Third Semester					
Group	Paper Code	Paper	L	P	Credits
Theory Papers					
ES	ES-201	Computational Methods	4		4
HS/MS	HS-203	Indian Knowledge System*	2		2
PC	CIC-205	Discrete Mathematics	4		4
PC	ECC-207	Digital Logic and Computer Design	4		4
PC	CIC-209	Data Structures	4		4
PC	CIC-211	Object-Oriented Programming using C++	4		4
Practical / Viva Voce					
ES	ES-251	Computational Methods Lab		2	1
PC	ECC-253	Digital Logic and Computer Design Lab		2	1
PC	CIC-255	Data Structures Lab		2	1
PC	CIC-257	Object-Oriented Programming using C++ Lab		2	1
Total			**22**	**8**	**26**

***NUES:**All examinations to be conducted by the concerned teacher as specified in the detailed syllabus of the paper.

Fourth Semester					
Group	Paper Code	Paper	L	P	Credits
Theory Papers					
BS	BS-202	Probability, Statistics and Linear Programming	4		4
HS/MS	HS-204	Technical Writing*	2		2
PC	CIC-206	Theory of Computation	4		4
PC	EEC-208	Circuits and Systems	4		4
PC	CIC-210	Database Management Systems	4		4
PC	CIC-212	Programming in Java	4		4
Practical / Viva Voce					
BS	BS-252	Probability, Statistics and Linear Programming Lab		2	1
PC	EEC-254	Circuits and Systems Lab		2	1
PC	CIC-256	Database Management Systems Lab		2	1
PC	CIC-258	Programming in Java Lab		2	1
Total			**22**	**8**	**26**

***NUES:**All examinations to be conducted by the concerned teacher as specified in the detailed syllabus of the paper.

Paper Code(s): EEC-213 / EEC-208	L	P	C
Paper: Circuits and Systems	**4**	**-**	**4**

Marking Scheme:
1. Teachers Continuous Evaluation: 25 marks
2. Term end Theory Examinations: 75 marks

Instructions for paper setter:
1. There should be 9 questions in the term end examinations question paper.
2. The first (1st) question should be compulsory and cover the entire syllabus. This question should be objective, single line answers or short answer type question of total 15 marks.
3. Apart from question 1 which is compulsory, rest of the paper shall consist of 4 units as per the syllabus. Every unit shall have two questions covering the corresponding unit of the syllabus. However, the student shall be asked to attempt only one of the two questions in the unit. Individual questions may contain upto 5 sub-parts / sub-questions. Each Unit shall have a marks weightage of 15.
4. The questions are to be framed keeping in view the learning outcomes of the course / paper. The standard / level of the questions to be asked should be at the level of the prescribed textbook.
5. The requirement of (scientific) calculators / log-tables / data – tables may be specified if required.

Course Objectives :

1.	To impart the knowledge of various signal and system.
2.	To understand modelling of circuit.
3.	To impart knowledge of theorems in AC circuit.
4.	To impart knowledge of two port network and transfer function.

Course Outcomes (CO)

CO 1	Ability to understand properties of signal and system.
CO 2	Ability to determine transient respond of circuit.
CO 3	Ability to solve AC circuit.
CO 4	Ability to determine two port parameter and transfer function.

Course Outcomes (CO) to Programme Outcomes (PO) mapping (scale 1: low, 2: Medium, 3: High)

	PO01	PO02	PO03	PO04	PO05	PO06	PO07	PO08	PO09	PO10	PO11	PO12
CO 1	3	3	3	3	2	-	-	-	1	1	1	1
CO 2	3	3	3	3	2	-	-	-	1	1	1	1
CO 3	3	3	3	3	2	-	-	-	1	1	1	1
CO 4	3	3	3	3	2	-	-	-	1	1	1	1

UNIT – I

Signals, Classification of Signals, Systems, Classification of Systems, Linear Time Invariant (LTI) Systems; Laplace Transform, z-Transform, Fourier Series and Transform (Continuous and Discrete) and their properties. Laplace Transform and Continuous Time LTI systems, z-Transform and Discrete Time LTI systems, Fourier analysis of signals and systems, State Space Analysis. [T1]

UNIT-II

System modeling in terms of differential equations and transient response of R, L, C, series and parallel circuits for impulse, step, ramp, sinusoidal and exponential signals by classical method and using Laplace transform. [T2]

UNIT – III

AC Circuits: Circuits containing Capacitors and Inductors, Transient Response, Alternating Current and Voltages, Phasors, Impedances and Admittance, Mesh Analysis, Loop Analysis, Nodal Analysis, Thevenin's and Norton's Theorem, Y - D and D- Y Transformation, Bridge Circuits. Resonant Circuits, Complex Frequency and Network Function, Two port Networks. Passive Filters. [T2]

UNIT – IV

Graph theory: concept of tree, tie set matrix, cut set matrix and application to solve electric networks.

