UNIVERSITY OF CALICUT

THENHIPALAM, CALICUT UNIVERSITY P.O

SYLLABUS

FOR

COMPUTER SCIENCE (COMPLEMENTARY)

(CHOICE BASED CREDIT AND SEMESTER SYSTEM FOR UNDER GRADUATE CURRICULUM)

UNDER THE

FACULTY OF SCIENCE

FOR THE STUDENTS ADMITTED FROM THE ACADEMIC YEAR 2019 – 20 ONWARDS

BOARD OF STUDIES IN COMPUTER SCIENCE (UG)

THENHIPALAM, CALICUT UNIVERSITY P.O
KERALA, 673 635, INDIA
JUNE, 2019

REGULATIONS

FOR

COMPUTER SCIENCE - COMPLEMENTARY

(Choice Based Credit and Semester System for Under Graduate Curriculum**)**
EFFECTIVE FROM THE ACADEMIC YEAR 2019-20

COURSE EVALUATION:

Total marks for each complementary theory course is 75 marks and lab course shall be 100 marks. The evaluation scheme for each course shall contain two parts (1) Internal evaluation (2) external evaluation. 15 marks shall be given to the internal evaluation of theory course. The remaining 60 marks shall be for the external evaluation.

INTERNAL EVALUATION

The internal assessment shall be based on a predetermined transparent system involving written test, assignments, seminars and attendance in respect of theory courses and on test/record/viva/ attendance in respect of lab courses. 15 marks in each theory course, 20 for lab, are for internal examinations.

Components with percentage of marks of Internal Evaluation of Theory Courses are:

Test paper	–	6 Marks
Attendance	–	3 Marks
Assignment	–	3 Marks
Seminar	–	3 Marks

Components with percentage of marks of Internal Evaluation of Lab Courses are:

Test paper (50%)	–	10 Marks
Attendance (20%)	–	4 Marks
Assignment/Lab involvement (30%)	–	6 Marks

Split up of marks for Test paper:

	Theory	Practical
85% -100%	6	10
65% -85%	5	8
55% - 65%	4	6
45% - 55%	3	5
35%- 45%	2	4
Less than 35%	1	2

Attendance of each course will be evaluated as below

	Theory	Practical
85 % and above	3	4
75% ≤CRP <85%	2	2
50% ≤CRP <75%	1	1

(If a fraction appears in the final internal marks awarded, nearest whole number is to be taken)

To ensure transparency of the evaluation process, the internal assessment marks awarded to the students in each course in a semester shall be notified on the notice board at least one week before the commencement of external examination. There shall not be any chance for improvement for internal marks. The course teacher(s) shall maintain the academic record of each student registered for the course, which shall be forwarded to the University by the college Principal after obtaining the signature of both course teacher and HOD. The marks secured for internal examination only need be sent to university, by the colleges concerned.

EXTERNAL EVALUATION:

There shall be University examinations for each theory course at the end of each semester. Practical examinations shall be conducted by the University at the end of fourth semester. External evaluation carries 60 Marks for each theory course, 80 Marks for lab course. External evaluation of even (2 and 4) semesters will be conducted in centralized valuation camps immediately after the examination. Answer scripts of odd semester (1 and 3) examination will be evaluated by home

valuation. All question papers shall be set by the university. The model of the question paper for external examination (theory courses) of 2 Hrs. duration. The students can answer all the questions in Sections A and B. But there shall be Ceiling in each section.

Section A: Short answer type carries 2 marks each - 12 questions **(Ceiling - 20)**
Section B: Paragraph/ Problem type carries 5 marks each - 7 questions **(Ceiling - 30)**
Section C: Essay type carries 10 marks (1 out of 2) - **(Ceiling - 10)**

The external examination in theory courses is to be conducted with question papers set by external experts. The evaluation of the answer scripts shall be done by examiners based on a well-defined scheme of valuation and answer keys shall be provided by the University. The external examination in practical courses shall be conducted by two examiners, one internal and an external, appointed by the University.

