# ACADEMIC REGULATIONS
# COURSE STRUCTURE
# AND
# DETAILED SYLLABUS
### (Choice Based Credit System)

## R19

### For
## MCA THREE YEAR PG COURSE

(Applicable for batches admitted from 2019-2020)



# SWARNANDHRA

# COLLEGE OF ENGINEERING & TECHNOLOGY

### (AUTONOMOUS)

**SEETHARAMAPURAM, NARSAPUR-534 280, W.G.DT., A.P.**

# DEPARTMENT OF MASTER OF COMPUTER APPLICATIONS

## ACADEMIC REGULATIONS

## 1. INTRODUCTION

Academic Program of the institute are governed by rules and regulations approved by the Academic Council, which is the highest Academic body of the Institute. These academic rules and regulations are applicable to the students admitted from the academic year 2019-20 into first year of three years postgraduate program offered by the college leading to Master of Computer Applications (MCA) degree in the respective discipline.

The MCA Degree of the Swarnandhra College of Engineering & Technology shall be conferred on candidates who are admitted to the program and fulfill all the requirements for the award of the Degree. Swarnandhra College of Engineering & Technology, an autonomous institution, follows Semester pattern for all the three years of its Postgraduate MCA programme with internal and external evaluation.

**Semester Pattern**: Each academic year shall be divided into two semesters: each semester consists of 22 weeks duration with a minimum of 110 working days which includes instruction, mid examinations and final examinations.

## 2. ADMISSIONS:

2.1 **Admission into first year MCA** : Admissions into first year of MCA Program of Swarnandhra College of Engineering & Technology (Subsequently referred to as SCET) will be as per the norms stipulated by Jawaharlal Nehru Technological University Kakinada & Govt. of Andhra Pradesh. Admissions into the program in the Institution are classified into CATEGORY – A, through convener, ICET and CATEGORY- B filled by the college management.

2.2 **Admission into Second Year/Third Semester (Lateral Entry):** Admissions into Lateral Entry of MCA Program of SCET will be as per the norms stipulated by Jawaharlal Nehru Technological University Kakinada & Govt. of Andhra Pradesh. Admissions into the programme in the Institution are into through Convener, ICET

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2.3 **Admissions with advance standing:** These may arise in the following cases:

   a)    When a student seeks transfer from other colleges to SCET and desirous to pursue the

study at SCET in an eligible branch of study.

b) When students of SCET get transferred from one regulation to another regulation or from previous syllabus to revised syllabus.

c) When a student after long discontinuity rejoins the college to complete his/her Program of study for the award of degree.

d) When a student is not able to pursue his/her existing Programme of study but wishes to get transferred to another Program of study.

These admissions may be permitted by the Academic Council of SCET as per the norms stipulated by the statutory bodies and Govt. of Andhra Pradesh. In all such cases for admission, when needed, permissions from the statutory bodies are to be obtained and the Program of study at SCET will be governed by the transitory regulations.

## 3. AWARD OF MCA DEGREE

3.1 A student shall be declared eligible for the award of 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. For Lateral Entry students, they have to completer not less than two years and not more than four academic years

3.2 A Student, who fails to fulfill all the academic requirements for the award of the degree with in six academic years from the year of their admission, shall forfeit his seat in MCA course.

3.3 For MCA course a student shall register for 110 credits and secure the same. For Lateral Entry a Student shall register for 71 credits and secure the same

## 4. ATTENDANCE

4.1 A candidate 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.

4.2 Condonation of shortage of attendance up to 10% i.e. 65% and above, and below 75% may be given by the College academic committee.

4.3 Condonation of shortage of attendance shall be granted only on genuine and valid reasons representations by the candidate with supporting evidence

4.4 Shortage of attendance below 65% shall in NO case be condoned

4.5 A candidate shall not be promoted to the next semester unless he fulfills the attendance requirements of the previous semester.

4.6 A stipulated fee shall be payable towards Condonation of shortage of attendance

# 5. <u>DISTRIBUTION AND WEIGHTAGE OF MARKS:</u>

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

**(a) External Evaluation**

For the theory subjects 70 marks shall be awarded based on the performance in the End Examination Marks. External examination shall be conducted for duration of 180 minutes with 5 questions from all units with internal choice.

**(b) Internal Evaluation**

30 marks shall be awarded based on the Internal Evaluation. Internal Evaluation shall be made based on the weighted Average of the marks secured in the two Mid Term –Examinations conducted, one in the middle of the Semester and the other immediately after the completion of instruction. The weights are 80% for the mid in which the students secured highest marks and 20% for mid in which the student secured lowest marks.  Each mid examination shall be conducted for duration of 90 minutes with 3 questions to be answered out of 3 questions from two and half units (without choice) and each question for 10 marks

5.2 For practical subjects, 30 marks for Internal Evaluation and 70 for external examination. Out of 30 Internal marks 15 marks shall be awarded for day-to-day work including Record work and the remaining 15 marks to be awarded by conducting internal laboratory test. The External Laboratory examination for MCA course must be conducted with two examiners.  One of them is the Laboratory Class Teacher, and the second examiner will be external examiner.  External examiner will be appointed by the COE.

5.3 A candidate shall be deemed to have secured the minimum academic requirement in a subject if he secures a minimum of 40% of marks in the End Examination and a minimum aggregate of 50% of the total marks in the End Semester Examination and Internal Evaluation taken together.

5.4 A Candidate shall be given one chance to re-register for each course provided the internal marks secured by a candidate are less than 50 per cent and he has failed in the end examination after completion of the three years. In such case, the candidate must reregister for the subject(s) and secure required minimum attendance. Attendance in the re-registered subject(s) should be calculated separately to become eligible to write the end examination in the re-registered

subject(s). The attendance of re-registered subject(s) shall be calculated separately to decide his eligibility for taking the end examination in those subject(s). In the event of taking another chance, 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 two subject(s). For re-registration the candidates have to apply to the Institute by paying the requisite fees and get approval from the concern authorities before the start of the semester in which re-registration is required. In case the candidate secures less than the required attendance in any re-registered course(s), he/she shall not be permitted to write the End Examination in that course.

**5.5** A candidate 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 (6th semester).

**5.6 Mini Project**: Student must submit a report at the beginning of V semester for the assessment by an internal evaluation committee comprising Head of the Department, Supervisor and one Senior faculty of the department. A minimum of 50% of maximum marks shall be obtained to earn the corresponding credits.

**5.7 Soft Skills Lab**: This lab is internal evaluation and will be evaluated for 50 marks in a semester. A minimum of 50% of maximum marks shall be obtained to earn the corresponding credits.

**5.8 Term Paper:** There shall be a Term Paper presentation during VI semester. For Term paper, a student under the supervision of a faculty member, shall collect the literature on a topic and critically review the literature and submit it to the Department in a report form and shall make an oral presentation before the Department Committee. The Department Committee consists of Head of the Department, supervisor and two other senior faculty members of the department. For Term Paper there will be only internal evaluation of 50 marks. A minimum of 50% of maximum marks shall be obtained to earn the corresponding credits.

# 6 EVALUATION OF PROJECT WORK

Every candidate shall be required to submit thesis or dissertation after taking up a topic approved by the Project Review Committee.

6.1 A Project Review Committee (PRC) shall be constituted with Head of the Department and two other senior faculty members of the concerned department.

6.2 Registration of Project Work: A candidate is permitted to register for the project work after satisfying the attendance requirement of all the courses (theory and practical subjects) up to V

semester.

6.3 After satisfying 6.2, a candidate has to submit, in consultation with his project supervisor, the title, objective and plan of action of his project work to the Project Review Committee for its approval before the fifth semester end examinations. After obtaining the approval of the Committee the student can initiate the Project work after the fifth semester end examinations.

6.4 Every candidate shall work on projects approved by the PRC of the College

6.5 The duration of the project is for one semester.

6.6 If a candidate wishes to change his supervisor or topic of the project he can do so with approval of the PRC. However, the Project Review Committee (PRC) shall examine whether the change of topic/supervisor leads to a major change of his initial plans of project proposal. If so, his date of registration for the project work starts from the date of change of Supervisor or topic as the case may be.

6.7 A candidate shall submit status report in two stages at least with a gap of one month between them.

6.8 The work on the project shall be initiated in the beginning of the Sixth semester and the duration of the project is for one semester. A candidate shall be allowed to submit the project report only with the approval of PRC and not earlier than 20 weeks from the date of registration of the project work. For the approval of PRC the candidate shall submit the draft copy of thesis to the Principal (through Head of the Department) and shall make an oral presentation before the PRC.

6.9 Three copies of the Project Thesis certified by the supervisor & HOD shall be submitted to the College / Department.

6.10 The project work carried out by the candidate during $6^{th}$ semester is evaluated for internal assessment and external examination

a) **Internal Assessment**: Internal Assessment will be carried out by the Project Review Committee consisting of 1) Head of the Department 2) Supervisor and 3) Senior faculty member appointed by the Principal. Internal Assessment shall be on the basis of two seminars given by the each student on the topic of his project.

b) **External Examination**: External Examination(Viva – Voce) will be conducted by Project External Examination committee consisting of 1) Head of the Department 2) Supervisor and 3) External member. External examiner will be appointed by the COE from the panel of examiners submitted by the HOD.

6.11 Out of a total of 150 marks for the project work, 50 marks shall be for internal assessment and

100 marks External examination (Viva-Voce).   A minimum of 50% of maximum marks shall be obtained to earn the corresponding credits.

6.12 If he/she fails to secure those marks he/she will retake the viva-voce examination after three months. If he/she fails to secure those marks at this second viva-voce examination, he will not be eligible for the award of the degree unless the candidate is asked to revise and resubmit. If he/she fails to secure those marks again, the project shall be summarily rejected.   Head of the Department shall coordinate and make arrangements for the conduct of Viva- Voce examination.

## SEMESTER WISE DISTRIBUTION OF CREDITS

| Semester | Theory | Lab | Total Credits |
|---|---|---|---|
| 1st Semester | 5 | 3 | 19.5 |
| 2nd Semester | 5 | 3 | 19.5 |
| 3rd Semester | 5 | 3 | 19.5 |
| 4th Semester | 5 | 2+ Soft Skills | 19.5 |
| 5th Semester | 5 | 2 + Mini Project | 20 |
| 6th Semester | Project + Term Paper | | 12 |
| Total | | | 110 |

## 7 GRADING SYSTEM

### 7.1 Award of Grade:

(i)  Grade Point Average (GPA):

a) The Grade Point Average (GPA) will be calculated according to the formula.

$$GPA = \frac{\sum C_i G_i}{\sum C_i}$$

Where $C_i$ = number of credits for the subject i

$G_i$ = grade points obtained by the student in the subject.

b) To arrive at Cumulative Grade Point Average (CGPA), the formula is used considering the student's performance in all the courses taken in all the semesters completed up to the particular point of time.

$$CGPA = \frac{\sum C_i G_i}{\sum C_i}$$

Where $C_i$ = number of credits for the subject i

$G_i$ = grade points obtained by the student in the subject.

(ii) After a student satisfies the requirements prescribed for the award of UG/PG Program he/she shall be placed in one of the following four grades. The award of the degree is based on CGPA on a grade point scale of 10.

| CGPA | Award of Division |
|---|---|
| ≥ 7.75 | First Class with Distinction |
| ≥ 6.75 | First Division |
| ≥ 5.75 | Second Division |
| < 5.75 | Unsatisfactory |

## 7.1 Award of Grade in Each Semester:

i) Based on the student performance during a given semester, a final letter grade will be awarded at the end of the semester for each subject. The letter grades and the corresponding grade points are as given in the Table.

| Percentage of Marks Scored | Letter Grade | Level | Grade points |
|---|---|---|---|
| ≥90 | O | Outstanding | 10 |
| 80 – 89 | S | Excellent | 9 |
| 70-79 | A | Very Good | 8 |
| 60-69 | B | Good | 7 |
| 50-59 | C | Fair | 6 |
| <50 | F | Fail | 0 |
| | | Absent | 0 |

ii) A student earns a minimum of 6 grade points (C grade) in a subject is declared to have successfully completed the subject, and is deemed to have earned the credits assigned to that subject. However it should be noted that a pass in any subject/term paper/project/mini project/labs shall be governed by the rules mentioned in against them

iii) Grade Sheet: A grade sheet (memorandum) will be issued to each student indicating his/her

performance in all courses taken in that semester and also indicating the grades.

iv) Transcripts: After successful completion of the total programme of study, a Transcript containing performance of all academic years will be issued as a final record. Duplicate transcripts will also be issued up to any point of study to any student on request and by paying the stipulated fee in force.

v) Candidates shall be permitted to apply for recounting/revaluation within the stipulated period with payment of prescribed fee.

vi) The Academic Council has to approve and recommend to the JNTUK, Kakinada for the award of a degree to any student.

## 8 WITH HOLDING OF RESULTS:

If the candidate has not paid any dues to the College or if any case of indiscipline is pending against him, the result of the candidate will be withheld. The issue of degree is liable to be withheld in such cases.

## 9 TRANSISTORY REGULATIONS

Candidates 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 subjects are offered.

## 10 GENERAL

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

10.2 In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Principal is final and which is to be ratified by the Chairman of the Governing Body.

10.3 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.

10.4 Wherever the word he, him or his occur, it will also include she, her and hers.

**I SEMESTER**

| S.NO | Course Code | Course Title | L | P | C | IM | EM | TM |
|---|---|---|---|---|---|---|---|---|
| 1 | 19MC1T01 | Computer Programming Using C | 3 | | 3 | 30 | 70 | 100 |
| 2 | 19MC1T02 | Computer Organization and Architecture | 3 | | 3 | 30 | 70 | 100 |
| 3 | 19MC1T03 | Discrete Mathematical Structures | 3 | | 3 | 30 | 70 | 100 |
| 4 | 19MC1T04 | Probability and Statistics | 3 | | 3 | 30 | 70 | 100 |
| 5 | 19MC1T05 | Accounting and Financial Management | 3 | | 3 | 30 | 70 | 100 |
| 6 | 19MC1L01 | English Language Communication Skills Lab | | 3 | 1.5 | 30 | 70 | 100 |
| 7 | 19MC1L02 | C Programming Lab | | 3 | 1.5 | 30 | 70 | 100 |
| 8 | 19MC1L03 | Computer Organization Lab | | 3 | 1.5 | 30 | 70 | 100 |
| | | Total | | | 19.5 | 240 | 560 | 800 |

**II SEMESTER**

| S.NO | Course Code | Course Title | L | P | C | IM | EM | TM |
|---|---|---|---|---|---|---|---|---|
| 1 | 19MC2T01 | Database Management Systems | 3 | | 3 | 30 | 70 | 100 |
| 2 | 19MC2T02 | Operating Systems | 3 | | 3 | 30 | 70 | 100 |
| 3 | 19MC2T03 | Data Structures Using C | 3 | | 3 | 30 | 70 | 100 |
| 4 | 19MC2T04 | Optimization Techniques | 3 | | 3 | 30 | 70 | 100 |
| 5 | 19MC2T05 | Perspectives of Organization and Management | 3 | | 3 | 30 | 70 | 100 |
| 6 | 19MC2L01 | Database Management Systems Lab | | 3 | 1.5 | 30 | 70 | 100 |
| 7 | 19MC2L02 | Data Structures Lab | | 3 | 1.5 | 30 | 70 | 100 |
| 8 | 19MC2L03 | Operating Systems Lab | | 3 | 1.5 | 30 | 70 | 100 |
| | | Total | | | 19.5 | 240 | 560 | 800 |

**III SEMESTER**

| S.NO | Course Code | Course Title | L | P | C | IM | EM | TM |
|------|-------------|--------------|---|---|---|----|----|----|
| 1 | 19MC3T01 | OOPS Through Java | 3 | | 3 | 30 | 70 | 100 |
| 2 | 19MC3T02 | Computer Networks | 3 | | 3 | 30 | 70 | 100 |
| 3 | 19MC3T03 | Python Programming | 3 | | 3 | 30 | 70 | 100 |
| 4 | 19MC3T04 | Software Engineering | 3 | | 3 | 30 | 70 | 100 |
| 5 | 19MC3T05 | Artificial Intelligence | 3 | | 3 | 30 | 70 | 100 |
| 6 | 19MC3L01 | OOPS Through Java Lab | | 3 | 1.5 | 30 | 70 | 100 |
| 7 | 19MC3L02 | Python Programming Lab | | 3 | 1.5 | 30 | 70 | 100 |
| 8 | 19MC3L03 | UML Lab | | 3 | 1.5 | 30 | 70 | 100 |
| | | Total | | | 19.5 | 240 | 560 | 800 |

**IV SEMESTER**

| S.NO | Course Code | Course Title | L | P | C | IM | EM | TM |
|------|-------------|--------------|---|---|---|----|----|----|
| 1 | 19MC4T01 | Data Warehousing and Mining | 3 | | 3 | 30 | 70 | 100 |
| 2 | 19MC4T02 | Full Stack Technologies | 3 | | 3 | 30 | 70 | 100 |
| 3 | 19MC4T03 | Cryptography and Network Security | 3 | | 3 | 30 | 70 | 100 |
| 4 | --- | Elective-I | 3 | | 3 | 30 | 70 | 100 |
| 5 | --- | Elective-II | 3 | | 3 | 30 | 70 | 100 |
| 6 | 19MC4L01 | Full Stack Technologies Lab | | 3 | 1.5 | 30 | 70 | 100 |
| 7 | 19MC4L02 | Data Warehousing and Mining with R Lab | | 3 | 1.5 | 30 | 70 | 100 |
| 8 | 19MC4L03 | Soft Skills Lab | | 3 | 1.5 | 30 | 70 | 100 |
| | | Total | | | 19.5 | 240 | 560 | 800 |

## V SEMESTER

| S.NO | Course Code | Course Title | L | P | C | IM | EM | TM |
|---|---|---|---|---|---|---|---|---|
| 1 | 19MC5T01 | Big Data Analytics | 3 | | 3 | 30 | 70 | 100 |
| 2 | 19MC5T02 | Mobile Application Development | 3 | | 3 | 30 | 70 | 100 |
| 3 | 19MC5T03 | Machine Learning | 3 | | 3 | 30 | 70 | 100 |
| 4 | --- | Elective-III | 3 | | 3 | 30 | 70 | 100 |
| 5 | --- | Elective-IV | 3 | | 3 | 30 | 70 | 100 |
| 6 | 19MC5L01 | Big Data Analytics Lab | | 4 | 2 | 30 | 70 | 100 |
| 7 | 19MC5L02 | Mobile Application Development Lab | | 3 | 1.5 | 30 | 70 | 100 |
| 8 | 19MC5P01 | Mini Project | | 3 | 1.5 | 30 | 70 | 100 |
| | | Total | | | 20 | 240 | 560 | 800 |

## VI Semester

| S.NO | Course Code | Course Title | L | P | C | IM | EM | TM |
|---|---|---|---|---|---|---|---|---|
| 1 | 19MC6Q01 | Term Paper | | | 2 | 50 | - | 50 |
| 2 | 19MC6P01 | Project Work | | | 10 | 50 | 100 | 150 |
| | | Total | | | 12 | 100 | 100 | 200 |

**ELECTIVE-I**

| S.NO | Course Code | Course Title |
|---|---|---|
| 1 | 19MC4E01 | Management Information Systems |
| 2 | 19MC4E02 | Human Computer Interaction |
| 3 | 19MC4E03 | Software Testing Methodologies |
| 4 | 19MC4E04 | Distributed Systems |

**ELECTIVE-II**

| S.NO | Course Code | Course Title |
|---|---|---|
| 1 | 19MC4E05 | Software Project Management |
| 2 | 19MC4E06 | Design and Analysis of Algorithms |
| 3 | 19MC4E07 | Embedded Systems |
| 4 | 19MC4E08 | Animation and Gamming |

**ELECTIVE-III**

| S.NO | Course Code | Course Title |
|---|---|---|
| 1 | 19MC5E09 | Cyber Security |
| 2 | 19MC5E10 | Unix Programming |
| 3 | 19MC5E11 | E-Commerce |
| 4 | 19MC5E12 | Deep Learning |

**ELECTIVE-IV**

| S.NO | Course Code | Course Title |
|---|---|---|
| 1 | 19MC5E13 | Internet of Things |
| 2 | 19MC5E14 | Dev Ops |
| 3 | 19MC5E15 | Cloud Computing |
| 4 | 19MC5E16 | Network Programming |

| SEMESTER-I | L | P | C |
|------------|---|---|---|
|            | 3 | - | 3 |
| **19MC1T01: COMPUTER PROGRAMMING USING C** | | | |

**Course Objectives**

1. To understand the various steps in Program development.

2. To understand the basic concepts in C Programming Language.

3. To learn how to write modular and readable C Programs

4. To learn to write programs

**Course Outcomes:**

1. Demonstrate the basic knowledge of computer hardware and software.

2. Ability to apply solving and logical skills to programming in C language and also in other languages.

**UNIT –I**

**Introduction to Computers**: Computer Systems, Computing Environments, Computer Languages, Creating and running programs, Program Development.