Two port networks – Introduction of two port parameters and their interconversion, interconnection of two 2-port networks, open circuit and short circuit impedances and ABCD constants, relation between image impedances and short circuit and open circuit impedances. Network functions, their properties and concept of transform impedance, Hurwitz polynomial.   [T2]

Textbook(s):
1. B. P. Lathi, "Signal Processing and Linear System", Berkeley Cambridge Press, 1998.
2. A. H. Robbins and W. C. Miller, "Circuit Analysis: Theory and Practice", Thomson Learning/Delmar Pub., 2007.

Reference Books:
1. S. Haykin and B. V. Veen, "Signal and Systems", John Wiley and Sons, 1999.
2. H. P. Hsu, "Schaum's Outlines of The Theory and Problems of Signals and Systems", McGraw-Hill, 1995.
3. S. Madhu, "Linear Circuit Analysis", Prentice Hall, 1988.
4. S. Ghosh, "Signals and Systems", Pearson Education, 2006.
5. S. Poornachandra, "Signal and Systems", Thomson Learning, 2004.
6. M. Nahvi and J. A. Edminister, "Schaum's Outline of Theory and Problems of Electric Circuits", McGraw-Hill, 2003.

Paper Code(s): BS-202	L	P	C
Paper: Probability, Statistics and Linear Programming	**4**	**-**	**4**

Marking Scheme:
1. Teachers Continuous Evaluation: 25 marks
2. Term end Theory Examinations: 75 marks
Instructions for paper setter:
1. There should be 9 questions in the term end examinations question paper.
2. The first (1st) question should be compulsory and cover the entire syllabus. This question should be objective, single line answers or short answer type question of total 15 marks.
3. Apart from question 1 which is compulsory, rest of the paper shall consist of 4 units as per the syllabus. Every unit shall have two questions covering the corresponding unit of the syllabus. However, the student shall be asked to attempt only one of the two questions in the unit. Individual questions may contain upto 5 sub-parts / sub-questions. Each Unit shall have a marks weightage of 15.
4. The questions are to be framed keeping in view the learning outcomes of the course / paper. The standard / level of the questions to be asked should be at the level of the prescribed textbook.
5. The requirement of (scientific) calculators / log-tables / data – tables may be specified if required.
Course Objectives:
1: To understand probability and probability distributions.
2: To understand methods of summarization of data.
3: To understand and use test for hypothesis.
4: To understand methods for solving linear programming problems.
Course Outcomes (CO):
CO1: Ability to solve probability problems and describe probability distributions.
CO2: Ability to describe and summarize data.
CO3: Ability to use test for hypothesis.
CO4: Ability to formulate and solve linear programming problems.

Course Outcomes (CO to Programme Outcomes (PO) Mapping (scale 1: low, 2: Medium, 3: High

CO/PO	PO01	PO02	PO03	PO04	PO05	PO06	PO07	PO08	PO09	PO10	PO11	PO12
CO1	-	3	1	1	1	-	-	-	-	-	1	2
CO2	-	3	1	1	1	-	-	-	-	-	1	2
CO3	-	3	2	2	1	-	-	-	-	-	2	2
CO4	-	3	3	3	1	-	-	-	-	-	2	2

Unit I

Basics: Probability and Statistical models, Sample Spaces and Events, Counting Techniques, Interpretations and Axioms of Probability, Unions of Events and Addition Rules, Conditional Probability, Intersections of Events and Multiplication and Total Probability Rules, Independence, Bayes' Theorem, Random Variables.
Discrete and Continuous Random Variables and Distributions: Probability Distributions and Probability Mass / density Functions, Cumulative Distribution Functions, Mean and Variance of a Random Variable, Discrete and continuous Uniform Distribution, Binomial Distribution, Geometric and Negative Binomial Distributions, Hypergeometric Distribution, Poisson Distribution. Normal Distribution, Normal Approximation to the Binomial, and Poisson Distributions; Exponential Distribution, Erlang and Gamma Distributions, Weibull Distribution, Lognormal Distribution, Beta Distribution.

