

# **DEPARTMENT OF COMPUTER SCIENCE**

**NEW SYLLABUS**

**GPO, PSO, CO**

## **Board of Studies**

1. Mrs Divya S, HOD, Assistant Professor ,Department of Computer science,B.C.M College,Kottayam
2. Miss. Ansmol George, Assistant Professor, Department of Computer science,B.C.MCollege, Kottayam
3. Miss. Remya Stephen, Assistant Professor, Department of Computer science,B.C.MCollege, Kottayam
4. Mrs Angitha Jeesis c, Assistant Professor ,Department of Computer science,B.C.MCollege, Kottayam
5. Mrs Athiradevi R, Assistant Professor ,Department of Computer science,B.C.M College,Kottayam
6. Mr Vinu Thadevus William, Assistant Professor ,Department of Computer science,B.C.MCollege, Kottayam
7. Dr. Elizabeth Philip,Principal, college of Applied Science,Payyappady
8. Mr.Naveen D Nair Operations Manager,Logic Software Solutions, Kottayam

Kottayam,

24-05-2019

## GRADUATE PROGRAMME OUTCOMES (GPO)

At the completion of the B.Sc. Computer Science Degree Programme, the student will be able to accomplish the following outcomes.

GPO No.	GRADUATE PROGRAMME OUTCOMES (GPO)
GPO.1	<b>Critical Thinking:</b> Take an informed and analytical approach to learning and demonstrate in-depth knowledge of the subject and give opinion(s) supported by logical reasoning that one have judged to be appropriate and understanding different approaches and using them
GPO.2	<b>Effective Communication:</b> Demonstrate proficiency in communicating competently in groups and organizations, competence in interpersonal communication; possess skills to effectively deliver formal and informal presentations to a variety of audiences in multiple contexts
GPO.3	<b>Social Interaction:</b> Foster social skills and peer interaction enabling them to make all people feel valued and respect their differences by being responsible citizens for creating a socially inclusive society
GPO.4	<b>Ethical Standards:</b> Recognize values such as justice, trust, equity, fairness, kindness and develop a commitment to meeting and upholding standards of ethical behaviour in all walks of life and comprehending the moral dimensions of decisions and actions
GPO.5	<b>Environmental Consciousness:</b> Discern the issues of environmental contexts and engages in promoting values and attitudes that claim coexistence and sustainable living with reduced, minimal, or no harm upon ecosystems
GPO.6	<b>Lifelong Learning:</b> Acquire the skill to be an independent lifelong learner embracing real-time changes in the socio-technological context, promoting continuous development and improvement of the knowledge and skills needed for employment and personal fulfilment

<b>PSO</b>	<b>PROGRAMME SPECIFIC OUTCOMES(PSO)</b>	<b>GPO</b>
1	Understand and able to assess hardware and software aspects necessary to develop IT based solutions.	1
2	Design, implement, test and evaluate a computer system, component or algorithm to meet desired needs and to solve a computational problem	1
3	Create and understand different programming languages, basic theory and summarise different recent technologies.	1
4	Design, build and test software solutions to meet the given requirement specifications and understand the basics of System Software.	1,6
5	Understand the concept of environment sustainability in terms of information technology and sustainable development	3,4
6	Develops practical skills in computer and apply standard practices in software project development and ability to assist and manage the execution of an effective project plan.	2,5,6
7	Explore technical comprehension in varied areas of Computer Applications and experience a conducive environment in cultivating skills for thriving career and higher studies.	2,4,5,,6

## SEMESTER I

<b>COURSE</b>	<b>DETAILS</b>
<b>CODE</b>	CS1CRT02
<b>TITLE</b>	METHODOLOGY OF PROGRAMMING AND C LANGUAGE
<b>DEGREE</b>	B.Sc.
<b>BRANCH</b>	COMPUTER SCIENCE
<b>YEAR/SEMESTER</b>	I/I
<b>TYPE</b>	CORE COURSE
<b>INSTRUCTOR(S)</b>	ATHIRADEVI R
<b>CREDITS</b>	4

<b>CO NO.</b>	<b>COURSE OUTCOME</b>	<b>CL</b>	<b>PSO</b>
1	DESCRIBE THE CONCEPTS OF PROGRAMMING AND PROGRAMMING LANGUAGES.	R	2
2	IDENTIFY TOKENS IN C PROGRAMMING	R	2
3	COMPARE INPUT AND OUTPUT IN C	U	2
4	IMPLEMENTING CONTROL STATEMENTS	APPLY	1
5	IMPLEMENTING ARRAY AND POINTERS	APPLY	1
6	EXECUTE FUNCTIONS (STRING HANDLING, MEMORY ALLOCATION) AND STRUCTURES	APPLY	1

