

**ACADEMIC REGULATIONS
COURSE STRUCTURE
AND
SYLLABI (I, II SEMESTERS)
FOR
MASTER OF COMPUTER APPLICATIONS
EFFECTIVE FROM THE ACADEMIC YEAR 2010-11.**



**COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**GAYATRI VIDYA PARISHAD
COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**ACCREDITED BY NAAC WITH A GRADE WITH A CGPA OF 3.47/4.00
AFFILIATED TO JNTU KAKINADA
MADHURAWADA, VISAKHAPATNAM 530048**

Vision

*To evolve into and sustain as a Centre of
Excellence in Technological Education
and Research with a holistic approach.*

Mission

To produce high quality engineering graduates with the requisite theoretical and practical knowledge and social awareness to be able to contribute effectively to the progress of the society through their chosen field of endeavor.

To undertake Research & Development, and extension activities in the fields of Science and Engineering in areas of relevance for immediate application as well as for strengthening or establishing fundamental knowledge.

FOREWORD

The G.V.P. College of Engineering has started its new life as an autonomous College with great responsibility and confidence one year ago. It has become now a torch bearer for other sister institutions because of its success story in running an autonomous system for the last one year. People are inquisitive to know what has happened and how it has happened.

The functional mechanism has been explained to the faculty and students before the start. A mid-term review and an end-term review are conducted with students as well as faculty for their feed-back and corrective measures in both the semesters of first year. This helped us in eliminating some of the hitches and improving the rate of progression.

The course structure and syllabi for 1st and 2nd semesters have been reviewed for fine tuning in the second BOS meeting along with the syllabi and regulation with a view to elevate the standards and quality of post-graduate education. The College expresses its thanks to all the members for their cooperation.

It must be said that the success is because of the acceptance of the main stakeholders, viz., the students. The involvement of the faculty in heading towards the goals cannot be understressed. Various learned academicians from outside, as paper setters and valuers have extended timely support through their positive response to become a part of the mechanism in the conduct of exams and bringing out the results quickly at the end of each semester. The college acknowledges their association and wishes to share its happiness with them.

Principal

ACADEMIC REGULATIONS

(Effective for the students admitted into first year from the academic year 2010-2011)

The MCA Degree of the Jawaharlal Nehru Technological University, Kakinada shall be recommended to be conferred on students who are admitted to the program and fulfill all the requirements for the award of the Degree.

1.0 ELIGIBILITY FOR ADMISSIONS :

Admission to the above program shall be made subject to the eligibility, qualifications and specialization prescribed by the AICTE from time to time.

Admissions shall be made on the basis of merit rank obtained by the qualifying candidate at ICET examination or an Entrance Test conducted by the University subject to reservations prescribed by the university from time to time.

2.0 AWARD OF M.C.A. DEGREE:

2.1 A student shall be declared eligible for the award of the MCA degree, if he pursues a course of study and completes it successfully for not less than three academic years and not more than six academic years.

2.2 A student, who fails to fulfill all the academic requirements for the award of the degree within six academic years from the year of his admission, shall forfeit his seat.

2.3 The minimum instruction for each semester shall be 20 weeks with 5 days a week. A working day shall have 7 periods each of 50 minutes.

3.0 CREDIT STRUCTURE:

Coursework(I-V semesters):	(5T+2P)/sem. 20+4 = 24 credits/sem.
Seminar(VI semester)	2 credits.
Projectwork(VI semester)	28 credits.
Total	150 credits.

4.0 ATTENDANCE:

4.1 The attendance shall be considered subject wise.

A candidate shall be deemed to have eligibility to write end semester examinations in a subject if he has put in at least 75% of attendance in that subject.

Shortage of attendance up to 10% in any subject (i.e. 65% and above and below 75%) may be condoned by a Committee on genuine and valid reasons on representation by the candidate with supporting evidence.

A student who gets less than 65% attendance in a maximum of two courses in any semester shall not be permitted to take the end- semester examination in which he/she falls short. His/her registration for those courses will be treated as cancelled. The student should re-register and repeat those courses as and when offered next.

If a student gets less than 65% attendance in more than two courses in any semester he/she shall be detained and has to repeat the entire semester.

Shortage of attendance below 65% shall in no case be condoned.

A stipulated fee shall be payable towards condonation of shortage of attendance.

Attendance will be indicated in the marks memo by a letter code as follows:

Grading of Attendance:

90% and above	A (Very Good)
75% to 89%	B (Good)
65% to 74%	C (Condoned)
Below 65%	D (Detained)

5.0 EVALUATION AND ACADEMIC REQUIREMENTS:

The performance of the student in each semester shall be evaluated subject-wise, with a maximum of 100 marks for each theory and 100 marks for each practical, on the basis of Internal Evaluation and End Semester Examination.

For the theory subjects 60 marks shall be awarded based on the performance in the External Examination, 40 marks shall be awarded based on the Internal Evaluation.

- 5.1 One part of the internal evaluation shall be made based on the average of the marks secured in the two Mid Term-Examinations of 30 each conducted one in the middle of the

Semester and the other immediately after the completion of instruction. Each mid term examination shall be conducted for duration of 90 minutes with 3 questions to be answered out of 5 questions. The remaining 10 marks are awarded through an average of continuous evaluation of assignments/seminars/any other method, as notified by the teacher at the beginning of the semester.

- 5.2 A student shall be deemed to have satisfied the minimum academic requirements in a subject if he secures minimum of 40% of marks in the End Examination and a minimum of 50% on aggregate of the total marks in the End Semester Examination and Internal Evaluation taken together.
- 5.3 Laboratory examination for MCA course must be conducted with two Examiners, one of them being Laboratory Class Teacher and second examiner shall be other than Class Teacher.
- 5.4 For Practical subjects, 50 marks shall be awarded based on the performance in the End Semester Examinations, 50 marks shall be awarded based on the day-to-day performance as Internal marks. A candidate has to secure a minimum of 50% in the external examination and has to secure a minimum of 50% on the aggregate to be declared successful.
- 5.5 A student shall be promoted from II to III year only if he fulfils the academic requirement of all the subjects (including theory and practical) of I year.
- 5.6 There shall be a seminar presentation in VI Semester. For Seminar there will be only internal evaluation of 50 marks.

A student has to secure a minimum of 50% to be declared successful. The assessment will be made by a Board consisting of Head of the Department and two other internal staff members of the department

5.7 A student shall be allowed to submit the project report only after fulfilling the attendance requirements of all the semesters. The viva-voce examination shall be conducted at the end of the course work and after the completion of the End Semester examination of the final semester.

