SCHEME AND SYLLABI FOR

THIRD SEMESTER

OF

BACHELOR OF

TECHNOLOGY IN
COMPUTER SCIENCE AND ENGINEERING

FROM 2009 ADMISSION ONWARDS

CALICUT UNIVERSITY (P.O), THENHIPALAM

Semester III		Hours / Week			Marks		Semester-end duration-hours	Credits
Code	Subject	L	T	D/P	Inte-rnal	S emes ter-end		
EN09 301	Engineering Mathematics III	3	1		30	70	3	4
CS09 302	Data structures	4	1		30	70	3	5
CS09 303	Discrete Computational Structures	3	1		30	70	3	4
EN09 304	Humanities and Communication Skills	2	1		30	70	3	3
CS09 305	Electronic Circuits	3	1		30	70	3	4
CS09 306	Switching Theory and Logic Design	3	1		30	70	3	4
CS09 307(P)	***Electronic Circuits Lab***			3	50	50	3	2
CS09 308(P)	***Programming Lab***			3	50	50	3	2
	Total	**18**	**6**	**6**				**28**
	Total Marks							

EN09 301: Engineering Mathematics III

(Common for all branches)

Teaching scheme **Credits:** 4

3 hours lecture and 1 hour tutorial per week

Objectives

- *This course provides a quick overview of the concepts and results in complex analysis that may be useful in engineering.*
- *Also it gives an introduction to linear algebra and Fourier transform which has good wealth of ideas and results with wide area of application*

Module I: Functions of a Complex Variable (13 hours)

Functions of a Complex Variable – Limit – Continuity – Derivative of a Complex function – Analytic functions – Cauchy-Riemann Equations – Laplace equation – Harmonic Functions – Conformal Mapping – Examples: Z^n, sinz, cosz, sinhz, coshz, $(z+{}^1/_z)$ – Mobius Transformation.

Module II: Functions of a Complex Variable (14 hours)

Definition of Line integral in the complex plane – Cauchy's integral theorem (Proof of existence of indefinite integral to be omitted) – Independence of path – Cauchy's integral formula – Derivatives of analytic functions (Proof not required) – Taylor series – Laurent series – Singularities and Zeros – Residues – Residue Integration method – Residues and Residue theorem – Evaluation of real integrals.

Module III: Linear Algebra (13 hours) - Proofs not required

Vector spaces – Definition, Examples – Subspaces – Linear Span – Linear Independence – Linear Dependence – Basis – Dimension – Ordered Basis – Coordinate Vectors – Transition Matrix – Orthogonal and Orthonormal Sets – Orthogonal and Orthonormal Basis – Gram-Schmidt orthogonolisation process – Inner product spaces –Examples.

Module IV: Fourier Transforms (14 hours)

Fourier Integral theorem (Proof not required) – Fourier Sine and Cosine integral representations – Fourier Transforms – Fourier Sine and Cosine Transforms – Properties of Fourier Transforms.

Text Books

Module I:
Erwin Kreysig, *Advanced Engineering Mathematics, 8e*, John Wiley and Sons, Inc.
Sections: 12.3, 12.4, 12.5, 12.6, 12.7, 12.9

Module II:
Erwin Kreysig, *Advanced Engineering Mathematics, 8e*, John Wiley and Sons, Inc.
Sections: 13.1, 13.2, 13.3, 13.4, 14.4, 15.1, 15.2, 15.3, 15.4

Module III:
Bernaed Kolman, David R Hill, *Introductory Linear Algebra, An Applied First Course,* Pearson Education.
Sections: 6.1, 6.2, 6.3, 6.4, 6.7, 6.8, Appendix.B.1

Module IV:
Wylie C.R and L.C. Barrett, *Advanced Engineering Mathematics*, McGraw Hill.
Sections: 9.1, 9.3, 9.5

