CURRICULUM FRAMEWORK AND SYLLABUS
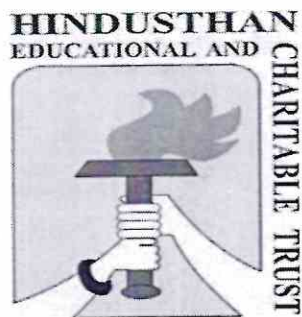
FOR OUTCOME BASED EDUCATION IN

Bachelor of Science in

Computer Technology

FOR THE STUDENTS ADMITTED FROM THE

ACADEMIC YEAR 2019 - 2020 AND ONWARDS

HINDUSTHAN
EDUCATIONAL AND CHARITABLE TRUST

HICAS

HINDUSTHAN COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS)

(Affiliated to Bharathiar University and Accredited by NAAC)
COIMBATORE-641028
TAMILNADU, INDIA.
Phone: 0422-4440555
Website: www.hicas.ac.in/

DEPARTMENT OF COMPUTER TECHNOLOGY

VISION

To create professionally competent and socially responsible graduates capable to face challenges in global environment.

MISSION

- To provide a strong theoretical and practical background in the field of Computer Technology.
- To impart the skills necessary to continue education to grow professional.
- To inculcate professional behavior, strong ethical values, innovative research capabilities and leadership abilities.

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

Under Graduates of Computer Technology program will

PEO1 : provide solutions to challenging problems in their profession by applying computer science theory and principles

PEO2 : engage in life-long learning and professional development to adapt to rapidly changing work environment

PROGRAM OUTCOME (PO) :

PO1 : Having ability to apply knowledge of computing and mathematics appropriate to the discipline.

PO2 : Recognition of the need for and ability to engage in continuing professional development.

PO3 : Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.

PO4 : Function effectively as a member or leader of a team engaged in activities appropriate to the computer technology discipline

PROGRAM SPECIFIC OUTCOME (PSO):

PSO1 : Ability to apply the knowledge of computing mathematics and related concepts in the appropriate domain.

PSO2 : Ability to analyze a problem, identify and define the requirements necessary for its solution.

PSO3 :. Ability to use current techniques, skills and tools to develop for application development with Professional ethics.

HINDUSTHAN COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS)

COIMBATORE - 641 028
B.Sc. COMPUTER TECHNOLOGY
SCHEME OF EXAMINATIONS - CBCS PATTERN
(For the students admitted from the Academic year 2019 - 2020 and onwards)

Course Code	Course Type	Course Title	Lecture Hours/ Week	Exam Duration (Hrs)	MAX.MARKS			Credit Points
					IE	EE	TOTAL	
Semester – I								
Part – I								
19LAT01/19LAH01/19LAM01/19LAF01	MIL	Tamil - I/ Hindi -I / Malayalam- I / French – I	6	3	30	70	100	3
Part – II								
19ENG01	AECC	English – I	6	3	30	70	100	3
Part – III								
19CTU01	DSC	Fundamentals of Computing and C Programming	5	3	30	70	100	5
19CTU02	DSC	Computer System Architecture	4	3	30	70	100	4
19CTU03	GE	**Allied:**Mathematical Structures	5	3	30	70	100	4
19CTU04	DSC	**Practical - I:**Programming using C	4	3	40	60	100	2
Semester – II								
Part – I								
19LAT02/ 19LAH02/ 19LAM02/ 19LAF02	MIL	Tamil - II/ Hindi - II/ Malayalam - II/ French – II	6	3	30	70	100	3
Part – II								
19ENG02	AECC	English – II	6	3	30	70	100	3
Part – III								
19CTU05	DSC	Data Structures	4	3	30	70	100	3
19CTU06	DSC	Python Programming	3	3	30	70	100	3
19CTU07	GE	**Allied:** Discrete Mathematics	5	3	30	70	100	4
19CTU08	DSC	**Practical - II:**Programming using python	4	3	40	60	100	2
Part – IV								
19GSU01	AEE	Value Education - Human Rights	2		100	-	100	2
Students Should Complete Value Added Courses, Communicative English And Soft Skills at the End of the First Year								
Semester – III								
Part – III								
19CTU09	DSC	Programming With Java	5	3	30	70	100	5
19CTU10	DSC	Computer Networks	5	3	30	70	100	5

19CTU11	DSC	PC Hardware andTroubleshooting	4	3	30	70	100	4
19CTU12	GE	**Allied:**Operations Research	5	3	30	70	100	4
19CTU13	DSC	**Practical - III:**Programming using JAVA	6	3	40	60	100	3
19CTU14	SEC	**Practical - IV:**Networking	3	3	40	60	100	2
Part – IV								
19GSU02	AEE	Environmental Studies	2		100	-	100	2
Semester – IV								
Part – III								
19CTU15	DSC	Relational Database Management System	6	3	30	70	100	5
19CTU16	DSC	LINUX and Shell Programming	6	3	30	70	100	5
19CTU17	DSC	**Practical -V:** RDBMS Applications	6	3	40	60	100	3
19CTU18	GE	**Allied:** Business Accounting	5	3	30	70	100	4
19CTU19	SEC	**Practical -VI:** Web Technology	5	3	40	60	100	3
Part – IV								
19GSU03	AEE	**Skill Based:** Internet Security	2		100	-	100	2
Part – V								
19GSU04	AECC	Extension Activity			100	-	100	2

Students Should Complete Value Added Courses,Online Courses (Or) Participation Certificates For Seminars, Workshops From Other Institutions For Each Semester And Womens Studies / Interdisciplinary at the end of Second Year

Extension Activity – means all those activities under NSS/NCC/sports/YRC Programme and other Co and extracurricular activities offered under part V of the programme.Every student shall participate compulsorily for a period of not less than two years (4 semesters) in any one of these programmes.

Semester – V								
Part – III								
19CTU20	DSC	.NET Programming	6	3	30	70	100	5
19CTU21	DSC	Data Mining	6	3	30	70	100	5
19CTU22	DSC	**Practical VII:** Programming using .Net	6	3	40	60	100	3

19CTU23A		**Elective I:** Cloud Computing (OR)	6	3	30	70	100	5
19CTU23B	DSE	**Elective I:** Soft Computing (OR)						
19CTU23C		**Elective I:** Mobile Computing						
19CTU24	SEC	**Practical VIII:** Data Analytics	6	3	40	60	100	3
Part – IV								
19GSU05	AEE	**Non Major Elective:** General Awareness			100	-	100	2
Part – V								
19GSU06	AECC	Law of Ethics			100	-	100	2
Semester – VI								
Part – III								
19CTU25	DSC	Open Source Tools	6	3	30	70	100	5
19CTU26A		**Elective II :** Software Testing (OR)	6	3	30	70	100	5
19CTU26B	DSE	**Elective II :** Computer Installation & Servicing **(OR)**						
19CTU26C		**Elective II :** Artificial Intelligence and Expert Systems						
19CTU27	DSC	**Practical IX:** Open Source Tools	6	3	40	60	100	3
19CTU28A		**Elective III :** Computer Graphics and Multimedia (OR)	6	3	30	70	100	5
19CTU28B	DSE	**Elective III :** Compiler Design (OR)						
19CTU28C		**Elective III:** Neural Networks						
19CTU29	SEC	**Practical X:** Software Testing Tools	6	3	40	60	100	3
19CTU30	DSC	Project Work			40	60	100	4
Students Should Complete Value Added Courses, Online Courses / Entrepreneurship/Startups/ Job Oriented Courses and Placement Training at the end of the Third Year								
						Total Credits		140

No of papers	Course Type	Total Credit Points
2	Modern Indian Language(MIL)	6
4	Ability Enhancement Compulsory course(AECC)	10
4	Ability Enhancement Elective (AEE)	8
19	Discipline Specific course(DSC)	74
3	Discipline Specific Elective(DSE)	15
4	Skill Enhancement Course(SEC)	11
4	Generic Elective(GE)	16
40	TOTAL	140

UG- REGULATION (2019-2020 and Onwards)

1. Internal Marks for all UG

Components	Marks
Test I	5
Test II	5
Model Exam	10
Assignment	5
Attendance*	5
TOTAL	**30**

*Split-up of Attendance Marks for UG

♣ 75-79 - 1 marks
♣ 80-84 - 2 marks
♣ 85-89 - 3 marks
♣ 90-94 - 4 marks
♣ 95-100 - 5 marks

QUESTION PAPER PATTERN FOR I.E TEST I and II

Duration: Two Hours   **Maximum: 70 Marks**

SECTION - A (6 x 1 = 6 Marks)
Answer **ALL** Questions
ALL Questions Carry **EQUAL** Marks
Multiple choice/Fill up the blanks /True or False questions
SECTION - B (4x 5 = 20 marks)
Answer **ALL** Questions
ALL Questions Carry **EQUAL** Marks
Either or Type

SECTION - C (3x 8 = 24 marks)
Answer **ALL** Questions
ALL Questions Carry **EQUAL** Marks Either or Type

QUESTION PAPER PATTERN FOR IE Model Examination

Duration: Three Hours   **Maximum: 70 Marks**

SECTION - A (10x1=10 Marks)
Answer **ALL** Questions
ALL Questions Carry **EQUAL** Marks
Q.No 1 to 10: (Multiple choice/Fill up the blanks /True or False questions).
(Two questions from each unit)
SECTION - B (5x4=20 Marks)
Answer **ALL** Question
ALL Questions Carry **EQUAL** Marks

Q.No 11 to 15: Either or type questions
(One question from each Unit)
SECTION- C (5x8=40 Marks)
Answer **ALL** Questions
ALL Questions carry **EQUAL** Marks
Q.No 16 to 20: Either or type questions (One question from each Unit)

2 a) Components for Practical I.E.

Components	Marks
Test –I	20
Test - II	20
Total	------- 40 =====

2 b) Components for Practical E.E.

Components	Marks
Completion of Experiments	50
Record	5
Viva	5
Total	------- 60 =====

3. Institutional/ Industrial Training, Mini Project and Major Project Work

Institutional /Industrial Training		Mini Project	Major Project Work	
Components	Marks	Marks	Components	Marks
I.E Work Diary Report Viva –voce Examination	25 50 25	- 50 50	I. E a) Attendance 10 Marks b) Review / Work Diary*[1] 30 Marks	40
Total	‾‾‾‾ 100 ====	‾‾‾‾ 100 ====		
			E.E*[2] a) Final Report 40 Marks b) Viva-voce 20 Marks	60
			Total	‾‾‾‾ 100 ====

*[1] Review is for Individual Project and Work Diary is for Group Projects (group consisting of minimum 3 and maximum 5)

*[2] Evaluation of report and conduct of viva voce will be done jointly by Internal and External Examiners

4. Components for Value Education (Part IV):

S.No.	Components	Marks
a)	Attendance 96% and above - 30 marks 91% to 95% - 25 marks 86% to 90% - 20 marks 76% to 85% - 10 marks	30 marks
b)	Participation in group activity	30 marks
c)	Assignment (2 x 10)	20 marks
d)	Test (1 hr for 20 marks) 2 out of three questions, 10 marks each	20 marks
	Total	100 marks

On completion of the above components students will be remarked as follows:

Range of marks	Equivalent remarks
80 and above	Exemplary
70 – 79	Very good
60 – 69	Good
50 – 59	Fair
40 – 49	Satisfactory
Below 39	Not Satisfactory = Not completed

The passing minimum for this paper is 40%

In case, the candidate fails to secure 40% passing minimum, he / she may have to reappear for the same in the subsequent semesters.

5. Guidelines for Environmental Studies (Part IV)

The paper Environmental Studies is to be treated as 100% IE course which is offered in III Semester for II year UG students.

The classes will be handled for two hours per week till the end of the Semester. At least one field trip should be arranged.

Total Marks for the subject   =   100

Components   Marks

Two Tests (2 x 30)	60
Field visit and report (10 + 10)	20
Two assignments (2 x 10)	20

Total	100

The question paper pattern is as follows:
Test I – 2 hours [3 out of 5 essay type questions]   3 x 10 = 30 Marks
Test II – 2 hours [3 out of 5 essay type questions] 3 x 10 = 30 Marks
                                                     ----
                                                     Total   60 Marks
                                                     ----

The passing minimum for this paper is 40%
In case, the candidate fails to secure 40% passing minimum, he / she may have to reappear for the same in the subsequent semesters.

6.   **Guidelines for Skill based subject - Internet Security (Part IV)**

Components	Marks
Two Tests (2 x 40)	80
Two assignments (2 x 10)	20

Total	100

The question paper pattern is as follows:
Test I – 2 hours [4 out of 7 essay type questions]   4 x 10 = 40Marks
Test II – 2 hours [4 out of 7 essay type questions] 4 x 10 = 40 Marks
                                                     ----
                                                     Total   80 Marks
                                                     ----

The passing minimum for this paper is 40%
In case, the candidate fails to secure 40% passing minimum, he / she may have to reappear for the same in the subsequent semesters

7.   **Guidelines for General Awareness (Part IV)**

Components	Marks
Two Tests (2 x 50)	100

The question paper pattern is as follows:
Test I – 2 hours [50multiple choice questions]   50 x 1 = 50Marks
Test II – 2 hours [50 multiple choice questions] 50 x 1 = 50 Marks
                                                 ----
       Total   100 Marks

The passing minimum for this paper is 40%
In case, the candidate fails to secure 40% passing minimum, he / she may have to reappear for the same in the subsequent semesters

8. Guidelines for Law of Ethics (Part V)

Components	Marks
Two Tests (2 x 50)	100

The question paper pattern is as follows:

Test I – 2 hours [5 out of 8 essay type questions]   5 x 10 = 50 Marks

Test II – 2 hours [5 out of 8 essay type questions]   5 x 10 = 50 Marks

----

Total   100 Marks

The passing minimum for this paper is 40%

In case, the candidate fails to secure 40% passing minimum, he / she may have to reappear for the same in the subsequent semesters

9. Guidelines for Extension Activity (Part V)

At least two activities should be conducted within this semester (IV) consisting of two days each.
The activities may be Educating Rural Children, Unemployed Graduates, Self Help Group etc.

