

**GOVERNMENT ARTS COLLEGE (AUTONOMOUS),
SALEM-7**

B.Sc(Computer Science)

SYLLABUS

(Effective from the Academic Year 2017-2018)



GOVERNMENT ARTS COLLEGE (AUTONOMOUS), SALEM-7

NAAC REACCREDITED WITH B

BACHELOR OF SCIENCE (B.Sc) COMPUTER SCIENCE DEGREE PROGRAMME

CHOICE BASED CREDIT SYSTEM (CBCS) - REGULATIONS AND SYLLABUS

(Effective from the Academic Year: 2017 - 2018 onwards)

1. PROGRAMME SPECIFIC OBJECTIVES

- To effectively communicate computing concepts and solutions to bridge the gap between academia and computing industries to initiate and create innovation.
- Effectively utilize the gained knowledge of computing principles and mathematical theory to develop sustainable solutions to current and future computing problems.
- To impart graduate attributes with employability skills to face current cut-throat global challenges.

PROGRAMME SPECIFIC OUTCOMES

- Communication :
Students will be able to communicate in written and oral forms in such a way as to demonstrate their ability to present information clearly, logically and critically.
- Mathematics and Theory :
Students will be able to apply mathematical and computing theoretical concepts in solution of common computing applications, such as computing the order of an algorithm.
- Programming:
Students will be able to complete successfully be able to program small-to-mid-size programs on their own. Sufficient programming skills will require use of good practice, e.g. good variable names, good use of computational units, appropriate commenting strategies.
- System Design and Engineering:
Students will be able to use appropriately system design notations and apply system design engineering process in order to design, plan, and implement software systems.

2. CONDITIONS FOR ADMISSION

A candidate who has passed Higher Secondary Examination, (Academic Stream) conducted by Department of School Education, Tamil Nadu or an examination accepted as equivalent to 10+2 courses including CBSE, that are recognised by Periyar University, are eligible for admission to B.Sc. Computer Science Programme. The candidates requesting admission to B.Sc Computer Science Programme shall have passed the qualifying examination with the mandatory subjects under any one of the following groups:

Group I : Mathematics, Physics, Chemistry and Computer Science

Group II : Mathematics, Physics, Chemistry and Biology

Along with the aforesaid conditions for admission of students, the latest guidelines issued by the Government of Tamil Nadu through the Directorate of Collegiate Education, Chennai - 6, may be followed.

3. DURATION OF THE PROGRAMME

B.Sc. Computer Science Programme (Degree of Bachelor of Science) consists of three consecutive academic years composed of six semesters.

4. COURSE OF STUDY AND SCHEME OF EXAMINATION

The detailed course of study and scheme of examination is provided in Table 1.

5. EXAMINATION

The Theory and Practical Examinations shall be of three hours duration conducted at the end of each semester. **The maximum mark for each theory course and practical course is 100.** The candidate failing to get the minimum marks required for passing in any course shall be permitted to appear for each failed subject(s) in the subsequent semesters. **There is no statutory provision to conduct instant or supplementary examinations for the practical courses.**

6. PASSING MINIMUM

For Theory Examination

The breakup of marks shall be: 75 by written examinations [Semester External or S.E.] and 25 by Internal Assessment [I.A.]. The passing minimum for all Theory courses (semester external) shall be 30 out of 75. The break up for internal assessment marks for Theory courses will be as follows: Attendance: 5 + Assignment: 10 + Test: 10 = 25 Marks. There is no passing

minimum for internal assessment. The passing minimum mark for all Theory courses shall be 40 marks with both internal and external marks added together under the mandatory requirement that the candidate has secured not less than 30 out of 75 in the written examination. Candidates who score less than 30 out of 75 in the Theory courses and secure more than 40 with internal assessment (out of 100), have NOT secured the passing minimum and are required to reappear for those courses in the subsequent semesters. Revaluation of Theory courses, re-totaling of marks, supplementary and instant examination, and transparency of Theory courses are allowed as per TANSICHE, CBCS, Government Arts College (Autonomous), Salem-7 and Periyar University norms and guidelines. Candidates need to apply to the Controller of the Examinations, through the Principal with proper endorsement and recommendation by the concerned tutor and head of the department.

For Practical Examination

The breakup of marks shall be 60 marks (external) and Internal Assessment - 40 marks. The breakup for internal assessment marks shall be Practical class Attendance 10 marks + Practical Tests 15 marks + Observation Note Book 15 Marks. There is no passing minimum for internal assessment for courses. The passing minimum mark for all practical courses shall be 40 marks with both internal and external marks added together under the mandatory requirement that the candidate has secured not less than 24 out of 60 in the Practical examinations. Candidates who score less than 24 out of 60 in the Practical courses and secure more than 40 with internal assessment (out of 100), have NOT secured the passing minimum and are required to reappear for those practical in the subsequent semesters.

Revaluation of Theory courses, re-totaling of marks, supplementary or instant examination, and transparency of all practical courses are NOT permitted as per TANSICHE /CBCS guidelines for UG Science programmes, Government Arts College (Autonomous), Salem-7 and Periyar University Norms/guidelines. The candidate has to apply and re-appear for the practical examination at the next or subsequent semester only.

7. CLASSIFICATION OF SUCCESSFUL CANDIDATE

The performance of the student is indicated by the Grades and the corresponding Grade Point (GP), Grade Point Average (GPA) and Cumulative Grade Point Average (CGPA). A student is deemed to have completed a course successfully and earned the appropriate credit,

only if the candidate has earned a grade of C and above. RA denotes the candidate should Re-Appear for the examination.

| Grade | Cumulative Grade Points Average (CGPA) | Grade Description | Range of Marks |
|--------|--|-------------------|----------------|
| O | 9.0-10 | Outstanding | 90-100 |
| E | 8.0-8.9 | Excellent | 80-89 |
| D | 7.5-7.9 | Distinction | 75-79 |
| A+ | 7.0-7.4 | Very Good | 70-74 |
| A | 6.0-6.9 | Good | 60-69 |
| B | 5.0-5.9 | Satisfactory | 50-59 |
| C | 4.0-4.9 | Average | 40-49 |
| RA | 0.0-3.9 | Re-Appear | 0-39 |
| ABSENT | 0.0 | ABSENT | ABSENT |

GP = (Marks obtained in a course x Credit) / 10

GPA = Total Grade points earned in a semester / Total Credits registered in a semester

CGPA = Sum of Grade Points earned / Sum of Credits registered

Classification of Cumulative Grade Point Average (CGPA)

| | |
|-------------|---------------------|
| 9 and Above | I CLASS-OUTSTANDING |
| 8 and 8.9 | I CLASS-EXCELLENT |
| 7.5 and 7.9 | I CLASS-DISTINCTION |
| 6.0 and 7.4 | I CLASS |
| 4.0 and 5.9 | II CLASS |

8. QUESTION PATTERN

The question pattern for theory courses shall be as follows:

Duration of examination: 3 Hours

Maximum Marks: 75

Part A: 10 x 2 =20 Marks

Number of questions = 10 (without internal choice)

All questions will carry equal marks. All questions are compulsory

(Two questions will be set from each unit)

Part B: 5 x 5 = 25 Marks

Number of questions = 5 [with internal choice: as (a) or (b)]

All questions will carry equal marks. All questions are compulsory

(One question will be set from each unit with internal choice)

Part C: 3 x 10 =30 Marks

No. of questions = 5 (without internal choice)

All questions will carry equal marks. Any three questions out of five are to be answered

(One question will be set from each unit)

The question pattern for practical courses shall be as follows:

Duration of examination: 3 Hours

Maximum Marks: 60

No. of questions = 2 (without internal choice)

No. of experiments 2 x 25 = 50 Marks

Record = 10 Marks

Total Marks = 60 Marks

9. RANKING

Candidates who have passed all the examinations prescribed for the course **in the first appearance only are eligible for ranking**. A candidate who is **absent** for one or more courses in a semester examination and who later appears for the same course or courses in the subsequent semester examination **is NOT eligible for ranking** even though he/she has completed the course within three academic years / six semesters from his/her year of admission. The maximum duration for the completion of UG programme shall not exceed twelve semesters. The scheme for completion shall be consecutive twelve semesters.

10. ATTENDANCE REQUIREMENT

The attendance shall be calculated on the basis of 90 days / 450 instructional hours per semester. Candidates are mandatorily required to have 75% or above in attendance to apply and appear for their semester theory examinations without condonation of attendance. Those candidates whose attendance ranges from 65% to 74% may appear for the theory examination

after payment of the appropriate condonation fee (Rs 800) through proper channel. A candidate who is absent for the theory examinations after paying the condonation fees has to repay the condonation fees for appearing in the next or subsequent semester. **Candidates whose attendance percentage for theory courses is below 65% in a semester are NOT allowed to appear for the theory examinations and mandatorily have to redo or repeat the particular semester(s) in which they lack the necessary attendance. They will be permitted to redo or repeat the lapsed semester(s) only after the completion of their third/final year of the course as per Government Arts College (Autonomous) and Periyar University norms/guidelines.** Redo or repeat candidates have to apply through proper channel to the Principal and COE for permission to redo their lapsed semesters. **For practical examinations the attendance for practical shall be calculated on the basis of 180 days / 900 instructional hours per year combining the odd and even semesters.** Candidates are mandatorily required to have 75% or above in attendance to apply and appear for the practical examinations without condonation of attendance. Those candidates whose attendance ranges from 65% to 74% may appear for the practical examination after payment of the appropriate condonation fee (Rs 800) through proper channel. **Candidates whose attendance percentage for the practical is below 65% are NOT allowed to appear for the practical examinations and mandatorily have to redo or repeat the particular practical(s) in which they lack the necessary attendance. They will be permitted to redo or repeat the lapsed practical(s) only after the completion of their third/final year of the course as per Government Arts College (Autonomous) and Periyar University norms/guidelines.** Redo or repeat candidates have to apply through proper channel to the Principal and COE for permission to redo their lapsed practical(s).