Unit II

Joint Probability Distributions for Two Random Variables, Conditional Probability Distributions and Independence, Joint Probability Distributions for Two Random Variables, Covariance and Correlation, Common Joint Distributions, Linear Functions of RandomVariables, General Functions of Random Variables, Moment-Generating Functions.
Numerical Summaries of Data, Stem-and-Leaf Diagrams, Frequency Distributions and Histograms, Box Plots, Time Sequence Plots, Scatter Diagrams, Probability Plots. Point Estimation, Sampling Distributions and the

Central Limit Theorem without proof, General Concepts of Point Estimation, Methods of Point Estimation, Statistical Intervals for a Single Sample.

Unit III

Hypotheses Testing for a SingleSample: Tests on the Mean of a Normal Distribution with Variance Known / Unknown, Tests on the Variance and Standard Deviationof a Normal Distribution, Tests on a Population Proportion, Testing for Goodness of Fit, Nonparametric tests (Signed, Wilcoxon), Similarly Statistical Inference forTwo Samples.
Regression and Correlation: Linear Regression, Least Squares Estimators, Hypotheses testing for simple linear regression, Confidence Intervals, Adequacy of model, Correlation, Transformed Variables, Logistic Regression. Similarly, for multiple linear regression including aspects of MLR.

Unit IV

Linear Programming: Introduction, formulation of problem, Graphical method, Canonical and Standard form of LPP, Simplex method, Duality concept, Dual simplex method, Transportation and Assignment problem.

Textbooks:
1. *Applied Statistics and Probability for Engineers* by Douglas G. Montgomery and Runger, Wiley, 2018
2. *Linear Programming* by G. Hadley, Narosa, 2002

References:
1. *Miller and Freund's Probability and Statistics for Engineers* by Richard A. Johnson, Pearson, 10th Ed., 2018.
2. *Probability & Statistics for Engineers & Scientists* by Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers and Keying Ye, Pearson, 2016.
3. *Statistics and probability with applications for engineers and scientists using Minitab, R and JMP*, C. Gupta, Irwin Guttman, and Kalanka P. Jayalath, Wiley, 2020.
4. *Probability and Statistics for Engineering and the Sciences*, Jay Devore, Cengage Learning, 2014.
5. *Probability and Statistics in Emgineering*, William W. Hines, Douglas C. Montgomery, David M. Goldman, and Connie M. Borror, Wiley, 2003.
6. *Operations Research: An Introduction* by Hamdy A. Taha, Pearson, 10th Edition, 2016

Paper Code(s): HS-204	L	P	C
Paper: Technical Writing	**2**	**-**	**2**

Marking Scheme:
1. Teachers Continuous Evaluation: 25 marks
2. Term end Theory Examinations: 75 marks
3. This is an NUES paper, hence all examinations to be conducted by the concerned teacher.

Instruction for paper setter:
1. There should be 9 questions in the term end examinations question paper.
2. The first (1st) question should be compulsory and cover the entire syllabus. This question should be objective, single line answers or short answer type question of total 15 marks.
3. Apart from question 1 which is compulsory, rest of the paper shall consist of 4 units as per the syllabus. Every unit shall have two questions covering the corresponding unit of the syllabus. However, the student shall be asked to attempt only one of the two questions in the unit. Individual questions may contain upto 5 sub-parts / sub-questions. Each Unit shall have a marks weightage of 15.
4. The questions are to be framed keeping in view the learning outcomes of the course / paper. The standard / level of the questions to be asked should be at the level of the prescribed textbook.
5. The requirement of (scientific) calculators / log-tables / data – tables may be specified if required.

Course Objectives:

1:	To improve grammar and sentence structure and build vocabulary.
2:	To understand how to write different types of writings.
3:	To understand how to compose different types of business documents.
4:	To understand business ethics and develop soft skills.

Course Outcomes (CO):

CO1:	Ability to improve grammar and sentence structure and build vocabulary.
CO2:	Ability to write different types of writings with clarity.
CO3:	Ability to write different types of business documents.
CO4:	Ability to apply business ethics and enhance personality.