The marks may be awarded as follows

No of Activities	Marks
2 x 50 (Each Activity for two days)	100

10. QUESTION PAPER PATTERN FOR EE (Part III Theory Papers)

Duration: Three Hours   **Maximum: 70 Marks**

SECTION - A (10x1=10 Marks)
Answer **ALL** Questions
ALL Questions Carry **EQUAL** Marks

Q.No 1 to 10: (Multiple choice/Fill up the blanks /True or False questions).
(Two questions from each unit)

SECTION - B (5x4=20 Marks)
Answer **ALL** Question
ALL Questions Carry **EQUAL** Marks

Q.No 11 to 15: Either or type questions
(One question from each Unit)

SECTION- C (5x8=40 Marks)
Answer **ALL** Questions
ALL Questions carry **EQUAL** Marks

Q.No 16 to 20: Either or type questions
(One question from each Unit)

BACHELOR OF SCIENCE (COMPUTER TECHNOLOGY)

Programme Code:	BST	Programme Title: Bachelor of Science (Computer Technology)		
Course Code:	19CTU01	Course Title	Batch:	2019-2022
		FUNDAMENTALS OF COMPUTING AND C PROGRAMMING	Semester:	I
Hrs/Week:	5		Credits:	5

Course Objective

- Learn the fundamentals of computing techniques.
- Develop the simple applications in 'C' language.

Course Outcomes (CO)

K1	CO1	To gain Knowledge in programming languages.
K2	CO2	Understand the fundamentals of C programming language.
K3	CO3	Apply and experiment the concepts of pointers, arrays, structures and Files in C.
K4	CO4	Analyze and develop application using C.

Mapping of Outcomes

PO / CO	PO1	PO2	PO3	PO4
CO1	S	S	L	-
CO2	S	S	M	L
CO3	S	S	S	S·
CO4	S	S	S	S

S - Strong; M-Medium; L-Low.

19CTU01	FUNDAMENTALS OF COMPUTING AND C PROGRAMMING	I
Unit No.	Topics	Hours
I	**Introduction to computers**: Characteristics and Limitations of computer-Block Diagram of Computer-Types of Computers-Uses of Computers- Computer Generations. **Input and output devices**: Keyboard and Mouse- Inputting Data in other ways-**Types of Software**: System Software- Application Software. **Memories**: Primary- Secondary and Cache memory. **Programming Languages**: Evolution of Programming Languages-- Translator programs –Problem Solving Techniques.	9
II	**Introduction to C**: Introduction –Structure of C Program –Writing the first C Program –File used in C Program –Compiling and Executing C Programs –Using Comments –Keywords –Identifiers – Data Types – Variables –Constants –I/O operations –Operators and Expressions - Programming Examples –Type Conversion and Type Casting.	12
III	**Decision Control and Looping Statements**: Introduction to Decision Control Statements –Conditional Branching Statements –Looping Statements –Nested Loops –Jumps in loops – Goto Statement. **Functions**: Introduction –using functions –Function declaration –Function definition –Function call –Return statement –Categories of Functions–Recursive function.	12
IV	**Arrays**: Introduction –One dimensional- Declaration of Arrays –Two dimensional –Multi dimensional –Dynamic arrays – Character arrays and Strings. **Pointers**: Understanding pointers–Declaring Pointer Variables – Initialization of pointer variables - Accessing a variable through its pointer - Pointer Expressions –Pointers and Arrays- Array of Pointers-Pointers to Functions.	13
V	**Structure and Union**: Introduction- Defining a Structures- Declaring structure variables-Accessing Structure members-Initialization-Array of structures- Arrays within structures-Structure within structures-Unions. **Files**: Introduction to Files – Defining and opening a file- Closing a file-I/O operations on files- Random access to files-Command line arguments.	14

Text Book:

1. Computing Fundamentals and C Programming –E.Balagurusamy TMH 7th reprint 2011

Reference Books:

1 .Programming in ANSI C - Balaguruswami, TMH 21ˢᵗ reprint 1998

2 .Let us C - Y.Kanetkar, BPB Publications

3. The C Programming Language – Brian W Kwenighan, Dennis M.Ritchie, Prentice Hall Software Series

  2nd Edition

Course Designed by	Verified by HOD	Checked by	Approved by
Mr.M.Karthi	Mrs.K.Mythili		

K. MYTHILI M.Sc., M.Phil., (Ph.D)
Associate Professor & HOD
Department of Computer Technology
Hindusthan College of Arts and
Science (Autonomous)
Coimbatore - 641 028.

Co-ordinator
Academic Audit Cell
Hindusthan College of Arts & Science,
Coimbatore-641 028.

BACHELOR OF SCIENCE (COMPUTER TECHNOLOGY)

Programme Code:	BST	Programme Title: Bachelor of Science (Computer Technology)		
Course Code:	19CTU02	Course Title	Batch:	2019-2022
		COMPUTER SYSTEM ARCHITECTURE	Semester:	I
Hrs/Week:	4		Credits:	4

Course Objective

1. To explore the concepts of the organization, architecture and designing concept of computer system

2. To design the components of basic Computer.

Course Outcomes (CO)

K1	CO1	Understand the data representation system.
K2	CO2	Comprehend the logic circuits and registers
K3	CO3	Apply the concepts in the basic Computer Organization and Design.
K4	CO4	To analyze the basic Computer Components such as CPU, Input/ Output and Memory organization.

Mapping of Outcomes

PO / CO	PO1	PO2	PO3	PO4
CO1	M	S	M	L
CO2	S	L	M	-
CO3	S	M	S	L
CO4	M	L	M	-

S - Strong; M-Medium; L-Low.
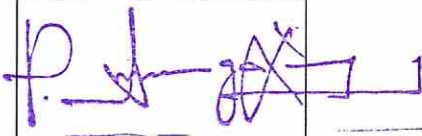
19CTU02	COMPUTER SYSTEM ARCHITECTURE	I
Unit No.	Topics	Hours
I	**Data Representation:** Number Systems-Binary-Octal-Hexadecimal number-Complements-Floating Point Representation-Other Binary codes – Error Detection Codes - **Logic Circuits:** Logic Gates-Combinational Circuits-Half-Adder-Full-Adder- Flip-Flops-SR - JK – D and T flip-flop.	9
II	**Basic computer organization:** Instruction codes- Computer registers- Computer instructions - Timing and Control - Instruction cycle- Memory - Reference Instructions - Input-output and interrupt - Complete computer description.	9
III	**Central processing unit:** Introduction - General Register Organization- Stack Organization- Instruction format - Addressing Modes - Data Transfer and Manipulation - Program Control - Reduced Instruction Set Computer (RISC) - Complex Instruction Set Computer (CISC) - comparison of RISC and CISC. **Pipelining:** Parallel processing - Pipelining - Arithmetic Pipeline - Instruction Pipeline - RISC Pipeline.	9
IV	**Input – Output organization:** Input-output interface - Asynchronous Data Transfer - Modes of Transfer - Priority Interrupt – DMA - Input-Output Processor (IOP) - CPU-IOP Communication - Serial Communication.	9
V	**Memory Organization:** Memory Sub System - Memory hierarchy - Main memory - Auxiliary memory - Flash memory - Associative memory - Cache memory - Virtual memory. **Self Study :** Intel 8086 Microprocessor	9

Text Book:

1.   *M. Morris Mano, "Computer System and Architecture", Pearson Education, Third Edition, (30 June 2017).*

Reference Books:

1.	Badri Ram , *"Advanced Microprocessors and Interfacing",TMH, 2012.*
2.	W. Stallings, *"Computer Organization & Architecture", Pearson Education,8th Edition.2012.*
3.	M. Carter , *"Computer Architecture", Schaum's outline series, TMH, Special Indian Edition.*

Course Designed by	Verified by HOD	Checked by	Approved by
Mrs.D.Mythili	Mrs.K.Mythili		

K. MYTHILI M.Sc., M.Phil., (Ph.D)
Associate Professor & HOD
Department of Computer Technology
Hindusthan College of Arts and
Science (Autonomous)
Coimbatore - 641 028.

Co-ordinator
Academic Audit Cell
Hindusthan College of Arts & Science,
Coimbatore-641 028.

Programme Code:	BST	Programme Title: Bachelor of Science (Computer Technology)		
Course Code:	19CTU04	Course Title	Batch:	2019-2022
		PRACTICAL I: PROGRAMMING USING C	Semester:	I
Hrs/Week:	4		Credits:	2

Course Objective

- To learn the fundamentals of C Programming
- To gain knowledge about arrays, structures, pointers and functions
- To develop the ability to apply file I/O operations.

Course Outcomes (CO)

K1	CO1	Write C programs.
K2	CO2	Apply pointers for effective memory access.
K3	CO3	Employ structure and pointer.
K4	CO4	Illustrate file access.

Mapping of Outcomes

PO CO	PO1	PO2	PO3	PO4
CO1	S	S	S	S
CO2	S	S	S	M
CO3	S	S	S	M
CO4	S	S	S	S

S - Strong; M-Medium; L-Low.

19CTU04	PRACTICAL I : PROGRAMMING USING C	I

Ex. No.	Program List
1	Program to develop a Simple Calculator using switch case.
2	Program to find the Sum Of The Digits
3	Program to sort numbers in Ascending and descending order using Arrays..
4	Program to Sort a set of names in Dictionary Order
5	Program to find the Prime numbers between two integers using functions
6	Program to implement Matrix operations Addition, Subtraction and Multiplication – using functions.
7	Program to generating Fibonacci Numbers using recursive functions
8	Program for String manipulations without using string functions (string length, string comparison, string copy) (Using function pointers).
9	Program to store information of Students using Structures
10	Program to implement dynamic memory allocation.
11	Program to write the content into a file, read the content from the same file and display it.
12	Program to read name and marks of n number of students from user and store them in a file. Again read the information from the file and display on the screen in a Mark Statement format.

Course Designed by	Verified by HOD	Checked by	Approved by
Mr.M.Karthi	Mrs.K.Mythili		

K. MYTHILI M.Sc., M.Phil., (Ph.D)
Associate Professor & HOD
Department of Computer Technology
Hindusthan College of Arts and
Science (Autonomous)
Coimbatore - 641 028.

Co-ordinator
Academic Audit Cell
Hindusthan College of Arts & Science,
Coimbatore-641 028.

Programme Code:	BST	Programme Title: Bachelor of Science(Computer Technology)			
				Batch:	2019-2022
Course Code:	19CTU05	DATA STRUCTURES		Semester:	II
Hrs/Week:	4			Credits:	3

Course Objective

- To understand the concept of fundamental data structure and about writing algorithms to solve problems practically.
- To design and implement various data structure algorithms for developing applications.

Course Outcomes (CO)

K1	CO1	Recall the fundamentals concepts of data structures.
K2	CO2	Understand the concepts of trees and graphs.
K3	CO3	Apply and experiment concepts of sorting.
K4	CO4	Analyze and classify concepts of merging and Files

Mapping of Outcomes

PO \\ CO	PO1	PO2	PO3	PO4
CO1	S	S	M	L
CO2	S	S	S	-
CO3	S	S	S	-
CO4	S	S	S	-

S - Strong; M-Medium; L-Low.
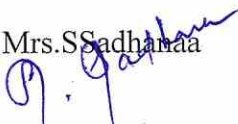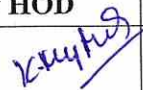
19CTU05	DATA STRUCTURES	II
Unit No.	Topics	Hours
I	**Introduction:**Introduction to Algorithm –Arrays -Stacks and Queues-Fundamentals-**Linked List:**-Singly Linked List – doubly linked list and Dynamic-Sparse Matrices- Polynomial addition.	9
II	**Trees:** Binary tree representations – Binary Tree Traversal – Threaded Binary Trees -Counting binary trees. **Graphs:** Terminology and representations - Traversals, Connected Components.	10
III	**Internal sorting** - Searching-Insertion sort-Quick sort-Heap Sort-2 way merge sort-Sorting on several keys. **External Sorting**: Storage device-Magnetic tape – Disk storage – Sorting with disk- K-way merging - Sorting with tape-Balanced Merge sorts-Polyphase Merge.	11
IV	**Symbol tables:** Static tree table –Dynamic Tree tables-Hash tables -Hashing Functions-overflow handling-Theoretical evaluation of overflow techniques. **Files:** Files, Queries and Sequential organizations	8
V	**Index Techniques:**-Hashed Index-tree indexing-B trees. **File organizations:** Sequential organizations-Random Organization- Linked Organization-Inverted Files-Storage Management.	7

Text Book:

1. *Ellis Horowiz, Sartaj Sahni and Sanguthevar, "Fundamentals of Data Structure", GalgotiaPublications,1981.*

Reference Books:

1. Shmuel Tomi Klein," Basic Concepts in Data Structures", Cambridge UniversityPress,2016.
2. *Ellis Horowitz, Sartaj Sahni, Susan Anderson Freed,*"Fundamentals Of Data Structures In C",Universities Press (India) Limited ,2017
3. *MarkAllenWeiss,"DataStructureoanAlgorithmanalysisin C",PearsonEducation,SecondEdition, Sixteenth Impression2014.*

Course Designed by	Verified by HOD	Checked by	Approved by
Mrs.S.Sadhanaa	Mrs.K.Mythili		

K. MYTHILI M.Sc., M.Phil., (Ph D)
Associate Professor & HOD
Department of Computer Technology
Hindusthan College of Arts and
Science (Autonomous)
Coimbatore - 641 028.

Co-ordinator
Curriculum Development Cell
Hindusthan College of Arts & Science,
Coimbatore-641 028.

BACHELOR OF COMPUTER TECHNOLOGY

Programme Code:	BST	Programme Title: Bachelor of Science(Computer Technology)		
Course Code:	19CTU06	**Course Title**	**Batch:**	2019-2022
		PYTHON PROGRAMMING	**Semester:**	II
Hrs/Week:	3		**Credits:**	3

Course Objective

- To know the programming concepts of python.
- To learn how to design and solve problems with algorithms using python.

Course Outcomes (CO)

K1	CO1	Deliberate Python syntax and semantics and be fluent in the use of Python flow control and functions.
K2	CO2	Understand, run and manipulate Python Programs using core data structures.
K3	CO3	Apply proficiency in handling Strings and File Systems.
K4	CO4	Able to Analyze Dictionaries and use Regular Expressions.