The model of the question paper for external examination (lab courses) of 3 Hrs. duration shall be:

1. **Section A**: One marked question of 30 Marks from Programming Lab Part A (C Programming) is to be attempted (Design - Algorithm/Flowchart/Interface: 10 Marks, Code: 10 Marks, Result: 10 Marks. **Total 30 Marks**)
2. **Section B**: One marked question of 30 Marks from Programming Lab Part B is to be attempted (Design - Algorithm/Flowchart/Interface: 10 Marks, Code: 10 Marks, Result: 10 Marks. **Total 30 Marks**)
3. **Section C**: Lab viva voce (**Total 10 Marks**)
4. **Section D**: Lab Record (**Total 10 Marks**)

Number of students in one batch for practical Examination must be limited to 14.

REVALUATION:

In the new system of grading, revaluation is permissible. The prevailing rules for revaluation are applicable. Students can apply for photocopies of answer scripts of external examinations. Applications for photocopies/scrutiny/revaluation should be submitted within 10 days of publication of results. The fee for this shall be as decided by the university.

IMPROVEMENT COURSE

A maximum of two courses (Common, Core, Complementary or Open) can be improved in each semester. Improvement of a particular semester can be done only once. The student shall avail the improvement chance in the succeeding year after the successful completion of the semester concerned. The internal marks already obtained will be carried forward to determine the

grades/marks in the improvement examination. If the candidate fails to appear for the improvement examination after registration, or if there is no change in the results of the improvement examination appeared, the marks/grades obtained in the first appearance will be retained. Improvement and supplementary examinations cannot be done simultaneously.

CURRICULUM FOR B.Sc. COMPUTER SCIENCE

(COMPLEMENTARY)

(2019-20 ACADEMIC YEAR ONWARDS – As per the CBCSSUG 2019 Regulations)

Total Courses: 5				Total Credits: 12					

Semester	Course No	Course Code	Course Title	Marks			Contact Hours			Credits
				Internal	External	Total	Theory	Lab	Total	
1	1	CSC1C01	Computer Fundamentals	15	60	75	2	2	4	2
II	2	CSC2C02	Fundamentals of System Software, Networks and DBMS	15	60	75	2	2	4	2
III	3	CSC3C03	Problem solving using C	15	60	75	3	2	5	2
IV	4	CSC4C04	Data Structures Using C	15	60	75	3	2	5	2
IV	5	CSC4C05	Programming Lab: C and Data Structures	20	80	100	0	0	0	4
Total (5 Courses)						400				12

CSC1C01 – Computer Fundamentals

Semester: 1

Course Number: 1

Contact Hours: 2T+2L

Number of Credits: 2

Number of Contact Hours: 64

Course Evaluation: Internal – 15 Marks + External – 60 Marks

Aim of the Course:

To impart the students with fundamental principles and operations of various units of computer and to impart them with the basic skill in application packages.

Objectives of the Course:

- To learn the basics of computer hardware units and how they work together
- To acquire basic skill with office packages

Prerequisites:

Background of the basic science at +2 level

Course Outline

UNIT I [7T+6L]

Number systems- Non-positional number systems and positional number systems (Binary, Octal and Hexadecimal), Converting from one number system to another- decimal to a new base, converting to decimal from another bases, converting from base other than ten to base other than ten, short cut method for converting from binary to octal, octal to binary, binary to hexadecimal and hexadecimal to binary, Computer Codes (BCD, EBCDIC, ASCII) error detecting and correcting codes, parity bit, Hamming Code, computer arithmetic ,importance of binary, binary addition and subtraction.