**Introduction to the C Language**: Background, C Programs, Identifiers, Types, Variables, Constants, Input / Output, Operators (Arithmetic, relational, logical, bitwise etc.), Expressions, Precedence and Associativity, Expression Evaluation, Type conversions.

**UNIT –II**

**Statements:** Selection Statements(making decisions) – if and switch statements, Repetition statements ( loops)- while, for, do-while statements, Loop examples, other statements related to looping – break, continue, goto, Simple C Program examples.

**Functions**: Designing Structured Programs, Functions, user defined functions, inter function communication, Standard functions, Scope, Storage classes-auto, register, static, extern, scope rules, type qualifiers, recursion-recursive functions, Limitations of recursion, example C programs, Preprocessor commands.

**UNIT –III**

**Arrays:** Concepts, using arrays in C, inter function communication, array applications, two – dimensional arrays, multidimensional arrays, C program examples.

**Pointers:** Introduction (Basic Concepts), Pointers for inter function communication, pointers to pointers, compatibility, Pointer Applications-Arrays and Pointers, Pointer Arithmetic and arrays, Passing an array to a function, memory allocation functions, array of pointers, programming applications, pointers to void, pointers to functions.

**UNIT –IV**

**Strings:** String Concepts, C Strings, String Input / Output functions, arrays of strings, string manipulation functions, string / data conversion, C program examples.

**Enumerated, Structure, and Union** Types– The Type Definition(typedef), Enumerated types, Structures – Declaration, initialization, accessing structures, operations on structures, Complex structures, structures and functions, Passing structures through pointers, self-referential structures, unions, bit fields, C programming examples, command –line arguments.

**UNIT –V**

**Input and Output** – Concept of a file, streams, text files and binary files, Differences between text and binary files, State of a file, Opening and Closing files, file input / output functions (standard library input / output functions for files), file status functions (error handling)Positioning functions, C program examples

**TEXT BOOKS**

1. Introduction to computers by Peter Nortons, MGH 5th Edition.

2. Computer science, A structured programming approach using C, B.A. Forouzan and

R.F. Gilberg, Third edition, Thomson.

3. Programming with C, Ashok M Kamthene.

**REFERENCES:**

1. The C Programming Language, B.W. Kernighan, Dennis M.Ritchie, PHI/ Pearson.

2. C Programming with problem solving, J.A. Jones & K. Harrow, Dreamtech Press.

3. Programming in C, Stephen G. Kochan, III Edition, Pearson.

4. Let us C by Yaswanth Kanetkar.

| SEMESTER-I | L | P | C |
|---|---|---|---|
| | 3 | - | 3 |
| **19MC1T02: COMPUTER ORGANIZATION AND ARCHITECTURE** | | | |

**Course Objectives**

1. To introduce the basic concepts and elements of Computer System
2. To give a detailed understanding of fundamentals of Computer Organization and its relevance to classical and modern problems of computer systems
3. To learn the basic hardware for processing, storing and moving information, and how they are organized within the internal architecture of a computer
4. Understand various combinational and sequential logical circuits
5. Describe various data representations and explain how arithmetic and logical operation are performed by computers.

**Course Objectives**

1. Understanding the internal functioning of CPU that includes analyzing performance of computer system using performance equations.
2. Make use of the binary number system and apply knowledge of mathematics to perform basic arithmetic operations performed by the processor for computation
3. To develop independent learning skills and to learn more about different computer architectures and hardware using modern tools
4. Design hardware and software components by studying hardwired and micro programmed control techniques of designing processor
5. Identify study and optimize various problems based on memory design and I/O performance issues

**UNIT – I**

**Introduction to Digital Computer**: Binary, Octal, HEXA and their inter conversion, 1's and 2's Complement, Boolean Algebra and Logic Gates, De-Morgan's Theorem and Duality Theorem K-Maps, Binary Addition and Binary Subtraction, Addition/Subtraction of number in 1's complement and 2's complement notation. Fixed and floating point representation of numbers

**UNIT – II**

**Combinational and Sequential Circuits:** Half Adder, Full Adder, Binary Adder and Subtractor, Docoder/Encoder Multiplexer and De-Multiplexer. Sequential Circuits: SR, D, JK Master – Slave and Edge Triggered, Shift Registers.  Introduction to Counters: Synchronous and Asynchronous Counters.

## UNIT –III

**CPU Organization:** CPU Building Blocks, CPU Registers, Stack Organization and BUS Characteristics, Data Transfer and Manipulation Instructions, Addressing Modes, Instruction Code, Instruction formats and types of Computer Instructions.

**Microprogrammed Control**: Control Memory, Addressing Sequencing, Microprogram Example and Design of Control Unit.

## UNIT – IV

**Memory System:** Memory Hierarchy, Main Memory-RAM and ROM Chips, RAM & ROM varients-DRAM, SRAM, ROM, PROM, EPROM, EEPROM, concepts of Auxiliary Memory, Associative Memory, Cache Memory

## UNIT – V

**Input-Output Organization:** Peripheral Devices, Input-Output Interface, Modes of Transfer, Asynchronous Data Transfer, Priority Interrupts, Direct Memory Access(DMA), and Input-Output Processor

## TEXT BOOKS
1. Computer System Architecture by Morris Mano, Pearson Education, 3$^{rd}$ edition 2002

## REFERENCE BOOKS

1. Digital Computer Fundamenrals Thomals C Bartee TMH 6$^{th}$ Edition

2. Computer Organization, 5$^{th}$ed., Hamacher, Vranesicand Zaky,TMH,2002

3. Computer System Organization & Architecture, John D. Carpinelli, Pearson, 2008

4. Computer System Organization, NareshJotwani, TMH, 2009

5. Computer Organization & Architecture: Designing for Performance, 7$^{th}$ ed. William Stallings, PHI, 2006

6. Computer Organization & Architecture William Stallings, Pearson Eudcation Sixth Edition 2003

| SEMESTER-I | L | P | C |
|---|---|---|---|
| | **3** | - | **3** |
| **19MC1T03: DISCRETE MATHEMATICAL STRUCTURES** | | | |

**Course Objectives:**

To develop problem-solving techniques and explore topics in a variety of areas of discrete mathematics, including but not limited to logic, graph theory, relations and recurrence relations. Students will learn to express statements in the language of formal logic and draw conclusions, model situations in terms of graph and set theory, find and interpret recursive definitions for mathematical sequences, to approach counting problems.

**Course Outcomes:**

1. Differentiate and select either the direct method or contradiction method is suitable in order toprove a mathematical statement effectively.

2. Construct the problem in the language of sets and perform set operation on it to solve.

3. Apply various methods to solve Recurrence relation.

4. Solve problem using graphs and trees both quantitatively and qualitatively.

**UNIT I**

**Mathematical Logic:** Statements and notations, Connectives, Well-formed formulas, Truth Tables, tautology, equivalence, implication, Normal forms, Theory of inference for the statement calculus, Rules of inference, Consistency of premises and indirect method of proof.

**UNIT II**

**Set theory & Relations:** Introduction, Relations and ordering, Properties of binary Relations, Equivalence, Compatibility Relations, Partial ordering, Hasse diagram, Lattice and its Properties, Pigeonhole Principle and its application.

**UNIT III**

**Recurrence Relations:** Generating Function of Sequences, Calculating Coefficient of

generating functions, Recurrence relations, Solving recurrence relation by substitution and Generating functions, the method of Characteristic roots, Solution of Inhomogeneous Recurrence Relation.

## UNIT IV

**Graph Theory:** Basic Concepts, Representation of Graph, Subgraphs, Multigraphs, EulerPaths, Euler circuits, Hamiltonian graphs and Graph Isomorphism and its related Problems.

## UNIT V

**Graph Theory and Applications:** Chromatic Numbers, Spanning Trees, minimal Spanning Trees, BFS, DFS, Kruskal's Algorithm, Prim's Algorithm's Binary trees, Planar Graphs

### Text Books:

1. Discrete Mathematical Structures with Applications to computer science J.P Trembly,R.Manohar, TMH
2. Discrete Mathematical for computer Scientists & Mathematicians "J.L.Mott, A.Kandel,T.P.Baker, PHI

### References:

1. Discrete Mathematical Structures, Kolman, Busby, Ross, 6thed., PHI,2009
2. Discrete Mathematics with Combinatorics and Graph Theory, Santha, Cengage Learning, 2009
3. Discrete Mathematics and its Applications, Rosen, 5thed, T MGraw-Hilled, 2006.

| SEMESTER-I | L | P | C |
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| | **3** | - | 3 |
| **19MC1T04: PROBABILITY AND STATISTICS** | | | |

**Course Objectives:**

1. Understand the concept of probability, random variables and their distributions.

2. Understand the concept of estimation and hypothesis testing for population averages andpercentages.

3. Select and produce the appropriate tabular and graphical formulas for displaying bivariate

4. Data sets and carry out correlation, regression and chi-square analyses.

**Course Outcomes:**

1. Understand and apply the concepts of probability and statistics to solve a range of

2. Different problems, and understand their applications in a variety of situations.

3. Construct the probability distribution of random variables, based on real-world situation, anduse it to compute expectation and variance.

4. Identify the components of statistical hypothesis and can apply them to solve real lifeproblems.

5. Estimate the extent of correlation and Regression between bivariate data.

## Unit-I PROBABILITY

Probability: Sample space and events–Probability–The axioms of probability–someElementarytheorems–Conditional Probability–Baye's theorem

## Unit-II PROBABILITY DISTRIBUTIONS

Random variables – Discrete and continuous – distributions – Distribution function.Binomial, Poisson, Normal distributions – related properties.

## Unit-III MOMENT GENERATING FUNCTIONS AND SAMPLING DISTRIBUTIONS

Expectations and higher order moments. Moment generating function and Characteristic function. Population and samples, Sampling distribution of mean (with known and unknown variance ), proportion, Variances, estimation.

## Unit-IV INFERENCE THEORY

Statistical Inference: Introduction to null hypothesis verses alternative hypothesis. Statistical

Hypothesis – Errors of type I and type II. One tail, two tail tests. Procedure for testing of hypothesis. Test of significance for large sampling using Z-test(i.e single mean, difference of means & proportions.)

Test of Hypothesis (Small Samples) using student's - t test and F-test. chi-square test-Test of independence of attributes and goodness of it.

## Unit-V CORRELATION AND REGRESSION

Types of Correlations – Positive, Negative Correlations – Methods of Studying Correlation –Carl Pearsons Coefficient and Correlation rank method - Correlation of Grouped data and Regression Analysis.

### Text Books:

1. Probability and Statistics by Mr. K.Murugesan and Mr. P.Gurusamy

2. Probability and Statistics for Engineers and scientists by R.E. Walpole and Raymond H.Myers.

### References:

1. Probability and Statistics for Engineers by Miller & Freund's

2. Higher Engineering Mathematics by Dr. B.S. Grewal.

| SEMESTER-I | L | P | C |
|---|---|---|---|
| | **3** | - | **3** |
| | **19MC1T05: ACCOUNTING AND FINANCIAL MANAGEMENT** | | |

**Course Objectives:**

1. To understand the basic principles of Accounting and various types of Accounting.
2. To acquaint with the principles of double entry system of Book Keeping and the stages of Accounting Cycle.
3. To recognize the importance of Financial management and ability to use Ratio Analysis as a technique of Financial Analysis.
4. Identify the various elements of cost and apply CVP analysis in decision making.
5. To develop ability to prepare and analyze various kinds of budgets in various areas.

**Course Outcomes**: At the end of the course the student should be able to

1. Understand the basics of accounting and the role of Accountants in various departments and different levels of an Organization.
2. Prepare Financial Statements and apprise the methods of analyzing those statements.
3. Identify various objectives and scope of Financial Management and use Ratio Analysis to analyze financial statements.
4. Identify various elements of cost and the tools and techniques of Cost and Management Accounting that can be applied in an organization
5. Make financial forecasting using various kinds of Budgets.

## UNIT I

Concept of Accounting- Features-Branches- Users and necessity of Accounting- Generally Accepted Accounting Principles (GAAP), Financial Accounting Vs. Cost Accounting Vs. Management Accounting -Role of Accountant in modern Organizations.

## UNIT II

Systems of Accounting- Double -entry System of Accounting- Basic books of accounts-

journal-Ledger-trail balance–Final accounts -company final accounts (Simple Problems)

## UNIT III

Financial Management – Meaning and scope-Functions –Role- Objectives - Time Value of Money – Over Capitalization – Under Capitalization – profit maximization – wealth maximization – EPS maximization. Ratio Analysis - Advantages - Limitations –Types- calculation of Ratios.

## UNIT IV

Costing –Basic cost concepts-Elements of cost – Marginal Costing –Cost Volume Profit Analysis- Break Even Point- BE chart-Practical applications of CVP Analysis - short run decisions.

## UNIT V

Budgeting :Concept-Nature, Scope and Importance – Budget-types – Cash Budget, Sales Budget – Flexible Budget, Master Budget-Zero based budget-Budgetary Control

## Text Books

1. Accounting for Managers, P. Vijaya Kumar, and Himalaya Publications.

2. Accounting for Management. VijayaKumar.TMH.

3. Financial Accounting, S.N Maheswari and S.K. Maheswari, Vikas.

4. Financial Accounting, A. Mukherjee and M. Heneef, TMH.

5. Basic Financial Accounting for Management, Ambaresh Gupta, Pearson.

6. Accounts And Finance for Non accounts, Chatterjee, D.K. Himalaya.

7. Financial Analysis and Accounting, P. PremchandBabu and M. Madam Mohan, Himalaya.

8. Essential of Financial Accounting, Ashish, K and Ballacharya, PHI.

9. Guide to Financial Management, John Tannent, Viva.

| SEMESTER-I | L | P | C |
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| | - | 3 | 1.5 |
| **19MC1L01: ENGLISH LANGUAGE COMMUNICATION SKILLS LAB** | | | |

**Course Objectives:**

The Language lab focuses Computer-aided multimedia instruction ad language acquisition to achieve the following targets:

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

2. 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.

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

4. To train them to use language effectively to face interviews, group discussions, publicspeaking.

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

## Course Outcomes:

1. Students able to speak and write in better English.

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 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

1. Introduction to Phonetics. 2. Introduction to Vowels and Consonants and associated Phonetic symbols. 3. Introduction to Accent, Intonation and Rhythm. 4. Situational Dialogues/Role Play. 5. Debate 6.Public Speaking. 7. Group Discussions 8. Facing Interviews 9. Resume preparation 10. e- correspondence

| MODULE | TOPICS/SUB-TOPICS | LABSESSIONS |
|---|---|---|
| 1 | INTRODUCTION TOPHONETICS-Vowels,-Consonants,-Diphthongs INTRODUCTION TO STRESS & | 3 |
| | INTONATION-Articulation, - Respiration, -Phonation | |
| 2 | GROUP DISCUSSIONS FACING INTERVIEWS | 4 |
| 3 | SITUATIONAL/DIALOGUE/ | 2 |
| | ROLE PLAY RESUME PREPARATION | 2 |
| 4 | PUBLIC SPEAKING, DEBATE | 2 |
| 5 | GRE,TOEFL,GMAT MODELS,e-CORRESPONDENCE | 3 |

**Suggested Software for Lab classes:**

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, 7th 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

**REFERENCE BOOKS:**

1. The Human Touch: personal Skills for Professional Success – by DebraPaul.

2. The Definitive Book of body Language – by Allan Pease, Barbara Pease.

3. How to Face Interviews – by Clive Fletcher.s

4. The 7 Habits of Highly Effective People – by StephenCovery.

5. The Google Resume: How to Prepare of a Career and Land a Job at Apple, Microsoft.

6. Good English –by G.H Vallns

7. Better English – G.H Vallins

8. Best English – G.H. Vallins

9. How to Talk to Anyone: 92 little tricks for big success in Relationships by Leli Lowndes.

10. The leader in you - by Dale Carnagie

11. 250 Job Interview Questions You'll most likely Be Asked – by Peter veluki, Peter Verki.

12. Contemporary English Gramm

| SEMESTER-I | L | P | C |
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| | **19MC1L02: C PROGRAMMING LAB** | | |

**Course Objective:**

      1. To understand computer programming and its roles in problem solving

      2. To understand and develop well-structured programs using C language

**Course Outcomes:**

      1. Understand problem analysis, algorithm design, and program implementation

      2. Able to Write modular, efficient and readable C programs

      3. Design modular programs with structured programming constructs

      4. Ability to formulate problems and implement algorithms in C and work in a team to develop projects.

**Exercise l**

**a)** Write a C program to find the sum of individual digits of a positive integer.

**b)** 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.

**c)** Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

**d)** Write a program which checks a given integer is Fibonacci number or not.

**Exercise 2**

**a)** Write a C program to calculate the following Sum:

      $Sum = 1 - x^2/2! + x^4/4! - x^6/6! + x^8/8! - x^{10}/10!$

**b)** Write a C program to find the roots of a quadratic equation.

**c)** Write a C program to implement Newton Raphson method for a quadratic equation

**d)** Write a C program to implement Newton Raphson method for a general purpose algebraic equation.

**Exercise 3**

Write C program that use both recursive and non-recursive functions

**a)** To find the factorial of a given integer.

**b)** To find the GCD(greatest common divisor)of two given integers.

**c)** To solve Towers of Hanoi problem.

**d)** Write program to calculate probability of head/tail by generating random numbers Using

random()function.

**Exercise 4**

**a)** The total distance travelled by vehicle in 't' seconds is given by distance = $ut+1/2at^2$ where
'u' and 'a' are the initial velocity (m/sec.) and acceleration (m/sec$^2$). 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 form 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 larges 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 symmetry city 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**

a) Write a C program to read in two numbers, x and n, and then compute the sum of this
geometric progression: $1+x+x^2+x^3+\ldots\ldots\ldots+x^n$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 andcomplementing 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**

a) 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 numbersiv) 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.)