A candidate who is absent for the practical examinations after paying the condonation fees has to repay the condonation fees for appearing in the next even or subsequent semester.

A candidate whose attendance for theory and practical classes are calculated separately is within 65% to 74%, has to pay condonation fees separately for theory and practical examinations as $\text{Rs } 800 + 800 = \text{Rs } 1600$. Condonation fees are separate for theory and practical examinations and are NOT to be combined as a single fee of Rs 800. The candidate will be allowed to appear for both theory and practical examinations under the condition that the condonation fees have been paid for both theory and practical examinations.

11. COMMENCEMENT OF THIS REGULATION

This regulation shall take effect from the academic year 2017 -2018. The students admitted to the first year of the UG Computer Science programme from 2017-2018 and thereafter shall follow these regulations.

12. TRANSITORY PROVISION

Candidates who are admitted to the B.Sc Course of study are permitted to appear for the examination under this regulation for a period of **6 years from their year of admission to the course (up to 2022-2023). Arrear candidates will be permitted to appear for the examination under this regulation up to three consecutive years or six consecutive semesters from their final or third year of their course.** The maximum duration for the completion of UG programme shall not exceed twelve consecutive semesters. The scheme for completion of the course shall be consecutive twelve semesters. Thereafter they will be permitted to appear for examination only under the syllabus and regulations then in force. It is mandatory for the candidate to inform the Controller of Examinations and Principal and get written permission from them to appear for their arrear courses after the transitory provision has lapsed in their case.

| Attendance percentage | Marks |
|-----------------------|-------|
| 90 to 100 | 5 |
| 80 to 89 | 4 |
| 70 to 79 | 3 |
| 60 to 69 | 2 |
| 50 to 59 | 1 |

The marks for assignments are given as follows:

Continuous Assessment I or CA I = 5; Continuous Assessment II or CA II = 5. The minimum number of assignments to be submitted for CA I & CAII separately is 3. The marks for tests are given as follows: Continuous Assessment I or CA I = 2; Continuous Assessment II or CA II = 2; Model Examinations (End semester) = 6. The minimum number of tests for CA I & CAII separately is 4. The test may be conducted as a unit test or for a prescribed set of marks (20/30/50) or particular question types (sections A, B or C).

For Practical Examinations

There is no passing minimum for internal assessment for practical examinations. The break up is as follows:

Attendance 10 marks + Practical Tests 15 marks + Observation Note Book 15 Marks

The marks for attendance are given as follows:

| Attendance percentage | Marks |
|------------------------------|--------------|
| 95 to 100 | 10 |
| 90 to 94 | 9 |
| 85 to 89 | 8 |
| 80 to 84 | 7 |
| 75 to 79 | 6 |
| 65 to 69 | 5 |
| 60 to 64 | 4 |
| 60 to 64 | 3 |
| 55 to 59 | 2 |
| 50 to 54 | 1 |

The marks for practical tests are given as follows:

Continuous Assessment I or CA I = 7.5; Continuous Assessment II or CA II = 7.5; the minimum number of practical tests to be conducted for CA I & CAII separately is 2. The mark for observation note book is 15. Submission of practical record notebooks with proper bona fide certificate duly signed by the Staff in charge prior to the Main practical examination is mandatory for the award for record notebook marks. Candidates who do not submit their record notebooks or submit incomplete record notebooks at the time of practical examination will be awarded zero (0) marks.

13. ACADEMIC COUNCIL RATIFICATION AND APPROVAL

These guidelines and regulations will be effective from the academic year 2017 - 2018. Any changes to these guidelines and regulation will be subject to the ratification and written approval of the Academic Council. Any subsequent changes may be done by the BOS after written permission / communication from the Academic Council. The changes are to be put up with justification for ratification and written approval of the Academic Council.

| S. No | Part | Course code | Course Name | Hours to be handled | Credits | Marks | | Max |
|-----------------------------|------|-------------|--|---------------------|-----------|------------|------------|------------|
| | | | | | | IA | SE | |
| <u>SEMESTER - I</u> | | | | | | | | |
| 1 | I | 17FTL01 | Language - I | 6 | 3 | 25 | 75 | 100 |
| 2 | II | 17FEL01 | English - I | 6 | 3 | 25 | 75 | 100 |
| 3 | III | 17UCS01 | Core Course I : Principles of Digital Computer | 5 | 4 | 25 | 75 | 100 |
| 4 | III | 17UCSP1 | Core Practical - I: Office Automation | 3 | 4 | 40 | 60 | 100 |
| 5 | III | 17AMT01 | Allied - I Course - I : Mathematics-I Algebra and Differential Calculus | 6 | 4 | 25 | 75 | 100 |
| 6 | III | 17AMT02 | Allied - I Course -II : Mathematics -II (Extended to Semester II) Integral Calculus, Fourier Series, and Laplace Transforms | 3 | - | - | - | - |
| 7 | IV | 17UVABE | Value Based Education | 1 | 2 | 25 | 75 | 100 |
| TOTAL | | | | 30 | 20 | 165 | 435 | 600 |
| <u>SEMESTER - II</u> | | | | | | | | |
| 1 | I | 17FTL02 | Language -II | 6 | 3 | 25 | 75 | 100 |
| 2 | II | 17FEL02 | English - II | 6 | 3 | 25 | 75 | 100 |
| 3 | III | 17UCS02 | Core Course II : Programming in C | 5 | 4 | 25 | 75 | 100 |
| 4 | III | 17UCSP2 | Core Practical- II: C Programming | 3 | 4 | 40 | 60 | 100 |
| 5 | III | 17AMT02 | Allied - I Course - II : Mathematics-II(Extended from Semester - I)Integral Calculus, Fourier Series, and Laplace Transforms | 3 | 3 | 25 | 75 | 100 |
| 6 | III | 17AMT03 | Allied - I Course -III : Mathematics - III: Partial Differential Equations and Vector Calculus | 6 | 3 | 25 | 75 | 100 |
| 7 | IV | 17UENST | Environmental Studies | 1 | 2 | 25 | 75 | 100 |
| TOTAL | | | | 30 | 22 | 190 | 510 | 700 |

| S. No | Part | Course code | Course Name | Hours to be handled | Credits | Marks | | Max |
|------------------------------|------|-------------|--|---------------------|-----------|------------|------------|------------|
| | | | | | | IA | SE | |
| <u>SEMESTER - III</u> | | | | | | | | |
| 1 | I | 17FTL03 | Language - III | 6 | 3 | 25 | 75 | 100 |
| 2 | II | 17FEL03 | English - III | 6 | 3 | 25 | 75 | 100 |
| 3 | III | 17UCS03 | Core Course III : Data Structures | 4 | 4 | 25 | 75 | 100 |
| 4 | III | 17UCSP3 | Core Practical III: Implementation of Data Structures | 3 | 4 | 40 | 60 | 100 |
| 5 | III | 17ASTM1 | Allied - II Course - I: Mathematical Statistics - I | 5 | 3 | 25 | 75 | 100 |
| 6 | III | 17ASTMP | Allied - II Practical (Extended to IV Semester) | 3 | - | - | - | - |
| 7 | IV | 17UCSN1 | Non Major Elective I: | 2 | 2 | 25 | 75 | 100 |
| 8 | IV | 17UCSS1 | Skill Based Elective Practical - I: Career Prospects I | 1 | 2 | 40 | 60 | 100 |
| TOTAL | | | | 30 | 21 | 205 | 495 | 700 |
| <u>SEMESTER - IV</u> | | | | | | | | |
| 1 | I | 17FTL04 | Language - IV | 6 | 3 | 25 | 75 | 100 |
| 2 | II | 17FEL04 | English - IV | 6 | 3 | 25 | 75 | 100 |
| 3 | III | 17UCS04 | Core Course IV : Relational Database Management Systems | 4 | 4 | 25 | 75 | 100 |
| 4 | III | 17UCSP4 | Core Practical -IV: SQL and PL/SQL Programming | 3 | 4 | 40 | 60 | 100 |
| 5 | III | 17ASTM2 | Allied - II Course - II : Mathematical Statistics - II | 5 | 3 | 25 | 75 | 100 |
| 6 | III | 17ASTMP | Allied - II : Practical (Extended from III Semester) | 3 | 4 | 40 | 60 | 100 |
| 7 | IV | 17UCSN2 | Non Major Elective - II : | 2 | 2 | 25 | 75 | 100 |
| 8 | IV | 17UCSS2 | Skill Based Elective Practical - II: Career Prospects II | 1 | 2 | 40 | 60 | 100 |
| TOTAL | | | | 30 | 25 | 245 | 555 | 800 |
| 1 | V | 17UEXAT | Extension Activity | - | 1 | - | - | 100 |

