

**ACADEMIC REGULATIONS  
COURSE STRUCTURE  
AND  
SYLLABI (I, II SEMESTERS)  
FOR  
MASTER OF COMPUTER APPLICATIONS  
EFFECTIVE FROM THE ACADEMIC YEAR 2009-10.**



**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 autonomy is conferred on any institution by the U.G.C. on the recommendations of the affiliating University and the State Government based on its performance history as well as future commitment and competency to deliver quality education. It is a mark of its ability to function independently in accordance with the set norms of the monitoring bodies like UGC and AICTE. It reflects the confidence of the affiliating University in the autonomous institution to uphold and maintain standards it expects to deliver on its own behalf and thus awards degrees on behalf of the institution. Thus, an autonomous institution is given the freedom to have its own **curriculum, examination system** and **monitoring mechanism**, independent of the affiliating University but under its eagle eyes.

The G.V.P. College of Engineering is proud to win the confidence of all the above bodies monitoring the quality in education and has gladly accepted the responsibility of sustaining, if not improve upon the standards and values it has been striving for more than a decade in reaching its present standing in the arena of contemporary technical education of the region. As a follow up, statutory bodies like Academic Council and Boards of studies are constituted with the guidance of the Governing Body of the College and recommendations of the JNTU Kakinada to frame the regulations, Course structure and syllabi under autonomous status.

The autonomous regulations, course structure and syllabi have been prepared after prolonged and detailed interaction with several experts taken from academics, industry and research, in accordance with the vision and mission of the college to give a quality engineering graduate to the society.

All the faculty are advised to read, understand, and follow the regulations in letter and spirit. In case of doubts /clarifications, interpretations have to be made carefully and cautiously with elderly guidance. No controversies shall arise in implementation.

All the parents and students are requested to go through carefully and be through. Any clarifications needed are to be sought at appropriate time and with official of the college, without presumptions, to avoid unwanted subsequent inconveniences and embarrassments.

The cooperation of all the stake holders is sought for the successful implementation of the autonomous system in the larger interests of the college and prospective engineering graduates.

**PRINCIPAL**

## **ACKNOWLEDGEMENT**

*This College took a bold step of asking for autonomy with the encouragement of erstwhile JNTU and the APSCHE gracefully recommended its case to UGC.*

*The UGC was kind enough to recommend to JNTU to grant autonomy to this college.*

*The Vice-Chancellor and the Registrar of JNTUK acted with extraordinary speed to make autonomous status a reality and to save one year of autonomy for this college.*

*Many experts gave their consent and responded at short notice to be part of the most important activity of giving direction to prospective engineering students of this college. They sat through long hours to discuss in depth to make it practicable.*

*All the faculty consulted several course structures and syllabi to bring out the best. They cooperated in sitting through lengthy meetings till late evenings.*

*The non-teaching staff toiled through hot summer in typing, printing several drafts before they are finalised. They spent late nights in the college to facilitate the smooth conduct of Board of studies, Academic council and Governing Body meetings.*

*The management extended all material and moral support to keep up the accelerated time schedules.*

*All are gratefully acknowledged for strengthening the hands of the administration.*

**PRINCIPAL**

## **ACADEMIC REGULATIONS**

The MCA Degree of the Jawaharlal Nehru Technological University, Kakinada shall 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 University 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 MCA 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 in MCA course.
- 2.3 The duration each semester will normally be 20 weeks with 5 days a week. A working day shall have 7 periods each of 50minutes.

### **3.0 ATTENDANCE:**

- 3.1 A student shall be deemed to have eligibility to write End Semester examinations if he has put in a minimum of 75% of attendance in aggregate of all the subjects.
- 3.2 Condonation of shortage of attendance up to 10% i.e. 65% and above, and below 75% may be given by the College academic committee.
- 3.3 Condonation of shortage of attendance shall be granted only on genuine and valid reasons on representation by the student with supporting evidence.
- 3.4 Shortage of attendance below 65% shall in no case be condoned.
- 3.5 A student shall not be promoted to the next semester unless he fulfils the attendance requirements of the previous semester.

### **4.0 EVALUATION AND ACADEMIC REQUIREMENTS:**

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

- 4.1 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. 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.

- 4.2 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% to be declared successful.
- 4.3 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.
- 4.4 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.
- 4.5 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.
- 4.6 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.
- 4.7 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.

- 4.8 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.

## **5.0 EVALUATION OF PROJECT WORK:**

- 5.1 A Project Review Committee (PRC) of the college is to be constituted with Principal as chairperson, Heads of the Departments, which are offering PG courses and two other senior faculty members of the department offering MCA.
- 5.2 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.
- 5.3 Every student shall work on project approved by the PRC of the college.
- 5.4 The duration of the project is for one semester.
- 5.5 Three copies of Thesis, certified by the supervisor shall be submitted to the College.
- 5.6 The Project report shall be adjudicated by one external examiner selected by the Chairman PRC, out of 5-member panel submitted by the HOD who are eminent in that field of study.
- 5.7 The viva-voce examination of the project shall be conducted by a board consisting of the External examiner (See section 5.6), The Head of the Department and Supervisor. The Board shall jointly report students work as:
- A. Excellent
  - B. Good
  - C. Satisfactory
  - D. Unsatisfactory

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

- 5.8 If the report of the viva-voce is not satisfactory, the student will retake the viva-voce examination after three months. If he fails to get a satisfactory report at the second viva-voce examination, he will not be eligible for the award of the degree, unless the student is asked to revise and resubmit. If the report of the examination is unfavorable again, the project shall be summarily rejected.

## **6.0 AWARD OF DEGREE AND CLASS:**

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 four classes:

Class Awarded	% of marks to be secured
First Class with Distinction	70% and above
First Class	Below 70% but not less than 60%
Second Class	Below 60% but not less than 50%

(The marks in internal evaluation and end examination shall be shown separately in the marks memorandum)

## **7.0 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 issue of degree is liable to be withheld in such cases.

## **8.0 TRANSISTORY 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 **4.6** and **2.0**.

## **9.0 GENERAL:**

- 9.1 The academic regulations should be read as a whole for purpose of any interpretation.
- 9.2 In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Chairman Academic Council is final.
- 9.3 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.
- 9.4 Wherever the word he, him or his occurs, it will also include she, her and her's.

