GLOBAL INSTITUTE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)
COURSE CATALOGUE
REGULATIONS B.TECH – GR - 24
COMPUTER SCIENCE AND ENGINEERING (DATA SCIENCE)
II YEAR I SEMESTER

Course Code	Course Name	Subject Area	Category	Periods Per Week			Credits	Scheme of Examination Max Marks		
				L	T	P		CIA	SEE	Total
THEORY										
DS301PC	Digital Electronics	PCC	CORE	3	0	0	3	40	60	100
DS302PC	Database Management Systems	PCC	CORE	3	0	0	3	40	60	100
DS303PC	Computer Oriented Statistical Methods	PCC	CORE	3	1	0	4	40	60	100
SM304MS	Business Economics & Financial Analysis	HSMC	Foundation	3	0	0	3	40	60	100
DS305PC	Object Oriented Programming through Java	PCC	CORE	3	0	0	3	40	60	100
PRACTICAL										
DS306PC	Database Management Systems Lab	PCC	CORE	0	0	3	1.5	40	60	100
DS307PC	Object Oriented Programming through Java Lab	PCC	CORE	0	0	3	1.5	40	60	100
DS308PC	Node JS/ React JS/ Django	PCC	CORE	0	0	2	1	40	60	100
MANDATORY COURSE										
*MC309	Gender Sensitization Laboratory	MC-III	MC	0	0	2	0			
			Total Credits	**15**	**1**	**10**	**20**			

COURSE CONTENT

DIGITAL ELECTRONICS								
II Year - I Semester: CSE (DS)								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
DS301PC	**Core**	**3**	**-**	**-**	**3**	**40**	**60**	**100**
Contact Classes: 48	Tutorial Classes: Nil	Practical Classes: Nil				**Total Classes: 48**		
Prerequisite: Nil								

1. COURSE OVERVIEW

Course is about to design and analyze digital circuits and systems using fundamental principles of binary numbers, Boolean algebra, and logic gates.

2. COURSE OBJECTIVE

The students will try to Learn:

1) To understand common forms of number representation in logic circuits.
2) To learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems.
3) To understand the concepts of combinational logic circuits and sequential circuits.
4) To understand the Realization of Logic Gates Using Diodes & Transistors.

3. COURSE OUTCOMES

After successful completion of the course, students should be able to:

CO 1	Acquire the knowledge on numerical information in different forms and Boolean Algebra theorems.
CO 2	Define Postulates of Boolean algebra and to minimize combinational functions, and
CO 3	Design the combinational circuits.
CO 4	Design and analyse sequential circuits for various cyclic functions.
CO 5	Characterize logic families and analyze them for the purpose of AC and DC parameters

4. COURSE CONTENT

UNIT – I

BOOLEAN ALGEBRA AND LOGIC GATES: Digital Systems, Binary Numbers, Number base conversions, Octal and Hexadecimal Numbers, complements, Signed binary numbers, Binary codes, Binary Storage and Registers, Binary logic. Basic Definitions, Axiomatic definition of Boolean Algebra, Basic theorems and properties of Boolean algebra, Boolean functions, canonical and standard forms, other logic operations, Digital logic gates.

UNIT – II

GATE – LEVEL MINIMIZATION: The map method, Four-variable map, Five-Variable map, product of sums simplification Don't-care conditions, NAND and NOR implementation other Two-level implementations, Exclusive – Or function.

UNIT – III

COMBINATIONAL LOGIC: Combinational Circuits, Analysis procedure Design procedure, Binary Adder-Subtractor Decimal Adder, Binary multiplier, magnitude comparator, Decoders, Encoders, Multiplexers, HDL for combinational circuits.

UNIT – IV

SEQUENTIAL LOGIC: Sequential circuits, latches, Flip-Flops Analysis of clocked sequential circuits, state Reduction and Assignment, Design Procedure. Registers, shift Registers, Ripple counters, synchronous counters, other counters.

UNIT – V

MEMORIES AND ASYNCHRONOUS SEQUENTIAL LOGIC: Introduction, Random-Access Memory, Memory Decoding, Error Detection and correction Read-only memory, Programmable logic Array programmable Array logic, Sequential Programmable Devices. Introduction, Analysis Procedure, Circuits with Latches, Design Procedure, Reduction of state and Flow Tables, Race-Free state Assignment Hazards, Design Example.

5. TEXT BOOKS

1) Zvi Kohavi &Niraj K. Jha, - Switching and Finite Automata Theory, 3rd Ed., Cambridge, 2010.
2) R. P. Jain - Modern Digital Electronics, 3rd Edition, 2007- Tata McGraw-Hill.

6. REFERENCE BOOKS

1) Morris Mano, Fredriac J. Hill, Gerald R. Peterson - Introduction to Switching Theory and Logic Design –3rd Ed., John Wiley & Sons Inc.
2) Charles H. Roth - Fundamentals of Logic Design, 5th ED., Cengage Learning, 2004.