**Reference Books:**

1. Computer Programming in C, V. Rajaraman, PHI.

2. Programming with C Ashok N.Kamthane

3. C Programming, E.Balagurusamy, 3rd edition, TMH.

4. Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publications.

| SEMESTER-I | L | P | C |
|---|---|---|---|
| | - | 3 | 1.5 |
| | **19MC1L03: COMPUTER ORGANIZATION LAB** | | |

**Course Objectives:**

1. Study of logic gates and realization of OR,AND,NOT AND XOR Functions using universal gates

2. Design and implement combinational circuits like half adder/full adder, half subtractor / full subtractor, code converters, comparators, MUX/DEMUX

3. Design and implement sequential circuits like flip-flops, counters and shift registers

4. Study of RAM, ROM, PROM, EPROM

**Course Outcomes:**

1. Able to understand basic logic gate

2. Construct simple logic circuits using flip flops and multiplexers

3. Able to implement Logic circuits for various applications

**Exercise1**

Boolean algebra: Theorems and logical gates, verification of truth tables

**Exercise2**

Realization of Boolean expressions; Using (i) AND–OR-NOT Gates (ii)NAND Gates (iii)NOR Gates

**Exercise3**

Latches Flip–Flops: RS, JK, T,D, Master–Slave FF, Edge–Triggered Flip–Flops

**Exercise4**

Counters: Binary Counter, Synchronous/Asynchronous Binary Counter, Ripple Counter, Decade Counter, Up/Down Counter

**Exercise5**

Modulo Counter: Modulo-5, Modulo– 10

**Exercise6**

Adders/Subtractors: Half Adder, Full Adder, 1's and 2's complement addition

**Exercise7**

Multiplexers/DataSelector:2-input and 8-input, Demultiplexers, Logic Function Generator

**Exercise8**

Decoders and Encoders

**Exercise9**

BCD adders and Comparators

**Exercise10**

Registers: Basic Shift Register (SR), SI/SO SR, SI/PO SR, PI/SO SR, PI/PO SR

**Exercise11**

Johnson Counter, Sequence Generator, Parity Generators/Checkers

**Exercise12**

Code Converters: Decimal–to-Binary, Binary–to –Decimal, Decimal–to-Hexa Decimal, BCD-to – Decimal, Binary–to-gray, gray-to –Binary

**Exercise13**

Buffers/Derivers: Open; collector Buffers

**Exercise14**

Gates: CMOS/NMOS/TTL–Basic Operational Characteristics and parameters

**Exercise15**

RAM, ROM, PROM, EPROM–Testing Memory Chips.

**REFERENCE BOOKS**

1. Digital Fundamentals, Floyd & Jain, Pearson, 2005.

2. Digital Logic and Computer Organization, Rajaraman, Radhakrishnan, PHI,2006

| SEMESTER-II | L | P | C |
|---|---|---|---|
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| | **19MC2T04 : Database Management Systems** | | |

**Course Objectives:**

1. The objective of the course is to learn the foundation of Database Technologies. In this course, student will learn to design a database, normalize it by eliminating the redundancies, Querying, Improve the database performance by Indexing, Hashing and finally optimize the queries and Transaction Management.

**Course Outcomes:**

1. Demonstrate the basic elements of a relational database management system.

2. Ability to identify the data models for relevant problems.

3. Ability to design entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries on the respective data.

4. Apply normalization and professional attitudes for the development of application software's.

# UNIT - I

Database System Applications, Purpose of Database Systems, View of Data, Data Abstraction, Instances and Schemas, Data Models – ER Model, Relational Model, Other Models, Database Languages, DDL, DML. Data Storage and Querying, Database Architecture, Database Users and Administrators. Introduction to Database design, Database Design and ER diagrams, Entities, Attributes and Entity sets, Relationships and Relationship sets, additional features of ER Model. Relational Model: Introduction to the Relational Model, Integrity Constraints over Relations, Enforcing Integrity constraints, Querying relational data, Logical data base Design, Introduction to Views.

# UNIT - II

Relational Algebra and Calculus: Relational Algebra, Selection and Projection, Set operations, Renaming, Joins, Division, Examples of Algebra Queries, Relational calculus, Tuple relational Calculus – Domain relational calculus. Form of Basic SQL Query, Examples of Basic SQL Queries, Introduction to Nested Queries, Correlated Nested Queries, Set, Comparison Operators, Aggregate Operators, NULL values, Comparison using Null values, Logical connectives, AND, OR and NOT, Impact on SQL Constructs, Outer Joins, Disallowing NULL values, Complex Integrity Constraints in SQL.

# UNIT - III

Introduction to Schema Refinement – Problems Caused by redundancy, Decompositions– Problem related to

decomposition, Functional Dependencies - Reasoning about FDS, Normal Forms – FIRST, SECOND, THIRD Normal forms – BCNF –Properties of Decompositions- Loss less join Decomposition, Dependency preserving Decomposition, Schema Refinement in Data base Design – Multi valued Dependencies – FOURTH Normal Form.

## UNIT - IV

Overview of Transaction Management: The ACID Properties, Transactions and Schedules, Concurrent Execution of Transactions, Lock Based Concurrency Control-Strict 2PL, Deadlocks. Introduction to Lock Management, Lock Conversions, Dealing with DeadLocks, Concurrency Control without Locking. Crash recovery: Introduction to Crash recovery, Introduction to ARIES, the Log, and Other Recovery related Structures, the Write-Ahead Log Protocol, Check pointing.

## UNIT - V

Indexing, Clustered Indexes, Primary and Secondary Indexes. Tree Structured Indexing: Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM) B+ Trees: A Dynamic Index Structure, Search, Insert, and Delete. Hash Based Indexing: Static Hashing, Extendable hashing, Linear Hashing.

## TEXT BOOKS:

1. Data base Management Systems, Raghu Rama krishnan, Johannes Gehrke, TMH, 3rd Edition, 2003.
2. Data base System Concepts, A.Silberschatz, H.F. Korth, S.Sudarshan, McGraw hill, VI edition, 2006.

## REFERENCE BOOKS:

1. Database Management System Oracle SQL and PL/SQL, P.K.DasGupta, PHI.
2. Database System Concepts, Peter Rob & Carlos Coronel, Cengage Learning, 2008.
3. Database Systems, A Practical approach to Design Implementation and Management Fourth edition, Thomas Connolly, Carolyn Begg, Pearson education.
4. Database Principles, Programming, and Performance, P.O’Neil, E.O’Neil, 2nd ed., ELSEVIER
5. Fundamentals of Relational Database Management Systems, S.Sumathi, S.Esakkirajan, Springer.
6. Introduction to Database Systems, C.J.Date, Pearson Education.

| SEMESTER-II | L | P | C |
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| | 3 | - | 3 |
| | **19MC2T02: Operating Systems** | | |

**Course Objectives:**

1. To understand the services provided by and the design of an operating system.

2. To understand the structure and organization of the file system.

3. To understand what a process is and how processes are synchronized and scheduled.

4. To understand different approaches to memory management.

5. Students should be able to use system calls for managing processes, memory and the file system.

6. Students should understand the data structures and algorithms used to implement an OS.

**Course Outcomes:**

1. Understand the basics of operating systems like kernel, shell, types and views of operating systems

2. Able Describe the various CPU scheduling algorithms and remove deadlocks.

2. Student is able to point the problems related to process management and synchronization

3. Able to use disk management and disk scheduling algorithms for better utilization of external memory.

4. Student is capable of explaining the cause and effect related to deadlocks and is able to analyze them related to common circumstances in operating systems

5. Explain the various features of distributed OS like Unix, Linux, windows etc

**Unit I**

**Introduction**: Computer–system organization, Computer- system Architecture, Operating- system Structure, Operating-system Operations, Process Management, Memory Management, Storage Management, Protection and Security, Distributed Systems, Special- purpose systems, Computing Environments, Operating-system Structure:  Operating-system Services, User , Operating-system Interface, System calls, System programs, Operating-system Design and Implementation, , Operating-system structure, Virtual Machine

**Unit II**

**Process Management: Processes**: Process Concept, Process Scheduling, Operations on Processes, Inter process Communication, Examples of IPC Systems, Communication in Client-Server systems
**Threads**: Overview, Multithreading Models, Thread Libraries, Java Threads, Threading Issues, OS Examples
**CPU Scheduling**: Basic concepts, Scheduling Criteria, Scheduling Algorithms, Multiple-Processor Scheduling, Thread Scheduling, Operating system Examples

**Process Synchronization**: Background, The Critical- section problem, Petersons solution, Synchronization Hardware, Semaphores, Classic problems of Synchronization, Monitors, Atomic Transactions.

**Unit III**

**Memory management**: Main memory: Swapping, Contiguous memory Allocation, Paging, Structure of the Page table, Segmentation

**Virtual memory**: Background, Demand paging, copy-on-Write, Page Replacement, Allocation of frames, Thrashing, Memory-Mapped Files.

**Unit IV**

**File-system Interface**: Concept, Access Methods, Directory structure, File-system Mounting, File sharing, Protection

**File-system Implementation**: File-system Structure, Implementation, Directory Implementation, Allocation Methods, Free- Space Management, Efficiency and Performance, Recovery, Log-Structured File systems, NFS

**Mass – storage Structure**: Overview, Disk Structure, Disk Attachment, Disk Scheduling, Disk and swap-space Management, RAID Structure, Stable-Storage Implementation, Tertiary-Storage Structure

**I/O systems**: Overview, I/O Hardware, Application I/O Interface, Kernel I/O Subsystem, Transforming I/O requests to Hardware Operations, STREAMS, Performance

**Unit V**

**Deadlocks**: System model, Deadlock Characterization, Methods for handling Deadlocks, Deadlock Prevention, Deadlock avoidance Deadlock Detection and Recovery form Deadlock.

**Protection**: Goals of Protection, Principles of protection, Domain of Protection, Access Matrix, Implementation of Access Matrix, Access Control, Revocation of Access Rights, Capability –Based systems, Language-Based Protection

**Security**: The Security Problem, Program Threads, System and Network Threats, Cryptography as a security tool, User Authentication, Implementing security Defenses, Firewalling to protect systems and Networks.

**TEXTBOOKS:**

1.  Operating system concepts, 7/e, Abraham Siliberschatz, Galvin, John Wiley &sons , Inc.

**REFERENCES:**

1. Operating systems, 6/E, William Stallings, PHI/Pearson.

2. Operating systems 3/edictal, Dietal, Pearson.

3. Operating systems, 2/e, Dhamdhere, TMH.

4. An introduction to Operating systems, Concepts and practice, Pramod Chandra P.Bhat,PHI

5. Operating systems, Elmasri, Carrick, Levine, TMH.

6. Operating systems, 3/e, Nutt, Chaki, Neogy, Pearson.

7. Operating systems, Brian L.Stuart, Cengage.

8. Operating systems, Haldar, Aravind, Pearson.

9. Operating systems, PAL Choudhury, PHI.

10. Operating systems: design and Implementation, 3/e, Tanenbaum

| SEMESTER-II | L | P | C |
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| | **19MC2T03: Data Structures using C** | | |

**Course Objectives:**

1. To understand the basic concepts such as Abstract Data Types, Linear and Non Linear Data structures.

2. To understand the notations used to analyze the Performance of algorithms.

3. To understand the behavior of data structures such as stacks, queues, trees, hash tables, search trees, Graphs and their representations.

4. To choose the appropriate data structure for a specified application.

5. To understand and analyze various searching and sorting algorithms.

6. To write programs in C to solve problems using data structures such as arrays, linked lists, stacks, queues, trees, graphs, hash tables, search trees.

**Course Outcomes:**

1. Learn how to use data structure concepts for realistic problems.

2. Ability to identify appropriate data structure for solving computing problems in respective language.

3. Ability to solve problems independently and think critically.

4. Be able to analyze algorithms and improve the efficiency of algorithms.

**UNIT I**

Data Structures: Introduction to Data Structures – Time Complexity – Space Complexity –Searching – Linear, binary search methods, Hashing, Collision Resolution Techniques – Bubble sort, selection sort, Insertion sort, Quick sort, merge sort.

**UNIT II**

Dynamic Memory allocation, Linked List- Single, Double Linked List, Circular Linked List – Implementation of various operations, Applications of Linked Lists: Polynomials, Sparse Matrix.

**UNIT III**

Stack and Queues: Definition, representation, Applications, Infix to postfix conversion using stacks, Evaluation of Postfix expressions using stacks, Operations on Stacks and Queues, Circular Queues, DEQueues and Priority Queues.

**UNIT IV**

Trees- Terminology, Binary trees representation and Tree traversals, Expression trees, BST and operations on BST, Heap and Heap sort, Threaded binary trees.

**UNIT V**

Graphs – Terminology, Graph representation, Graph traversals-DFS, BFS, Dijkstra's, Warshall's and Floyd's algorithms, Minimum Cost spanning trees-Prim's and Kruskal's algorithms.

**TEXT BOOKS**

1. Data Structures A Pseudocode Approach with C Richard F. Gilberg&Behrouz A Forouzan.
2. Data Structures through C in depth, S K Srivastava, DeepaliSrivastava, BPB Publications

**REFRENCE BOOKS**

1. Introduction to Data structures with applications, Jean Paul Trembly& Paul G.Sorenson
   Second Edition, TMH.
2. Data structures using C and C++, Langsam, Augenstein and Tenenbaum, PHI.
3. Data Structures and Algorithms Concepts, Techniques and Applications. G A Pai Tata
   McGraw-Hill Education Private Limited
4. Schaum's outline series – Theory and Problems of Data Structures by Seymour and Lipschutz, MGH
   International Edition.

| SEMESTER-II | L | P | C |
|---|---|---|---|
| | 3 | - | 3 |
| 19MC2T04 : OPTIMIZATION TECHNIQUES | | | |

**Course Objectives:**

- To understand the theory of optimization methods and algorithms developed for solving various types of optimization problems.
- To develop and promote research interest in applying optimization techniques in problems of Engineering and Technology.
- To apply the mathematical results and numerical techniques of optimization theory to concrete Engineering problems.

**Course Outcomes (COs)**: At the end of the course, student will be able to

- Describe clearly a problem, identify its parts and analyze the individual functions
- Feasibility study for solving an optimization problem
- Becoming a mathematical translation of the verbal formulation of an optimization problem
- To design algorithms, the repetitive use of which will lead reliably to finding an approximate solution
- Discovery, study and solve optimization problems
- Investigate, study, develop, organize and promote innovative solutions for various applications

**UNIT–I:**

**Development:** Definition, Characteristics and Phrases, scientific method. Types of models, general methods for solving, operations research modes, **Allocation:** introduction linear programming formulation, graphical solution, simplex methods, artificial variable technique, duality principle.

**UNIT-II:**

**Transportation problem:** Formulation, optimal solution, unbalanced transportation.

**Assignment problem:** formulation, optimal solution, variations problem, degeneracy i.e. non square MXN) matrix, restrictions, **Sequencing:** Introduction, optimal solution for processing each of n jobs through three machines, travelling salesman problem (i.e.) shortest acyclic route models.

**UNIT-III:**

**Replacement:** Introduction, replacement of items that deteriorate when money value is not counted

and counted, and replacement of items that fail completely (i.e.) group replacements.

**Waiting lines:** Introduction, single channel, poisson arrivals, exponential service time infinite population and unrestricted queue.

## UNIT-IV:

**Inventory:** Introduction, single item, deterministic models, production is instantaneous or at a constant rate , shortages are allowed or not allowed and with drawls 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, simple problems.

## UNIT–V:

**Theory of Games:** Introduction, minmax (maximum), criterion and optimal strategy solution of games with saddle points, rectangular without saddle points. **Dynamic programming:** Introduction, Bellman's Principle of optimality, solutions for simple problems, **Project Management:** PERT and CPM, difference between PERT and CPM, PERT/CPM network components and precedence relations, Time Estimates for activities

## Text Books:

1. Operations Research, S.D.Sharma, Ramnath, & Kedarnath co, Meerut
2. Operations Research, An introduction, 8/e, Taha, Pearson

## Reference Books:

1. Operations Research, P.K.Gupta, D.S. Hira, S.Chand
2. Operations Research, R.D.Asrhedkar, R.V.Kulkarni
3. Operations Research, Problems & sollutons, 3/e, JKSharma, Macmillan
4. Operations Research, 8/e, Hillier, Liberman, TMH
5. Operations Research, 2/e, Panneerselvam

| SEMESTER-II | L | P | C |
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| **19MC2T05 : PERSPECTIVES OF ORGANIZATION AND MANAGEMENT** | | | |

*Course Objectives:*

- To familiarize the student with the basic principles and functions of Management.
- To understand the various approaches to Management and the concept of organizational structure.
- To understand the fundamentals of HRM and the duties and responsibilities of HR manager.
- To be able to identify the training needs in an organization and choose appropriate training methods.
- To understand the process of communication by identifying and eliminating the barriers of communication.
- To create awareness about various leadership styles and strategies to thrive in the LPG context.

**Course Outcomes**: At the end of the course the student should be able to

1. Understand the Conceptual Framework of Management and how management concepts can be applied in practice.
2. Acquaint with various organizational structures, and dynamics of motivation.
3. Identify the duties of a HR manager and the modus operandi of Training and Development.
4. Assess the effectiveness of communication in an organization and ways to improve them.
5. Gain insight into leadership styles and the challenges posed by LPG to organizations.

Unit I

    **Introduction to Management:** Concepts, Nature and Definitions of Management – Management and administration, Principles of Management - Functions of Management- Planning, Organizing, Directing and Controlling – Importance of Management.

Unit II

    **Classical Theories of Organization:** Functional approach – Division of labor, Levels of

authority, Span of Control, Authority &responsibility, Efficiency of Management. Concept of organization structure- Formal and Informal organization, Difficulties due to Informal Organization- Group Behaviour- Committee- Motivation and theories of Motivation.

Unit III

**Human Resource Management:** Objectives, Functions of HRM, Duties and Responsibilities of HR Manager- Position of HR Department in the Organization. Job Description, Job specification, Recruitment and selection, Interviewing techniques, transfers, Promotion and its Policies.

**Training and Development:** Identifying trainings needs –training Methods- on the Job training – Off the Job training –job Evaluation methods.

Unit IV

**Communication:** Importance of Communication, Communication process-Methods of Communication two way Communication, Barriers of Communication, Organizational barriers – Essentials of Effective Communication System

Unit V

**Leadership and Strategic Management:** Leadership Theories and Styles-Managerial Grid. Introduction to Strategic Management – Environmental Scanning-Internal Environment and External Environment-SWOT analysis- Challenges' in LPG.

Text Books:

1. Organization Structure and personal Management, 2/e, Subbarao. P, HPH.
2. Personal and Human Resource Management, Recenzo, Robins, PHI.
3. Business Communications and soft skills, kuberudu B, and Krishna K.s, Excel publications.
4. Management process and Organizational Behaviour, karam pal, I.k.int.

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| **19MC2L01: DATABASE MANAGEMENT SYSTEMS LAB** | | | |

**Course Objectives**:

1. This lab enables the students to practice the concepts learnt in the subject Database management systems.

**Course Outcomes:**

1. Ability to design and implement a database schema for given problem.
2. Be capable to Design and build a GUI application.
3. Apply the normalization techniques for development of application software to realistic problems.
4. Ability to formulate queries using SQL DML/DDL/DCL commands.

