# Dr. AMBEDKAR GOVERNMENT ARTS COLLEGE

**(AUTONOMOUS)**
**VYASARPADI, CHENNAI – 600 039**

## MINUTES OF THE MEETING OF BOARD OF STUDIES - B.Sc - COMPUTER SCIENCE

Meeting of the Board of Studies in Computer Science [for revising the B.Sc Computer Science course syllabus] was held on 11-06-2019 (Tuesday) at 11.00 A.M at the Department of Computer Science of this College.

- The syllabus is revised as per the TANSCHE norms.
- The board members gone through the syllabus, discussed and necessary corrections are incorporated.
- This syllabus is approved and it is with effect from the academic year 2019-20.

| S.No. | Members Present | Signature |
|---|---|---|
| 1 | **Dr. A. Murugan** – **Chairman**<br>Associate Professor & HOD of Computer Science<br>Dr. Ambedkar Government Arts College (Autonomous)<br>Vyasarpadi, Chennai – 600 039 | |
| 2 | **Dr. Sornam** – **University Nominee**<br>Professor of Computer Science<br>University of Madras, Chennai – 600 108. | |
| 3 | **Dr. Vidya Priya** – **College Nominee (External)**<br>Associate Professor, PG & Research department of Computer Science<br>Quaid-e-millath College for Women, Chennai. | |
| 4 | **Dr J Senthil Kumar** – **College Nominee (External)**<br>Assistant Professor<br>Govt. Arts College, Perumbakkam, Chennai. | |
| 5 | **Dr. (Mrs.) K. Shyamala** – **Member**<br>Associate Professor of Computer Science<br>Dr. Ambedkar Government Arts College (Autonomous)<br>Vyasarpadi, Chennai – 600 039 | Shyamala 11/06/19 |
| 6 | **Mr. K. Radhakrishnan** – **Member**<br>Assistant Professor of Computer Science<br>Dr. Ambedkar Government Arts College (Autonomous)<br>Vyasarpadi, Chennai – 600 039 | 11/6/19 |
| 7 | **Mrs. N.Vanitha** – **Member**<br>Assistant Professor of Computer Science<br>Dr. Ambedkar Government Arts College (Autonomous)<br>Vyasarpadi, Chennai – 600 039 | |
| 8 | **Mrs. B.Jayapradha** – **Member**<br>Assistant Professor of Computer Science<br>Dr. Ambedkar Government Arts College (Autonomous)<br>Vyasarpadi, Chennai – 600 039 | 11/6/19 |
| 9 | **Dr. G.Sekar** – **Member**<br>Assistant Professor of Computer Science<br>Dr. Ambedkar Government Arts College (Autonomous)<br>Vyasarpadi, Chennai – 600 039 | present 11-6-19 |

| | | |
|---|---|---|
| 10 | **Dr. Behin Sam** – **Member**<br>Assistant Professor of Computer Science<br>Dr. Ambedkar Government Arts College (Autonomous)<br>Vyasarpadi, Chennai – 600 039 | 11/06/2019 |
| 11 | **Mr. Krishna Kumar** – **Member**<br>Assistant Professor of Computer Science<br>Dr. Ambedkar Government Arts College (Autonomous)<br>Vyasarpadi, Chennai – 600 039 | 11/6/19 |
| 12 | **Mr Suresh Thangavel**, **-Industrialist**<br>Information Security Manager<br>Tata Consultancy Services,<br>Thoraipakkam<br>Chennai 97 | 11/06/2019 |
| 13 | **Mr Vasantha Raj**, **- Alumni**<br>Assistant Professor of Computer Science,<br>Muthukumarasamy College,<br>Kodungaiyur, Chennai – 118. | V. Vasanthi 11/6/19 |

# Dr. AMBEDKAR GOVERNMENT ARTS COLLEGE

**(AUTONOMOUS)**

VYASARPADI, CHENNAI - 600 039

**(AFFILIATED TO UNIVERSITY OF MADRAS)**

**Choice Based Credit System (CBCS)**

**B.Sc. COMPUTER SCIENCE - DEGREE COURSE**
**(With effect from the Academic year 2019 – 2020)**

Dr. Ambedkar Government Arts College (Autonomous) offers the semester System of education with credits for UG courses. Credit is related to the number of hours a teacher teaches a particular subject as well as to the number of hours a student spends learning a subject or carrying out an activity. In the semester system of study, every academic year is divided into two semester sessions. Each semester will have a minimum of 90 working days and each day will have 5 working hours.

Differential weightage is given according to the content and duration of the course in the curriculum design. Each course is designed variously under lectures/ tutorials/ laboratory/ work/ seminar/ project work/ practical training/ viva, etc., to facilitate effective teaching and learning and the credits are assigned accordingly depending on the content and the specialization.

## Regulations

**(Effective from the Academic year 2019-2020 onwards)**

### 1. Eligibility for Admission

Candidates for admission to the first year of the Degree of Bachelor of Computer Science course shall be required to have passed the Higher Secondary Examination conducted by the Government of Tamil Nadu or an Examination accepted as equivalent thereto by the Syndicate of the University of Madras.

### 2. Eligibility for the award of Degree

A Candidate shall be eligible for the award of the Degree only if he/she has undergone the prescribed course of study in a college affiliated to the University for a period of not less than three academic years, passed the examination of all the six semesters prescribed earning 140 credits including 2 credits for Environmental Studies, 2 credits for Value Education and 1 credit for the compulsory Extension Services prescribed.

## 3. Duration

Each academic year shall be divided into two semesters. The first academic year shall comprise the first and second semester, the second academic year the third and the fourth semester and the third academic year the fifth and sixth semester respectively.

The odd semester shall consist of the period from June to November of each academic year and the even semester from December to April of each academic year. There shall be not less than 90 working days for each semester.

## 4. The CBCS System

All Programmers' (named after the Core subject) mentioned earlier are based on Choice Based Credit System (CBCS). It is an instructional package developed to suit the needs of students to keep pace with the developments in higher education and the quality assurance expected of it in the light of liberalization and globalization in higher education.

## 5. Course of Study

The UG programme consists of several courses. The term 'course' is applied to indicate a logical part of the subject matter of the programme and is invariably equivalent to the subject matter of a "paper" in the conventional sense.

The following are the various categories of Courses suggested for the UG programmes. Language Course (LC) (Tamil), English Language Course (ELC), Core Course (CC), Allied Courses (AC), Allied Practical (ACP), Elective Courses (EC) (instead of Applied Course in the curriculum followed earlier), Non-major elective courses (NME), Skill based Elective courses (SS), Environmental studies (ES), Value Education (VE) and Extension Activity (EA).

## 6. Credits

The term 'Credit' refers to the weightage given to a course, usually in relation to the instructional hours assigned to it. For instance, the course with six hour per week is assigned four credits, course with four / five hour per week is assigned three credits and course with two hour per week is given two credits. However, in no instance the credits of a course can be greater than the hours allotted to it. The total minimum credits, required for completing the UG program is 140. The detail of credits for the courses is given below:

| S.No. | Part | | Subject Name | Credits | Class Hours |
|---|---|---|---|---|---|
| | | **SEMESTER I** | | | |
| 1 | I | 19UAFTA1 | Tamil/ Other languages – I | 3 | 6 |
| 2 | II | 19UAFEN1 | English - I | 3 | 4 |
| 3 | III | 19UACSC1 | Core I : Digital Computer Fundamentals | 4 | 5 |
| 4 | III | 19UACSC2 | Practical I : Digital Lab | 3 | 4 |
| 5 | III | 19UAMAA1 | Allied I - Mathematics | 5 | 7 |
| 6 | IV | 19UASBE1 | SBS I: Essential of Language and | 3 | 2 |
| 7 | IV | 19UACSN1 | NME – Fundamentals of Computers | 2 | 2 |
| | | | **Total Credits** | **23** | **30** |
| | | **SEMESTER II** | | | |
| 8 | I | 19UBFTA2 | Tamil/ Other languages – II | 3 | 6 |
| 9 | II | 19UBFEN2 | English - II | 3 | 4 |
| 10 | III | 19UBCSC1 | Core II : Programming in C and Data structures | 4 | 5 |
| 11 | III | 19UBCSC2 | Practical II : Data structures using C lab | 3 | 4 |
| 12 | III | 19UBMAA2 | Allied II - Mathematics | 5 | 7 |
| 13 | IV | 19UBSBE2 | SBS II : Essential of Spoken and | 3 | 2 |
| 14 | IV | 19UBCSN2 | NME – HTML Programming | 2 | 2 |
| | | | **Total Credits** | **23** | **30** |
| | | **SEMESTER III** | | | |
| 15 | I | 19UCFTA3 | Tamil/ Other languages – III | 3 | 6 |
| 16 | II | 19UCFEN3 | English - III | 3 | 4 |
| 17 | III | 19UCCSC1 | Core III: Object Oriented Programming | 4 | 5 |
| 18 | III | 19UCCSC2 | Practical III Programming in C++ Lab | 3 | 4 |
| 19 | III | 19UCPHA1 | Allied III - Physics | 5 | 4 |
| 20 | III | *** | Allied III – Physics Practical | *** | 3 |
| 21 | IV | 19UCSBE3 | SBS III : Personality Enrichment | 3 | 2 |
| 22 | IV | 19UCEVS1 | Environmental Studies | 2 | 2 |
| | | | **Total Credits** | **23** | 30 |
| | | **SEMESTER IV** | | | |
| 23 | I | 19UDFTA4 | Tamil/ Other languages – IV | 3 | 6 |
| 24 | II | 19UDFEN4 | English – IV | 3 | 4 |
| 25 | III | 19UDCSC1 | Core IV: Programming in Java | 4 | 5 |
| 26 | III | 19UDCSC2 | Practical V : Java Programming Lab | 3 | 4 |
| 27 | III | 19UDPHA2 | Allied IV - Physics | 3 | 4 |
| 28 | III | 19UDPHA3 | Allied III – Physics Practical | 2 | 3 |
| 29 | IV | 19UDSBE4 | SBE IV: Android Programming | 3 | 2 |
| 30 | IV | 19UDCVE1 | Value Education | 2 | 2 |
| 31 | V | 19UDEXT1 | Extension Activities (NCC/NSS/Sports) | 1 | * |

