Course: Fundamentals of Computer and C-Programming

Total Hrs. of Teaching-Learning: 52 @ 4 Hrs / Week   **Credits: 03**

Course Objectives:
1. To explore basic knowledge on computers
2. Learn how to solve common types of computing problems.
3. Learn basic constructs of computer programming languages
4. Learn data types and control structures of C
5. Learn to map problems to programming features of C.
6. Learn to write good portable C programs.

Course Outcomes
Upon successful completion of the course, a student will be able to:
1. Appreciate and understand the working of a digital computer
2. Analyze a given problem and develop an algorithm to solve the problem
3. Improve upon a solution to a problem
4. Use the 'C' language constructs in the right way
5. Design, develop and test programs written in 'C'

UNIT-I

Introduction to computers - Characteristics and limitations of computer, Block diagram of computer, types of computers, computer generations. Number systems: binary, hexadecimal and octal numbering system. Input and output devices: Keyboard and mouse, inputting data in other ways

Types of Software: system software, Application software, commercial, open source, domain and free ware software, Memories: primary, secondary and cache memory.

UNIT-II

Problem Analysis and its Tools: Problem solving technique and Program Development Life Cycle, Problem Definition, Algorithm, Flow Charts, Types of Errors, Testing and Debugging.

Basics of C: Historical development of C Language, Basic Structure of C Program, C Character Set, Identifiers and Keywords, constants, variables, Data types.

Operators and expressions: Arithmetic, Relational, Logical, Assignment, Unary, Conditional and Bitwise operators.Type conversions. Input and output statements: getchar( ), getch( ), getche( ), putchar( ), printf( ), scanf( ), gets( ), puts( )

UNIT-III

Control statements: Decision making statements: if, if else, else if ladder, switch statements. Loop control statements: while loop, for loop and do-while loop. Jump Control statements: break, continue and goto.

Arrays: one dimensional Array, two dimensional arrays.

UNIT-IV

Strings: Input/ Output of strings, string handling functions, table of strings

Functions: Function Prototype, definition and calling. Return statement. Nesting of functions. Categories of functions. Recursion, Parameter Passing by address & by value. Local and Global variables. Storage classes: automatic, external, static and register.

UNIT-V

Pointers: Pointer data type, Pointer declaration, initialization, accessing values using pointers. Pointer arithmetic. Pointers and arrays, pointers and functions.

Structures and Unions : Using structures and unions, use of structures in arrays and arrays in structures. Comparison of structure and Union.

Text Books:

1. E. Balagurusway, "Programming in C", Tata McGrwal Hill.
2. Computer fundamentals and c programming in c by Reemathareja, oxford university press

Reference Books

1. Introduction to C programming by REEMA THAREJA from OXFORD UNIVERSITY PRESS
2. E Balagurusamy: ―COMPUTING FUNDAMENTALS & C PROGRAMMING – Tata McGraw-Hill, Second Reprint 2008, ISBN 978-0-07-066909-3.
3. Ashok N Kamthane: Programming with ANSI and Turbo C, Pearson Edition Publ, 2002.
4. Henry Mullish&HuubertL.Cooper: The Spirit of C An Introduction to modern Programming, Jaico Pub. House,1996.
5. Y kanithkar, let us C BPB, 13 [th] edition-2013, ISBN:978-8183331630,656 pages.

RECOMMENDED CO-CURRICULAR ACTIVITIES:

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

A. Measurable

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity

B. General

1. Group Discussion
2. Try to solve MCQ's available online.
3. Others

RECOMMENDED CONTINUOUS ASSESSMENT METHODS:

Some of the following suggested assessment methodologies could be adopted;

1. The oral and written examinations (Scheduled and surprise tests),
2. Closed-book and open-book tests,
3. Problem-solving exercises,
4. Practical assignments and laboratory reports,
5. Observation of practical skills,
6. Individual and group project reports like "Creating Text Editor in C".
7. Efficient delivery using seminar presentations,
8. Viva voce interviews.
9. Computerized adaptive testing, literature surveys and evaluations,
10. Peers and self-assessment, outputs form individual and collaborative work

P. R.GOVT. COLLEGE (AUTONOMOUS), KAKINADA
MODEL BLUE PRINT(W.E.F. 2021-2022)
I B.Sc (MEIOT)
SEMESTER-I
Course: Fundamentals of Computer and C -Programming   Time: 2.30Hrs
Marks: 50

Model Blue print for the question paper setter

Chapter Name	Essay Questions 10 Marks	Short Questions 5 Marks	Marks allotted to the chapter
Module-1	2	2	30
Module-2	1	2	20
Module-3	1	1	15
Module-4	1	1	15
Module-5	1	1	15
Total No. of questions	6	7	
Total Marks Including choice			95