<b>MODULE</b>	<b>COURSE DESCRIPTION</b>	<b>HR</b>	<b>CO</b>
<b>1.0</b>	<b>Introduction to programming</b>	<b>12</b>	
1.1	Basics of Programming	1	1
1.2	Classification of computer languages	2	1
1.3	Classification of Language translators	2	1
1.4	Linker, Characteristics of a good programming language	1	1
1.5	Factors for selecting a language	1	1
1.6	Subprogram, Purpose of program planning	1	1
1.7	Algorithm,Flowchart,Pseudocode	3	1
1.8	Control structures, Testing and debugging.	1	1
<b>2.0</b>	<b>C character set</b>	<b>12</b>	
2.1	Delimiters, Types of tokens keywords, Identifiers, Constants.	3	2
2.2	Variables, Rules for defining variables, Datatypes,Declaring and initialization of variables	2	2
2.3	Type modifiers, type conversion.	2	2
2.4	Operators and Expressions, Properties of operators, Priority of operator,	2	2
2.5	Arithmetic, Relational, Conditional, Logical, bitwise operators.	3	2
<b>3.0</b>	<b>Input and Output in c</b>	<b>15</b>	
3.1	Formatted functions, Unformatted functions	3	3
3.2	Commonly used library functions.	2	3
3.3	Decision statements – if, if-else, if-else-if ladder, break, continue, goto,switch etc.	6	4
3.4	Looping statements – for loop, while loop, do while loop	4	4
<b>4.0</b>	<b>Array</b>	<b>15</b>	
4.1	Initialization, terminology, characteristics	1	5
4.2	One-dimensional and two-dimensional array and operations	4	5
4.3	Strings and standard functions	2	5
4.4	Pointer, Features of pointer	1	5
4.5	Pointers and address	2	5
4.6	Declaration. void wild constant pointers	1	5
4.7	Arithmetic operations with pointers	2	5
4.8	Pointers and arrays.	2	5
<b>5.0</b>	<b>Function, Structure and Union</b>	<b>18</b>	
5.1	Basics of a function, function definition, return statement	1	6
5.2	Types of functions, call by value and reference.	2	6
5.3	Types of recursion, Rules for recursive function, direct and indirect recursion	3	6
5.4	Recursion v/s iterations, advantages and disadvantages	2	6
5.5	Storage class.	2	6

5.6	Structure-features, declaration and initialization, array of structures, pointer to structure, structure and functions.	3	6
5.7	Typedef,bitfields,Enumerated data types	2	6
5.8	Union, Dynamic memory allocation, Memory models, Memory allocation functions.	3	6

### **Reference Books**

1. Ashok Kamthane - Programming in C, Third Edition, Pearson Education
2. P K Sinha & Priti Sinha - Computer Fundamentals , Fourth Edition, BPB Publications.
3. E. Balaguruswamy -Programming in ANSI C, Seventh Edition, McGraw Hill Education

<b>COURSE</b>	<b>DETAILS</b>
<b>CODE</b>	CS1CRP01
<b>TITLE</b>	<b>METHODOLOGY OF PROGRAMMING AND C LANGUAGE</b>
<b>DEGREE</b>	<b>B.Sc.</b>
<b>BRANCH</b>	<b>COMPUTER SCIENCE</b>
<b>YEAR/SEMESTER</b>	<b>I/I</b>
<b>TYPE</b>	<b>CORE PRATICALS</b>
<b>INSTRUCTOR(S)</b>	<b>ATHIRADEVI R</b>
<b>CREDITS</b>	<b>2</b>

<b>CONO.</b>	<b>COURSE OUTCOME</b>	<b>CL</b>	<b>PSO</b>
1	USE THE SYNTAX AND SEMANTICS OF C LANGUAGE	APPLY	1,2
2	CONSTRUCT A SOFTWARE USING C PROGRAM	CREATE	1,2
3	IMPLEMENT THE FLOW CONTROL IN C PROGRAM	APPLY	1,2
4	IMPLEMENT THE ARRAY ,STRUCTURE AND POINTER	APPLY	1,2
5	STRUCTURING THE CODE : FUNCTIONS	ANALYZE	1,2