| | | | | | |
|---|---|---|---|---|---|
| | | | **Total Credits** | **23** | **30** |
| | | **SEMESTER V** | | | |
| 32 | III | 19UECSC1 | Core V: Operating Systems | 4 | 5 |
| 33 | III | 19UECSC2 | Core VI : Relational Database Management Systems | 4 | 4 |
| 34 | III | 19UECSC3 | Practical V : SQL and PLSQL Lab | 2 | 4 |
| 35 | III | 19UECSC4 | Core VII : Software Engineering | 4 | 4 |
| 36 | III | 19UECSC5 | Core VIII : Open Source Technology | 4 | 4 |
| 37 | III | 19UECSC6 | Practical VI : Open Source Technology | 2 | 4 |
| 38 | III | ** | Elective I | 5 | 5 |
| | | | **Total Credits** | **25** | **30** |
| | | **SEMESTER VI** | | | |
| 39 | III | 19UFCSC1 | Core VIII : Programming in Python | 4 | 5 |
| 40 | III | 19UFCSC2 | Practical VII : Python Programming Lab | 2 | 5 |
| 41 | III | ** | Elective II: | 5 | 5 |
| 42 | III | 19UFCSC3 | Core IX :Linux and Shell Programming | 4 | 5 |
| 43 | III | 19UFCSC4 | Practical VIII: Shell Programming Lab | 2 | 5 |
| 44 | III | ** | Elective III | 5 | 5 |
| | | | | | |
| | | | **Total Credits** | **23** | **30** |
| | | | **Total credits ( Core, Elective, SBS)** | **140** | |
| | | **Elective I - V$^{th}$ Semester** | | | |
| 19UECSE1A<br>19UECSE1B<br>19UECSE1C | | E-Commerce Technologies<br>Multimedia Systems<br>Computer Graphics | | | |
| | | **Elective II -VI$^{th}$ Semester** | | | |
| 19UFCSE1A<br>19UFCSE1B<br>19UFCSE1C | | Computer Networks<br>Wireless Network<br>Discrete Structures | | | |
| | | **Elective III - VI$^{th}$ Semester** | | | |
| 19UFCSE2A<br>19UFCSE2B<br>19UFCSE2C | | Network Security<br>System Administration and Maintenance<br>Software Testing | | | |

The Department of Computer Science will offer the following Non Major courses for other department students

1. Fundamentals of Computers - I Semester
2. HTML Programming - II Semester

and the following Soft skill papers for Other UG Students

3. Computer basics and Office automation - IV Semester

All the students shall have to undergo a course on Environmental Studies during III Semester and Value education during IV Semester.

**Extension Activity**

All the students shall have to enroll for NSS/NCC/NSO (Sports & Games) Rotract/ Youth Red Cross or any other service organizations in the college and shall have to put in compulsory minimum attendance of 40 hours which shall be duly certified by the Principal of the College before 31st March in a year. If a student LACKS 40 HOURS ATTENDANCE in the First Year, he/ shall have to compensate the same during the subsequent years.

Students those who complete minimum attendance of 40 hours in One year will get HALF A CREDIT and those who complete the attendance of 80 or more hours in Two Years will get ONE CREDIT.

Literacy and Population Education Field work shall be compulsory components in the above extension service activities.

**7. Selection of candidates to Non-Major Elective Courses and Skill based Elective Courses**

The Non-Major and skill based elective Courses 2+4 in numbers for each UG degree, are open to all students irrespective of science, Arts or Commerce Programmes. A student shall choose at least two Non-Major Elective Courses and three skill based elective courses from outside his / her Department.

Selection of student to the Elective Courses (NME & SS):
a. The Department Committee shall follow a selection procedure on a first come first served basis, fixing the maximum number of students, giving counseling to the students etc. to avoid overcrowding to particular course(s) at the expense of some other courses.
b. The failed candidates in one EC are permitted to select for another EC in another programme or they are permitted to continue with the same EC.
c. The College shall provide all information relating to the ECs in each programme to all the students so as to enable them to choose their ECs.

**8. Attendance**

A Candidate shall be permitted to appear for the examinations only if he or she secures not less than 75% attendance.

Students who have 60% to 74% of attendance shall apply for condonation in the prescribed form with the prescribed fee Rs.250/- towards the condonation of shortage of attendance.

Students who have secured less than 60% but more than 49% of attendance are NOT Eligible for condonation of shortage of attendance and such candidates will not be permitted to appear for the regular examination, but will be allowed to proceed to the next year / next semester of the course and they may be permitted to take next End Semester Examination by paying the prescribed condonation fee of Rs.250/.

Students who have below 50% of attendance are not eligible to appear for the examination. They shall re-do the semester(s) after completion of the programme by paying the fee for the break of study as prescribed by the academic council from time to time.

**9. Conduct of Examination**

Examination will be conducted by the college at the end of each semester. A candidate who does not pass the examination in any paper(s) shall be permitted to appear in such failed paper(s) in the subsequent examinations.

**10. College Day Proficiency Price**

Candidates who passed all the subjects prescribed for the course in the first appearance only are eligible for any endowment price/ Rank.

**11. Scheme of Examinations: Theory**

| | |
|---|---|
| Continuous Assessment | : 25 Marks |
| End semester Examination | : 75 Marks |
| | --- |
| Total | :100 Marks |
| | --- |

The break up for continuous Assessment is as follows:

| | |
|---|---|
| a) Test | (1 x 10) : 10 Marks |
| b) Assignment | (1 x 10) : 10 Marks |
| c) Model Examination | (1 x 25) : 25 Marks |
| d) Attendance | : 5 Marks |
| | --- |
| Total | : 50 Marks |
| | --- |

50 Marks for continuous assessment can be converted to 25 Marks.

**For Major and Allied Practicals**

The breakup of marks for continuous assessment year end practical examination is as follows:

| | |
|---|---|
| Continuous Assessment | : 40 Marks |
| Practical | : 60 Marks |
| | --- |
| Total | : 100 Marks |
| | --- |

The break up for continuous assessment for major and Allied Practical's are

| | |
|---|---|
| a. Submission of Record/Observation | : 25 Marks |
| b. Practical Tests (2 x 15) | : 30 Marks |
| c. Model Practical Examination | : 20 Marks |
| d. Attendance | : 5 Marks |
| | --- |
| Total | : 80 Marks (scaled down to 40) |
| | --- |

The external examiner will prepare a question paper on the SPOT with the help of the Question Bank supplied by the Controller's office. The duration of the practical examinations for each paper shall be 3 hours carrying 60 Marks.

**12. Requirements for proceeding to subsequent Semester**

a. Candidates shall register their names for the First Semester Examinations after the admission in the UG Courses.

b. Candidates shall be permitted to proceed from the First Semester up to Final semester irrespective of their failure in any of the semester Examinations subject to the condition that the candidate should register for all the arrear papers of earlier semester along with current (subsequent) semester papers.

c. Candidates shall be eligible to go to subsequent semester, only if they earn sufficient attendance as prescribed, from time to time, by the University of Madras.

Provided in case of a candidate earning less than 50% of attendance in any one of the semester due to any extraordinary circumstance such as medical grounds, such candidate who shall produce medical certificate issued by the Authorized Medical Attendant (AMA), duly certified by the Principal of the College, shall be permitted to proceed to the next semester and to complete the Course of study. Such candidates shall have to repeat the missed Semester by rejoining after completion of Final Semester of the Course, after paying the fee for the break of study as prescribed from time to time.

**13. Valuation of Answer Papers**

For undergraduate courses, only single valuation is permissible. Re-totaling and revaluation of theory papers are allowed. The fee prescribed for Re-totaling is Rs.250/- per paper and for revaluation Rs.500/- per script. Photo copy of the Answer scripts will be supplied to the candidate applying for revaluation.

**14. Passing Minimum**

a. There shall be no Passing Minimum for Internal.
b. For External Examination, Passing Minimum shall be of 40% (Forty Percentage) of the maximum marks prescribed for the paper for each Paper/Practical/Project and Viva voce.
c. In the aggregate (External + Internal) the passing minimum shall be of 40%.
d. He / She shall be declared to have passed the whole examination, if he/she passes in all the papers and practical's wherever prescribed / as per the scheme of examinations by earning 140 CREDITS in Parts-I, II, III, IV & V. He/she shall also fulfill the activities prescribed earning a minimum of 1 Credit to qualify for the Degree.

**15. Classification of successful candidates:**
**Grading system**

The following table gives the marks, grade points, letter grades and classification to indicate the performance of the candidate.

**Conversion of Marks to Grade Points and Letter Grade (Performance in a Course/ Paper)**

| RANGE OF MARKS | GRADE PONTS | LETTER GRADE | DESCRIPTION |
|---|---|---|---|
| 90-100 | 9.0-10.0 | O | Outstanding |
| 80-89 | 8.0-8.9 | D+ | Excellent |
| 75-79 | 7.5-7.9 | D | Distinction |
| 70-74 | 7.0-7.4 | A+ | Very Good |
| 60-69 | 6.0-6.9 | A | Good |
| 50-59 | 5.0-5.9 | B | Average |
| 40-49 | 4.0-4.9 | C | Satisfactory |
| 00-39 | 0.0 | RA | Re-appear |
| ABSENT | 0.0 | AAA | ABSENT |

'$C_i$' is the credit earned for the course *i* in any semester;
'$G_i$' is the Grade Point obtained by the student for the Course *i* and '*n*' is the number of Courses **passed** in that semester.