Reference books

1. H S Kasana, *Complex Variables, Theory and Applications*, 2e, Prentice Hall of India.
2. John M Howie, *Complex Analysis*, Springer International Edition.
3. Shahnaz bathul, *Text book of Engineering Mathematics*, *Special functions and Complex Variables*, Prentice Hall of India.
4. Gerald Dennis Mahan, *Applied mathematics*, Springer International Edition.
5. David Towers, *Guide to Linear Algebra*, MacMillan Mathematical Guides.
6. Howard Anton, Chris Rorres, *Elementary Linear Algebra, Applications Version, 9e*, John Wiley and Sons.
7. Anthony Croft, Robert Davison, Martin Hargreaves, *Engineering Mathematics*, 3e, Pearson Education.
8. H Parthasarathy, *Engineering Mathematics, A Project & Problem based approach*, Ane Books India.
9. B V Ramana, *Higher Engineering Mathematics*, McGrawHill.
10. Sarveswara Rao Koneru, *Engineering Mathematics*, Universities Press.
11. J K Sharma, *Business Mathematics, Theory and Applications*, Ane Books India.
12. John bird, *Higher Engineering Mathematics*, Elsevier, Newnes.
13. M Chandra Mohan, Varghese Philip, *Engineering Mathematics-Vol. I, II, III & IV.*, Sanguine Technical Publishers.
14. N Bali, M Goyal, C Watkins, *Advanced Engineering Mathematics, A Computer Approach, 7e*, Infinity Science Press, Fire Wall Media.
15. V R Lakshmy Gorty, *Advanced Engineering Mathematics-Vol. I, II.*, Ane Books India.
16. Sastry S.S., *Advanced Engineering Mathematics-Vol. I and II.*, Prentice Hall of India.
17. Lary C Andrews, Bhimsen K Shivamoggi, *Integral Transforms for Engineers*, Prentice Hall of India

Internal Continuous Assessment *(Maximum Marks-30)*

60% - Tests (minimum 2)
30% - Assignments (minimum 2) such as home work, problem solving, group discussions, quiz, literature survey, seminar, term-project, software exercises, etc.
10% - Regularity in the class

University Examination Pattern

PART A: *Short answer questions (one/two sentences)* *5 x 2 marks=10 marks*

All questions are compulsory. There should be at least one question from each module and not more than two questions from any module.

PART B: *Analytical/Problem solving questions* *4 x 5 marks=20 marks*

Candidates have to answer four questions out of six. There should be at least one question from each module and not more than two questions from any module.

PART C: *Descriptive/Analytical/Problem solving questions* *4 x 10 marks=40 marks*

Two questions from each module with choice to answer one question.

Maximum Total Marks: 70

CS09 302 : Data Structures

Teaching scheme **Credits:** 5
4 hours lecture and 1 hour tutorial per week

Objectives

- *To impart the basic concepts of continuous data structures*
- *To develop understanding about fundamental searching and sorting techniques..*

Module I (11 hours)
Review of Data Types - Scalar Types - Primitive types - Enumerated types - Subranges - Arrays- sparse matrices - representation - Records - Complexity of Algorithms - Time & Space Complexity of Algorithms -Recursion: Recursive algorithms - Analysis of Recursive algorithms

Module II (18 hours)
Linear Data Structures - Stacks – Queues -Lists - Dequeus - Linked List - singly, doubly linked and circular lists - Application of linked lists - Polynomial Manipulation - Stack & Queue implementation using Array & Linked List - Typical problems - Conversion of infix to postfix - Evaluation of postfix expression - priority queues

Module III (18 hours)
Non Linear Structures - Graphs - Trees - Graph and Tree implementation using array and Linked List - Binary trees - Binary tree traversals - pre-order, in-order and postorder - Threaded binary trees - Binary Search trees - AVL trees - B trees and B+ trees - Graph traversals - DFS, BFS - shortest path - Dijkstra's algorithm, Minimum spanning tree - Kruskal Algorithm, Prims algorithm

Module IV (18 hours)
Searching - Sequential Search - Searching Arrays and Linked Lists - Binary Searching - Searching arrays and Binary Search Trees - Hashing - Open & Closed Hashing - Hash functions - Resolution of Collision -Sorting- n^2 Sorts - Bubble Sort - Insertion Sort - Selection Sort - n log n Sorts - Quick Sort - Heap Sort - Merge Sort - External Sort - Merge Files

Text Books

1. Aho A.V, Hopcroft J.E. & Ullman J.D, *Data Structures and Algorithms,* Addison Wesley

Reference Books

1. Sahni S, *Data Structures, Algorithms and Applications in C++,* McGrawHill
2. Wirth N, *Algorithms + Data Structures = Programs,* Prentice Hall.
3. Cormen T.H, Leiserson C.E & Rivest R.L, *Introduction to Algorithms in C++*, Thomson Books.
4. Deshpande P.S, Kakde O.G, *C and Data Structures*, Dream- tech India Pvt. Ltd.