5.8 A candidate shall be given one chance to re-register for each subject provided the internal marks secured by a candidate are less than 50% and he has failed in the end examination. The re-registration is permitted only after completion of his regular course and before submitting his final project report and as and when the subjects (or any other equivalent subjects as decided by the College) are offered. In the event of re-registering, the internal marks and end examination marks obtained in the previous attempt are nullified. At a given time a candidate is permitted to re-register for a maximum of three subjects.

6.0 EVALUATION OF PROJECT WORK:

6.1 A Departmental Project Review Committee (DPRC) shall be constituted with the Head of the Department as the chairman and two senior faculty as members to oversee the proceedings of the project work from allotment to submission.

- 6.2 A Project Review Committee (PRC) of the college is to be constituted with a Senior Professor not below the rank of a HOD as chairperson, Heads of the Departments, which are offering PG courses and two other senior faculty members of the department offering MCA.
- 6.3 Registration of Project work: A student is permitted to register for the project work after satisfying the attendance requirement of all the courses (theory and practical courses) up to V Semester. A candidate has to submit, in consultation with his project supervisor, the title, objective and plan of action of his project work to the DPRC for its approval. Only after obtaining the approval of DPRC the student can initiate the Project work
- 6.4 Duration of the project is for one semester.
- 6.5 If a candidate wishes to change mid course his supervisor or topic of the project he can do so with approval of the Departmental Project Review Committee (DPRC). However the departmental review committee shall examine whether the change of topic/supervisor leads to a major change of his initial plans of the project proposal. If so, his date of registration for the project work shall start from the date of change of supervisor or topic as the case may be or whichever is earlier.
- 6.6 Three copies of the project report, certified by the supervisor shall be submitted to the College.
- 6.7 The Project report shall be adjudicated by one external examiner selected by the Principal, out of 5-member panel

submitted by the HOD who are eminent in that field of study.

6.8 The viva-voce examination of the project shall be conducted by a board consisting of the External examiner, The Head of the Department and Supervisor. The Board shall jointly report students work as:

A Excellent

B Good

C Satisfactory

Head of the Department shall coordinate and make arrangements for the conduct of viva-voce examination.

6.9 If the work is not satisfactory, the student will revise and resubmit the Project report after three months. If he fails to get a satisfactory report again, the project shall be summarily rejected.

7.0 SUMMER PROGRAM FOR DEFAULTERS:

7.1 A summer term course is open only to those students who had taken the course earlier and failed to fulfill the attendance and/or academic requirements in the earlier semesters for promotion to the next academic year.

7.2 Summer term courses shall be announced at the end of the even semester before the commencement of the end-semester examinations. The announcement of subjects offered for the summer programme is at the discretion of the Principal. A student shall have to register within the time stipulated in the announcement by paying the prescribed fee.

7.3 The number of total contact hours and method of evaluation for any summer program shall be the same as those for a regular semester.

- 7.4 No student can register for more than two courses during a summer term.
- 7.5 It is desirable for a candidate to put up 100% attendance in all the subjects registered for the summer course. However 25% concession in attendance may be permitted at the discretion of the principal based on the merits of the individual case under extraneous conditions with proper evidence. No further condonation of attendance on par with the regular semester shall be permitted.
- 7.6 If a candidate is failed to satisfy the attendance requirement in a course registered during summer then he has to repeat the course in the subsequent summer programme when offered next.
- 7.7 The method of internal evaluation is same as for the regular M.C.A programme. mid examination shall be completed by the end of IV weeks and II mid to be completed by the end of VIII weeks of the programme.
- 7.8 The earlier internal marks secured in the regular semester for the subjects registered in the summer programme are nullified and internal marks from the latest summer programme shall be final.
- 7.9 The end semester examinations for the summer programme shall be conducted in the immediately following Saturdays and /or Sundays as the need arises.

7.10 Attendance and completion of subjects during the summer programme shall be suitably reflected in the consolidated marks memo.

7.11 Withdrawal from a summer program after registration will not entitle for any refund of fees.

8.0 AWARD OF DEGREE AND CLASS:

8.1 After a student has satisfied the requirements prescribed for the completion of the program and is eligible for the award of MCA Degree he shall be placed in one of the following three classes:

% of marks to be secured	Class Awarded
70% and above	First Class with Distinction
60% and above but less than 70%	First Class
50% and above but less than 60%	Second Class

8.2 The marks in internal evaluation and end examination shall be shown separately in the marks memorandum.

8.3 The grade of the dissertation shall also be mentioned in the marks memorandum.

9.0 WITHHOLDING OF RESULTS:

If the student has not paid any dues to the college or if any case of indiscipline is pending against him, the result of the student will be withheld and he will not be allowed into the next semester. The recommendation to the issue of degree is liable to be withheld in such cases.

10.0 TRANSITORY REGULATIONS:

Students who have discontinued or have been detained for want of attendance or who have failed after having undergone the course are eligible for admission to the same or equivalent subjects as and when the subjects are offered, subject to **5.6** and **2.0**.

11.0 GENERAL:

The academic regulations should be read as a whole for purpose of any interpretation.

- 11.1 In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Chairman Academic Council is final.
- 11.2 The College may change or amend the academic regulations and syllabus at any time and the changes and amendments made shall be applicable to all the students with effect from the date notified by the College.
- 11.3 Wherever the word he, him or his occurs, it will also include she, her and her's.

COURSE STRUCTURE

I SEMESTER

COURSE CODE	THEROY/ LAB	L	P	T	C
10CA3101	Computer programming through C	4	-	1	4
10CA3102	Computer Organization	4	-	1	4
10CA3103	Numerical Methods, Probability & statistics	4	-	2	4
10CA3104	Mathematical Foundations of Computer Applications	4	-	-	4
10CA3105	Accountancy and Financial Management	4	-	-	4
10CA3106	<i>Computer Organization Lab</i>	-	4	-	2
10CA3107	<i>Computer programming through C Lab</i>	-	4	-	2
Total		20	8	4	24

II SEMESTER

COURSE CODE	THEROY/ LAB	L	P	T	C
10CA3108	Operating Systems	4	-	1	4
10CA3109	Operations Research	4	-	2	4
10CA3110	English Language Communication Skills	4	-	-	4
10CA3111	Oops through java	4	-	1	4
10CA3112	Data Structures Using C++	4	-	-	4
10CA3113	<i>Oops through java Lab</i>	-	4	-	2
10CA3114	<i>Data Structures Lab</i>	-	4	-	2
Total		20	8	4	24