Course Outcomes (CO to Programme Outcomes (PO) Mapping (scale 1: low, 2: Medium, 3: High

CO/PO	PO01	PO02	PO03	PO04	PO05	PO06	PO07	PO08	PO09	PO10	PO11	PO12
CO1	-	-	-	-	-	1	-	-	-	3	-	-
CO2	-	-	-	-	-	1	-	-	-	3	-	-
CO3	-	-	-	-	-	1	-	-	-	3	-	-
CO4	-	-	-	-	-	1	-	3	-	3	-	-

Unit I

Grammar and Vocabulary--- Types of sentences (simple, complex and compound) and use of connectives in sentences, Subject-verb agreement, Comprehension, Synonyms and Antonyms, Homophones and Homonyms, Word Formation: Prefixes and Suffixes, Indianism, Misappropriation and Redundant Words, Question Tags and Short Responses.

Unit II

Writing Styles -- Expository, Explanatory, Descriptive, Argumentative and Narrative.
Precis writing, Visual Aids in Technical Writing, Plagiarism and Language Sensitivity in Technical Writing,
Dialogue Writing, Proposals: Purpose and Types.

Unit III

Letters at the Workplace—letter writing: Request, Sales, Enquiry, Order and Complaint.
Job Application---Resume and Cover letter, Difference between Resume and CV, Preparation for Interview.
Meeting Documentation--- Notice, Memorandum, Circular, Agenda, Office Order and Minutes of meeting, Writing Instructions.

Unit IV

Ethics and Personality Development-----The Role of Ethics in Business Communication—Ethical Principles, Time Management, Self-Analysis through SWOT and JOHARI Window, Emotional Intelligence and Leadership Skills, Team Building, Career Planning, Self Esteem.

Textbook:
1. Meenakshi Raman and Sangeeta Sharma, Technical Communication: Principles and Practice, Oxford University Press, New Delhi (2015).

References:
1. Sanjay Kumar and Pushp Lata, Communication Skills, Oxford University Press, New Delhi (2015).
2. Herta A Murphy, Herbert W Hildebrandt, Jane P Thomas, Effective Business Communication, Tata McGraw-Hill, Hill Publishing Company Limited, Seventh Edition.

Paper Code(s): CIC-206	**L**	**P**	**C**
Paper: Theory of Computation	**4**	**-**	**4**

Marking Scheme:
1. Teachers Continuous Evaluation: 25 marks
2. Term end Theory Examinations: 75 marks
Instructions for paper setter:
1. There should be 9 questions in the term end examinations question paper.
2. The first (1ˢᵗ) question should be compulsory and cover the entire syllabus. This question should be objective, single line answers or short answer type question of total 15 marks.
3. Apart from question 1 which is compulsory, rest of the paper shall consist of 4 units as per the syllabus. Every unit shall have two questions covering the corresponding unit of the syllabus. However, the student shall be asked to attempt only one of the two questions in the unit. Individual questions may contain upto 5 sub-parts / sub-questions. Each Unit shall have a marks weightage of 15.
4. The questions are to be framed keeping in view the learning outcomes of the course / paper. The standard / level of the questions to be asked should be at the level of the prescribed textbook.
5. The requirement of (scientific) calculators / log-tables / data – tables may be specified if required.

Course Objectives :	
1.	To understand Automata (Deterministic and Non-Deterministic) and Language Theory
2.	To understand Context Free Grammar (CFG), Parse Trees and Push Down Automata
3.	To introduce the concepts of Turing Machines and Computability Theory
4.	To understand Complexity Theory (NP-completess NP-hardness) and Space complexity

Course Outcomes (CO)	
CO 1	Ability to understand the design aspects of "abstract models" of computers like finite automata, pushdown automata, and Turing machines.
CO 2	Ability to comprehend the recognizability (decidability) of grammar (language) with specific characteristics through these abstract models.
CO 3	Ability to decide what makes some problems computationally hard and others easy?
CO 4	A ability to deliberate the problems that can be solved by computers and the ones that cannot?

Course Outcomes (CO) to Programme Outcomes (PO) mapping (scale 1: low, 2: Medium, 3: High)

	PO01	PO02	PO03	PO04	PO05	PO06	PO07	PO08	PO09	PO10	PO11	PO12
CO 1	3	2	2	2	2	-	-	-	2	1	1	3
CO 2	3	2	2	2	2	-	-	-	2	1	1	3
CO 3	3	2	2	2	2	-	-	-	2	1	1	3
CO 4	3	2	2	2	2	-	-	-	2	1	1	3

UNIT – I

Automata and Language Theory: Chomsky Classification, Finite Automata, Deterministic Finite Automata (DFA), Non-Deterministic Finite Automata (NFA), Regular Expressions, Equivalence of DFAs, NFAs and Regular Expressions, Closure properties of Regular grammar, Non-Regular Languages, Pumping Lemma.