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## COURSE STRUCTURE FOR 2009 ADMITTED BATCH

### I SEMESTER:

<b>COURSE CODE</b>	<b>THEORY/LAB</b>	<b>L</b>	<b>T</b>	<b>P</b>
ACA3101	Computer Organization	4	1	-
ACA3102	Object Oriented Programming through C++	4	1	-
ACA3103	Accountancy and Financial Management	4	0	-
ACA3104	Discrete Structures	4	0	-
ACA3105	Probability and Statistics	4	0	-
ACA3106	English Language Communication Skills	2	-	-
ACA3107	<i>Computer Organization Lab</i>	-	-	4
ACA3108	<i>Object Oriented Programming through C++ Lab</i>	-	-	4
ACA3109	<i>English Language Communication Skills Lab</i>	-	-	2
<b>Total</b>		<b>22</b>	<b>02</b>	<b>10</b>

### II SEMESTER:

<b>COURSE CODE</b>	<b>THEORY/LAB</b>	<b>L</b>	<b>T</b>	<b>P</b>
ACA3110	Business Data Processing	4	1	-
ACA3111	Data Structures through Java	4	1	-
ACA3112	Operating Systems	4	1	-
ACA3113	Operations Research	4	1	-
ACA3114	Organizational Structure and Personal Management	4	0	-
ACA3115	<i>Business Data Processing Lab</i>	-	-	4
ACA3116	<i>Data Structures through Java Lab</i>	-	-	4
<b>Total</b>		<b>20</b>	<b>04</b>	<b>8</b>

**III SEMESTER:**

<b>COURSE CODE</b>	<b>THEORY/LAB</b>	<b>L</b>	<b>T</b>	<b>P</b>
ACA3117	Computer Communications	4	1	-
ACA3118	Computer Graphics	4	1	-
ACA3119	Database Management Systems	4	1	-
ACA3120	Unix Network Programming	4	1	-
ACA3121	Management Information Systems	4	0	-
ACA3122	<i>Database Management Systems Lab</i>	-	-	4
ACA3123	<i>Unix Network Programming Lab</i>	-	-	4
<b>Total</b>		<b>20</b>	<b>04</b>	<b>8</b>

**IV SEMESTER:**

<b>COURSE CODE</b>	<b>THEORY/LAB</b>	<b>L</b>	<b>T</b>	<b>P</b>
ACA3124	Advanced Java Programming	4	1	-
ACA3125	Data Warehousing and Mining	4	1	-
ACA3126	Software Engineering	4	0	-
	<b>Elective – I</b>	4	1	-
ACA3127	Embedded Systems			
ACA3128	Human Computer Interaction			
ACA3129	Perl Programming			
	<b>Elective – II</b>	4	1	-
ACA3130	Distributed Operating Systems			
ACA3131	Mobile Computing			
ACA3132	Systems Programming			
ACA3133	<i>Advanced Java Programming Lab</i>	-	-	4
ACA3134	<i>Data Warehousing and Mining Lab</i>	-	-	4
<b>Total</b>		<b>20</b>	<b>04</b>	<b>8</b>

**V SEMESTER:**

<b>COURSE CODE</b>	<b>THEORY/LAB</b>	<b>L</b>	<b>T</b>	<b>P</b>
ACA3135	E-Commerce	4	0	-
ACA3136	Multimedia Application Development	4	1	-
ACA3137	Object Oriented Analysis and Design (using UML)	4	1	-
	<b>Elective-III</b>	4	1	-
ACA3138	Software Project Management			
ACA3139	Middle Ware Technologies			
ACA3140	Information Retrieval Systems			
	<b>Elective – IV</b>	4	1	-
ACA3141	Software Testing Methodologies			
ACA3142	Advanced Databases			
ACA3143	Information Security			
ACA3144	<i>Multimedia Application Development Lab</i>	-	-	4
ACA3145	<i>UML Lab</i>	-	-	4
	<b>Total</b>	<b>20</b>	<b>04</b>	<b>8</b>

**VI-SEMESTER:**

<b>COURSECODE</b>	<b>THEORY/LAB</b>
ACA3146	Project Seminar
ACA3147	Dissertation/Thesis :
	Eexcellent/Good/Satisfactory/Not-Satisfactory

**COMPUTER ORGANIZATION****Course Code: ACA3101**

<b>L</b>	<b>T</b>	<b>P</b>
4	1	-

**UNIT-I:**

NUMBER SYSTEMS-AND COMPUTER ARITHMETIC- Signed and unsigned numbers, Addition and subtraction, multiplication, division, Floating point representation logical operation, Gray code, BCD codes, Error detecting codes. Boolean algebra, Simplification of Boolean expressions, K-Maps.

**UNIT-II:**

COMBINATIONAL AND SEQUENTIAL CIRCUITS- decoders, Encoders, Multiplexers, Half and Full adders, Shift registers; Sequential circuits- flip-flops.

**UNIT-III:**

MEMORY ORGANIZATION-memory hierarchy, Main memory-RAM, ROM chips, Memory address map, memory contention to CPU; Associative Memory-Hardware logic, match, read and write logic; Cache Memory-Associative mapping, Direct mapping, set-associative mapping, hit and miss ratio;

**UNIT-IV:**

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-V:**

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

**UNIT-VI:**

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

**UNIT-VII:**

MICRO PROGRAMMED CONTROL: Control memory, Address sequencing, microprogram example, design of control unit Hard wired control. Microprogrammed control

**UNIT-VIII:**

INPUT -OUTPUT ORGANIZATION-peripheral devices, input-output interface-I/O Bus and interface modules, I/O versus Memory bus, isolated versus memory mapped I/O, Modes of transfer-Programmed I/O, Interrupt-initiated I/O, priority interrupts-Daisy chaining, parallel priority, interrupt cycle, DMA- DMA control, DMA transfer, Input output processor-CPU-IOP communication.

**TEXT BOOKS:**

1. Morris Mano -Computer System Architecture –3<sup>rd</sup> Edition-Pearson Education.
2. Douglas V.Hall Intel 8086-Programming- McGraw-Hill International studies.