1. Create table for various relations.

2. Implement the query in SQL for a) insertion b) retrieval c) updation d) deletion

3. Execute a single line and group functions for a table.

4. Execute DCL and TCL Commands.

5. Create and manipulate various DB objects for a table.

6. Create views, partitions and locks for a particular DB.

7. Write PL/SQL procedure for an application using exception handling.

8. Write PL/SQL procedure for an application using cursors.

9. Write a PL/SQL program for an application using functions.

10. Write a PL/SQL block for transaction operations of a typical application using triggers.

11. Write a PL/SQL block for transaction operations of a typical application using package.

12. Implementing operation on relations using PL/SQL

13. Writing Assertions.

14. Generating Forms

15. Generating Reports

| SEMESTER-II | L | P | C |
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| **19MC2L02: DATA STRUCTURES LAB** | | | |

**Course Objectives:**

1. Implement various searching and sorting algorithms.

2. Programs to demonstrate the implementation of various operations on stack and queue

3. Implement basic data structures such as arrays and linked list.

4. Programs to demonstrate fundamental algorithmic problems including Tree Traversals, Graph traversals, and shortest paths.

**Course Outcomes:**

1. Implement stack, queue and list ADT to manage the memory using static and dynamic allocations

2. Apply binary search tree to construct expression trees used in indexing.

3. Identify and create code for real life applications of shortest path and Minimum Spanning Tree.

4. Develop and compare the graph search algorithms and sorting algorithms.

5. Predict appropriate data structure and algorithm for a given contextual problem and Develop the same using C language.

**LIST OF EXPERIMENTS**

**Implement the following programs using C language.**

1. Implement Linear and Binary Search mechanisms

2. Sort the given list of numbers using

a) Selection sortc) Insertion Sorte) Quick Sort

b) Bubble Sort          d) Merge Sort

3. Create a Single Linked List and Implement the following operations:

a) Insert a node at specific position          c) Counting the nodes

b) Delete a node from a specific positiond) Reversing the Linked List

4. Create a Double Linked List and Implement the following operations:

a) Insert a node at specific position          b) Counting the nodes

c) Delete a node from a specific position          d) Reversing the Linked List

5. Implement PUSH and POP operations on Stack using Arrays.  Handle the OVERFLOW and UNDER FLOW operations also.

6. Implement PUSH and POP operations on Stack using Linked List.  Handle the OVERFLOW and UNDER FLOW operations also.

7. Implement PUSH and POP operations on Queue using Arrays.  Handle the OVERFLOW and UNDER FLOW operations also.

8. Implement PUSH and POP operations on Queue using Linked List.  Handle the OVERFLOW and UNDER FLOW operations also.

9. Implement PUSH and POP operations on Circular Queue using Arrays.

10. Write a Program to create a BST and traverse it in Inorder, Preorder and Post order.

11. Write a program to count the number of leaf nodes in a Binary tree.

12. Write a program to find the Path Matrix of a graph using Warshall's algorithm.

13. Implement BFS and DFS traversal techniques on a given graph.

14. Write a program to find the All Pairs Shortest Path matrix using Floyd's.

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| **19MC2L03**: **OPERATING SYSTEMS LAB** | | | |

**Course Objectives:**

• To implement CPU scheduling algorithms

• To implement Disk scheduling algorithms

• To execute different types of Linux commands

• To write shell scripts

**Course Outcomes(COs)**: At the end of the course, student will be able to

• Implement various CPU scheduling algorithms and compare results

• Implement various disk scheduling algorithms and compare results

• Implement page replace algorithms

• Implement various memory management techniques.

• Execute basic Linux commands

**List of Experiments:**

1. Simulate the Following CPU Scheduling Algorithms

A) FCFS        B) SJF     C) Priority     D) Round Robin

2. Multiprogramming-Memory Management- Implementation of fork(),wait(),  exec() and exit()

3. Simulate The Following

   a. Multiprogramming     with     A Fixed Number Of Tasks (MFT)

   b. Multiprogramming with A Variable Number Of Tasks (MVT)

4. Simulate Bankers Algorithm for Dead Lock Avoidance

5. Simulate Bankers Algorithm for Dead Lock Prevention.

6. Simulate The Following Page Replacement Algorithms.

A) FIFO        B) LRUC) LFU

7. Simulate the Following File Allocation Strategies.

A) Sequenced  B) Indexed     C) Linked

| SEMESTER-III | L | P | C |
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| | **19MC3T01**: **OOPS Through JAVA** | | |

**COURSE OBJECTIVES:**

    1. Understand the concepts and features of Object Oriented Programming

    2. To examine the key concept of  JAVA standard API

    3. To learn JAVA's Inheritance, Exception handling and Multithreading

    4. To develop the skills in internet programming using applets and swings

**COURSE OUTCOMES:**

    1. Ability to apply Object Oriented Programming features and concepts for solving the given problem

    2. Able to use JAVA standard API library to write complex programs

    3. Able to develop interactive programs using applet and swing

**Unit I**

**Basics of Object Oriented Programming(OOP):**Need for OO 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

**Java Basics:** 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 II**

**Inheritance:** Hierarchical abstractions, Base class object, subclass, subtype,substitutability, forms of inheritance- specialization, specification, construction, extension, limitations, combination, benefits of inheritance costs of inheritance. Member access  rules,  super uses, using final with inheritance, polymorphism, abstract classes.

**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.

**Unit III**

**Exception handling and Multithreading**: Concepts of exception handling, benefits of exception handling, Termination or presumptive models, exception hierarchy, usage of try, catch, 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 IV**

**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, list panes- scroll pane, dialogs, menu bar, graphics, layout manager- layout manager types- boarder, grid, flow, card and grid bag.

**Unit V**

**Applets:** Concepts of Applets, differences between applets and applications, lifecycle of an applet, types of applets, creating applets, passing parameters to applets.

**Swings:** 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.

**TEXTBOOKS:**

1. Java-The complete reference, 7/e, Herbert schildt, TMH.

**REFERENCES:**

1. JAVA: How to program, 8/e, Dietal, Dietal,PHI.
2. Introduction of programming with JAVA, S.Dean, TMH.
3. Introduction to Java programming, 6/e, Y.Daniel Liang, Pearson.
4. Core Java 2, Vol 1(Vol 2) Fundamentals (Advanced), 7/e, Cay.S.Horstmann,Gary Cornell, Pearson.
5. Big Java2, 3/e, Cay.S. Horstmann,Wiley.
6. Object Oriented Programming through Java, P.Radha Krishna, University Press.
7. JAVA & Object Orientation an Introduction, 2/e, John Hunt, Springer.
8. Introduction to JAVA Programming, 7/e, Y.Daniel Liang, Pearson.
9. JAVA Programming and Object –Oriented Application Development, Johnson, Cengage Learning.
10. First Encounter with JAVA, S.P.Bhuta, SPD
11. JAVA for Professionals, B.M.Harwani, SPD.
12. Program with JAVA, Mahesh Bhave, Palekan, Pearson.

| SEMESTER-III | L | P | C |
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| | **19MC3T02**: **COMPUTER NETWORKS** | | |

**Course Objectives:**

1. To introduce the fundamentals of various types of computer networks.

2. To demonstrate the TCP/IP and OSI models with merits and demerits.

3. To explore the various layers of OSI Model.

4. To introduce UDP and TCP Models.

**Course Outcomes:**

1. After this course student could understand and explore the basics of Computer Networks and Various Protocols. She/he will be in a position to understand the World Wide Web concepts.

2. After this course he/she will be in a position to administrate a network and flow of information.

**UNIT -I**

The OSI Reference Model, The TCP/IP Reference Model , A Comparison of the OSI and TCP/IP Reference Models, Magnetic Media , Twisted Pair , Coaxial Cable, Fiber Optics. Data Link Layer Design Issues - Services Provided to the Network Layer , Framing , Error Control , Flow Control, Error-Correcting Codes, Error-Detecting Codes, An Unrestricted Simplex Protocol, A Simplex Stop-and-Wait Protocol, A Simplex Protocol for a Noisy Channel, A One-Bit Sliding Window Protocol, A Protocol Using Go Back N, A Protocol Using Selective Repeat.

**UNIT- II**

Static Channel Allocation in LANs and MANs, Dynamic Channel Allocation in LANs and MANs, ALOHA, Carrier Sense Multiple Access Protocols, Collision-Free Protocols. Ethernet Cabling, Manchester Encoding, The Ethernet MAC Sub layer Protocol, The Binary Exponential BackoffAlgorithm, Ethernet Performance,IEEE 802.2: Logical Link Control. 802.3, 802.4, 802.5

**UNIT- III**

Network Layer Design Issues-Store and Forward Packet Switching, Services Provided to the Transport Layer, Implementation of Connectionless Service, Implementation of  Connection-Oriented Service , Comparison of Virtual-Circuit and Datagram Subnets, The Optimality Principle Routing Algorithms **-** Shortest Path Routing, Flooding, Distance Vector Routing, Link State Routing.

Congestion Control Algorithms - General Principles of Congestion Control, Congestion Prevention Policies,

Congestion Control in Virtual-Circuit Subnets, Congestion Control in Datagram Subnets, Load Shedding, Jitter Control, How Networks Differ, How Networks can be Connected, Concatenated Virtual Circuits, Connectionless Internetworking, Tunneling, Internetwork Routing, Fragmentation. The IP Protocol - IP Addresses, Internet Control Protocols, IPv6

## UNIT -IV

Elements of Transport Protocols - Addressing, Establishing a Connection, Releasing a Connection, Flow Control and Buffering, Multiplexing, Crash Recovery; UDP, RPC;

TCP - Introduction to TCP, The TCP Service Model, The TCP Protocol, The TCP Segment Header, TCP Connection Establishment, TCP Connection Release, Modeling TCP Connection Management, TCP Transmission Policy, TCP Congestion Control

## UNIT-V

DNS-The DNS Name Space, Resource Records, Name Servers E MAIL - Architecture and Services, The User Agent, Message Formats, Message Transfer, Final Delivery WWW - Architectural Overview, Static Web Documents, Dynamic Web Documents, HTTP, MIME

**Text Books:**

1. Computer Networks, Andrew Tanenbaum, 4/e, Pearson

**Reference Books:**

1. Data Communications and Networking Forouzan, 4/e, TMH

2. Data and Computer Communications, Stallings, 8/e, PHI

3. Computer Networks – A System Approach , Peterson ,Bruce Davie,2/ e,Harcourt Asia

4. Compute Communications and Networking Technologies, Gallo, Hancock,Cengage

5. An Engineering approach to Computer Networking, Kesha ,Pearson

6. Communication Networks, 2/e , Leon-Garcia, TMH

7. Computer Networks, AnuranjanMisra, ACME Learning

8. Computer Networks, C R Sarma, Jaico, Understanding data communications, Held,7/e ,

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| **19MC3T03**: **PYTHON PROGRAMMING** | | | |

## UNIT – I:

Introduction:History of Python, Need of Python Programming, Applications Basics of Python Programming Using the REPL(Shell), Running Python Scripts, Variables, Assignment, Keywords, Input-Output, Indentation.

## UNIT – II:

Types, Operators and Expressions: Types - Integers, Strings, Booleans; Operators- Arithmetic Operators, Comparison (Relational) Operators, Assignment Operators, Logical Operators, Bitwise Operators, Membership Operators, Identity Operators, Expressions and order of evaluations Control Flow- if, if-elif-else, for, while, break, continue, pass

## UNIT – III:

Data Structures Lists - Operations, Slicing, Methods; Tuples, Sets, Dictionaries, Sequences. Comprehensions.

## UNIT – IV:

Functions - Defining Functions, Calling Functions, Passing Arguments, Keyword Arguments, Default Arguments, Variable-length arguments, Anonymous Functions, Fruitful Functions(Function Returning Values), Scope of the Variables in a Function - Global and Local Variables. Modules: Creating modules, import statement, from. Import statement, name spacing, Python packages, Introduction to PIP, Installing Packages via PIP, Using Python Packages

## UNIT – V:

Object Oriented Programming OOP in Python: Classes, 'self variable', Methods, Constructor Method, Inheritance, Overriding Methods, Datahiding,

Error and Exceptions: Difference between an error and Exception, Handling Exception, try except block, Raising Exceptions, User Defined Exceptions

Brief Tour of the Standard Library - Operating System Interface - String Pattern Matching, Mathematics, Internet Access, Dates and Times, Data Compression, Multithreading, GUI Programming, Turtle Graphics

Testing: Why testing is required ?, Basic concepts of testing, Unit testing in Python, Writing Test cases, Running Tests.

**TEXT BOOKS**
1. Python Programming: A Modern Approach, Vamsi Kurama, Pearson
2. Learning Python, Mark Lutz, Orielly

**Reference Books:**

1. Think Python, Allen Downey, Green Tea Press
2. Core Python Programming, W.Chun, Pearson.
3. Introduction to Python, Kenneth A. Lambert, Cengage
4. Python with Machine Learning, S Chand, Dr. A Krishna Mohan, Dr. T Murali Mohan

| SEMESTER-III | L | P | C |
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| | **19MC3T04**: **SOFTWARE ENGINEERING** | | |

**Course Objectives:**

1. Understanding of software process models such as waterfall and evolutionary models.

2. Understanding of software requirements and SRS document.

3. Analyze of different software architectural styles.

4. Understanding of software testing approaches such as unit testing and integration testing.

5. Know about quality control and how to ensure good quality software.

**Course Outcomes:**

1. Ability to Develop the minimum requirements for the development of application.

2. Ability to Design and Architectural Style of Software Systems

3. Ability to develop, maintain, efficient, reliable and cost effective software solutions.

4. Propose Testing Strategy for a Software Application

**UNIT – I**

**The software problem**: Cost, schedule and quality, Scale and change.

Software Processes: Process and project, component software processes, Software development process models : Waterfall model, prototyping, iterative development, relational unified process, time boxing model, Extreme programming and agile process, using process models in a project. Project Management Process.

**UNIT – II**

**Software requirement analysis and specification**: Value of good SRS, requirement process, requirement specification, functional specifications with use cases, other approaches for analysis, validation.

**Planning a software project**: Effort estimation, project schedule and staffing, quality planning, risk management planning, project monitoring plan, detailed scheduling.

**UNIT – III**

**Software Architecture**: Role of software architecture, architecture views, components and connector view, architecture styles for C & C view, documenting architecture design, evaluating architectures.

**Design**: Design concepts, function-oriented design, object-oriented design, detailed design, verification, and

metrics

**UNIT- IV**

**Coding and Unit Testing**: Programming principles and guidelines, incrementally developing code, managing evolving code, unit testing, code inspection, metrics.

**Unit - V**

**Testing**: Testing concepts, Testing Process, Black-Box Testing, White-Box Testing, and Metrics.

**TEXT BOOKS:**

1. Software Engineering, A Precise approach, PankajJalote, Wiley-India

**REFERENCE BOOKS:**

1. Software Engineering, 3/e ,& 7e Roger S.Pressman , TMH
2. Software Engineering, 8/e, Sommerville, Pearson.
3. Software Engineering principles and practice, W S Jawadekar, TMH
4. Software Engineering concepts, R Fairley, TMH

| SEMESTER-III | L | P | C |
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| | **19MC3T05**: **ARTIFICIAL INTELLIGENCE** | | |

**Course Objective:**

1. To learn the difference between optimal reasoning Vs human like reasoning

2. To understand the notions of state space representation, exhaustive search, heuristic search along with the time and space complexities

3. To learn different knowledge representation techniques

4. To understand the applications of AI namely, Game Playing, Theorem Proving, Expert Systems, Machine Learning and Natural Language Processing

**Course Outcome:**

1. Possess the ability to formulate an efficient problem space for a problem expressed in English

2. Possess the ability to select a search algorithm for a problem and characterize its time and space complexities.

3. Possess the skill for representing knowledge using the appropriate technique

4. Possess the ability to apply AI techniques to solve problems of Game Playing, Expert Systems and Machine Learning.

**Unit – I**
**Foundations of AI**: What is AI, History of AI, Strong and weak AI, The State of the Art.

Intelligent Agents: Agents and Environments, Good Behavior: The Concept of Rationality, The Nature of Environments, The Structure of Agents.

**Unit – II**
**Solving Problems by Searching**: Problem – Solving Agents, Example Problems, Searching for Solutions, uniformed search Strategies, Informed (Heuristic) Search Strategies, Heuristic Functions.

**Unit – III**
**Knowledge Representation**: Ontological Engineering, Categories and Objects, Events, Mental Events and Mental Objects, Reasoning Systems for Categories, Reasoning with Default Information, The Internet Shopping World.

**Unit – IV**
**Learning from Examples**: Forms of Learning, Supervised Learning, Learning Decision Trees, Evaluating and

Choosing the Best Hypothesis, The Theory of Learning, Regression and Classification with Learner Models, Nonparametric Models, Support Vector Machines, Ensemble Learning, Practical Machine Learning.

**Unit – V**
**Learning Probabilistic Models**: Statistical Learning, Learning with Complete data, Learning with Hidden variables: The EM Algorithm.

**Text Books**:
1. "Artificial Intelligence A Modern Approach", Stuart J. Russell & Peter Norvig – Pearson.
2. "Artificial Intelligence", Elaine Rich, Kevin Knight & Shivashankar B Nair – McGraw Hill Education.

| SEMESTER-III | L | P | C |
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| | **19MC3L01**: **OOPS through JAVA Lab** | | |

**Course Objectives:**

1. To familiarize the students with various data types, control structures, storage classes & various I/O statements of JAVA

2. To introduce the students with the features of Object Oriented Programming such as classes, objects, data abstraction.

3. To introduce the levels of inheritance.

4. To familiarize the students with polymorphism & their implementation in JAVA

**Course Outcomes:**

1. Able to develop JAVA program using object oriented concepts

2. Get the capability to implement the different types of inheritance & done problems related to them.

3. Implement the programs using polymorphism

4. Able to write programs using AWT and Swings concept

Use JDK 1.5 or above on any platform e.g. Windows or Unix. II. Student is expected to complete any 16 programs.

1. The Fibonacci sequence is defined by the following rule. The first 2 values in the sequence are 1, 1.every subsequent value is the sum of the 2 values preceding it. Write A Java Program (WAJP) that uses both recursive and non recursive functions to print the nth value of the Fibonacci sequence.

2. WAJP to demonstrate wrapper classes and to fix the precision
   WAJP that prompts prompts the user for an integer and then prints out all the prime numbers
   i. upto that Integer.

3. WAJP that checks whether a given string is a palindrome or not. Ex. MALAYALAM is a palindrome.

4. WAJP for sorting a given list of names in ascending order.

5. WAJP to check the compatibility for multiplication, if compatible multiply two matrices and find its transpose.

6. WAJP that illustrates how runtime polymorphism is achieved.

7. WAJP to create and demonstrate packages.

8.  WAJP, using String Tokenizer class, which reads a line of integers and then displays each integer and the sum of all integers.

9.  WAJP that reads on file name form the user then displays information about whether the file exists, whether the file is readable/writable, the type of file and the length of the file in bytes and display the content of the using FileInputStream class.

10. WAJP that displays the number of characters, lines and words in a text/text file.

11. Write an Applet that displays the content of a file.

12. WAJP 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.

13. WAJP for handling mouse events.

14. WAJP demonstrating the life cycle of a thread.

15. WAJP that correctly implements Producer-Consumer problem using the concept of Inter Thread Communication.

16. WAJP that lets users create Pie charts. Design your own user interface(with Swings & AWT).

17. WAJP that allows user to draw lines, rectangles and ovals.

18. WAJP 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 send form the client is the radius of a circle and the result produced by the server is the area of the circle.

19. WAJP to generate a set of random numbers between two numbers x1 and x2, and x1>0.

20. WAJP to create an abstract class named shape, that contains an empty method named number Of Sides(). Provide three classes named Trapezoid, Triangle and Hexagon, such that each one of the classes contains only the method number Of Sides(), that contains the number of sides in the given geometrical figure.