MODULE	COURSE DESCRIPTION	HR	CO
1	Programs to familiarize printf () and scanf () functions.	2	1,2
2	Programs Based on Decision statements, break, goto, continue, switch and Loop controls statements.	4	1,2,3
3	Programs Based on One dimensional and two dimensional arrays.	4	1,2,4
4	Programs on Strings and string handling functions.	3	1,2,5
5	Programs based on Pointers, operations on pointers, Arrays & Pointers,	5	1,2,4
6	Programs based on functions, Call by value, Call by reference, Recursion,	5	1,2,5
7	Programs based on structure and union, array of structures, Pointer to structure, structure and functions	5	1,2,4
8	Simple programs using pointers and malloc ().	4	1,2,4,5

### Reference Books

1. Ashok Kamthane - Programming in C, Third Edition, Pearson Education
2. E. Balaguruswamy -Programming in ANSI C, Seventh Edition, McGraw Hill Education



## SEMESTER II

<b>COURSE</b>	<b>DETAILS</b>
<b>CODE</b>	<b>CS2CRT04</b>
<b>TITLE</b>	<b>COMPUTER ORGANIZATION AND ARCHITECTURE</b>
<b>DEGREE</b>	<b>B.Sc.</b>
<b>BRANCH</b>	<b>COMPUTER SCIENCE</b>
<b>YEAR/SEMESTER</b>	<b>I/II</b>
<b>TYPE</b>	<b>CORE COURSE</b>
<b>INSTRUCTOR(S)</b>	<b>ATHIRADEVI R</b>
<b>CREDITS</b>	<b>4</b>

<b>CO NO.</b>	<b>COURSE OUTCOME</b>	<b>CL</b>	<b>PSO</b>
1	Understand the functionality, organization and implementation of computer system.	U	1,3
2	Recognize the instruction codes and formats.	R	1,3
3	Examine the various addressing modes and formats of different CPUs.	U	1,3
4	Discuss the internal working of main memory, cache memory, associative memory and various modes of data transfer.	U	1,3
5	Compare the working of parallel processing and vector processing.	U	1,3

<b>MODULE</b>	<b>COURSE DESCRIPTION</b>	<b>HR</b>	<b>CO</b>
1.0	<b>Basic computer organization and design</b>	<b>12</b>	
1.1	Operational concepts, Instruction codes	2	1,2

1.2	Computer Registers,Computer Instructions	3	1,2
1.3	Memory locations and addresses	2	1,2
1.4	Instruction cycle,Timing and control	3	1,2
1.5	Bus organization	2	1,2
<b>2.0</b>	<b>Central Processing Unit</b>	<b>15</b>	
2.1	General Register Organization	3	3
2.2	Stack Organization	3	3
2.3	Addressing modes	3	3
2.4	Instruction Classification	3	3
2.5	Program control	3	3
<b>3.0</b>	<b>Memory Organization</b>	<b>16</b>	
3.1	Memory Hierarchy, Main Memory	3	4
3.2	Organization of RAM, SRAM, DRAM	3	4
3.3	Read Only Memory-ROM-PROM,EROM,EEPROM	3	4
3.4	Auxiliary memory,Cache memory, Virtual Memory	4	4
3.5	Memory mapping Techniques.	3	4
<b>4.0</b>	<b>Parallel Computer Structures</b>	<b>15</b>	
4.1	Introduction to parallel processing	3	5
4.2	Pipeline computers	4	5
4.3	Multi processing systems	3	5
4.4	Architectural classification scheme-SISD, SIMD, MISD,MIMD	5	5
<b>5.0</b>	<b>Pipelining and Vector processing</b>	<b>14</b>	
5.1	Introduction to pipelining	3	5
5.2	Instruction and Arithmetic pipelines (design)	3	5
5.3	Vector processing	4	5
5.4	Array Processors	4	5

### Reference Books

- 1.M.Morris Mano-Computer Systems Architecture, Third Edition, Pearson Education
- 2.Kai Hwang and F A Briggs-Computer Architecture and parallel processing, McGraw Hills,1990
- 3.Carl Hamacher -Computer Organization, Fifth Edition, Tata McGraw Hill.
4. John P Hayes -Computer Architecture & Organization–Mc Graw Hill

<b>COURSE</b>	<b>DETAILS</b>
<b>CODE</b>	<b>CS2CRT05</b>

<b>TITLE</b>	<b>OBJECT ORIENTED PROGRAMMING USING C++</b>
<b>DEGREE</b>	<b>B.SC.</b>
<b>BRANCH</b>	<b>COMPUTER SCIENCE</b>
<b>YEAR/SEMESTER</b>	<b>I/II</b>
<b>TYPE</b>	<b>CORE COURSE</b>
<b>INSTRUCTOR(S)</b>	<b>DIVYA S</b>
<b>CREDITS</b>	<b>3</b>