7. ELECTRONIC RESOURCES

https://onlinecourses.nptel.ac.in/noc21_ee39/preview

CO-PO-PSO Mapping

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO 1	**3**	**2**	**3**	**1**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**2**	**3**	**2**
CO 2	**3**	**2**	**2**	**1**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**2**	**2**	**3**
CO 3	**2**	**3**	**3**	**2**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**1**	**3**	**2**
CO 4	**3**	**2**	**1**	**1**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**3**
CO 5	**3**	**2**	**3**	**1**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**2**	**3**	**2**

COURSE CONTENT

DATABASE MANAGEMENT SYSTEMS								
II Year - I Semester: CSE (DS)								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
DS302PC	**Core**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**-**	**-**	**3**	**40**	**60**	**100**
Contact Classes: 48	Tutorial Classes: Nil	Practical Classes: Nil				**Total Classes: 48**		
Prerequisite: Nil								

1. COURSE OVERVIEW

The "Database Management Systems" course introduces students to the principles, design, and implementation of database systems. It covers data models, ER modeling, relational algebra, SQL, normalization, transaction management, concurrency control, recovery, and indexing structures. Students will develop both theoretical foundations and practical skills to design, query, and manage databases. By the end of the course, students will be equipped to apply DBMS concepts in real-world applications requiring efficient and reliable data management.

2. COURSE OBJECTIVE

The students will try to Learn:

1) To understand the basic concepts, architecture, and applications of database systems.
2) To master SQL for data definition, manipulation, and control.
3) To apply relational algebra and design normalized database schemas.
4) To understand transaction management, concurrency control, and recovery.
5) To explore indexing and hashing structures for optimized query performance.

3. COURSE OUTCOMES

After successful completion of the course, students should be able to:

CO 1	Understand database concepts, ER modeling, and convert ER diagrams into relational schemas.
CO 2	Apply relational algebra and SQL to define, manipulate, and query data.
CO 3	Normalize relational schemas using appropriate normal forms to reduce redundancy.
CO 4	Demonstrate understanding of transaction concepts, concurrency control, and recovery techniques.
CO 5	Implement indexing and hashing techniques to improve query processing and data retrieval.

4. COURSE CONTENT

UNIT – I **(10L)**

Database System Applications: A Historical Perspective, File Systems vs DBMS, Data Models, Levels of Abstraction, Data Independence, Structure of a DBMS.

Introduction to Database Design: ER Diagrams, Entities, Attributes, Entity Sets, Relationships and Relationship Sets, Additional ER Features, Conceptual Design using ER Model.

UNIT – II **(10L)**

Relational Model: Integrity Constraints, Enforcing Constraints, Querying Relational Data, Logical Database Design, Views, Altering/Destroying Tables and Views.

Relational Algebra, Tuple Relational Calculus, Domain Relational Calculus.

UNIT – III **(10L)**

SQL: Basic SQL Queries, UNION, INTERSECT, EXCEPT, Nested Queries, Aggregates, NULLs, Integrity Constraints, Triggers, Active Databases.

Schema Refinement: Problems due to redundancy, Decompositions, Functional Dependencies, Normalization (1NF, 2NF, 3NF, BCNF, 4NF, 5NF).

UNIT – IV **(9L)**

Transactions: Transaction Concept, States, Atomicity & Durability.

Concurrency Control: Serializability, Recoverability, Isolation, Lock-based Protocols, Timestamp-based Protocols, Validation-based Protocols, Multiple Granularity.

Recovery: Log-based Recovery, Recovery with Concurrent Transactions.

UNIT – V **(9L)**

Storage & Indexing: Data on External Storage, File Organization, Primary/Secondary/Cluster Indexes. Index Data Structures: Hash-based Indexing, Tree-based Indexing, ISAM, B+ Trees, Comparison of File Organizations.

5. TEXT BOOKS

1) Abraham Silberschatz, Henry F. Korth, S. Sudarshan, *Database System Concepts*, 6th Edition, McGraw Hill.
2) Ramez Elmasri, Shamkant B. Navathe, *Fundamentals of Database Systems*, 7th Edition, Pearson.

6. REFERENCE BOOKS

1) Raghu Ramakrishnan, Johannes Gehrke, *Database Management Systems*, Tata McGraw Hill.
2) C.J. Date, *An Introduction to Database Systems*, Pearson Education.
3) Peter Rob, Carlos Coronel, *Database Systems: Design, Implementation, and Management*, 7th Edition, Cengage.
4) Shah & Shah, *Oracle for Professionals*, SPD/PHI.
5) M.L. Gillenson, *Fundamentals of Database Management Systems*, Wiley Student Edition.

CO-PO-PSO Mapping

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO 1	**3**	**3**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**		
CO 2	**3**	**3**	**3**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**		
CO 3	**3**	**3**	**3**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**		
CO 4	**3**	**3**	**3**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**		
CO 5	**3**	**3**	**3**	**3**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**2**		

COURSE CONTENT

COMPUTER-ORIENTED STATISTICAL METHODS								
II Year - I Semester: CSE (DS)								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
DS303PC	**Core**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**1**	**-**	**4**	**40**	**60**	**100**
Contact Classes: 48	Tutorial Classes: 16	Practical Classes: Nil				**Total Classes: 64**		
Prerequisite: Mathematics courses of the first year of study.								