Mapping of Outcomes

PO CO	PO1	PO2	PO3	PO4
CO1	M	L	M	L
CO2	M	M	L	M
CO3	S	M	S	S
CO4	M	S	S	M

S - Strong; M-Medium; L-Low.
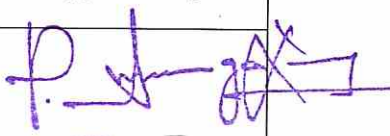
19CTU06	PYTHON PROGRAMMING	II
Unit No.	**Topics**	**Hours**
I	**PYTHON BASICS, LIBRARIES** **Overview of Python**-History of Python - Origins Features - Downloading and Installing Python - Running Python. **Basic Syntax**– Hello World - Interactive mode Programming - Script mode Programming - A simple Python Example- Python Libraries.	12
II	**DATA, EXPRESSIONS, STATEMENTS** Python Interpreter and Interactive mode. -**Values and Types:** Int, Float, Boolean, String, and List; Variables – Expressions - Statements, Tuple Assignment - Precedence of Operators – Comments. **Modules and Functions:** Function Definition and Use, Flow of Execution, Parameters and Arguments.	12
III	**CONTROL FLOW, FUNCTIONS** **Conditionals:** Boolean Values and Operators - Conditional (if), Alternative (if-else), Chained Conditional (if-elif-else). **Iteration:** State, While, For, Break, Continue, Pass. **Fruitful Functions:** Return Values - Parameters - Local and Global Scope - Function Composition – recursion. **Strings:** String Slices - String Functions and Methods - Lists as Arrays.	12
IV	**LISTS, TUPLES** **Lists:** List Operations - List Slices - List Methods - List Loop – Mutability – Aliasing - Cloning Lists - List Parameters. **Tuples:** Tuple Assignment - Tuple as Return Value.	12
V	**DICTIONARIES, FILES** **Dictionaries:** Operations and Methods - Advanced List Processing - List Comprehension. **Files and Exception:** Text Files - Reading and Writing Files - Format Operator - Command Line Arguments.	12

Text Books

1. Allen B. Downey, ``Think Python: How to Think Like a Computer Scientist'', 2nd edition, Updated for Python 3, Shroff/O'Reilly Publishers, 2016 (http://greenteapress.com/wp/think-python/)

Reference Books

1. *Mark Lutz ,"Programming Python ", O Reily, 4thEdition, 2010, ISBN 9780596158118*

2. *Tim Hall and J-P Stacey ,"Python 3 for Absolute Beginners" , 2009, ISBN:9781430216322*

3. *Magnus Lie Hetland , "Beginning Python: From Novice to Professional", 2nd Edition, 2009, ISBN:9781590599822.*

Course Designed by	Verified by HOD	Checked by	Approved by
Mr.D.Vijaya Kumar	Mrs.K.Mythili		

K. MYTHILI M.Sc., M.Phil., (Ph.D)
Associate Professor & HOD
Department of Computer Technology
Hindusthan College of Arts and
Science (Autonomous)
Coimbatore - 641 028.

Co-ordinator
Academic Audit Cell
Hindusthan College of Arts & Science,
Coimbatore-641 028.

BACHELOR OF COMPUTER TECHNOLOGY

Programme Code:	CTU	Programme Title: Bachelor of Science (Computer Technology)		
Course Code:	**19CTU08**	**Course Title**	**Batch:**	2019-2022
		Practical II : PROGRAMMING USING PYTHON	**Semester:**	II
Hrs/Week:	4		**Credits:**	2

Course Objective

- To understand the concepts of Python Program.
- To design and implement various data structure algorithms for developing applications using Python Programming

Course Outcomes (CO)

K1	CO1	Understand concepts of Basic Python Program.
K2	CO2	Implement the concepts of sorting
K3	CO3	Apply the concepts of Data structure using python
K4	CO4	Develop applications through searching Algorithms
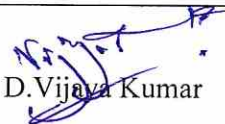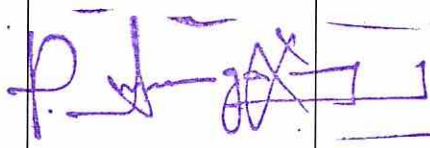
Mapping of Outcomes

PO / CO	PO1	PO2	PO3	PO4
CO1	S	S	M	L
CO2	S	M	L	S
CO3	S	S	M	S
CO4	S	S	L	S

S - Strong; M-Medium; L-Low.

19CTU08	PRACTICAL II : PROGRAMMING USING PYTHON	II

Ex. No.	Program List
1	Program to find first n prime numbers.
2	Program to find the exponentiation of a number.
3	Program to identify the maximum from a list of numbers.
4	Program to perform Binary Search.
5	Program to implement Linear Search.
6	Program to perform selection sort.
7	Program to perform insertion sort.
8	Program to implement Merge sort.
9	Gene Sequence mining using string manipulation
10	Bio computing using string manipulation

Course Designed by	Verified by HOD	Checked by	Approved by
D.Vijaya Kumar	Mrs.K.Mythili		

Programme Code:	BST	Programme Title: Bachelor of Computer Technology		
Course Code:	19CTU09	PROGRAMMING WITH JAVA	Batch:	2019 and onwards
			Semester:	III
Hrs/Week:	5		Credits:	5

Course Objective

- To impart the basic knowledge of object oriented programming, the fundamental concepts of java.
- To analyze and implement the concepts of Exception Handling, Multithreading, AWT, Applet in java.

Course Outcomes (CO)

K1	CO1	Gain knowledge about the principles of Java programming.
K2	CO2	Apply and experiment the concepts Object Oriented Programming and Develop java standalone applications.
K3	CO3	Employ the robust & concurrent application using Multithreading and Exception handling concepts.
K4	CO4	Relate and Experiment Java applications with Graphical User Interface (GUI)using AWT

Mapping of Outcomes

PO CO	PO1	PO2	PO3	PO4
CO1	S	S	M	L
CO2	S	M	S	L
CO3	S	S	S	S
CO4	S	S	S	S

S - Strong; M-Medium; L-Low.

19CTU09	PROGRAMMING WITH JAVA	III
Unit No.	Topics	Hours
I	**Introduction to Java** Features of Java - History of Java- Structure – Java Tokens – Statements – Java Virtual Machine - Data Types - Variables - Operators - Decision Making and Branching - Decision Making and Looping	10
II	**Object Oriented concepts:** Classes, Objects and Methods: Methods & variables - Constructor- Overloading - Static members - Final Classes – Abstract method- Arrays, Strings and Vectors. – Interfaces: Multiple Inheritance –Extending interfaces-implementing interfaces. Packages: Putting Classes together-creating, accessing & using packages.	15
III	**Multithreaded Programming:** creating Threads -Extending Threads - Thread life cycle- Thread Exception- Priority-Implementing Runnable interface. **Managing Errors and Exceptions:** Introduction- Exception handling – Exceptions- Multiple Catch statement-using finally statement–Applet Programming – Graphics Programming.	10
IV	**Files:** Managing Input / Output Files in Java : Concepts of Streams- Stream Classes – Byte Stream classes – Character stream classes – Using streams – I/O Classes – File Class – I/O exceptions – Creation of files – Reading / Writing characters, Byte-Handling Primitive data Types – Random Access Files.	10
V	**Advanced concepts of Java:** AWT Class and Controls: Introduction -AWT class - AWT controls-Labels, Buttons, CheckBox, List, TextField, TextArea– AWT managers and menus – Layout manager - MenuBar& Menus - Event handling by AWT components . Introduction: Java Bean - Socket Programming – Servlets - Java Server Pages, JDBC.	15

Text Book :
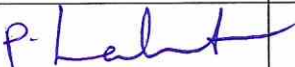
1.Balagurusamy.E, " Programming with Java – A Primer" , TMH, 3rd Edition.

Reference Books:

1.Patrick Naughton& Herbert Schildt, "The Complete Reference Java 2", TMH, 3rd Edition.

2.John R. Hubbard, "Programming with Java" , TMH, 2nd Edition.

3.Herbert Schildt, "The Complete Reference Java", Paperback, 7th Edition

Course Designed by	Verified by HOD	Checked by	Approved by
Dr.P.Lalitha	Mrs.K.Mythili		

K. MYTHILI.M.Sc., M.Phil., (Ph.D)
Associate Professor,& HOD
Department of Computer Technology
Hindusthan College of. Arts and
Science (Autonomous)
Coimbatore - 641 028.

Co-ordinator
Academic Audit Cell
Hindusthan College of Arts & Science,
Coimbatore-641 028.

Programme Code:	BST	**Programme Title:** Bachelor of Computer Technology		
Course Code:	19CTU10	**COMPUTER NETWORKS**	**Batch:**	2019 and onwards
			Semester:	III
Hrs/Week:	5		**Credits:**	5

Course Objective

- Study the basic terminology of computer networks and to enumerate the layers of TCP/IP and OSI Reference Model.
- To Introduce the various aspects of Network Security.

Course Outcomes (CO)

K1	CO1	Describe the basic concept of Computer Networks Terminology and Explain the layers of TCP/IP and OSI Reference Model.
K2	CO2	Examine the Concept of Bluetooth Technology.
K3	CO3	Understand and Building the skills of Subnetting and Routing Mechanism.
K4	CO4	Explain the Network Security Primitives.

Mapping of Outcomes

PO / CO	PO1	PO2	PO3	PO4
CO1	M	M	M	M
CO2	S	S	S	S
CO3	S	M	L	L
CO4	L	S	M	M

S - Strong; M-Medium; L-Low.

For the students admitted in the academic year 2019 and onwards
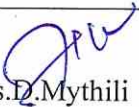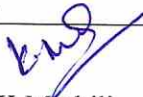
19CTU10	COMPUTER NETWORKS	III
Unit No.	Topics	Hours
I	**Introduction**: - Uses Of Computer Networks- Network Hardware- Network Software- Reference Models- The Osi Reference Model- The TCP/IP - Reference Model- A Comparison Of The Osi And Tcp/Ip Reference Models- Example Networks- The Internet Third-Generation Mobile Phone Networks- Wireless Lans:- Rfid And Sensor Networks- **The Physical Layer** :The Theoretical Basis For Data Communication- Fourier Analysis- Bandwidth-Limited Signals- The Maximum Data Rate Of A Channel- Guided Transmission Media - Wireless Transmission- Communication Satellite - The MobileTelephone System.	10
II	**The Data Link Layer:**- Data Link Layer Design Issues- Error Detection And Correction- Elementary Data Link Protocols- Sliding Window Protocols- **The Medium Access Control Sublayer**- Multiple Access Protocols- Aloha- Carrier Sense Multiple Access Protocols- Collision - Free Protocols- Limited-Contention Protocols- Wireless LAN Protocols- Ethernet- Wireless LANs- Broadband Wireless- **Bluetooth**- RFID- Data Link LayerSwitching	10
III	**The Network Layer:**- Network Layer Design Issues- Routing Algorithms- The Optimality Principle -Shortest Path Algorithm- Flooding-Distance Vector Routing-Link State Routing-Hierarchical Routing-Broadcast Routing-Multicast Routing - Anycast Routing - Routing For Mobile Hosts- Routing In Ad Hoc Networks- Congestion Control Algorithms- Internetworking- The Network Layer In The Internet- Ip Addresses − Ip Version 6 -Internet Control Protocols- OSPF-BGP- Internet Multicasting-Mobile IP.	15
IV	**The Transport Layer:**- The Transport Service-Services Provided To The Upper Layers-Transport Service Primitives-Berkeley Sockets- Elements Of Transport Protocols- The Internet Transport Protocols: UDP-The Internet Transport Protocols: TCP- Performance Issues- Delay-Tolerant Networking.	15
V	**The Application Layer:** - DNS - The Domain Name System-Electronic Mail- **Network Security**- Cryptography- Symmetric-Key Algorithms- Public-Key Algorithms- Digital Signatures- Communication Security- Authentication Protocols- Email Security- Web Security.	10

Text Book:

1. *Andrew S. Tanenbaum and David J. Wetherall - "Computer Networks"- Prentice hall India Pub- Fifth Edition-2011.*

Reference Books:

1 *Achyut. S. Godbole," Data Communications and Networks"- Tata McGraw-Hill Publishing Company-2007.*
2 *William Stallings-" Data and computer communications"- PHI- seventh edition-2000.*

Course Designed by	Verified by HOD	Checked by	Approved by
Mrs.D.Mythili	Mrs.K.Mythili		

K. MYTHILI M.Sc., M.Phil., (Ph.D)
Associate Professor & HOD
Department of Computer Technology
Hindusthan College of Arts and
Science (Autonomous)
Coimbatore - 641 028.

Co-ordinator
Academic Audit Cell
Hindusthan College of Arts & Science,
Coimbatore-641 028.

Programme Code:	BST	Programme Title: Bachelor of Computer Technology		
Course Code:	19CTU11	PC hardware and Troubleshooting	Batch:	2019 and onwards
			Semester:	III
Hrs/Week:	4		Credits:	4

Course Objective

- Examine current personal computer hardware including personal computer assembly and upgrading, setup and configuration, and troubleshooting.
- Develops student's technology skills required for troubleshooting computer software and hardware problems.

Course Outcomes (CO)

K1	CO1	Describe the fundamentals of PC technology and memory works
K2	CO2	Demonstration of motherboard, power supply and cooling protection
K3	CO3	Describe the storage principles and optical storage
K4	CO4	Classify the I/O Ports, Keyboard , Mouse Interface and Troubleshooting tools and Data, Disaster Recovery

Mapping of Outcomes

PO CO	PO1	PO2	PO3	PO4
CO1	S	M	S	S
CO2	S	S	S	M
CO3	S	S	M	M
CO4	S	M	S	M

S - Strong; M-Medium; L-Low.

For the students admitted in the academic year 2019 and onwards

19CTU11	PC Hardware and Troubleshooting	III
Unit No.	**Topics**	**Hours**
I	Fundamentals of PC Technology: Fundamental building blocks of the PC - Principles of CPU operation - Trouble shooting the CPU: Handling and replacing the CPU- CPU configuration- CPU troubleshooting checklist - Memory: How memory works - Troubleshooting memory - Advanced memory technologies: DRAM – DDRAM –PPRAM	10
II	Motherboards: Motherboard controllers and system resources - The I/O system bus - On board I/O devices – Chipsets - ROM BIOS - ROM POST - The power supply - Ventilation and cooling protection.	9
III	Magnetic storage Principles: Magnetic storage – How Magnetic field are used to Store – Head Sliders – Hard Disk Storage: Hard Disk Advancement and its Features – Removable Disk Storage: The Role of removable media drives – Optical Storage: Optical Technology – CD Construction and Technology -DVD Construction and Technology	10
IV	External I/O Interfaces: Introduction to I/O Ports - Serial Vs Parallel –Universal Serial Bus (USB) – Input Devices: Keyboards/Mouse Interface - Keyboard troubleshooting and Repair – Mouse troubleshooting – Wireless Input Devices – Power management features of wireless input devices – Troubleshooting wireless input devices.	9
V	Troubleshooting tools and techniques: Tools of the trade - Basic PC handling techniques. Basic data recovery and disaster recovery: Disk structure and Data recovery: partitions- the master boot record- partition tables- extended partitions- file allocation tables - Disaster recovery.	10

Text Book:

1. *Upgrading & Repairing PCs:Scott Mueller's– Pearson Education, Inc,19th Edition– 2010.*

Reference Book:

1. *The Complete ReferencePC Hardware by Craig Zacker and John Rourke, Tata McGraw-Hill –2001.*
2. *The Winn L.Rosch Hardware Bible by Winn L.Rosch, A Prentice Hall Computer, 6nd Edition-2003.*
3. *PC Hardware and A+ Handbook by Kate J.Chase, Microsoft Corporation –2004.*

Course Designed by	Verified by HOD	Checked by	Approved by
Mrs.M.Amalmary	Mrs.K.Mythili		

K. MYTHILI M.Sc., M.Phil., (Ph.D)
Associate Professor & HOD
Department of Computer Technology
Hindusthan College of Arts and
Science (Autonomous)
Coimbatore - 641 628.