III SEMESTER

COURSE CODE	THEROY/ LAB	L	P	T	C
10CA3115	UNIX Programming	4	-	1	4
10CA3116	Design and Analysis of Algorithms	4	-	-	4
10CA3117	DBMS	4	-	1	4
10CA3118	Management Information Systems	4	-	-	4
10CA3119	Computer Networks	4	-	2	4
10CA3120	<i>UNIX & OS Lab</i>	-	4	-	2
10CA3121	<i>DBMS Lab</i>	-	4	-	2
Total		20	8	4	24

IV SEMESTER

COURSE CODE	THEROY/ LAB	L	P	T	C
10CA3122	Software Engineering	4	-	2	4
10CA3123	Object Oriented Analysis and Design (using UML)	4	-	1	4
10CA3124	Data Warehousing and Mining	4	-	1	4
	Elective – I	4	-	-	4
10CA3125	Embedded Systems				
10CA3126	Distributed Operating Systems				
10CA3127	Perl Programming				
	Elective – II	4	-	-	4
10CA3128	Network Protocols				
10CA3129	Mobile Computing				
10CA3130	Introduction to Multi-Core rogramming – Threading on Multi-Core Processors				
10CA3131	<i>UML Lab</i>	-	4	-	2
10CA3132	<i>English Language Communication Skills and Technical Document, Report writing Lab</i>	-	4	-	2
Total		20	8	4	24

V SEMESTER

COURSE CODE	THEROY/ LAB	L	P	T	C
10CA3133	Multimedia Application Development	4	-	1	4
10CA3134	Web Technologies & Services	4	-	1	4
10CA3135	Information Security	4	-	2	4
	Elective – III	4	-	-	4
10CA3136	Software Project Management				
10CA3137	Middle Ware Technologies				
10CA3138	E-Commerce				
	Elective – IV	4	-	-	4
10CA3139	Software Testing Methodologies				
10CA3140	Storage Area Networks and Management				
10CA3141	Information Retrieval Systems				
10CA3142	<i>Web Technologies & Services Lab</i>	-	4	-	2
10CA3143	<i>Multimedia Application Development Lab</i>	-	4	-	2
Total		20	8	4	24

VI SEMESTER)

COURSE CODE	THEROY/ LAB	C
10CA3144	General Seminar	2
10CA3145	Dissertation/Thesis Excellent/Good/Satisfactory/Not Satisfactory	28

COMPUTER PROGRAMMING THROUGH C**Course Code : 10CA3101**

L	P	T	C
4	-	1	4

UNIT -I

Algorithm, Flow chart, Program development steps, Basic structures of C Language, C tokens, Data types and sizes, Declaration of variables, Assigning values, Arithmetic, Relational and Logical operators, Increment and decrement operators, Conditional operator, Bitwise operators, Type conversions, Expressions, evaluation, Input output statements, blocks.

UNIT-II

If and switch statements, while, do while and for statements. C programs covering all the above aspects.

UNIT -III

One dimensional and two dimensional arrays, Initialization, String variables declaration, reading, writing, basics of functions, parameter passing, String handling functions.

UNIT -IV

User defined functions, recursive functions, variables and storage classes, scope rules, block structure, header files, C preprocessor, Example C Programs.

UNIT -V

Pointers and arrays: Pointers and addresses, Pointers and arrays, Pointers and function arguments, address arithmetic, character pointers and functions

UNIT –VI

Pointers to pointers, multi-dimensional arrays, initialization of pointer arrays, command line arguments, pointers to functions, function pointers.

UNIT -VII

Structure definition, initializing, assigning values, passing of structures as arguments, arrays of structures, pointers to structures, self reference to structures, unions, type-defs, bit fields, C program examples.

UNIT -VIII

Console and file-I/O: Standard I/O, Formatted I/O, Opening and closing of files, I/O operations on files.

Text Books:

1. Complete Reference Using C: Herbert Schildt
2. Let us C: Yashwanth Kanethkar

Reference Books:

1. Computer Science, A structured programming approach using C, B.A.Fouruzan and R.F.Gilberg Third edition, Thomson.
2. C Programming Language: B.W.Kerninghan and Dennis M. Ritchie. Pearson Education.
3. Programming in C – Stephen G.Kochan. Third Edition. Pearson Education.

COMPUTER ORGANIZATION**Course Code : 10CA3102**

L	P	T	C
4	-	1	4

UNIT- I

BASIC STRUCTURE OF COMPUTERS : Computer Types, Functional unit, Basic OPERATIONAL concepts, Bus structures, Software, Performance, multiprocessors and multi computers. Data Representation. Fixed Point Representation. Floating – Point Representation. Error Detection codes.

UNIT-II

BASIC CPU ORGANIZATION: Instruction formats-INTEL-8086 CPU architecture-Addressing modes - generation of physical address-code segment registers, Zero, one, two, and three address instructions.

UNIT -III

INTEL 8086 ASSEMBLY LANGUAGE INSTRUCTIONS-Data transfer instructions-input-output instructions, address transfer, Flag transfer, and arithmetic, logical, shift, and rotate instructions.

UNIT-IV

INTEL 8086 ASSEMBLY LANGUAGE INSTRUCTIONS-conditional and unconditional transfer, iteration control, interrupts and process control instructions, assembler directives. Programming with assembly language instructions.

UNIT-V

THE MEMORY SYSTEM : Basic concepts semiconductor RAM memories. Read-only memories Cache memories performance considerations, Virtual memories secondary storage.

UNIT-VI

INPUT-OUTPUT ORGANIZATION : Peripheral Devices, Input-Output Interface, Asynchronous data transfer Modes of Transfer, Priority Interrupt Direct memory Access, Input –Output Processor (IOP) Serial communication; Introduction to peripheral component, Interconnect (PCI) bus.

UNIT-VII

PIPELINE AND VECTOR PROCESSING : Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline Vector Processing, Array Processors.

UNIT-VIII

MULTI PROCESSORS: Characteristics or Multiprocessors, Interconnection Structures, Interprocessor Arbitration. InterProcessor Communication and Synchronization Cache Coherence. Shared Memory Multiprocessors.

TEXT BOOKS :

1. Computer Organization – Carl Hamacher, Zvonks Vranesic, SafeaZaky, Vth Edition, McGraw Hill.
2. Computer Systems Architecture – M.Moris Mano, IIIrd Edition, Pearson/PHI
3. Douglas V.Hall Intel 8086-Programming- McGraw-Hill International studies.

REFERENCES :

1. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI
2. Structured Computer Organization – Andrew S. Tanenbaum, 4th Edition PHI/Pearson
3. Fundamentals or Computer Organization and Design, - Sivaraama Dandamudi Springer Int. Edition.
4. Computer Architecture a quantitative approach, John L. Hennessy and David A. Patterson, Fourth Edition Elsevier
5. Computer Architecture: Fundamentals and principles of Computer Design, Joseph D. Dumas II, BS Publication.