1. COURSE OVERVIEW

This course introduces Computer Science and Engineering students to the fundamental concepts of probability, statistics, and stochastic processes, which are essential for data analysis, decision-making, and modelling in computing applications.

The course begins with the **Basics of Probability Theory**, random variables, and probability distributions, which help students understand uncertainty in computational problems. It then explores **Discrete and Continuous Distributions, such as the Binomial, Poisson, and Normal Distributions**, which are widely applied in data science, machine learning, and performance analysis.

Students also learn about **Sampling Distributions, Estimation Methods, and Hypothesis Testing**, which form the foundation of statistical inference and are crucial in areas such as experimental analysis, algorithm evaluation, and system performance studies.

In the final part, the course covers **Stochastic Processes and Markov Chains**, providing tools for analysing systems that evolve with time. These concepts are highly relevant in **computer networks, queuing models, reliability analysis, machine learning, and AI-based systems**.

2. COURSE OBJECTIVE

The students will try to Learn:

1) The theory of Probability, Probability distributions of single and multiple random variables.
2) The sampling theory, testing of hypotheses and making statistical inferences.
3) Stochastic processes and Markov chains.

3. COURSE OUTCOMES

After successful completion of the course, students should be able to:

CO 1	Apply the concepts of probability and distributions to case studies.
CO 2	Formulate and solve problems involving random variables and apply statistical methods for analysing experimental data.
CO 3	Apply the concepts of estimation and hypothesis testing to case studies.
CO 4	Correlate the concepts of one unit to the concepts in other units.
CO 5	Stochastic Process, Markov Process & Markov Chains.

4. COURSE CONTENT

UNIT - I: **Probability** **10 L**

Sample Space, Events, Counting Sample Points, Probability of an Event, Additive Rules, Conditional Probability, Independence, and the Product Rule, Baye's Rule,Random Variables and Probability

Distributions: Concept of a Random Variable, Discrete Probability Distributions, Continuous Probability Distributions.

UNIT - II: Expectation and discrete distributions **10 L**

Mean of a Random Variable, Variance and Covariance of Random Variables, Means and Variances of Linear Combinations of Random Variables, Chebyshev's Theorem.

Discrete Probability Distributions: Binomial Distribution, Poisson Distribution.

UNIT - III: Continuous and Sampling Distributions **10 L**

Uniform Distribution, Normal Distribution, Areas under the Normal Curve, Applications of the Normal Distribution, Normal Approximation to the Binomial Distributions.

Fundamental Sampling Distributions: Random Sampling, Some Important Statistics, Sampling Distributions, Sampling Distribution of Means and the Central Limit Theorem, t-Distribution, F-Distribution.

UNIT - IV: Sample Estimation & Tests of Hypotheses **10 L**

Introduction, Statistical Inference, Classical Methods of Estimation, Single Sample: Estimating the mean, standard error of a point estimate, prediction interval. Two-sample: Estimating the difference between two means, Single sample: Estimating a proportion, Two samples: Estimating the difference between two proportions, Two samples: Estimating the ratio of two variances.

Statistical Hypotheses: General Concepts, Testing a Statistical Hypothesis, Single sample: Tests concerning a single mean, Two samples: tests on two means, One sample: test on a single proportion.

Two samples: tests on two proportions, Two-sample tests concerning variances.

UNIT-V: Stochastic Processes and Markov Chains **8L**

Introduction to Stochastic Processes- Markov Process. Transition Probability, Transition Probability Matrix, First order and Higher order Markov process, n-step transition probabilities, Markov chain, Steady state condition, Markov analysis.

5. TEXT BOOKS

1) Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, Keying Ye, Probability & Statistics.
2) S C Gupta and V K Kapoor, Fundamentals of Mathematical Statistics, Khanna Publications.
3) S.D.Sharma, Operations Research, Kedarnath and Ramnath Publishers, Meerut, Delhi.

6. REFERENCE BOOKS

1) T.T. Soong, Fundamentals of Probability and Statistics for Engineers, John Wiley & Sons, Ltd, 2004.
2) Sheldon M Ross, Probability and statistics for Engineers and scientists, academic press.
3) Miller and Freund's Probability and Statistics for Engineers, 8th Edition, Pearson Education.

CO-PO-PSO Mapping

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO 1	**3**	**2**										**2**	**3**	**2**
CO 2	**2**	**3**										**2**	**2**	**3**
CO 3	**2**	**3**											**2**	**3**
CO 4	**3**	**-**	**1**		**2**								**3**	**-**
CO 5	**3**	**3**			**1**							**2**	**3**	**3**

COURSE CONTENT

BUSINESS ECONOMICS & FINANCIAL ANALYSIS								
II Year - I Semester: CSE (DS)								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
SM304MS	**Foundation**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**-**	**-**	**3**	**40**	**60**	**100**
Contact Classes: 48	Tutorial Classes: Nil	Practical Classes: Nil				**Total Classes: 48**		
Prerequisite: Nil								

1. COURSE OVERVIEW

This course introduces the fundamentals of **business, economics, and financial accounting**, focusing on business structures, demand and supply analysis, production and cost functions, market structures, and pricing strategies. It also covers accounting principles, preparation of financial statements, and ratio analysis, enabling students to apply economic and accounting tools for effective business decision-making.