Course: Fundamentals of Computer and C -Programming
Time: 2.30Hrs

Marks: 50

Model blue print for the model paper and choice

S.NO	Type of Question	To be given in the Question Paper			To be answered		
		No. of Questions	Marks allotted to each question	Total Marks	No. of Questions	Marks allotted to each question	Total Marks
1	Section-A Short Questions	7	5	35	4	5	20
2	Section-B Essay Questions	6	10	60	3	10	30
	TOTAL	**13**		95	**TOTAL MARKS**		**50**

Percentage of choice given = $\dfrac{95 - 50}{95}$ x 100= $\dfrac{45}{95}$ x 100 = 47.36%

P R GOVT COLLEGE (A), KAKINADA
I B.Sc –MEIOT / Semester- I (W.E.F. 2021-2022)
Course: Fundamentals of Computer and C –Programming

<u>**Time: 2:30hrs**</u>　　　　　　　**SEMISTER – I**　　　　　**Max. Marks: 50**
<u>**Section – I**</u>
Answer any 4 Questions   (Short answer questions)　　　　　　　**(4x5=20M)**
　　1) Types of Software?
　　2) What is Identifier? Explain with example.
　　3) What is switch statement? Write its syntax?
　　4) Explain about Break and continue?
　　5) What are the different storage classes?
　　6) What is dynamic memory allocation?
　　7) Explain about pointer datatypes?

<u>**Section – II**</u>
Answer Any Four Questions　　　　　　　　　　　　　**(3x10=30M)**
　　8) A) Explain about various components of computer and draw the blockdiagram?
　　　　　　(OR)
　　　B) What are the generations of computers?
　　9) A) What is operator? Explain different types of operators in C?
　　　　　　(OR)
　　　B) Explain about conditional control statements in C?
　　10) A) explain about functions in details?
　　　　　(OR)
　　　B) What is a pointer? Explain the types of pointers?

Time: 2 Hrs   Marks: 50
<u>Practical/Laboratory – IV</u>

1. Internal Practicals   20 Marks

2. External Practicals   30 Marks

Semester	Course Code	Course Title	Hours	Credits
I	C1-P	**Hardware and C Programming Lab**	30	1

SEMESTER-I

Hardware Lab:

1. Identify various Memory components of the Computer.
2. Identify Various Cables and their uses
3. Identify various Network Devices.
4. Assembling and Disassembling of Computers.

C Programming Lab

1. Find the biggest of three numbers using C.
2. Write a c program to find the sum of individual digits of a positive integer.
3. A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence.
4. Write a c program to check whether a number is Armstrong or not.
5. Write a program to perform various string operations.
6. Write a c program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
7. Write a c program that uses functions to perform the following: Addition of two matrices. Multiplication of two matrices.
8. Write a c program that implements searching of given item in given list.
9. Write a c program to sort a given list of integers in ascending order.
10. Write a c program to perform various operations using pointers.
11. Write a c program to read data of 10 employees with a structure of 1.employee id 2.aadar no, 3.title, 4.joined date, 5.salary, 6.date of birth, 7.gender, 8.department.
12. Write a program for concatenation of two strings.
13. Write a program for length of a string

P R GOVT COLLEGE (A), KAKINADA
I B.Sc –MEIOT / Semester- II(W.E.F. 2021-2022)
Course: Fundamentals of IoT and Applications

Total Hrs. of Teaching-Learning: 52 @ 4 Hrs / Week   **Credits: 03**

Course Objectives
1. To study fundamental concepts of IoT
2. To understand roles of sensors in IoT
3. To Learn different protocols used for IoT design
4. To be familiar with data handling and analytics tools in IoT
5. Appreciate the role of big data, cloud computing and data analytics in a typical IoT system.
6. Understand the role of IoT in various domains of Industry.

Course Outcomes:
On completion of the course, student will be able to
1. Understand the various concepts, terminologies and architecture of IoT systems.
2. Use sensors and actuators for design of IoT.
3. Understand and apply various protocols for design of IoT systems
4. Use various techniques of data storage and analytics in IoT
5. Understand various applications of IoT
6. Understand APIs to connect IoT related technologies

UNIT-I

Fundamentals of IoT: Introduction, Definitions & Characteristics of IoT, IoT Architectures, Physical & Logical Design of IoT, Enabling Technologies in IoT, History of IoT, About Things in IoT, The Identifiers in IoT, About the Internet in IoT, IoT frameworks, IoT and M2M.

UNIT-II

Sensors Networks : Definition, Types of Sensors, Types of Actuators, Examples and Working, IoT Development Boards: Arduino IDE and Board Types, RaspberriPi Development Kit, RFID Principles and components, Wireless Sensor Networks: History and Context, The node, Connecting nodes, Networking Nodes, WSN and IoT.

UNIT-III

Wireless Technologies for IoT: WPAN Technologies for IoT: IEEE 802.15.4, Zigbee, HART, NFC, Z-Wave, BLE, Bacnet, Modbus.
IP Based Protocols for IoT IPv6, 6LowPAN, RPL, REST, AMPQ, CoAP, MQTT.
Edge connectivity and protocols

UNIT-IV

Data Handling& Analytics: Introduction, Bigdata, Types of data, Characteristics of Big data, Data handling Technologies, Flow of data, Data acquisition, Data Storage, Introduction to Hadoop. Introduction to data Analytics, Types of Data analytics, Local Analytics, Cloud analytics and applications

UNIT-V

Applications of IoT: Home Automation, Smart Cities, Energy, Retail Management, Logistics, Agriculture, Health and Lifestyle, Industrial IoT, Legal challenges, IoT design Ethics, IoT in Environmental Protection.