UNIT – II

Context Free Languages: Context Free Grammar (CFG), Parse Trees, Push Down Automata (deterministic and non-deterministic) (PDA), Equivalence of CFGs and PDAs, Closure properties of CFLs, Pumping Lemma, Parsing, LL(K) grammar.

UNIT – III

Turing Machines and Computability Theory: Definition, design and extensions of Turing Machine, Equivalence of various Turing Machine Formalisms, Church – Turing Thesis, Decidability, Halting Problem, Reducibility and its use in proving undecidability. Rices theorem. Undecidability of Posts correspondence problem., Recursion

Theorem.

UNIT – IV

Complexity Theory: The class P as consensus class of tractable sets. Classes NP, co-NP. Polynomial time reductions. NP-completess, NP-hardness. Cook- Levin theorem (With proof). Space complexity, PSPACE and NPSPACE complexity classes, Savitch theorem (With proof). Probabilistic computation, BPP class. Interactive proof systems and IP class. relativized computation and oracles.

Textbook(s):
1. Sipser, Michael. Introduction to the Theory of Computation, Cengage Learning, 2012.
2. J. Hopcroft, R. Motwani, and J. Ullman, Introduction to Automata Theory, Language and Computation, Pearson, 2nd Ed, 2006.

References:
1. Peter Linz, An Introduction to Formal Languages and Automata, 6th edition, Viva Books, 2017
1. Maxim Mozgovoy, Algorithms, Languages, Automata, and Compilers, Jones and Bartlett, 2010.
2. D. Cohen, Introduction to Computer Theory, Wiley, N. York, 2nd Ed, 1996.
3. J. C. Martin, Introduction to Languages and the Theory of Computation, TMH, 2nd Ed. 2003.
4. K. L. Mishra and N. Chandrasekharan, Theory of Computer Science: Automata, Languages and Computation, PHI, 2006.
5. Anne Benoit, Yves Robert, Frédéric Vivien, A Guide to Algorithm Design: Paradigms, Methods, and Complexity Analysis, CRC Press, 2013.

Paper Code(s): CIC-210	L	P	C
Paper: Database Management System	4	-	4

Marking Scheme:
1. Teachers Continuous Evaluation: 25 marks
2. Term end Theory Examinations: 75 marks

Instructions for paper setter:
1. There should be 9 questions in the term end examinations question paper.
2. The first (1st) question should be compulsory and cover the entire syllabus. This question should be objective, single line answers or short answer type question of total 15 marks.
3. Apart from question 1 which is compulsory, rest of the paper shall consist of 4 units as per the syllabus. Every unit shall have two questions covering the corresponding unit of the syllabus. However, the student shall be asked to attempt only one of the two questions in the unit. Individual questions may contain upto 5 sub-parts / sub-questions. Each Unit shall have a marks weightage of 15.
4. The questions are to be framed keeping in view the learning outcomes of the course / paper. The standard / level of the questions to be asked should be at the level of the prescribed textbook.
5. The requirement of (scientific) calculators / log-tables / data – tables may be specified if required.

Course Objectives :

1.	To introduce basic concepts, architecture and characteristics of database systems
2.	To introduce relational model concepts and PL/SQL programming
3.	To introduce relational database design and Normal forms based on functional dependencies
4.	To introduce concepts of object oriented & distributed databases

Course Outcomes (CO) :

CO 1	Ability to understand advantages of database systems
CO 2	Ability to use SQL as DDL, DCL and DML
CO 3	Ability to design database and manage transaction processing
CO 4	Understand object oriented & distributed databases systems and use them

Course Outcomes (CO) to Programme Outcomes (PO) mapping (scale 1: low, 2: Medium, 3: High)

	PO01	PO02	PO03	PO04	PO05	PO06	PO07	PO08	PO09	PO10	PO11	PO12
CO 1	3	3	2	2	2	-	-	-	3	2	2	3
CO 2	3	3	2	2	2	-	-	-	3	2	2	3
CO 3	3	3	2	3	3	-	-	-	3	2	2	3
CO 4	3	3	2	3	3	-	-	-	3	2	2	3

UNIT – I

Basic concepts: database & database users, characteristics of the database systems, concepts and architecture, date models, schemas & instances, DBMS architecture & data independence, database languages & interfaces, data modelling using the entity-relationship approach. Enhanced ER concepts - Specialization/Generalization, Aggregation, Mapping of ER model to Relational Model.
SQL – DDL, DCL & DML views and indexes in SQL. Basics of SQL, DDL, DML,DCL, structure – creation, alteration, defining constraints – Primary key, foreign key, unique, not null, check, IN operator.