21. WAJP to implement a Queue, using user defined Exception Handling (also make use of throw, throws).

22. WAJP that creates 3 threads by extending Thread class. First thread displays "Good Morning" every 1 sec, the second thread displays "Hello" every 2 seconds and the third displays"Welcome" every 3 seconds. (Repeat the same by implementing Runnable).

23. Create an inheritance hierarchy of Rodent, Mouse, Gerbil, Hamsteretc. In the base class provide methods that are common to all Rodents and override these in the derived classes to

perform different behaviours, depending on the specific type of Rodent. Create an array of Rodent, fill it with different specific types of Rodents and call your base class methods.

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| **19MC3L02: PYTHON PROGRAMMING LAB** | | | |

**Exercise 1 - Basics**
a) Running instructions in Interactive interpreter and a Python Script
b) Write a program to purposefully raise Indentation Error and Correct it

**Exercise 2 - Operations**
a) Write a program to compute distance between two points taking input from the user
(Pythagorean Theorem)
b) Write a program add.py that takes 2 numbers as command line arguments and prints its sum.

**Exercise - 3 Control Flow**
a) Write a Program for checking whether the given number is a even number or not.

b) Using a for loop, write a program that prints out the decimal equivalents of 1/2, 1/3, 1/4, . . . , 1/10
c) Write a program using a for loop that loops over a sequence. What is sequence ?

d) Write a program using a while loop that asks the user for a number, and prints a countdown from
that number to zero.

**Exercise 4 - Control Flow - Continued**
a) Find the sum of all the primes below two million.

Each new term in the Fibonacci sequence is generated by adding the previous two terms. By starting
with 1 and 2, the first 10 terms will be: 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, ...

b) By considering the terms in the Fibonacci sequence whose values do not exceed four million, find the
sum of the even-valued terms.

**Exercise - 5 - DS**

a) Write a program to count the numbers of characters in the string and store them in a dictionary

data structure

b) Write a program to use split and join methods in the string and trace a birthday with a dictionary

data structure.

**Exercise - 6 DS -Continued**

a) Write a program combine_lists that combines these lists into a dictionary.

b) Write a program to count frequency of characters in a given file. Can you use character frequency to

tell whether the given file is a Python program file, C program file or a text file?

**Exercise - 7 Files**

a) Write a program to print each line of a file in reverse order.

b) Write a program to compute the number of characters, words and lines in a file.

**Exercise - 8 Functions**

a) Write a function ball_collide that takes two balls as parameters and computes if they are colliding. Your function shou ld return a Boolean representing whether or not the balls are colliding.

Hint: Represent a ball on a plan e as a tuple of (x, y, r), r being the radius

If (distance between two balls centers) <= (sum of their radii) then (they are colliding)

b) Find mean, median, mode for the given set of numbers in a list.

**Exercise - 9 Functions - Continued**

a) Write a function nearly_equal to test whether two strings are nearly equal. Tw o strings a and b are nearly equal when a can be generated by a single mutation on b.

b) Write a function dups to find all duplicates in the list.

c) Write a function unique to fin d all the unique elements of a list.

**Exercise - 10 - Functions - Pro blem Solving**

a) Write a function cumulative_p roduct to compute cumulative product of a list of numbers.

b) Write a function reverse to re verse a list. Without using the reverse function.

c) Write function to compute gcd , lcm of two numbers. Each function shouldn't exceed one line.

**Exercise 11 - Multi-D Lists**

a) Write a program that defines a matrix and prints

b) Write a program to perform addition of two square matrices

c) Write a program to perform multiplication of two square matrices

**Exercise - 12 - Modules**

a) Install packages requests, fl ask and explore them. using (pip)

b) Write a script that imports requests and fetch content from the page. Eg. (W iki)

c) Write a simple script that serves a simple HTTPResponse and a simple HT ML Page

**Exercise - 13 OOP**

a) Class variables and instance v ariable and illustration of the self variable

i) Robot
ii) ATM Machine

**Exercise - 14 GUI, Graphics**

1. Write a GUI for an Expression Calculator using tk

2. Write a program to implement the following figures using turtle
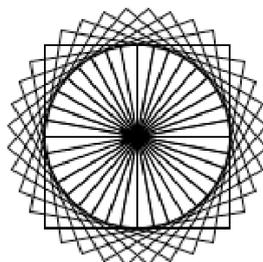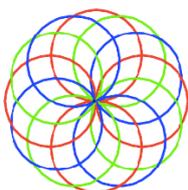
**Exercise - 15 - Testing**

a) Write a test-case to check the function even _numbers which return True on passing a list of all even numbers

b) Write a test-case to check the function reverse _string which returns the reversed string

**Exercise - 16 - Advanced**

a) Build any one classical data structure.

b) Write a program to solve knapsack problem.

| SEMESTER-III | L | P | C |
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| **19MC3L03**: **UML LAB** | | | |

**Course Objectives:**

- To know the practical issues of the different object oriented analysis and design concepts
- Inculcate the art of object oriented software analysis and design
- Apply forward and reverse engineering of a software system
- Carry out the analysis and design of a system in an object oriented way

**Course Outcomes(COs):** At the end of the course, student will be able to

- Know the syntax of different UML diagrams
- Create use case documents that capture requirements for a software system
- Create class diagrams that model both the domain model and design model of a software  system.
- Create interaction diagrams that model the dynamic aspects of a software system.
- Write code that builds a software system.
- Develop simple applications

**Note:**  For performing the experiments consider any case study (ATM/ Banking
/ Library /Hospital management systems)

**Experiment 1:**

Familiarization with Rational Rose or Umbrella environment

**Experiment 2:**

a)   Identify and analyze events

b)   Identify Use cases

c)   Develop event table

**Experiment 3:**

a)   Identify & analyze domain classes

b)   Represent use cases and a domain class diagram using Rational Rose

c)   Develop CRUD matrix to represent relationships between use cases and problem

domain  classes

**Experiment 4:**

    a)   Develop Use case diagrams

    b)   Develop elaborate Use case descriptions & scenarios

    c)   Develop prototypes (without functionality)

**Experiment 5:**

    a)  Develop system sequence diagrams and high-level sequence diagrams for each use case

    b)   Identify MVC classes / objects for each use case

    c)  Develop Detailed Sequence Diagrams / Communication diagrams for each use case showing  interactions among all the three-layer objects

# Experiment 6:

a) Develop detailed design class model (use GRASP patterns for responsibility assignment)

b) Develop three-layer package diagrams for each case study

# Experiment 7:

a) Develop Use case Packages

b) Develop component diagrams

c) Identify relationships between use cases and represent them

d) Refine domain class model by showing all the associations among classes

# Experiment 8:

Develop sample diagrams for other UML diagrams - state chart diagrams, activity diagrams and deployment diagrams

| SEMESTER-IV | L | P | C |
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| | **19MC4T01**: **DATA WAREHOUSING AND MINING** | | |

**Course Objectives:** Students undergoing this course are expected to

1. Understand the basic principles, concepts and applications of data warehousing & data mining.

2. Differentiate Online Transaction Processing and Online Analytical processing.

3. Learn Multidimensional schemas suitable for data warehousing.

4. Inculcate knowledge on data mining query languages.

5. Understand various data mining functionalities & Know in detail about data mining algorithms.

**Course Outcomes:** After undergoing the course, Students will be able to understand

1. Importance of data mining, knowledge discovery process, data preprocessing.

2. Describe the various architectures and main components of a data warehouse & Design a data warehouse, and be able to address issues that arise when implementing a data warehouse.

3. Develop skills to write queries using DMQL & Extract knowledge using data mining techniques.

4. Discover the relationships among data bases, data classification and data clustering.

**UNIT - I**

**Introduction**: Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems,

**Data Preprocessing**: Needs Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.

**Data Mining Primitives, Languages, and System Architectures** : Data Mining Primitives, Data Mining Query Languages, Designing Graphical User Interfaces Based on a Data Mining Query Language Architectures of Data Mining Systems.

**UNIT - II**

**Data Warehouse and OLAP**: Data Warehouse and OLAP Technology for Data Mining Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, From Data Warehousing to Data Mining.

**Concepts Description, Characterization and Comparison**: Data Generalization and Summarization- Based Characterization, Analytical Characterization: Analysis of Attribute **Relevance, Mining Class Comparisons**:

Discriminating between Different Classes.

## UNIT - III

**Mining Association Rules in Large Databases** : Association Rule Mining, Mining Single-Dimensional Boolean Association Rules from Transactional Databases, Mining Multilevel Association Rules from Transaction Databases, Mining Multidimensional Association Rules from Relational Databases and Data Warehouses, From Association Mining to Correlation Analysis, Constraint-Based Association Mining.

## UNIT - IV

**Classification and Prediction**: Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, and Classification by Back propagation, Classification Based on Concepts from Association Rule Mining, Other Classification Methods, Prediction, and Classifier Accuracy.

## UNIT - V

**Cluster Analysis Introduction**: Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, and Partitioning Methods- K means, K mediods, Hierarchical methods- single link, complete link, average link agglomerative clustering methods, Density-Based Methods-DBSCAN.

**Mining Complex Types of Data**: Multidimensional Analysis and Descriptive Mining of Complex, Data Objects, Mining Multimedia Databases, Mining Text Databases, Mining the World Wide Web.

**TEXT BOOKS:**

1.  Data Mining, Concepts and Techniques, Jiawei Han, MichelineKamber, Harcourt India.

**REFERENCE BOOKS:**

1. Introduction to data mining Pang-Ning Tan, Vipin Kumar, Michael Steinbacn, Pearson

2. Data Mining Techniques, Arun K Pujari, University Press.

3. Data Warehousing Fundamentals, PaulrajPonnaiah, Wiley.

4. The Data Warehouse Life cycle Tool kit, Ralph Kimball, Wiley.

| SEMESTER-IV | L | P | C |
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| | **16MC4T02**: **FULL STACK TECHNOLOGIES** | | |

**Course Objectives:**

From the course the student will learn

1. Translate user requirements into the overall architecture and implementation of new systems and Manage Project and coordinate with the Client.
2. Write backend code in Python/Java, PHP languages and Writing optimized front end code HTML and JavaScript.
3. Understand, create and debug database related queries and Create test code to validate the applications against client requirement.
4. Monitor the performance of web applications & infrastructure and Troubleshooting web application with a fast and accurate a resolution.

**Course Outcomes(COs)**: At the end of the course, student will be able to

1. Identify the Basic Concepts of Web & Markup Languages

2. Develop web Applications using Scripting Languages & Frameworks

3. Creating & Running Applications using JSP libraries

4. Creating Our First Controller Working with and Displaying in Angular Js and Nested Forms with ng-form

5. Working with the Files in React JS and Constructing Elements with Data

**UNIT – I: HTML**

Web Essentials: Clients, Servers, and Communication. The Internet-Basic Internet Protocols - The World Wide Web-HTTP request message-response message-Web Clients Web Servers. Markup Languages: XHTML an Introduction to HTML, History, Versions, Basic, XHTML Syntax and Semantics Some Fundamental HTML Elements-Relative URLs-Lists-tables-Frames-Forms- HTML 5.0.

**UNIT – II: Cascading Style Sheets (CSS)**

Style Sheets: CSS-Introduction to Cascading Style Sheets-Features-Core Syntax-Style Sheets and HTML- Style Rule Cascading and Inheritance-Text Properties-Box Model Normal Flow Box Layout beyond the Normal Flow-CSS3.0, Boot strap basics, Boot strap CSS3,

Introduction to Java Script, Jscript basics, JScripts objects, JSON, Don.

## UNIT – III: Jscript

Separating Programming and Presentation: JSP Technology, Introduction to JSP and Servlets- Running JSP Applications, Basic JSP-JavaBeans Classes and JSP-Tag Libraries and Files- Support for the Model-View-Controller Paradigm- Mongo DB, JQuery, Mean stack Fundamentals

## UNIT – IV: Angular Js

Introducing AngularJS, Starting Out with AngularJS, Basic AngularJS, Directives and Controllers, AngularJS Modules, Creating First Controller, working with and Displaying, Arrays, more Directives, working with ng-repeat, Unit Testing in AngularJS, Forms, Inputs, and Services, Working with ng-model, Working with Forms, Leverage Data-Binding and Models, Form Validation and States, Error Handling with Forms, ngModelOptions, Nested Forms with ng-form, Other Form Controls.

## UNIT – V: React JS

Introduction to React, Obstacles and Roadblocks, keeping Up with the Changes, Working with the Files, Pure React, Page Setup, The Virtual DOM, React Elements, ReactDOM, Children, Constructing Elements with Data, React Components, DOM Rendering, Factories

## Text Books:

1. Jeffrey C. Jackson, "Web Technologies--A Computer Science Perspective", Pearson Education, 2006

2. Robert. W. Sebesta, "Programming the World Wide Web", Fourth Edition, Pearson Education, 2007

3. AngularJS: Up and Running Enhanced Productivity with Structured Web Apps By Brad Green, Shyam Seshadri Publisher: O'Reilly Media

4. Learning React Functional Web Development with React and Redux By Alex Banks, Eve Porcello Publisher: O'Reilly Media

5. Head First Java, 2nd Edition by Bert Bates, Kathy Sierra Publisher: O'Reilly Media, Inc

**UNIT- I**

**Introduction to PHP**: Declaring variables, data types, arrays, strings, operators, expressions, control structures, functions, Reading data from web form controls like text boxes, radio buttons, lists etc.,

**Browser-Handling Power**: Server Variable, HTTP Headers, Handling From data, Data validation Handling File Uploads, Connecting to database (MySQL as reference), executing simple queries, handling results, Handling sessions and cookies.

**File Handling in PHP**: File operations like opening, closing, reading, writing, appending, deleting etc. on text and binary files, listing directories

**UNIT- II**

**OOP through PHP:** Creating Class and Objects, Access Specifiers, Constructors, Destructors, Overriding Methods, Overloading Methods, Auto loading Classes

**Advanced PHP Programming**: PHP and Web Forms, Files, PHP Authentication          and Methodologies – Hard Coded File based, Database based, IP based, Login, Administration, Uploading Files with PHP, Sending Email using PHP, Building Web sites for the World

**UNIT-III**

**Introduction to Servlets**: Common Gateway Interface (CGI), Lifecycle of a Servlet, deploying a servlet, The Servlet API, Reading Servlet parameters, Reading Initialization parameters, Handling Http Request & Responses, Using Cookies and Sessions, connecting to a database using JDBC

**UNIT-IV**

**Introduction to JSP**: The Anatomy of a JSP Page, JSP Processing, Declarations, Directives, Expressions, Code Snippets, implicit objects, Using Beans in JSP Pages, Using Cookies and session for session tracking, connecting to database in JSP.

**UNIT-V**

**Client side Scripting**: Introduction to Javascript: Javascript language - declaring variables, scope of variables, functions, event handlers (onclick, onsubmit etc.), Document Object Model, Form validation. Simple AJAX application.

**TEXT BOOKS:**
1. Web Technologies, Uttam K Roy, Oxford University Press
2. The Complete Reference PHP – Steven Holzner, Tata McGraw-Hill

3. The Completer Reference JAVA Herbert Schildt Tata McGraw-Hill

**REFERENCE BOOKS:**

1. Web Programming, building internet applications, Chris Bates 2nd edition, Wiley Dreamtech.
2. Java Server Pages –Hans Bergsten, SPD O'Reilly.
3. Java Script, D.Flanagan, O'Reilly, SPD.
4. Beginning Web Programming-Jon Duckett WROX.
5. Programming World Wide Web, R.W.Sebesta, Fourth Edition, Pearson.
6. Internet and World Wide Web – How to program, Dietel and Nieto, Pearson

| SEMESTER-IV | L | P | C |
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| **19MC4T03**: **CRYPTOGRAPHY AND NETWORK SECURITY** | | | |

**Course Objectives:**

1. Understand and classify different kinds of attacks and security services.

2. Comprehend conventional encryption principles algorithms and its applications.

3. Importance of public key encryption principles algorithms and authentication services.

4. To learn and implement various security mechanisms like IP security for providing security to the data over the network.

5. To be familiar with protocols like SNMP for providing authentication service.

**Course Outcomes**

1. Identify passive attacks, active attacks and how to prevent them.

2. Encipher and decipher data using public key algorithms.

3. Have adequate knowledge about the security services implemented in network protocols.

**UNIT - I**

**Introduction**: Security Attacks (Interruption, Interception, Modification and Fabrication),Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability) and Mechanisms, A model for Internetwork security, Internet Standards and RFCs, Buffer overflow & format string vulnerabilities, TCP session hijacking, ARP attacks, route table modification, UDP hijacking, and man-in-the-middle attacks.

**UNIT –II**

**Conventional Encryption**: Conventional Encryption Principles, Conventional encryption algorithms, cipher block modes of operation, location of encryption devices, key distribution Approaches of Message Authentication, Secure Hash Functions and HMAC

**UNIT -III**

**Public key**: Public key cryptography principles, public key cryptography algorithms, digital signatures, digital Certificates, Certificate Authority and key management Kerberos, X.509 Directory Authentication Service

**UNIT-IV**

**IP Security**: IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management Web Security: Web Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET) Email Privacy: Pretty Good Privacy (PGP) and S/MIME.

**UNIT-V**

**SNMP**: Basic concepts of SNMP, SNMPv1 Community facility and SNMPv3, Intruders, Viruses and related threats Fire walls: Firewall Design principles, Trusted Systems, Intrusion Detection Systems.

**TEXT BOOKS:**

1. Network Security Essentials: Applications and Standards, William Stallings, PEA.
2. Hack Proofing your Network, Russell, Kaminsky, Forest Puppy, Wiley Dreamtech

**REFERENCE BOOKS:**

1. Network Security & Cryptography, Bernard Menezes, Cengage,2010
2. Fundamentals of Network Security, Eric Maiwald, Dream Tech
3. Network Security: Private Communication in a Public World, Kaufman, Perlman, PEA/PHI.
4. Principles of Information Security, Whitman, Thomson.
5. Cryptography and Network Security, 3/e, Stallings, PHI/PEA
6. Network Security: The complete reference, Robert Bragg, Mark Rhodes, TMH
7. Introduction to Cryptography, Buchmann, Springer

| SEMESTER-IV | L | P | C |
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## 19MC4E01: MANAGEMENT INFORMATION SYSTEMS
### (ELECTIVE-I)

**Course Objectives:**

1. One of the main aims of this subject is to analyze the system in such a way that a programme description can be made. The student will become conversant with the various ways of analyzing the system. The ultimate aim of the student is to write a system design. There after he is supposed to become conversant with the implementation of the software in the organization and the problems encountered by him. These elements will be useful to the student in career.
2. To understand MIS within organization.
3. To understand Information Systems and Strategy Formulation
4. To understand Conceptual System Design. Understand the basic functioning of the organization, Writing a report.
5. To understand Detailed System Design Understand the minute working of the functions of the organization. Writing a report.
6. To understand Implementation of software.
7. To understand the pitfalls in MIS development.