## **REFERENCE BOOKS:**

1. Computer Organization – Car Hamacher, Zvonks Vranesic, SafeaZaky, Vth Edition, McGraw Hill.
2. Fundamentals or Computer Organization and Design, - Sivaraama Dandamudi Springer Int. Edition.
3. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI
4. David A. Paterson and john L.Hennessy-Computer- organization and design-Harcourt Asia Pte Ltd.-2<sup>nd</sup> Edition
5. Structured Computer Organization – Andrew S. Tanenbaum, 4<sup>th</sup> Edition PHI/Pearson

**OBJECT ORIENTED PROGRAMMING THROUGH C++****Course Code: ACA3102**

L	T	P
4	1	-

**UNIT-I:**

Different paradigms for problem solving, need for OOP, differences between OOP and Procedure oriented programming, Abstraction, Overview of OOP principles, Encapsulation, Inheritance and Polymorphism.

**UNIT-II:**

C++ Basics: Structure of a C++ program, Data types, Declaration of variables, Expressions, Operators, Operator Precedence, Evaluation of expressions, Type conversions, Pointers, Arrays, Pointers and Arrays, Strings, Structures, References.

Flow control statement- if, switch, while, for, do, break, continue, goto statements.

Functions-Scope of variables, Parameter passing, Default arguments, inline functions, Recursive functions, Pointers to functions.

Dynamic memory allocation and deallocation operators-new and delete, Preprocessor directives.

**UNIT-III:**

C++ Classes And Data Abstraction: Class definition, Class structure, Class objects, Class scope, this pointer, Friends to a class, Static class members, Constant member functions, Constructors and Destructors, Dynamic creation and destruction of objects, Data abstraction, ADT and information hiding.

#### **UNIT-IV:**

Polymorphism: Function overloading, Operator overloading, Generic programming-necessity of templates, Function templates and class templates.

#### **UNIT-V:**

Inheritance: Defining a class hierarchy, Different forms of inheritance, Defining the Base and Derived classes, Access to the base class members, Base and Derived class construction, Destructors, Virtual base class.

#### **UNIT-VI:**

Virtual Functions And Polymorphism: Static and Dynamic bindings, Base and Derived class virtual functions, Dynamic binding through virtual functions, Virtual function call mechanism, Pure virtual functions, Abstract classes, Implications of polymorphic use of classes, Virtual destructors.

#### **UNIT-VII:**

C++ I/O: I/O using C functions, Stream classes hierarchy, Stream I/O, File streams and String streams, Overloading << and >> operators, Error handling during file operations, Formatted I/O.

#### **UNIT-VIII:**

Exception Handling: Benefits of exception handling, Throwing an exception, The try block, Catching an exception, Exception objects, Exception specifications, Stack unwinding, Rethrowing an exception, Catching all exceptions, Design issues in exception handling.

#### **TEXT BOOKS:**

1. Problem solving with C++, The OOP, 4<sup>th</sup> Edition, Walter Savitch, Pearson Education.
2. C++, The Complete Reference, 4<sup>th</sup> Edition, Herbert Schildt, TMH.

## **REFERENCE BOOKS:**

1. C++ Primer, 3<sup>rd</sup> Edition, S.B.Lippman and J.Lajoie, Pearson Education.
2. The C++ Programming Language, 3<sup>rd</sup> Edition, B.Stroutstrup, Pearson Education.
3. OOP in C++, 3<sup>rd</sup> Edition, T.Gaddis, J.Walters and G.Muganda, Wiley DreamTech Press.
4. Object Oriented Programming in C++, 3<sup>rd</sup> Edition, R.Lafore, Galigotia Publications pvt ltd.
5. Computer Science, A Structured Programming Approach Using C++, B.A.Forouzan and R.F.Gilberg, Thomson

**ACCOUNTANCY AND FINANCIAL MANAGEMENT****Course Code: ACA3103**

<b>L</b>	<b>T</b>	<b>P</b>
<b>4</b>	<b>0</b>	<b>-</b>

**UNIT-I:**

Accounting: Principles, concepts, conventions, double entry system of accounting, introduction of basic books of accounts ledgers.

**UNIT-II:**

Preparation of trial balance - Final accounts - company final accounts.

**UNIT-III:**

Financial Management - meaning and scope, role, objectives of time value of money - over vitalization - under capitalization - profit maximization - wealth maximization - EPS maximization.

**UNIT IV:**

Ratio Analysis - advantages - limitations - Fund flow analysis - meaning, importance, preparation and interpretation of Funds flow and cash flow statements-statement of changes in working capital.

**UNIT-V:**

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

**UNIT-VI:**

Marginal costing and Break-even Analysis: nature, scope and importance - practical applications of marginal costing, limitations and importance of cost - volume, profit analysis.

**UNIT-VII:**

Standard costing and budgeting: nature, scope and computation and analysis - materials variance, labor variance and sales variance - budgeting - cash budget, sales budget - flexible Budgets, master budgets.

**UNIT-VIII:**

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.

**TEXT BOOKS :**

1. Van Horne, James, C : Financial Management and Policy. Pearson Education, 12<sup>th</sup> Edition.
2. Financial Accounting, S.N.Maheshwari, Sultan Chand Company
3. Financial Management, S.N.Maheshwari, Sultan Chand Company

**DISCRETE STRUCTURES****Course Code: ACA3104**

<b>L</b>	<b>T</b>	<b>P</b>
<b>4</b>	<b>0</b>	<b>-</b>

**UNIT-I:**

Mathematical Logic: Statements and notations, Connectives, Well formed formulas, Truth Tables, tautology, equivalence implication, Normal forms.

**UNIT-II:**

Predicates: Predicative logic, Free & Bound variables, Rules of inference, Consistency, proof of contradiction, Automatic Theorem Proving.

**UNIT-III:**

Set Theory: Properties of binary Relations, equivalence, compatibility and partial ordering relations, Hasse diagram. Functions: Inverse Function Comports of functions, recursive Functions, Lattice and its Properties, Pigeon hole principles and its application.

**UNIT-IV:**

Algebraic structures: Algebraic systems Examples and general properties, Semi groups and monads, groups sub groups' homomorphism, Isomorphism.

**UNIT-V:**

Elementary Combinatorics: Basis of counting, Combinations & Permutations, with repetitions, Constrained repetitions, Binomial Coefficients, Binomial Multinomial theorems, the principles of Inclusion – Exclusion.

**UNIT-VI:**

Recurrence Relation: Generating Functions, Function of Sequences  
Calculating Coefficient of generating function, Recurrence relations,  
Solving recurrence relation by substitution and Generating funds.  
Characteristics roots solution of In homogeneous Recurrence Relation.