<b>CO NO.</b>	<b>COURSE OUTCOME</b>	<b>CL</b>	<b>PSO</b>
1	Understand the principles of oops concept and control structure	U	2
2	Analyse the concept of classes and object, array, functions.	A	2
3	Understand the concept of constructors, inheritance and classification.	U	2
4	Execute the concept of Pointers and virtual function	APPLY	2
5	Discuss to work with files, file pointers and its manipulations	U	2

<b>MODULE</b>	<b>COURSE DESCRIPTION</b>	<b>HR</b>	<b>CO</b>
<b>1.0</b>	<b>Principles of Object Oriented Programming, Beginning with C++</b>	<b>10</b>	
1.1	Procedure Oriented Programming-Object Oriented Programming	1	1
1.2	Basic concepts of object-oriented programming- Benefits of OOP- Applications of OOP	1	1
1.3	A simple C++program-Structure of C++ program	1	1
1.4	C++ data types- Symbolic constants- Reference by variables	2	1
1.5	Operators in C++- Operator precedence	1	1
1.6	Control structures-	1	1
1.7	Function in C++ - The main function, Function prototyping-	1	1
1.8	Call by reference- Return by reference- Inline function-	1	1
1.9	Default arguments- Function overloading.	1	1
<b>2.0</b>	<b>Classes and Objects</b>	<b>10</b>	
2.1	Specifying a class- Defining member functions-	1	2
2.2	Nesting of member functions -Private member functions	2	2
2.3	Arrays within a class - Memory allocation for objects	2	2
2.4	Static data members -Static member functions -	2	2
2.5	Arrays of objects - objects as function arguments	2	2

2.6	Friendly functions- Returning Objects.	1	2
<b>3.0</b>	<b>Constructers and Destructors, Overloading</b>	<b>12</b>	
3.1	Constructors- Default constructor-Parameterized constructor- Copy constructor	3	3
3.2	Multiple constructors-Constructors with default arguments-	2	3
3.3	Dynamic constructor-Destructors	2	3
3.4	Operator overloading- Unary and Binary operator overloading-	2	3
3.5	Overloading using friends- Rules for overloading- Type conversion.	3	3
<b>4.0</b>	<b>Inheritance</b>	<b>10</b>	
4.1	Inheritance- Defining derived classes-Visibility modes	2	3
4.2	Multilevel, Multiple, Hierarchical and Hybrid inheritance-	2	3
4.3	Virtual base classes- Abstract classes-	2	3
4.4	Constructors in derived classes-	2	3
4.5	Nesting of classes.	2	3
<b>5.0</b>	<b>Pointers</b>	<b>12</b>	
5.1	Pointers- Pointers to objects-	1	4
5.2	this pointer-Pointers to derived classes-	1	4
5.3	Virtual functions- Pure virtual functions-	2	4
5.4	File Stream classes, Opening and closing a file-	2	5
5.5	File opening modes-	1	5
5.6	File pointers and their manipulations-	2	5
5.7	Sequential input and output operations.	2	5

### Reference Books

- 1.E. Balagurusamy - Object Oriented Programming with C++, Fifth edition, Tata McGraw Education Hill , 2011.
- 2.Ashok N. Kamthane, Object oriented Programming with ANSI & Turbo C++, First Edition,Pearson India
- 3.Robert Lafore, Object Oriented Programming in Turbo C++, First Edition, GalgotiaPublications.
4. D Ravichandran, Programming with C++, Second edition, Tata McGraw- Hill.

COURSE	DETAILS
CODE	CS2CRP02
TITLE	OBJECT ORIENTED PROGRAMMING USING C++

<b>DEGREE</b>	<b>B.SC.</b>
<b>BRANCH</b>	<b>COMPUTER SCIENCE</b>
<b>YEAR/SEMESTER</b>	<b>I/II</b>
<b>TYPE</b>	<b>CORE PRATICALS</b>
<b>INSTRUCTOR(S)</b>	<b>DIVYA S</b>
<b>CREDITS</b>	<b>2</b>

CO NO.	COURSE OUTCOME	CL	PSO
1	USE THE CONCEPT OF DEFAULT ARGUMENTS AND FUNCTION OVERLOADING	APPLY	2
2	EXECUTE THE CONCEPTS OF ARRAY OF OBJECTS	APPLY	2
3	IMPLEMENT THE CONCEPT OF OPERATOR OVERLOADING	APPLY	2
4	USE THE CONCEPT OF CONSTRUCTORS AND ITS TYPES	APPLY	2
5	IMPLEMENT THE CONCEPT OF INHERITANCE	APPLY	2

MODULE	COURSE DESCRIPTION	HR	CO
1	Programs based on default arguments, function overloading.	5	1
2	Programs based on array of objects, friend functions, passing objects as arguments to function.	7	2
3	Programs based on operator overloading (binary, unary) using member functions and friend functions.	6	3
4	Programs based on constructors, different types of constructors.	5	4
5	Programs based on inheritance, different types of inheritance.	6	5

### Reference Books

1.E. Balagurusamy - Object Oriented Programming with C++, Fifth edition, Tata McGraw Education Hill , 2011.