2. COURSE OBJECTIVE

The students will try to Learn:

1) To learn the basic business types, impact of the economy on Business and Firms specifically.
2) To analyze the Business from the Financial Perspective.

3. COURSE OUTCOMES

After successful completion of the course, students should be able to:

CO 1	Understand the structure of business firms and apply economic concepts such as national income, inflation, and business cycles in analyzing business decisions.
CO 2	Apply the concepts of demand, elasticity, and supply in business decision making and forecasting.
CO 3	Analyze production and cost functions, and evaluate pricing strategies under different market structures.
CO 4	Prepare and interpret basic financial statements using accounting principles, conventions, and the double-entry system.
CO 5	Evaluate financial performance of a business through ratio analysis and interpretation.

4. COURSE CONTENT

UNIT – I (10L)

Introduction to Business and Economics Business: Structure of Business Firm, Theory of Firm, Types of Business Entities, Limited Liability Companies, Sources of Capital for a Company, Non-Conventional Sources of Finance. Economics: Significance of Economics, Micro and Macro Economic Concepts, Concepts and Importance of National Income, Inflation, Money Supply and Inflation, Business Cycle, Features and Phases of Business Cycle. Nature and Scope of Business Economics, Role of Business Economist, Multidisciplinary nature of Business Economics.

UNIT – II (10L)

Demand and Supply Analysis Elasticity of Demand: Elasticity, Types of Elasticity, Law of Demand, Measurement and Significance of Elasticity of Demand, Factors affecting Elasticity of Demand, Elasticity of Demand in decision making, Demand Forecasting: Characteristics of Good Demand Forecasting, Steps in Demand Forecasting, Methods of Demand Forecasting. Supply Analysis: Determinants of Supply, Supply Function and Law of Supply.

UNIT – III (10L)

Production, Cost, Market Structures & Pricing Production Analysis: Factors of Production, Production Function, Production Function with one variable input, two variable inputs, Returns to Scale, Different Types of Production Functions. Cost analysis: Types of Costs, Short run and Long run Cost Functions. Market Structures: Nature of Competition, Features of Perfect competition, Monopoly, Oligopoly, Monopolistic Competition. Pricing: Types of Pricing, Product Life Cycle based Pricing, Break Even Analysis, Cost Volume Profit Analysis.

UNIT – IV (9L)

Financial Accounting: Accounting concepts and Conventions, Accounting Equation, Double-Entry system of Accounting, Rules for maintaining Books of Accounts, Journal, Posting to Ledger, Preparation of Trial Balance, Elements of Financial Statements, Preparation of Final Accounts (Simple Problems).

UNIT – V (9L)

Financial Ratios Analysis: Concept of Ratio Analysis, Importance and Types of Ratios, Liquidity Ratios, Turnover Ratios, Profitability Ratios, Proprietary Ratios, Solvency, Leverage Ratios – Analysis and Interpretation (simple problems).

5. TEXT BOOKS

1) D. D. Chaturvedi, S. L. Gupta, Business Economics - Theory and Applications, International Book House Pvt. Ltd. 2013.
2) Dhanesh K Khatri, Financial Accounting, Tata Mc –Graw Hill, 2011.
3) Geethika Ghosh, Piyali Gosh, Purba Roy Choudhury, Managerial Economics, 2e, Tata Mc Graw Hill Education Pvt. Ltd. 2012

6. REFERENCE BOOKS

1) Paresh Shah, Financial Accounting for Management 2e, Oxford Press, 2015.
2) S. N. Maheshwari, Sunil K Maheshwari, Sharad K Maheshwari, Financial Accounting, 5e, Vikas Publications, 2013.

CO-PO-PSO Mapping

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO 1	**3**	**2**	**2**	**1**	**1**	**2**	**1**	**1**						
CO 2	**3**	**3**	**3**	**1**	**1**	**1**	**2**	**1**						
CO 3	**3**	**3**	**3**	**2**	**1**	**2**	**1**	**1**						
CO 4	**3**	**3**	**2**	**2**	**2**	**1**	**1**	**2**						
CO 5	**3**	**3**	**3**	**2**	**2**	**1**	**1**	**2**						

COURSE CONTENT

OBJECT ORIENTED PROGRAMMING THROUGH JAVA								
II Year - I Semester: CSE (DS)								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
DS305PC	**Core**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**-**	**-**	**3**	**40**	**60**	**100**
Contact Classes: 48	Tutorial Classes: Nil	Practical Classes: Nil				**Total Classes: 48**		
Prerequisite: Nil								

1. COURSE OVERVIEW

This course introduces the fundamentals of **Object-Oriented Programming (OOP)** using Java. It emphasizes key OOP principles such as abstraction, encapsulation, inheritance, and polymorphism while providing practical exposure to Java constructs. Students will learn exception handling, multithreading, event-driven programming, and GUI development using AWT and Swing. The course also covers database connectivity (JDBC), enabling students to develop robust and scalable Java applications.