NUMERICAL METHODS, PROBABILITY AND STATISTICS**Course Code : 10CA3103**

L	P	T	C
4	-	2	4

UNIT- I

Solution of linear simultaneous equations – Gaussian Elimination, Gauss Jordan, Factorization Method, Gauss Seidel Iterative Method
(6.1,6.2, 6.3.2, 6.3.3, 6.3.6, 6.4 of [1])

UNIT-II

Solutions of algebraic and transcendental equations-Bisection method-Regula Falsi-Newton Raphson method, finite differences-differences of polynomial-other difference operators.
(2.1, 2.2, 2.5, 3.3, 3.5of [1])

UNIT- III

Interpolation-Newton's forward interpolation- Newton's backward interpolation-interpolation with unequal intervals-Lagrange's interpolation-Newton's divided interpolation, Inverse interpolation
(3.6, 3.7.1, 3.7.2, 3.9.1, 3.10.1 3.11 of [1])

UNIT-IV Empirical Laws and Curve Fitting

Principle and Method of least squares, Fitting a straight line, parabola, Fitting of power curve and Fitting of exponential curve..
(4.2.1, 4.2.2 of [1])

UNIT-V (Discrete Random variables)

Random variables, mean and variance, Chebyshev's theorem, Binomial distribution, Poisson distribution
(4.1, 4.2, 4.4-4.7 of [2])

UNIT-VI (Continuous Random variables)

Continuous random variable, normal distribution, normal approximation to binomial distribution, uniform distribution
(5.1-5.3, 5.5 of [2])

UNIT-VII

Sampling distribution of Means

Population and sample, sampling distribution of the mean, Point estimation, interval estimation
(6.1-6.3, 7.1, 7.2 of [2])

Inferences concerning mean

Null hypotheses and tests of hypotheses, inferences concerning one mean and two means
(7.3 - 7.5, 7.8 of [2])

UNIT-VIII (Inferences concerning Proportions)

Estimation of Proportions, Hypotheses concerning one Proportion, several Proportions.
(9.1 – 9.3 of [2])

Text Book:

[1] Introductory Methods of Numerical Analysis by S. S. Sastry, Prentice Hall India Pvt., Limited, Fourth Edition, 2005.

[2] Miller. Freund's "Probability and Statistics for Engineers", Richard A. Johnson, C.B. Gupta, Pearson education, Seventh edition 2005.

Reference Books:

1. “Elementary Numerical Analysis: An Algorithmic Approach”, Samuel Daniel Conte, Carl W. De Boor 3rd edition, McGraw-Hill.
2. S.C. Gupta and V.K. Kapoor “Fundamentals of Mathematical Statistics” Ninth Revised Edition, Sultan Chand & Sons Educational Publishers

**MATHEMATICAL FOUNDATIONS OF
COMPUTER APPLICATIONS.**

Course Code : 10CA3104

L	P	T	C
4	-	-	4

UNIT- I

MATHEMATICAL LOGIC-I

Statements and notations, connectives, Well formed formulas, tautologies, equivalence of formulas, Duality law, Tautological Implications, other connectives, Normal forms, Rules of inference, consistency of premises and Indirect method of proof.

(1-1, 1-2.1 to 1-2.4, 1-2.7 to 1-2.11, 1-2.14, 1-3.1 to 1-3.4, 1-4.2, 1-4.3 of [1])

UNIT- II

MATHEMATICAL LOGIC-II

Predicates, the statement function, variables and quantifiers, predicate formula, free and bound variables, universe of discourse, inference theory of the predicate calculus, Automatic theorem proving.

(1-5.1 to 1-5.4, 1-6.1, 1-6.3, 1-6.4, 1-4.4 of [1])

UNIT- III

RELATIONS

Relations, properties of binary relations in a set, Relation matrix and Graph

of a relation, partition and covering of a set, equivalence relations, compatibility relation, composition of binary relations, partial ordering, partially ordered set. (2-3.1 to 2-3.9 of [1])

UNIT- IV

LATTICES AND BOOLEAN ALGEBRAS

Lattices, Definition and examples, properties of lattices, some special lattices, Boolean algebra-Definitions and Examples, Boolean forms and free Boolean algebra, Values Boolean Expressions and Boolean functions, representation of Boolean functions.

(4-1.1, 4-1.2, 4-1.5, 4-2.1, 4-3.1,4-3.2,4-4.1 of [1])

UNIT- V

ALGEBRAIC STRUCTURES

Algebraic systems: Definition and examples, Semi groups and monoids: Definitions and examples, Homomorphism of Semi groups and Monoids, Groups: Definitions, and examples, Subgroups and Homeomorphisms. (3-1.1, 3-2.1, 3-2.2, 3-5.1, 3-5.2 of [1])

UNIT- VI

COMBINATORICS-I

Basics of counting, Combinations and permutations, Enumeration of Combinations and permutations , Enumerating Combinations and permutations with repetitions, Enumerating permutations with constrained

repetitions, binomial coefficients, The binomial and Multinomial theorems The principle of inclusion-exclusion. (2.1-2.8 of [2])

UNIT- VII

COMBINATORICS-II

Generating Functions of sequences, Calculating coefficients of generating functions, Recurrence relations, Solving Recurrence relations by substitution and generating functions, the method of characteristic roots, (3.1-3.5 of [2])

UNIT- VIII

GRAPH THEORY

Basic concepts, Isomorphism and Subgraphs, Trees and their properties, spanning trees.(5.1-5.4 of [2])

Text Books:

[1] “**Discrete Mathematical Structures with Applications to Computer Science**”, J.P Tremblay R.Manohar, Tata McGraw-Hill Publishing Company Limited, 1997

[2] “**Discrete Maths for Computer Scientists & Mathematicians**”, J.L. Mott, A. Kandel, T.P. Baker, Prentice Hall of India Pvt Limited, New Delhi Second Edition.

References:

“**Discrete Mathematics for Computer Science**”, Kenneth Bogart, Clifford Stein, Robert L.Drysdale, Springer International Edition, 2006.

