Government of Karnataka
Department of Collegiate and Technical Education
Board of Technical Examinations, Bangalore

Course Code	20CS11T	Semester	I
Course Title	**FUNDAMENTALS OF COMPUTER**	Course Group	Core
No. of Credits	4	Type of Course	Lecture
Course Category	PC	Total Contact Hours	4Hrs Per Week
			52Hrs Per Semester
Prerequisites	Nil	Teaching Scheme	(L: T:P) = 4:0:0
CIE Marks	50	SEE Marks	50

1. COURSE RATIONALE

Fundamentals of Computer is the foundational course that sets the base for computer science engineering. Core knowledge of number system, conversion, Boolean algebra, logic circuits are fundamental and even sets the basis for further study of computer organization & architecture, system software and computer network. Understanding the functional units, peripherals and components of a computer is vital.

2. COURSE SKILL SET

The aim of the course is to help the student to attain the following industry identified competency through various teaching –learning experiences

1. Identify computer hardware and software
2. Understand the data representation in computers
3. Basic knowledge of computer system and its working
4. Basic knowledge of logical thinking and problem solving

3. COURSE OBJECTIVES

1. Introduction to number system, conversion and data representation
2. Introduction to logic design
3. Understand functional units and components of computer
4. Develop logical thinking and problem-solving skills

4. JOB ROLE

SL.NO	LEVEL	JOB ROLES
1	3	Computer Operator & Program Assistant
2	3	Front Desk Operator
3	3	Office Assistant

5. PREREQUISITES

STUDENT	NIL
TEACHER	Various pedagogical techniques

6. COURSE OUT COMES

On successful completion of the course, the students will be able to demonstrate industry-oriented COs associated with the above-mentioned competency:

COURSE OUTCOME		CL	LINKED PO	TEACHING HOURS
CO1	Apply the knowledge of number system and Boolean algebra in computer system	U, A	1,4,7	12
CO2	Apply the knowledge of logic circuits for practical application	U, A	1,4,7	14
CO3	Recognize the various hardware and software associated with computer	U	1,7	8
CO4	Comprehend the functional units of a computer	U	1,7	10
CO5	Represent simple problems in terms of algorithm and flowchart	U, A	1,7	8

7. SUGGESTED SPECIFICATION TABLE WITH HOURS & MARKS (THEORY)

UNIT NO.	UNIT NAME	TEACHING HOURS	DISTRIBUTION OF THEORY MARKS			
			R	U	A	TOTAL
1	Basic of Logic design	12	10	30	10	50
2	Logic circuits	14	10	30	10	50
3	Introduction to computer concepts	8	05	20	05	30
4	Introduction to computer organization	10	10	20	10	40
5	Introduction to computer programming	8	05	20	05	30
	TOTAL	52	40	120	40	200

Legends: R = Remember; U = Understand; A = Apply and above levels (Bloom's revised taxonomy)

8. INSTRUCTIONAL STRATEGY

These are sample strategies, which teacher can use to accelerate the attainment of the various course outcomes

1. Massive Open online courses (MOOCS) can be used to teach various topics/subtopics.
2. Lecture method(L) does not mean only traditional lecture method, but different type of teaching methods and media can be employed to develop the outcomes.
3. About 15 to 20% of the topics/subtopics which are relatively simpler or descriptive in nature are to be given to the students for self-directed learning.
4. Arrange visits to nearby Offices/Industries/ Academic institution having network facility to understand types of network and types of computers being used.
5. Use different instructional strategies in classroom teaching
6. Use of virtual labs wherever mentioned

5. DETAILS OF COURSE CONTENT

The following topics/subtopics is to be taught and assessed in order to develop Unit Skill sets for achieving CO to attain identified skill sets

UNIT NO	TOPICS/SUBTOPICS	LEARNING OUTCOME (IN COGNITIVE DOMAIN)	HOURS L-T-P
1	**BASICS OF LOGIC DESIGN**		12
	1.1 Introduction to number system. • Binary • Octal • Decimal • Hexadecimal (characteristics of each number system) 1.2 Conversion from one number system to other 1.3 Complements of number systems and arithmetic operations 1.4 Computer codes (BCD, EBCDIC, ASCII	1. Understand various number representation 2. Perform conversion and arithmetic operations using different number system 3. Apply the knowledge of codes to represent data 4. Explain the working of logic gates 5. Apply Boolean rules and laws to solve the Boolean expression	