UNIT II [6T+7L]

Boolean Algebra and Logic circuits- fundamental concepts of Boolean Algebra, postulates, Principle of duality, theorems of Boolean Algebra, Boolean functions, minimization, complement, canonicals forms, conversion between canonical forms. Logic Gates- AND, OR, NOT, NAND, NOR, XOR and XNOR, logic circuits, converting expression to logic circuit, universal NAND and NOR gates, Exclusive OR and equivalence functions, Design of Combinational circuits (Half Adder, Subtractor and Full Adder)

UNIT III [6T+7L]

Basic Computer Organization-Input Unit, Output Unit, Storage Unit (Direct, Sequential and Random Access), CPU organization, Control Unit (micro programmed and hardwired control), primary storage, memory hierarchy, storage locations and addresses, storage capacity, bit, byte, nibble, RAM, ROM, PROM and EPROM, cache memory, registers. Secondary storage devices (Magnetic tape, Hard disk and CD drive)

UNIT IV [7T+6L]

I/O devices - Input Devices-identification and its use, keyboard, pointing devices (mouse, touch pad and track ball), Video digitizer, remote control, joystick, magnetic stripes, scanner, digital camera, microphone, sensor, and MIDI instruments, Output Devices identification and its use, monitor, printer (laser, inkjet, dot-matrix), plotter, speaker, control devices (lights, buzzers, robotic arms, and motors)

UNIT V [6T+6L]

Planning a Computer program, purpose of program planning, algorithm, flowchart - symbols, sample flowcharts, advantages and limitations.

Text Books:

1. Pradeep K. Sinha and Priti Sinha, Computer Fundamentals, BPB

References:

1. Peter Nortorn, Introduction to Computer, TMH
2. Rajaraman, V, Fundamental of Computers, Prentice Hall India
3. B. Ram, Computer Fundamentals

Lab List

Word Processing

- Paragraph formatting
- Newspaper style Document
- Table creation
- Mail merge
- Page formatting **and prin**ting

Spreadsheet

- Worksheet entries, including formulas

- Formatting cells
- Chart creation
- Functions

Presentation Software

- Creating presentation
- Animations
- Sound
- Inserting picture

CSC2C02 – Fundamentals of System Software, Networks and DBMS

Semester: 2

Course Number: 2

Contact Hours: 2T+2L

Number of Credits: 2

Number of Contact Hours: 64

Course Evaluation: Internal – 15 Marks + External – 60 Marks

Aim of the Course:

To impart the students with the basic concepts of system software, Computer Networks and Database.

Objectives of the Course:

- To learn the basic concepts of various system software
- To learn the basics of Computer Networks
- To learn the basics of Databases

Prerequisites:

Background of the basic science at +2 level

Course Outline

UNIT I [6 T+6L]

System software - classification of programming languages (Machine, assembly & High level), Characteristics and Comparison, language processors (Assembler, Interpreter and Compiler), Operating Systems- Functions, types of OS (batch, multiprogramming, time sharing, real time and distributed)

UNIT II [7 T+6L]

Computer networks- goals of networking, network topologies, types of networks (LAN, MAN and WAN), network model, OSI model- 7 layers, Internet Layer- 5 layers, Communication Media-Guided (Twisted Pair, Coaxial Cable and Fiber Optic) and Unguided (microwave, satellite).

UNIT III [6 T+7L]

Database Management Systems-definition, structure of Database, data models (Record based Data model, Network model: - Basic Components, Record types, data types, links, relationships,Hierarchical model and Relational model)

UNIT IV [6 T+7L]

Structured query language - Create, insert, select, update, delete, alter, drop commands

UNIT V [7 T+6L]

HTML-hypertext, hyper media, understanding basic HTML tools- HTML editor, web browser, General structure of HTML document, different types of elements-doc type, comment element, structural element, HTML tags and attributes: <html>, <body>, <head>, <title>, <h1>,... ,<h6>, <br>, <table>, <img>, <hr>, adding links, background image to the body, creating lists.