2. COURSE OBJECTIVE

The students will try to Learn:

1) To understand the principles of OOP and apply them in solving real-world problems.
2) To illustrate and apply inheritance for program reusability.
3) To implement multitasking using multithreading and event handling.
4) To develop database-driven applications using JDBC.
5) To design console-based and GUI-based applications using Java.

3. COURSE OUTCOMES

After successful completion of the course, students should be able to:

CO 1	Demonstrate program behavior using control structures, constructors, string handling, and garbage collection.
CO 2	Implement inheritance (multilevel, hierarchical, multiple) using extends and implements.
CO 3	Develop applications with multithreading concepts for inter-process communication.
CO 4	Design graphical user interfaces using AWT and Swing.
CO 5	Build applets and deploy them in client-server environments.

4. COURSE CONTENT

UNIT – I **(10L)**

Object-oriented thinking and Java basics: Need for OOP paradigm, abstraction, agents, responsibility, messages, methods. History and buzzwords of Java. Data types, variables, scope, arrays, operators, expressions, control statements, type conversion and casting. Classes, objects, constructors, methods, access control, this keyword, garbage collection. Overloading, method binding, inheritance, overriding, exceptions, recursion, nested and inner classes. String handling.

UNIT – II **(10L)**

Inheritance, Packages, and Interfaces: Hierarchical abstractions, base/subclass concepts, substitutability, specialization, extension, and combination. Polymorphism, abstract classes, the Object class. Packages: defining, creating, accessing, CLASSPATH, importing. Interfaces: defining, implementing, extending. Exploring java.io.

UNIT – III **(10L)**

Exception Handling and Multithreading: Exception hierarchy, try-catch-throw-throws-finally, built-in and user-defined exceptions. String handling. Exploring java.util. Multithreading vs multitasking, thread lifecycle, priorities, synchronization, inter-thread communication, thread groups, daemon threads. Enumerations, autoboxing, annotations, generics.

UNIT – IV **(9L)**

Event Handling: Events, sources, classes, listeners, delegation model. Mouse and keyboard event handling, adapter classes. AWT hierarchy, UI components: labels, buttons, canvas, scrollbars, text components, checkboxes, choice lists, panels, scrollpane, dialogs, menubar, graphics. Layout managers: border, grid, flow, card, grid bag.

UNIT – V **(9L)**

Applets and Swing: Applet concepts, life cycle, types, creating applets, passing parameters. Swing overview: MVC architecture, advantages over AWT. Swing components: JApplet, JFrame, JComponent, icons, labels, text fields, buttons, checkboxes, radio buttons, combo boxes, tabbed panes, scroll panes, trees, tables.

5. TEXT BOOKS

1) Herbert Schildt, *Java: The Complete Reference*, 7th Edition, TMH.
2) Timothy Budd, *Understanding OOP with Java*, Pearson Education.

6. REFERENCE BOOKS

1) J. Nino, F.A. Hosch, *An Introduction to Programming and OO Design using Java*, Wiley.
2) T. Budd, *An Introduction to OOP*, 3rd Edition, Pearson Education.
3) Y. Daniel Liang, *Introduction to Java Programming*, Pearson Education.
4) R.A. Johnson-Thomson, *Introduction to Java Programming and OOP Development*.
5) Cay S. Horstmann, Gary Cornell, *Core Java 2, Vol I – Fundamentals*, 8th Edition, Pearson Education.
6) Cay S. Horstmann, Gary Cornell, *Core Java 2, Vol II – Advanced Features*, 8th Edition, Pearson Education.
7) R. Buyya, S.T. Selvi, X. Chu, *Object-Oriented Programming with Java*, TMH.
8) John Hunt, *Java and Object Orientation: An Introduction*, 2nd Edition, Springer.
9) Maurach, *Beginning Java2 JDK 5*, SPD.

CO-PO-PSO Mapping

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO 1	**3**	**3**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**		
CO 2	**3**	**3**	**3**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**		
CO 3	**2**	**3**	**3**	**3**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**		
CO 4	**2**	**3**	**3**	**3**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**2**		
CO 5	**2**	**3**	**3**	**3**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**2**		

COURSE CONTENT

DATA MANAGEMENT SYSTEMS LAB								
II Year - I Semester: CSE (DS)								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
DS306PC	**Core**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		-	**-**	**3**	**1.5**	**40**	**60**	**100**
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 48				**Total Classes: 48**		
Prerequisite: Nil								

1. COURSE OVERVIEW

The "Database Management Systems Lab" course provides hands-on experience in the design and implementation of databases. Students will practice ER modeling, relational schema design, normalization, and SQL programming to manage and query data. The course also focuses on database programming using procedures, triggers, and cursors, enabling students to develop complete database applications.

2. COURSE OBJECTIVE

The students will try to Learn:

1) To design conceptual models using ER diagrams and convert them into relational schemas.
2) To implement normalization techniques to reduce redundancy and improve database design.
3) To gain practical skills in SQL for data definition, manipulation, and querying.
4) To apply advanced SQL features like triggers, procedures, and cursors for application development.
5) To strengthen database application development skills through practical problem-solving.