| S. No | Part | Course code | Course Name | Hours to be handled | Credits | Marks | | Max |
|----------------------|------|-------------|--|---------------------|-----------|------------|------------|------------|
| | | | | | | IA | SE | |
| SEMESTER - V | | | | | | | | |
| 1 | III | 17UCS05 | Core Course V : Visual Basic Programming | 5 | 5 | 25 | 75 | 100 |
| 2 | III | 17UCS06 | Core Course VI : Web Programming | 6 | 5 | 25 | 75 | 100 |
| 3 | III | 17UCS07 | Core Course VII : Programming in Python | 6 | 5 | 25 | 75 | 100 |
| 4 | III | 17UCSM1 | Major Based Elective - I : Operating Systems | 6 | 3 | 25 | 75 | 100 |
| 5 | III | 17UCSP5 | Core Practical - V : Visual Basic Programming | 3 | 4 | 40 | 60 | 100 |
| 6 | IV | 17UCSS3 | Skill Based Elective Practical - III : Web Design | 2 | 2 | 40 | 60 | 100 |
| 7 | IV | 17UCSS4 | Skill Based Elective Practical- IV : Python Programming | 2 | 2 | 40 | 60 | 100 |
| TOTAL | | | | 30 | 26 | 220 | 480 | 700 |
| SEMESTER - VI | | | | | | | | |
| 1 | III | 17UCS08 | Core Course VIII : Data Communication and Networking | 5 | 4 | 25 | 75 | 100 |
| 2 | III | 17UCS09 | Core Course IX : Programming in Java | 5 | 4 | 25 | 75 | 100 |
| 3 | III | 17UCSM2 | Major Based Elective - II : Multimedia and its applications | 5 | 3 | 25 | 75 | 100 |
| 4 | III | 17UCSM3 | Major Based Elective-III : Software Engineering | 5 | 3 | 25 | 75 | 100 |
| 5 | III | 17UCSP6 | Core Practical - VI : Java Programming | 3 | 4 | 40 | 60 | 100 |
| 6 | III | 17UCSP7 | Core Practical - VII : Software Development | 3 | 3 | 40 | 60 | 100 |
| 7 | IV | 17UCSS5 | Skill Based Elective Practical -V: Multimedia Packages | 2 | 2 | 40 | 60 | 100 |
| 8 | IV | 17UCSS6 | Skill Based Elective Practical -VI: Android Programming | 2 | 2 | 40 | 60 | 100 |
| TOTAL | | | | 30 | 25 | 260 | 540 | 800 |

TOTAL CREDITS = 140
TOTAL MARKS = 4400

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), SALEM-7

BACHELOR OF SCIENCE (B.Sc) IN COMPUTER SCIENCE

SEMESTER - I

Core Course - I : PRINCIPLES OF DIGITAL COMPUTER

Course Code : 17UCS01

A. Objectives:

- The objectives of the course can be grouped into two categories. The first one relates to digital literacy in fundamentals of digital computer and handling Input, Output and Storage Devices.
- The second set of objective relates to understanding the Number System, Codes, Boolean algebra and the Operation of Logic Components, Combinational and Sequential Circuits

B. Learning Outcomes:

- To obtain the knowledge about the Basic Computer types, Characteristics, Classification, Components and Memory.
- To analyze and per use the ability to identify the Input / Output and Storage devices of the Computer.
- To understand and examine the structure of various number systems and its application in digital design. The ability to understand, analyze and design various Combinational and Sequential Circuits.

C. Syllabus

UNIT - I

Introduction to Computers: Introduction - Types of Computers - Characteristics of Computer - Classification of Digital Computer Systems - Components of a digital computer - Memory - RAM and ROM - Types of ROM.

UNIT - II

Input Devices : Keyboard - Mouse - Trackball - Scanners Barcode Reader - Card Reader - Digitizer - Voice Regeneration - Web Cam - Digital Camera - Camcorders - OCR - OMR -ICR - MICR - **Output Devices :** Monitor - Printer - Plotter - Projector - Speakers - **Storage Devices :** Classification of Secondary storage devices - Magnetic tape - Magnetic Disks - Optical Disks .

UNIT - III

Number Systems - Base conversions - Complements - Signed Binary Numbers - Binary Arithmetic's - 2's Complement - 1's Complement Arithmetic - Binary Code - Gray Code - Excess Code & ASCII, EBCDIC. **Digital Circuits:** AND, OR, NOT, NAND & NOR, EX-OR, EX-NOR Operations - Universal Gates. **Boolean algebra:**Basic Theorem, Properties of Boolean algebra - Boolean Functions - Canonical and Standard forms - K-Map Method.

UNIT - IV

Combinational Logic Design: Introduction – Half Adder/ Half Subtractor - Full Adder/ Full Subtractor – Binary Parallel Adder / Binary Parallel Subtractor - Decoder and Encoders – Multiplexers and De-multiplexers.

UNIT - V

Sequential Logic Design: Introduction – SR Flip Flop, J-K Flip Flop, Master Slaves Flip Flop – D & T Flip Flop – Registers – Shift Registers – Counters – Modulus of Counter – Synchronous of Counter.

TEXT BOOKS:

1. Alexis Leon, Mathew's Leon, LeenaLeon "Introduction to Information Technology" Vijay Nicole Imprints Private Limited, 2013. [Units I & II).
2. Sanjay Kumar Summan, L. Bhagyalakshmi, "Digital Principals and System Design", Vijay Nicole Imprints Private Limited, 2013. [Units III, IV & V) .

REFERENCE BOOKS:

1. M. Morris Mano, "Digital Logic and Computer Design", Prentice 2004
2. K. Meena, "Principals of Digital Electronics", Prentice Hall of India (PHI), 2009.
3. V. Rajaraman, "Introduction to Information Technology", PHI, 2013.

D. Web References

1. <https://www.gcflernfree.org/computerbasics/>
2. https://www.tutorailpoint.com/computer_fundamentals/
3. https://www.tutorialpoint.com/computer_logical_organization/logic_gets.htm

E. Assignments:

1. Represent the various number Systems with examples.
2. Draw the full adder circuits a collection of two half adder.
3. What you mean by Virtual organization with Example.
4. Demonstrate telecommuting and wireless mobile commuting in Business.

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), SALEM - 7

BACHELOR OF SCIENCE (B.Sc) IN COMPUTER SCIENCE

SEMESTER I

Core Practical- I : PRACTICAL - I: OFFICE AUTOMATION

Course Code : 17UCSP1

Practical List

MS WORD:

1. Create a word document from yesterday's News Paper
 - (a) The heading should be 16-point Arial Font in Bold – Center Alignment.
 - (b) The rest of the document should use 10-point font size with Page Border
 - (c) Other heading should use 10-point Courier New Font and the use News paper name in water marking.
 - (d) The header should show your name and the footer should show the page number.
 - (e) Use Page breaks.
2. Create a document about Dr.A.P.J. Abdul Kalam and insert his images (left, right and centre alignment) using text wrapping format.
 - (a) Use bullets and Numbering for highlighting his job profile.
 - (b) Use options in Page setup.
 - (c) Use the Indent and spacing options.
 - (d) Use Hyperlinks to view his achievements.
3. Table creation.
 - (a) Create a table with the following columns Name, Father name, Address, DOB and Phone No.
 - (b) Include email-id as last column and Reg.No. as 2nd Column.
 - (c) Use various Styles and Border options.
 - (d) Use Quick table option and design the same table.
4. Create an invitation for SACS - 20 -- Inaugural function to invite various department staff of this institution using mail merge

MS EXCEL:

1.

| Student Details | | | | | | |
|-----------------|------|------|------|------|-----|---------------|
| Reg.No. | Name | Sub1 | Sub2 | Sub3 | Tot | Percentage(%) |
| | | | | | | |

Consider the student worksheet above

- Calculate total & average using formula.
- Find maximum and minimum mark in each subject.
- Apply different font style size and color. Fill the heading row with green color.

2. The following table gives an year wise sale figure of five salesman in Rs.

| Salesman | 2000 | 2001 | 2002 | 2003 |
|----------|-------|-------|--------|-------|
| S1 | 10000 | 12000 | 20000 | 50000 |
| S2 | 15000 | 18000 | 50000 | 60000 |
| S3 | 20000 | 22000 | 70000 | 70000 |
| S4 | 30000 | 30000 | 10000 | 80000 |
| S5 | 40000 | 45000 | 120000 | 90000 |

- Calculate the Commission for each sales man under the condition:
 - If total sales is greater than Rs.4,00,000 than commission is 5 % of total sale made by the salesman.
 - Otherwise, 2 % of total sale.
 - Draw a bar graph representing the sale made by each salesman.
 - Draw a pie graph representing the sale made by salesman in year 2001.
 - Create a spread sheet labeled with such text watermarks as "Confidential".
3. Enter student names and their HSC marks.
- Create a sheet with alphabetical order of names and name the sheet as sorted list.
 - Create another sheet sorting the above data in descending order of marks.
4. Use the sheet create in exercise 1 Add a Column at the right end for "Grade".
Grade is Calculated as follows:
If percentage ≥ 90 Grade = 'A'
If percentage ≥ 80 & < 90 Grade = 'B'
If percentage ≥ 70 & < 80 Grade = 'C'
If percentage ≥ 60 & < 70 Grade = 'D'
otherwise students will be declared as Fail.
- Calculate Grade using if function.
 - Apply filter to display the marks of the students details for each Grade.