**For a Semester:**

$$Grade\ Point\ Average\ [GPA] = \frac{Sum\ of\ the\ multiplication\ of\ the\ grade\ points\ by\ the\ credits\ of\ the\ courses}{Sum\ of\ the\ credits\ of\ the\ courses\ in\ a\ semester}$$

$$GPA = \sum_i C_i G_i / \sum_i C_i$$

**16. Classification of Final Results**

$$Cumulative\ Grade\ Point\ Average\ [CGPA] = \frac{Sum\ of\ the\ multiplication\ of\ grade\ points\ by\ the\ credits\ of\ the\ entire\ programme}{Sum\ of\ the\ credits\ of\ the\ courses\ of\ the\ entire\ programme}$$

$$CGPA = \sum_n \sum_i C_{ni} G_i / \sum_n \sum_i C_{ni}$$

| CGPA | GRADE | Classification of Final Result |
|---|---|---|
| 9.5-10.0 | O+ | First Class Exemplary |
| 9.0 and above but below 9.5 | O | |
| 8.5 and above but below 9.0 | D++ | First Class with Distinction |
| 8.0 and above but below 8.5 | D+ | |
| 7.5 and above but below 8.0 | D | |
| 7.0 and above but below 7.5 | A++ | First Class |
| 6.5 and above but below 7.0 | A+ | |
| 6.0 and above but below 6.5 | A | |
| 5.5 and above but below 6.0 | B+ | Second Class |
| 5.0 and above but below 5.5 | B | |
| 4.5 and above but below 5.0 | C+ | Third Class |
| 4.0 and above but below 4.5 | C | |
| 0.0 and above but below 4.0 | RA | Re-appear |

**Note:** The GPA and CGPA shall be calculated separately for the following three parts:

Part I: Language
Part II: English and
Part III Core, Allied, Project and Elective.

**(i)** Candidates who pass all the examinations prescribed for the Course in the FIRST APPEARANCE ITSELF ALONE are eligible for classification/ Ranking/Distinction.

Provided in the case of Candidates who pass all the Examinations prescribed for the Courses with a break in the First Appearance due to the reasons as furnished in the Regulations 12c supra are only eligible for Classification/ Distinction.

**(ii)** For each of the three parts, there shall be separate classification on the basis of CGPA as indicated in the above Table.

**(iii)** For purposes of declaring a candidate to have qualified for the Degree of Bachelor of Arts/Science/ Commerce/Management/Literature in the First class/Second class/Third class or First class with Distinction / Exemplary, the marks and the corresponding CGPA earned by the candidate in Part III alone will be the criterion, provided he/she has secured the prescribed passing minimum in LCs and ELCs.

**(iv)** Grade in Part IV and Part V shall be shown separately and it shall not be taken into account for classification.

**17. Pattern of Question Paper:**

**SECTION – A (30 words)**
To Answer 10 out of 12 Questions 10 x 2 = 20 marks
**SECTION – B (200 words)**
To Answer 5 out of 8 Questions 5 x 5 = 25 marks
**SECTION – C (500 words)**
To Answer 3 out of 5 Questions 3 x 10 = 30 marks

**TOTAL = 75 marks**

**B.Sc Computer Science - SYLLABUS**
**Semester – I**
**CORE I - DIGITAL COMPUTER FUNDAMENTALS**

## COURSE OBJECTIVES

- It aims to train the student to the basic concepts of Digital Computer Fundamentals
- To impart the in-depth knowledge of logic gates, Boolean algebra, combinational circuits and sequential circuits.

### UNIT – I

Number Systems and Codes: Number System – Base Conversion – Binary Codes – Code Conversion (Binary to BCD, BCD to Binary, BCD to Excess-3, Excess-3 to BCD, Binary to Gray, Gray to Binary). Digital Logic: Logic Gates – Truth Tables – Universal Gates.

### UNIT – II

Boolean Algebra: Laws and Theorems – SOP, POS Methods – Simplification of Boolean Functions using Theorems, Simplification of Boolean Functions using K-Map (upto 4-variables only) – Binary Arithmetic: Binary Addition – Binary Subtraction – Various Representations of Binary Numbers – Arithmetic Building Blocks: Half-Adder, Full-Adder – Half-Subtractor, Full-Subtractor – Parallel Binary Adder.

### UNIT – III

Combinational Logic: Multiplexers – Demultiplexers – Decoders – Encoders – Code Converters (Binary to BCD, BCD to Binary, BCD to Excess-3, Excess-3 to BCD, Binary to Gray, Gray to Binary) – Parity Generators and Checkers.

### UNIT – IV

Sequential Logic: RS, JK, D, and T Flip-Flops – Master-Slave Flip-Flops. Registers: Shift Registers – Types of Shift Registers.

### UNIT – V

Counters: Asynchronous and Synchronous Counters - Ripple, Mod, Up-Down Counters– Ring Counters. Memory: Basic Terms and Ideas –Types of ROMs – Types of RAMs.

## TEXT BOOKS

1. V.Rajaraman and T.Radhakrishnan, *Digital Computer Design*, Prentice Hall of India, 2001
2. D.P.Leach and A.P.Malvino, *Digital Principles and Applications* – TMH – Fifth Edition – 2002.
3. M. Moris Mano, *Digital Logic and Computer Design*, PHI, 2001.
4. T.C.Bartee, *Digital Computer Fundamentals*, 6th Edition, Tata McGraw Hill, 1991.

## PRACTICAL I: DIGITAL LAB

**COURSE OBJECTIVES**

To impart the practical knowledge of Logic Gates, Boolean Algebra and construction of the Combinational and Sequential circuits.

I: Study of Logic Gates

1. Verification of truth table for AND, OR, NOT, NAND, NOR and XOR gates.
2. NAND as Universal Gate.
3. NOR as Universal Gate.

II: Implementation of logic circuits

1. Verification of Associative law for AND, OR gates.
2. Verification of Demorgan's Laws.
3. Karnaugh's Map reduction and logic circuit implementation.

III: Adder and Subtractor

1. Implementation of Half-Adder and Half-Subtractor.
2. Implementation of Full-Adder and Full-Subtractor.
3. Implementation of Four bit binary Adder/Subtractor.

IV: Multiplexers and Encoders

1. Implementation of 4:1 Multiplexer
2. Implementation of 1:4 DeMultiplexer
3. Implementation of 2 to 4 Decoder
4. Implementation of 4 to 2 Priority Encoder

V: Registers and Counters

1. Implementation of R-S Flip-Flop and J-K Flip-Flop
2. Implementation of Shift Register-Serial Transfer.
3. Implementation of binary Up/Down Counter.

## NME I: FUNDAMENTALS OF COMPUTERS

**COURSE OBJECTIVES**

To teach the basics of Computers and internet

**UNIT - I**

Introduction - Computer Basics – Block diagram – Software and Programming Languages. Components of Computer System: Central Processing Unit (CPU), input/output Devices, computer Memory: primary and secondary memory Concepts of Hardware and Software.

**UNIT - II**

Input Devices: Key board, Mouse, Joystick, Scanner

Output devices: Monitor, Printer – Types of printers – Plotter

**UNIT- III**

Operating system-Definition & functions, Types of Operating System – Single user, Multi user, Multi tasking, Time Sharing

**UNIT - IV**

Basics of Windows - Basic components of windows, icons, types of icons, taskbar, activating windows, using desktop, title bar, running applications, exploring computer, managing files and folders, copying and moving files and folders

**UNIT – V**

Basic of Computer networks: LAN, WAN, MAN.
Internet: Introduction to internet and its application in education, Browsing
Service on Internet: WWW and web-sites, Electronic mails.
Web Browsers: Internet Explorer, Netscape Communicator.

**TEXT BOOKS**

1. Alexis Leon and Mathews Leon, “Fundamentals of Information Technology”, Vikas, 1999

2. Stewart Venit, “Introduction to Programming: Concepts and Design”,4th Edition,2010, Dream Tech Publishers.

**E- REFERENCES**

1. http://www.nptel.iitm.ac.in/video.php?subjectId=106102067
2. http://utubersity.com/?page_id=876

**Semester – II**

## CORE III: PROGRAMMING IN C & DATA STRUCTURES

### COURSE OBJECTIVES

- To develop programming skills using the fundamentals and basics of C language
- To develop programs using the basic elements like control statements, Arrays and Strings
- To introduce the various data structures and their implementations

**UNIT - I**

C Fundamentals: Character set - Identifier and Keywords - Data Types - Constants - Variables - Declarations - Expressions - Arithmetic, Unary, Relational, Logical, Assignment and Conditional Operators - Input/Output Statements – Mathematical Library Functions -Simple C programs.

**UNIT - II**

Decision-Making and Branching Statements: if, if-else, switch, go to. Decision-Making and Looping Statements: while, do-while, for loop, nested loops. Jumps in Loops: break. Continue. Arrays: Defining and Processing – One-dimensional, Two-dimensional and Multi-dimensional arrays – Strings: Declaration, processing and String handling functions.

**UNIT – III**

User Defined Functions: Definition, declaration and function call - Passing arguments - Recursion. Structures: Definition, Assigning values and Array of structures. Pointers: Declarations and Initializing pointers – Accessing a variable through its pointer – Pointer expressions.

**UNIT - IV**

Introduction of Data Structures: Arrays: Representation of Arrays. Stack: Push and Pop operations- Application of Stack: Evaluation of Expression - Infix to postfix Conversion. Queue: Insert and Delete operations in Queue. Singly Linked list – Operations.

**UNIT - V**

Trees: Basic Terminology - Binary Trees and its representations - Binary trees Traversal: Inorder, Preorder and Postorder. Graphs: Terminology and Graph Representations: Adjacency Matrix and List representation – Graph Traversals: Breadth First Traversal and Depth First Traversal.

### TEXT BOOKS

1. E.Balagurusamy, “Programming in ANSI C”, Fifth Edition, Tata McGraw Hill.
2. Ellis Horowitz, Sartaj Shani, Fundamental of Data Structures, Galgotia publication.

### REFERENCE BOOKS

1. H. Schildt, “C: The Complete Reference”, 4th Edition. TMH Edition, 2000.
2. Kanetkar Y., “Let us C”, BPB Pub., New Delhi, 1999.
3. Alfred V. Aho, John E. Hopcroft, Jeffrey D. Ullman, “Data structure and Algorithms “Pearson Education Pvt. Ltd.,

## PRACTICAL - II: DATA STRUCTURES USING C

### COURSE OBJECTIVES

- To implement the simple programs in C.
- To implement the various data structures.