2. Ashok N. Kamthane, Object oriented Programming with ANSI & Turbo C++, First Edition, Pearson India

## SEMESTER III

<b>COURSE</b>	<b>DETAILS</b>
<b>CODE</b>	<b>CS3CRT06</b>
<b>TITLE</b>	<b>DBMS</b>
<b>DEGREE</b>	<b>B.SC.</b>
<b>BRANCH</b>	<b>COMPUTER SCIENCE</b>
<b>YEAR/SEMESTER</b>	<b>II/III</b>
<b>TYPE</b>	<b>CORE</b>
<b>INSTRUCTOR(S)</b>	<b>VINU THADEVUS WILLIAMS</b>
<b>CREDITS</b>	<b>2</b>

<b>CO NO.</b>	<b>COURSE OUTCOME</b>	<b>CL</b>	<b>PSO</b>
1	UNDERSTAND ABOUT DATA AND ARRANGEMENT OF DATA	U	3
2	SUMMARIZE DIFFERENT DATA LANGUAGES SCHEMES	U	2
3	ANALYSE DIFFERENT DATA MODELS DDL ,DML,DCL,TCL	A	1
4	RECOGNIZE AND INTERPRET DIFFERENT DATA MODELS ERMODEL, RELATIONAL MODEL ETC.	R	1
5	CLASSIFY DIFFERENT DBMS LANGUAGES AND COMPONENTS	U	2
6	UNDERSTAND AND IMPLEMENT DIFFERENT SQL QUERIES	U	1
7	EXECUTE AND IMPLEMENT DIFFERENT PROJECT ASPECT DEMO DATABASE	APPLY, C	4
8	EXPLAIN DIFFERENT NORMALIZATION AND INDEXING ASPECTS	U	1
9	EXPLAIN DIFFERENT TRANSACTION AND SECURITY ASPECTS OF DBMS	R	1
10	GENERATE DIFFERENT DATABASE SQL AND PLSQL BASED QUERY FORMAT	CREATE	1

MODULE	COURSE DESCRIPTION	HR	CO
<b>1.0</b>	<b>Introduction</b>	15	1,2,7
1.1	Characteristics of the Database Approach	2	1
1.2	Database users : DBA , Database Designers ,End users	2	1
1.3	Advantages of using the DBMS Approach	2	1
1.4	Data models, Schemas and Instances	2	1
1.5	Three-Schema Architecture and Data Independence	2	1
1.6	DBMS Languages: DDL, DML	2	1,2
1.7	The Database System Environment: DBMS Component Modules	3	1
<b>2.0</b>	Relational Model, Entity Relationship Modelling Relational Model concepts .	15	4
2.1	Introduction –Entity Types , Entity Sets , Attributes and Keys	2	4
2.2	Relationship Types ,Relationship Sets, Roles , and Structural Constraints	2	4
2.3	Weak Entity Types – Notation	2	4
2.4	ER diagrams – Sample ER diagrams	2	4
2.5	Domains ,Attributes , Tuples , and Relations	2	4
2.6	Characteristics of Relations Relational Model Constraints	2	4
2.7	Relational Database Schemas : Domain Constraints, Key Constraints	2	4
2.8	Relational Database Schemas , Entity Integrity , Referential Integrity, and Foreign Keys	1	4
<b>3.0</b>	SQL queries	15	3,6,10,5
3.1	Data Types – Data Definition commands : CREATE , ALTER DROP - Adding constraints in SQL	3	3