**Course Outcome**

1. Understand Information Systems and Strategy Formulation
2. Define Conceptual System Design.
3. Write a MIS report
4. Detailed System Design Understand the minute working of the functions of the organization. Writing a report.
5. Analyze pitfalls in MIS development

**UNIT - I**

**Management Information Systems: A Framework:** Importance of MIS, MIS: A Definition Nature and Scope of MIS, **Structure and Classification of MIS:** Structure of MIS, MIS Classification

**Information and System Concepts:** Information: A Definition, Types of Information, Dimensions of Information, System: A Definition, Kinds of Systems, System Related Concepts, Elements of a System, Human as an Information Processing System

**Information Systems for Competitive Advantage:** Introduction, Changing concepts of Information System, Competitive Advantage, Information systems Strategies for Dealing with competitive Force, Porter's Value Chain Model, Strategic Information Systems (SIS)

## UNIT - II

### BUSINESS APPLICATIONS OF IS

**e – Commerce: Introduction**, e – Commerce

**ERP Systems: Introduction**, Enterprise Information Systems

**Decision – Support Systems:** Decision – Making: A Concept, Simon's Model of Decision – Making Types of Decisions, Methods for Choosing Among Alternatives, Decision – Making and MIS, Decision Support Systems – Why?, Decision Support Systems: A framework, Characteristics and Capabilities of DSS

**Business Intelligence and knowledge Management System: Business** Intelligence, Knowledge Management System.

## UNIT - III

**Information System Planning :** Information System Planning: WHY?, Planning Terminology Information System Planning, The Nolan Stage Model, The Four – Stage Model of is planning Selecting A Methodology, Information Resources Management (IRM), Organization Structure and Location of MIS

**System Acquisition: Acquisition** of Information Systems, Acquisition of Hardware and Software

## UNIT - IV

**System Implementation:** IMPLEMENTATION PROCESS, Organizational Change

**Evaluation & Maintenance of IS:** Evaluation of MIS, System Maintenance

**IS Security and Control:** IS Security Threats, Protecting Information System, IS Security Technology. The Disaster Recovery Plan

## UNIT - V

### BUILDING OF IS

**System Development Approaches:** System Development Stages, System Development Approaches

**System Analysis and Design: SYSTEM ANALYSIS -** Introduction, Requirement Determination, Strategies for Requirement Determination, Structured Analysis Tools

**SYSTEMS DESIGN:** Design Objectives , Conceptual Design , Design Methods, Detailed System Design

**TEXT BOOKS:**

1. Management Information System, Managerial Perspecives, D P Goyal, 3 ed, McMillan Publications

**REFERENCE BOOKS:**

1. Management Information Systems, Managing the Digital Firm Edition by Kenneth C. Laudon, Jane P. Laudon, Pearson Education, 10th Edition.

2. Management information Systems, 4th edition by Robert Schultheis, Mary Sumner, PHI-Seventeenth Reprint 2007.

| SEMESTER-IV | L | P | C |
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| **19MC4E02**: **HUMAN COMPUTER INTERACTION** | | | |

**Course Objectives:**

1. The main objective is to get student to think constructively and analytically about how to design and evaluate interactive technologies.

**Course Outcomes:**

1. Explain the capabilities of both humans and computers from the viewpoint of human information processing.
2. Describe typical human–computer interaction (HCI) models, styles, and various historic HCI paradigms.
3. Apply an interactive design process and universal design principles to designing HCI systems.
4. Describe and use HCI design principles, standards and guidelines.
5. Analyze and identify user models, user support, socio-organizational issues, and stakeholder requirements ofHCI systems.
6. Discuss tasks and dialogs of relevant HCI systems based on task analysis and dialog design.

**UNIT - I**

**Introduction**: Importance of user Interface, definition, importance of good design. Benefits of good design. A brief history of Screen designs

**The graphical user interface**: Popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user –interface popularity, characteristics-Principles of user interface.

**UNIT - II**

**Design Process**: Human interaction with computers, importance of human characteristics, human consideration, Human interaction speeds, understanding business junctions.

**UNIT – III**

**Screen Designing** : Design goals, Screen planning and purpose, organizing screen elements, ordering of screen data and content, screen navigation and flow, Visually pleasing composition, amount of information, focus and emphasis, presentation information simply and meaningfully, information retrieval on web, statistical graphics, Technological consideration in interface design.

**UNIT - IV**

**Windows**: Windows new and Navigation schemes selection of window, selection of devices based and screen based controls. Components: Components text and messages, Icons and increases, Multimedia, colors, uses problems, choosing colors.

**UNIT - V**

**Software tools**: Specification methods, interface, Building Tools. Interaction Devices: Keyboard and function keys, pointing devices, speech recognition digitization and generation, image and video displays, drivers.

**TEXT BOOKS:**

1. The Essential guide to user interface design,2/e, Wilbert O Galitz, Wiley DreamaTech.

**REFERENCE BOOKS:**

1. Human Computer Interaction. 3/e, Alan Dix, Janet Finlay, Goryd, Abowd, Russell Beal, PEA,2004

2. Designing the user interface. 4/e, Ben Shneidermann , PEA.

3. User Interface Design, SorenLauesen , PEA.

4. Interaction Design PRECE, ROGERS, SHARPS, Wiley .

5. Human Computer, Interaction Dan R.Olsan, Cengage ,2010.

| SEMESTER-IV | L | P | C |
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| **19MC4E03**: **SOFTWARE TESTING METHODOLOGIES** | | | |

**Course Objectives:**

- To study fundamental concepts in software testing, including software testing objectives, process, criteria, strategies, and methods.
- To discuss various software testing issues and solutions in software unit test; integration, regression, and system testing.
- To learn how to planning a test project, design test cases and data, conduct testing operations, manage software problems and defects, generate a testing report.
- To expose the advanced software testing topics, such as object-oriented software testing methods, and component-based software testing issues, challenges, and solutions.
- To gain software testing experience by applying software testing knowledge and methods to practice-oriented software testing projects.
- To understand software test automation problems and solutions.
- To learn how to write software testing documents, and communicate with engineers in various forms.
- To gain the techniques and skills on how to use modern software testing tools to support software testing projects.

**Course Outcomes:**

By the end of the course, the student should:

1. Have an ability to apply software testing knowledge and engineering methods.
2. Have an ability to design and conduct a software test process for a software testing project.
3. Have an ability to identify the needs of software test automation, and define and develop a test tool to support test automation.

4. Have an ability understand and identify various software testing problems, and solve these problems by designing and selecting software test models, criteria, strategies, and methods.

5. Have an ability to use various communication methods and skills to communicate with their teammates to conduct their practice-oriented software testing projects.

6. Have basic understanding and knowledge of contemporary issues in software testing, such as component based software testing problems

7. Have an ability to use software testing methods and modern software testing tools for their testing projects.

**UNIT-I**

**Software Testing:** Introduction, Evolution, Myths & Facts, Goals, Psychology, Definition, Model for testing, Effective Vs Exhaustive Software Testing.

**Software Testing Terminology and Methodology:** Software Testing Terminology, Software Testing Life Cycle, relating test life cycle to development life cycle Software Testing Methodology

**UNIT-II**

**Verification and Validation:** Verification & Validation Activities, Verification, Verification of Requirements, High level and low level designs, How to verify code, Validation

**Dynamic Testing I: Black Box testing techniques:** Boundary Value Analysis, Equivalence class Testing, State Table based testing, Decision table based testing, Cause- Effect Graphing based testing, Error guessing

**UNIT-III**

**Dynamic Testing II: White-Box Testing:** need, Logic coverage criteria, Basis path testing, Graph matrices, Loop testing, data flow testing, mutation testing

**Static Testing:** inspections, Structured Walkthroughs, Technical reviews

**Validation activities:** Unit testing, Integration Testing,. Function testing, system testing, acceptance testing

**UNIT-IV**

**Regression testing:** Progressives Vs regressive testing, Regression testability, Objectives of regression testing, When regression testing done? Regression testing types, Regression testing techniques

**Efficient Test Suite Management:** Test case design Why does a test suite grow, Minimizing the test suite and its benefits, test suite prioritization, Types of test case prioritization, prioritization techniques, measuring the effectiveness of a prioritized test suite

**Software Quality Management:** Software Quality metrics, SQA models

Debugging: process, techniques, correcting bugs, Basics of testing management tools, test link and Jira

**UNIT-V**

**Automation and Testing Tools:** need for automation, categorization of testing tools, selection of testing tools, Cost incurred, Guidelines for automated testing, overview of some commercial testing tools.

**Testing Object Oriented Software:** basics, Object oriented testing

**Testing Web based Systems:** Challenges in testing for web based software, quality aspects, web engineering, testing of web based systems, Testing mobile systems

**TEXT BOOKS:**

1. Software Testing, Principles and Practices, Naresh Chauhan, Oxford

2. Foundations of Software testing, Aditya P Mathur, 2ed, Pearson

3. Software Testing- Yogesh Singh, CAMBRIDGE

**REFERENCE BOOKS:**

1. Software testing techniques - Baris Beizer, International Thomson computer press, second edition.

2. Software Testing, Principles, techniques and Tools, M G Limaye, TMH

3. Effective Methods for Software testing, Willian E Perry, 3ed, Wiley

| SEMESTER-IV | L | P | C |
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| | **19MC4E04**: **DISTRIBUTED SYSTEMS** | | |

**Course Objectives:**

1. Understand the need for distributed systems and their applications.
2. Understand the concepts of remote procedure calls, remote file systems, distributed agreement, clock synchronization, and security.
3. Analyze the Security Concepts

**Course Outcomes:**

1. Study Distributed Systems Models and Architecture
2. Analyze DOS Architecture
3. Mechanisms for establishing communication in DS
4. Define Transaction Management in DS
5. Design Security issues in DS

**UNIT-I**

Characterization of Distributed Systems-Introduction, Examples of Distributed systems, Resource sharingand web, challenges, System models-Introduction, Architectural and Fundamental models, Networkingand Internetworking, Interprocess Communication.

Distributed objects and Remote Invocation-Introduction, Communication between distributed objects,RPC, Events and notifications, Case study-Java RMI.

**UNIT-II**

Operating System Support- Introduction, OS layer, Protection, Processes and Threads, Communicationand Invocation, Operating system architecture, Distributed File Systems-Introduction, File Servicearchitecture, case study- SUN network file systems.

Name Services-Introduction; Name Services and the Domain Name System, Case study of the Global Name Service, Case study of the X.500 Directory Service.

**UNIT-III**

Peer to Peer Systems–Introduction, Napster and its legacy, Peer to Peer middleware, Routing overlays, Overlay case studies-Pastry, Tapestry, Application case studies-Squirrel, Ocean Store, Time and Global States-Introduction, Clocks, events and Process states, Synchronizing physical clocks, logical time and logical clocks, global states, distributed debugging. Coordination and Agreement-Introduction, Distributed mutual exclusion, Elections, Multicast communication, consensus and related problems.

**UNIT-IV**

Transactions and Concurrency control-Introduction, Transactions, Nested Transactions, Locks, Optimistic concurrency control, Timestamp ordering, Comparison of methods for concurrency control. Distributed Transactions-Introduction, Flat and Nested Distributed Transactions, Atomic commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery. Replication-Introduction, System model and group communication, Fault tolerant services, Transactions with replicated data.

**UNIT-V**

Security-Introduction, Overview of Security techniques, Cryptographic algorithms, Digital signatures, Case studies-Kerberos, TLS, 802.11 Wi-Fi.

Distributed shared memory, Design and Implementation issues, Sequential consistency and Ivy case study, Release consistency and Munin case study, Other consistency models, CORBA case study- Introduction, CORBA RMI, CORBA Services.

**TEXT BOOKS:**

1. Distributed Systems Concepts and Design, G Coulouris, J Dollimore and T Kindberg, Fourth Edition, Pearson Education.
2. Distributed Systems, S.Ghosh, Chapman& Hall/CRC, Taylor & Francis Group, 2010.

**REFERENCE BOOKS:**

1. Distributed Computing, S.Mahajan and S.Shah, Oxford University Press.
2. Distributed Operating Systems Concepts and Design, PradeepK.Sinha, PHI.
3. Advanced Concepts in Operating Systems, M Singhal, N G Shivarathri, TMH.

| SEMESTER-IV | L | P | C |
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| | **19MC4E05:  SOFTWARE PROJECT MANAGEMENT** | | |

**Course Objectives:**

1. To study how to plan and manage projects at each stage of the software developmentlife cycle (SDLC)
2. To train software project managers and other individuals involved in software projectplanning and tracking and oversight in the implementation of the software project management process.
3. To understand successful software projects that support organization's strategic goals

**Course Outcomes:**

1. To match organizational needs to the most effective software development model
2. To understand the basic concepts and issues of software project management
3. To effectively Planning the software projects
4. To implement the project plans through managing people, communications and change
5. To select and employ mechanisms for tracking the software projects
6. To conduct activities necessary to successfully complete and close the Softwareprojects
7. To develop the skills for tracking and controlling software deliverables
8. To create project plans that address real-world management challenges

**UNIT-I**

**Introduction** Project, Management, Software Project Management activities,Challenges in software projects, Stakeholders, Objectives & goals Project Planning: Step-wise planning, Project Scope, Project Products & deliverables,Project activities, Effort

### UNIT-II

**Project Approach** Lifecycle models, Choosing Technology, Prototyping Iterative & incremental Process Framework: Lifecycle phases, Process Artifacts, Process workflows (Book 2)

### UNIT-III

**Effort estimation & activity Planning** Estimation techniques, Function Point analysis, SLOC, COCOMO, Usecase-based estimation , Activity Identification Approaches, Network planning models, Critical path analysis

### UNIT-IV

**Risk Management & Software Quality** Risk categories, Identification, Assessment, Planning and management, PERT technique, Monte Carlo approach Planning Quality, Defining Quality - ISO 9016, Quality Measures, Quantitative Quality Management Planning, Product Quality & Process Quality

### UNIT-V

**Project Monitoring & Control , Resource Allocation** Creating a framework for monitoring & control, Progress monitoring, Cost monitoring, Earned value Analysis, Defects Tracking, Issues Tracking, Status reports, Types of Resources, Identifying resource requirements, Resource scheduling.

### TEXT BOOKS:

1. Software Project Management, Bob Hughes & Mike Cotterell, TATA Mcgraw-Hill
2. Software Project Management, Walker Royce: Pearson Education, 2005.
3. Software Project Management in practice, Pankaj Jalote, Pearson

### REFERENCE BOOKS:

1. Software Project Management, Joel Henry, Pearson Education

| SEMESTER-IV | L | P | C |
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| **19MC4E06**: **DESIGN AND ANALYSIS OF ALGORITHMS** | | | |

**Course Objectives**: The course content enables students to:

1. Know asymptotic runtime complexity of algorithms including formulating recurrence relations using divide and conquer process.
2. Understand and design algorithms using greedy strategy and dynamic programming, to arrive at local best solution.
3. Understand and design of algorithms using search space and optimization problem techniques for finding globally best solution.
4. Identify basic computability concepts and the complexity classes like P, NP, and NP-Complete and Relate real world problems to abstract mathematical problems.

**Course Outcomes**: At the end of the course students are able to:

1. Analyze the asymptotic runtime complexity of algorithms for real world problems developed using different algorithmic methods.
2. Find the optimal solutions by using advanced design and analysis of algorithm techniques like greedy method and dynamic programming.
3. Apply the search space and optimization problem techniques like backtracking and branch and bound method to solve problems optimally where advanced algorithm design techniques fail to find solution.
4. Distinguish the problems and its complexity as polynomial and NP problems and can formulate some real world problems to abstract mathematical problems.

**UNIT-I**

**Introduction**: Algorithm, Psuedo code for expressing algorithms, performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little oh notation, Probabilistic Analysis. Disjoint Sets - disjoint set operations, union and find algorithms, spanning trees, connected components and bi-connected components

**UNIT-II**

**Divide and Conquer**: General method, applications-Binary search, Quick sort, Merge sort, Strassen's

matrix multiplication. Greedy method: General method, applications-Job sequencing with deadlines, 0/1 knapsack problem, Minimum cost spanning trees, Single source shortest path problem.

## UNIT-III

**Dynamic Programming**: General method, applications-Matrix chain multiplication, Optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, Travelling sales person problem, Reliability design.

## UNIT-IV

**Backtracking**: General method, applications-n-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles.

## UNIT-V

**Branch and Bound:** General method, applications - Travelling sales person problem,0/1 knapsack problem- LC Branch and Bound solution, FIFO Branch and Bound solution. NP-Hard and NP-Complete problems: Basic concepts, non-deterministic algorithms, NP - Hard and NP Complete classes, Cook's theorem

## TEXT BOOKS:

1. Fundamentals of Computer Algorithms, Ellis Horowitz, SatrajSahni and Rajasekharam, Universities Press.
2. The Algorithm Design Manual, 2nd edition, Steven S. Skiena, Springer.
3. Introduction to Algorithms, second edition, T.H.Cormen, C.E.Leiserson, R.L.Rivest and C.Stein, PHI Pvt. Ltd.

## REFERENCE BOOKS:

1. Introduction to the Design and Analysis of Algorithms, AnanyLevitin, PEA
2. Design and Analysis of Algorithms, ParagHimanshu Dave, Himansu B Alachandra Dave, Pearson Education.
3. Introduction to Design and Analysis of Algorithms A strategic approach, R.C.T. Lee, S.S.Tseng, R.C.Chang and T.Tsai, McGraw Hill.
4. Design and Analysis of algorithms, Aho, Ullman and Hopcroft, Pearson education

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| | **19MC4E07**: **EMBEDDED SYSTEMS** | | |

**UNIT-I:**

**Introduction to Embedded systems:** What is an embedded system Vs. General computing system, history, classification, major application areas, and purpose of embedded systems. Core of embedded system, memory, sensors and actuators, communication interface, embedded firmware, other system components, PCB and passive components.

**UNIT-II:**

**8—bit microcontrollers architecture:** Characteristics, quality attributes application specific, domain specific, embedded systems. Factors to be considered in selecting a controller, 8051 architecture, memory organization, registers, oscillator unit, ports, source current, sinking current, design examples.

**UNIT-III:**

RTOS and Scheduling, Operating basics, types, RTOS, tasks, process and threads, multiprocessing and multitasking, types of multitasking, non preemptive, preemptive scheduling.

**UNIT-IV:**

Task communication of RTOS, Shared memory, pipes, memory mapped objects, message passing, message queue, mailbox, signaling, RPC and sockets, task communication/synchronization issues, racing, deadlock, live lock, the dining philosopher's problem.

**UNIT-V:**

The producer-consumer problem, Reader writers problem, Priority Inversion, Priority ceiling, Task Synchronization techniques, busy waiting, sleep and wakery, semaphore, mutex, critical section objects, events, device, device drivers, how to clause an RTOS, Integration and testing of embedded hardware and fire ware.

Simulators, emulators, Debuggers, Embedded Product Development life cycle (EDLC), Trends in embedded Industry, Introduction to ARM family of processor.

**TEXT BOOK:**

1. Introduction to embedded systems Shibu. K.V, TMH, 2009.

**REFERENCE BOOKS:**

1. Ayala & Gadre: The 8051 Microcontroller & Embedded Systems using Assembly and CENGAGE

2. Embedded Systems, Rajkamal, TMH, 2009.

3. Embedded Software Primer, David Simon, Pearson.

4. The 8051 Microcontroller and Embedded Systems, Mazidi, Mazidi, Pearson

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| | **19MC4E08**: **ANIMATION AND GAMMING** | | |

**Course Objectives:**

1. Students should understand basic concepts of Animation.  They should learns concepts of Flash software

2. Know about how to develop storyboard layout

3. Learn Animation Development Techniques

**Course Outcomes: Students are able to**

1. Analyze types and techniques of Animation

2. Develop Animation using Flash Tool

3. Develop Storyboard layout

4. Construction of Frames and with Time based motion

5. Develop a Pinball Game

**UNIT-I**

What is mean by Animation – Uses of Animation – History of Animation – Uses of Animation – Types of Animation – Principles of Animation – Some Techniques of Animation – Animation on the WEB – 3D Animation – Special Effects - Creating Animation.