### C Programming

1. Write a C program to demonstrate the functioning of operators.
2. Write a C program for mathematical library functions.
3. Write a C program to find the biggest of three numbers using if.
4. Write a C program to find the root of quadratic equation.
5. Write a C program to find whether a given number is prime or not using loops.
6. Write a C program for Linear Search using one dimensional array.
7. Write a C program for Matrix Addition and Subtraction using two dimensional arrays.
8. Write a C program to demonstrate built-in string handling functions.
9. Write a C program to compute ${}^{n}C_{r}$ using recursion.
10. Write a C program to define and manipulate structure with following fields: studentno, studentname, studenttotal.

### Data Structures Using C

1. Write a C program to merge two array lists of integers into a single array.
2. Write a C program to illustrate the working of STACK using array.
3. Write a C program to illustrate the working of QUEUE using array.
4. Write a C program to create Singly Linked list and perform creation, insertion, deletion and print operations.
6. Write a C program to construct a Binary tree and to traverse in preorder.
7. Write a C program to construct a Binary tree and to traverse in inorder.
8. Write a C program to construct a Binary tree and to traverse in Postorder.
9. Write a C program to traverse the given graph in BFS fashion.
10. Write a C program to traverse the given graph in DFS fashion.

## NME – II – HTML PROGRAMMING

**COURSE OBJECTIVES**

To acquire the knowledge in HTML programming

**UNIT – I**

History of Internet, WWW, Web Site, Web Page. Web Browsers: Internet Explorer, Netscape Communicator, Information searching.

**UNIT – II**

HTML: Basic tags, HTML basics, document tags, Head and Body sections.

**UNIT - III**

Formatting tags - paragraph and heading tags, List types – Ordered, unordered, Definition list. Nested list

**UNIT - IV**

Hyper link – tags for link to web pages, insert a image, Image as a Hyper link

**UNIT - V**

Table – Table tags, creation of train time table and class time table. Frame

**TEXT BOOK**

Faithe Wempen , "Step by Step HTML ",Microsoft Corporation, 2011

**REFERENCE**

https://www.tutorialspoint.com/html5/html5_tutorial.pdf

**Semester – III**

## CORE III: OBJECT ORIENTED PROGRAMMING USING C++

### COURSE OBJECTIVES

To acquire the knowledge in and object oriented programming using C++.

**UNIT- I**

C++ Language Fundamentals:- Procedure Oriented Paradigm and Object Oriented Paradigm - Basic concept of Object Oriented Programming (OOP) – Introduction to C++; Structure of C++ Program, Tokens, Keywords, Identifiers, Data Types, Variables, Operators, Expressions. – Branching statements – Looping statements.

**UNIT - II**

Arrays: One-dimensional, Two-dimensional and Multi-dimensional arrays – Functions: Declaration and definition, call-by-value and call-by-reference – Inline functions – Default arguments – Function Overloading.

**UNIT- III**

Classes and Objects: Specifying a Class – Defining member functions – Arrays with in class – Arrays of Objects – Objects as function arguments – Friend Function - Constructors**: -** Constructors – Types of constructors & Destructors – Operator Overloading.

**UNIT - IV**

Inheritance: Definition- Types of Inheritance –Virtual functions – Formatted I/O operations, Manipulators and user-defined manipulators - Command line Arguments.

**UNIT - V**

C++ Files: **-** Opening and closing a File, End-of-File detection – File Pointers - Error handling during file operations – File manipulation – Class Templates and Function Templates – Basics of Exception handling – Introduction to Standard Template Library: Components, Containers, Algorithms and Iterators.

### TEXT BOOKS

1. E. Balagurusamy – Object Oriented Programming with C++ - TMH.

### REFERENCE BOOK

1. Robert Lafore – Object Oriented Programming in Microsoft C++ - Galgotia.

## PRACTICAL – III - PROGRAMMING IN C++ - LAB

**COURSE OBJECTIVES**

To implement the various object oriented programming concepts using C++

1. Write a C++ program to demonstrate function overloading, Default Arguments and Inline function.
2. Write a C++ program to demonstrate Class and Objects
3. Write a C++ program to demonstrate the concept of Passing Objects to Functions
4. Write a C++ program to demonstrate the Friend Functions.
5. Write a C++ program to demonstrate the concept of Passing Objects to Functions
6. Write a C++ program to demonstrate Constructor and Destructor
7. Unary Operator Overloading
8. Binary Operator Overloading
9. Write a C++ program to demonstrate:
    - Single Inheritance
    - Multilevel Inheritance
    - Multiple Inheritance
    - Hierarchical Inheritance
    - Hybrid Inheritance

10 Write a C++ program to demonstrate Virtual Functions.
11. Write a C++ program to manipulate a Text File.
12. Write a C++ program to perform Sequential I/O Operations on a file.
13. Write a C++ program to find the Biggest Number using Command Line Arguments
14. Write a C++ program to demonstrate Exception Handling.

## SBE III : PERSONALITY ENRICHMENT

**COURSE OBJECTIVES**

To make students understand the concepts and Determinants of Personality. To enable students to keep themselves abreast of general knowledge and current information.
To bring out creativity and other latent talents with proper goal setting so that self-esteem.
To sharpen memory skills and other study skills which are vital for academic excellence.
To give training for positive thinking, this will keep the students in a good stead at the time of crisis.

**UNIT - I**

Introduction : Definition of Personality - Determinants of Personality biological, psychological and socio-cultural factors - Misconceptions and Classifications - Need for personality development.

**UNIT- II**

Self-awareness and self-motivation: Definition of self, self concept and self awareness Self analysis through SWOT and Johari window, Definition of Motivation - Types of Motivation Techniques and strategies for self motivation - Motivation checklist and Goal setting based on the principle of SMART - Self motivation and life.

**UNIT - III**

Memory and Decision making - Definition and importance of memory - Causes of forgetting Techniques of improving memory - The decision making process.

**UNIT - IV**

Study skills - Definition of study skills - Characteristics of study skills - Techniques of passing exams

**UNIT-V** Assertiveness - Definition and characteristics - Assertive-submissive - Aggressive differences - Assertiveness skills

**REFERENCES BOOKS**

1. Mile, D.J. 2004. Power of positive thinking. Delhi:Rohan Book Company.
2. Praveshkumar. 2005. All about self-motivation. New Delhi: Goodwill Publishing House
3. Dudley, D.A. 2004. Double your learning power. Delhi: Konark Press. Thomas Publishing Group Ltd.
4. Lorayne, H. 2004. How to develop super power memory. Delhi: Konark Press. Thomas Publishing Group Ltd.
5. Hurlock, E.B. 2006. Personality Development, 28th Reprint. New Delhi: Tata McGraw Hill.

## EVS : ENVIRONMENTAL STUDIES

**COURSE OBJECTIVES**

To make students understand the environment and Environmental pollution

**UNIT - I : Scope and importance of Environmental Science :** Definition, Multidisciplinary nature of environmental science, scope and importance; global environmental problems.

**UNIT - II : Ecosystems:** Concept of an ecosystem. Structure and function of an ecosystem. Producers, consumers and decomposers. Energy flow in the ecosystem. Food chains, food webs and ecological pyramids.

**UNIT - III : Biodiversity and its conservation** : Introduction – Definition : Value of biodiversity: consumptive use, productive use. India as a mega-diversity nation, Hot-spots of biodiversity. Brief account on biodiversity conservation.

**UNIT - IV Environmental Pollution** : Definition – Cause, effects and control measures of :- a) Air pollution, b) Water pollution. Solid waste Management : Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution.

**UNIT - V Social Issus and the Environment** : Water conservation, rain water harvesting. Climate change, global warning, acid rain, ozone layer depletion, nuclear accidents. Waste land reclamation.

**TEXT BOOK**

1. Environmental Studies (UGC syllabus), Jazym Publications, Trichy.
2. Odum, E.P. 1971. Fundamentals of Ecology. W.B. Saunders Co. USA.
3. Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
4. Jadhav, H & Bhosale, V.M. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi
5. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad India.

**Semester – IV**

## CORE IV : PROGRAMMING IN JAVA

### COURSE OBJECTIVES

- To understand the basic programming constructs of Java Language.
- To explore the features of Java by coding.

**UNIT- I**

Genesis of Java: Creation of Java – why java is important to internet – The Java Buzz words – An overview of Java Object Oriented Programming. Data types – Variables – Type conversion and casting – Automatic type promotion in Expressions – Strings. Arrays: One Dimensional Array – Multi Dimensional Array – Operators – Control statements.

**UNIT - II**

Class Fundamentals – Declaring objects – Assigning object Reference variables – Introducing Methods – Constructors – Garbage collection – Finalize () Method – Stack class. A Closer Look at Methods and classes: Overloading Methods –Argument passing –Nested and Inner classes – String class – Using command line arguments. Inheritance Basics & Types - Method overriding – Dynamic Method Dispatch – Using Abstract class – Using final with inheritance.

**UNIT - III**

Packages & Interface - Exception Handling - Creating your own Exception subclasses. Multithreaded Programming: Java Thread Model – Main Thread – Creating a Thread - Creating Multiple Threads–Using is Alive () and join () – Thread priorities – Synchronization – Inter thread Communication.

**UNIT - IV**

I/O: I/O Basics Reading console Input – writing console output – The Print Writer class – Reading and Writing Files. - AWT Classes – Window fundamentals – working with Frame Windows - working with Graphic Using AWT controls: Controls fundamentals – Labels – using Buttons – Applying check Boxes – Check Box group – Choice controls – Using a Text field – Using a Text Area – Understanding Layout Managers (Flow Layout only) – Menu Bars and Menus.

**UNIT - V**

JDBC -Introduction - JDBC Architecture - JDBC Classes and Interfaces – Database Access with Databases -Steps in Developing JDBC application – Database manipulation with JDBC.