3. COURSE OUTCOMES

After successful completion of the course, students should be able to:

CO 1	Design database schemas using ER modeling and normalization.
CO 2	Apply SQL commands for data definition, manipulation, and constraints.
CO 3	Use advanced SQL queries including joins, nested queries, and aggregate functions.
CO 4	Implement database triggers, procedures, and cursors for application development.
CO 5	Develop complete database applications integrating SQL features to solve real-world problems.

4. COURSE CONTENT

Practice Sessions / Experiments

1. Concept design with E-R Model.
2. Relational Model implementation.
3. Normalization up to 3NF / BCNF.
4. Practicing DDL commands.
5. Practicing DML commands.
6. **Queries:**
   (i) A. Using ANY, ALL, UNION, INTERSECT, JOIN, Constraints etc.
   (ii) B. Nested & Correlated subqueries.

7. Queries using Aggregate functions, GROUP BY, HAVING; Creating and Dropping Views.
8. Triggers: Insert, Delete, Update Triggers.
9. Procedures: Writing and executing stored procedures.
10. Cursors: Usage of cursors in database applications.

5. TEXT BOOKS

1) Raghu Ramakrishnan, Johannes Gehrke, *Database Management Systems*, 3rd Edition, Tata McGraw Hill.
2) Abraham Silberschatz, Henry F. Korth, S. Sudarshan, *Database System Concepts*, 6th Edition, McGraw Hill.

6. REFERENCE BOOKS

1) Peter Rob, Carlos Coronel, *Database Systems: Design, Implementation, and Management*, 7th Edition, Cengage.
2) Ramez Elmasri, Shamkant Navathe, *Fundamentals of Database Systems*, Pearson Education.
3) C.J. Date, *An Introduction to Database Systems*, Pearson Education.
4) Shah & Shah, *Oracle for Professionals*, SPD/PHI.
5) Shah, *Database Systems Using Oracle: A Simplified Guide to SQL and PL/SQL*, PHI.
6) M.L. Gillenson, *Fundamentals of Database Management Systems*, Wiley Student Edition.

CO-PO-PSO Mapping

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO 1	**2**	**3**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**		
CO 2	**2**	**3**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**		
CO 3	**2**	**3**	**3**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**		
CO 4	**2**	**3**	**3**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**		
CO 5	**2**	**3**	**3**	**3**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**2**		

COURSE CONTENT

OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB								
II Year - I Semester: CSE (DS)								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
DS307PC	**Core**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		-	**-**	**3**	**1.5**	**40**	**60**	**100**
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 48				**Total Classes: 48**		
Prerequisite: Nil								

1. COURSE OVERVIEW

This laboratory course provides **hands-on programming experience in Java**, focusing on **object-oriented programming concepts** such as abstraction, inheritance, multithreading, exception handling, event-driven programming, and GUI development using Swing. Students will learn to work with Java tools such as Eclipse IDE and practice problem-solving through collection framework, applets, and file handling.

2. COURSE OBJECTIVE

The students will try to Learn:

1) To write programs using abstract classes and inheritance.
2) To solve real-world problems using Java Collection Framework.
3) To implement multithreaded applications.
4) To design GUI programs using Swing controls.
5) To introduce Java compiler, Eclipse IDE, and debugging features.
6) To provide practical exposure to core Java concepts.

3. COURSE OUTCOMES

After successful completion of the course, students should be able to:

CO 1	Develop Java programs for solving real-world problems using Collection Framework.
CO 2	Apply abstraction and inheritance using abstract classes.
CO 3	Implement multithreaded applications with inter-thread communication.
CO 4	Design GUI applications using AWT and Swing controls.
CO 5	Develop file handling applications using Java I/O classes.

4. COURSE CONTENT

LIST OF EXPERIMENTS

1. Explore Eclipse/NetBeans IDE: Create a project, add classes, run code, use auto-suggestions, formatter, refactoring, and debugging with a sample program.
2. Develop a **calculator application** using Grid Layout with buttons for digits and operations (+, -, *, %). Handle exceptions (e.g., divide by zero).
3. (a) Create a simple **applet** that displays a message.
   (b) Create an applet that computes the factorial of an integer entered in a text field and displays the result.
4. Develop a **division application** with GUI that validates integer inputs. Handle Number Format Exception and Arithmetic Exception using dialog boxes.
5. Implement a **multithreaded program** with three threads: one generates random integers, second computes square of even numbers, third computes cube of odd numbers.

6. Create and manipulate a **doubly linked list**: insert, delete, and display elements.
7. Simulate a **traffic light system** using radio buttons (Red → Stop, Yellow → Ready, Green → Go).
8. Implement an **abstract class Shape** with subclasses Rectangle, Triangle, Circle; each overriding print Area().
9. Read tabular data from a file and display it using **Labels in Grid Layout**.
10. Write a program to handle all **mouse events** using Adapter classes and display the event name dynamically.
11. Load data from a file into a **Hash Table** (name → phone mapping). Allow lookup by either key and return corresponding value.
12. Implement the **Producer–Consumer problem** using inter-thread communication.
13. Write a program to recursively **list all files in a directory**, including subdirectories.