**UNIT-VII:**

Graph Theory: Representation of Graph, DFS, BFS, Spanning Trees,  
planar Graphs

**UNIT-VIII:**

Graph Theory and Applications, Basic Concepts Isomorphism and Sub  
graphs, Multi graphs and Euler circuits, Hamiltonian graphs, Chromatic  
Numbers

**TEXT BOOKS:**

1. Discrete and Combinatorial Mathematics- An Applied  
Introduction- 5th Edition – Ralph. P.Grimaldi. Pearson Education
2. Discrete Mathematical Structures with applications to computer  
science Trembly J.P. & Manohar .P, TMH
3. Discrete Mathematics for Computer Scientists & Mathematicians  
Prentice Hall, 1986 J.L. Mott, A. Kandel, T.P. Baker.

**REFERENCE BOOKS:**

1. Discrete Mathematical Structures, Bernand Kolman, Roberty C.  
Busby, Sharn Cutter Ross, Pearson Education/PHI.
2. Discrete Mathematics for Computer science, Garry Haggard and  
others, Thomson
3. Discrete Mathematical Structures, Mallik and Sen, Thomson
4. Mathematical Foundations of computer science Dr  
D.S.Chandrasekharaiaha Prism books Pvt Ltd.
5. Discrete Mathematics, Lovasz, Springer.

**PROBABILITY AND STATISTICS****Course Code: ACA3105**

L	T	P
4	0	-

**UNIT-I:**

Probability: Sample space and events – Probability – The axioms of probability - Some elementary theorems - Conditional probability – Baye’s theorem.

**UNIT-II:**

Random variables – Discrete and continuous – Distribution – Distribution function.

**UNIT-III:**

Distribution - Binomial, poisson and normal distribution – related properties.

**UNIT-IV:**

Sampling distribution: Populations and samples - Sampling distributions of mean (known and unknown) proportions, sums and differences.

**UNIT-V:**

Estimation: Point estimation – interval estimation - Bayesian estimation.

**UNIT-VI:**

Test of Hypothesis – Means and proportions – Hypothesis concerning one and two means – Type I and Type II errors. One tail, two-tail tests.

**UNIT-VII:**

Tests of significance – Student's t-test, F-test,  $\chi^2$  test. Estimation of proportions.

**UNIT-VIII:**

Curve fitting: The method of least squares – Inferences based on the least squares estimations - Curvilinear regression – multiple regressions – correlation for univariate and bivariate distributions.

**TEXT BOOKS:**

1. Probability and statistics for engineers:Erwin Miller And John E.Freund.Prentice-Hall of India / Pearson , Sixth edition.
2. Text book of Probability and Statistics by Dr.Shahnaz Bathul, V.G.S.Publishers 2003.

**REFERENCE BOOKS:**

1. Probability, Statistics and Random Processes Dr.K.Murugesan & P.Gurusamy by Anuradha Agencies, Deepti Publications.
2. Advanced Engineering Mathematics (Eighth edition), Erwin Kreyszig, John Wiley and Sons (ASIA) Pvt. Ltd., 2001.
3. Probability and Statistics for Engineers: G.S.S.Bhishma Rao,sitech., Second edition 2005.
4. Probability, Statistics and Queuing Theory, 2<sup>nd</sup> Edition, Trivedi, John Wiley and Sons

**ENGLISH LANGUAGE COMMUNICATION SKILLS****Course Code: ACA3106****L T P**  
2 - -**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.
4. Raymond V. Lesikav; John D. Pettit Jr.; 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, Hyderabad.
8. Cliffs Test Prep for GRE and TOEFL: Computer Based Test, IDG Books. India (P) Ltd. New Delhi-002.

GRE and TOEFL; Kaplan and Baron's

English in Mind, Herbert Puchta and Jeff Stranks, Cambridge

**COMPUTER ORGANIZATION LAB****Course Code: ACA3107****L T P**  
- - 4**List of Programmes:**

1. Write assembly language programs to evaluate the expressions:

i)  $a = b + c - d * e$

ii)  $z = x * y + w - v + u / k$

a. Considering 8-bit, 16 bit and 32 bit binary numbers as b, c, d, e.

b. Considering 2 digit, 4digit and 8 digit BCD numbers.

Take the input in consecutive memory locations and results also.

Display the results by using “int xx” of 8086. Validate program for the boundary conditions.

2. Write an ALP of 8086 to add two exponential numbers which are in IEEE 754 notation. Display the results by using “int xx” of 8086. Validate program for the boundary conditions.

3. 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 average

Considering 8-bit, 16 bit binary numbers and 2 digit, 4digit and 8 digit BCD numbers. Display the results by using “int xx” of 8086.

Validate program for the boundary conditions.

4. Write an ALP of 8086 to take a string of as input (in 'C' format) and do the following Operations on it.
  - a. Find the length
  - b. Find it is Palindrome or not
  - c. Find whether given string substring or not.
  - d. Reverse a string
  - e. Concatenate by taking another sting display the results by using "int xx" of 8086.
  
5. Write the ALP to implement the above operations as procedures and call from the main procedure.
  
6. 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.
  
7. A computer uses RAM chips of 1024 X 1 capacity.
  - a. How many chips are needed, and how should their address lines be connected to provide a memory capacity of 1024 bytes?
  - b. How many chips are needed to provide a memory capacity of 16K bytes?
  
8. A computer uses RAM chips of 1024 X 1 capacity.
  - a. How many chips are needed, and how should their address lines be connected to provide a memory capacity of 1024 bytes?
  - b. How many chips are needed to provide a memory capacity of 16K bytes?
  
9. A computer employs RAM chips of 256X8 and ROM chips of 1024X8. 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.
10. 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.
11. 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.
- a. Formulate all pertinent information required to construct the cache memory.
  - b. What is the size of the cache memory?
12. 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.
- a) How many bits are there in each word of cache, and how are they divided into functions? Include a valid bit.
  - b) How many bits are there in the tag, index, block, and word fields of the address format?
  - c) How many blocks can the cache accommodate?
13. An address space is specified by 24 bits and the corresponding memory space by 16 bits.
- a) How many words are there in the address space?
  - b) How many words are there in the memory space?
  - c) If a page consists of 2K words, how many pages and blocks are there in the system.
14. A virtual memory has a page size of 1K words. There are eight pages and four blocks. The associative memory page table contains the following entries.