3.2	Basic SQL Queries : INSERT ,SELECT ,DELETE ,UPDATE - Substring comparison using LIKE operator ,BETWEEN operator	3	6
3.3	Ordering of rows – SQL set operations :UNION , EXCEPT , INTERSECT	3	6
3.4	Complex Queries : Comparison involving NULL and Three-valued logic	2	3
3.5	Nested queries , EXISTS and UNIQUE functions, Renaming of attributes and Joining of tables	2	3
3.6	Aggregate functions ,Grouping	1	3
3.7	Managing Views	1	3
<b>4.0</b>	Normalization and Indexing Structures for Files Normalization, Indexing Structures for files	15	8
4.1	Informal Design Guidelines for Relational Schemas –Functional Dependencies – Normal forms	3	8
4.2	First Normal Form , Second Normal Form , Third Normal Form	3	8
4.3	General Definitions of Second and Third Normal Forms –Boyce-Codd Normal Form.	3	8
4.4	Types of Single-Level Ordered Indexes	3	8
4.5	Primary Indexes, Clustering Indexes	2	8
4.6	Secondary Indexes.	1	8
<b>5.0</b>	Transaction Processing and Database Security Transaction Processing, Database Security and Authorization	15	8
5.1	Introduction to Transaction Processing - Transaction and System Concepts –Desirable properties of Transactions	5	8
5.2	Types of Security – Control measures – Database Security	5	8
5.3	DBA – Access Control , User Accounts, and Database Audits – Access Control based on Granting and Revoking Privileges	5	8

**References:**



1. C.J Date- an Introduction to Database Systems, Eighth edition, Pearson Education, 2003
2. Reghu Ramakrishna and Johannes Gehrke- Database Management Systems, Third edition, Mc Graw Hill International Edition.
3. Dipin Desai, an Introduction to Database Systems, First Edition, Galgoria Publications

<b>COURSE</b>	<b>DETAILS</b>
<b>CODE</b>	<b>CS3CRT07</b>
<b>TITLE</b>	<b>SYSTEM ANALYSIS AND DESIGN</b>
<b>DEGREE</b>	<b>B.SC.</b>
<b>BRANCH</b>	<b>COMPUTER SCIENCE</b>
<b>YEAR/SEMESTER</b>	<b>II/III</b>
<b>TYPE</b>	<b>CORE</b>
<b>INSTRUCTOR(S)</b>	<b>ATHIRADEVI R</b>
<b>CREDITS</b>	<b>2</b>

<b>CO NO.</b>	<b>COURSE OUTCOME</b>	<b>CL</b>	<b>PSO</b>
1	IDENTIFY THE VARIOUS TYPES OF INFORMATION SYSTEM CONCEPTS AND TERMINOLOGIES.	R	1
2	UNDERSTAND THE ISSUES AND RESPONSIBILITIES OF SYSTEM ANALYST	U	1
3	DESCRIBE THE BASIC TOOL OF SYSTEM ANALYSIS.	R	1
4	DISCUSS THE INITIAL PHASES OF SYSTEM DEVELOPMENT LIFE CYCLE.	U	1
5	EXAMINE THE DIFFERENT ISSUES RELATED TO SYSTEM DESIGN	R	1
6	EXPLAIN A WIDE RANGE OF PROBLEMS RELATED TO THE SYSTEM DEVELOPMENT ACTIVITIES.	U	1

7	CREATE TEAM BUILDING , COMMUNICATION AND INTERVIEWING SKILLS	C	4
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MODULE	COURSE DESCRIPTION	HR	CO
<b>1.0</b>	<b>Introduction</b>	<b>10</b>	
1.1	Information systems concepts, Business information systems;	1	1
1.2	Describing the business organization – organization chart , organization function list	2	1
1.3	Information system levels - operational, lower, middle, top management;	1	1
1.4	The system development life cycle concepts;hardware and software end products.	2	1
1.5	Life cycle activities- life cycle flow chart, task,	1	1
1.6	Management review, baseline specifications, role of system analyst.	3	2
<b>2.0</b>	<b>Basic tool of system analysis</b>	<b>15</b>	
2.1	Identification codes – definition, need for codes	1	3
2.2	Code plan, code dictionary,common type of codes	2	3
2.3	Forms design – basic parts of form, style and types of form, principles of form design	3	3
2.4	Tools for structure analysis and design: Types of basic charts, decision tables, decision trees,structured English	3	3
2.5	Data flow diagram, data dictionary, system flow charts, flow charting symbols	3	3
2.6	Information oriented flow charts, process oriented flow charts, HIPO charts.	3	3
<b>3.0</b>	<b>Study phase</b>	<b>13</b>	
3.1	Study phase activities	2	4
3.2	Information service request, initial investigation	3	4
3.3	Fact finding techniques ,fact analysis techniques	3	4
3.4	Steps in feasibility analysis	3	4
3.5	Study phase report.	2	4
<b>4.0</b>	<b>Design phase</b>	<b>12</b>	
4.1	Design phase activities	2	5
4.2	Structure design	2	5
4.3	Input design- input data, input media and devices	3	5
4.4	Output design	3	5
4.5	Design phase report.	2	5
<b>5.0</b>	<b>Development phase</b>	<b>15</b>	
5.1	Development phase activities	2	6
5.2	Bottom up and top down computer program development	3	6
5.3	Training- programmer, operator, user trainings	4	6
5.4	Conversion; change over plan; steps in	4	6

	computer program development		
5.5	Structured programming; development phase report.	2	6
<b>6.0</b>	<b>Operation phase</b>	<b>10</b>	
6.1	Operation phase activities	2	7
6.2	Change over crisis	2	7
6.3	Change over activities	2	7
6.4	Routine operations;security	3	7
6.5	Performance evaluation.	2	7