5. NOTE

1) Use **LINUX and MySQL** for lab experiments.
2) Eclipse IDE is recommended for programming, debugging, and refactoring.
3) Faculty are encouraged to add additional problem statements beyond the minimum suggested list.

6. REFERENCE BOOKS

1) P. J. Deitel, H. M. Deitel, *Java for Programmers*, 10th Edition, Pearson Education.
2) Bruce Eckel, *Thinking in Java*, Pearson Education.
3) D. S. Malik, P. S. Nair, *Java Programming*, Cengage Learning.
4) Cay S. Horstmann, Gary Cornell, *Core Java, Volume I*, 9th Edition, Pearson Education.

CO-PO-PSO Mapping

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO 1	**3**	**2**	**3**	**2**	**2**	**1**	**-**	**-**	**-**	**2**	**2**	**3**		
CO 2	**3**	**3**	**3**	**2**	**2**	**1**	**-**	**-**	**-**	**2**	**2**	**2**		
CO 3	**3**	**2**	**3**	**3**	**2**	**1**	**-**	**-**	**-**	**2**	**2**	**3**		
CO 4	**3**	**3**	**3**	**3**	**3**	**1**	**-**	**-**	**-**	**2**	**2**	**2**		
CO 5	**3**	**2**	**3**	**3**	**2**	**1**	**-**	**-**	**-**	**2**	**2**	**3**		

COURSE CONTENT

NODE JS / REACT JS / DJANGO LAB								
II Year - I Semester: CSE (DS)								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
DS308PC	**Core**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		-	**-**	**2**	**1**	**40**	**60**	**100**
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 32				**Total Classes: 32**		
Prerequisite: Nil								

1. COURSE OVERVIEW

This course introduces students to **full stack web development** with emphasis on client-side design, server-side programming, and modern frameworks. Students begin by designing static and responsive websites, move on to database connectivity using Java, and then implement server-side applications with **Node.js**. The course concludes with building **single-page applications (SPAs)** using **React**.

2. COURSE OBJECTIVE

The students will try to Learn:

1) To implement static and responsive web pages using **HTML, CSS, Bootstrap, and JavaScript**.
2) To perform **client-side validation** with JavaScript and use advanced ES6 features.
3) To design and interact with **databases** using JDBC.
4) To implement **server-side applications** using Java and Node.js.
5) To design and develop **single-page applications** with React.

3. COURSE OUTCOMES

After successful completion of the course, students should be able to:

CO 1	Build responsive web applications using HTML, CSS, Bootstrap, and JavaScript.
CO 2	Demonstrate advanced JavaScript features (ES6, promises, async/await) with real-time APIs.
CO 3	Implement database-driven applications using JDBC and servlets.
CO 4	Develop server-side implementations using Node.js and Express framework.
CO 5	Design and deploy **Single Page Applications (SPA)** using React.

4. COURSE CONTENT

LIST OF EXPERIMENTS

1. Build a **responsive shopping cart web application** with registration, login, catalog, and cart pages using CSS3 (flex & grid).
2. Enhance the above web application using the **Bootstrap framework**.
3. Perform **client-side validation** using JavaScript for the pages developed in Experiments 1 and 2.
4. Explore **ES6 features** (arrow functions, callbacks, promises, async/await). Implement an application that fetches weather data from *openweathermap.org* and displays it graphically.
5. Develop a **Java standalone application** that connects to a database (Oracle/MySQL) and performs CRUD operations.
6. Create an **XML document** for a bookstore and validate it using both DTD and XSD.
7. Design a **Servlet-based controller** that integrates the shopping cart application with the database created in Experiment 5.

8. Explore and implement **session tracking mechanisms** (Cookies, HTTP Session) for maintaining user transactional history.
9. Create a **custom server in Node.js** using the HTTP module and explore additional Node.js modules (OS, path, event).
10. Develop an **Express.js web application** that interacts with a REST API to perform CRUD operations on student data. (Test using Postman).
11. Secure the above application by creating **authorized endpoints using JWT (JSON Web Token)**.
12. Create a **React application** for a student management system with registration, login, contact, and about pages. Implement **routing** for navigation.
13. Build a **React service** that fetches weather information from *openweathermap.org* and displays current and historical data graphically using **Chart.js**.
14. Create a **React TODO application** with reusable components and deploy it on **GitHub Pages**.

5. REFERENCE BOOKS

1) Jon Duckett, *Beginning HTML, XHTML, CSS, and JavaScript*, Wrox Publications, 2010.
2) Bryan Basham, Kathy Sierra, Bert Bates, *Head First Servlets and JSP*, O'Reilly Media, 2nd Edition, 2008.
3) Vasan Subramanian, *Pro MERN Stack: Full Stack Web App Development with Mongo, Express, React, and Node*, 2nd Edition, A press.