MS POWER POINT:

1. Create a presentation using auto content wizard about a social issue with minimum 5 slides.
 - a. Use Slide number.
 - b. Date and time options.
 - c. Insert a movie clip.
2. Prepare a presentation about various career options for your degree
 - a. Try different views.
 - b. Use various transition effects and custom animation with Advanced Slide options.
3. Prepare a presentation about your favorite sportsman with slides having
 - a. His / her Debut play.
 - b. His / her achievements using hyperlinks.
 - c. Insert audio for slideshow.
 - d. Use various options in Illustration to show the images.

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), SALEM - 7

BACHELOR OF SCIENCE (B.Sc) IN COMPUTER SCIENCE

SEMESTER - II

Core Course - II : PROGRAMMING IN C

Course Code : 17UCS02

A. Objectives :

- To enable the students to understand the concept in C Language.
- To Encourage the students to build logical thinking capability.

B. Learning Outcomes:

- To write an Application / Software for an Embedded Systems.
- To Develop Software interfaces.
- To determine the solutions for Mathematical and Scientific Problem.

C. Syllabus

UNIT - I

History of C - Importance of C - Basic structure of C programs - Constants, Variables and Data types - Operators and Expressions - Managing Input and Output Operations.

UNIT - II

Decision making and Branching: Decision Making with IF Statement, Simple IF Statement - IF ... ELSE Statement - Nesting of IF...ELSE Statement - ELSE - IF Ladder - Switch Statement - The ?: Operator, GO TO Statement - Decision Making and Looping - WHILE Statement - DO Statement - FOR Statement.

UNIT - III

Arrays: One Dimensional Arrays - Two Dimensional Arrays - Multi-Dimensional Arrays - Character Arrays and String - Declaring and Initializing String Variables - Reading and Writing Strings - Arithmetic Operations on Characters - Comparison of Two Strings - String Handling Functions.

UNIT - IV

User-Defined Functions - Function Declaration - Category of Functions - Nesting of Functions - Recursion - Storage Classes - Structures and Union - Arrays of Structures - Arrays within Structures - Structures within Structures - Structures and Functions - Unions.

UNIT - V

Pointers- Pointer Declaration - Pointer Expression - Pointers and Arrays - Pointers and Character Strings - Array of Pointers - Pointers to Function - File management - Defining and Opening a File - Closing a File - I/O Operations on Files - Error Handling during I/O Operations - Random Access to Files - Command Line Arguments.

TEXT BOOK:

E. Balagurusamy ,"**Programming in ANSI C**" , Tata McGraw Hill Education Private Limited, 5th edition 2011.

REFERENCE BOOKS:

1. *D.Ravichandran* ,"**Programming in C**" , New Age International(P) Ltd, First Edition, 1996.
2. *R.Punithavathy,S.Sakthi and P.Vasanthakumari* "**Programming and Data Structures I**" Vijay Nicole Imprints(P) Limited, Chennai, 2014.

F.Web References

1. www.tutorialspoint.com/cprogramming.
2. [www.htgps://youtube/0mLLLRXOZ2c](https://youtube/0mLLLRXOZ2c).

G. Assignments:

1. Control Structures
2. Arrays
3. File Concepts

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), SALEM - 7

BACHELOR OF SCIENCE (B.Sc) IN COMPUTER SCIENCE

SEMESTER - II

Core Practical- II : PRACTICAL - II: C PROGRAMMING

Course Code : 17UCSP2

Practical List

1. Program to calculate area of rectangle.
2. Program to swap two numbers without using temporary variables.
3. Program to reverse a given number.
4. Program to use switch statement. Display Monday to Sunday.
5. Program to print fibonacci series upto 100.
6. Program to add two numbers using pointers.
7. Program to find the maximum number in an array using pointers.
8. Program for matrix manipulation
 - (a) Addition of two matrix.
 - (b) Subtraction of two matrix.
 - (c) Multiplication of two matrix.
 - (d) Transpose of two matrix.
9. (a) Program to show call by value.
(b) Program to show call by reference.
10. Program to find factorial of a number using recursions.
11. Program to prepare mark sheet using structures.
12. Program to create a sequential file and perform various file operations.

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), SALEM - 7

BACHELOR OF SCIENCE (B.Sc) IN COMPUTER SCIENCE

SEMESTER - III

Core Course - III : DATA STRUCTURES

Course Code : 17UCS03

A. Objective:

- To understand the concepts of Data Structures (Linear and Non-Linear)

B. Learning Outcomes:

- Students develop knowledge of basic data structures for storage and retrieval of ordered or unordered data. Data structures include: stack, queue, linked lists, binary trees, and graph.
- Students develop knowledge of applications of data structures including the ability to implement algorithms for the creation, insertion, deletion, searching, and sorting of each data structure.

C. Syllabus

UNIT - I

Introduction and Overview of Data Structures - **Stack:** Definition - Operations of Stacks - Application of Stacks. **Queue:** Definition - Operations of Queues - Various Queue Structures - Application of Queues.

UNIT - II

Linked Lists: Definition - Operation on Single Linked List, Circular Linked List and Double Linked List - Application of Linked List.

UNIT - III

Trees: Basic Terminologies - Binary Tree Representation - Binary Tree Traversals - Conversion of a Forest Tree to Binary Tree.

UNIT - IV

Graph: Definition - Graph Terminologies - Representation of Graphs - Graph Traversals.

UNIT - V

Sorting Techniques: Insertion - Radix - Quick - Heap - Merge.

Searching : Linear Search - Binary Search - Comparison of Linear & Binary Search.

D. TEXT BOOK:

Debasis Samanta "Classic Data Structures", PHI, Second Edition.

E. REFERENCE BOOKS :

1. *Ellis Horowitz, Sartaj Sahni, "Fundamentals of Data Structures", Galgotia Booksource Pvt. Ltd.*

2. *Seymour Lipschutz, "Data Structures" Tata Mcgraw Hill, Schaum's Outline Series.*

F. Web References

1. <http://nptel.ac.in/courses/106102064/>
2. <http://nptel.ac.in/courses/106106133/>
3. <http://nptel.ac.in/courses/106106127/>
4. https://www.tutorialspoint.com/data_structures_algorithms/
5. <http://www.careerride.com/test.aspx?type=Data-structure>
6. https://www.tutorialspoint.com/data_structures_algorithms/data_structures_algorithms_online_test.htm
7. <http://www.withoutbook.com/OnlineTest.php>
8. <http://www.sitesbay.com/data-structure/index>
9. https://en.wikipedia.org/wiki/Data_structure

G. Assignments:

1. Array representations and operations
2. Applications of Stack and Queue
3. Applications of Linked List
4. Binary tree traversal algorithms
5. Graph traversal algorithms
6. Algorithms for Quick and Heap sorting

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), SALEM - 7

BACHELOR OF SCIENCE (B.Sc) IN COMPUTER SCIENCE

SEMESTER - III

Core Practical - III : IMPLEMENTATION OF DATA STRUCTURES

Course Code : 17UCSP3

Practical List

1. In two dimensional array find the following using functions
 - i) Biggest number in each row.
 - ii) Smallest number in each column.
2. Implement Stack operations using array and pointers.
3. Write a program to convert infix expression to postfix.
4. Implement Queue operations using array and pointers.
5. Implement singly linked list using menu.
6. Implement Binary Tree Traversals using recursive functions.
7. Write a program to implement linear search and binary search.
8. Implement Insertion sort algorithm.
9. Implement Merge Sort Algorithm.
10. Implement Quick Sort Algorithm.

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), SALEM - 7

BACHELOR OF SCIENCE (B.Sc) IN COMPUTER SCIENCE

SEMESTER - III

Skill Based Elective Practical -I : CAREER PROSPECTS - I

Course Code : 17UCSS1

I. Conduct Online/Offline Aptitude Test using Objective Type Questions -50Nos./hour
for the topics given below:

1. Arithmetic ability
2. Verbal Reasoning
3. Nonverbal Reasoning

II. Conduct Online/Offline Technical Skill Test using Objective Type Questions 50Nos./hour for
various programming languages.

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), SALEM - 7

BACHELOR OF SCIENCE (B.Sc) IN COMPUTER SCIENCE

SEMESTER - IV

Core Course - IV : RELATIONAL DATABASE MANAGEMENT SYSTEMS

Course Code : 17UCS04

A. Objective:

- To provide the basic concepts of the Database Systems including Data Models, Storage Structure, Normalization and SQL.

B. Learning Outcomes:

- Understand what a database system is.
- Structure Data using Data Models.
- Understand the relational model of data.
- Understand Data Normalization.
- Be proficient in SQL.
- Understand query languages for databases.
- Understand basic transaction processing concepts.

C. Syllabus

UNIT - I

Introduction to Database Management Systems: Benefits of using DBMS - Functions of DBMS - Components of a DBMS. **Database Architecture and Design:** Data Abstraction - Physical and Logical Data Independence. **Data Models:** Hierarchical Model - Network Model - Relational Model - E-R Model - Object-oriented Model. **Entity-Relationship (E-R) Modeling:** Components of an E-R Model - E-R Diagram Conventions - Relationships.

UNIT - II

Data Normalization: What is Normalization? - Keys - Relationships - First Normal Form - Second Normal Form - Third Normal Form - Boyce-Codd Normal Form(BCNF). **Relational Algebra:** Relational Algebraic Operations: Union, Intersection and Difference - Cartesian Product- Select - Project - Assignment - Division - Rename - Join.