### TEXT BOOK

1. Herbert Schildt, “Java - The Complete Reference”, Ninth Edition, McGraw-Hill Education, 2014

### REFERENCE BOOKS

1. E. Balagurusamy, “Programming with Java”, Tata McGraw-Hill Education India, 2014
2. Paul Deitel and Harvey Deitel, “Java: How to Program”, Prentice Hall Publishers; 9th Edition.
3. Sagayaraj, Denis, Karthik and Gajalakshmi, “JAVA Programming for Core and Advanced Learners”, 2018

## PRACTICAL: IV JAVA PROGRAMMING LAB

### COURSE OBJECTIVES

- To study the programming language Java and develop programs on OOP concepts

1. Define a class called Student with the attributes name, reg_number and marks obtained in four subjects(m1,m2,m3,m4).Write a suitable constructor and methods to find the total mark obtained by the student and display the details of the student.
2. Write a Java program to find the area of a square, rectangle and triangle by
   (i) Overloading Constructor (ii) Overloading Method.
3. Write a java program to add two complex numbers. [Use passing object as argument and return object].
4. Define a class called Student_super with data members name, roll number and age. Write a suitable constructor and a method output () to display the details.
5. Derive another class Student from Student_super with data members height and weight. Write a constructor and a method output () to display the details which overrides the super class method output().[Apply method Overriding concept].
6. Write a java program to create an interface called Demo, which contains a double type constant, and a method called area () with one double type argument. Implement the interface to find the area of a circle.
7. Write a java program to create a thread using Thread class.
8. Demonstrate Java inheritance using extends keyword.
9. Write a Java program to throw the following exception,
   1) Negative Array Size 2) Array Index out of Bounds
10. Write a java program to create a file menu with option New, Save and Close, Edit menu with option cut, copy, and paste.

## SBE – IV - ANDROID PROGRAMMING

**COURSE OBJECTIVES**

- To give an exposure over android programming

**UNIT –I**

Introduction to Android – Features of Android-Architecture of Android- Creating First Android Application - Anatomy of Android Application-Components of Android Application-Lifecycle of Activity.

**UNIT-II**

Screen Layouts: Linear, Table, Relative, Absolute and Grid. Basic Views: Toast, TextView, EditText, Button, AutoCompleteTextView, CheckBox, ToggleButton, ImageButton, RadioButton, SeekBar, ListView, ImageView, DatePicker and TimePicker.

**UNIT – III**

Intents: Creating Intents, Explicit and Implicit Intents, Calling Built – In Application Using Intents. Menus: OptionsMenu, ContextMenu and PopupMenu.

**UNIT - IV**

Data Persistence: Saving and Loading using Shared Preferences - Persisting Data to Files - SQLite Database: Create, Insert, Delete, Update and Select queries.

**UNIT–V**

Developing Android Services: Lifecycle of Service, Types of service and Creating own services. Publishing Android Applications: Preparing for Publishing - Deploying APK Files.

**TEXT BOOK**

1. Wei- Meng Lee ,‖Beginning ANDROID 4 Application Development‖, Wiley publications,2013.

**REFERENCE BOOKS**

1. "Android programming for Beginners" - By John Horton, Packt
2. "Android system programming" By Roger Ye, Packt
3."Android For Beginners " Pratiyash Guleria, BPB publications.

## VBE : VALUE BASED EDUCATION

**COURSE OBJECTIVES**

The age today is marked by vast technological changes which have wrought widespread transformations in social and cultural conditions. In such a situation Education without values becomes directionless. This paper stresses the importance of inculcating values in the young minds.

**UNIT- I**

**Values:** Definition and Meaning of Values- Human Values, Social Values, Cultural and Religious Values, Ethical Values, Global Values and Spiritual Values.

**UNIT-II**

**The Power of Positive Thinking:** 'Building Self-Confidence'-Norman Vincent Peale (From Touchstone: Synergy of Values)

**UNIT-III**

**Leadership: The Challenge of Excellence:** Living Excellence –Anthony Robbins (From Touchstone: Synergy of Values)

**UNIT-IV**

**The Personal Value of Truth and Its Importance:** The Story of My Experiments with Truth - M.K. Gandhi (Chapter 2)

**UNIT V**

**Human Rights:** Universal Declaration of Human Rights – Human Rights violations (From Touchstone: Synergy of Values)

**REFERENCE BOOKS**

1) *Touchstone : Synergy of Values* ( Madras University Publication - 2003)
2) Swami Vivekananda- *Youth and Modern India*, Ramakrishna Mission, Chennai.
3) M.K.Gandhi- *The Story of My Experiments with Truth*, Maple Classic
4) Norman Vincent Peale-*The Power of Positive Thinking*
5) Martin Meadows- *How to Build Self-Discipline: Resist Temptations and Reach Your Long-Term Goals*
6) M.G.Chitakra- *Education and Human Values*, A.P.H Publishing Corporation, New Delhi, 2003.
7) Anthony Jay Robbins - *Unlimited Power: The New Science of Personal Achievement*, Free Press New York, 1986 (Pages 408 – 410)
8) Ed. Dr. N.Venkataiah. *Value Education.* APH Publishing Corporation, New Delhi,2007.(Pages 1- 8)

**Semester – V**

## CORE V - OPERATING SYSTEMS

### COURSE OBJECTIVES

- To introduce basic concepts and functions of operating systems and understand the concept of process, thread and resource management
- To understand various Memory, I/O and File management techniques.

**UNIT – I**

Introduction: Views- Goals – Types of System – OS Structure – Components – Services – Process Management: Process – Process Scheduling – Cooperating process – Threads – Inter Process Communication. CPU Scheduling: CPU Schedulers – Scheduling Criteria – Scheduling Algorithms.

**UNIT – II**

Process Synchronization: Critical-Section Problem – Synchronization Hardware – Semaphores – Classical Problems of Synchronization. Deadlocks: Characterization – Methods for Handling Deadlocks – Deadlock Prevention - Avoidance – Detection - Recovery.

**UNIT – III**

Memory Management: Address Binding – Dynamic Loading and Linking – Overlays – Logical and Physical Address Space – Contiguous Allocation – Internal and External Fragmentation. Non-Contiguous Allocation: Paging and Segmentation Schemes – Implementation – Fragmentation.

**UNIT – IV**

Virtual Memory: Demand Paging – Page Replacement – Page Replacement Algorithms. File System: File Concepts – Access Methods – Directory Structures – File System Structures – Allocation Methods – Free Space Management.

**UNIT – V**

I/O System: Overview – I/O Hardware – Application I/O Interface – Transforming I/O Requests to Hardware Operations – Protection – Goals – Domain – Access matrix – The Security Problem – Authentication – Unix System: Features of UNIX - Basic commands.

### TEXT BOOK

A. Silberschatz P.B.Galvin, Gange., *Operating System Concepts*, 6th Edition, John Wiley and Sons, 2002.

### REFERENCES

H.M. Deitel, *An Introduction to Operating System*, Second Edition, Addition Wesley, 1990.

## CORE VI - RELATIONAL DATABASE MANAGEMENT SYSTEMS

### COURSE OBJECTIVES

- To describe a sound introduction to the discipline of database management systems.
- To give a good formal foundation on the relational model of data and study the SQL and PL/SQL in detail.

### UNIT - I

Introduction: Database System-Characteristics of Database Management Systems - DBMS Vs. File System – Advantages of DBMS - Architecture of Database Management Systems -Database Models - Entity Relationship Model.

### UNIT - II

Relational Database Model: Structure of Relational Model-Types of keys. Relational Algebra: Unary operations-Set operations - Join operations.

Normalization: Functional Dependency - First Normal form - Second Normal Form - Third Normal form - Boyce-Codd Normal Form - Fourth Normal Form.

### UNIT - III

SQL: Introduction. Data Definition Language, Data Manipulation Language, Data Retrieval: Select statement, Transaction Control Language, Single row functions using dual: Date, Numeric and Character functions. Group/Aggregate functions, Set Functions. Defining Constraints: Primary Key, Foreign Key, Unique, Check, Not Null.

### UNIT - IV

PL/SQL: Introduction-PL/SQL Basic-Character Set- PL/SQL Structure-SQL Cursor Management – Subprograms – Functions - Procedures.

### UNIT - V

Exception Handling: Introduction - Predefined Exception - User Defined Exception –Triggers - Implicit and Explicit Cursors - Loops in Explicit Cursor.

### TEXT BOOK

1. Pranab Kumar Das Gupta and P. Radha Krishnan, "*Database Management System Oracle SQL and PL/SQL"*, Second Edition, 2013, PHI Learning Private Limited.

### REFERENCE BOOKS

1. Ramez Elmasri and Shamkant B. Navathe, "*Fundamentals of Database Systems*", Seventh Edition, Pearson Publications.
2. Abraham Silberschatz, Henry Korth, S. Sudarshan, "*Database System Concepts*", Seventh Edition, TMH.

## PRACTICAL V – SQL AND PL/SQL

### COURSE OBJECTIVES

- Study the various DDL, DML commands.
- Write queries in SQL to retrieve any type of information from a data base.

Demonstrate the following SQL commands and can take any back end RDBMS system for implementation purpose.

1. Data Definition of Base Tables.
2. DDL with Primary key constraints
3. View creation and updation
4. DML Commands: Insert, Delete and Update of Base Table
5. Demonstrate the Query commands
6. Numeric and Character Functions.
7. Aggregate or Group Functions.
8. Set operations
9. Write a PL/SQL code block that will accept an account number from the user and debit an amount of Rs. 2000 from the account. If the account has a minimum balance of 500 after the amount is debited, the Process will fire a message.
10. Write a PL/SQL code block to write a PL/SQL code to calculate the total and the percentage of marks of the students in four subjects (Use Cursors).
11. Write a PL/SQL program to demonstrate various Exception Handling mechanism.
12. Create a transparent audit system for a table Client_master (client_no, name, address, Bal_due). The system must keep track of the records that are being deleted or updated. The functionality being when a record is deleted or modified the original record details and the date of operation are stored in the auditclient(client_no, name, bal_due, operation, userid, opdate) table, then the delete or update is allowed to go through.