	Code, Gray code, Excess-3 code and Unicode) 1.5 Logic gates 1.6 Boolean algebra (rules, laws, De-Morgan Theorem, Boolean expressionsand simplifications)		
	Note: **1. Use visual/graphic content for demonstration** **2. Demonstrate data representation inside the computer using virtual labs** **3. Demonstrate logic gates using virtual labs** **4. Explain with block diagram, circuit diagram and truth table**		
2	**LOGIC CIRCUITS**		**14**
	2.1 Combinational Circuits ▪Characteristics ▪Logic circuit design ▪Block diagram, features & Applications of ▪adders,subtractors and comparators ▪multiplexers, demultiplexers ▪encoders, decoders and code converters (7 segment) 2.2 Sequential Circuits ▪Characteristics ▪Types ▪ Asynchronous ▪ Synchronous (clocked, un clocked) ▪Flip flops ○ Types, circuit analysis and truth table ▪Applications of sequential circuits ○ Shift registers (types and	1. Identify logic circuits 2. Describe the working of logic circuits 3. Compare combinational and sequential circuits 4. List the applications of logic circuits	

	application)		
	○ Counters (classification and application)		
	Note: **1. Demonstrate logic circuits and their application using virtual labs**		
3	**INTRODUCTION TO COMPUTER CONCEPTS**		8
	3.1 Introduction to computers ▪ Evolution of computer (abstract only) ▪ Generation of computers ▪ Classification of computer ▪ Applications 3.2 Components of computers ▪ Hardware (different types of hardware components) ▪ Software (System Software, Application Software, E-accessibility Software) (Open source, freeware and proprietary software) ▪ Peripherals (working of keyboard and laser printer) 3.3 Computer Network (Concept Only) ▪ Basics ▪ Categories ▪ Protocols (Application layer) ▪ Advantages. 3.4 Methods of data processing (concepts only) ▪ Single user programming ▪ Multi programming ▪ Real-time processing ▪ On-line processing	1. Describe the characteristics of computer of various generations 2. Identify the functional units and peripherals of a computer 3. Identify components of a computer system 4. Explain computer network concepts such as types, protocols 5. Identify and distinguish threats and viruses		

	- Time sharing processing - Distributed processing 3.5 Computer Security - Types of threats and source of threats		
	Note **1. Demonstrate computer and computer software's using videos and other visual/graphical method**		
4	**INTRODUCTION TO COMPUTER ORGANIZATION & OPERATING SYSTEM**		**10**
	4.1 Introduction - Overview of functional units of a computer - Stored Program Concept - Flynn's Classification of Computers 4.2 Memory Hierarchy - Main memory - Auxiliary memory - Cache memory 4.3 Introduction to BIOS and UEFI 4.4 OS Concepts - Overview - Types (Batch Operating System, Multitasking/Time Sharing OS, Multiprocessing OS, Real Time OS, Distributed OS, Network OS, Mobile OS) - Services	1.Examine the working of each functional unit 2. Explain memory hierarchy 3.Explain BIOS and UEFI 4.Describe type and functions of OS	
	Note: **1. Demonstrate using videos and other visual/graphical method**		
5	**INTRODUCTION TO COMPUTER PROGRAMMING**		**8**
	5.1 Basics of programming - Algorithms and Flowcharts - Basics - Decision making	1.Writing algorithms for mathematical concepts 2.Representation with flowchart 3. Identify the naming rules for	

	▪ Iterative (With sufficient examples) 5.2 Programming Languages ▪Generation of languages ▪General concepts of variables and constants	variables	
	Note: 1. Demonstrate using videos and other visual/graphical method 2. Use of online tools for flowchart design. ex:https://app.diagrams.net/		

10. MAPPING OF CO WITH PO

COURSE	CO'S	PROGRAMME OUTCOMES (PO'S)						
		1	2	3	4	5	6	7
FUNDAMENTALS OF COMPUTERS	CO1	3	-	-	2	-	-	1
	CO2	3	-	-	2	-	-	1
	CO3	3	-	-	2	--	-	1
	CO4	3	-	-	2	-	-	3
	CO5	3	-	-	2	-	-	3
Level 3- Highly Mapped, Level 2-Moderately Mapped, Level 1-Low Mapped, Level 0- Not Mapped								

11. SUGGESTED LEARNING RESOURCES

BOOKS	
1	Digital fundamentals – Thomas L. Floyd, PEARSON EDUCATION publication, Eleventh edition – Global Edition, ISBN 10: 1-292-07598-8, ISBN 13: 978-1-292-07598-3
2	Digital Electronics –principles and integrated circuits. Anil K. Maini. Wiley publications, first edition. ISBN: 978-81-265-1466-3
3	Digital Electronics –principles and integrated circuits. Anil K. Maini. Wiley publications, first edition. ISBN: 978-81-265-1466-3
4	Digital principles and applications. Donald P Leach, Albert Paul Malvino, GoutamSaha, McGraw Hill Publisher, 7th edition, ISBN (13 digit): 978-0-07-014170-4 ISBN (10 digit): 0-07-014170-3
5	Digital Computer Fundamentals, - Thomas C Bartee, McGraw-Hill Publisher,4th edition. ISBN 0-07-003892-9
6	Digital Logic and Computer Design M. Morris Mano