Internal Continuous Assessment *(Maximum Marks-30)*

60% - Tests (minimum 2)
30% - Assignments (minimum 2) such as home work, problem solving, group discussions, quiz, literature survey, seminar, term-project, software exercises, etc.
10% - Regularity in the class

University Examination Pattern

PART A:	*Short answer questions (one/two sentences)* All questions are compulsory. There should be at least one question from each module and not more than two questions from any module.	*5 x 2 marks=10 marks*
PART B:	*Analytical/Problem solving questions* Candidates have to answer four questions out of six. There should be at least one question from each module and not more than two questions from any module.	*4 x 5 marks=20 marks*
PART C:	*Descriptive/Analytical/Problem solving questions* Two questions from each module with choice to answer one question.	*4 x 10 marks=40 marks*

Maximum Total Marks: 70

CS09 303 : Discrete Computational Structures

Teaching scheme **Credits:** 4
3 hours lecture and 1 hour tutorial per week

Objectives

- *This course provides the mathematical foundations required in any stream of study in Computing. The material covered is essential for most of the subsequent semesters for a sound understanding of the various algorithms and methods. At the end of the course, the student is expected to be familiar with the essential proof techniques, logic and useful mathematical objects.*

Module I (13 hours)
Logic - Logical connectives and Truth tables – Logical equivalence and laws of logic – Logical implication and rules of inference- Quantifiers – Proofs of theorems using rules of universal specification and universal generalization.

Module II (13 hours)
Relational Structures - Cartesian products – Relations – Relation matrices – Properties of relations – Composition of relations - Equivalence relations and partitions - Functions – One-to-one, onto functions – Composition of functions and inverse functions - Partial orders - Hasse diagrams.

Module III (13 hours)
Group Theory - Definition and elementary properties - Cyclic groups - Homomorphisms and Isomorphisms – Subgroups - Cosets and Lagrange's theorem - Elements of coding theory- Hamming metric - Generator matrices - Group codes - Hamming matrices.

Module IV (13 hours)
Recurrence Relations - Introduction, Linear recurrence relations with constant coefficients - Homogeneous solutions - Particular solutions - Total solutions Generating Function - solutions of recurrence relations by the method of generating functions.

Text Books

1. Ralph P Grimaldi, *Discrete and Combinatorial Mathematics: An applied introduction (Fourth Edition)*, Pearson Education, 2004.

Reference Books

1. Thomas Koshy, Discrete Mathematics with Applications, Academic Press/Elsevier, 2005
2. Tremblay, J P & Manohar,R, *Discrete and Mathematical Structures with Applications to Computer Science*, McGraw Hill Book Company.
3. Kolman B & Busby R C, *Discrete and Mathematical Structures for Computer Science*, Prentice Hall of India.
4. C.L. Liu, *Elements of Discrete Mathematics*, Tata McGraw Hill, 2002
5. Donald F Stanat & David F McAllister, *Discrete and Mathematical Structures in Computer Science*, Prentice Hall.
6. Truss J K, *Discrete Mathematics for Computer Scientists*, Pearson Education, 2001.

Internal Continuous Assessment *(Maximum Marks-30)*

60% - Tests (minimum 2)
30% - Assignments (minimum 2) such as home work, problem solving, group discussions, quiz, literature survey, seminar, term-project, software exercises, etc.
10% - Regularity in the class

University Examination Pattern

PART A: *Short answer questions (one/two sentences)* *5 x 2 marks=10 marks*

All questions are compulsory. There should be at least one question from each module and not more than two questions from any module.

PART B: *Analytical/Problem solving questions* *4 x 5 marks=20 marks*

Candidates have to answer four questions out of six. There should be at least one question from each module and not more than two questions from any module.

PART C: *Descriptive/Analytical/Problem solving questions* *4 x 10 marks=40 marks*

Two questions from each module with choice to answer one question.

Maximum Total Marks: 70

EN09 304: Humanities and Communication Skills

(Common for all branches)

Teaching scheme **Credits:** 3

2 hours lecture and 1 hour tutorial per week

Objectives

- *To identify the most critical issues that confronted particular periods and locations in history*
- *To identify stages in the development of science and technology*
- *To understand the purpose and process of communication*
- *To produce documents reflecting different types of communication such as technical descriptions, proposals , and reports*
- *To develop a positive attitude and self-confidence in the workplace and*
- *To develop appropriate social and business ethics*

Module I (14 hours)

Humanities, Science and Technology: Importance of humanities to technology, education and society- Impact of science and technology on the development of modern civilization.- Contributions of ancient civilization: Chinese, Indian, Egyptian and Greek. -Cultural, Industrial, Transportation and Communication revolutions.