## CORE VII - SOFTWARE ENGINEERING

**COURSE OBJECTIVES**

- To understand the software engineering concepts.
- Understand the coding, testing and user interface design
- Design, develop the software projects and software reliability and quality management

**UNIT - I**

Introduction - Software Engineering Discipline - Evolution and Impact - Programs Vs Software Products. Software Life Cycle Models: Use of a Life Cycle Models - Classical Waterfall Model - Iterative Waterfall Model - Prototyping Model - Evolutionary Model - Spiral Model. Software Project Management: Responsibilities of a Software Project Manager - Project Planning - Metrics for Project Size Estimation - Project Estimation Techniques -Risk Management.

**UNIT - II**

Requirements Analysis and Specification: Requirements Gathering and Analysis -Software Requirements Specification (SRS) - Formal System Development Techniques. Software Design: Characteristics of a Good Software Design - Cohesion and Coupling -Neat Arrangement - Software Design Approaches.

**UNIT - III**

Function-Oriented Software Design: Overview of SA/SD Methodology - Structured Analysis - Data Flow Diagrams (DFDs).Object Modeling Using UML: Overview of Object-Oriented Concepts - UML Diagrams - Use Case Model - Class Diagrams - Interaction Diagrams - Activity Diagrams - State Chart Diagram.

**UNIT - IV**

User Interface Design: Characteristics of a Good User Interface - Basic Concepts - Types of User Interfaces - Component-Based GUI Development; Coding and Testing: Coding - Testing - UNIT Testing - Black-Box Testing - White-Box Testing - Debugging -Integration Testing - System Testing.

**UNIT - V**

Software Reliability and Quality Management: Software Reliability - Statistical Testing - Software Quality - Software Quality Management System - ISO 9000.Computer Aided Software Engineering: CASE Environment - CASE support in Software Life Cycle - Characteristics of CASE Tools - Architecture of a CASE Environment. Software Maintenance: Characteristics of Software Maintenance - Software Reverse Engineering.

**TEXT BOOK**

1. Rajib Mall, "Fundamentals of Software Engineering",3rd Edition, Prentice Hall of India Private Limited, 2008.

**REFERENCE BOOKS**

1. Rajib Mall, "Fundamentals of Software Engineering", 4thEdition, Prentice Hall of India Private Limited, 2014.
2. Richard Fairley, "Software Engineering Concepts", TMGH Publications, 2004.

## CORE VIII: OPEN SOURCE TECHNOLOGY

### COURSE OBJECTIVES

- Introduces Open Source methodologies.
- To make the students to gain experience using open source tools, languages and frameworks to prepare for careers in software development.

**UNIT - I**

Introduction: Open Source, Free Software – Commercial Software vs. Open Source Software, History: BSD, The Free Software Foundation and the GNU Project. Open Source Development Model Licences and Patents: License basics, Important FOSS Licenses (Apache, BSD, GPL, LGPL), copyrights and copylefts.

**UNIT - II**

Principle and methodologies of Open Source Softwares - Philosophy: Software Freedom, Patents - Economics of FOSS: Zero Marginal Cost, Income-generation opportunities - Community Building: Importance of Communities in Open Source Movement - Open source ethics - Social and Financial impacts of open source technology - Shared software and shared source.

**UNIT - III**

PHP Introduction – Structure of a PHP script – Understanding Data types – Variables - Constants – Operators - Controlling Program Flow: Conditional Statements – Looping Statements.

**UNIT - IV**

PHP Arrays: Indexed, Associative and Multidimensional Arrays – User defined functions - Built-in functions: String, Numeric, Date, Time and Array Functions – Creating Classes – Basic Form Processing - Cookies – Session Management.

**UNIT - V**

Working with Files and Directories: Reading Files - Writing Files - Processing Directories – Database Access with PHP – MySQL: MySQL Functions – Inserting Records – Selecting Records – Deleting Records – Updating Records.

### TEXT BOOKS

1. Kailash Vedera, Bhavyesh Gandhi, “Open Source Technology”, Laxmi Publications; First edition
2. VIKRAM VASWANI- PHP A Beginner’s Guide, Tata McGraw-Hill

### REFERENCE BOOKS

1. Paul Kavanagh, “Open Source Software: Implementation and Management”, Elsevier Digital Press
2. The Linux Documentation Project : http://www.tldp.org
3. The PHP Complete Reference – Steven Holzner – Tata McGraw-Hill Edition.
4. Spring into PHP5 – Steven Holzer, Tata McCraw Hill Edition
5. Docker Project Home : http://www.docker.com

## PRACTICAL VI: OPEN SOURCE TECHNOLOGY LAB

### COURSE OBJECTIVES

- To develop technical solutions for problems using the open source software are readily available at free of cost.
- Learn about Web Servers and configurations.
- Learn programming in PHP and MySQL.

1. Write a PHP Script to demonstrate Variables and Constants

2. Write a PHP Script to compare three variables using IF statement and relational operators.

3. Write a PHP Script to perform arithmetic operations on two variables using switch case statement.

4. Create a PHP script using for loop to add all the integers between 0 and 30 and display the total**.**

5. Write a PHP script using nested for loop that creates a chess board.

6. Create a PHP indexed array to store set of integers and iterate thru loops and for each statements.

7. Create a PHP script that stores the capital and country name of few countries. Sort the list by the name of the country.

8. Create a PHP script to demonstrate call-by-value and call-by-reference using user-defined functions.

9. Create a PHP script to demonstrate built-in functions (Array, Numeric, String and Date).

10. Create a PHP script to create a Book class with members Bookid, BookName, AuthorName and Publishing Date. Include appropriate constructor to assign PublishingDate as current date.

11. Create a PHP script that accepts student's rollnumber, name and marks in three subjects as input and display the total marks.

12. Write a PHP script to create and display Cookies.

13. Write a PHP script to display the number of visitors visited the particular page using session management.

14. Write a PHP script to create and delete files in server-side.

15. Write a PHP script for Pay roll processing using MySQL.

**Semester : VI**

## CORE IX: PROGRAMMING IN PYTHON

### COURSE OBJECTIVES

- To understand the basic components of computer programming using the Python language
- To demonstrate significant experience with the Python program development environment

**UNIT-I**

Introduction to Python - Why Python - Installing in various Operating Systems - Executing Python Programs - Basic Programming concepts - Variables, expressions and statements - Input/ Output – Operators.

**UNIT-II**

Conditions - Functions - Arguments - Return values - Iteration - Loops - Strings -Data Structures - Lists - Dictionaries - Tuples - Sequences - Exception Handling.

**UNIT-III**

File Handling - Modules - Regular Expressions - Text handling - Object Oriented Programming - Classes - Objects - Inheritance - Overloading - Polymorphism Interacting with Databases - Introduction to MySQL - interacting with MySQL - Building a address book with add/edit/delete/search features.

**UNIT-IV**

Introduction to Graphics programming - Introduction to GTK - PyGTK - Developing GUI applications using pyGTK - Scientific Programming using NumPy / SciPy - Image Processing - Processing multimedia files -Network Programming, Web services using SOAP, Introduction to Graphics programming - PyGame

**UNIT-V**

Introduction to Version Control Systems - Subversion/Git, Writing Unit Tests, Creating Documentation, Contributing to Open Source Projects

### TEXT BOOK

1. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist",1st Edition 2012, O'Reilly.

### REFERENCE BOOKS

1. Jeff McNeil ,"Python 2.6 Text Processing: Beginners Guide", 2010 ,Packet Publications
2. Mark Pilgrim ,"Dive Into Python " , 2nd edition 2009, Apress

## PRACTICAL VII: PYTHON PROGRAMMING LAB

### COURSE OBJECTIVES

- To understand the programming basics in Python Programming
- To understand the object-oriented program design and development in Python Programming

1. Create a simple calculator to do all the arithmetic operations
2. Write a program to use control flow tools like if.
3. Write a program to use for loop
4. Data structures

    use list as stack

    use list as queue

    tuple, sequence
5. Create new module for mathematical operations and use in your program
6. Write a program to read and write files, create and delete directories
7. Write a program with exception handling
8. Write a program using classes
9. Connect with MySQL and create address book
10. Write a program using string handling and regular expressions
11. Program to parse apache log file
12. Create a GUI program using pygtk

## CORE X : LINUX AND SHELL PROGRAMMING

### COURSE OBJECTIVES

- To understand the basics of Linux OS
- Study the shell programming

**UNIT - I**

Introduction to Linux: History of Linux – Linux Architecture – Kernel – Uses of Linux – Linux distributions - Linux Essential Commands – Files and directories - File types - Linux System Standard Files – The vi Editor.

**UNIT - II**

Introduction to Shell scripting: Shell – Shell Types – Structure of bash shell script – Script file names and permissions – Variables: Variable names, Defining and accessing variables, Variable types, Special variables – Read and Echo commands – Basic operators: Arithmetic Operators, Relational Operators, Boolean Operators, String Operators and File Test Operators

**UNIT - III**

Decision Making: if statement, if else statement, elif ladder and case statement- Looping: while loop, for loop and until loop – break and continue statements – Meta characters -Substitution in expression and command substitution - Input and Output redirection.

**UNIT - IV**

Arrays - User-defined functions – Command line arguments – String processing – Process basics – Commands related with processes – Filter commands.

**UNIT - V**

Basic System administration: Super User Control – Scheduling tasks using cron – System run levels – Configuration directories and files – User configuration files – Adding and Removing Users and Groups

### TEXT BOOK

1. The Complete Reference LINUX - Richard L. Petersen, McGraw Hill,

2. LINUX shell scripting by Ganesh Naik, Packt Publishing Ltd.,

### REFERENCE BOOK

1. Linux Shell Scripting with Bash 1st Edition by Ken O. Burtch

## PRACTICAL VIII : SHELL PROGRAMMING LAB

**COURSE OBJECTIVES**

- Simulate the file commands
- Write simple shell scripting

1. Write a shell script for basic arithmetic and logical calculations
2. Write a shell script to demonstrate the file commands: rm, cp, cat, mv, cmp, wc, split, diff using choice menus (use elif ladder).
3. Write a shell script to show the following system configuration:
    a. currently logged user and his log name.
    b. current shell, home directory, Operating System type, current Path setting, current working directory.
    c. show currently logged number of users, show all available shells
    d. show CPU information like processor type, speed
    e. show memory information.
4. Write a Shell Script to demonstrate the following: pipes, Redirection and tee commands.
5. Write a shell script for displaying current date, user name, file listing and directories by getting user choice (use case statement).
6. Write a shell script to create an array and perform various operations in that array.
7. Write a shell script to demonstrate the filter commands.
8. Write a shell script to remove the files which has file size as zero bytes.
9. Write a shell script to find the sum of the individual digits of a given number.
10. Write a shell script to find the greatest among the given set of numbers using command line arguments.
11. Write a shell script for palindrome checking.
12. Write a shell script to print the multiplication table of the given argument using for-loop.