Co-ordinator
Academic Audit Cell
Hindusthan College of Arts & Science,
Coimbatore-641 028.

Programme Code:	BST	**Programme Title:** Bachelor of Computer Technology		
Course Code:	19CTU13	PRACTICAL - III: PROGRAMMING USING JAVA	**Batch:**	2019and onwards
			Semester:	III
Hrs/Week:	6		**Credits:**	3

Course Objective

- Understand and Develop Standalone Java Programs.
- Design and Develop GUI Applications using AWT, Applet and Swing.

Course Outcomes (CO)

K1	CO1	Design and Develop Java problems using object-oriented concepts
K2	CO2	Develop java applications using packages & collection interfaces.
K3	CO3	Apply and Develop concurrent Applications using Multithreading
K4	CO4	Develop Event driven and Graphical User Interface programming using AWT and Applet
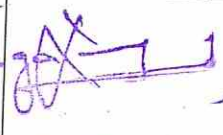
Mapping of Outcomes

PO / CO	PO1	PO2	PO3	PO4
CO1	S	S	S	L
CO2	S	S	S	L
CO3	S	S	S	M
CO4	S	S	S	S

S - Strong; M-Medium; L-Low.

19CTU13	PRACTICAL - III: PROGRAMMING USING JAVA	III
Ex. No	**Program List**	
1	Write the java program for the manipulation of string class.	
2	Write a java program to implement the multiple inheritance using interfaces.	
3	Write a java program to demonstrate the use of packages.	
4	Write a java program to implement the concept of Multithreading.	
5	Write a java program to create an Exception and throw the exception.	
6	Write a java program to demonstrate Graphics and Applet class.	
7	Write a java program to implement the concept of Applet & AWT Events.	
8	Develop a Java Program to implement Swing concepts.	
9	Develop a GUI program using Swing components.	
10	Write a java program which open an existing file and append the text to that file.	
11	Develop a program to Analyze the Gene sequence.	
12	Write a program for calculating Biocomputing.	

Course Designed by	Verified by HOD	Checked by	Approved by
Dr.P.Lalitha	Mrs.K.Mythili M.Sc., M.Phil., (Ph.D) Associate Professor & HOD Department of Computer Technology Hindusthan College of Arts and Science (Autonomous) Coimbatore - 641 028.		Co-ordinator Curriculum Development Cell Hindusthan College of Arts & Science, Coimbatore-641 028.

Programme Code:	BST	Programme Title: Bachelor of Computer Technology		
Course Code:	19CTU14	Practical – IV :Networking	Batch:	2019 and onwards
Hrs/Week:	3		Semester:	III
			Credits:	2

Course Objective

To impart knowledge about Computer Networks, various protocols used in Communication, Managing and configuring Cisco Switches and Routers and various WANtechnologies

Course Outcomes (CO)

K1	CO1	Design enterprise network for given user requirements in an application.
K2	CO2	Design a network in recent methodology and also to make remote connectivity as one's own work, as a member and leader in a team.
K3	CO3	Practice packet/file transmission between nodes.
K4	CO4	Evaluate protocol and network operation in a simulated environment.

Mapping of Outcomes

PO CO	PO1	PO2	PO3	PO4
CO1	M	S	S	S
CO2	M	S	S	S
CO3	L	M	M	L
CO4	M	S	S	S

S - Strong; M-Medium; L-Low.

For the students admitted in the academic year 2019 and onwards

19CTU14	Practical – IV :Networking	III
Ex. No.	**ProgramList**	
1	Program to determine class, Network and Host ID	
2	Program to Configure DHCP and DNS Server	
3	Program to implement the File Transfer Protocol	
4	Program to downloading the file from HTTP Server	
5	Program to Configure SNMP	
6	Program to implement the RIP Routing Protocol	
7	Program to implement the Multicasting service.	
8	Study on Network interfacing and communication of physical objects, devices and peripherals	

Course Designed By	Verified By HOD	Checked By	Approved By
Mrs.D.Mythili	Mrs.K.Mythili		

Programme Code:	BST	Programme Title: Bachelor of Computer Technology		
Course Code:	19CTU15	Relational Database Management System	Batch:	2019 and onwards
			Semester:	IV
Hrs/Week:	6		Credits:	5

Course Objective

- To understand database management system, data availability, data integrity, data security, and data independence.
- To analyze database requirements and determine the entities involved in the system and their relationship to one another.
- To inculcate knowledge on RDBMS concepts.

Course Outcomes (CO)

K1	CO1	Defines the fundamental elements of Database Management System.
K2	CO2	Implements the Relational Database Design and Data Modeling using Entity-Relationship (ER) model.
K3	CO3	Demonstrates the use of constraints and Relational Algebra Operations, Use of SQL in querying the database and applying various Normalization Techniques.
K4	CO4	Performs PL/SQL programming using Cursor Management, Error Handling, Procedures, Functions, Triggers and Packages.

Mapping of Outcomes

PO / CO	PO1	PO2	PO3	PO4
CO1	S	S	S	S
CO2	M	M	S	S
CO3	M	M	S	S
CO4	S	S	S	S

S- Strong; M-Medium; L-Low.

For the students admitted in the academic year 2019 and onwards
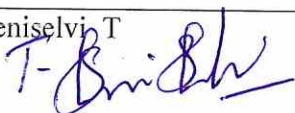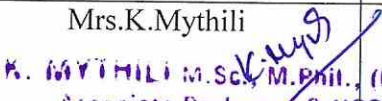
19CTU15	Relational Database Management System	IV
Unit No.	Topics	Hour
I	**Database Concepts:A Relational approach**: Database – Relationships – Database Management System (DBMS) – The Relational Database Model – Integrity Rules – Theoretical Relational Languages. **Database Design: Data Modeling and Normalization:** Data Modeling – Dependency– Database Design– Normal forms – Dependency Diagrams – Denormalization.	14
II	**Oracle 9i: An Overview:** Personal Databases – Client/Server Databases – Oracle9i: An Introduction – The SQL *Plus Environment – Structured Query Language (SQL) – Logging into SQL *Plus - SQL *Plus Commands. **Oracle Tables:Data Definition Language (DDL):** Naming Rules and conventions– Data Types – Constraints – Creating an Oracle Table– Displaying Table Information – Altering an Existing Table– Dropping, Renaming, Truncating a Table – Oracle's Various Table Types – Spooling – Error Codes.	14
III	**Working with Tables:Data Management and Retrieval**: Data Manipulation Language(DML) – Adding a new Row/Record – Customized Prompts – Updating and Deleting Existing Rows/Records – Retrieving Data from a Table – Arithmetic Operations – Restricting Data with WHERE clause – Sorting – Revisiting Substitution Variables – DEFINE command – CASE structure. **Functions and Grouping:** Built-in functions – Grouping Data. **Multiple Tables: Joins and Set operators:** Join – Set operators.	15
IV	**PL/SQL:A Programming Language:** Fundamentals of PL/SQL – PL/SQL Block Structure –Comments– Data Types –Variable Declaration – Assignment Operation – Bind Variables– Substitution Variables – Printing – Arithmetic Operators. **Control Structures and Embedded SQL:** Control Structures – Nested Blocks – SQL in PL/SQL – Data Manipulation– Transaction Control statements. **PL/SQL Cursors and Exceptions:** Cursors – Implicit & Explicit Cursors and Attributes – Cursor FOR loops – SELECT...FOR UPDATE cursor– WHERE CURRENT OF Clause – Cursor with Parameters –Cursor Variables – Exceptions – Types of Exceptions.	14
V	**PL/SQL Composite Data Types:** Records – Tables – VArrays. **PL/SQL Named Blocks:** Procedures – Functions – Packages –Triggers –Data Dictionary Views.	15

Text Book:
1. *NileshShah.''Database Systems using Oracle'', PHI Learning Private Limited, 2nd edition, 2014.*

Reference Books:
1. Raghu Ramakrishnan and Johannes Gehrke, ''Database Management Systems'', McGraw-Hill Education , 2003.
2. Singh,''Database Systems: Concepts,Design& applications'', Pearson Education.
3.Abraham Silberschatz, Henry F. Korth, S. Sudarshan, ''Database System Concepts'',McGraw-Hill, Fifth edition, 2005.

Course Designed by	Verified by HOD	Checked by	Approved by
Ms.Seeniselvi.T	Mrs.K.Mythili K. MYTHILI M.Sc., M.Phil., (Ph.D) Associate Professor & HOD Department of Computer Technology Hindusthan College of Arts and Science (Autonomous) Coimbatore - 641 028.	Co-ordinator Curriculum Development Cell Hindusthan College of Arts & Science, Coimbatore-641 028.	

Programme Code:	BST	**Programme Title:** Bachelor of Computer Technology		
Course Code:	19CTU16	**LINUX and Shell Programming**	Batch:	2019 and onwards
Hrs/Week:	6		Semester:	IV
			Credits:	5

Course Objective

- Educate the principles of operating system including File handling utilities, Security by file permissions, Process utilities, Disk utilities, Networking Commands, Basic Linux commands, Scripts andfilters.
- Familiarize fundamentals of the Bourne again shell (bash), shell programming, pipes, input and output redirection Control structures, arithmetic in shell interrupt processing, functions, debugging shell scripts.

Course Outcomes (CO)

K1	CO1	Ability to use various Linux commands that are used to manipulate system operations at admin level and a prerequisite to pursue job as a Network administrator.
K2	CO2	Ability to write Shell Programming using Linux commands
K3	CO3	Ability to use filters and pipes.
K4	CO4	Ability to design and write application to manipulate internal kernel level Linux File System.

Mapping of Outcomes

PO / CO	PO1	PO2	PO3	PO4
CO1	M	M	M	L
CO2	S	S	S	M
CO3	S	M	S	M
CO4	S	S	M	M

S - Strong; M-Medium; L-Low.

For the students admitted in the academic year 2019 and onwards

19CTU16	LINUX and Shell programming	IV
Unit No.	Topics	Hours
I	**INTRODUCTION TO OPERATING SYSTEMS ANDLINUX:** Basics of Operating Systems: Definition – Generations of Operatingsystems – Types of Operating Systems, OS Service - A brief history of LINUX.	14
II	**LINUX UTILITIES:** Architecture of LINUX - features of LINUX - introduction to vi editor. **Linux commands-** PATH, man, echo, printf, script, passwd, uname, who, date, stty, pwd, cd, mkdir, rmdir, ls, cp, mv, rm, cat, more, wc, lp, od, tar, gzip, file handling utilities, security by file permissions, process utilities, disk utilities, networking commands, unlink, du, df, mount, umount, find, unmask, ulimit, ps, w, finger, arp, ftp, telnet, rlogin.Text Processing utilities and backup utilities,tail,head,sort,nl,uniq,grep,egrep,fgrep,cut,paste,join, tee, pg, comm, cmp, diff, tr, awk, cpio	15
III	**Introduction to Shells:** Linux Session, Standard Streams, Redirection, Pipes, Tee Command, Command Execution, Command-Line Editing, Quotes, Command Substitution, Job Control, Aliases, Variables, Predefined Variables, Options, Shell/Environment Customization.	15
IV	**Filters:** Filters and Pipes, Concatenating files, Display Beginning and End of files, Cut and Paste, Sorting, Translating Characters, Files with Duplicate Lines, Count Characters, Words or Lines, Comparing Files.	14
V	**Grep:** Operation, grep Family, Searching for File Content. **Sed:** **Scripts**, Operation, Addresses, commands, Applications, grep and sed.	14

*Text Books***:**

1. Richard Petersen, Linux: The Complete Reference, Sixth Edition, Tata McGraw-Hill Publishing Company Limited, New Delhi, Edition 2008.
2. Operating System Concepts, Silberschatz, Peter B. Galvin and Greg Gagne, Wiley-Indian Edition.

Reference Books:

1. Linux System Programming, Robert Love, O'Reilly, SPD.
2. W. Richard. Stevens (2005), Advanced Programming in the UNIX Environment, 3rd edition, PearsonEducation, New Delhi, India.
3. Understanding the Linux Kernel: From I/O Ports to Process Management Kindle Edition, Daniel P. Bovet.

Course Designed by	Verified by HOD	Checked by	Approved by
Dr.C.Thirumoorthi	Mrs.K.Mythili		

K. MYTHILI M.Sc., M.Phil., (Ph.D)
Associate Professor & HOD
Department of Computer Technology
Hindusthan Coll of Arts and
Science
Coi

Co-ordinator
Academic Audit Cell
Hindusthan College of Arts & Science,
Coimbatore-641 028.

Programme Code:	BST	Programme Title: Bachelor of Computer Technology		
Course Code:	19CTU17	Practical -V: RDBMS Applications	Batch:	2019 and onwards
			Semester:	IV
Hrs/Week:	6		Credits:	3

Course Objective

- To Understand and gain knowledge in database concepts.
- To Design and develop applications using front end tools and back end DBMS.

Course Outcomes (CO)

K1	CO1	Paraphrasing and underlying concepts of database
K2	CO2	Experimenting the Database model and determining the DDL and DCL commands
K3	CO3	Structures PL/SQL functions
K4	CO4	Design and Validate by building applications.