Advances in modern India: Achievements in information, communication and space technologies.

Module II (16 hours)

Concept of communication: The speaker/writer and the listener/reader, medium of communication, barriers to communication, accuracy, brevity, clarity and appropriateness

Reading comprehension: Reading at various speeds, different kinds of text for different purposes, reading between lines.

Listening comprehension: Comprehending material delivered at fast speed and spoken material, intelligent listening in interviews

Speaking: Achieving desired clarity and fluency, manipulating paralinguistic features of speaking, task oriented, interpersonal, informal and semi formal speaking, making a short classroom presentation.

Group discussion: Use of persuasive strategies, being polite and firm, handling questions and taking in criticisms on self, turn-taking strategies and effective intervention, use of body language.

Module III (16 hours)

Written Communication : Note making and taking, summarizing, notes and memos, developing notes into text, organization of ideas, cohesion and coherence, paragraph writing, ordering information in space and time, description and argument, comparison and contrast, narrating events chronologically. Writing a rough draft, editing, proof reading, final draft and styling text.

Technical report writing: Synopsis writing, formats for reports. Introductory report, Progress report, Incident report, Feasibility report, Marketing report, Field report and Laboratory test report

Project report: Reference work, General objective, specific objective, introduction, body, illustrations using graphs, tables, charts, diagrams and flow charts. Conclusion and references

Preparation of leaflets, brochure and C.V.

Module IV (14 hours)

Human relations and Professional ethics: Art of dealing with people, empathy and sympathy, hearing and listening. Tension and stress, Methods to handle stress

Responsibilities and rights of engineers- collegiality and loyalty – Respect for authority – Confidentiality – conflicts of interest – Professional rights, Rights of information, Social responsibility.

Senses of ethics – variety of moral issues – Moral dilemma – Moral autonomy – Attributes of an ethical personality – right action – self interest

Reference Books

1. Meenakshi Raman and Sangeeta Sharma, *Technical Communication - Principles and Practice* Oxford University press, 2006
2. Jayashree Suresh and B S Raghavan, *Professional Ethics*, S Chand and Company Ltd, 2005
3. Subrayappa, *History of Science in India*, National Academy of Science, India
4. R C Bhatia, *Business Communication*, Ane Books Pvt. Ltd, 2009
5. Sunita Mishra and C Muralikrishna, *Communicatin Skils for Engineers*, Pearson Education, 2007.
6. Jovan van Emden and Lucinda Becker, *Effective Communication for Arts and Humanities Students*, Palgrave macmillam, 2009
7. W C Dampier, *History of Science*, Cambridge University Press
8. Vesilind, *Engineering, Ethics and the Environment*, Cambridge University Press
9. Larson E, *History of Inventions*, Thompson Press India Ltd.
10. Bernal J.D, *Science in History*, Penguin Books Ltd
11. Encyclopedia Britannica, *History of Science, History of Technology*
12. Brownoski J, *Science and Human Values*, Harper and Row

Internal Continuous Assessment *(Maximum Marks-30)*

60% - Tests (minimum 2)
30% - Assignments (minimum 2) such as home work, problem solving, group discussions, quiz, literature survey, seminar, term-project, software exercises, etc.
10% - Regularity in the class

University Examination Pattern

PART A: *Short answer questions (one/two sentences)* *5 x 2 marks=10 marks*

All questions are compulsory. There should be at least one question from each module and not more than two questions from any module.

PART B: *Analytical/Problem solving questions* *4 x 5 marks=20 marks*

Candidates have to answer four questions out of six. There should be at least one question from each module and not more than two questions from any module.

PART C: *Descriptive/Analytical/Problem solving questions* *4 x 10 marks=40 marks*

Two questions from each module with choice to answer one question.