## ELECTIVE I: E-COMMERCE TECHNOLOGIES

**COURSE OBJECTIVES :**

- Understand concept of Ecommerce and its types
- Study the various online payment and marketing on Web
- Understand various E-business Strategies.

**UNIT- I**

History of E-commerce and Indian Business Context: E-Commerce -Emergence of the Internet - Emergence of the WWW - Advantages of E-Commerce - Transition to E-Commerce in India - The Internet and India - E-transition Challenges for Indian Corporate.

**UNIT- II**

Business Models for E-commerce: Business Model - E-business Models Based on the Relationship of Transaction Parties - E-business Models Based on the Relationship of Transaction Types.

**UNIT- III**

Enabling Technologies of the World Wide Web: World Wide Web - Internet Client-Server Applications - Networks and Internets - Software Agents - Internet Standards and Specifications - ISP.E-Marketing : Traditional Marketing - Identifying Web Presence Goals - Online Marketing - E-advertising - Ebranding.

**UNIT- IV**

E-Payment Systems: Main Concerns in Internet Banking - Digital Payment Requirements - Digital Token-based e-payment Systems - Classification of New Payment Systems - Properties of Electronic Cash - Cheque Payment Systems on the Internet.

**UNIT- V**

Information systems for Mobile Commerce: Introduction - Wireless Applications - Cellular Network - Wireless Spectrum - Technologies for Mobile Commerce - Wireless Technologies.

**TEXT BOOKS**

1. P.T.Joseph, "E-Commerce - An Indian Perspective", 4th Edition, PHI Learning, 2012.
2. C Xavier, "World Wide Web Design with HTML", 13th Reprint, Tata McGraw Hill, 2006.
3. A.Leon and M.Leon, "Introduction to Information Technology", 1stEdition, Vijay Nicole Publications, 2013.

**REFERENCE BOOKS**

1. David Whiteley, "E-Commerce Strategy, Technologies and Applications", 1st Edition, Tata Mc-Graw-Hill, 2001.
2. Alexis Leon and Mathews Leon, "Internet for Everyone", 15th Anniversary Edition, Leon Tech world, UBS Publications, 2012.
3. Ritendra Goel, "e-commerce", New Age International Publishers, 2016.

## ELECTIVE I – MULTIMEDIA SYSTEMS

### COURSE OBJECTIVES

- To understand the standards available for different audio, video and text applications
- To learn various multimedia authoring systems in multimedia production team

### UNIT - I

Multimedia Definition - Use Of Multimedia - Delivering Multimedia - Text: About Fonts and Faces - Using Text in Multimedia - Computers and Text - Font Editing and Design Tools - Hypermedia and Hypertext.

### UNIT- II

Images: Plan Approach - Organize Tools - Configure Computer Workspace - Making Still Images - Color - Image File Formats. Sound: The Power of Sound - Digital Audio - Midi Audio - Midi vs. Digital Audio - Multimedia System Sounds - Audio File Formats -Vaughan's Law of Multimedia Minimums - Adding Sound to Multimedia Project.

### UNIT- III

Animation: The Power of Motion - Principles of Animation - Animation by Computer - Making Animations that Work. Video: Using Video - Working with Video and Displays - Digital Video Containers - Obtaining Video Clips - Shooting and Editing Video.

### UNIT- IV

Making Multimedia: The Stage of Multimedia Project - The Intangible Needs - The Hardware Needs - The Software Needs - An Authoring Systems Needs- Multimedia Production Team.

### UNIT - V

Planning and Costing: The Process of Making Multimedia - Scheduling - Estimating - RFPs and Bid Proposals. Designing and Producing - Content and Talent: Acquiring Content - Ownership of Content Created for Project - Acquiring Talent.

### TEXT BOOK

1. Tay Vaughan, "Multimedia: Making It Work", 8th Edition, Osborne/McGraw-Hill, 2001.

### REFERENCE BOOK

1. Ralf Steinmetz & Klara Nahrstedt "Multimedia Computing, Communication & Applications", Pearson Education, 2012.

## ELECTIVE I : COMPUTER GRAPHICS

**COURSE OBJECTIVES**

- Understand the basic concepts of Computer Graphics
- Apply geometric transformations, viewing and clipping on graphical objects
- Understand visible surface detection techniques and illumination models

**UNIT - I**

Overview of graphics Systems: Video Display Device - Refresh Cathode-Ray tubes Raster - Scan Displays Random - Scan Displays - Color CRT Monitors - Direct view Storage tubes Flat - Panel Displays Three - Dimensional Viewing Devices, Stereoscopic and Virtual - Reality Systems.

**UNIT - II**

Raster - Scan Systems Video Controller - Random - Scan Systems Video Controller - Random-Scan Systems - Input device – Keyboard- Mouse - Trackball - Space ball and Joysticks - Data Glove – Digitizers Image Scanners - Touch Panels - Light pens. Voice Systems - Hard-Copy Devices - Line Drawing Algorithms-DDA Algorithms - Circle generating Algorithm Properties of Ellipses.

**UNIT - III**

Two Dimensional Geometric Transformation: Basic Transformations - Translation - Rotation - Scaling - Matrix Representations and Homogeneous Coordinates - Other Transformations Reflections Two Dimensional Viewing : Windows to view point coordinate Transformations - Clipping Operations - Point Clipping - Line Clipping - Curve Clipping - Text Clipping - Exterior Clipping.

**UNIT - IV**

Three Dimensional Concepts: Three Dimensional Display method - Parallel projection - Depth cueing visible line and surface - Three Dimensional Geometric and modelling Transformations: Translation - Rotation - Scaling - Composite Transformations. Three Dimensional Viewing: Viewing pipeline - Viewing Coordinates - Projections - Parallel Projections - Perspective Projections.

**UNIT – V**

Visible Surface Detection Methods : Classification Visible Surface Detection Algorithms - Back Face Detection - Depth - Buffer Method - A-Buffer Method - Scan line method - Depth sorting method.

**TEXT BOOK**

1. Donald Hearn and M. Pauline Baker , "Computer Graphics", 2nd Edition, 1996

**REFERENCE BOOK**

1. John f. Hughes, Andries Van Dam, Morgan Mcguire, David F. Sklar, James D. Foley, Steven K. Feiner, Kurt Akeley, "Computer Graphics Principles and Practice" 3rd Edition, Pearson Education,2014.

## ELECTIVE II - COMPUTER NETWORKS

### COURSE OBJECTIVES

- To understand the concept of Computer network
- To impart knowledge about networking and inter networking devices

### UNIT – I

Introduction :Uses of Computer Networks-Business Applications-Home Applications-Mobile Users-Social issues– Network Hardware-Personal area networks-Local area networks-Metropolitan area networks-Wide area networks-internetworks-Network Software– Reference Models – OSI and TCP/IP Models.

### UNIT - II

The Physical Layer : Guided Transmission Media-Wireless Transmission - Communication Satellites – Telephone System: Structure, Local Loop, Trunks and Multiplexing and Switching.

### UNIT - III

The Data Link Layer: Design Issues – Error Detection and Correction-Elementary Data Link Protocols - Medium Access Control SubLayer – Multiple Access Protocols –ALOHA-carrier sense Multiple access protocols-Collision free protocols-Limited contention protocols.

### UNIT - IV

Network Layer - Design Issues - Routing Algorithms-Optimality principle-shortest path algorithm-Flooding-Distance vector routing-Link state routing-Hierarchical routing-Broadcast routing-Multicast routing - Congestion Control Algorithms .

### UNIT - V

Transport Layer - Services - Connection Management - Addressing, Establishing and Releasing a Connection –Application Layer-DNS-Email.

### TEXT BOOK

1. A. S. Tanenbaum, “Computer Networks”, 4th Edition, Prentice-Hall of India, 2008.

### REFERENCE BOOKS

1. B. A. Forouzan, “Data Communications and Networking”, Tata McGraw Hill, 4th Edition, 2007.
2. F. Halsall, “Data Communications, Computer Networks and Open Systems”, Pearson Education, 2008.
3. D. Bertsekas and R. Gallagher, “Data Networks”, 2nd Edition, PHI, 2008.
4. Lamarca, “Communication Networks”, Tata McGraw- Hill, 2002

## ELECTIVE II: WIRELESS NETWORK

## COURSE OBJECTIVES

- To Study about Wireless Networks, Protocol Stack And Standards.
- To Study about Fundamentals of 3G/4G Services, Its Protocols And Applications.

**UNIT I**

Introduction-WLAN Technologies: Infrared, UHF Narrowband, Spread Spectrum -IEEE802.11: System Architecture, Protocol Architecture, Physical Layer, MAC Layer, 802.11b, 802.11a – Hiper LAN: WATM, BRAN, HiperLAN2 – Bluetooth: Architecture, Radio Layer, Baseband Layer, Link Manager Protocol, Security – IEEE802.16-WIMAX: Physical Layer, MAC, Spectrum Allocation For WIMAX.

**UNIT II**

Introduction – Mobile IP: IP Packet Delivery, Agent Discovery, Tunneling And Encapsulation, IPV6-Network Layer In The Internet- Mobile IP Session Initiation Protocol – Mobile Ad-Hoc Network: Routing, Destination Sequence Distance Vector, Dynamic Source Routing.