UNIT - III

Structured Query Language (SQL): Advantages of SQL - Types of SQL Commands - Arithmetic Operators - Comparison Operators - Logical Operators - Set Operators. **Queries:** Select - WHERE clause - GROUP BY clause - HAVING clause - ORDER BY clause - **Subqueries - Aggregate Functions - Insert, Update and Delete Operations.**

UNIT - IV

Database Security: Data Security Risks - Data Security Requirements - Granting and Revoking Privileges and Roles. **Transaction Management and Concurrency Control:** Transaction Properties - Transaction States - Concurrency Control - Transaction Management in SQL. **Backup and Recovery:** Database Backups - Causes of Failures - Recovery Concepts and Terminology.

UNIT - V

Distributed Databases: Architecture - Homogeneous and Heterogeneous Distributed Databases - Distributed Data Storage - Advantages and Disadvantages of Distributed Databases. **Temporal, Spatial, Multimedia and Web Databases.**

TEXT BOOK:

Alexis Leon, Mathews Leon, "Essentials of Database Management Systems", Vijay Nicole Imprints Pvt. Ltd., Second Reprint 2009.

REFERENCE BOOKS :

1. Avi Silberschatz, Henry F. Korth, S. Sudarshan, "Database System Concepts", McGraw-Hill, 6th edition
2. Nilesh Shah, "Database Systems Using Oracle", Pearson, 2nd edition.

D. Web References

1. <http://nptel.ac.in/courses/106106093/>
2. <https://www.tutorialspoint.com/dbms/>
3. <http://www.db-book.com/>
4. <http://www.w3schools.in/dbms/>
5. <https://en.wikipedia.org/wiki/SQL>
6. <https://www.w3schools.com/SQL/>
7. <https://www.tutorialspoint.com/sql/>
8. https://www.tutorialspoint.com/sql/sql_online_test.htm
9. <http://www.sanfoundry.com/1000-database-management-system-questions-answers/>

E. Assignments:

1. Entity-Relationship (E-R) Modeling
2. Data Normalization
3. Aggregate Functions in SQL
4. Database Security
5. Distributed Databases

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), SALEM - 7

BACHELOR OF SCIENCE (B.Sc) IN COMPUTER SCIENCE

SEMESTER - IV

Core Practical - IV : SQL AND PL/SQL PROGRAMMING

Course Code : 17UCSP4

Practical List

1. Designing ER diagrams for different case studies:
 - i) Banking Enterprise
 - ii) Library Management System
2. Case studies for SQL:
 - a) Create a table **client_master** with the following fields client_no, name, address1, address2, city, state, pin_code, remarks, balance_due and implement the following
 - i) Create a primary key constraint on the column client_no
 - ii) Insert five rows into the table.
 - iii) Update the table client_master
 - iv) Add a new column in the table: Age
 - v) Remove a column from the existing table.
 - vi) Change the existing data type of a column in table using ALTER/MODIFY.
 - b) Create a table named student with fields of student_id, student_name, class, M1, M2, M3, total, average, result, grade and implement the following
 - i) Compute total, average, result, grade using formula.
 - ii) Display all the students with average above 90.
 - iii) Display all the students in class II B.Sc who have a average value above 80.
 - iv) Display the rank of all the students.
 - v) Display the gradewise information for the students.
 - vi) Display student names that start with 'K'
 - vii) Select unique student names from the table.

- c) Create the following table with fields:
employee (employee-name, street, city), works(employee-name, company-name, salary), company(company-name, city), manages(employee-name, manager-name)
- Give an expression in SQL for each of the following queries:
- i) Find the names, street address, and cities of residence for all employees who work for 'ABC Corporation' and earn more than Rs.10,000.
 - ii) Find the names of all employees in the database who live in the same cities as the companies for which they work.
 - iii) Find the names of all employees in the database who live in the same cities and on the same streets as do their managers.
 - iv) Find the names of all employees in the database who do not work for 'ABC Corporation'. Assume that all people work for exactly one company.
 - v) Find the names of all employees in the database who earn more than every employee of 'XYZ Corporation'. Assume that all people work for at most one company.
 - vi) Assume that the companies may be located in several cities. Find all companies located in every city in which 'XYZ Corporation' is located.
 - vii) Find the names of all employees who earn more than the average salary of all employees of their company. Assume that all people work for at most one company.
 - viii) Find the name of the company that has the smallest payroll.
3. Write a PL/SQL to split the student table into two tables based on result (one table for "Pass" and another for "Fail"). Use cursor for handling records of student table. Assume necessary fields and create a student's details table.
 4. Write a PL/SQL block to display the given number is palindrome or not.
 5. Write a PL/SQL block to compute grade using functions.
 6. Write a PL/SQL program for finding the person who is getting maximum salary using cursor.

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), SALEM - 7

BACHELOR OF SCIENCE (B.Sc) IN COMPUTER SCIENCE

SEMESTER - IV

Skill Based Elective Practical -II : CAREER PROSPECTS - II

Course Code : 17UCSS2

I. Writing Skill Development

- a. Official/Professional Letter writing.
- b. Curriculum Vitae Preparation.

II. Speaking Skill Development

- a. Spontaneous Two Minutes Talk to improve self-confidence.
- b. Group Discussion to check Leadership, role play, flexibility, politeness and team work.
- c. Introduce yourself (Stage presentation).

I. Reading Skill Development

Answering questions for the passage given.

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), SALEM - 7

BACHELOR OF SCIENCE (B.Sc) IN COMPUTER SCIENCE

SEMESTER - V

Core Course - V : VISUAL BASIC PROGRAMMING

Course Code : 17UCS05

A. Objectives:

- To understand many of the general programming concepts required in VB.
- To understand .the basic concepts involved in event driven language.
- Analyze program requirements
- Design class develop programs with by interfaces.

B. Learning Outcomes:

The students who complete this course will have

- An ability to analyze problems and determine their requirements.
- An ability to construct solution strategy algorithms.
- Ability to create database and Reports.
- Ability to utilize database connectivity skills for Modern Project development.

C. Syllabus :

UNIT - I

Working with Visual Basic Window Components: Menu Bar, Tool Bar, Project Explorer Window, Form Layout Window, properties Window, Toolbox, Code Editor Window **Working with Forms:** Properties, Events, Methods Working with Basic Controls: Label, Command Button, Text Box, Option Button, Frame, Check Box, List Box, Combo Box, Image, Scroll, Picture, Timer, Drive List Box, Dir List Box, File List Box and Shape Controls.

UNIT-II

Basic Programming Fundamentals: Variables, Data types, Constant, Conversion Function. Scope of Variable: Public, Private, Static. Operators: Logical, Arithmetic, Concatenation, Comparison. Decision Structure: If.. Then, If..Then..Else, Select Case.. End Case. Loop Structure: Do..While, While.. Wend, For.. Next, With..End With. Do Events()

UNIT - III

Arrays: Dynamic Array, Preserve and Control arrays. **Procedure:** General procedure, General Methods for Passing Arguments to a Procedure, **Functions:** User-Interaction, String, Math, Date, Conversion Functions. **Modules:** Form, Standard.

UNIT - IV

Menus: Creating, Adding Menu Items, Creating Shortcut, Adding Separators Bars, Submenus, Code for Menus. Creating Popup Menu: System, Custom. **Database Handling:** Database Concepts, Creating and Accessing Database, Using Data Control. **Using DAO:** Creating Search Programs, Numeric Search and Complex Search Programs.

UNIT - V

Using ADO Data Control, Data Link, ODBC Data Source name, Using Connection String, Creating Navigating buttons. Working with Advanced Data Controls : Data List Control, Data Combo Control, Data Grid Control and Ms flex grid Control. **Handling Errors :** Run Time, Trapping and Handling Error, ERR Object. Data Environment and Data Reports.

TEXT BOOK:

Soma Dasgupta , "VISUAL BASIC",[BPB Publication]

REFERENCE BOOKS:

1. Evangelos Petroustos, Mastering Visual Basic 6.0 BPB Publication.
2. VISUAL BASIC 6 COMPLETE REFERENCE (TMH PUB).
3. Visual Basic 6 Deitel & Deitel (Pearson Education).

D. Web References

1. <http://www.cs.uni.edu/~fienu/ps030s09/lectures/>
2. http://people.stfx.ca/rpalanis/131/lecture_notes/VB/
3. <http://www.vbtutes.com/p/visual-basic-60-tutorial.html>
4. <http://www.vbtutor.net/vbtutor.html>
5. <http://www.freetutes.com/learn-vb6/>

E. Assignments

1. Branching and Looping
2. Menus
3. ADO & DAO Data Control

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), SALEM - 7

BACHELOR OF SCIENCE (B.Sc) IN COMPUTER SCIENCE

SEMESTER - V

Core Course - VI : WEB PROGRAMMING

Course Code : 17UCS06

A. Objectives :

- Indented basics involved in publishing content and world wide web.
- To understand the fundamentals of how the internet and the web works.
- To understand the basic tools and applications used in web publishing.

B. Learning Outcomes:

- To create and maintain responsive websites and employee strategies with user - centered design methodologies, usability principles.
- To display ability to adopt to changing web development and design skills and solid understanding of common design prince .

C. Syllabus

UNIT - I

Introduction: History - Internet and WWW- Applications and Development Tools- Web Browser - What is a Server?- Server Choices- Web Site Design issues, planning the web site, Navigation.