**UNIT-II**

Creating Animation in Flash: Introduction to Flash Animation – Introduction to Flash – Working with the Timeline and Frame-based Animation -Working with the Timeline and Tween-based Animation – Understanding Layers

**UNIT-III**

Concept Development – Story Developing – Audio & Video – Color Model – Device Independent Color Model – Gamma and Gamma Correction Production Budgets - 3D Animated Movies.

**UNIT –IV**

Animation: The Animation Loop, Calculating Frame Rates, Scheduling Tasks at Alternate Frame Rates, Restoring the Background, Double Buffering, Time – Based Motion, Scrolling the Background, Parallax, User Gestures, Timed Animations, Animation Best Practices

**UNIT –V**

A Game Engine , The Game Loop, Loading Images, Multitask Sound, Keyboard Events, High Scores, The Game Engine Listing, The Ungame, A Pinball Game

**TEXT BOOKS:**

1.  PRINCIPLES OF MULTIMEDIA – Ranjan Parekh, 2007, TMH. (Unit I, Unit III)
2.  Multimedia Technologies – Ashok Banerji, Ananda Mohan Ghosh – McGraw Hill Publication. (Unit II: Chapter 10)
3.  Core HTML5 CANVAS, Graphics, Animation and Game Development, David Geary, PEARSON ( Unit IV, Unit V)

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| **19MC4L01**: **FULL STACK TECHNOLOGIES LAB** | | | |

**Course Objectives:**

From the course the student will

1. Learn the core concepts of both the frontend and backend programming course.
2. Get familiar with the latest web development technologies.
3. Learn all about SQL and Mongo databases.
4. Learn complete web development process.

**Course Outcomes(COs)**: At the end of the course, student will be able to

1. Identify the Basic Concepts of Web & Markup Languages
2. Develop web Applications using Scripting Languages & Frameworks
3. Creating & Running Applications using JSP libraries
4. Creating Our First Controller Working with and Displaying in Angular Js and Nested Forms with ng-form
5. Working with the Files in React JS and Constructing Elements with Data

## List of Experiments:

1. Implementation of 'get' and 'post' methods.

2. CSS implementation in colors, boarder padding.

3. CSS3 implementation button frames tables, navigation bars.

4. Create registration and login forms with validations using Jscript query.

5. Jscript to retrieve student information from student database using database connectivity.

6. Angular Js data binding

7. Angular JS directives and Events

8. Using angular Js fetching data from MySQL.

9. Using React Js creating constructs data elements.

10. Using React Js implementations DoM

11. Invoking data using Jscript from Mongo DB.

12. Create an Online fee payment form using JSCript and MangoDB

## Reference/ Preferred Text Books:

1. Jeffrey C. Jackson, "Web Technologies--A Computer Science Perspective", Pearson Education, 2006

2. Robert. W. Sebesta, "Programming the World Wide Web", Fourth Edition, Pearson Education, 2007

3. Angular JS: Up and Running Enhanced Productivity with Structured Web Apps By Brad Green, Shyam Seshadri Publisher: O'Reilly Media

4. Learning React Functional Web Development with React and Redux By Alex Banks, Eve Porcello Publisher: O'Reilly Media

5. Head First Java, 2nd Edition by Bert Bates, Kathy Sierra Publisher: O'Reilly Media, Inc

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| **19MC4L02**: **DATA WAREHOUSING AND MINING WITH R LAB** | | | |

**Course Objectives**:

1. Provide the students with practice on applying data mining solutions using common data mining software tools (e.g. WEKA, R , Data Miner,...)
2. Prepare students to work with data preprocessing techniques.
3. Prepare students to work with data classification techniques.
4. Prepare students to work with data clustering techniques.

1. Familiar with a data mining software (WEKA, R) and use it for solving data mining problems
2. Can apply association, classification, clustering algorithms on popular data sets.
1. Demonstration of preprocessing on dataset student.arff
2. Demonstration of preprocessing on dataset labor.arff
3. Demonstration of Association rule process on dataset contactlenses. arff using apriori algorithm
4. Demonstration of Association rule process on dataset test.arff using apriori algorithm
5. Demonstration of classification rule process on dataset student.arff using j48 algorithm
6. Demonstration of classification rule process on dataset employee.arff using j48 algorithm
7. Demonstration of classification rule process on dataset employee.arff using id3 algorithm
8. Demonstration of classification rule process on dataset employee.arff using naïve bayes algorithm
9. Demonstration of clustering rule process on dataset iris.arff using simple k-means
10. Demonstration of clustering rule process on dataset student.arff using simple k-means

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| | **19MC4L03**: **SOFT SKILLS LAB** | | |

**Objectives:**

- To encourage the all-round development of students by focusing on soft skills

- To make students aware about the importance, the role and the content of soft skills through instruction, knowledge acquisition and practice

| 1 | Interpersonal skills and Relationships | 1 |
|---|---|---|
| 2 | Presentation Skills | 1 |
| 3 | Planning & Stress Management | 1 |
| 4 | Leadership & Facilitation | 1 |
| 5 | Conflict Management and Decision Making | 1 |
| 6 | The art of Negotiation | 1 |
| 7 | Language skills LSRW | 2 |
| 8 | Communication Skills | 4 |
| 9 | Learning Skills : Critical Thinking- Creative Thinking – Communicating- Collaborating | 3 |
| | Total | 15 |

**References for students for their self-study**:

1. You can win by Shiv Khera :Macmillan books

2. The 7 habits of Highly effective people – Stephen Covey

3. Sure Success in Interviews

4. Web resources

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| | **19MC5T01**: **BIG DATA ANALYTICS** | | |

**Course Objectives:**

1. Optimize business decisions and create competitive advantage with Big Data analytics

2. Introducing Java concepts required for developing map reduce programs

3. Derive business benefit from unstructured data

4. Imparting the architectural concepts of Hadoop and introducing map reduce paradigm

5. To introduce programming tools PIG & HIVE in Hadoop echo system.

**Course Outcomes:**

1. Preparing for data summarization, query, and analysis.

2. Applying data modeling techniques to large data sets

3. Creating applications for Big Data analytics

4. Building a complete business data analytic solution

**UNIT-I**

Data structures in Java: Linked List, Stacks, Queues, Sets, Maps; Generics: Generic classes and Type parameters, Implementing Generic Types, Generic Methods, Wrapper Classes, Concept of Serialization

**UNIT-II**

Working with Big Data: Google File System, Hadoop Distributed File System (HDFS) – Building blocks of Hadoop (Name node, Data node, Secondary Name node, Job Tracker, Task Tracker), Introducing and Configuring Hadoop cluster (Local, Pseudo-distributed mode, Fully Distributed mode), Configuring XML files.

**UNIT-III**

Writing Map Reduce Programs: A Weather Dataset, Understanding Hadoop API for Map Reduce Framework (Old and New), Basic programs of Hadoop Map Reduce: Driver code, Mapper code, Reducer code, Record Reader, Combiner, Partitioner.

**UNIT - IV**

Hadoop I/O: The Writable Interface, Writable Comparable and comparators, Writable       Classes: Writable wrappers for Java primitives, Text, Bytes Writable, Null Writable,        Object     Writable    and Generic Writable, Writable collections, Implementing a Custom  Writable:      Implementing    a    Raw Comparator for speed, Custom comparators

**UNIT – V**

Pig: Hadoop Programming Made Easier

Admiring the Pig Architecture, Going with the Pig Latin Application Flow, Working       through the ABCs of Pig Latin, Evaluating Local and Distributed Modes of Running        Pig    Scripts,   Checking out the Pig Script Interfaces, Scripting with Pig Latin Applying   Structure  to  Hadoop  Data  with  Hive: Saying Hello to Hive, Seeing How the Hive is   Put  Together,  Getting  Started  with  Apache  Hive, Examining the Hive Clients,       Working with   Hive Data Types, Creating and Managing Databases and Tables, Seeing How the Hive    Data Manipulation Language Works, Querying and Analyzing    Data

**TEXT BOOKS:**

1. Big Java 4th Edition, Cay Horstmann, Wiley John Wiley & Sons, INC
2. Hadoop: The Definitive Guide by Tom White, 3rd Edition, O'reilly
3. Hadoop in Action by Chuck Lam, MANNING Publ.
4. Hadoop for Dummies by Dirk deRoos, Paul C.Zikopoulos, Roman B.Melnyk,Bruce Brown, Rafael

**Reference Books:**

1. Hadoop in Practice by Alex Holmes, MANNING Publ.
2. Hadoop Map Reduce Cookbook, Srinath Perera, Thilina Gunarathne

**Software Links:**

1. Hadoop:http://hadoop.apache.org/
2. Hive: https://cwiki.apache.org/confluence/display/Hive/Home
3. **Piglatin:** http://pig.apache.org/docs/r0.7.0/tutorial.html

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| | **19MC5T02**: **MOBILE APPLICATION DEVELOPMENT** | | |

**Course Objective:**

1. To make the student understand the concept of mobile computing paradigm, its novel applications and limitations.
2. To understand the typical mobile networking infrastructure through a popular GSM protocol
3. To understand the issues and solutions of various layers of mobile networks, namely MAC layer, Network Layer & Transport Layer
4. To understand the database issues in mobile environments & data delivery models.
5. To understand the ad hoc networks and related concepts.
6. To understand the platforms and protocols used in mobile environment.

**Course Outcomes:**

1. Able to think and develop new mobile application.
2. Able to take any new technical issue related to this new paradigm and come up with a solution(s).
3. Able to develop new ad hoc network applications and/or algorithms/protocols.
4. Able to understand & develop any existing or new protocol related to mobile environment

**UNIT - I**

**Introduction:** Mobile Communications, Mobile Computing – Paradigm, Promises/Novel Applications and Impediments and Architecture; Mobile and Handheld Devices, Limitations of Mobile and Handheld Devices.

GSM – Services, System Architecture, Radio Interfaces, Protocols, Localization, Calling, Handover, Security, New Data Services, GPRS.

**UNIT - II**

**(Wireless) Medium Access Control (MAC):** Motivation for a specialized MAC (Hidden and

exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA, Wireless LAN/(IEEE 802.11)

## UNIT-III

**Mobile Network Layer:** IP and Mobile IP Network Layers, Packet Delivery and Handover Management, Location Management, Registration, Tunneling and Encapsulation, Route Optimization, DHCP

**Mobile Transport Layer:** Conventional TCP/IP Protocols, Indirect TCP, Snooping TCP, Mobile TCP

## UNIT - IV

**Database Issues:** Database Hoarding & Caching Techniques, Client-Server Computing & Adaptation, Transactional Models, Query processing, Data Recovery Process &QoS Issues.

**Data Dissemination and Synchronization:** Communications Asymmetry, Classification of Data Delivery Mechanisms, Data Dissemination, Broadcast Models, Selective Tuning and Indexing Methods, Data Synchronization – Introduction, Software, and Protocols.

## UNIT- V

**Mobile Ad hoc Networks (MANETs) :** Introduction, Applications & Challenges of a MANET, Routing, Classification of Routing Algorithms, Algorithms such as DSR, AODV, DSDV, etc. , Mobile Agents, Service Discovery.

**Protocols and Platforms for Mobile Computing:**WAP, Bluetooth, XML, J2ME, JavaCard, PalmOS, Windows CE, SymbianOS, Linux for Mobile Devices,Android.

**Text Books:**
1. Jochen Schiller, "Mobile Communications", Addison-Wesley, Second Edition, 2009.
2. Raj Kamal, "Mobile Computing", Oxford University Press, 2007, ISBN: 0195686772

**References:**
1. ASOKE K TALUKDER, HASAN AHMED, ROOPA R YAVAGAL, "Mobile Computing, Technology Applications and Service Creation" Second Edition, McGraw Hill.
2. UWE Hansmann, LotherMerk, Martin S. Nocklous, Thomas Stober, "Principles of Mobile Computing," Second Edition, Springer.

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| | **19MC5T03**: **MACHINE LEARNING** | | |

**Course objectives**

The main objective of this course is for the students to achieve basic knowledge of artificial intelligence, a deepened technical understanding of machine learning research and theories, as well as practical experience of the use and design of machine learning and data mining algorithms for applications and experiments. The course has a strong focus towards applied IT. The student not only learns how to critically review and compare different algorithms and methods, but how to plan, design, and implement learning components and applications and how to conduct machine learning experiments.

**Course outcomes**

1. The student will be able evaluate and compare the performance or, other qualities, of algorithms for typical learning problems.
2. The student will be able to design a supervised or unsupervised learning system.
   Syllabus

**UNIT I: Introduction :** Well-posed learning problems, Designing a learning system, Perspectives and issues in machine learning. Concept learning and the general to specific ordering – Introduction, A concept learning task, Concept learning as search, Find- S: finding a maximally specific hypothesis, Version spaces and the candidate elimination algorithm, Remarks on version spaces and candidate elimination, Inductive bias.

**UNIT II:** Linear Regression & Logistic Regression: Predicting numeric values: regression – Finding the best fit lines with linear regression, Locally weighted linear regression, Shrinking Coefficients, The bias / Variance tradeoff. Logistic Regression: Classification with logistic regression and the sigmoid function, Using optimization to find the best regression coefficients.

**UNIT III:** Artificial Neural Networks: Introduction, Neural network representation, Appropriate problems for neural network learning, Perceptions, Multilayer networks and the back propagation

algorithm, Remarks on the back propagation algorithm, An illustrative example face recognition, Advanced topics in artificial neural networks.

**UNIT IV:** Evaluation Hypotheses: Motivation, Estimation hypothesis accuracy, Basics of sampling theory, A general approach for deriving confidence intervals, Difference in error of two hypotheses, Comparing learning algorithms.

**UNIT V:** Support vector machines & Dimensionality Reduction techniques: Separating data with the maximum margin, finding the maximum margin, efficient optimization with SMO algorithm, speeding up optimization with full platt SMO, Using Kernels for more Complex data. Dimensionality Reduction techniques: Principal Component analysis, Example.

**UNIT VI:** Instance-Based Learning- Introduction, k -Nearest Neighbor Learning, Locally Weighted Regression, Radial Basis Functions, Case-Based Reasoning, Remarks
On Lazy and Eager Learning.
**Genetic Algorithms:** Representing Hypotheses, Genetic Operators, Fitness Function and Selection, Illustrative Example.

### TEXT BOOKS
1. Machine Learning ,Tom M. Mitchell, MGH
2. Machine Learning in Action, Peter Harington, 2012, Cengage.`

### REFERENCE BOOKS
1. Introduction to Machine Learning, Ethem Alpaydin, PHI, 200

**ELECTIVE-III**

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| | **19MC5E09: CYBER SECURITY** | | |

### UNIT- I: Introduction to Cybercrime:

Introduction, Cybercrime: Definition and Origins of the Word, Cybercrime and Information Security, Who are Cybercriminals? , Classifications of Cybercrimes, Cybercrime: The Legal Perspectives, Cybercrimes: An Indian Perspective, Cybercrime and the Indian ITA 2000, A Global Perspective on Cybercrimes, Cybercrime Era: Survival Mantra for the Netizens

### UNIT -II: Cyber offenses:

How Criminals Plan Them –Introduction, How Criminals Plan the Attacks, Social Engineering, Cyber stalking, Cyber cafe and Cybercrimes, Botnets: The Fuel for Cybercrime, Attack Vector Cloud Computing.

### UNIT -III: Cybercrime Mobile and Wireless Devices:

Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit Card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication Service Security, Attacks on Mobile/Cell Phones, Mobile Devices: Security Implications for Organizations, Organizational Measures for Handling Mobile, Organizational Security Policies and Measures in Mobile Computing Era, Laptops.

### UNIT -IV: Tools and Methods Used in Cybercrime:

Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Key loggers and Spywares, Virus and Worms, Trojan Horses and Backdoors, Steganography, DoS and DDoS Attacks, SQL Injection, Buffer Overflow, Attacks on Wireless Networks, Phishing and Identity Theft: Introduction, Phishing, Identity Theft (ID Theft)

### UNIT -V: Cybercrimes and Cyber security:

Why Do We Need Cyber laws: The Indian Context, The Indian IT Act, Challenges to Indian Law

and Cybercrime Scenario in India, Consequences of Not Addressing the Weakness in Information Technology Act, Digital Signatures and the Indian IT Act, Information Security Planning and Governance, Information Security Policy Standards, Practices, The information Security Blueprint, Security education, Training and awareness program, Continuing Strategies.

**TEXT BOOKS**:

1. Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Nina Godbole, Sunit Belapure, Wiley.
2. Principles of Information Security, Micheal E.Whitman and Herbert J.Mattord, Cengage Learning.

**REFERENCES:**

1. Information Security, Mark Rhodes, Ousley, MGH.

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| | **19MC5E10: UNIX PROGRAMMING** | | |

**Course Objectives**

1. Understand the evolution of UNIX operating system.

2. Develop programs using commands and shell scripts.

3. Know the various methods to share information using system calls and IPC mechanism.

**Course Outcomes**

1. To learn and practice internal and external commands with examples.

2. Automate tasks using shell scripts andAbility to work with system calls.

3. Develop application programs (API) using IPC mechanisms.

**Unit - I**

History of UNIX operating system, structure of Unix, features of Unix, Unix file system, internal structure of file system, internal and external commands, directory commands, File Processing Commands.

**Unit - II**

Protection and security commands, communication commands, information processing commands, process management commands, I/O redirection.

Shell programming: shell variables, positional parameters, decision control structures, loop control structures, set statement, shift statement, command grouping.

**Unit – III**

File and directory maintenance: file access functions-open, crate, read, write, close, file control functions-fcntl, lseek, stat, lstat, fstat, dup, ioctal, directory maintenance-chmod, chown, link, unlink, symlink, mkdir, rmdir, chdir,getcwd.

Process: process structure, fork(), wait(), vfork(), orphan process, zombie process, waitpid(), getpid(), getppid().

**Unit - IV**

Memory management, file and record locking, signals-signal(), kill(), raise(), alaram(), pause(), sleep(), abort(), inter process communication-communication among unix processes, pipes, named pipes.

**Unit - V**

**Message queues**: message structure, creating a message queue, writing message onto message queue, reading messages from message queue, controlling message queue operations.

**Shared memory**: allocating a shared memory segment, attaching and detaching a shared memory segment, placing data in a shared memory, destroying a shared memory segment.

**Semaphores**: creating a semaphore set, setting and getting semaphore values, using semaphore for mutual exclusion.

**Text Books:**

1. Unix Programming the first drive- Kumar Saurabh

2. UNIX concepts and applications-Sumitahba Das, TMH, 3/E.

**Reference Books:**

1. Introduction to unix and shell programming – M.G. VenkateshMurthy

2. Unix and shell programming- N B Venkateswaralu.

3. Unix and shell programming- Stephen G kochan, Patrick wood, Pearson,3/E.

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| **19MC5E11**: **E-Commerce** | | | |

**Course Objectives:**

1.  Identify the major categories and trends of e-commerce applications.
2.  Identify the essential processes of an e-commerce system.
3.  Identify several factors and web store requirements needed to succeed in e-commerce.
4.  Discuss the benefits and trade-offs of various e-commerce clicks and bricks alternatives.
5.  Understand the main technologies behind e-commerce systems and how these technologies interact.
6.  Discuss the various marketing strategies for an online business.
7.  Define various electronic payment types and associated security risks and the ways to protect against them.