**UNIT III**

TCP Enhancements For Wireless Protocols – Traditional TCP: Congestion Control, Fast Retransmit/Fast Recovery, Implications Of Mobility – Classical TCP Improvements: Indirect TCP, Snooping TCP, Mobile TCP, Time Out Freezing, Selective Retransmission, Transaction Oriented TCP – TCP Over 3G Wireless Networks.

**UNIT IV**

Overview Of UTMS Terrestrial Radio Access Network-UMTS Core Network Architecture: 3G-MSC, 3G-SGSN, 3G-GGSN, SMS-GMSC/SMS-IWMSC, Firewall, DNS/DHCP-High Speed Downlink Packet Access (HSDPA) - LTE Network Architecture And Protocol.

**UNIT V 4G**

Introduction – 4G Vision – 4G Features And Challenges – Applications Of 4G – 4G Technologies: Multicarrier Modulation, Smart Antenna Techniques, OFDM-MIMO Systems, Adaptive Modulation And Coding With Time Slot Scheduler, Cognitive Radio.

## TEXT BOOKS

1. Jochen Schiller, "Mobile Communications", Second Edition, Pearson Education 2012.(Unit I,II,III)
2. Vijay Garg , "Wireless Communications And Networking", First Edition, Elsevier 2007.(Unit IV,V)

## REFERENCE BOOKS

1. Erik Dahlman, Stefan Parkvall, Johan Skold And Per Beming, "3G Evolution HSPA And LTE For Mobile Broadband", Second Edition, Academic Press, 2008.

2. Anurag Kumar, D.Manjunath, Joy Kuri, "Wireless Networking", First Edition, Elsevier 2011.

3. Simon Haykin , Michael Moher, David Koilpillai, "Modern Wireless Communications", First Edition, Pearson Education 2013

## ELECTIVE II : DISCRETE STRUCTURES

### COURSE OBJECTIVES

- To understand the logic, functions and reasoning.
- To learn relations and probability

**UNIT I**

Logic: propositional logic, logical equivalence, predicates & quantifiers, and logical reasoning. Sets: basics, set operations

**UNIT II**

Functions: one-to-one, onto, inverse, composition, graphs Integers: greatest common divisor, Euclidean algorithm.

**UNIT III**

Sequences and Summations**,** Mathematical reasoning and induction: Proof strategies, Mathematical Induction, Recursive definitions, Structural Induction

**UNIT IV**

Counting: basic rules, Pigeonhole principle, Permutations and Combinations, Binomial coefficients and Pascal triangle. Probability: Discrete probability. Expected values and variance

**UNIT V**

Relations: Properties, Combining relations, Closures, Equivalence, Partial ordering, Graphs: directed, undirected graphs.

### TEXT BOOK

1.Kenneth H. Rosen. *Discrete Mathematics and Its Applications*, 7th Edition, McGraw Hill, 2012

## ELECTIVE – III : NETWORK SECURITY

### COURSE OBJECTIVES

- To study the number theory used for network security
- To understand the design concept of cryptography and authentication
- To develop experiments on algorithm used for security

### UNIT- I

Model of network security – Security attacks, services and attacks – OSI security architecture – Classical encryption techniques – SDES – Block cipher Principles DES – Strength of DES – Block cipher design principles – Block cipher mode of operation – Evaluation criteria for AES – RC4 - Differential and linear cryptanalysis – Placement of encryption function – traffic confidentiality.

### UNIT - II

Number Theory – Prime number – Modular arithmetic – Euclid's algorithm - Fermet's and Euler's theorem – Primality – Chinese remainder theorem – Discrete logarithm – Public key cryptography and RSA – Key distribution – Key management – Diffie Hellman key exchange – Elliptic curve cryptography.

### UNIT- III

Authentication requirement – Authentication function – MAC – Hash function – Security of hash function and MAC – SHA - HMAC – CMAC - Digital signature and authentication protocols – DSS.

### UNIT- IV

Authentication applications – Kerberos – X.509 Authentication services - E-mail security – IP security - Web security

### UNIT- V

Intruder – Intrusion detection system – Virus and related threats – Countermeasures – Firewalls design principles – Trusted systems – Practical implementation of cryptography and security

### TEXT BOOK

1. William Stallings, "Cryptography & Network Security", Pearson Education, Fourth Edition 2010.

### REFERENCE BOOKS

1. Charlie Kaufman, Radia Perlman, Mike Speciner, "Network Security, Private communication in public world", PHI Second Edition, 2002.
2. Bruce Schneier, Neils Ferguson, "Practical Cryptography", Wiley Dreamtech India Pvt Ltd, First Edition, 2003.
3. Douglas R Simson "Cryptography – Theory and practice", CRC Press, First Edition, 1995.

## Elective III : SYSTEM ADMINISTRATION AND MAINTENANCE

**COURSE OBJECTIVES**

- To study the basic concepts of computer system and operating system
- To configure the system installation, maintenance and trouble shooting
- To understand the basic concepts laptop, portable device and preventive maintenance techniques

**UNIT – I**

Introduction to Personal Computer: Computer System – Purposes & Characteristics of Cases - Power Supplies - Internal Components - Ports - Cables - Input devices - Output devices. Safe Lab Procedures and Tool Use: Safe Working Conditions and Procedures - Tools and Software used with PC components.

**UNIT - II**

Computer Assembly: Open Case - Install Power Supply - Attach Components to Motherboard - Installation: Motherboard - Internal Drives - Drives in External Bayes -Adapter Cards. Internal cables connections -Reattach side panels - Connection of external cables - Boot the Computer. Preventive Maintenance and Troubleshooting: Purpose of Preventing Maintenance - Steps of Troubleshooting Process.

**UNIT - III**

Fundamental Operating System: Purposes - Characteristics of Modern Operating Systems – Concepts Comparisons, Limitations, and Compatibilities - Determination of Operating System based on Customer Needs - Installation of Operating System -Navigate a GUI (Windows) - Common Preventive Maintenance Techniques- Troubleshoot.

**UNIT - IV**

Fundamental Laptops and Portable Devices: Common Uses - Components of Laptop - Comparison of the components of Desktop and Laptops - Configure Laptops - Mobile Phone Standards - Preventive Maintenance Techniques - Troubleshoot Laptop and Portable Devices. Fundamental Printers and Scanners: Types of Printers and Scanners - Installation and Configuration Process of Printers and Scanners - Preventive Maintenance Techniques - Troubleshoot.

**UNIT -V**

Fundamental Networks: Principles - Types - Concepts and Technologies - Physical Components - LAN Topologies and Architectures- Standard Organizations - Ethernet Standards - OSI and TCP/IP Models - Configuration of NIC and Modem - Establishing Connectivity - Preventive Maintenance Techniques - Troubleshoot. Fundamental Security: Security Threats - Security Procedures - Preventive Maintenance Techniques - Troubleshoot Security.

**TEXTBOOK**

1. David Anfinson & Ken Quamme, "IT Essentials: PC Hardware and Software Companion Guide", 3rd Edition, Pearson Publications, 2008.

**REFERENCE BOOK**

1. Quentin Docter, Emmett Dulaneyand Toby Skandier, "CompTIA A+ Complete Review Guide: Exam 220-901, Exam 220 - 902", 3rd Edition, Wiley Publications, 2015.

## ELECTIVE III : SOFTWARE TESTING

### COURSE OBJECTIVES

- To study various Software techniques
- To study fundamental concepts in software testing

**UNIT - I**

Introduction: Purpose – Productivity and Quality in Software – Testing Vs Debugging – Model for Testing – Bugs – Types of Bugs – Testing and Design Style.

**UNIT - II**

Flow / Graphs and Path Testing – Achievable paths – Path instrumentation – Application – Transaction Flow Testing Techniques.

**UNIT - III**

Data Flow Testing Strategies - Domain Testing: Domains and Paths – Domains and Interface Testing.

**UNIT - IV**

Linguistic –Metrics – Structural Metric – Path Products and Path Expressions. Syntax Testing – Formats – Test Cases.

**UNIT – V**

Logic Based Testing – Decision Tables – Transition Testing – States, State Graph, State Testing.

### TEXT BOOKS

1. B. Beizer, “Software Testing Techniques”, II Edn., DreamTech India, New Delhi, 2003.
2. K.V.K. Prasad , “Software Testing Tools”, DreamTech. India, New Delhi, 2005.

### REFERENCE BOOKS

1. I. Burnstein, 2003, “Practical Software Testing”, Springer International Edn.
2. E. Kit, 1995, “Software Testing in the Real World: Improving the Process”, Pearson Education, Delhi.
3. R.Rajani, and P.P.Oak, 2004, “Software Testing”, Tata Mcgraw Hill, New Delhi.

**Skill Based Elective for students other than Computer Science**

IV Semester

**SBE: COMPUTER BASICS AND OFFICE AUTOMATION**

## COURSE OBJECTIVES

The major objective in introducing the Computer Skills course is to impart training for students in Microsoft Office which has different components like MS Word, MS Excel and Power point. The course is highly practice oriented rather than regular class room teaching.

**UNIT - I**

Introductory concepts: History - Generation - Classification - Block diagram - Memory unit – CPU.

**UNIT - II**

Input Devices: Key board, Mouse and Scanner. Output devices: Monitor, Printer. Introduction to Operating systems & its features: DOS – UNIX – Windows. Introduction to Programming Languages: C, C++ and its features.

**UNIT - III**

Word Processing: Open, Save and close word document; Editing text – tools, formatting, bullets; Spell Checker - Document formatting – Paragraph alignment, indentation, headers and footers, numbering; printing – Preview, options.

**UNIT - IV**

Spreadsheets: Excel – opening, entering text and data, formatting, navigating; Formulas – entering, handling and copying; Charts – creating, formatting and printing.

**UNIT - V**

Power point: Introduction to Power point - Features – Understanding slide types – creating & viewing slides – creating slide shows. Applying special object – including objects & pictures – Slide transition – Animation effects.

## TEXT & REFERENCE BOOKS

1. Peter Norton, “Introduction to Computers” –Tata McGraw-Hill.

2. Jennifer Ackerman Kettel, Guy Hat-Davis, Curt Simmons, “Microsoft 2003”, Tata McGraw-Hill.

Note : All units need an approach through practical exposure.