UNIT - II:

Relational model concepts, relational model constraints, relational algebra, relational calculus.
SQL – Functions - aggregate functions, Built-in functions – numeric, date, string functions, set operations, sub-queries, correlated sub-queries, Use of group by, having, order by, join and its types, Exist, Any, All , view and its types. Transaction control commands – Commit, Rollback, Save point.

UNIT - III

Relational data base design: functional dependencies & normalization for relational databases, normal forms based on functional dependencies, (1NF, 2NF, 3NF & BCNF), lossless join and dependency preserving

decomposition, normal forms based on multivalued & join dependencies (4NF & 5NF) & domain key normal form

Properties of Transaction, Transaction states, Transaction Schedule, Serializability, Concurrency control techniques, locking techniques, time stamp ordering, Recoverable schedules, granularity of data items, Deadlock detection and Recovery, recovery techniques: recovery concepts, database backup and recovery from catastrophic failures.
Database Programming – control structures, exception handling, stored procedures, Triggers.

UNIT - IV

File Structures and Indexing: Secondary Storage Devices, Operations on Files, Heap Files, Sorted Files, Hashing, Single level indexes, Multi-level indexes, B and B+ tree indexes.
Concepts of Object Oriented Database Management systems & Distributed Database Management Systems

Textbooks:
1. R. Elmsari and S. B. Navathe, "Fundamentals of database systems", Pearson Education, 7th Edition, 2018
2. V. M. Grippa and S. Kumichev, "Learning MySQL", O'Reilly, 2021.
3. SQL/ PL/SQL, The programming language of Oracle, Ivan Bayross, 4th Edition BPB Publications

References:
1. A. Silberschatz, H. F. Korth and S. Sudershan, "Database System Concept", McGraw Hill, 6th Edition,2013.
2. Date, C. J., "An introduction to database systems", 8th Edition, Pearson Education, 2008.
3. P. Rob & C. Coronel, "Database Systems: Design Implementation & Management", Thomson Learning, 6th Edition, 2004
4. Desai, B., "An introduction to database concepts", Galgotia publications, 2010
5. H. Garcia-Molina, J. D. Ullman, J. Widom, "Database System: The Complete Book", PH.
6. Joel Murach, Murach's Mysql"", 3rd Edition-Mike Murach and Associates, Incorporated, 2019.
7. Oracle and MySQL manuals.

Paper Code(s): CIC-212	L	P	C
Paper: Programming in Java	4	-	4

Marking Scheme:
1. Teachers Continuous Evaluation: 25 marks
2. Term end Theory Examinations: 75 marks
Instructions for paper setter:
1. There should be 9 questions in the term end examinations question paper.
2. The first (1st) question should be compulsory and cover the entire syllabus. This question should be objective, single line answers or short answer type question of total 15 marks.
3. Apart from question 1 which is compulsory, rest of the paper shall consist of 4 units as per the syllabus. Every unit shall have two questions covering the corresponding unit of the syllabus. However, the student shall be asked to attempt only one of the two questions in the unit. Individual questions may contain upto 5 sub-parts / sub-questions. Each Unit shall have a marks weightage of 15.
4. The questions are to be framed keeping in view the learning outcomes of the course / paper. The standard / level of the questions to be asked should be at the level of the prescribed textbook.
5. The requirement of (scientific) calculators / log-tables / data – tables may be specified if required.
Course Objectives :
1.	To understand and gain knowledge of characteristics of Java, JVM, instruction set, control flow, programming and the sandbox model.
2.	To learn the Java programming, use of exceptional handling and inheritance.
3.	To understand threads, thread synchronization, AWT components and event handling mechanism.
4.	To understand the concepts of I/O streams, JDBC, object serialization, sockets, RMI, JNI, Collection API interfaces, Vector, Stack, Hash table classes, list etc.