7	Introduction to Computer Science, ITL Education Solutions Pvt. Ltd., Pearson Education
8	"Computer Fundamentals" by Goel
URL'S	
1	**https://www.tutorialspoint.com/basics of computer science**
2	https://www.guru99.com/operating-system-tutorial.html
3	https://www.javatpoint.com/computer-organization-and-architecture-tutorial

12. SUGGESTED LIST OF PROPOSED STUDENT ACTIVITYS

Note: the following activities or similar activities for assessing CIE (IA)

SL. NO	ACTIVITY
1	Prepare a report on programming languages and their features
2	Prepare a report on open source and proprietary, system and application software
3	Prepare a report on recent viruses(computer)
4	Identify the logic circuits used in construction of memory and prepare a report
5	Identify the utilities of OS and prepare a report

13. COURSE ASSESSMENT AND EVALUATION CHART

SL.NO	ASSESSMENT	DURATION (in minutes)	MAX MARKS	CONVERSION
1	CIE Assessment 1 (Written Test -1) - At the end of 3 d week	80	30	Average of three written tests 30
2	CIE Assessment 2 (Written Test -2) - At the end of 7 week	80	30	
3	CIE Assessment 3 (Written Test -3) - At the end of 13 week	80	30	
4	CIE Assessment 4 (MCQ/Quiz)- At the end of 5 week	60	20	Average of three 20
5	CIE Assessment 5 (Open book Test) - At the end of 9 week	60	20	
6	CIE Assessment 6 (Student activity/ Assignment)- At the end of 11 week	60	20	
7	**Total Continuous Internal Evaluation (CIE) Assessment**			**50**

8	Semester End Examination (SEE) Assessment (Written Test)	3 hrs	100	50
TOTAL MARKS				**100**

14. RUBRICS FOR ACTIVITY

RUBRICS FOR ACTIVITY (Example Only)

Dimension	Poor	Below average	Average	Good	Exemplary	Student Score
	4	**8**	**12**	**16**	**20**	
Collection of data	Does not collect any information relating to the topic	Collects very limited information; some relate to the topic	Collect much information; but very limited relate to the topic	Collects some basic information; most refer to the topic	Collects a great deal of information; all refer to the topic	8
Fulfil team's roles & duties	Does not perform any duties assigned to the team role	Performs very little duties but unreliable.	Performs very little duties	Performs nearly all duties	Performs all duties of assigned team roles	6
Shares work equally	Always relies on others to do the work	Rarely does the assigned work; often needs reminding	Usually does the assigned work; rarely needs reminding	Normally does the assigned work	Always does the assigned work without having to be reminded.	8
Listen to other Team mates	Is always talking; never allows anyone else to speak	Usually does most of the talking; rarely allows others to speak	Talks good; but never show interest in listening others	Listens, but sometimes talk too much	Listens and speaks a fair amount	8
				Average / Total Marks: (8+6+8+8)/4		7.5 = 8 marks

Model Question Paper
I A Test (CIE)

Programme:				Semester: I	
Course :				Max Marks : 30	
Course Code :				Duration : 1 Hr 20 minutes	
Name of the course coordinator:				Test : I/II/III	

Note: Answer one full question from each section. One full question carries 10 marks.

Qn.No	Question	CL	CO	PO	Marks
	Section-1				
1.a)					
b)					
c)					
2.a)					
b)					
c)					

	Section-2				
3.a)					
b)					
c)					
4.a)					
b)					
c)					
	Section-3				
5.a)					
b)					
c)					
6.a)					
b)					
c)					

Model Question Paper
Semester End Examination

Programme:	Semester: I
Course :	Max Marks: 100
Course Code:	Duration: 3 Hrs

Instruction to the Candidate:
Answer one full question from each section. One full question carries 20 marks.

Qn.No	Question	CL	CO	Marks
	Section-1			
1.a)				
b)				
2.a)				
b)				
	Section-2			
3.a)				
b)				
4.a)				
b)				
	Section- 3			
5.a)				
b)				
6.a)				
b)				
	Section-4			
7.a)				
b)				
8.a)				
b)				
	Section-5			
9.a)				
b)				
10.a)				
b)				