Mapping of Outcomes
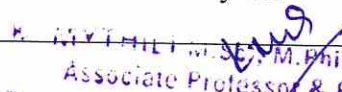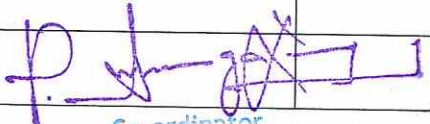
PO / CO	PO1	PO2	PO3	PO4
CO1	S	S	M	L
CO2	S	M	L	S
CO3	S	S	M	S
CO4	S	S	L	S

S - Strong; M-Medium; L-Low.

For the students admitted in the academic year 2019 and onwards

19CTU17	Practical -V: RDBMS Applications	IV
Ex. No.	**Program List**	
1	Create a table for Student details with Registration Number as Primary Key and following fields: Name, Course, Gender, Age, Year of Joining and Percentage. Insert at least 10 rows and perform various queries using any one Comparison, Logical, Set, Sorting and Grouping Operators.	
2	Create a table for Student database and perform DDL and DML Commands and generate a report.	
3	Develop a database for Employee applications by applying Built-in Functions.	
4	Write a PL/SQL block to find out if a year is a leap year. A leap year is divisible by 4 but not by 100, or it is divisible by 400. (Hint: The function MOD (n,d) divides n by d and return the integer remainder from the operations).	
5	Write a PL/SQL code to find Factorial of a given number using Recursive Function.	
6	Write a PL/SQL program in Cursor using Loops.	
7	Create a database trigger to implement in the main and transaction tables which is related to the inventory system for checking the data validity with the tables having the needed fields	
8	Write a PL/SQL program to create a table for a bank account and create an exception for managing the account where the account is said to be zero.	
9	Develop a simple project for Student Database Management System using Visual Basic as front end and ORACLE as back end.	
10	Demonstrate simple project for Airline Reservation Management System using Visual Basic as front end and ORACLE as back end and display a report.	

Course Designed by	Verified by Hod	Checked by	Approved by
Mrs.T.Senthiselvi	Mrs.K.Mythili		
	K. MYTHILI M.Sc.,M.Phil., (Ph.D) Associate Professor & HOD Department of Computer Technology Hindusthan College of Arts and Science (Autonomous) Coimbatore - 641 028.	Co-ordinator Curriculum Development Cell Hindusthan College of Arts & Science, Coimbatore-641 028.	

Programme Code:	BST	Programme Title: Bachelor of Computer Technology		
Course Code:	19CTU19	Practical – VI :Web Technology	Batch:	2019 and onwards
Hrs/Week:	5		Semester:	IV
			Credits:	3

Course Objective

The objective of this lab is to develop an ability to design and implement static and dynamic website.

Course Outcomes (CO)

K1	CO1	Able to develop a webpage and publishing them.
K2	CO2	Ability to apply design and development principles in producing software systems of varying complexity using Javascript and ASP.
K3	CO3	Able to write well formed/ Valid XML Document.
K4	CO4	Use web application development software tools like Javascript, ASP, XML and identify the environments currently available on the market to design web sites as a member and leader in a team.

Mapping of Outcomes

PO CO	PO1	PO2	PO3	PO4
CO1	M	S	M	S
CO2	S	S	S	S
CO3	S	M	M	L
CO4	M	S	S	S

S - Strong; M-Medium; L-Low.

For the students admitted in the academic year 2019 and onwards

19CTU19	Practical – VI : Web Technology	IV
Ex. No.	Program List	
1.	Write a JavaScript to design a simple calculator to perform the following operations: sum, product, difference and quotient.	
2.	Using Java Script's Window and document objects and their properties and various methods like alert (), eval (), ParseInt () etc. methods to give the dynamic functionality to HTML web pages.	
3.	Writing Java Script snippet which make use of Java Script's inbulit as well as user defined objects like navigator, Date Array, Event, Number etc.	
4.	Write a JavaScript code that displays text "TEXT-GROWING" with increasing font size in the interval of 100ms in RED COLOR, when the font size reaches 50pt it displays "TEXT-SHRINKING" in BLUE color. Then the font size decreases to 5pt.	
5.	Develop and demonstrate a HTML5 file that includes JavaScript script that uses functions for the following problems: a. Parameter: A string b. Output: The position in the string of the left-most vowel c. Parameter: A number d. Output: The number with its digits in the reverse order	
6.	Design an XML document to store information about a student.The information must include Reg No, Name, and Name of the College, Branch, Year of Joining, and email id. Make up sample data for 3 students. Create a CSS style sheet and use it to display the document	
7.	Design a personal web page using ASP.	
8.	Perform different Text file operations using Textstream Object in ASP.	
9.	Write a Program in ASP to get data using a form, validate the data and returns the same data for correction if any using the same form	
10.	Display a different content each time a user visits a page Using ASP 3.0.	

Course Designed by	Verified by HOD	Checked by	Approved by
Mrs.D.Mythili	Mrs.K.Mythili		

Programme Code:	BST	Programme Title: Bachelor of Computer Technology		
Course Code:	19CTU20	Course Title	Batch:	2019 - 2020
		.NET Programming	Semester:	V
Hrs/Week:	6		Credits:	5

Course Objective

- To Understand the concept of .NET Framework and GUI Design Tool.
- Determine to modularize code with C# Methods and Properties.
- Understand the concept of Data access using ADO.Net.
- Develop Web applications using Asp .Net

Course Outcomes (CO)

K1	CO1	Getting started with .Net Data types and variable using .Net framework.
K2	CO2	Development of console applications.
K3	CO3	Create & develop distributed data driven applications using ADO.Net framework
K4	CO4	Relating the basic concepts of ASP.Net with web Applications

Mapping of Outcomes

PO CO	PO1	PO2	PO3	PO4
CO1	S	M	M	M
CO2	S	M	S	M
CO3	S	S	M	M
CO4	S	M	S	M

S - Strong; M-Medium; L-Low.

Code No.	Subject	Semester No.
19CTU20	.NET Programming	V

Unit No.	Topics	Hours
Unit I	Essential Visual Basic.Net: The .NET Framework and the Common Language Runtime - Building VB.NET Applications - The Visual Basic Integrated Development Environment (IDE)- The Visual Basic Language: Conditionals: Visual Basic Statements - Statement Syntax - The Option and Imports Statements - Declaring Constants - Declaring variables - Data Types - Making Decisions with If…Else Statements - Using Select Case - Making Selections with Switch and Choose.	14
Unit II	C# Basics: Data Types, Variables & Constants, Operators in C#, Arithmetic Operators, Prefix and Postfix notation, Assignment Operators, Relational Operators, Other Operators, Operator's precedence, Flow Control and Conditional Statements. Object and Classes: Concept of a class, Objects, Fields, Methods, Access modifiers, Properties, Static members of the class, Constructors, Destructors, Method overloading, events and delegates, Operator overloading.	14
Unit III	C# Using Libraries: Namespace-System, Input/Output, Multi-Threading, Networking and Sockets, Data Handling, Windows Forms, C# in Web application, Error Handling.	15
Unit IV	ADO.NET Fundamentals: Understanding Data Management – Configure database – SQL Basics - ADO.Net basics – Direct Data Access – Disconnect Data Access. Data Binding: Single-Value data binding	15
Unit V	Introduction to ASP.NET: Overview of the ASP.NET-Asp.Net Standard Controls- Displaying information- Accepting User Input- Displaying Images- Asp.Net Validation Controls- ASP.NET Working with Data.	14

Text Book:
1. *Steven Holzner, "Visual Basic.NET Programming Black Book", Dream Tech Press, 2013*
2. *E.Balagurusamy, "Programming in C#", Tata McGraw Hill, 3 rd Edition, 2010*
3. *Shirish Chavan. (2007), Visual Basic.Net, 1st Edition, Pearson Education, New Delhi. Matt J. Crouch, "ASP.NET and VB.NET Web Programming", Edition 2012.*

Reference Books:
1. Blair Richard & Crosland Jonathan Professional VB.NET, Willy
2. Herbert Schildt (2010). Complete Reference C#, Tata McGraw-Hill.
3. Joe Duffy (2010). Professional .Net Framework 2.0l, Wiley India
4. Jeffrey R.Sharpiro, "The Complete Reference Visual Basic.Net", TataMcGraw Hill

Course Designed by	Verified by HOD	Checked by	Approved by
Mrs.S.Saranya	Mrs.K.MYTHILI		

K. MYTHILI M.Sc., M.Phil., (Ph.D)
Associate Professor & HOD
Department of Computer Technology
Hindusthan College of Arts and
Science (Autonomous)
Coimbatore - 641 028.

Co-ordinator
Academic Audit Cell
Hindusthan College of Arts & Science
Coimbatore-641 028.

Programme code:	BST	Programme Title: Bachelor of Science in Computer Technology		
Course Code:	19CTU21	Course Title	Batch:	2019-2020
Hrs/Week:	6	Data Mining	Semester:	V
			Credits:	5

Course Objective

- To understand the principles of Data Mining.
- To understand the various Data pre-processing Methods.
- To perform classification and prediction of data.
- To be familiar with the Data warehouse architecture and its Implementation.

Course Outcomes (CO)

K1	CO1	List principles, concepts and applications of data mining
K2	CO2	Extend the knowledge using data mining techniques
K3	CO3	Build new data mining tools.
K4	CO4	Survey a data mart or data warehouse for any organization

Mapping of Outcomes

PO / CO	PO1	PO2	PO3	PO4
CO1	S	S	S	S
CO2	M	S	S	S
CO3	S	S	S	S
CO4	S	M	S	S

S - Strong; M-Medium; L-Low.

For the students admitted in academic year 2019-2020

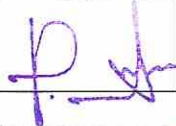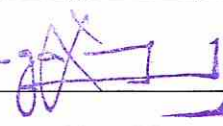| 19CTU21	Data Mining	V
Unit No.	**Topics**	**Hours**
I	Data Mining: - Data Mining Functionalities – Data Pre-processing – Data Cleaning – Data Integration and Transformation – Data Reduction-Association Rule Mining: - Efficient and Scalable Frequent Item set Mining Methods – Mining Various Kinds of Association Rules – Association Mining to Correlation Analysis – Constraint-Based Association Mining.	14
II	Classification and Prediction: - Issues Regarding Classification and Prediction – Classification by Decision Tree Introduction – Bayesian Classification – Rule Based Classification – Classification by Back propagation – Support Vector Machines	15
III	Cluster Analysis: - Types of Data in Cluster Analysis – A Categorization of Major Clustering Methods – Partitioning Methods – Hierarchical methods – Density-Based Methods – Grid-Based Methods – Model-Based Clustering Methods – Clustering High-Dimensional Data – Constraint-Based Cluster Analysis – Outlier Analysis.	14
IV	Mining Object, Spatial, Multimedia, Text and Web Data:Multidimensional Analysis and Descriptive Mining of Complex Data Objects – Spatial Data Mining – Multimedia Data Mining – Text Mining – Mining the World Wide Web.	14
V	Data Warehousing and Business Analysis: - Data warehousing Components –Building a Data warehouse –Data Warehouse Architecture – DBMS Schemas for Decision Support – Data Extraction, Cleanup, and Transformation Tools –Metadata – reporting – Query tools and Applications – Online Analytical Processing (OLAP) – OLAP and Multidimensional Data Analysis.	15

Text Book:

1. *Jiawei Han, Micheline Kamber and Jian Pei "Data Mining Concepts and Techniques", Third Edition, Elsevier, 2011.*

Reference Books:

1. *Pang-Ning Tan, Michael Steinbach, Vipin Kumar: "Introduction to Data Mining", Pearson, First impression,2014*
2. *Jiawei Han, Micheline Kamber, Jian Pei: "Data Mining -Concepts and Techniques", 3rd Edition, Morgan Kaufmann Publisher, 2012*

3. *Alex Berson and Stephen J. Smith "Data Warehousing, Data Mining & OLAP", Tata McGraw – Hill Edition, Tenth Reprint 2007.*

Course Designed by	Verified by HOD	Checked by	Approved by
Mrs. M.Selvapriya	Mrs.K.Mythili		

K. MYTHILI M.Sc., M.Phil., (Ph.D)
Associate Professor & HOD
Department of Computer Technology
hindusthan College of Arts and
Science (Autonomous)
Coimbatore - 641 028.

Co-ordinator
Academic Audit Cell
Hindusthan College of Arts & Science,
Coimbatore-641 028.

Programme Code:	BST	Programme Title: Bachelor of Computer Technology		
Course Code:	19CTU22	Course Title	Batch:	2019 - 2020
		Practical – VII:Programming using .NET	Semester:	V
Hrs/Week:	6		Credits:	3

Course Objective:

- Programming concepts in .Net Framework.
- It also covers the concepts ofserver controls, form validation, tracking and session handling, Error handling, inheritance, delegates, file operations and ADO.net Connectivity.
- To implement database applications using .NET .
- This course presents the practical aspects of application development using fundamentals of VB.Net, C#. Net and ASP.Net .

Course Outcomes (CO):

K1	CO1	Implement the concepts of programming language
K2	CO2	Implement the behaviour of various objects and classes
K3	CO3	Apply the decision and iteration control structures
K4	CO4	Design and develop the applications using ADO.Net

Mapping of Outcomes

PO CO	PO1	PO2	PO3	PO4
CO1	S	M	M	S
CO2	S	M	M	S
CO3	S	S	M	M
CO4	S	M	S	S

S - Strong; M-Medium; L-Low.

For the students admitted in the academic year 2019 – 2020

Code No.	Subject	Semester No.
19CTU22	Practical – VII: Programming using .NET	V
Ex. No.	Program List	
1	Write a VB.Net Program to Demonstrate the usage of Classes and its members using Console Application	
2	Write a VB.Net Program to Demonstrate the use of Decision Making and Looping Statements.	
3	Write a C# .Net Program to Demonstrate the use of Various Events	
4	Write a C# .Net Program to display the use of Exception Handling	
5	Write a C# .Net Program to work with Various Controls (10)	
6	Write a C# .Net Program to Prepare Student Details with **ADO.Net**	
7	Write a VB .Net Program to Prepare Library Management with **ADO.Net**	
8	Write a ASP .Net program to navigate between pages using Controls	
9	Write a ASP .Net Program to validate a Data (Validation Controls)	
10	Write a ASP .Net Program to prepare details of Employee Payroll System in web.	

Course Designed by	Verified by HOD	Approved by CDC Co-coordinator
Mr.S.Aravind	Mrs.K.MYTHILI	

Programme Code:	BST	Programme Title: Bachelor of Science in Computer Technology		
Course Code:	19CTU23A	Elective I: Cloud Computing	Batch:	2019 - 2020
			Semester:	V
Hrs/Week:	6		Credits:	5

Course Objective

- To be familiar with concept of Cloud Computing Architecture.
- To have knowledge on the evolution of cloud from existing technologies.
- To learn key concepts of Virtualization and cloud computing services.
- To appreciate the emergence of cloud as the next generation computing paradigm.