Course Outcomes (CO)	
CO 1	Ability to understand the compilation process of Java, role of JVM as an emulator and various types of instructions.
CO 2	Ability to learn and apply concepts of Java programming, exceptional handling and inheritance.
CO 3	Ability to understand the use of multi-threading, AWT components and event handling mechanism in Java.
CO 4	Ability to understand the concepts of I/O streams, IDBC, object serialization, sockets, RMI, JNI, Collection API interfaces, Vector, Stack, Hash table classes, list etc.

Course Outcomes (CO) to Programme Outcomes (PO) mapping (scale 1: low, 2: Medium, 3: High)

	PO01	PO02	PO03	PO04	PO05	PO06	PO07	PO08	PO09	PO10	PO11	PO12
CO 1	3	2	2	2	3	-	-	-	3	2	2	3
CO 2	3	2	2	2	3	-	-	-	3	2	2	3
CO 3	3	2	2	2	3	-	-	-	3	2	2	3
CO 4	3	2	2	2	3	-	-	-	3	2	2	3

UNIT - I

Overview and characteristics of Java, Java program Compilation and Execution Process Organization of the Java Virtual Machine, JVM as an interpreter and emulator, Instruction Set, class File Format, Verification, Class Area, Java Stack, Heap, Garbage Collection. Security Promises of the JVM, Security Architecture and Security Policy. Class loaders and security aspects, sandbox model

UNIT - II

Java Fundamentals, Data Types & Literals Variables, Wrapper Classes, Arrays, Arithmetic Operators, Logical Operators, Control of Flow, Classes and Instances, Class Member Modifiers Anonymous Inner Class Interfaces and Abstract Classes, inheritance, throw and throws clauses, user defined Exceptions, The String Buffer Class, tokenizer, applets, Life cycle of applet and Security concerns.

UNIT - III

Threads: Creating Threads, Thread Priority, Blocked States, Extending Thread Class, Runnable Interface, Starting Threads, Thread Synchronization, Synchronize Threads, Sync Code Block, Overriding Synced Methods, Thread Communication, wait, notify and notify all.

AWT Components, Component Class, Container Class, Layout Manager Interface Default Layouts, Insets and Dimensions, Border Layout, Flow Layout, Grid Layout, Card Layout Grid Bag Layout AWT Events, Event Models, Listeners, Class Listener, Adapters, Action Event Methods Focus Event Key Event, Mouse Events, Window Event

UNIT - IV

Input/Output Stream, Stream Filters, Buffered Streams, Data input and Output Stream, Print Stream Random Access File, JDBC (Database connectivity with MS-Access, Oracle, MS-SQL Server), Object serialization, Sockets, development of client Server applications, design of multithreaded server. Remote Method invocation, Java Native interfaces, Development of a JNI based application.

Collection API Interfaces, Vector, stack, Hashtable classes, enumerations, set, List, Map, Iterators.

Textbook(s):
1. Patrick Naughton and Herbertz Schidt, "Java-2 the Complete Reference",TMH

References:
1. E. Balaguruswamy, "Programming with Java", TMH
2. Horstmann, "Computing Concepts with Java 2 Essentials", John Wiley.
3. Decker & Hirshfield, "Programming Java", Vikas Publication.

Paper Code(s): EEC-253 / EEC-254	L	P	C
Paper: Circuits and Systems Lab	-	2	1

Marking Scheme:
1. Teachers Continuous Evaluation: 40 marks
2. Term end Theory Examinations: 60 marks
Instructions:
1. The course objectives and course outcomes are identical to that of (Circuits and Systems) as this is the practical component of the corresponding theory paper.
2. The practical list shall be notified by the teacher in the first week of the class commencement under intimation to the office of the Head of Department / Institution in which the paper is being offered from the list of practicals below. Atleast 10 experiments must be performed by the students, they may be asked to do more. Atleast 5 experiments must be from the given list.

1. Introduction to MATLAB and its basic commands.

2. Plot unit step, unit impulse, unit ramp, exponential, parabolic functions and sinusoidal signals

3. Plot the linear convolution of two sequences

4. Study the transient response of series RLC circuit for different types of waveforms on CRO and verify using MATLAB

5. Study the time response of a simulated linear system and verify the unit step and square wave response of first order and second order, type 0,1 system

6. To determine Z and Y parameters of the given two port network.

7. To determine ABCD parameters of the given two port network.

8. To verify various theorems in AC Circuits.

9. To determine Hybrid parameters of the given two port network.

10. To design Cascade Connection and determine ABCD parameters of the given two port network.

11. To design Series-Series Connection and determine Z parameters of the given two port network.

12. To design Parallel-Parallel Connection and determine Y parameters of the given two port network.

13. To design Series-Parallel Connection and determine h parameters of the given two port network.

Paper Code(s): BS-252	L	P	C
Paper: Probability, Statistics and Linear Programming Lab	-	2	1