References:

1. P. K Sinha, Fundamentals of Computers
2. D. M Dhamdhere,Operating System: A concept based Approach
3. Behrouz A Forouzan, Data Communication & Networking, MC Graw Hill
4. Joel Sklar,Principles of Web Page Design, Vikas Publications

Lab List

HTML

1. Simple HTML document creation
2. HTML document with tables
3. HTML document with various lists
4. HTML document with links to different parts of the same
5. documents and to separate documents

MySQL

1. Table creation
2. Data insertion and deletion
3. Data retrieval
4. Alteration of tables

CSC3C03 – Problem Solving Using C

Semester: 3
Course Number: 3
Contact Hours: 3T+2L
Number of Credits: 2
Number of Contact Hours: 80 Hrs.
Course Evaluation: Internal – Internal – 15 Marks + External – 60 Marks

Aim of the Course:

To equip the students with the basic concepts of problem solving using computers.

Objectives of the Course:

- To learn the concepts of programming.
- To learn the C language

Prerequisites:

- Background of the basic science at +2 level

Course Outline

UNIT I [9 T+7L]

Introduction to C- Structure of C program, Character Set, Keywords, Identifiers, Data Types, Qualifiers, Variables, Declarations, Symbolic Constants, Expressions, Statements, Different Types of Operators (Arithmetic, Logical, Relational & Equality, Unary and Conditional), Operator Precedence and Associativity, Library Functions, Comments, I/O functions-(Formatted scanf() &printf(), getchar (), putchar (), getche(), gets(), puts())

UNIT II [9 T+7L]

Control Statements- Selection Statements (if, if-else, else if ladder, switch), iteration (while, do while, for), jumping (goto, break, continue), Nested Control Statements

UNIT III [10 T+6L]

Structured Data types - Arrays (One dimensional and Two Dimensional), Character and String Functions, Structure (Definition,Processing-period Operator), Union

UNIT IV [10 T+6L]

User defined Functions - Advantages, Definition, Accessing functions, formal and Actual

Parameters, Recursion, Storage Classes- Automatic, External, Static and Register Variable, Argument Passing Mechanism
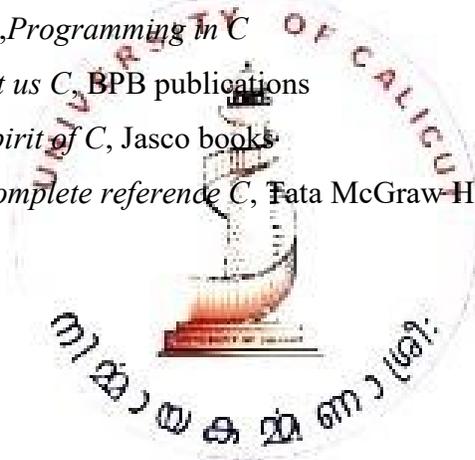
UNIT V [11T+6L]

Pointers and data files- Pointers, advantages, declaration, operations on pointers, pointers and one dimensional arrays, dynamic memory allocation. Data files (sequential), file handling functions (fopen(), fclose(), fputc(), fgetc(), fgets(), fputs(), fscanf(), fprintf())

Text Book:

1. E Balagurusamy, *Programming in Ansi C*, Tata McGraw Hill

References:

1. Byran Gotfried, *Programming with C*, Schaum Series
2. Kezningham & Ritchie,*Programming in C*
3. Yashvant Kanetkar, *Let us C*, BPB publications
4. Mullish Cooper, *The spirit of C*, Jasco books
5. Herbert Schildt, *The Complete reference C*, Tata McGraw Hill

CSC4C04 – Data Structure Using C

CourseNumber: 4

ContactHoursperWeek: 5(3T+2L)

NumberofCredits:2

NumberofContactHours: 80 Hrs

CourseEvaluation: Internal – 15 Marks+External – 60 Marks

Objectives of the Course:
- To introduce the concept of datastructures
- To make the students aware of various datastructures
- To equip the students implement fundamental datastructures

Prerequisites:
- Knowledge in C Programming Language

Objectives of the Course:

Unit I [11 T+6L]

Primitive Data types and Abstract Data Types(ADT)- Introduction to data structures – definition - characteristics of data structures - categories of data structures – algorithm - space complexity and time complexity of an algorithm (concept only).