Make a list of all virtual addresses (in decimal) that will cause a page fault.

Page	Block
0	3
1	1
4	2
6	0

**OBJECT ORIENTED PROGRAMMING LAB THROUGH C++****Course Code: ACA3108****L T P**  
**- - 4****List of Programmes:**

1. Write a C++ program to find the sum of individual digits of a positive integer.
2. 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.
3. Write a C++ program to generate all the prime numbers between 1 and n , where n is a value supplied by the user.
4. Write C++ programs that use both recursive and non-recursive functions
  - To find the factorial of a given integer.
  - To find the GCD of two given integers.
  - To find the nth Fibonacci number.
5. Write a C++ program that uses a recursive function for solving Towers of Hanoi problem.
6. Write a C++ program that uses functions
  - a) To swap two integers.
  - b) To swap two characters.
  - c) To swap two reals. Note: Use overloaded functions.

7. Write a C++ program to find both the largest and smallest number in a list of integers.
8. Write a C++ program to sort a list of numbers in ascending order.
9. Write a C++ program that uses function templates to solve problems-7&8.
10. Write a C++ program to sort a list of names in ascending order.
11. Write a C++ program to implement the matrix ADT using a class. The operations supported by this ADT are:
  - a) Reading a matrix.
  - b) Printing a matrix.
  - c) Addition of matrices.
  - d) Subtraction of matrices.
  - e) Multiplication of matrices.
12. Implement the matrix ADT presented in the problem-11 using overloaded operators ( $\ll$ ,  $\gg$ ,  $+$ ,  $-$ ,  $*$ ) and templates.
13. Implement the complex number ADT in C++ using a class. The complex ADT is used to represent complex numbers of the form  $c=a+ib$ , where  $a$  and  $b$  are real numbers. The operations supported by this ADT are:
  - a) Reading a complex number.
  - b) Writing a complex number.
  - c) Addition of Complex numbers.
  - d) Subtraction of complex numbers.
  - e) Multiplication of complex numbers.
  - f) Division of complex numbers.
14. Write a C++ program that overloads the  $+$  operator and relational operators (suitable) to perform the following operations:
  - a) Concatenation of two strings.
  - b) Comparison of two strings.

15. Implement the complex number ADT in C++ using a class. The complex ADT is used to represent complex numbers of the form  $c=a+ib$ , where  $a$  and  $b$  are real numbers.  
The operations supported by this ADT are:
- a) Reading a complex number.
  - b) Writing a complex number.
  - c) Addition of Complex numbers.
  - d) Subtraction of complex numbers.
  - e) Multiplication of complex numbers.
  - f) Division of complex numbers.
- Note: 1. overload  $\ll$  and  $\gg$  operators in part a and part b.  
2. overload  $+$ ,  $-$ ,  $*$ ,  $/$  operators in parts c, d, e and f.
16. Write a template based C++ program that determines if a particular value occurs in an array of values.
17. Write a C++ program that uses functions to perform the following operations to:
- a) Insert a sub-string in to the given main string from a given position.
  - b) Delete  $n$  characters from a given position in a given string.
18. Write a C++ program that uses a function to reverse the given character string in place, without any duplication of characters.
19. Write a C++ program to make the frequency count of letters in a given text.
20. Write a C++ program to count the lines, words and characters in a given text.
21. Write a C++ program to determine if the given string is a palindrome or not.
22. Write a C++ program to make frequency count of words in a given text.

23. Write a C++ program that displays the position or index in the string S where the string t begins or -1 if S doesn't contain t.
24. 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.
25. Write a C++ program that counts the number of 1 bit in a given integer.
26. Write a C++ program to generate Pascal's triangle.
27. Write a C++ program to construct a pyramid of numbers.
28. Write a C++ program to compute the Sine series.
29. Write a C++ program that converts Roman numeral into an Arabic integer.
30. Write a C++ program which converts a positive Arabic integer into its corresponding Roman Numeral.
31. Write a C++ program to display the contents of a text file.
32. Write a C++ program which copies one file to another.
33. Write a C++ program that counts the characters, lines and words in the text file.
34. Write a C++ program to change a specific character in a file.  
Note: Filename, number of the byte in the file to be changed and the new character are specified on the command line.
35. Write a C++ program to reverse the first n characters in a file.

36. Write a C++ program that uses a function to delete all duplicate characters in the given string.
37. Write a C++ program that uses a function ( i to a ) which converts a number to a character string.
38. Write a C++ program that uses a recursive function to find the binary equivalent of a given non-negative integer n.
39. Write a C++ program to generate prime numbers up to n using Sieve of Eratosthenes method.
40. Write a C++ program
  - a) To write an object to a file.
  - b) To read an object from the file.
41. Write C++ programs that illustrate how the following forms of inheritance are supported:
  - a) Single inheritance
  - b) Multiple inheritance
  - c) Multi level inheritance
  - d) Hierarchical inheritance
42. Write a C++ program that illustrates the order of execution of constructors and destructors when new class is derived from more than one base class.
43. Write a C++ program that illustrates how run time polymorphism is achieved using virtual functions.
44. Write a C++ program that illustrates the role of virtual base class in building class hierarchy.

45. Write a C++ program that illustrates the role of abstract class in building class hierarchy.
46. Write a C++ program that uses functions:
- a) To create a singly linked list of elements
  - b) To display the elements of the above list.

Note: Use the following in solving the above problems wherever they make sense:

- a) Constructors and destructors.
- b) Overloaded functions.
- c) Overloaded operators.
- d) Function and class templates.
- e) Exception handling mechanism.

### **Suggested Books for lab:**

1. C++ programming from Problem Analysis to Program Desgn, 2<sup>nd</sup> Edition, D.S.Malik, Thomson.
2. Object-Oriented Programming with C++, M.P.Bhave, S.A.Patekar, Pearson Education.

**ENGLISH LANGUAGE COMMUNICATION SKILLS LAB****Course Code: ACA3109****L T P**  
- - 2

To expose the students to a variety of self-instructional, learner friendly modes of language learning.

To help the students cultivate the habit of reading passages from the computer monitor, thus providing them with the required facility to face computer-based competitive exams such GRE, TOEFL, GMAT etc.

To enable them to learn better pronunciation through stress on word accent, intonation, and rhythm.

