dressing
- Corporate Grooming
- Business Etiquette
- Communication Media Etiquette

UNIT-IV:
Group Discussions, Interviews and Presentations:

- Group Discussions
- Interviews
- Presentations

UNIT-V:
Entrepreneurial Skills Development:

- Goal Setting
- Entrepreneurial Skills – Awareness and Development

REFERENCES

1. UNLEASH the power within Soft Skills – Training Manual (Infosys Campus Connect)

Course Outcomes

At the end of the course, the students will be able to

1. Express themselves with proper pronunciations and sentence construction
2. Demonstrate a strong teamwork and be a team player
3. Develop a strong personal etiquette
4. Demonstrate good leadership qualities
5. Recognize and identify basic English grammar

END