Marking Scheme:
1. Teachers Continuous Evaluation: 40 marks
2. Term end Theory Examinations: 60 marks
Instructions:
1. The course objectives and course outcomes are identical to that of (Probability, Statistics and Linear Programming) as this is the practical component of the corresponding theory paper.
2. The practical list shall be notified by the teacher in the first week of the class commencement under intimation to the office of the Head of Department / Institution in which the paper is being offered from the list of practicals below. Atleast 10 experiments must be performed by the students, they may be asked to do more. Atleast 5 experiments must be from the given list.

Implementation to be done in MATLAB or in equivalent software.

1. Installation of Scilab and demonstration of simple programming concepts like marix multiplication (scalar and vector), loop, conditional statements and plotting.

2. Program for demonstration of theoretical probability limits.

3. Program to plot normal distributions and exponential distributions for various parametric values.

4. Fitting of binomial distributions for given n and p.

5. Fitting of binomial distributions after computing mean and variance.

6. Fitting of Poisson distributions for given value of lambda.

7. Fitting of Poisson distributions after computing mean.

8. Fitting of normal distribution when parameters are given.

9. Fitting of linear regression line through given data set and testing of goodness of fit using mean error.

10. Fitting of Multiple Linear Regression (MLR) curve through given data set and testing of goodness of fit using mean error.

11. Solve a LPP of three variable using Simplex Method.

12. Solve a Transportation problem of three variables.

13. Solve an Assignment problem of three variables.

Paper Code(s): CIC-256	L	P	C
Paper: Database Management System Lab	**-**	**2**	**1**

Marking Scheme:
1. Teachers Continuous Evaluation: 40 marks
2. Term end Theory Examinations: 60 marks
Instructions:
1. The course objectives and course outcomes are identical to that of (Database Management System) as this is the practical component of the corresponding theory paper.
2. The practical list shall be notified by the teacher in the first week of the class commencement under intimation to the office of the Head of Department / Institution in which the paper is being offered from the list of practicals below. Atleast 10 experiments must be performed by the students, they may be asked to do more. Atleast 5 experiments must be from the given list.

1. Experiments based on DDL commands – CREATE, ALTER, DROP and TRUNCATE.

2. Apply the integrity constraints like Primary Key, Foreign key, Check, NOT NULL, etc. to the tables.

3. Experiments based on basic DML commands – SELECT, INSERT, UPDATE and DELETE.

4. Write the queries for implementing Built-in functions, GROUP BY, HAVING and ORDER BY.

5. Write the queries to implement the joins.

6. Write the queries to implement the subqueries.

7. Write the queries to implement the set operations.

8. Write the queries to create the views and queries based on views.

9. Demonstrate the concept of Control Structures.

10. Demonstrate the concept of Exception Handling.

11. Demonstrate the concept of Functions and Procedures.

12. Demonstrate the concept of Triggers.

Paper Code(s): CIC-258	L	P	C
Paper: Programming in Java Lab	-	2	1

Marking Scheme:
1. Teachers Continuous Evaluation: 40 marks
2. Term end Theory Examinations: 60 marks
Instructions:
1. The course objectives and course outcomes are identical to that of (Programming in Java) as this is the practical component of the corresponding theory paper.
2. The practical list shall be notified by the teacher in the first week of the class commencement under intimation to the office of the Head of Department / Institution in which the paper is being offered from the list of practicals below. Atleast 10 experiments must be performed by the students, they may be asked to do more. Atleast 5 experiments must be from the given list.

1. Write a java program to implement stack and queue concept.

2. Write a java program to produce the tokens from given long string.

3. Write a java package to show dynamic polymorphism and interfaces.

4. Write a java program to show multithreaded producer and consumer application.

5. Create a customized exception and also make use of all the 5 exception keywords.

6. Convert the content of a given file into the uppercase content of the same file.

7. Write a program in java to sort the content of a given text file.

8. Develop an analog clock using applet.

9. Develop a scientific calculator using swings.

10. Create an editor like MS-word using swings.

11. Create a servlet that uses Cookies to store the number of times a user has visited your servlet.

12. Create a simple java bean having bound and constrained properties.