Unit II [7 T+6L]

Arrays and Singly Linked Lists - 1D, 2D and Multi-dimensional arrays – operations on arrays - Sparse matrix Representation

Unit III [9 T+7L]

Lists- Linked List- Definition –Creation- Operations, Basics of Doubly Linked List, Circular Linked List.

Unit IV [11 T+7L]

Stack and Queues – Definition and Operations on stack - Implementation of Stack using arrays and linked lists - Applications of Stacks - Polynomial Addition
Queues – Definition, Implementations of queue using arrays and linked lists – basics of Circular queue, Dequeue - Applications of queues.

Unit V [10 T+7L]

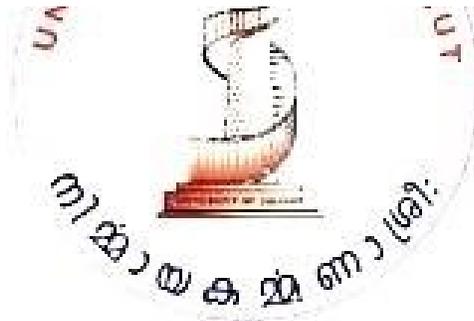Searching and Sorting: Searching: Linear search & Binary search.
Sorting – Linear sort - Bubble sort - Selection sort - Insertion sort - Quick sort - Merge sort – Comparisons and implementations.

Text Books:

1. SeymourLipschutz,"DataStructures",TataMcGraw-HillPublishingCompanyLimited,Schaum'sOutlines,NewDelhi.

2. YedidyanLangsam,MosheJ.Augenstein,andAaronM.Tenenbaum, "DataStructuresUsingC",PearsonEducation.,NewDelhi.

3. HorowitzandSahani, "FundamentalsofdataStructures",GalgotiaPublicationPvt.Ltd.,NewDelhi.

Reference Books:

1. Trembley, J.P. And Sorenson P.G., "An Introduction to Data Structures With Applications", Mcgraw- Hill International Student Edition, New York.

2. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Addison- Wesley, (An Imprint of Pearson Education), Mexico City.

CSC4C05 – Programming Lab: C and Data structure

Semester: 4

Course Number: 5

Number of Credits: 4

Course Evaluation: Internal – 20 Marks + External – 80 Marks

Aim of the Course:

- To provide practical skill in Programming

Objectives of the Course:

- To develop C Programming skills
- To make the students equipped to solve mathematical or scientific problems using C
- To learn how to implement various data structures.

Prerequisites:

- Background of the basic computing knowledge

Course Outline

LAB LIST

C programming

Write programs and draw flowchart/write algorithms to do the following

C PROGRAMMING

1. Find roots of a quadratic equation
2. Find the area and nature of a triangle
3. Find the sum of digits and reverse of a number
4. Find the factorial of a number
5. Find Sin(x)
6. Find Cos(x)
7. Display pyramid using '*'
8. Check for leap year
9. To display count of +ves, -ves and zeros in a set of N numbers
10. Find first n prime numbers
11. Find LCM and HCF of 2 numbers
12. To print Armstrong numbers within range