Maximum Total Marks: 70

CS09 305: Electronic Circuits

Teaching scheme **Credits:** 4
3 hours lecture and 1 hour tutorial per week

Objectives

- *To introduce the concepts and working principles of electronic circuits essential for the computing field.*

Module I (14 hours)
Diode switch, clipping and clamping circuits – Types of Diodes - light emitting diodes - photo diode - opto coupler - laser diode - the schottky diode - varactor diodes - varistors - current-regulator diodes - step recovery diodes - back diodes - tunnel diodes - pin diodes – Transistors - Transistor switch and amplifier circuits – Bistable multivibrator - Schmitt trigger - Monostable and astable multivibrator

Module II (15 hours)
MOSFETs - Depletion mode MOSFET - Depletion mode MOSFET Amplifiers - Dual Gate D-MOSFETs - Enhancement-mode MOSFET - Drain characteristics of E-MOSFET - Digital switching - CMOS circuits – Non-linear Op-amp circuits - Comparators with Zero Reference Voltage - Comparators with Non-zero references - Comparator with hysterisis - Window comparator - Integrator - Waveform conversion with op-amp - waveform generation using op-amp

Module III (10 hours)
Logic levels - Concepts of SSI, MSI, LSI and VLSI - Logic families: NOT gate, TTL, ECL, CMOS logic - Interfacing - Comparison of logic families - TTL and, MOS flip-flops.

Module IV (13 hours)
Memories: Basic concepts - Read only memories - Programmable ROMs - Static and dynamic random access memories - Memory expansion - Magnetic bubble memories - Magnetic surface storage devices - CD-ROMs - Special memories -1 Sample and hold circuit - D/A converters - A/D converters - Timing circuits.

Text Books

1. Mahadevaswamy U.B & V. Nattarasu, *Electronic Circuits : Computer Engineer's Perspective*, Sanguine Technical Publishers, 2008 (Module I & II)
2. Taub H. & Schilling D., *Digital Integrated Electronics*, McGraw Hill (Modules III & IV)

Reference Books

1. Nagarath I. J., *Electronics Analog & Digital*, Prentice Hall India
2. Floyd T.L., *Digital Fundamentals*, Universal Book Stall
3. Schilling D.L. & Belove C, *Electronic Circuits: Discrete & Integrated*, McGraw Hill.

Internal Continuous Assessment *(Maximum Marks-30)*

60% - Tests (minimum 2)
30% - Assignments (minimum 2) such as home work, problem solving, group discussions, quiz, literature survey, seminar, term-project, software exercises, etc.
10% - Regularity in the class

University Examination Pattern

PART A: *Short answer questions (one/two sentences)* *5 x 2 marks=10 marks*

All questions are compulsory. There should be at least one question from each module and not more than two questions from any module.

PART B: *Analytical/Problem solving questions* *4 x 5 marks=20 marks*

Candidates have to answer four questions out of six. There should be at least one question from each module and not more than two questions from any module.

PART C: *Descriptive/Analytical/Problem solving questions* *4 x 10 marks=40 marks*

Two questions from each module with choice to answer one question.

Maximum Total Marks: 70

CS09 306 : Switching Theory and Logic Design

Teaching scheme **Credits:** 4
3 hours lecture and 1 hour tutorial per week

Objectives

- *To introduce the principles, features and properties of digital devices and circuits. This provides the basic concepts of computations and logic designs of Arithmetic Logic Unit (ALU) of a Computer.*

Module I (13 hours)
Number Systems and codes - Boolean algebra - Postulates and theorems -Constants, variables and functions - Switching algebra - Electronic gates and mechanical contacts Boolean functions and logical operations - Normal and canonical forms - Self-dual functions - Logical operations - Karnaugh map - prime cubes - Minimum sum of products and product of sums - Quine-McClusky algorithm.

Module II (13 hours)
Combinational Logic - Analysis and design of combinational logic circuits - Universal property of the NAND and NOR gates - Adders - Parallel adders and look-ahead adders - Comparators - Decoders and encoders - Code conversion - Multiplexers and demultiplexers - Parity generators and checkers - ROMs, PLAs.

Module III (13 hours)
Fault diagnosis and tolerance - Fault classes and models - Fault diagnosis and testing - Test generation - Fault table method - Path sensitization method -Boolean difference method - Fault-tolerance techniques. Programmable logic arrays - PLA minimization - Essential prime cube theorem - PLA folding – Design for testability.

Module IV (13 hours)
Counters and shift registers - SR, JK, D and T flip-flops - Excitation tables -Triggering of flipflops - Flip-flop applications - Latches - Ripple counters - Synchronous counters - Up-down counters - Design of sequential circuits - Counter decoding - Counter applications - Shift registers and their applications - Clock mode sequential machine - State tables and diagrams.