### Reference Books

1. Marvin Gore & John Stubbe- Elements Of System Analysis, Galgotia Book Source.
2. Elias M Awad - System Analysis And Design, Second Edition, Galgotia Publications

COURSE	DETAILS
CODE	CS3CRT09
TITLE	DATA STRUCTURE USING C++
DEGREE	B.SC.
BRANCH	COMPUTER SCIENCE
YEAR/SEMESTER	II/III
TYPE	CORE
INSTRUCTOR(S)	ANGITHA JEESIS C
CREDITS	3

CO NO.	COURSE OUTCOME	CL	PSO
1	KNOWLEDGE OF ADVANCED ADT AND DATA STRUCTURES AND THEIR IMPLEMENTATIONS	U	1,2
2	ABILITY TO IMPLEMENT ALGORITHMS TO PERFORM VARIOUS OPERATIONS ON DATA STRUCTURES	APPLY	1,2
3	UNDERSTAND DS USED FOR REPRESENTING DATA IN MEMORY LIKE ARRAYS, LINKED LIST AND TREES.	U	1,2

4	UNDERSTANDING OF VARIOUS SEARCHING AND SORTING ALGORITHM INCLUDING INSERTION SORT, SELECTION SORT AND QUICK SORT	U	1,2
5	DESCRIBE THE HASH FUNCTION AND CONCEPTS OF COLLISION AND ITS RESOLUTION METHODS	U	1,2
6	DEMONSTRATE ADVANTAGES AND DISADVANTAGES OF SPECIFIC ALGORITHMS AND DATA STRUCTURES.	APPLY	1,2

MODULE	COURSE DESCRIPTION	HR	CO
<b>1.0</b>	<b>Introduction</b>	12	1,3,4,6
1.1	Concept of Structured data - Data structure definition, Different types and classification of data structures	1	1
1.2	Arrays – Memory allocation and implementation of arrays in memory, array operations,	2	3
1.3	Applications - sparse matrix representation and operations,	3	3
1.4	polynomials representation and addition,	2	3
1.5	Concept of search and sort – linear search, binary search,	2	4,6
1.6	Selection sort, insertion sort, quick sort.	2	4,6
<b>2.0</b>	<b>Stacks and queue</b>	12	1,3,6
2.1	Stacks – Concepts, organization and operations on stacks using arrays (static), examples,	2	1,3,6
2.2	Applications -Conversion of infix to postfix and infix to prefix,	2	3
2.3	postfix evaluation, subprogram calls and execution, Multiple stacks representation.	2	3
2.4	Queues - Concepts, organization and operations on queues, examples.	2	3,6
2.5	Circular queue – limitations of linear queue, organization and operations on circular queue.	2	3,6
2.6	Double ended Queue, Priority queue.	2	3,6
<b>3.0</b>	<b>List</b>	18	1,3,6
3.1	Linked list: Concept of dynamic data structures, linked list	3	1,3,6
3.2	types of linked list, linked list using pointers,	3	3
3.3	insertion and deletion examples	3	3
3.4	circular linked list, doubly linked lists	3	3
3.5	Applications- linked stacks and queues,	3	3
3.6	Memory management basic concepts, garbage collection.	3	3
<b>4.0</b>	<b>Tree</b>	15	3
4.1	Trees - Concept of recursion, trees, tree terminology, binary trees, representation of binary trees,	3	3

4.2	strictly binary trees, complete binary tree, extended binary trees, creation and operations on binary tree	3	3
4.3	binary search trees, Creation of binary search tree,	4	3
4.4	tree traversing methods – examples, binary tree representation Of expressions.	4	3
<b>5.0</b>	<b>Files</b>	<b>15</b>	<b>5</b>
5.1	File - Definition, Operations on file (sequential), File organizations - sequential, Indexed sequential, random files, linked organization, inverted files, cellular partitioning,	5	5
5.2	hashing – hash tables, hashing functions,	5	5
5.3	Collisions, collision resolving methods.	5	5

#### References:

1. Seymour Lipschutz, Theory and Problems of Data Structures, Shamus Outline Series, 2006, McGraw Hill
2. Yedidyah Lannsam, Moshe Augstein, Aaron M Tenenbaum- Data structures using C and C++, Second Edition, Prentice Hall
3. G.S Baluja - Data Structures Through C++ (A Practical Approach), Second Edition-2004, Danapat Rai & Co.
4. Ellis Horowitz and Sartaj Sahni - Fundamentals of Data Structures in C++ , Second Edition, Galgotia Publications.