ACCOUNTANCY AND FINANCIAL MANAGEMENT**Course Code : 10CA3105**

L	P	T	C
4	-	-	4

UNIT -I**Introduction to Financial Accounting**

Accounting: Principles, concepts, conventions, double entry book keeping, Journal, Ledger

Trial Balance, Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments

UNIT- II**Introduction to Financial Management and Financial Statements Analysis**

Introduction, nature and scope of financial management Meaning and concept, objectives, types of financial statements: Comparative and common size statement of analysis

UNIT- III**Ratio Analysis**

Introduction, Advantages and limitations of ratio analysis, Computation, Analysis and Interpretation of Liquidity ratios, Activity ratios, Solvency ratios and Profitability ratios (simple numerical problems)

UNIT- IV**Funds Flow and Cash Flow Statements**

Introduction meaning and importance of funds flow and cash flow statement. Procedure for preparing funds flow and cash flow statements. Comparison between funds flow and cash flow statements (simple numerical problems)

UNIT -V

Cost Analysis and Behavior

Costing- nature, importance and basic principles. Elements of cost, Absorption costing vs. marginal costing. Financial accounting vs. cost accounting vs. management accounting.

Cost Sheet preparation (simple numerical problems)

UNIT- VI

Marginal Costing

Marginal costing and Break-even Analysis: Nature, scope and importance - practical applications of marginal costing, limitations and importance of cost - volume, profit analysis, Short run decisions (simple numerical problems)

UNIT-VII

Budgeting and Capital Budgeting

Introduction to Budgeting: Production budget, Flexible budget and Cash budget

Definition, nature and scope of capital budgeting, features of capital budgeting proposals, methods of capital budgeting: traditional and modern methods (simple numerical problems)

UNIT-VIII

Computerized accounting system

Introduction to computerized accounting system: coding logic and codes, master files, transaction files, introduction documents used for data collection, processing of different files and Outputs obtained

Reference Books

1. Shashi K Gupta & R K Sharma: Accounting and Financial Management, Kalyani Publishers
2. R L Gupta: Financial Accounting, Sultan Chand & Sons

3. A. Mukherjee and M. Haneef: Financial Accounting, Tata McGraw Hill
4. S P Jain & K L Narang: Cost and Management Accounting, Kalyani Publishers
5. M C Shukla: Advanced Accounts, Sultan Chand & Sons
6. I M Pandey: Financial Management, Vikas Publishers
7. SP Jain and KL Narang: Cost Accounting: Principles and Practice, Kalyani Publishers
8. S N Maheswari & S K Maheswari: Management Accounting, Vikas Publishers
9. Bhattacharya: Management Accounting: Pearson Education
10. Chandra Bose: Fundamentals of Financial Management, Prentice Hall

COMPUTER ORGANIZATION LAB**Course Code : 10CA3106**

L	P	T	C
-	4	-	2

Write assembly language programs for the following using MASAM.

1. Arithmetic Operations on Two Numbers.
 - Addition , Subtraction, Multiplication, Division
2. Write assembly language programs to evaluate the expressions:
 - i) $a = b + c - d * e$
 - ii) $z = x * y + w - v + u / k$
 - Considering 8-bit, 16 bit and as b, c, d, e.Take the input in consecutive memory locations and results also.
- 3 .Write an ALP of 8086 to perform Multibyte addition and Subtraction.
4. Write an ALP of 8086 to take N numbers as input. And do the following operations on them.
 - Arrange in ascending and Descending order.
 - Find max and minimum
 - Find averageConsidering 8-bit, 16 bit binary numbers.
5. Write an ALP of 8086 to perform ASCII Arithmetic Operations.
6. Write an ALP of 8086 to perform following Logic Operations: Shift & Rotate.

- Converting Packed BCD to Un-Packed BCD and Vice-versa

7. Write an ALP of 8086 to take a string of as input and do the following Operations on it.

- Find the length
- Find it is Palindrome or not
- Find whether given string substring or not.
- Reverse a string
- Concatenate by taking another sting

8. Write the ALP to implement the above operations as procedures and call from the main procedure.

9. Write an ALP of 8086 to find the factorial of a given number as a Procedure and call from the main program which display the result.

10 A computer employs RAM chips of 256X8 and ROM chips of 1024 X 8. The computer needs 2K bytes of RAM, 4K bytes of ROM, and four interface units, each with four registers. A memory-mapped I/O configuration is used. The two highest-order bits of the address bus are assigned 00 for RAM, 01 for ROM, 10 for interface registers.

- a. How many RAM and ROM chips are needed?
- b. Draw a memory-address map for the system.
- c. Give the address range in hexadecimal for RAM, ROM and interface.

11. Obtain the complement function for the match logic of one word in an associative memory. Draw the logic diagram for it and compare with the actual match logic diagram.

12. A two-way set associative cache memory uses blocks of four words. The cache can accommodate a total of 2048 words from main memory. The main memory size is 128K X 32.
- Formulate all pertinent information required to construct the cache memory.
 - What is the size of the cache memory?
13. A digital computer has a memory unit of 64K X 16 and a cache memory of 1K words. The cache uses direct mapping with a block size of four words.
- How many bits are there in each word of cache, and how are they divided into functions? Include a valid bit.
 - How many bits are there in the tag, index, block, and word fields of the address format?
 - How many blocks can the cache accommodate?

COMPUTER PROGRAMMING THROUGH C LAB**Course Code : 10CA3107**

L	P	T	C
-	4	-	2

- Write a C program to find the sum of individual digits of a positive integer.
- A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
- Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
- Write a program which checks a given integer is Fibonacci number or not.

Exercise 2.

- Write a C program to calculate the following Sum:
$$\text{Sum} = 1 - x^2/2! + x^4/4! - x^6/6! + x^8/8! - x^{10}/10!$$
- Write a C program to find the roots of a quadratic equation.

Exercise 3

- Write C programs that use both recursive and non-recursive functions
 - To find the factorial of a given integer.
 - To find the GCD (greatest common divisor) of two given integers.
 - To solve Towers of Hanoi problem.
 - Write program to calculate probability of head/tail by generating random numbers using random() function.

Exercise 4

- The total distance travelled by vehicle in 't' seconds is given by $\text{distance} = ut + \frac{1}{2}at^2$ where 'u' and 'a' are the initial velocity (m/sec.) and acceleration (m/sec²). Write C program to find the distance travelled at regular intervals of time given the values of 'u' and 'a'. The program

should provide the flexibility to the user to select his own time intervals and repeat the calculations for different values of 'u' and 'a'.

b) Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)

Exercise 5

- a) Write a C program to find both the largest and smallest number in a list of integers.
- b) Write a C program that uses functions to perform the following:
 - i) Addition of Two Matrices
 - ii) Multiplication of Two Matrices
 - iii) Checking symmetricity of a square matrix.
 - iv) Calculating transpose of a matrix in-place manner.

Exercise 6

- a) Write a C program that uses functions to perform the following operations:
 - i) To insert a sub-string in to given main string from a given position.
 - ii) To delete n Characters from a given position in a given string.
- b) Write a C program to determine if the given string is a palindrome or not

Exercise 7

- a) Write a C program that displays the position/ index in the string S where the string T begins, or -1 if S doesn't contain T.
- b) Write a C program to count the lines, words and characters in a given text.