UNIT - II

Web Page Designing: Introduction to HTML, XHTML - basic HTML, formatting and fonts, commenting code, color, hyperlink, lists, tables, images, simple HTML forms, frames and frame sets.

UNIT - III

Style Sheets Need for CSS, introduction to CSS, basic syntax and structure, using CSS, background images, colors and properties, manipulating texts, using fonts, borders and boxes, margins, padding lists, positioning using CSS, CSS2.

UNIT - IV

Elements of JavaScript: Data types - Variables - Operators - conditional statements - Array objects - Date objects - String objects.

UNIT - V

Objects and events: Document Object Model - The Document object - Image object - Forms and Elements - Event Handling - Browser object.

TEXT BOOKS

1. *Ralph Moseley, M.T. Savaliya –“Developing Web Application”, Wiley India, 2013.*
[UNIT I - III]
2. *Xavier, C, “ Web Technology and Design” , New Age International, 2011.*

REFERENCE BOOKS

1. *Black Book, -“Web Technologies”, Dreamtech Press, 2008.*
2. *U. K. Roy, -“Web Technologies”, Oxford Higher Education, 2003.*
3. *Craig Knuckles and David Yuen. – “Web applications”, Wiley India, 2001.*

D. Web References

1. <https://www.w3schools.com/>
2. <https://www.w3.org/standards/webdesign/htmlcss>

E. Assignments

1. Design a webpage to present the syllabus for all the programmes of Department of Computer Science.
2. Design a webpage using JavaScript and CSS to display the days on which your birthday falls on next 20 years.
3. Comparative study of web 1.0, web 2.0 and web 3.0

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), SALEM - 7

BACHELOR OF SCIENCE (B.Sc) IN COMPUTER SCIENCE

SEMESTER - V

Core Course - VII : PROGRAMMING IN PYTHON

Course Code : 17UCS07

A. Objectives:

- To introduce concise and easy-to-learn syntax which enables programmers to develop more complex programs.
- To develop problem solving skills and their implementation through python.
- To apply various constructs of the language for data analytics.

B. Learning Outcomes:

The students to complete this course will have ability to

- Use Built-in high level data types: string, lists, dictionaries etc.
- Apply control structures: if, if-else, if-elif-else, while and a powerful collection iterator.
- Write codes using Multiple level of organizational structures, functions, classes, modules and package.
- Utilize Object-oriented Python which provides a consistent way to use objects.

C. Syllabus

UNIT I:

Introduction - History of python - Installation - commenting - Execution modes - Internal working of Python - Implementation. Python character set - Token - core data type - the printf() function - assigning value to a variable - multiple assignments -input(), eval() function - Formatting number and strings - inbuilt functions. **Operator and Expression:** Types of Arithmetic operators: Unary, Binary - Bitwise operators - Operator precedence and Associativity.

UNIT II:

Decision making Statements - if, if - else, nested if , multi-way if-elif-else statements. **Loop Control Statements:** While loop - range() Function - for loop.

Functions: Syntax and basics of a function -Parameters and Arguments in a function - Local and Global scope of a variable -return statement - Recursive Functions -Lamda Function.

UNIT III:

Lists: Introduction - Creating Lists - Accessing the Elements of a list - Negative List Indices - List Slicing - Python Inbuilt Functions for List - List comprehensions - List methods - **List and strings** - Splitting a string in list - Passing List to a Functions - Returning List from a Function.

UNIT IV:

Object Oriented Programming : Introduction – Defining Classes – The Self-parameter and Adding Methods to a Class- Display Class Attributes and Methods – Special Class Attributes – Accessibility – The `_init_Method` (Constructor) – Passing on Object as Parameter to a Method – `_del_()` (Destructor Method) – Class membership Tests – Method Overloading – Operator Overloading – **Inheritance :** Types of Inheritance – The Object Class – Subclass accessing attributes of Parent Class – Multiple Inheritance – Multilevel Inheritance – Method Overriding .

UNIT V:

Tuples: Creating Tuples – `tuple()` function – Inbuilt functions for tuples – Indexing and Slicing – Passing variable length arguments to tuples – **Sets:** Creating sets – The Python set class – Set operations – **Dictionaries:** Basics of Dictionaries – Creating a Dictionary – Adding, Replacing and Retrieving Values – Methods of Dictionary Class.

TEXT BOOK:

Ashok Namdev Kamthane, Amit Ashok Kamthane, “Programming and Problem Solving with PYTHON”, McGraw Hill Education (India) Private Limited, Chennai, 2018.

REFERENCES:

1. S. A. Kulkarni, “Problem Solving and Python Programming”, Yes Dee Publishing Pvt Ltd, Chennai, 2017 (Anna University Regulation 2017).
2. Martin C Brown, “The Complete Reference Python”, McGraw Hill Education, Osborne.

D. Web Reference:

1. <http://www.python.org>
2. <http://www/python.org/doc/>
3. <http://wiki.python.org/>
4. <http://pypi.python.org/pypi>
5. <http://www/mhhe.com/kamthane/python>

E. Assignments:

1. Write a Python program to search a name in given tuple of names.
2. Write a Python program using Dictionary to find maximum and minimum from a set of values.

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), SALEM - 7

BACHELOR OF SCIENCE (B.Sc) IN COMPUTER SCIENCE

SEMESTER - V

Major Based Elective - I : OPERATING SYSTEMS

Course Code : 17UCSM1

A. Objectives:

- To know the basic mechanisms to handle processes and concurrent processes.
- To provide fundamental concepts of memory, process and processor managements in an operating system.
- To inculcate ideas on process synchronization inter process communication scheduling deadlock handling and memory management.

B. Learning Outcomes:

- Understanding of the concepts, structure and design of Operating Systems.
- Analyze the various device and resource management techniques for timesharing.

C. Syllabus

UNIT - I

Early History - process concepts: process states - process state transitions - Process Control Block - operations - Interrupt processing - Asynchronous concurrent processes: Mutual Exclusion Primitives - Dekker's Algorithm - Peterson's Algorithm.

UNIT - II

Deadlock and Indefinite postponement: - Introduction - Examples - Necessary conditions - Major areas of deadlock research - Deadlock prevention, avoidance, detection, recovery.

UNIT - III

Real storage:-storage organization, management, hierarchy - storage management strategies - contiguous vs. non contiguous storage allocation - Fixed, variable partition Multiprogramming - virtual storage organization: Basic Concepts - Paging - Segmentation - virtual storage management: Page Replacement Strategies.

UNIT - IV

Job and processor scheduling:- Scheduling objectives - preemptive vs non - preemptive scheduling - priorities - Deadline scheduling - FIFO - RR - Quantum size - SJF - SRT - HRN - Multilevel Feedback Queues - disk performance optimization : Seek Optimization.

UNIT - V

File and database systems : Functions - Blocking and Buffering - File Organization -UNIX system - The Shell - The Kernel - File System.

TEXT BOOK:

H. M. Deital, "Operating Systems", Pearson Edition, second Edition

REFERENCE BOOKS:

1. *William Stallings* "Operating Systems - Internals & Design Principles" ,Prentice hall of India P.Ltd, New Delhi. 5th Edition..
2. *Silberschatz and Galvin*, "Operating System Concepts", 6th Edition, John Wiley & Sons, Inc., 2004.

D. Web References :

1. <http://www.deitel.com/books/os3e/slides.html>
2. <http://www.dcs.ed.ac.uk/teaching/cs3/os/slides/>
3. <https://www.slideserve.com/teagan-burton/operating-systems-internals-design-principles-fifth-edition-william-stallings>
4. <http://codex.cs.yale.edu/avi/os-book/OS9/slide-dir/index.html>

E. Assignments

1. Real storage Vs virtual storage
2. Job and processor scheduling
3. File and database systems

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), SALEM - 7

BACHELOR OF SCIENCE (B.Sc) IN COMPUTER SCIENCE

SEMESTER - V

Core Practical - V : VISUAL BASIC PROGRAMMING

Course Code : 17UCSP5

Practical List

1. Design an application to create a login form and validate it using msgbox & timer control.
2. Construction of an Arithmetic Calculator. (Simple)
3. Design an application to simulate the working of a font dialog box using combo box.
4. Develop a Visual Basic Program to simulate the traffic signals, by using following conditions.
 - i. Form consists of three signals REG, YELLOW and GREEN in an order of column wise.
 - ii. Form consists of one timer label, to display the Time out of the signal.
 - iii. While transforming the signal from REG to Green, signal travel to YELLOW signal.
 - iv. Time out for RED signal is 180 seconds.
 - v. Time out for Green signal is 120 seconds.
 - vi. Time out for YELLOW signal is 60 seconds.
5. Develop a Visual Basic Application to implement the Key Events
Note: All the active controls of the form should navigate through the Key events like Key Press, Lost Focus, Got Focus
6. Design an application to prepare Students Mark Sheet.
7. Design an application to implement Personal Information System.
8. Write a program to implement animation using timers.