Text Books

1. Biswas N. N., *Logic Design Theory*, Prentice Hall of India (Modules I, II & III)
2. Floyd T.L., *Digital Fundamentals*, Universal Book Stall (module IV).

Reference Books

1. Kohavi Z., *Switching & Finite Automata Theory*, Tata McGraw Hill
2. Millman J. & Halkias C.C., *Integrated Electronics: Analog & Digital Circuits & Systems*, Tata McGraw Hill.
3. M.Morris Mano, Charles R. Kime, Logic *and Computer Design Fundamentals*, Pearson Education.

Internal Continuous Assessment *(Maximum Marks-30)*

60% - Tests (minimum 2)
30% - Assignments (minimum 2) such as home work, problem solving, group discussions, quiz, literature survey, seminar, term-project, software exercises, etc.
10% - Regularity in the class

University Examination Pattern

PART A: *Short answer questions (one/two sentences)* *5 x 2 marks=10 marks*

All questions are compulsory. There should be at least one question from each module and not more than two questions from any module.

PART B: *Analytical/Problem solving questions* *4 x 5 marks=20 marks*

Candidates have to answer four questions out of six. There should be at least one question from each module and not more than two questions from any module.

PART C: *Descriptive/Analytical/Problem solving questions* *4 x 10 marks=40 marks*

Two questions from each module with choice to answer one question.

Maximum Total Marks: 70

CS09 307(P) : Electronics Circuits Lab

Teaching scheme **Credits:** 2
3 hours practicals per week

Objective

- *To give a hands on experience to students in the static and dynamic characteristics of the electronics components and systems.*

1. Silicon, germanium and zener diode characteristics
2. Characteristics of UJT and UJT relaxation oscillator
3. Static transistor characteristics in CE and CB configurations
4. Clipping, clamping, differentiating and integrating circuits
5. Series voltage regulator
6. Frequency response of CE amplifier with and without feedback
7. Emitter follower: measurement of input and output impedance
8. RC phase shift oscillator
9. Op amp: inverting and non-inverting amplifier, voltage follower
10. Op amp: differential amplifier.

Reference Books

1. Millman & Halkias, *Integrated Electronics*, Tata McGraw Hill.
2. Bhargava etal., Basic *Electronic Circuits and Linear Circuits*, Tata McGraw Hill

Internal Continuous Assessment *(Maximum Marks-50)*

60%-Laboratory practical and record
30%- Test/s
10%- Regularity in the class

Semester End Examination *(Maximum Marks-50)*

70% - Procedure, conducting experiment, results, tabulation, and inference
20% - Viva voce
10% - Fair record

CS09 308(P) : Programming Lab

Teaching scheme **Credits:** 2
3 hours practicals per week

Objectives

- *To give a strong foundation for developing the art of programming to the students of computing streams. For adequacy this has to be complemented by exercises appearing in the references.*

Set 1 (3 lab sessions)
HCF (Euclid's algorithm) and LCM of given numbers - Find mean, median and mode of a given set of numbers - Conversion of numbers from binary to decimal, hexadecimal, octal and back - Evaluation of functions like e^x, sin(x) and cos(x) for a given numerical precision using Taylor's series - Testing whether a given number is prime.

Set 2 (2 lab sessions)
String manipulation programs: sub-string search, deletion - Lexicographic sorting of a given set of strings - Generation of all permutations of the letters of a given string using recursion.

Set 3 (2 lab sessions)
Matrix operations: Programs to find the product of two matrices - Inverse and determinant (using recursion) of a given matrix - Solution to simultaneous linear equations using Jordan elimination

Set 4 (3 lab sessions)
Files: Use of files for storing records with provision for insertion - Deletion, search, sort and update of a record

Reference Books

1. Schildt H., *C The Complete Reference*, Tata McGraw Hill
2. TanH.H. &D'OrazioT.B., *C Programming for Engineering & Computer Science*, McGraw Hill
3. Cormen T.H. et al, *Introduction to Algorithms*, Prentice Hall of India

Internal Continuous Assessment *(Maximum Marks-50)*

60%-Laboratory practical and record
30%- Test/s
10%- Regularity in the class

Semester End Examination *(Maximum Marks-50)*

70% - Procedure, conducting experiment, results, tabulation, and inference
20% - Viva voce
10% - Fair record