Exercise 8

- a) Write a C program to generate Pascal's triangle.
- b) Write a C program to construct a pyramid of numbers.

Exercise 9

Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression:

$$1+x+x^2+x^3+\dots\dots\dots+x^n$$

For example: if n is 3 and x is 5, then the program computes $1+5+25+125$. Print x , n , the sum

Perform error checking. For example, the formula does not make sense for negative exponents – if n is less than 0. Have your program print an error message if $n < 0$, then go back and read in the next pair of numbers of without computing the sum. Are any values of x also illegal ? If so, test for them too.

Exercise 10

a) 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.

b) Write a C program to convert a Roman numeral to its decimal equivalent.

Exercise 11

Write a C program that uses functions to perform the following operations using Structure:

i) Reading a complex number ii) Writing a complex number

iii) Addition of two complex numbers iv) Multiplication of two complex numbers

Exercise 12

a) Write a C program which copies one file to another.

b) Write a C program to reverse the first n characters in a file.

(Note: The file name and n are specified on the command line.)

OPERATING SYSTEMS**Course Code : 10CA3108**

L	P	T	C
4	-	1	4

UNIT-I

Operating System Introduction, Structures - Simple Batch, Multi programmed, time-shared, Personal Computer, Parallel, Distributed Systems ,Real-Time Systems , System components, Operating-System services, System Calls, Virtual Machines, System Design and Implementation.

UNIT-II

Process and CPU Scheduling - Process concepts and scheduling, Operation on processes, Cooperating Processes, Threads, and Interposes Communication Scheduling Criteria, Scheduling Algorithm, Multiple - Processor Scheduling, Real-Time Scheduling.

UNIT- III

Memory Management and Virtual Memory - Logical versus Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation, Segmentation with Paging. Demand Paging, Performance of Demanding Paging , Page Replacement ,Page Replacement Algorithm, Allocation of Frames, Thrashing.

UNIT-IV

File System Interface and Implementation -Access methods, Directory Structure, Protection, File System Structure, Allocation methods, Free-space Management, Directory Management, Directory Implementation, Efficiency and Performance.

UNIT-V

Process Management and Synchronization - The Critical Section Problem, Synchronization Hardware, Semaphores, and Classical Problems of Synchronization, Critical Regions, Monitors.

UNIT-VI

Deadlocks - System Model, Dead locks Characterization, Methods for Handling Dead locks Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, and Recovery from Deadlock.

UNIT-VII

Case Study-1- Windows XP- Design Principles, System Components, Environmental Subsystems, File System, Networking, Programmer Interface.

UNIT-VIII

Case Study-II-Linux System - Design Principles, Kernel modules, Process Management, Scheduling Memory Management, File Systems, Input and Output, Interposes Communication , Network Structure , Security .

TEXT BOOKS:

- 1 Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley
- 2 Operating Systems – Internals and Design Principles Stallings, Fifth Edition–2005, Pearson Education/PHI

REFERENCE BOOKS:

1. Operating System A Design Approach-Crowley,TMH.
2. Modern Operating Systems, Andrew S Tanenbaum 2nd edition Pearson/PHI

OPERATIONS RESEARCH

Course Code : 10CA3109

L	P	T	C
4	-	2	4

UNIT-I (Introduction to OR and LPP)

Introduction, Origin and Development of O.R, Scientific Method in OR, Modeling in O.R Advantages and Limitations of O.R, General Solution Methods For O.R models, Methodology of OR O.R and Decision making, Applications of O.R, Linear Programming, Mathematical Formulation of the problem, Graphical Solution.

(1.1 – 1.10, 2.1 – 2.3, 3.1- 3.3)

UNIT-II (Simplex method)

General LPP, Canonical and standard form of LPP Simplex Method: Introduction, Computational Procedure, Use of artificial variables, Degeneracy in LPP.

(3.4, 3.5, 4.1, 4.3 – 4.5)

UNIT-III (Duality in LPP)

Duality in LPP: Introduction, General Primal-Dual pair, Formulating a Dual Problem, Primal-Dual pair in Matrix form, Duality and Simplex Method, Dual Simplex Method.

(5.1 – 5.4, 5.7, 5.9)

UNIT-IV (Transportation Problem)

Introduction, LP formulation of Transportation Problem, The Transportation Table, Solution of Transportation problem, Finding IBFS, Test for Optimality, Degeneracy in Transportation problem, Transportation Algorithm, Some Exceptional cases.

(10.1, 10.2, 10.5, 10.8 – 10.10, 10.12, 10.13, 10.15)

UNIT-V (Assignment Problem)

Introduction, Mathematical Formulation of the Problem, Hungarian Assignment Method, Special Cases in Assignment Problems, The Traveling Salesman Problem.

(11.1, 11.2, 11.3.4, 11.4, 11.7)

UNIT-VI (Sequencing Problem and Queueing Theory)

Sequencing Problem: Introduction, Problem of Sequencing, Processing n jobs through two machines. Processing n jobs through k - machines.

Queueing Theory: Introduction, Queueing system, elements of Queueing system Operating characteristics of a Queueing system, Classification of queueing models: Model-I ($M/M/1:(\infty/FIFO)$) ,Model-II ($M/M/1:(\infty/SIRO)$),Model-III ($M/M/1:(N/FIFO)$)

(12.1-12.5, 21.1-21.4, 21.7-21.9) (Proofs shall be omitted)

UNIT-VII (Inventory control)

Introduction, Types of Inventories, Costs associated with inventories, the concept of EOQ, Deterministic inventory problems with no shortages, with shortages.

(19.1-19.11) (Proofs shall be omitted).

UNIT-VIII (PERT/ CPM)

Introduction, Basic Components, Logical sequencing, Rules of Network Construction, Critical Path Analysis.

(25.1 – 25.6)

Text Book:

1.” Operations Research” Kanthi Swarup, P.K.Gupta and Man Mohan, Sultan Chand & Sons New Delhi, Fourteenth Edition -2008.

Reference Books:

1.”Operations Research, An Introduction” Hamdy. A. Taha, Pearson Education, Seventh Edition.

ENGLISH LANGUAGE COMMUNICATION SKILLS**Course Code : 10CA3110**

L	P	T	C
4	-	-	4

UNIT -I

Features of Indian English - Correction of sentences - Structures - Tenses - ambiguity - idiomatic distortions.