To train them to use language effectively to face interviews, group discussions, public speaking.

To initiate them into greater use of the computer in resume preparation, report writing, format-making etc.

However, depending upon the available of infrastructure and budget, the above targets can also be achieved by procuring the minimum required equipment suggested for the establishment of a Conventional Lab the details of which are given below. The lab should cater to the needs of the students to build up their confidence to help them develop leadership qualities through their communicative competence.

**ENGLISH LANGUAGE LABORATORY PRACTICE****Syllabus**

The following course content is prescribed for the English Language Laboratory Practice

Introduction to Phonetics.  
Introduction to Vowels and Consonants and associated Phonetic symbols.  
Introduction to Accent, Intonation and Rhythm.  
Situational Dialogues / Role Play.  
Public Speaking.  
Debate  
Group discussions  
Facing Interviews  
Resume preparation  
e-correspondence

**Suggested Software:**

Cambridge Advanced Learners' Dictionary with exercises  
The Rosetta Stone English Library  
Clarity Pronunciation Power  
Mastering English in Vocabulary, Grammar, Spellings, Composition  
Dorling Kindersley series of Grammar, Punctuation, Composition etc.  
Oxford Advanced Learner's Compass, 7<sup>th</sup> Edition  
Language in Use, Foundation Books Pvt Ltd  
Learning to Speak English - 4 CDs  
Microsoft Encarta  
Murphy's English Grammar, Cambridge  
Time series of IQ Test, Brain-teasers, Aptitude Test etc.  
English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge

## **Books Suggested for English lab :**

1. Developing Communication Skills by Krishna Mohan & Meera Benerji (Macmillan)
2. Speaking English Effectively by Krishna Mohan & NP Singh (Macmillan)
3. Better English Pronunciation by JDO Connor (UBS – Cambridge)
4. Oxford Practice Grammar with Answers, John Eastwood, Oxford
5. Handbook of English Grammar and Usage, Mark Lester and Larry Beason, Tata McGraw-Hill
6. A text book of English Phonetics for Indian Students by T.Balasubramanian (Macmillan)
7. Lingua TOEFL CBT Insider, by Dreamtech
8. TOEFL & GRE( KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
9. English Skills for Technical Students, WBSCTE with British Council, OL
10. A Handbook of English for Competitive Examinations, by B Shyamala Rao, Blakie Books, Chennai.

**BUSINESS DATA PROCESSING****Course Code: ACA3110**

<b>L</b>	<b>T</b>	<b>P</b>
<b>4</b>	<b>1</b>	<b>-</b>

**UNIT- I:**

Introduction: Computer Programming - An Overview, The Applications Program Development Process, The Nature of COBOL, Techniques for Improving program Design.

The IDENTIFICATION and ENVIRONMENT DIVISIONS: Basic Structure of a COBOL program, Coding Requirements of the Identification Division, The Sections of the Environment division, Assigning files to Devices in the Environment Division.

**UNIT – II:**

The DATA DIVISION : Systems Design considerations, Forming Data-Names, The FILE SECTION of the Data Division, Types of Data, The working-Storage section of the Data division.

Coding Complete COBOL Programs: The PROCEDURE DIVISION, The format of the Procedure division, Statements typically coded in the Main Module of Batch Programs, Statements typically coded for Processing Input records and Producing output records.

**UNIT – III:**

Moving Data, Printing Information, and Displaying Output Interactively, The instruction formats of the MOVE STATEMENT, Numeric MOVE, Nonnumeric or Alphanumeric MOVE, Other Options of the MOVE STATEMENT. PRINTING OUTPUT, Interactive output that is displayed on a screen.

Computing in COBOL: The Arithmetic Verbs and Intrinsic Functions, The Basic Arithmetic Verbs, Options Available with Arithmetic Verbs,

The COMPUTE Statement, Use of Signed Numbers in Arithmetic Operations, Improving Program Efficiency with the USAGE Clause.

#### **UNIT – IV:**

Decision Making Using the IF and EVALUATE Statements, Selection using a simple IF statement, Selection using other Options of the IF statement, CONDITION-NAMES.

Iteration: The simple PERFORM, Iteration using other types of PERFORMs, Using Nested PERFORM varying statements.

#### **UNIT – V:**

Control Break Processing: An introduction to control break processing, Program Requirements for control break processing, Multiple-level control breaks.

Data Validation: Avoiding logic errors by validating input, What to do if input errors occur, When data should be validated, Understanding program interrupts.

#### **UNIT – VI:**

Single level OCCURS clause, Processing data stored in an array, Using an OCCURS clause for Table Handling, Use of the SEARCH statement for Table and Array processing, Varying option of SEARCH verb SEARCH ALL statement, Multiple level OCCURS Clause.

Systems overview of Sequential processing: Sequential file updating, Validity checking in update procedures, Update procedures with multiple transaction records, Rewriting records on a disk.

#### **UNIT – VII:**

Sorting and Merging: The SORT features - an overview, Processing data before/after sorting, MERGE statement,

Indexed and Relative File Processing : Systems considerations for organizing disk files, Features of magnetic disks and disk drives, Processing indexed disk files, Processing relative Disk Files, Converting a key field to a relative key.

## **UNIT – VIII:**

Program performance: The COPY, CALL and other Statements, COPY statement, CALL statement, Text Manipulation with the STRING and UNSTRING STATEMENT.

The Report Writer Module: Introduction, The benefits of the report writer module, The report section in the data division, Procedure division statements.

## **TEXT BOOKS:**

1. Cobol Programming – Collopy – Pearson Ed.
2. Nancy Stern and Robert A.Stern - Structured COBOL programming 8<sup>th</sup> Ed. - John Wiley&Sons.

**DATA STRUCTURES THROUGH JAVA****Course Code: ACA3111**

<b>L</b>	<b>T</b>	<b>P</b>
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**UNIT-I:**

Java Basics: Creation of java, java buzzwords, data types, variables, operators, expressions, control flow statements- if and switch statements, loops- for, while, do-while, jump statements, classes, objects, class modifiers, class members and access control, methods, simple input and output statements, an example program, string handling, inheritance- super and sub classes, member access rules, method overriding, dynamic method dispatch, abstract classes, Object class, interfaces- implementing interfaces, multiple inheritance in interfaces.