13. Evaluate the series $1 + x + x^2/2! + x^3/3! + \ldots + x^n/n!$
14. Convert a decimal number to a new base
15. Find the decimal equivalent of a number(base other than 10)
16. Calculate percentage of marks obtained for N students appeared for examination in M subjects.
17. To calculate standard deviation of N numbers.
18. To merge two arrays
19. To find N^{th} Fibonacci number
20. To find row and column totals of a matrix
21. Matrix addition, multiplication and transpose
22. To find the trace of a square matrix
23. To sort n numbers
24. Find the strings end with a particular character
25. Find the number of words in a given sentence
26. To check whether given string is palindrome or not
27. Swapping of two numbers using function
28. Reverse a string using recursion
29. Find the number of vowels in a string
30. To find length of a string using pointer
31. To count the occurrence of a word in a sentence.
32. To generate mark list of N students in a class using array of structures.
33. To insert an element at the correct position in a sorted array
34. To store and read from a text file
35. Write odd and even numbers into two files
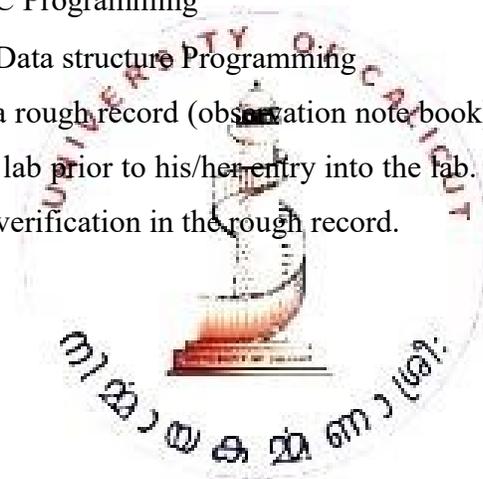
DATASTRUCTURE USING C

1. Sort a given list of strings
2. Search an element in a 1-dimensional array
3. Search an element in a 2-dimensional array
4. Merge two sorted array into one sorted array.
5. Search an element in the array using recursive binary search.
6. Implement sparse matrix
7. Implement polynomial using arrays
8. Implement singly linked list of integers.
9. Delete an element from a singly linked list
10. Implement a doubly linked list of integers
11. Implement a circular linked list.
12. Implement polynomial using linked list
13. Addition of 2 polynomials
14. Implement Stack using array

15. Implement Stack using linked list
16. Implement Queue using array
17. Implement Queue using linked list
18. Implement bubble sort
19. Implement selection sort.
20. Implement insertion sort.
21. Implement quick sort.
22. Implement merge sort.

All lab works should be neatly recorded in a Laboratory Record Book in written form. However Program results can be pasted in the left hand side of the fare record. The laboratory record should have a minimum of:

- 20 lab exercises from C Programming

- 15 lab exercises from Data structure Programming

All students should maintain a rough record (observation note book) too, in which they write all the works to be carried out in the lab prior to his/her entry into the lab. He/She may also note down the input and output for program verification in the rough record.

(Model Question Paper)

Name…………………………….
Reg. No………………………….

FIRST SEMESTER B.Sc. DEGREE EXAMINATION NOVEMBER 2019
(CBCSS-UG)
Complementary Course – COMPUTER SCIENCE: CS1C01 – COMPUTER FUNDAMENTALS

Time: 2 hours   *Marks: 60*

Section A – Short Answer type questions

(Answer all questions, each correct answer carries a maximum of 2Marks. Ceiling 20 marks)

1.   What are the different types of number systems?

2.   Perform of the following conversions:

      (a) 120_8 to decimal   (b) 11011.101_2 to decimal

3.   Perform of the following binary operations:

      (a) $10111 + 1101$ (b) $10101 – 1111$

4.   What is universal gate? Why it is known as universal gate?

5.   Apply DeMorgan's theorem in the expression, $\overline{A B (C + \overline{D})}$

6.   What is cache memory?

7.   What is microprogram?

8.   What is MIDI instrument?

9.   Write an algorithm to check for leap year.

10.   What is the function of video digitizer?

11.   What is the use of magnetic strip?

12.   What is the purpose of programme planning?

Section B – Short Essay type questions

(Answer all questions, each correct answer carries a maximum of 5 marks. Ceiling 30 marks)

13.   What are the different digital codes?

14.   Write about different error detection and correction codes.

15.   Draw the logic diagram and truth table of full adder.

16.   What are the different types of memory?

17.   What are the different types of printers?

18.   Write a note on gaming devices.

19.   What are the advantages and limitations of flowchart?

SECTION C – Essay type questions

(Answer any one question, correct answer carries l0 marks)

20.   What are rules, laws and theorems of Boolean Algebra?

21.   Explain the functions of any two secondary storage devices.