UNIT-II

Informal conversation Vs Formal expression Verbal and non-verbal communication, barriers to effective communication – kinesics

UNIT - III

Types of Communication - - Oral, aural, Writing and reading - Word-Power - Vocabulary- Jargon - rate of speech, pitch, tone - Clarity of voice

UNIT - IV

Technical presentations - types of presentation –video conferencing-- participation in meetings - chairing sessions.

UNIT - V

Formal and informal interviews – ambiance and polemics - interviewing in different settings and for different purposes e.g., eliciting and giving information, recruiting, performance appraisal.

UNIT - VI

Written communication - differences between spoken and written communication - features of effective writing such "as clarity, brevity, appropriate tone clarity, balance etc.- GRE. TOEFL models

UNIT – VII

Letter-writing - business letters – pro forma culture - format - style – effectiveness, promptness - Analysis of sample letters collected from industry - email, fax.

UNIT – VIII

Technical Report writing - Business and Technical Reports – Types of reports - progress reports, routine reports - Annual reports - format - Analysis of sample reports from industry - Synopsis and thesis writing

REFERENCE BOOKS:

1. Essentials of Business Communication, Rajendra Pal, J S KorlahaHi Sultan Chand & Sons, New Delhi.
2. Basic Communication Skills for Technology, Andrea J. Rutherford: Pearson Education Asia, Patparganj, New Delhi-92.
3. Advanced Communication Skills, V. Prasad, Atma Ram Publications, New Delhi. Raymond V. Lesikav; John D. Pettit Jr.;
4. Business Communication; Theory & Application, All India Traveller Bookseller, New Delhi-51.
5. Business Communication, RK Madhukar, Vikas Publishing House Pvt Ltd
6. K.R. Lakshminarayana : English. for Technical Communication – vols. 1 and 2, SCITECH Publications (India) Pvt. Ltd., T. Nagar, Chennai-600 017.
7. Edmond H Weiss: Writing Remedies: Practical Exercises for Technical Writing, Universities Press, .
8. Cliffs Test Prep for GRE and TOEFL: Computer Based Test, IDG Books. India (P) Ltd. New Delhi-002.
9. GRE and TOEFL; Kaplan and Baron's English in Mind, Herbert Puchta and Jeff Stranks, Cambridge

OBJECT ORIENTED PROGRAMMING THROUGH JAVA**Course Code : 10CA311**

L	P	T	C
4	-	1	4

AIM: To make the student confident in object oriented programming and also in developing network, and multi threaded user interface programs.

Objective: Student will get the capability of developing applications using GUI with the help of JAVA concepts.

UNIT-I

Object oriented thinking :- Need for oop paradigm, A way of viewing world – Agents, responsibility, messages, methods, classes and instances, class hierarchies (Inheritance), method binding, overriding and exceptions, summary of oop concepts, coping with complexity, abstraction mechanisms.

UNIT-II

Java Basics History of Java, Java buzzwords, data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and costing, simple java program, classes and objects – concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, string handling.

UNIT-III

Inheritance – Hierarchical abstractions, Base class object, subclass, subtype, substitutability, forms of inheritance- specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance. Member access rules, super uses,

using final with inheritance, polymorphism- method overriding, abstract classes.

UNIT-IV

Packages and Interfaces : Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages, differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces, Exploring packages, java.io(Characterstreams, Bytestreams), Files, (Directories, randomaccessfiles), java.util(collections(vectors, hashmap, treemap, lists, sets,)), calendar, regex(pattern matching), date, scanner)

UNIT-V

Exception handling and multithreading - Concepts of exception handling, benefits of exception handling, Termination or resumptive models, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes. Differences between multi threading and multitasking, thread life cycle, creating threads, synchronizing threads, daemon threads, thread groups.

UNIT-VI

Event Handling : Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes, inner classes. The AWT class hierarchy, user interface components- labels, button, canvas, scrollbars, text components, check box, check box groups, choices, lists panels – scrollpane, dialogs, menubar, graphics, layout manager – layout manager types – boarder, grid, flow, card and grib bag.

UNIT-VII

Applets – Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets,

passing parameters to applets.

Swing – Introduction, limitations of AWT, MVC architecture, components, containers, exploring swing- JApplet, JFrame and JComponent, Icons and Labels, text fields, buttons – The JButton class, Check boxes, Radio buttons, Combo boxes, Tabbed Panes, Scroll Panes, Trees, and Tables.

UNIT-VIII

Networking – Basics of network programming, addresses, ports, sockets, simple client server program, multiple clients, Java .net package Packages – java.util

TEXT BOOKS :

1. Java; the complete reference, 7th editon, Herbert schildt, TMH.
2. Understanding OOP with Java, updated edition, T. Budd, Pearson education.

REFERENCES :

1. An Introduction to programming and OO design using Java, J.Nino and F.A. Hosch, John Wiley & sons.
2. An Introduction to OOP, second edition, T. Budd, pearson education.
3. Introduction to Java programming 6th edition, Y. Daniel Liang, pearson education.
4. An introduction to Java programming and object oriented application development, R.A. Johnson-Thomson.
5. Core Java 2, Vol 1, Fundamentals, Cay.S.Horstmann and Gary Cornell, seventh Edition, Pearson Education.
- 6 .Core Java 2, Vol 2, Advanced Features, Cay.S.Horstmann and Gary Cornell, Seventh Edition, Pearson Education.
7. Object Oriented Programming through Java, P. Radha Krishna, University Press.
8. Beginning Java 2 SDK 1.4 edition, Ivor Horton, Wrox publications

DATA STRUCTURES USING C++**Course Code : 10CA3112**

L	P	T	C
4	-	-	4

UNIT-I

Different strategies for problem solving , need for OOP, overview of OOP principles –Encapsulation, inheritance, polymorphism .C++ Class Overview- Class Definition, Objects, Class Members, Access Control, Class Scope, Constructors and destructors, Inline functions, static class members, this pointer, friend functions, dynamic memory allocation and deallocation (new and delete).

UNIT- II

Polymorphism and inheritance :Function Overloading, Operator Overloading, Generic Programming- Function and class templates, Inheritance basics, base and derived classes, inheritance types, base class access control, virtual base class, function overriding , runtime polymorphism using virtual functions, abstract classes.

UNIT- III

Streams, libraries and error handling-stream classes hierarchy, console I/O, formatted I/O,file streams and string streams, exception handling mechanism , standard template library.

UNIT- IV

Searching and sorting- linear and binary search methods, sorting-bubble sort, selection sort, insertion sort, quick sort, merge sort.

UNIT- V

Introduction to data structures, singly linked lists, doubly linked lists, circular list, representing stacks and queues in C++ using arrays and linked lists, infix to post fix conversion, postfix expression evaluation.