**UNIT-II:**

Packages, Exception Handling And Multi Threading: Packages- defining, creating and accessing a package, importing packages, exception handling- concepts of exception handling, types of exceptions, usage of try, catch, throw, throws and finally key words, creating own exception sub classes, multi threading- thread life cycle, creating multiple threads using Thread class, Runnable interface, java library- java.util, java.io.

**UNIT-III:**

Introduction To Algorithms And Data Structures: Notion of algorithm, pseudo code, performance analysis- time complexity and space complexity, asymptotic notation (big-oh, omega, theta), data abstraction, concept of ADT, linear and non linear data structures, sequential and linked allocation, arrays and linked lists, representation of single, two and multi dimensional arrays, sparse matrices and their representation, the list ADT-array based implementation and linked list implementation.

#### **UNIT-IV:**

Stacks And Queues: Stack ADT-array based implementation, linked list implementation, applications-infix to postfix conversion, postfix evaluation, implementation of recursion, Queue ADT- array based implementation, linked list implementation, circular queues, Dequeue ADT- array based implementation, linked list implementation, Priority Queues ADT- implementation, heaps.

#### **UNIT-V:**

Trees And Graphs: Trees- Terminology and basic properties, tree ADT, binary tree ADT, data structures for representing binary trees-a vector based structure and linked structure, traversals of a binary tree, representing general trees with binary trees, threaded binary trees, graphs- graph ADT, basic terminology, data structures for representing graphs- edge list structures, adjacency list structures, adjacency matrix, graph traversals- DFS, BFS.

#### **UNIT-VI:**

Search Trees: Binary search trees, operations- insertion, deletion and searching, AVL trees, operations- insertion and searching, B-trees, operations-insertion, deletion and searching, comparison of performance of search trees.

#### **UNIT-VII:**

Searching And Sorting: Linear search, binary search, hashing-hash table, its implementation, hash functions, collision handling schemes, bubble sort, selection sort, insertion sort, quick sort, merge sort, heap sort, radix sort, comparison of searching and sorting methods.

#### **UNIT-VIII:**

Text Processing: Pattern matching algorithms- Brute force, the Boyer-Moore algorithm, the KMP algorithm, tries- standard tries, compressed tries, suffix tries, text compression- Huffman coding algorithm.

**TEXT BOOKS:**

1. Data Structures And Algorithms in Java, 2<sup>nd</sup> edition, M.T.Goodrich and R.Tamassia, John Wiley and Sons, Inc.
2. Data Structures and Algorithms in Java, 2<sup>nd</sup> edition, A.Drozdek, Thomson.
3. Data Structures and Software Development in an Object Oriented Domain, Java Edition, Tremblay, Pearson Education

**REFERENCE BOOKS:**

1. Data Structures and Java Collections Frame Work, W.J.Collins, McGraw Hill.
2. Data Structures Using Java, Yedidyah Langsam, Moshe Augenstein, Aaron M. Tenenbaum, Pearson Education.
3. Data Structures with Java, J.R.Hubbard and A.Huray, Pearson Education/PHI.
4. The Complete Reference Java J2SE, 5<sup>th</sup> Edition, Herbert Schildt, TMH.
5. Big Java, C. Horstmann, John Wiley.

**OPERATING SYSTEMS****Course Code: ACA3112**

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**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- UNIX - Design Principles, Programmer Interface, User Interface, Process Management, Memory Management, File System, I/O System, Inter process Communication.

**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 7<sup>th</sup> 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 2<sup>nd</sup> edition  
Pearson/PHI
3. Operating Systems, Dhamdhare, TMH

**OPERATIONS RESEARCH****Course Code: ACA3113**

L	T	P
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**UNIT-I:**

DEVELOPMENT DEFINITION: Characteristics and phases scientific Method, Types of models, General methods for solving. Operations Research models.

ALLOCATION: Introduction, Linear programming Formulation, Graphical solution, Simplex method, artificial variable technique, Duality principle.

**UNIT-II:**

TRANSPORTATION PROBLEM: Formulation, optimal solution, un-balanced transportation problem, Degenracy. Assignment problem: formulation optimal solution, variations. 1.a non-square (mxn) Matrix, Restrictions.

**UNIT-III:**

EEQUE CEING: Introduction, optimal solution for processing each of n-jobs through three machines, travelling salesman problem i.e., shortest acyclic route models.

**UNIT-IV:**

REPLACEMENT: Introduction, replacement of items that deteriorate when money value is not counted and counted, replacement items that fail completely i.e., group replacements.

### **UNIT-V:**

**WAITING LINES:** Introduction, single channel, poisson arrivals, exponential service times, unrestricted queue, with infinite population and finite population models, single channel, poisson arrivals, exponential service times with infinite population and restricted queue, multi channel, poisson arrivals, exponential service times with infinite population and unrestricted queue.

### **UNIT-VI:**

**INVENTORY:** Introduction, single item deterministic models, production is instantaneous or at a constant rate, shortages are allowed or not allowed and withdrawals from stock is continuous, purchase inventory model with one price break, shortages are not allowed, Instantaneous production demand, production or purchase cost is relevant, stochastic models, demand may be discrete or variable or instantaneous production, instantaneous demand and no setup cost.

### **UNIT-VII:**

**THEORY OF GAMES:** Introduction, Minimax (maximum) criterion and optimal strategy, solution of games with saddle points, rectangular games without saddle points.

### **UNIT-VIII:**

**DYNAMIC PROGRAMMING:** Introduction, Bellman's Principle of optimality, solution of problems with finite number of stages.

### **TEXT BOOKS:**

1. S.D.SHARMA : Operations Research
2. P.K.GUPTA & D.S.HIRA : Operations Research
3. R.D.ASRHEDKAR & R.V.KULKARNI : Operations Research.

**ORGANIZATION STRUCTURE AND PERSONAL MANAGEMENT****Course Code: ACA3114****L T P**  
**4 0 -****UNIT-I:**

Classical Theories of organization: Functional approach, classical theories of organization, division of labour, levels of authority, span of control, authority & responsibility, efficiency of management.

**UNIT-II:**

Behavioural theories of organization, limitations of formal organization, human relation, group behaviour, committee and group making, motivation and morale.

**UNIT-III:**

Decision process approach: Parts of organization system, development of corporate strategy, dynamics of decision, role of system, types models, mathematical planning models, deterministic and probabilistic models.