Text Books:
1. Hakima Chaouchi, ― "The Internet of Things Connecting Objects to the Web" ISBN : 978-1- 84821-140-7, Wiley Publications
2. Olivier Hersent, David Boswarthick, and Omar Elloumi, ― "The Internet of Things: Key Applications and Protocols", WileyPublications
3. Vijay Madisetti and ArshdeepBahga, ― "Internet of Things (A Hands-on-Approach)", 1st Edition, VPT, 2014.
4. J. Biron and J. Follett, "Foundational Elements of an IoT Solution", O'Reilly Media, 2016.
5. Keysight Technologies, "The Internet of Things: Enabling Technologies and Solutions for Design and Test", Application Note, 2016.

References
1. Daniel Minoli, ― "Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications", ISBN: 978-1-118-47347-4, Willy Publications
2. Pethuru Raj and Anupama C. Raman, "The Internet of Things: Enabling Technologies, Platforms, and Use Cases", CRC Press
3. https://onlinecourses.nptel.ac.in/noc17_cs22/course
4. http://www.cse.wustl.edu/~jain/cse570-15/ftp/iot_prot/index.html

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problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

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3. Problem-solving exercises,
4. Practical assignments and laboratory reports,
5. Observation of practical skills,
6. Individual and group project reports like "Developing IoT real time application using Arduino".
7. Efficient delivery using seminar presentations,
8. Viva voce interviews.
9. Computerized adaptive testing, literature surveys and evaluations,

Peers and self-assessment, outputs form individual and collaborative work

P. R.GOVT. COLLEGE (AUTONOMOUS), KAKINADA
MODEL BLUE PRINT (W.E.F. 2021-2022)
I B.Sc (MEIOT)
SEMESTER-II
Course: Fundamentals of Computer and C -Programming   **Time: 2.30Hrs**
                                                                 Marks: 50

Model Blue print for the question paper setter

Chapter Name	Essay Questions 10 Marks	Short Questions 5 Marks	Marks allotted to the chapter
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UNIT-2	1	2	20
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UNIT-4	1	1	15
UNIT-5	1	1	15
Total No. of questions	6	7	
Total Marks Including choice			95

P. R.GOVT. COLLEGE (AUTONOMOUS), KAKINADA
MODEL BLUE PRINT(W.E.F. 2021-2022)
I B.Sc (MEIOT)
SEMESTER-II
Course: Fundamentals of Computer and C -Programming
Time: 2.30Hrs   **Marks: 50**

Model blue print for the model paper and choice

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Percentage of choice given = $\dfrac{95 - 50}{95}$ x 10 0= $\dfrac{45}{95}$ x 100 = 47.36%

<u>Time: 2:30hrs</u>   **SEMISTER – II**   <u>Max. Marks: 50</u>
<u>**Section – I**</u>
Answer any 4 Questions   (Short answer questions)   (4x5=20M)
1. write the history of IoT?
2. Explain the role of internet in Iot?
3. What is RFID? Explain its components?
4. Explain about networking nodes?
5. Explain about z-wave?
6. Explain descriptive analytics?
7. Explain working of IoT in Logistics?

<u>**Section – III**</u>
Answer Any Four Questions   (3x10=30M)
8. A) what is Iot? Explain characteristics of IoT?
        (OR)
     B) Explain the architecture of IoT?
9. A) Explain the types of actuators with example?
        (OR)
     B) What is edge connectivity? Write its applications
10. A) Explain Hadoop in detail
        (OR)
     B) Write the role of IoT in home automations &health and life cycle?

Practical /Laboratory-II

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Time: 2 Hrs   **Marks: 50**
<u>**Practical/Laboratory – IV**</u>

1. Internal Practicals   20 Marks

2. External Practicals   30 Marks

P R GOVT COLLEGE (A), KAKINADA
I B.Sc –MEIOT / Semester- II(W.E.F. 2021-2022)
Course: Arduino Lab

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List of Experiments

1. Understanding Arduino UNO Board and Components

2. Installing and work with Arduino IDE

3. Blinking LED sketch with Arduino

4. Simulation of 4-Way Traffic Light with Arduino

5. Using Pulse Width Modulation

6. LED Fade Sketch and Button Sketch

7. Analog Input Sketch (Bar Graph with LEDs and Potentio metre)

8. Digital Read Serial Sketch (Working with DHT/IR/Gas or Any other Sensor)

9. Working with Adafruit Libraries in Arduino

10. Spinning a DC Motor and Motor Speed Control Sketch

11. Working with Shields

12. Interfacing Arduino with Cloud (Thingspeak API)