Course Outcomes (CO)

K2	CO1	Classifies the key and enabling technologies that help in the development of cloud.
K3	CO2	Develops the ability to understand and use the architecture of compute and storage cloud.
K1	CO3	List the use of current cloud technologies
K4	CO4	Analyze importance of Virtualization along with their technologies.

Mapping of Outcomes

PO / CO	PO1	PO2	PO3	PO4
CO1	S	S	M	M
CO2	S	M	S	M
CO3	S	S	M	M
CO4	S	M	S	S

S - Strong; M-Medium; L-Low.

19CTU23 A	Cloud Computing	V
Unit No.	Topics	Hours
I	**Cloud Computing Fundamentals** The Need for Cloud computing- Defining Cloud Computing- Principles of Cloud Computing – Cloud Ecosystem- Requirements for cloud services – Cloud Application – Benefits and Drawbacks	12
II	**Cloud Computing Architecture and Management** Introduction- Cloud Architecture- Anatomy of Cloud- Network Connectivity in Cloud Computing- Applications on the Cloud- Managing the Cloud- Migrating Application to Cloud	15
III	**Cloud Deployment and Service Models** **Cloud Deployment Models:** Private Cloud- Public Cloud- Community Cloud- Hybrid Cloud. **Cloud Service Models:** Infrastructure as a Service- Platform as a Service- Software as a service.	15
IV	**Virtualization** Introduction – Virtualization Opportunities – Processor Virtualization, Memory Virtualization, Storage Virtualization, Network Virtualization, Data Virtualization, Application Virtualization – Approaches to Virtualization – Full Virtualization, Para Virtualization, Hardware assisted Virtualization	15
V	**Cloud Service Providers** Introduction- Google- Amazon web services- Microsoft- IBM- Salesforce – Rackspace- VMware – Manjrasoft.	15

Text Book:

1. K.Chandrasekaran "Essentials of Cloud Computing", CRC Press, Taylor and Francis group, 2015.

Reference Book:

1. Kai Hwang, Geoffrey C. Fox, Jack G. Dongarra, "Distributed and Cloud Computing, From Parallel Processing to the Internet of Things", Morgan Kaufmann Publishers, 2012.

2. Rajkumar Buyya, Christian Vecchiola, S. ThamaraiSelvi, —Mastering Cloud Computing, Tata Mcgraw Hill, 2013.

3. Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Computing - A Practical Approach, Tata Mcgraw Hill, 2009.

Course Designed by	Verified by HOD	Checked by	Approved by
Ms.G.Priyanka	Mrs.K.Mythili		

Programme Code:	BST	Programme Title: Bachelor of Science in Computer Technology		
Course Code:	19CTU23B	Elective I : Soft Computing	Batch:	2019 - 2020
			Semester:	V
Hrs/Week:	6		Credits:	5

Course Objective

- To enable the students to learn soft computing techniques neural networks, fuzzy logics and genetic algorithms.
- Learn Fuzzy Logic, Various fuzzy systems and their functions
- To determine about hybrid models by integrating neural networks, fuzzy logic.
- Applications of Soft computing to solve problems in varieties of application domains.

Course Outcomes (CO)

K1	CO1	Define about soft computing techniques and their applications
K2	CO2	Classify various neural network architectures
K3	CO3	Identify the perceptron's and counter propagation networks
K4	CO4	Categorize the fuzzy systems & list out the genetic algorithms and their applications

Mapping of Outcomes

PO CO	PO1	PO2	PO3	PO4
CO1	S	M	S	M
CO2	S	M	S	M
CO3	S	S	M	M
CO4	S	S	M	M

S - Strong; M-Medium; L-Low.
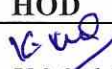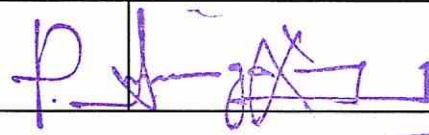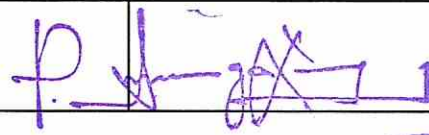
19CTU23B	Soft Computing	V
Unit No.	**Topics**	**Hours**
I	**Fundamentals of Neural Networks:** Basic Concepts of Neural Networks, Human Brain, Model of an Artificial Neuron, Neural Network Architectures, Characteristics of Neural Networks, Learning Methods, Taxonomy of Neural Network Architectures, History of Neural Network Research, Early Neural Network Architectures, Some Application Domains. Back Propagation Networks: Architecture of a Back Propagation Network, Back Propagation Learning, Illustration, Applications..	12
II	**Associative Memory:** Auto correlators, Heterocorrelators, Exponential BAM, Associative Memory for Real-Coded Pattern Pairs, Applications, Recent Trends. Adaptive Resonance Theory: Introduction, ART1, ART2, Applications, Sensitives of Ordering of Data	12
III	**Fuzzy Set Theory:** Fuzzy Versus Crisp, Crisp Sets, Fuzzy Sets, Crisp Relations, Fuzzy Relations. Fuzzy Systems: Crisp Logic, Predicate Logic, Fuzzy Logic, Fuzzy Rule Based Systems, Defuzzification Methods, and Applications.	12
IV	**Fundamentals of Genetic Algorithms:** Genetic Algorithms: History, Basic Concepts, Creation of Off springs, Working Principle, Encoding, Fitness Function, Reproduction. Genetic Modeling: Inheritance Operators, Cross Over, Inversion, And Deletion, Mutation Operator, Bit-Wise Operators, Bit-Wise Operators used in GA, Generational Cycle, Convergence of Genetic Algorithms	12
V	**Integration of Neural Networks,** Fuzzy Logic and Genetic Algorithms: Hybrid Systems, Neural Networks, Fuzzy Logic, and Genetic Algorithms Hybrids, Preview of Hybrid Systems. Training Convolutional Network-Case Studies of Convolutional Architectures.	12

Text Book:

1. S.Rajasekaran, G.A.Vijayalakshmi Pai, "Neural Networks, Fuzzy Logic and Genetic Algorithm, Synthesis and Applications ", PHI Learning Pvt. Ltd., 2017.

Reference Book:

1. Samir Roy, Udit Chakrabotty, Introduction to Soft Computing, Neuro – Fuzzy and Genetic Algorithms, Pearson India, 2013

2. Neuro-Fuzzy and Soft Computing by by Jang / Sun / Mizutani (Author), Pearson Education India, 2015.

3. S.N.Sivanandam , S.N.Deepa, "Principles of Soft Computing", Wiley India Pvt. Ltd., 2nd Edition, 2011.

Course Designed by	Verified by HOD	Checked by	Approved by
Mrs.N. Dhanapriya	Mrs.K.Mythili		

K. MYTHILI M.Sc., M.Phil., (Ph.D)
Associate Professor & HOD
Department of Computer Technology
Hindusthan College of Arts and
Science (Autonomous)
Coimbatore - 641 028.

Co-ordinator
Academic Audit Cell
Hindusthan College of Arts & Science,
Coimbatore-641 028.

Programme Code:	BST	Programme Title: Bachelor of Science in Computer Technology		
Course Code:	19CTU23C	Elective I :Mobile Computing	Batch:	2019 - 2020
			Semester:	V
Hrs/Week:	6		Credits:	5

Course Objective

- Understand the fundamentals and various computational processing of mobile networks
- Familiar with the network protocolstack.
- Be exposed to Ad-Hocnetworks and can gain knowledge about different mobile platforms and applicationdevelopment.
- To study the specifications and functionalities of various protocols/standards of mobile networks.

Course Outcomes (CO)

K1	CO1	Define the basics of Mobile Computing and MAC protocol.
K2	CO2	Classify the need of Mobile Internet Protocol and Transport Layer Protocol.
K3	CO3	Organize the various architectures of Mobile Telecommunication System.
K4	CO4	Compare various routing protocols in Mobile Ad-hoc networks.

Mapping of Outcomes

PO CO	PO1	PO2	PO3	PO4
CO1	M	S	M	M
CO2	M	M	S	S
CO3	S	M	M	L
CO4	L	S	L	M

For the students admitted in the academic year 2019 - 2020

19CTU23C	Mobile Computing	V
Unit No.	Topics	Hours
I	INTRODUCTION: Mobile Computing – Mobile Computing vs. wireless Networking – Mobile Computing Applications – Characteristics of Mobile computing – Structure of Mobile Computing Application. MAC Protocols – Wireless MAC Issues – Fixed Assignment Schemes – Random Assignment Schemes – Reservation Based Schemes.	14
II	MOBILE INTERNET PROTOCOL AND TRANSPORT LAYER SYLLABUS: Overview of Mobile IP – Features of Mobile IP – Key Mechanism in Mobile IP – route Optimization. Overview of TCP/IP – Architecture of TCP/IP- Adaptation of TCP Window – Improvement in TCP Performance.	14
III	MOBILE TELECOMMUNICATION SYSTEM SYLLABUS: Global System for Mobile Communication (GSM) – General Packet Radio Service (GPRS) – Universal Mobile Telecommunication System (UMTS)	14
IV	MOBILE AD-HOC NETWORKS SYLLABUS: Ad-Hoc Basic Concepts – Characteristics – Applications – Design Issues – Routing – Essential of Traditional Routing Protocols –Popular Routing Protocols – Vehicular Ad Hoc networks (VANET) – MANET vs. VANET – Security.	14
V	MOBILE PLATFORMS AND APPLICATIONS SYLLABUS: Mobile Device Operating Systems – Special Constrains & Requirements – Commercial Mobile Operating Systems – Software Development Kit: iOS, Android, BlackBerry, Windows Phone – MCommerce – Structure – Pros & Cons – Mobile Payment System – Security Issues.	14

Text books:

1. *Jesus Hamilton Ortiz, Mobile Computing, ItechOpen, 2020.*
2. *Jochen Schiller, Mobile Communications, PHI, Second Edition, 2014.*

Reference Books

1. *William.C.Y.Lee,Mobile Cellular Telecommunications-Analog and Digital Systems, Second Edition,TataMcGraw Hill Edition ,2017.*
2. *C.K.Toh, AdHoc Mobile Wireless Networks, First Edition, Pearson Education, 2017.*
3. *Prasant Kumar Pattnaik, Rajib Mall, Fundamentals of Mobile Computing, PHI Learning Pvt.Ltd,New Delhi – 2015.*

Course Designed by	Verified by HOD	Checked by	Approved by
Dr.C.Thirumoorthi	Mrs.K.Mythili		

Programme Code:	BST	**Programme Title:** Bachelor of Science in Computer Technology		
Course Code:	19CTU24	**Course Title**	Batch:	2019 -2020
		Practical - VIII: Data Analytics	Semester:	V
Hrs/Week:	6		Credits:	3

Course Objective

- Understand the key issues in big data management

- Acquire the Knowledge of applications in the area of intelligent business and scientific computing.

- Demonstrate scalable algorithms like Hadoop, Map Reduce and NO SQL in big dataanalytics.

- Implement various search methods and visualization techniques.

Course Outcomes (CO)

K4	CO1	Analyze an exciting growing field of big data analytics.
K3	CO2	Experiment with the tools required to manage and analyze big data like Hadoop, NoSql MapReduce.
K1	CO3	Define the techniques and principles in achieving big data analytics with scalability and streaming capability.
K2	CO4	Extend the skills that will help them to solve complex real-world problems in for decision support.

Mapping of Outcomes

PO / CO	PO1	PO2	PO3	PO4
CO1	S	S	S	S
CO2	M	M	S	M
CO3	S	M	S	L
CO4	M	S	S	S

S - Strong; M-Medium; L-Low.

For the students admitted in the academic year 2019 - 2020

19CTU24	Practical - VIII: Data Analytics
Ex. No	Program List
1	Install, configure and run hadoop and hdfs
2	Implement word count /frequency programs using map reduce
3	Implement an mr program that processes a weather dataset
4	Implement linear and logistic regression
5	Implement svm / decision tree classification techniques
6	Implement clustering techniques
7	Visualize data using any plotting framework
8	Implement an application that stores big data in hbase / mongodb / pig Using Hadoop / R.

Course Designed by	Verified by HOD	Checked by	Approved by
Dr.C.Thirumoorthi	Mrs.K.Mythili		

K. MYTHILI M.Sc., M.Phil., (Ph.D)
Associate Professor & HOD
Department of Computer Technology
Hindusthan College of Arts and
Science (Autonomous)
Coimbatore - 641 028.

Co-ordinator
Academic Audit Cell
Hindusthan College of Arts & Science,
Coimbatore-641 028.

Programme Code:	BST	**Programme Title:** Bachelor of Science in Computer Technology		
Course Code:	**19CTU25**	**Course Title**	**Batch:**	2019 -2020
		OPEN SOURCE TOOLS	**Semester:**	VI
Hrs/Week:	6		**Credits:**	5

Course Objective

- To impart the basic knowledge of Open-Source Technologies in analysing and implementing the concepts of Web Servers and My SQL with PHP Scripting Code.
- To Use open-source database software packages that each go head-to-head with commercial products from Oracle, Microsoft, Sybase, and IBM
- To expose students to free open-source software environment and introduce them to use open-source packages.
- To understand the installation of various packages in open-source operating systems

Course Outcomes (CO)

K1	CO1	Find knowledge about the principles of Server Script.
K3	CO2	Apply and experiment the concepts PHP in Web applications.
K2	CO3	Outline the robust & concurrent application usingPostgreSQL, MongoDB, Hadoop concepts.
K4	CO4	Examine Linux Vi Editor with Essential commands

Mapping of Outcomes

PO CO	PO1	PO2	PO3	PO4
CO1	S	M	S	M
CO2	S	L	S	M
CO3	S	S	M	S
CO4	S	L	S	M

S - Strong; M-Medium; L-Low.