**Course Outcomes:**

1.  Ability to understand E-Commerce framework, consumer oriented electronic commerce and mercantile process models.
2.  Ability to distinguish different electronic payment and their issues
3.  Ability to demonstrate Inter-organizational and intra-organizational electronic commerce.
4.  Ability to explain corporate digital library, advertising and marketing on the Internet
5.  Understand consumer search and resource discovery and key multimedia concepts.

**UNIT-I**

Electronic Commerce, Frame Work, Anatomy of E-Commerce Applications, E-Commerce Consumer Applications, E-Commerce organization applications. Consumer Oriented Electronic Commerce, Mercantile Process Models.

**UNIT- II**

Electronic Payment Systems - Digital Token-Based, Smart Cards, Credit Cards, Risks in Electronic Payment systems. Designing Electronic Payment Systems.

**UNIT-III**

Inter Organizational Commerce - EDI, EDI Implementation, Value added networks. Intra

Organizational Commerce - work Flow, Automation Customization and internal Commerce, Supply chain Management.

**UNIT- IV**

Corporate Digital Library -Document Library, digital Document types, corporate Data Warehouses. Advertising and Marketing, Information based marketing, Advertising on Internet, on-line marketing process, market research.

**UNIT- V**

Consumer Search and Resource Discovery, Information Search and Retrieval, Commerce Catalogues, Information Filtering. Multimedia -key multimedia concepts, Digital Video and electronic Commerce, Desktop Video Processing, Desktop video conferencing.

**TEXT BOOK:**

1. Frontiers of Electronic Commerce, Kalakata, Whinston, PEA, 2006.

**REFERENCE BOOKS:**

1. E-Commerce Fundamentals and Applications Hendry Chan, Raymond Lee, Dillon, hang, John Wiley.
2. E-Commerce, A Managerial Perspective, Turban E, Lee J, King, Chung H.M., PEA, 2001.
3. E-Commerce An Indian Perspective, 3/e, P.T. Joseph, PHI, 2009.
4. E-Commerce, S.Jaiswal, Galgotia.
5. Electronic Commerce, Gary P.Schneider, Thomson.

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| | **19MC5E12**: **DEEP LEARNING** | | |

**Course Objectives:**

1. Identify problems that are amenable to solution by AI methods, and which AI methods may be suited to solving a given problem.

2. Analyze a given problem in the language/framework of different AI methods (e.g., as a search problem, as a constraint satisfaction problem, as a planning problem, as a Markov decision process, etc).

3. Implement basic AI algorithms (e.g., standard search algorithms or dynamic programming).

4. Design and carry out an empirical evaluation of different algorithms on problem formalization, and state the conclusions that the evaluation supports.

**Course Outcomes:**

After the completion of the course, student will be able to

1. Explain the definition and usage of the term 'the internet of things' in different contexts.

2. Demonstrate on various network protocols used in IoT.

3. Analyze on various key wireless technologies used in IoT systems, such as WiFi, 6LoWPAN, Bluetooth and ZigBee.

4. Illustrate on the role of big data, cloud computing and data analytics in IoT system.

5. Design a simple IoT system made up of sensors, wireless network connection, data analytics and display/actuators, and write the necessary control software.

**Unit-I: Introduction-**Towards Intelligent Machines, Well posed Problems, Example of Applications in diverse fields, Data Representation, Domain Knowledge for Productive use of Machine Learning, Diversity of Data: Structured / Unstructured,

Forms of Learning, Machine Learning and Data Mining, Basic Linear Algebra in Machine Learning Techniques.

**Unit-II: Supervised Learning-** Rationale and Basics: Learning from Observations, Bias and Why Learning Works: Computational Learning Theory, Occam's Razor Principle and Over fitting Avoidance Heuristic Search in inductive Learning, Estimating Generalization Errors, Metrics for assessing regression, Metris for assessing classification.

**Unit-III: Statistical Learning-** Machine Learning and Inferential Statistical Analysis, Descriptive Statistics in learning techniques, Bayesian Reasoning: A probabilistic approach to inference, K-Nearest Neighbor Classifier. Discriminant functions and regression functions, Linear Regression with Least Square Error Criterion, Logistic Regression for Classification Tasks, Fisher's Linear Discriminant and Thresholding for Classification, Minimum Description Length Principle.

**Unit-IV: Support Vector Machines (SVM)-** Introduction, Linear Discriminant Functions for Binary Classification, Perceptron Algorithm, Large Margin Classifier for linearly seperable data, Linear Soft Margin Classifier for Overlapping Classes, Kernel Induced Feature Spaces, Nonlinear Classifier, Regression by Support vector Machines.

**Learning with Neural Networks:** Towards Cognitive Machine, Neuron Models, Network Architectures, Perceptrons, Linear neuron and the Widrow-Hoff Learning Rule, The error correction delta rule.

**Unit -V:** Multilayer Perceptron Networks and error back propagation algorithm, Radial Basis Functions Networks. **Decision Tree Learning**: Introduction, Example of classification decision tree, measures of impurity for evaluating splits in decision trees, ID3, C4.5, and CART decision trees, pruning the tree, strengths and weakness of decision tree approach.

## Textbooks:

1. Applied Machine Learning, M. Gopal, McGraw Hill Education
2. Machine Learning: A Probabilistic Perspective, Kevin Murphy, MIT Press,2012
3. The Elements of Statistical Learning, Trevor Hastie, Robert Tibshirani, Jerome Friedman, Springer 2009 (freely available online)

## Reference Books:

1. Pattern Recognition and Machine Learning, Christopher Bishop, Springer,2007
2. Programming Collective Intelligence: Building Smart Web 2.0 Applications - Toby Segaran
3. Building Machine Learning Systems with Python - WilliRichert, Luis Pedro Coelho

## ELECTIVE IV

| SEMESTER-V | L | P | C |
|---|---|---|---|
| | 3 | - | 3 |
| **16MC5TE6: INTERNET OF THINGS** | | | |

**Course Objectives:**

1. To introduce the terminology, technology and its applications
2. To introduce the concept of M2M (machine to machine) with necessary protocols
3. To introduce the Python Scripting Language which is used in many IoT devices
4. To introduce the Raspberry PI platform, that is widely used in IoT applications
5. To introduce the implementation of web based services on IoT devices.

### UNIT- I

**Introduction to Internet of Things** –Definition and Characteristics of IoT, Physical Design of IoT – IoT Protocols, IoT communication models, Iot Communication APIs IoT enabaled Technologies – Wireless Sensor Networks, Cloud Computing, Big data analytics, Communication protocols, Embedded Systems, IoT Levels and Templates Domain Specific IoTs – Home, City, Environment, Energy, Retail, Logistics, Agriculture,Industry, health and Lifestyle

### UNIT- II

IoT and M2M – Software defined networks, network function virtualization, difference between SDN and NFV for IoT

Basics of IoT System Management with NETCOZF, YANG- NETCONF, YANG, SNMP NETOPEER

### UNIT - III

Introduction to Python - Language features of Python, Data types, data structures, Controlof flow, functions, modules, packaging, file handling, data/time operations, classes,

Exception handling Python packages - JSON, XML, HTTPLib, URLLib, SMTPLib.

**UNIT - IV**

IoT Physical Devices and Endpoints - Introduction to Raspberry PI-Interfaces (serial, SPI, I2C)

Programming – Python program with Raspberry PI with focus of interfacing external gadgets, controlling output, reading input from pins.

**UNIT -V**

IoT Physical Servers and Cloud Offerings – Introduction to Cloud Storage models and communication APIs, Webserver – Web server for IoT, Cloud for IoT, Python web application frameworkDesigning a RESTful web API

**TEXT BOOKS:**

1. Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD),2014, ISBN 9789350239759

## ELECTIVE IV

| SEMESTER-V | L | P | C |
|---|---|---|---|
| | 3 | - | 3 |
| **16MC5TE7: DEV OPS** | | | |

**Objectives:**

DevOps improves collaboration and productivity by automating infrastructure and workflows and continuously measuring applications performance

**Course Outcomes(COs)**: At the end of the course, student will be able to

1. Understand the principles of continuous development and deployment, automation of configuration management, inter-team collaboration, and IT service agility

2. Describe DevOps & DevSecOps methodologies and their key concepts

3. Explain the types of version control systems, continuous integration tools, continuous monitoring tools, and cloud models

4. Set up complete private infrastructure using version control systems and CI/CD tools

**UNIT I:**

Phases of Software Development life cycle. Values and principles of agile software development.

**UNIT II:**

Fundamentals of DevOps: Architecture, Deployments, Orchestration, Need, Instance of applications, DevOps delivery pipeline, DevOps eco system.

**UNIT III:**

DevOps adoption in projects: Technology aspects, Agiling capabilities, Tool stack implementation, People aspect, processes

**UNIT IV:**

CI/CD: Introduction to Continuous Integration, Continuous Delivery and Deployment , Benefits of CI/CD, Metrics to track CICD practices

**UNIT V:**

Devops Maturity Model: Key factors of DevOps maturity model, stages of Devops maturity model, DevOps maturity Assessment

**Text Books:**

1. The DevOPS Handbook: How to Create World-Class Agility, Reliability, and Security in Technology Organizations by Gene Kim , John Willis , Patrick Debois , Jez Humb,O'Reilly publications

2. What is Devops? Infrastructure as code By in Mike Loukides ,O'Reilly publications.

3. continuous delivery: Reliable software releasesThrough Build, Test, and Deployment Automation, by Jez Humble andDavid Farley

4. Achieving DevOps: A Novel About Delivering the Best of Agile, DevOps, and Microservices by Dave Harrison, Knox Lively

**Reference Books:**

1. Building a DevOps Culture by Mandi Walls, O'Reilly publications

    2. The DevOps 2.0 Toolkit: Automating the Continuous Deployment Pipeline With Containerized Microservices by Viktor Farcic

| SEMESTER-V | L | P | C |
|---|---|---|---|
| | 3 | - | 3 |
| | **19MC5E15: CLOUD COMPUTING** | | |

**Course Objectives**:

The student will learn about the cloud environment, building software systems and components that scale to millions of users in modern internet, cloud concepts capabilities across the various cloud service models including Iaas,Paas,Saas, and developing cloud based software applications on top of cloud platforms.

## UNIT – I

**Introduction:** Network centric computing, Network centric content, peer-to –peer systems, cloud computing delivery models and services, Ethical issues, Vulnerabilities, Major challenges for cloud computing

**Parallel and Distributed Systems:** introduction, architecture, distributed systems, communication protocols, logical clocks, message delivery rules, concurrency, model concurrency with Petri Nets.

## UNIT–II

**Cloud Infrastructure:** At Amazon, The Google Perspective, Microsoft Windows Azure, Open Source Software Platforms, Cloud storage diversity, Inter cloud, energy use and ecological impact, responsibility sharing, user experience, Software licensing

**Cloud Computing :** Applications and Paradigms: Challenges for cloud, existing cloud applications and new opportunities, architectural styles, workflows, The Zookeeper, The Map Reduce Program model, HPC on cloud, biological research.

## UNIT – III

**Cloud Resource virtualization:** Virtualization, layering and virtualization, virtual machine monitors, virtual machines, virtualization- full and para, performance and security isolation, hardware support for virtualization, Case Study: Xen, vBlades.

**Cloud Resource Management and Scheduling**: Policies and Mechanisms, Applications of control theory to task scheduling, Stability of a two-level resource allocation architecture, feed back control based on dynamic thresholds, coordination, resource bundling, scheduling algorithms, fair queuing, start time fair queuing, cloud scheduling subject to deadlines, Scheduling Map Reduce applications, Resource management and dynamic application scaling

## UNIT IV

**Storage Systems:** Evolution of storage technology, storage models, file systems and database, distributed file systems, general parallel file systems. Google file system. Apache Hadoop, Big Table, Megastore (text book 1), Amazon Simple Storage Service(S3) (Text book 2)

**Cloud Security:** Cloud security risks, security – atop concern for cloud users, privacy and privacy impact assessment, trust, OS security, Virtual machine security, Security risks

## UNIT–V

**Cloud Application Development:** Amazon Web Services : EC2 – instances, connecting clients, security rules, launching, usage of S3 in Java, Installing Simple Notification Service on Ubuntu 10.04, Installing Hadoop on Eclipse, Cloud based simulation of a Distributed trust algorithm, Cloud service for adaptive data streaming ( Text Book 1)

**Google:** Google App Engine, Google Web Toolkit (Text Book 2)

**Microsoft:** Azure Services Platform, Windows live, Exchange Online, Share Point Services, Microsoft Dynamics CRM (Text Book 2)

### TEXT BOOKS:

1. Cloud Computing, Theory and Practice, Dan C Marinescu, MK Elsevier.

2. Cloud Computing, A Practical Approach, Anthony T Velte, Toby J Velte, RobertElsenpeter, TMH

### REFERENCE BOOKS:

1. Mastering Cloud Computing, Foundations and Application Programming, Raj Kumar Buyya, Christen vecctiola, S Tammarai selvi, TMH.

| SEMESTER-V | L | P | C |
|---|---|---|---|
| | 3 | - | 3 |
| | **19MC5E16: NETWORK PROGRAMMING** | | |

**UNIT-I**

Introduction to Network Programming: OSI model, Unix standards, TCP and UDP & TCP connection establishment and Format, Buffer sizes and limitation, standard internet services, Protocol usage by common internet application.

**UNIT-II**

Sockets : Address structures, value – result arguments, Byte ordering and manipulation function and related functions Elementary TCP sockets – Socket, connect, bind, listen, accept, fork and exec function, concurrent servers. Close function and related function.

**UNIT-III**

TCP client server : Introduction, TCP Echo server functions, Normal startup, terminate and signal handling server process termination, Crashing and Rebooting of server host shutdown of server host.I/O Multiplexing and socket options: I/O Models, select function, Batch input, shutdown function, poll function, TCP Echo server, getsockopt and setsockopt functions. Socket states, Generic socket option IPV6 socket option ICMPV6 socket option IPV6 socket option and TCP socket options.

**UNIT-IV**

Elementary UDP sockets: Introduction UDP Echo server function, lost datagram, summary of UDP example, Lack of flow control with UDP, determining outgoing interface with UDP. Elementary name and Address conversions: DNS, gethost by Name function, Resolver option, Function and IPV6 support, uname function, other networking information.

**UNIT-V**

IPC : Introduction, File and record locking, Pipes, FIFOs streams and messages, Name spaces, system IPC, Message queues, Semaphores. Remote Login: Terminal line disciplines, Pseudo-Terminals, Terminal modes, Control Terminals, rlogin Overview, RPC Transparency Issues.

**TEXT BOOKS**:

1. UNIX Network Programming, Vol. I, Sockets API, 2nd Edition. – W.Richard Stevens, Pearson Ed. Asia.
2. UNIX Network Programming, 1st Edition, – W.Richard Stevens. PHI

**REFERENCES:**

1. UNIX Systems Programming using C++ T CHAN, PHI.
2. UNIX for Programmers and Users, 3rd Edition Graham GLASS, King abls, Pearson Education
3. Advanced UNIX Programming 2nd Edition M. J. ROCHKIND, Pearson Education

| SEMESTER-V | L | P | C |
|---|---|---|---|
| | - | 3 | 1.5 |
| **19MC5L01: BIG DATA ANALYTICS Lab** | | | |

*Week 1,2:*

1.  Implement the following Data structures in Java a)Linked Lists b) Stacks c) Queues d) Set
    e) Map

*Week 3, 4:*

2. (i)Perform setting up and Installing Hadoop in its three operating modes: Standalone, Pseudo distributed, Fully distributed

   (ii)Use web based tools to monitor your Hadoop setup.

*Week 5:*

3.  Implement the following file management tasks in Hadoop:

    • Adding files and directories

    • Retrieving files

    • Deleting files

Hint: A typical Hadoop workflow creates data files (such as log files) elsewhere and copies them into HDFS using one of the above command line utilities.

*Week 6:*

4.  Run a basic Word Count Map Reduce program to understand Map Reduce Paradigm.

*Week 7:*

5.  Write a Map Reduce program that mines weather data.

Weather sensors collecting data every hour at many locations across the globe gather a large volume of log data, which is a good candidate for analysis with MapReduce, since it is semi structured and record-oriented.

*Week 8:*

6.  Implement Matrix Multiplication with Hadoop Map Reduce

*Week 9,10:*

7.          Install and Run Pig then write Pig Latin scripts to sort, group, join, project, and filter your data.

*Week 11, 12:*

8.	Install and Run Hive then use Hive to create, alter, and drop databases, tables, views, functions, and indexes

| SEMESTER-V | L | P | C |
|---|---|---|---|
| | 3 | - | 1.5 |
| **19MC5L02**: **MOBILE APPLICATION DEVELOPMENT LAB** | | | |

**Course Objectives**:

    1. Develop menus in J2ME

    2. Develop J2ME Socket Program

    3. Develop Android Basic Programs

1.   Write a J2ME program to show how to change the font size and color.

2.   Write a J2ME program which creates the following kind of menu.

      I.     cut

     II.    copy

    III.   past

    IV.   delete

     V.    select all

    VI.   unselect all

3.   Create a J2ME menu which has the following options (Event Handling):

      I.     cut - can be on/off

     II.    copy - can be on/off

    III.   paste - can be on/off

    IV.   delete - can be on/off

     V.    select all - put all 4 options on

    VI.   unselect all - put all

4.   Create a MIDP application, which draws a bar graph to the display. Data values can be given at int[] array. You can enter four data (integer) values to the input text field.

5.   Create an MIDP application which examine, that a phone number, which a user has entered is in the given format (Input checking):

   I. Area code should be one of the following: 040, 041, 050, 0400, 044

    II. There should 6-8 numbers in telephone number (+ area code)

6.   Write a sample program to show how to make a SOCKET Connection from J2ME phone. This J2ME sample program shows how to how to make a SOCKET Connection from a J2ME Phone.

Many a times there is a need to connect backend HTTP server from the J2ME application. Show how to make a SOCKET connection from the phone to port 80.

7. Login to HTTP Server from a J2ME Program. This J2ME sample program shows how to display a simple LOGIN SCREEN on the J2ME phone and how to authenticate to a HTTP server. Many J2ME applications for security reasons require the authentication of the user. This free J2ME sample program, shows how a J2ME application can do authentication to the backend server. Note: Use Apache Tomcat Server as Web Server and MySQL as Database Server.

8. The following should be carried out with respect to the given set of application domains: (Assume that the Server is connected to the well-maintained database of the given domain. Mobile Client is to be connected to the Server and fetch the required data value/information)

      I.     Students Marks Enquiry

     II.    Town/City Movie Enquiry

   III.   Railway/Road/Air (For example PNR) Enquiry/Status

   IV.   Sports (say, Cricket) Update

     V.    Town/City Weather Update

   VI.   Public Exams (say Intermediate or SSC)/ Entrance (Say EAMCET) Results

  VII.   Enquiry

Divide Student into Batches and suggest them to design database according to their domains and render information according the requests.

9. Write an Android application program that displays Hello World using Terminal.

10. Write an Android application program that displays Hello World using Eclipse.

11. Write an Android application program that accepts a name from the user and displays the hello name to the user in response as output using Eclipse.

12. Write an Android application program that demonstrates the following:

      I.     LinearLayout

     II.    RelativeLayout

   III.   TableLayout

   IV.   GridView layout

13. Write an Android application program that converts the temperature in Celsius to Fahrenheit.

14. Write an Android application program that demonstrates intent in mobile application development