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), SALEM - 7

BACHELOR OF SCIENCE (B.Sc) IN COMPUTER SCIENCE

SEMESTER - V

Skill Based Elective Practical- III : WEB DESIGN

Course Code : 17UCSS3

Practical List

1. Create a HTML document which consists of:
 - A. Safety Considerations
 1. Body substance isolation
 2. Sense safety
 3. Initial size-up
 - B. Initial Patient Assessment
 1. General Impression
 2. Unresponsiveness
 - i. Alert to person, place and time
 - ii. Verbal response to audible stimuli
 - iii. Pain evokes verbal or physical response
 - iv. Unresponsive to all stimuli
 - C. Patient Critical Needs
 1. Airway
 2. Breathing
 - i. Use oxygen if indicated
 - ii. Consider use of assisting with bag value mask
 3. Circulation
 4. Bleeding
2. Create a Web page with Image Gallery using tables, frames and hyperlinks.
3. Create a HTML document which consists of:

Subscribe to XYZ News Magazine and Emails

Interested in receiving daily small updates of all latest News? Well, now you can. And best of all, it is free! Just fill out this form and submit it by clicking the "send it In" button. We will put you on our mailing list and you will receive your first email in 3-5 days.

Please fill the following boxes to help us send the emails and our news letter:

First Name:

Last Name:

Business:

We must have a correct e-mail address to send you the news letter:

Email:

How did you hear about XYZ News Magazine and Emails?

Here on the Web In a magazine Television Other

Would you like to be on our regular mailing list?

Yes, we love junk emails

4. Create a simple webpage for your resume designed with various CSS properties.
5. Create a webpage using CSS positioning
6. Write a JavaScript program to display the current day and time in the following format.
Today is: Friday. Current time is: 4 PM : 50 : 22
7. Write a JavaScript program to design a simple arithmetic calculator.
8. Change/enhance the content of the webpage with event handling using Javascript code.

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), SALEM - 7

BACHELOR OF SCIENCE (B.Sc) IN COMPUTER SCIENCE

SEMESTER - V

Skill Based Elective Practical - IV : PYTHON PROGRAMMING

Course Code : 17UCSS4

Practical List

1. Programs using conditional branches and loops.
2. Programs using functions.
3. Programs using Lists and List processing.
4. Programs using exception handling.
5. Programs using classes and objects.
6. Programs using Overloading.
7. Programs using inheritance.
8. Programs using polymorphism.

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), SALEM - 7

BACHELOR OF SCIENCE (B.Sc) IN COMPUTER SCIENCE

SEMESTER - VI

Core Course - VIII : DATA COMMUNICATION AND NETWORKING

Course Code : 17UCS08

A. Objective:

- To inculcate knowledge on Networking concepts and technologies like wireless, broadband and Bluetooth.

B. Learning Outcomes:

After completing this course the student must demonstrate the knowledge and ability to:

- Understand basic computer network technology.
- Understand and explain Data Communications System and its components.
- Identify the different types of network topologies and protocols.
- Enumerate the layers of the OSI model and TCP/IP.
- Identify the different types of network devices and their functions within a network.
- Have a basic knowledge of the use of cryptography and network security.

C. Syllabus

UNIT - I

Overview: Introduction – Network Models. **Physical Layer and Media:** Data and Signals – Digital Transmission – Analog Transmission – Transmission Media.

UNIT - II

Data Link Layer: Error Detection and Correction – Data Link Control- Wired LANs – Wireless LANs.

UNIT - III

Network Layer : Logical Addressing – Internet Protocol – Delivery, Forwarding, and Routing.

UNIT - IV

Transport Layer: Process-to-Process Delivery – Congestion Control and Quality of Service.

Application Layer: Domain Name System – Remote Logging, E mail and File Transfer, WWW and HTTP.

UNIT - V

Security : Cryptography - Network Security – Security in the Internet.

TEXT BOOK:

Behrouz A Forouzan, "Data Communications and Networking", Tata McGrawHill, Fifth Edition, 2013.

REFERENCE BOOKS :

1. *Andrew S. Tanenbaum, "Computer Networks", 4th edition, PHI.*
2. *Achyut Godbole, "Data Communication and Networks", 2007, TMH.*
3. *Uyless Black , "Computer Networks: Protocols, Standards, and Interfaces", 2nd ed, PHI*

D. Web References

1. http://highereducation.com/sites/0072967757/student_view0/index.html
2. <http://www.sanfoundry.com/computer-networks-question-answers-basics/>
3. <http://nptel.ac.in/courses/106105081/>
4. https://www.tutorialspoint.com/data_communication_computer_network/
5. <http://www.computerscienceonline.org/courses/>
6. <http://www.careerride.com/networking-test-quiz.aspx>

E. Assignments:

1. Layers in the OSI model
2. Guided and Unguided media
3. Error detection and correction methods
4. Unicast and multicast routing protocols
5. Security in the Internet: IPSec, SSL/TLS, PGP, VPN, and Firewalls

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), SALEM - 7

BACHELOR OF SCIENCE (B.Sc) IN COMPUTER SCIENCE

SEMESTER - VI

Core Course - IX : PROGRAMMING IN JAVA

Course Code : 17UCS09

A. Objectives

- Gain knowledge about basic java language syntax and semantics to write java programs
- Understand the fundamentals of object-oriented programming in java, including defining classes.
- Understand the principles of Inheritance, Packages and Interfaces.
- Read and Write data using Java streams.
- Develop ideas on GUI components.

B. Learning Outcomes

At the end of the course, the students will be able to

- Write java application programs using OOP principles with proper program structuring.
- Demonstrate the concepts of polymorphism and Inheritance.
- Develop an application with AWT component classes and SWING component classes.

C. Syllabus

UNIT I

Java Features - Object Oriented Programming - Classes and Objects - Modifiers - Passing Arguments - Constructors - Static class members - Overloaded methods - Overloaded constructors - this reference variable - Introduction to Array - String Array - Array of objects - Two-dimensional array.

UNIT II

String class - String class methods - StringBuffer class - Basics of Inheritance - Inheriting and Overriding super class methods - Polymorphism - Types of Inheritance - Abstract classes - Final class - Basics of interface - Multiple Inheritance using Interface.

UNIT III

Packages - create and access packages - Introduction to Exception handling - Try and Catch block - Multiple catch blocks - finally block - throw statement - Introduction to Multithreading - Thread creation - Thread priority - Thread synchronization - Inter-Thread communication.

UNIT IV

Applet fundamentals - Applet Life cycle - Graphics in Applet - File Class - writing Text files - reading from a Text file - Java Stream classes : Byte Streams - FileInputStream - FileOutputStream - DataInputStream - DataOutputStream - Character Streams - Reader – Writer.

UNIT V

Graphical User Interface - Creating windows - Dialog boxes - Layout Managers: Border Layout - Flow Layout - Grid Layout - Card Layout - AWT component classes - Label control - TextField control - CheckBox control - Radio button control. Swing Component classes - creating swing program using JFrame - creating swing program using JPanel - creating swing program using JApplet.

TEXT BOOK

Sagayaraj, Denis, Karthik, Gajalakshmi, “Java Programming for core and advanced learners “, Universities Press Private Limited, ,2018.

REFERENCE BOOKS

1. *E.Balagurusamy, “Programming with Java”, TMH Publ, 2nd Edition, 2005.*
2. *Patrick Naughton and Hebert Schidt, “The Complete Reference Java 2” –, 3rd Edition TMH Publ, 2000.*
3. *C.Xavier, “Programming with Java 2” , SciTech Publ,2000.*

D. Web Resources

1. www.tutorialspoint.com
2. www.coursera.org
3. www.w3schools.in

E. Assignments

1. Demonstrate the usage of control statements.
2. Demonstrate the concept of constructor overloading.
3. Experiment on I/O Streams.

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BACHELOR OF SCIENCE (B.Sc) IN COMPUTER SCIENCE

SEMESTER - VI

Major Based Elective - II : MULTIMEDIA AND ITS APPLICATIONS

Course Code : 17UCSM2

A. Objectives :

- To enable the students to understand the concept of Multimedia.
- To encourage the students to create multimedia projects.

B. Learning Outcomes:

- To obtain the knowledge about the multimedia basics, kinds.
- To analyze the components of multimedia, animation and different file formats.
- To understand audio and video file structure and formats.
- To train the students to obtain the capability of creating multimedia projects.

C. Syllabus

UNIT I

Multimedia Overview: Introduction to Multimedia: What is multimedia- a concise history of multimedia- Linear vs. interactive multimedia - The purposes and applications of multimedia: Why and how multimedia is used - Planning stages and development process - Tools for creating and preparing media.

UNIT II

Kinds of Media: Graphics and Images: The role of graphics and images in multimedia - Designing vector graphics - Creating raster images - Color theory - Text and Typography: Text defined - Typing , Texting and E-mailing - Typography.

UNIT III

2D and 3D animation: Animation in multimedia - Kinds of animation - Traditional animation overview-Principles of animation-Difference between 2D and 3D animation - Animation files and formats.

UNIT IV

Audio: Audio fundamentals - recording vs importing sound - MIDI and Digital Music - Editing and manipulating Audio Tracks - Audio File formats- Audio file Types.

UNIT V

Video: Video mechanics – Video in Multimedia – Analog and Digital Video – Shooting and obtaining video – video compression schemes and file formats – Authoring for multimedia functionality: Tools for authoring – Web authoring with HTML.

TEXT BOOK

Jennifer Coleman Dowling, “Multimedia Demystified”, Tata McGraw Hill, Edition 1, 2011.