19CTU25	OPEN SOURCE TOOLS	VI
Unit No.	Topics	Hours
I	**Introduction to open source** Open source Introduction: Open Source – Open source vs. Commercial Software – What is Linux? – Free Software – Where I can use Linux? Linux Kernel – Linux Distributions	14
II	**Linux operating system** Linux Introduction: Linux Essential Commands – File system Concept – Standard Files – Vi Editor – Partitions creation – Shell Introduction – String Processing – Installing Application	15
III	**Open Source Web Servers** Open Source Web Servers: Installation, Configuration and administration of Apache, Nginx. Open Source Tools, IDE,RDBMS: Eclipse IDE, OpenStack cloud technology, Version Control Systems, GIT, CVS, Open Source Repositories: GitHub, SourceForge, Google Code, Open Source RDBMS:MYSQL basics, installation an d usage, PostgreSQL, NoSQL, MongoDB, Hadoop	15
IV	**MY SQL** Introduction-Basic Select statement-From Clause-Where Clause-Understanding Basic Select Statements-Adding records to a table using INSERT Statement-Changing data with Update Statement-How to delete rows from a table-Basics of sorting data using ORDER BY Clause.	15
V	**Server script** Introduction: General Syntactic Characteristics – PHP Scripting – Commenting your code – Primitives, Operations and Expressions – PHP Variables – Operations and Expressions Control Statement – Array – Functions – Basic Form Processing – File and Folder	13

	Access – Cookies – Sessions – Database Access with PHP – MYSQL – MYSQL Functions – Inserting Records – Selecting Records – Deleting Records – Update Records	

Text Book:

1. James Lee and Brent Ware: "Open Source Web Development with LAMP using Linux, Apache, MySQL, Perl and PHP", Dorling Kindersley(India) Pvt. Ltd, 2008.
2. Eric Rosebrock, Eric Filson: "Setting up LAMP: Getting Linux, Apache, MySQL and PHP and working Together", Published by John Wiley and Sons, 2004.

3. Gregory A.Larson "Transact-SQL-The building blocks to SQL server programming language"-Redgate,Publication , First Edition-2020.

Reference Books:

1. Dacie Cristian- "Pack Pub AJAX and PHP" - 2006.

2. Scouarnec Yann- Stolz Jeremy Jeremy and Glass Michael - "Beginning PHP5- APACHE- MYSQL Web Development" - Wiley-India. New Delhi- 2005.
3. Christopher Diggins-" Linux Unwired"- Shroff Publishers & Distributors Pvt. Ltd-2004.

Course Designed by	Verified by HOD	Checked by	Approved by
MrsG.S.Geethamani	Mrs.K.Mythili		

Programme Code:	BST	Programme Title: Bachelor of Science in Computer Technology		
Course Code:	19CTU26A		Batch:	2019 -2020
		Software Testing	Semester:	VI
Hrs/Week:	6		Credits:	5

Course Objective

- Comprehending and testing products, while considering factors like functionality, performance, security and many others, is a multi-faceted and complex task.
- To improve analysis power, to learn new tools and to implement the learning in real life.
- To identify the needs of software test automation, and define and develop a test tool to support test automation.
- To discuss various software testing issues and solutions in software unit test; integration, regression, and system testing.

Course Outcomes (CO)

K1	CO1	Define purpose of software testing is not to find bugs, but to make the product superior.
K2	CO2	Classify Software Development life cycle defines a methodology for improving the quality of software and the overall development process.
K3	CO3	Experiment with Regression Testing is performed to validate the build that hasn't changed for a period of time. This build is deployed or shipped to customers.
K4	CO4	Analyze validate if the test object is complete and works as per the expectation of the users and the stakeholders

Mapping of Outcomes

PO / CO	PO1	PO2	PO3	PO4
CO1	S	S	M	L
CO2	S	M	S	L
CO3	S	S	S	S
CO4	S	S	S	S

S - Strong; M-Medium; L-Low.

19CTU26A	Software Testing	VI
Unit No.	**Topics**	**Hours**
I	**Introduction to Testing:** Principle of Testing- Context of Testing in Producing Software - A test in time-Test the test first-The end of pendulum- Putting all together-Phases of Software project.	14
II	**Software development and Life cycle model:** Quality Assurance and Control-Testing verification and validation-Process model to represent different phases-Life cycle model: Waterfall Model, Iterative Model or Spiral model- Rapid Application model and V model Prototyping .	15
III	**Testing Types and Tools** Testing Types: Unit Testing –Mutation Testing- Data Flow Testing-Domain Testing. Testing tools: Test Tools and Automation, Testing frame work, types of testing tools- Concept of Unit Testing- Unit Testing in extreme Programming- JUnit: Framework for Unit Testing- Tools for Unit Testing	15
IV	**System and Acceptance Testing** Over View of System and Acceptance Testing-Why System Testing-Functional Vs Non-Functional Testing-Functional Testing-Non-Function Testing-Acceptance Testing- Performance Testing-Factors of testing-Methodology of testing- Tools of testing.	14

	Regression Testing	
V	What is Regression Testing- Types of Regression Testing - When Regression Testing is done- When Regression Testing is performed- Planning Regression Testing-Management of Regression Testing- Execution of Regression Testing- Reporting Regression Testing.	14

Text Books:

1. SrinivasanDesikan&Gopalswamy Ramesh, "Software Testing Principles and Practices", PearsonEducatio,2006.
2. KshirasagarNaik ,PriyadarshiTripathy "Software Testing and Quality Assurance Theory and Practice" A John Wiley & Sons, Inc., publication,2008

Reference Books:

1. RenuRajani, Pradeep Oak , "Software Testing. – Effective Methods, Tools & Techniques" – Tata McGraw Hill.
2. Bob Hughes & Mike Cotterell, "Software Project Management ",4th ed, PHI.
3. Ron Patton,"Software Testing" Second Edition, 2005 .

Course Designed by	Verified by HOD	Checked by	Approved by
MrsG.S.Geethamani	Mrs.K.Mythili		

K. MYTHILI M.Sc., M.Phil., (Ph.D)
Associate Professor & HOD
Department of Computer Technology
Hindusthan College of Arts and
Science (Autonomous)
Coimbatore - 641 028.

Co-ordinator
Academic Audit Cell
Hindusthan College of Arts & Science,
Coimbatore-641 028.

Programme Code:	BST	**Programme Title:** Bachelor of Science in Computer Technology		
Course Code:	19CTU26B	**COMPUTER INSTALLATION AND SERVICES**	**Batch:**	2019 - 2020
			Semester:	V
Hrs/Week:	6		**Credits:**	5

Course Objective

- On Successful Completion of this subject the students should have a thorough knowledge on the different components of the computer and how to install the various hardware devices.
- Develops student's technology skills required for troubleshooting computer software and hardware problems.
- Find and edit basic input/output system (BIOS) settings.
- Select and install the correct memory module and identify the elements, expectations, and requirements of theprogram.

Course Outcomes (CO)

K1	CO1	Tell the functionality of different parts of system.
K3	CO2	Developthe fundamental principles of using laptops and portable devices
K2	CO3	Classify the I/O Ports, Keyboard, Mouse Interface
K4	CO4	Test for the Knowledge about PC's Memory Organization and Troubleshooting tools

Mapping of Outcomes

PO / CO	PO1	PO2	PO3	PO4
CO1	M	S	S	S
CO2	S	S	S	S
CO3	S	S	S	S
CO4	M	S	S	S

S - Strong; M-Medium; L-Low.

19CTU26B	COMPUTER INSTALLATION AND SERVICES	V
Unit No.	Topics	Hours
I	Personal Computer Components-Fundamental principles of using personal computers-Purposes and characteristics of storage devices - Purposes and characteristics of motherboards - Purposes and characteristics of power supplies-Purposes and characteristics of processor and CPUs - Purposes and characteristics of memory -Purposes and characteristics of display devices - Purposes and characteristics of input devices - Purposes and characteristics of adapter cards - Purposes and characteristics of ports and cables - Purposes and characteristics of cooling systems .	14
II	Laptops and Portable Devices - The fundamental principles of using laptops and portable devices - Purposes and characteristics of laptop- Specific technologies-Identify and distinguish between mobile and desktop motherboards and processors including throttling, Power management and WiFi - Install, configure, Optimize and upgrade laptops and portable devices- Configure power management - Identify tools, basic diagnostic procedures and troubleshooting techniques for laptops and portable devices - Perform preventive maintenance on laptops and portable devices - Implement software security preventive maintenance techniques.	15
III	**Input and Output Devices** Keyboard-Mouse-Scanner-Digitizer-Digital Camera-Monitors and Adapters-CRT-VGA –Display Controllers – Digital Display Technology – CRT Controller – Graphic Cards-Printers - Dot Matrix Printer – Plotters – Laser Printers – Inkjet Printers- Install, configure, optimize and upgrade personal computer components - Add, remove and configure internal and external storage devices - Install display devices - Add, remove and configure basic input and multimedia devices.	14
IV	**On-Board Memory** PC's Memory Organization-DRAM - SDRAM – FPM DRAM -EDO DRAM - DDR SDRAM –DR DRAM – Cache – Virtual-Memory-Memory packaging-SIMM- DIMM- RIMM-I/OPorts: Serial – Parallel – USB – Game	15

	Port-External Memory-Hard Disk: Hard Disk Drive Sub Assemblies-Hard Disk Controller-MMX: CD-ROM Disk-CD-ROM Drive-DVD-Sound Blaster-Video on Pc.	
V	**Computer Troubleshooting and Maintenance** Power supply - Troubleshooting and Services -POST – Troubleshooting the Motherboard - Troubleshooting the Keyboard - Troubleshooting the HDD - Troubleshooting the Printer - Diagnostic software –Microsoft Diagnostic – Norton Utilities – QA Plus – ATDIAGS - Data Security: Computer Virus – Virus Prevention Techniques - Firewalls- Computers and Communications- Networking- LAN-WAN-Network Component- MODEM – Interrupt	14

Text Book:

1. Computer Service and Repair, Richard M. Roberts- G-W Publisher, 5th Edition 2021.

Reference Book:
1. Networking Fundamentals, Richard M. Roberts -G-W Publisher, 3rd Edition 2020.
2. Upgrading & Repairing PCs: Scott Mueller's– Publisher Que, 22nd Edition 2015.
3. Computer Installation & Servicing, D Balasubramanian -McGraw Hill Education2nd Edition.2005.

Course Designed by	Verified by HOD	Checked by	Approved by
Mrs.M.Amalmary	Mrs.K.Mythili		

K. MYTHILI M.Sc., M.Phil., (Ph.D)
Associate Professor & HOD
Department of Computer Technology
Hindusthan College of Arts and
Science (Autonomous)
Coimbatore - 641 028.

Co-ordinator
Academic Audit Cell
Hindusthan College of Arts & Science,
Coimbatore-641 028.

Programme Code:	BST	Programme Title: Bachelor of Science in Computer Technology		
Course Code:	19CTU26C	Elective II: Artificial Intelligence and Expert Systems	Batch:	2019-2020
			Semester:	VI
Hrs/Week:	6		Credits:	5

Course Objective

- Use appropriate search algorithms for any AI problem
- Represent a problem using first order and predicate logic
- Provide the apt agent strategy to solve a given problem
- Design software agents to solve a problem

Course Outcomes (CO)

K1	CO1	List the various searching techniques, constraint satisfaction problem and example problems- game playing techniques.
K3	CO2	Apply these techniques in applications which involve perception, reasoning and learning.
K2	CO3	Extend the knowledge of real-world Knowledge representation.
K4	CO4	Classify different machine learning techniques to design AI machine and enveloping applications for real world problems.

Mapping of Outcomes

PO CO	PO1	PO2	PO3	PO4
CO1	S	S	S	S
CO2	S	M	M	S
CO3	S	M	S	S
CO4	S	S	S	S

S - Strong; M-Medium; L-Low.
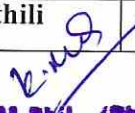
19CTU26C	Elective II: Artificial Intelligence and Expert Systems	VI
Unit No.	Topics	Hours
I	**Introduction**–Definition – Future of Artificial Intelligence – Characteristics of Intelligent Agents–Typical Intelligent Agents – Problem Solving Approach to Typical AI problems.	14
II	**Problem solving Methods**: Problem solving Methods – Search Strategies- Uninformed – Informed – Heuristics – Local Search Algorithms and Optimization Problems – Searching with Partial Observations – Constraint Satisfaction Problems – Constraint Propagation – Backtracking Search – Game Playing – Optimal Decisions in Games – Alpha – Beta Pruning – Stochastic Games	14
III	**Predicate Logic:** First Order Predicate Logic – Prolog Programming – Unification – Forward Chaining-Backward Chaining – Resolution – Knowledge Representation – Ontological Engineering-Categories and Objects – Events – Mental Events and Mental Objects – Reasoning Systems for Categories – Reasoning with Default Information	15
IV	**Architecture:** Intelligent Agents – Agent communication – Negotiation and Bargaining – Argumentation among Agents – Trust and Reputation in Multi-agent systems.	15
V	**AI applications** – Language Models – Information Retrieval- Information Extraction – Natural Language Processing – Machine Translation – Speech Recognition – Robot – Hardware – Perception – Planning – Moving	14

Text Book:

I. Bratko, —"Prolog: Programming for Artificial Intelligence", Fourth edition, Addison-Wesley Educational Publishers Inc., 2011

Reference Books:

1. M. Tim Jones, —"Artificial Intelligence: A Systems Approach", Jones and Bartlett Publishers, Inc.; First Edition, 2008
2. S. Russell and P. Norvig, "Artificial Intelligence: A Modern Approach", Prentice Hall, Third Edition, 2009.
3. Nils J. Nilsson, —"The Quest for Artificial Intelligence"' Cambridge University Press, 2009.

Course Designed by	Verified by HOD	Checked by	Approved by
S.Lakshmipriya	Mrs.K.Mythili		

K. MYTHILI :: Sc., M.Phil., (Ph.D)
Associate Professor & HOD
Department of Computer Technology
Hindusthan College of Arts and
Science (Autonomous)
Coimbatore - 641 028.

Co-ordinator
Academic Audit Cell
Hindusthan College of Arts & Science,
Coimbatore-641 028.

Programme Code:	BST	Programme Title: Bachelor of Science in Computer Technology		
Course Code:	19CTU27	Practical IX: Open Source Tools	Batch:	2019 -2020
			Semester:	VI
Hrs/Week:	6		Credits:	3

Course Objective

- To impart the basic knowledge of Server Scripting Concepts and Shell Script.
- To analyse and implement the concepts of Website applications with My SQL Database.
- To understand the kernel configuration and virtual environment
- To understand various version control systems

Course Outcomes (CO)

K1	CO1	Label the Basic knowledge about the Linux Shell Script.
K2	CO2	Extend Web Page Creation for business deployment is applied.
K3	CO3	Construct PHP Programming with application using My SQL Database Applications.
K4	CO4	Assume and functioning of tables using My SQL Databases.