UNIT-VI

Trees-binary trees, terminology, representation, insertion, deletion, searching, traversals, Binary search trees, definition, ADT, implementation, operations-searching, insertion and deletion, Balanced search trees- AVL trees, definition, height of an AVL tree, representation, operations-insertion, deletion and searching.

UNIT -VII

Priority Queues – Definition, ADT, Realizing a Priority Queue using Heaps, Definition, insertion, Deletion, Application-Heap Sort, Leftist Trees.

UNIT -VIII

Graphs- terminology, representation, traversal(BFS and DFS) , minimal spanning trees, Kruskal’s algorithm, prim’s algorithm.

TEXT BOOKS :

1. Data structures , algorithms and applications in C++, S.Sahni, 2nd edition, university Press(India) pvt ltd.
2. Data structures using C and C++, Langsam ,M. J. Augenstein, A. M. Tanenbaum , 2nd edition, PHI Education.

REFERENCE BOOKS:

1. Data structures and Algorithm analysis in C++, Mark Allen Weiss, Pearson Education, 2nd edition.
2. Herbert Schildt, “C++: The complete Reference”, 4th Edition, Tata McGraw Hill.
3. Ashok N. Kamthane, “ OOP with ANSI & Turbo C++”, PEA.
4. Barkakati, “Object Oriented Programming Using C++”, PHI
5. Data Structures and Algorithms: Concepts, Techniques and Applications, GAV Pai, Tata McGraw Hill Publications.

OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB**Course Code : 10CA3113**

L	P	T	C
-	4	-	2

1. (Using java. math class)

a) Write a Java program that prints all real solutions to the quadratic equation $ax^2 + bx + c = 0$. Read in a,b, c and use the quadratic formula. If the discriminant $b^2 - 4ac$ is negative, display a message stating that there are no real solutions.

b) The Fibonacci sequence is defined by the following rule:

The first two values in the sequence are 1 and 1. Every subsequent value is the sum of the two values preceding it. Write a Java program that uses both recursive and non recursive functions to print the nth value in the Fibonacci sequence.

2 .a) Write a Java program that prompts the user for an integer and then prints out all prime numbers up to that integer.

b) Write a Java program to multiply two given matrices.

c) Write a Java Program that reads a line of integers, and then displays each integer, and the sum of all the integers (Use StringTokenizer class of java.util)

3. (Using java.lang.FileInputStream and FileOutputStream)

a) Write a Java program that reads a file name from the user, then displays information about whether the file exists, whether the file is readable, whether the file is writable, the type of file and the length of the file in bytes.

b) Write a Java program that reads a file and displays the file on the screen, with a line number before each line.

c) Write a Java program that displays the number of characters, lines and words in a text file.

4. Write a Java program that:

a. Implements stack ADT.

b. Converts infix expression into Postfix form

c. Evaluates the postfix expression

5.(packages)

Design a package to contain the class **Student** that contains data members such as name, roll number and another package contains the interface **Sports** which contains some sports information. Import these two packages in a package called **Report** which process both Student and Sport and give the report.

6.(Exception Handling and Multithreading)

a) Write a program that reads two numbers from the user to perform integer division into Num1 and Num2 variables. The division of Num1 and Num2 is displayed if they are integers. If Num1 or Num2 were not an integer, the program would throw a NumberFormatException. If Num2 were Zero, the program would throw an ArithmeticException.

b) Create a user defined exception.

C) Write a Java program that correctly implements producer consumer problem using the concept of multithreading.

7.(Using java.awt.*)

a) Write a java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green. When a radio button is selected, the light is turned on, and only one light can be on at a time No light is on when the program starts.

b) Write an applet program that simulates a digital clock.

8. (Applets and Event Handling)

a) Develop an applet that displays a simple message.

- b) Develop an applet that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named “Compute” is clicked.
- c) Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -,*, % operations. Add a text field to display the result.

9. (Swings and Event Handling)

- a) Suppose that a table named Table.txt is stored in a text file. The first line in the file is the header, and the remaining lines correspond to rows in the table. The elements are separated by commas. Write a java program to display the table using J table component.
- b) Write a Java program for handling mouse events.

10. (Socket Programming)

Write a Java program that implements a simple client/server application. The client sends data to a server. The server receives the data, uses it to produce a result, and then sends the result back to the client. The client displays the result on the console. For ex: The data sent from the client is the radius of a circle, and the result produced by the server is the area of the circle. (Use java.net)

11.a) Write a java program to create an abstract class named Shape that contains an empty method named numberOfSides (). Provide three classes named Trapezoid, Triangle and Hexagon such that each one of the classes extends the class Shape. Each one of the classes contains only the method numberOfSides () that shows the number of sides in the given geometrical figures.

- b) Write a Java program that checks whether a given string is a palindrome or not. Ex: MADAM is a palindrome.
- c) Write a Java program for sorting a given list of names in ascending order.

DATA STRUCTURES LAB**Course Code : 10CA3114**

L	P	T	C
	4	-	2

1. Write C++ programs that use both recursive and non recursive functions to perform the following searching operations for a Key value in a given list of integers :
 - i) Linear search ii) Binary search
2. Write C++ programs that implement the following sorting methods to sort a given list of integers in ascending order:
 - i) Bubble sort ii) Quick sort
3. Write C++ programs that implement the following sorting methods to sort a given list of integers in ascending order:
 - i) Insertion sort ii) Merge sort
4. Write C++ programs that implement stack (its operations) using
 - i) Arrays ii) singly linked list
5. Write C++ programs that implement Queue (its operations) using
 - i) Arrays ii) singly linked list
6. Write a C++ program to implement Circular queue
7. Write a C++ program that uses Stack operations to perform the following:

- i) Converting infix expression into postfix expression
 - ii) Evaluating the postfix expression
8. Write a C++ program to perform the following operations on singly linked list to implement priority queue on student records.
- i) Creation ii) Insertion iii) Deletion iv) Traversal v) Reversal
9. Write a C++ program to perform the following operations on circular doubly linked lists
- i) Creation ii) Insertion iii) Deletion iv) Traversal in both ways
10. Write a C++ program to implement binary trees
- i) Creating a Binary Tree of integers
 - ii) Insertion, searching
 - iii) Traversing the above binary tree in preorder, inorder and postorder.
11. Write a C++ program to perform the following operations:
- i) Insert an element into a binary search tree.
 - ii) Delete an element from a binary search tree.
 - iii) Search for a key element in a binary search tree.
12. Write C++ programs for the implementation of bfs and dfs for a given graph.
13. Write C++ programs for the implementation of Prim's algorithm for shortest paths between every pair of nodes in the graph.
14. Write a C++ program to implement Kruskal's algorithm to generate Minimum cost spanning tree.