REFERENCE BOOKS

1. *Robert Reinhardt, Snow Dowd, “Macromedia Flash8 Bible”, Wiley Publishing Inc., Edition I, 2006.*
2. *Tay Vaughan , “Multimedia Making it work”- Sixth Edition -Tata Mc-GrawHill-2004.*

D. Web References

1. *nptel.ac.in/courses/Webcourse-contents/.../Multimedia%20Processing/New_index1.html*

E. Assignments:

1. Tools for creating and preparing media.
2. Animation files and formats.
3. Tools for authoring.

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BACHELOR OF SCIENCE (B.Sc) IN COMPUTER SCIENCE

SEMESTER - VI

Major Based Elective - III : SOFTWARE ENGINEERING

Course Code : 17UCSM3

A. Objectives:

- To know the various phases in software development and the tools available for software engineering.
- To provide insight on software engineering discipline and the processes of software development.

B. Learning Outcomes:

- An ability to analyze, design, verify & validate, implement and maintain software systems.
- An ability to use the techniques, skills and Computer aided software engineering tools.
- Design applicable solution in one or more applications domains using software engineering approaches that integrate ethical, social, legal, and economics concerns.

C. Syllabus

UNIT I

Introduction to Software Engineering: Definitions- quality and productivity factors. Planning a software project: Defining the problem – developing a solution strategy – phased life cycle model – cost model – prototype model.

UNIT II

Planning an organizational structure: Project structure – Programming team structure. Software Requirements: Software requirement specification – formal specification techniques – Structured analysis and design techniques.

UNIT III

Software design : Fundamental design concepts –modules – Design notations: DFD – Structured charts – HIPO diagrams – decision tables. Design Techniques: Stepwise refinement – levels of abstraction – Structured design – integrated top-down development..

UNIT IV

Software Coding and Testing: Coding standards and guidelines – Code review – testing : Unit Testing – Black box testing – White box testing – debugging - integration testing – System Testing
Software Maintenance : Types – software reverse engineering – software maintenance process models – estimation of maintenance cost,

UNIT V

Computer aided software engineering :CASE environment – CASE support in software life cycle – characteristics of CASE tools – architecture of CASE environment - emerging Trends.

TEXT BOOK

1. *Richard Fairley, "software Engineering Concepts" TMH edition, 21st reprint 2005.*

1. *Rajib Mall, "Fundamentals of software engineering" PHI, Third Edition.*

REFERENCE BOOKS:

Roger S. Pressman, " Software Engineering" McGraw Hill , Seventh Edition.

D. Web References:

1. https://www.tutorialspoint.com/software_engineering/index.htm

2. <https://ocw.mit.edu/courses/aeronautics-and-astronautics/16-355j-software-engineeringconcepts-fall-2005/lecture-notes/>

3. <http://nptel.ac.in/downloads/106105087/>

E. Assignments:

1. Software Requirements

2. Software design

3. Software Coding and Testing

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BACHELOR OF SCIENCE (B.Sc) IN COMPUTER SCIENCE

SEMESTER - VI

Core Practical - VI : JAVA PROGRAMMING

Course Code : 17UCSP6

Practical List

1. Write a Java Program to read a digit and display the number in a word using nested if and do the same using switch-case statement.
2. Write a Java program using for loop that will print both uppercase and lowercase letters in sequence.
3. Write a Java program to read test score of students in a class of 50 students. Find the class average, number of students who have scored above class average and below class average.
4. Write a Java program to demonstrate constructor overloading.
5. Write a Java program to demonstrate String class and its methods.
6. Write a Java program to demonstrate the usage of inheritance in banking environment.
7. Write a Java program to implement the concept of Exception handling by using system defined exceptions and by creating user defined exceptions.
8. Write a Java program to implement multithreads with priorities and synchronization.
9. Write a Java program to draw four different smiley using applets.
10. Create a Simple calculator application using AWT.

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SEMESTER - VI

Core Practical - VII : SOFTWARE DEVELOPMENT

Course Code : 17UCSP7

This practical Software development is introduced in the curriculum with the motive of imparting practical knowledge in the phases of Software Development and Engineering. Hence, the Faculty in-charge for this practical continuously assesses the development process of the software developed by each student.

In the semester examinations, the External and Internal Examiners would assess the quality of the software with various parameters like Problem definition, Form design, Table design, Validation etc.,

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SEMESTER - VI

Skill Based Elective Practical -V : MULTIMEDIA PACKAGES

Course Code : 17UCSS5

Practical List

1. Design a Greeting Card for Birthday using different text effects.
2. Apply various filter and blending effects to an Image .
3. Create a Pattern using Pattern Stamp Tool and Clone Stamp Tool.
4. Create Plastic Surgery for the Nose.
5. Converting Text into Shapes.
6. Animate using Motion, Shape, Twining and Actions.
7. Create masking effects on an image and text.
8. Create a poster or an invitation for SACS.
9. Guide an object on a desired path.
10. Use script knowledge in creating a movie effect.

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SEMESTER - VI

Skill Based Elective Practical -VI : ANDROID PROGRAMMING

Course Code : 17UCSS6

Practical List

1. Creating an App to display the text "Hello World".
2. Creating an App to create and display a table of information
3. Creating an App to receive student details as input and display it.
4. Creating a Simple Currency Converter App.
5. Creating an App to demonstrate Login process (On success it should open a new page with success message).
6. Creating a menu based app.

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BACHELOR OF SCIENCE (B.Sc) IN COMPUTER SCIENCE

SEMESTER - III

Non Major Elective -I : Web Design : Basics

Course Code : 17UCSN1

A. Objectives:

- To provide basic idea on web design.
- To provide insight on various elements of HTML

B. Learning Outcomes:

- An ability to create web pages using basic elements.
- An ability to use various elements for generating hyperlinks
- Design simple web pages with necessary elements for having texts and images.

C. Syllabus

UNIT -I

HTML Overview - Basic HTML Document - HTML Tags - HTML Document Structure - The <!DOCTYPE> Declaration - Heading Tags - Paragraph Tag - Line Break Tag - Centering Content - Horizontal Lines - Preserve Formatting Nonbreaking Spaces.

UNIT - II

HTML - Elements - HTML - Formatting - Bold Text Italic Text Underlined Text Strike Text - Monospaced Font Superscript Text Subscript Text Larger Text Smaller Text Emphasized Text - Marked Text Strong Text .

UNIT - III

HTML Comments - Valid vs Invalid Comments - Multiline Comments - HTML Images - Insert Image - Set Image Location - Set Image Width/Height - Set Image Border - Set Image Alignment.

UNIT - V

HTML Text Links - Hyperlinks - Linking Documents The target Attribute Setting Link Colors HTML .

UNIT - V

HTML - Lists - HTML Unordered Lists - The type Attribute for Unordered Lists - HTML Ordered Lists - The type Attribute for Ordered Lists - The start Attribute HTML Definition Lists.

TEXT BOOK

<https://www.tutorialspoint.com/html/>

REFERENCE BOOKS:

1. *C.Xavier, "World wide webdesign with HTML", Tata McGraw Hill, 2nd Reprint 2000.*
2. *Andy Holyer, "HTML in easy steps", DreamTech Press, 2001.*

D. Web References:

1. <https://www.w3schools.com/html/>
1. <https://www.w3.org/standards/webdesign/htmlcss>

E. Assignments:

1. Create an HTML document which consists of:
 - I. Ordered List
 - II. Unordered List
 - III. Nested List
 - IV. Image
2. Create an HTML document which implements Internal linking as well as external linking.
2. Create an HTML document with the following formatting options:
 - I. Bold
 - II. Italics
 - III. Underline
 - IV. Headings (Using H1 to H6 heading styles)
 - V. Font (Type, Size and Color)
 - VI. Background (Colored background/Image in background)
 - VII. Paragraph
 - VIII. Line Break
 - IX. Horizontal Rule
 - X. Pre tag

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SEMESTER - IV

Non Major Elective -II : Web Design : Advanced

Course Code : 17UCSN2

A. Objectives

- To provide ideas for designing web pages with tables and forms.
- To provide insight on colors, background and Style sheet.

B. Learning Outcomes

- An ability to create web pages with tables and forms.
- An ability to use various elements for designing with colors and backgrounds
- Design simple web pages with necessary elements for having texts and images with style sheets.

C. Syllabus

UNIT -I

HTML Tables - Table Heading - Cellpadding and Cellspacing Attributes -Colspan and Rowspan Attributes - Tables Backgrounds - Table Height and Width - Table Caption.

UNIT -II

HTML Forms - The <input> Element - Text Input - Radio Button Input - Submit Button - Action Attribute - Method Attribute.

UNIT -III

HTML Backgrounds - Html Background with Colors - Html Background with Images - HTML Colors - HTML Color Coding Methods - HTML Color Names HTML Hex Codes.

UNIT -IV

HTML Text - Text Color - Text Alignment - Text Decoration - Text Transformation - HTML Header - The HTML <title> Tag - The HTML <meta> Tag.

UNIT -V

HTML Style Sheet - Cascading Style Sheets - CSS in three ways - External Style Sheet - Internal Style Sheet - Inline Style Sheet.

TEXT BOOK

<https://www.tutorialspoint.com/html/>

REFERENCE BOOKS:

1. C.Xavier, "World wide webdesign with HTML", Tata McGraw Hill, 2nd Reprint 2000.
2. Andy Holyer, "HTML in easy steps", DreamTech Press, 2001.
3. Lokesh Vats, "Web Designing", Cybertech Publications, 2001.

D. Web References:

1. <https://www.w3schools.com/html/>
2. <https://www.w3.org/standards/webdesign/htmlcss>

E. Assignments:

1. Design a Webpage using tables
2. Design a Webpage using forms
3. Design a web page with internal and external stylesheets