Mapping of Outcomes

PO / CO	PO1	PO2	PO3	PO4
CO1	S	S	M	M
CO2	S	M	S	L
CO3	S	S	S	S
CO4	L	S	S	S

S - Strong; M-Medium; L-Low.

Code No.	Subject	Semester No.
19CTU27	**Practical IX: Open Source Tools**	**VI**

Ex. No.	Program List
1.	Write a shell script to show the following system configuration: a. Currently logged user and his log name. b. Current shell, home directory, Operating System type, current Path setting, current working directory. c. Show currently logged number of users, show all available shells. d. Show CPU information like processor type, speed. e. Show memory information.
2.	Write a shell script to implement the filter commands
3.	Create a my sql table and execute queries to read, add, remove and modify a record from that table.
4.	Write a PHP program interface to create a database and to insert a table into it.
5.	Write a PHP program using classes to create a table.
6.	Write a PHP program to upload a file to the server.
7.	Write a PHP program to access the data stored in a mysql table.
8.	Write a PHP program to create a directory, and to read contents from the directory.

9.	Write a server side PHP program that displays marks, total, grade of a student in tabular format by accepting user inputs for name, number landmarks from a HTML form.
10.	Write a PHP program that adds products that are selected from a web page to a shopping cart.

Course Designed by	Verified by HOD	Checked by	Approved by
MrsG.S.Geethamani	Mrs.K.Mythili		

Programme Code:	CTU	Programme Title: Bachelor of Science in Computer Technology		
Course Code:	19CTU28A	Computer Graphics And Multimedia	Batch:	2019 - 2020
			Semester:	VI
Hrs/Week:	6		Credits:	5

Course Objective

- To gain knowledge about graphics hardware devices and software used.
- To understand the Two-dimensional and Three-dimensional graphics and their transformations
- To develop an understanding and awareness how issues such as content, information architecture, motion, sound, design, and technology merge to form effective and compelling interactive experiences for a wide range of audiences and end users.
- To learn various multimedia authoring systems.

Course Outcomes (CO)

K1	CO1	To understand the various computer graphics hardware and display technologies
K2	CO2	Various 2D and 3D objects transformation techniques.
K3	CO3	Developed understanding of technical aspect of Multimedia Systems
K4	CO4	To Understand Different types of Multimedia File Format.

Mapping of Outcomes

PO / CO	PO1	PO2	PO3	PO4
CO1	S	S	M	M
CO2	S	M	S	S

	S			
CO3		S	S	M
CO4	S	S	S	L

<center>S - Strong; M-Medium; L-Low.</center>

<center>**For the students admitted in the academic year 2019 - 2020**</center>

19CTU28A	COMPUTER GRAPHICS AND MULTIMEDIA	III
Unit No.	Topics	Hours
Unit I	**COMPUTER GRAPHICS** **Basic of Computer Graphics:**Applicationsof Computer Graphics, DisplayDevices, Random and Raster Scan Systems, Graphics Input Devices, Graphics Software and Standards. **Graphics Primitives:**Points, Lines, Circles and Ellipses as Primitives, Scan Conversion Algorithms for Primitives, Fill Area Primitives Including Scan-Line Polygon Filling, Inside-Outside Test, Boundary and Flood-Fill, Character Generation, Line Attributes, Area-Fill Attributes, Character Attributers.	12
Unit II	**Two- Dimensional Graphics:Two Dimensional Geometric Transformations** – Matrix Representations and Homogeneous Coordinates, Composite Transformations, Two-Dimensional Viewing – Viewing Pipeline, Viewing Coordinate Reference Frame, Window-To-Viewport Coordinate Transformation, Two-Dimensional Viewing Functions. **Clipping Operations**: Point, Line (Cohen-Sutherland), Text and Sutherland-Hodgeman Polygon Clipping Algorithms.	12
Unit III	**Three- Dimensional Graphics:** Three Dimensional Concepts- Three-Dimensional Object Representations – Polygon Surfaces- Polygon Tables- Plane Equations - Polygon Meshes, Curved Lines and Surfaces, Quadratic Surfaces, Blobby Objects, Spline Representations – Bezier Curves and Surfaces -B-Spline Curves and Surfaces. **Transformation and Viewing:** Three Dimensional Geometric and Modeling Transformations – Translation, Rotation, Scaling, Composite Transformations, Three-Dimensional Viewing – Viewing Pipeline, Viewing Coordinates, Projections, Clipping, Visible Surface Detection Methods.	12

Unit IV	**MULTIMEDIA** **Multimedia:** Text – Font, Faces, Animating Text, Hyper Text. **Sound:** MIDI, Digital Audio Basics, Auto File Formats, Audio Editing, MCI-Multimedia Control Interface. **Image** - Bitmap, Vector Drawing, Color Palate, Concept of 3D Modeling, Image File Formats (Bmp,Jpg) **Animation:** Principle of Animation, Cell Animation, Kinematics, Morphing. Design of Animation Sequences – Animation Function –Raster Animation – Key Frame Systems – Motion Specification –Morphing – Tweening.	12
	VIDEO: Broadcast Video Standards (NTSC, PAL), Integrating Computer and Television, Video Capture Board, Video, Colour, Shooting and Editing Video, Recording Formats (9S-VHS) Video Hardware Resolution, Video Compression (JPEG, MPEG)	
Unit V	**HYPERMEDIA:** Multimedia Authoring And User Interface - Hypermedia Messaging -Mobile Messaging − Hypermedia Message Component − Creating Hypermedia Message − Integrated Multimedia Message Standards − Integrated Document Management − Distributed Multimedia Systems	12

Text Book:

1.*Donald Hearn &M.Pauline Baker "Computer Graphics-C version", Pearson Education,2ndEdition[UNIT I ,II,III]*

2.*Andleigh, P. K and Kiran Thakrar, ―Multimedia Systems and Design‖, PHI, 2003. [UNIT IV,V]*

Reference Books:

1. *Judith Jeffcoate, ―Multimedia in practice: Technology and Applications‖, PHI, 1998. John R. Hubbard, "Programming with Java", TMH, 2nd Edition.*
2. *Jeffrey McConnell, ―Computer Graphics: Theory into Practice‖, Jones and Bartlett Publishers,2006.*
3. *Peter Shirley, Michael Ashikhmin, Michael Gleicher, Stephen R Marschner, Erik Reinhard, KelvinSung, and AK Peters, ―Fundamentals of Computer Graphics‖, CRC Press, 2010.*

Course Designed by	Verified by HOD	Checked by	Approved by
Dr. P.Jayasree	Mrs.K.MYTHILI		

19CTU28B	Elective III :Compiler Design	VI
Unit No.	**Topics**	**Hours**
I	Introduction to compiler Introduction to compiler – Analysis of source program-The Phases of complier – cousins of compilers – The grouping of phases-compiler construction goals - Lexical analysis- Incorporating a symbol table – The role of lexical analyzer Generator – optimization of DFA.	14
II	Syntax Analysis The role of a parser – context Free Grammar –Top – down parsing- Recursive Descent parsing – predictive parsing – Bottom up parsing- shift reduce parsing – Operator precedence parsing – LR parsing.	14
III	**Intermediate Code Generation** Syntax Directed Definitions, Evaluation Orders for Syntax Directed Definitions, Intermediate Languages: Syntax Tree, Three Address Code, Types and Declarations, Translation of Expressions, Type Checking	15
IV	**Issues in Design** Issues in the design of code generate- The target machine – Run time storage management – Basics Blocks and Flow Graphs -- A simple code generator-DAG representation of Basic blocks – Optimization.	15
V	**Principal of source optimization** Introduction – principal source of optimization – optimization of basic blocks – Introduction a global data flow analysis –Runtime Environment –source Language issues-Storage organization-parameter passing	14

Text Book:

1. *Alfred Aho, Ravi Sethi, Jeffrey D Ullman, "Compilers Principles, Techniques and Tools", Pearson Education Asia, 2008.*

Reference Books

1. Raghavan, "Introduction to Compilers", Tata McGraw-Hill, 2008.
2. Chithra D," Principles Of Compiler Design "Cbs Publishers & Distributors-NewDelhi.
3. Alfred Aho and Jeffrey Ullman," Principles of Compiler Design", Addison-Wesley.

Course Designed by	Verified by HOD	Approved by CDC Co-coordinator
Mrs.R.Sivaranjani	Mrs.K.Mythili	

K. MYTHILI M.Sc., M.Phil., (Ph.D)
Associate Professor & HOD
Department of Computer Technology
Hindusthan College of Arts and
Science (Autonomous)
Coimbatore - 641 028.

Co-ordinator
Academic Audit Cell
Hindusthan College of Arts & Science,
Coimbatore-641 028.

Programme Code:	BST	Programme Title: Bachelor of Science in Computer Technology		
Course Code:	19CTU28C	Elective III: Neural Networks	Batch:	2019 - 2020
Hrs/Week:	6		Semester:	VI
			Credits:	5

Course Objectives

- To learn the principles of Neural Networks.

- To learn the architecture of Neural Networks.

- Understand the factors of Neural Networks and Deep Learning.

- Understand data needs of Neural Networks and its Working knowledge.

Course Outcomes (CO)

K1	CO1	Find basis of Neural Networks and Deep Learning.
K2	CO2	Classify the various architecture of Neural Network.
K4	CO3	Analyze and understand various training methods for Neural Network.
K3	CO4	Build some applications of Neural Network and Deep Learning.

Mapping of Outcomes

PO / CO	PO1	PO2	PO3	PO4
CO1	S	M	M	M
CO2	S	M	M	M
CO3	S	S	S	M
CO4	S	S	S	M

S - Strong; M-Medium; L-Low.
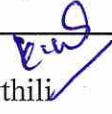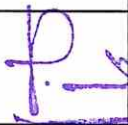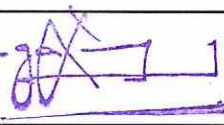
19CTU28C	Neural Networks	VI
Unit No.	**Topics**	**Hours**
I	**An Introduction to Neural Networks**: Introduction - The Basic Architecture of Neural Networks- Training a Neural Networks with Backpropagation - Practical Issues in Neural Networks Training- The Secrets to the Power of Function Composition- Common Neural Architectures -Advanced Topics- Two Notable Benchmarks.	14
II	**Machine Learning with Shallow Neural Networks**: Introduction - Neural Architectures for Binary Classification Models- Neural Architectures for Multiclass Models- Matrix Factorization with Autoencoders - Word2vec: An application of Simple Neural Architectures.	14
III	**Training Deep Neural Networks:** Introduction-Backpropagation: The Glory Details- Setup and Initialization Issues- The Vanishing and Exploding Gradient Problems-Gradient-Descent Strategies	14
IV	**Radial Basis Function Networks**: Introduction - Training an RFB Networks- Variations and Special Cases of RBF Networks- **Restricted Boltzmann Machines**: Introduction - The Boltzmaan Machine - Restricted Boltzmaan Machines- Applications of Restricted Boltzmaan Machines-Using RBMs Beyond Binary Data Types-Stacking Restricted Boltzmann Machines	15
V	**Recurrent Neural Networks**: Introduction- The Architecture of Recurrent Neural Networks- The Challenges of Training Recurrent Networks- Applications of Recurrent Neural Networks **Convolutional Neural Networks**: Introduction-The Basic Structure of a Convolutional Network Training Convolutional Network-Case Studies of Convolutional Architectures.	15

Text Book:

1. Charu C. Aggarwal –"*Neural Networks and Deep Learning,*", Publisher Springer International Publishing ,Copyright 2018, Edition Number 1

Reference Book:

1.François Duval ,"*Artificial Neural Networks, Concepts ,Tools and Techniques*", Kindle Edition,2018.

2.Russel R. Russo ,"*Neural Networks for Beginners*", Kindle Edition,2019.
3.Mohamad H. Hassoun, "*Fundamentals of Artificial Neural Networks*", The MIT Press, 1995.

Course Designed by	Verified by HOD	Checked by	Approved by
Mrs.T.Kavipriya	Mrs.K.Mythili		

K. MYTHILI M.Sc., M.Phil., (Ph.D)
Associate Professor & HOD
Department of Computer Technology
Hindusthan College of Arts and
Science (Autonomous)
Coimbatore - 641 028.

Co-ordinator
Academic Audit Cell
Hindusthan College of Arts & Science,
Coimbatore-641 028.

Programme Code:	BST	**Programme Title:** Bachelor of Science in Computer Technology		
Course Code:	19CTU29	**Course Title**	**Batch:**	2019 -2020
		Practical X: Software Testing Tools	**Semester:**	VI
Hrs/Week:	6		**Credits:**	3

Course Objective

- To impart the basic knowledge of Testing Tools.

- To analyse and implement the concepts of Testing Web based Applications

- Gaining confidence in and providing information about the level of quality.

- To ensure that it satisfies the BRS that is Business Requirement Specification and SRS that is System Requirement Specifications.

Course Outcomes (CO)

K1	CO1	Recall knowledge about the win Runner
K3	CO2	Apply and experiment the concepts Test cases Writing
K4	CO3	Test for Suite Applications for different fields.
K2	CO4	Summarize Bugzillz, Jira Tools

Mapping of Outcomes

PO / CO	PO1	PO2	PO3	PO4
CO1	S	S	M	L
CO2	S	M	S	L
CO3	S	S	S	S
CO4	S	S	S	S

S - Strong; M-Medium; L-Low.

19CTU29	Practical X: Software Testing Tools
Ex. No.	**ProgramList**
	Automation Tool: Win runner
1	Perform Synchronization point test using Flight Reservation Application
2	Create a software test case to perform TSL programming for Flight Reservation Application
3	Develop a test case to implement the GUI object properties Test for the Flight Reservation Application
4	Write a test case to perform Bitmap check points for Flight Reservation Application
5	Write a test case to perform Database check points for Student Information Application
6	Develop a test case to implement Data Driven Test
7	Identify the use of bug tracking and testing tool Bugzilla
8	Conduct a test suite for any two web sites.
9	Identify the use of bug tracking tool Jira
10	Test an Application Using WinRunner

Course Designed by	Verified by HOD	Checked by	Approved by
MrsG.S.Geethamani	Mrs.K.Mythili		

K. MYTHILI M.Sc., M.Phil., (Ph.D)
Associate Professor & HOD
Department of Computer Technology
Hindusthan College of Arts and
Science (Autonomous)
Coimbatore - 641 028.

Co-ordinator
Academic Audit Cell
Hindusthan College of Arts & Science,
Coimbatore-641 028.