**UNIT-IV:**

Personnel Function : Evaluation, objectives, principles, philosophies and policies, duties & responsibilities of the manager, position of the personnel department in the organization, line and staff relationship & the changing concept of personnel management in India.

**UNIT-V:**

Manpower planning: Uses benefits problems and limitations, manpower, inventory, manpower forecasting, job discription, recruitment, job specification and job selection interviewing techniques, transfers, promotion and its policies.

**UNIT-VI:**

Training and development: Objectives and policies planning, organizing the training department, training manager and his job, on and off the job training, techniques, career planning, objectives of performance appraisal.

**UNIT-VII:**

Strategic management: Objectives, importance policies, concept of core competence capability of organizational learning.

**UNIT-VIII:**

Communication: Importance of communication, interpersonnel communication barriers of communication, communication in organizations, using communication skills to manage conflicts.

**TEXT BOOK:**

1. Rudrabasavaraj M.N.: Dynamic personnel Administration, 2<sup>nd</sup> Edn. Himalaya Publishing House, Bombay, 1979.

**BUSINESS DATA PROCESSING LAB****Course Code: ACA3115****L T P**  
**- - 4****List of Programmes:**

1. Develop a COBOL program to understand the arithmetic verbs viz., ADD, SUBTRACT, DIVIDE, MULTIPLY and COMPUTE.
2. Develop a COBOL program for the creation of a sequential data file. Assume suitable record structure.
3. Develop a COBOL program to access a desired record from a sequential file and to print it. Assume appropriate record structure.
4. Develop a COBOL program to create and manipulate an INDEXED file. The manipulation includes accessing a particular record, modify a desired record, add a record and delete a record. Assume a suitable record structure.
5. Develop a COBOL program to create and manipulate a RANDOM file. The manipulation includes accessing a particular record, to modify a desired record, to add a record to an existing file and to delete a record.
6. Develop a COBOL program to illustrate the concepts of REDEFINES and RENAMES clauses in COBOL.
7. Develop a COBOL program illustrating the usage of level-88 entry.
8. Develop a COBOL program for the implementation of 'mid-square' technique.

9. Develop a COBOL program illustrating the OCCURS clause.
10. Develop a COBOL program illustrating the SORT verb. Assume appropriate record structure.
11. Develop a COBOL program illustrating the MERGE verb. Assume appropriate record structure.
12. Develop a COBOL program to implement 'Bubble sort' technique on a file. Assume appropriate record structure.

**DATA STRUCTURES THROUGH JAVA LAB****Course Code: ACA3116****L T P**  
- - 4**List of Programmes :**

1. 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.
2. 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  $n^{\text{th}}$  value in the Fibonacci sequence.
3. Write a Java program that prompts the user for an integer and then prints out all prime numbers up to that Integer.
4. Write a Java program that checks whether a given string is a palindrome or not. Ex: MADAM is a palindrome.
5. Write a Java program for sorting a given list of names in ascending order.
6. Write a Java program to multiply two given matrices.
7. 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)

8. 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.
9. Write a Java program that reads a file and displays a file and displays the file on the screen, with a line number before each line.
10. Write a Java program that displays the number of characters, lines and words in a text file.
11. Write a Java program for creating multiple threads
  - a) Using Thread class
  - b) Using Runnable interface
12. Write a Java program that illustrates how run time polymorphism is achieved.
13. Write a java program that illustrates the following
  - a) Creation of simple package.
  - b) Accessing a package.
  - c) Implementing interfaces.
14. Write a java program that illustrates the following
  - a) Handling predefined exceptions
  - b) Handling user defined exceptions
15. Write Java programs that use both recursive and non-recursive functions for implementing the following searching methods:
  - a) Linear search
  - b) Binary search
16. Write java programs to implement the following using arrays and linked lists \* List ADT

- a) Write Java programs to implement the following using an array.
  - a) Stack ADT
  - b) Queue ADT
  
- 17. Write a java program that reads an infix expression, converts the expression to postfix form and then evaluates the postfix expression (use stack ADT).
  
- 18. Write a java program that determines whether parenthetic symbols ( ), { } and < > are nested correctly in a string of characters(use stack ADT).
  
- 19. Write a java program that uses both stack and queue to test whether the given string is a palindrome.
  
- 20. Write Java programs to implement the following using a singly linked list.
  - a) Stack ADT
  - b) Queue ADT
  
- 21. Write Java programs to implement the deque (double ended queue) ADT using
  - a) Array
  - b) Singly linked list
  - c) Doubly linked list.
  
- 22. Write a java program to implement priority queue ADT.
  
- 23. Write a Java program to perform the following operations:
  - a) Insert an element into a binary search tree.
  - b) Delete an element from a binary search tree.
  - c) Search for a key element in a binary search tree.
  
- 24. Write a Java program to implement all the functions of a dictionary (ADT) using Hashing.
  
  
- 25. Write a Java program to implement circular queue ADT using an array.

26. Write Java programs that use recursive and non-recursive functions to traverse the given binary tree in  
a) Preorder      b) Inorder      c) Postorder.
27. Write Java programs for the implementation of BFS and DFS algorithm for a given graph.
28. Write Java programs for implementing the following sorting methods.  
a) Bubble sort      d) Quick sort      g) Radix sort  
b) Selection sort      e) Merge sort      h) Binary tree sort  
c) Insertion sort      f) Heap sort
29. Write a Java program to perform the following operations  
a) Insertion into a B-tree      b) Deletion from a B-tree
30. Write a Java program to perform the following operations  
a) Insertion into an AVL-tree      b) Deletion from an AVL-tree
31. Write a Java program for implementing KMP pattern matching algorithm.
32. Write a java program that displays node values in a level order traversal (traverse the tree one level at a time, starting at the root node) for a binary tree.
33. Write a java program that uses recursive functions  
a) To create a binary search tree.  
b) To count the number of leaf nodes.  
c) To copy the above binary search tree.

34. Write a Java program to implement all the functions of a dictionary (ADT) using Hashing.

**Suggested Books for lab:**

1. Data Structures, Algorithms and Applications in Java, 2<sup>nd</sup> Edition, S.Sahani,Universities Press

2. Data Structures and Java Collections Frame Work, W.J.Collins, McGraw Hill.

3. Java How to Program, 5<sup>th</sup> Edition, Dietel & Dietel, Pearson Education