CO-PO-PSO Mapping

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO 1	**3**	**3**	**3**	**2**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**		
CO 2	**3**	**3**	**3**	**2**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**		
CO 3	**3**	**3**	**3**	**3**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**		
CO 4	**3**	**3**	**3**	**3**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**		
CO 5	**3**	**3**	**3**	**3**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**2**		

COURSE CONTENT

GENDER SENSITIZATION LAB								
II Year - I Semester: CSE (DS)								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
***MC309**	**Mandatory**	**-**	**-**	**2**	**0**	**40**	**60**	**100**
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 32				**Total Classes: 32**		
Prerequisite: Nil								

1. COURSE OVERVIEW

This course offers an introduction to Gender Studies, an interdisciplinary field that asks critical questions about the meanings of sex and gender in society. The primary goal of this course is to familiarize students with key issues, questions and debates in Gender Studies, both historical and contemporary. It draws on multiple disciplines – such as literature, history, economics, psychology, sociology, philosophy, political science, anthropology and media studies – to examine cultural assumptions about sex, gender, and sexuality. This course integrates analysis of current events through student presentations, aiming to increase awareness of contemporary and historical experiences of women, and of the multiple ways that sex and gender interact with race, class, caste, nationality and other social identities. This course also seeks to build an understanding and initiate and strengthen programmes combating gender-based violence and discrimination. The course also features several exercises and reflective activities designed to examine the concepts of gender, gender-based violence, sexuality, and rights. It will further explore the impact of gender-based violence on education, health and development.

2. COURSE OBJECTIVE

The students will try to Learn:

1) To develop students' sensibility with regard to issues of gender in contemporary India.
2) To provide a critical perspective on the socialization of men and women.
3) To introduce students to information about some key biological aspects of genders.
4) To expose the students to debates on the politics and economics of work.
5) To help students reflect critically on gender violence.
6) To expose students to more egalitarian interactions between men and women.

3. COURSE OUTCOMES

After successful completion of the course, students should be able to:

CO 1	Students will have developed a better understanding of important issues related to gender in contemporary India.
CO 2	Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film
CO 3	Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
CO 4	Students will acquire insight into the gendered division of labor and its relation to politics and economics.
CO 5	Men and women students and professionals will be better equipped to work and live together as equals.

4. COURSE CONTENT

Unit-I: UNDERSTANDING GENDER

Introduction: Definition of Gender-Basic Gender Concepts and Terminology-Exploring Attitudes towards Gender-Construction of Gender-Socialization: Making Women, Making Men- Preparing for Womanhood. Growing up Male. First lessons in Caste.

Unit – II: GENDER ROLES AND RELATIONS

Two or Many? -Struggles with Discrimination-Gender Roles and Relations-Types of Gender Roles- Gender Roles and Relationships Matrix-Missing Women-Sex Selection and Its Consequences- Declining Sex Ratio. Demographic Consequences-Gender Spectrum: Beyond the Binary.

Unit – III: GENDER AND LABOUR

Division and Valuation of Labour-Housework: The Invisible Labor- "My Mother doesn't Work." "Share the Load."-Work: Its Politics and Economics -Fact and Fiction. Unrecognized and Unaccounted work.

-Gender Development Issues-Gender, Governance and Sustainable Development-Gender and Human Rights-Gender and Mainstreaming

Unit – IV: GENDER - BASED VIOLENCE

The Concept of Violence- Types of Gender-based Violence-Gender-based Violence from a Human Rights Perspective-Sexual Harassment: Say No!-Sexual Harassment, not Eve-teasing- Coping with Everyday Harassment- Further Reading: "Chupulu".

Domestic Violence: Speaking OutIs Home a Safe Place? -When Women Unite [Film]. Rebuilding Lives. Thinking about Sexual Violence Blaming the Victim-"I Fought for my Life…."

Unit – V: GENDER AND CULTURE

Gender and Film-Gender and Electronic Media-Gender and Advertisement-Gender and Popular Literature-Gender Development Issues-Gender Issues-Gender Sensitive Language-Gender and Popular Literature - Just Relationships: Being Together as Equals Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers. Rosa Parks- The Brave Heart.

Note: Since it is Interdisciplinary Course, Resource Persons can be drawn from the fields of English Literature or Sociology or Political Science or any other qualified faculty who has expertise in this field from engineering departments.

- Classes will consist of a combination of activities: dialogue-based lectures, discussions, collaborative learning activities, group work and in-class assignments. Apart from the above prescribed book, Teachers can make use of any authentic materials related to the topics given in the syllabus on "Gender".
- ESSENTIAL READING: The Textbook, "Towards a World of Equals: A Bilingual Textbook on Gender" written by A.Suneetha, Uma Bhrugubanda, DuggiralaVasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu published by Telugu Academy, Telangana Government in 2015.

ASSESSMENT AND GRADING:

- Discussion & Classroom Participation: 20%.
- Project/Assignment: 30%
- End Term Exam: 50%

CO-PO-PSO Mapping

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO 1								**3**	**3**					
CO 2								**3**	**3**					
CO 3								**3**	**3**					
CO 4								**3**	**3**					
CO 5								**3**	**3**					