<b>COURSE</b>	<b>DETAILS</b>
<b>CODE</b>	<b>CS3CRP03</b>
<b>TITLE</b>	<b>DATA STRUCTURE USING C++</b>
<b>DEGREE</b>	<b>B.SC.</b>
<b>BRANCH</b>	<b>COMPUTER SCIENCE</b>
<b>YEAR/SEMESTER</b>	<b>II/III</b>
<b>TYPE</b>	<b>CORE PRATICALS</b>

<b>INSTRUCTOR(S)</b>	ANGITHA JEESIS C
<b>CREDITS</b>	2

CO NO.	COURSE OUTCOME	CL	PSO
1	TO DEVELOP SKILLS TO DESIGN AND ANALYZE SIMPLE LINEAR AND NON-LINEAR DATA STRUCTURE	APPLY	1
2	ABILITY TO IDENTIFY TO GAIN KNOWLEDGE IN PRATICAL APPLICATIONS OF DS	U	1
3	ABLE TO UNDERSTAND AND APPLY VARIOUS DS SUCH AS STACKS, QUEUE, TREES.	U	1

MODULE	COURSE DESCRIPTION	HR	CO
<b>1.0</b>		16	1,2
1.1	Array – Insertion , Deletion, Polynomial addition using arrays	4	1,2
1.2	Sort – Selection, Insertion, Quick	4	1,2
1.3	Search – Linear search, Binary search	4	1,2
1.4	Sparse matrix – Sparse form representation, transpose and addition using the sparse form	4	1,2
<b>2.0</b>	<b>STACK AND QUEUE.</b>	12	1,2,3
2.1	Stack - Implementation using arrays ( linear stack), Infix to postfix conversion, Postfix evaluation	6	1,2,3
2.2	Queue – Implementation using arrays ( linear queue), Implementation of circular queue	6	1,2,3
<b>3.0</b>	<b>List</b>	12	1,2,3
3.1	Singly linked list – Implementation using dynamic memory allocation techniques	6	1,2,3
3.2	Doubly linked list – Implementation of doubly linked list, Implementation of circular doubly linked list.	6	1,2,3
<b>4.0</b>	<b>Tree</b>	12	1,2,3
4.1	Creation of binary search trees, Insertion and deletion of nodes, Tree traversals.	12	1,2,3

## SEMESTER IV

COURSE	DETAILS
CODE	CS4CRT10
TITLE	LINUX ADMINISTRATION
DEGREE	B.SC.
BRANCH	COMPUTER SCIENCE
YEAR/SEMESTER	II/IV
TYPE	CORE
INSTRUCTOR(S)	ATHIRADEVI R
CREDITS	4

CO NO.	COURSE OUTCOME	CL	PSO
1	Understand Unix and Linux Operating System	U	3
2	Implement and innovate commands using the basic tool kit.	APPLY	3
3	Execute the Basic Shell Commands	APPLY	3
4	Identify the skills needed for basic administration	R	3
5	Discuss Simple filter commands	U	3

MODULE	COURSE DESCRIPTION	HR	CO
<b>1.0</b>	<b>Overview of Linux</b>	<b>12</b>	
1.1	What is Linux, Linux's root in Unix	2	1
1.2	Common Linux Features, advantage of Linux	2	1
1.3	Overview of Unix and Linux architectures, Linux files system	2	1
1.4	hardware requirements for Linux, Linux standard directories	2	1
1.5	Commands for files and directories cd, ls, cp, rm, mkdir, rmdir, pwd, file, more, less	2	1,2
1.6	Creating and viewing files using cat, file comparisons	2	2
<b>2.0</b>	<b>Essential Linux commands</b>	<b>15</b>	

2.1	Processes in Linux, process fundamentals, connecting processes with pipes	3	2
2.2	redirecting input/output, Background processing, managing multiple processes	3	2
2.3	process scheduling – (at,batch), nohup command, kill, ps, who, find, sort, touch, file	3	2
2.4	file processing commands - wc, cut, paste etc	2	2
2.5	Mathematical commands - expr, factor etc	2	2
2.6	Creating and editing files with vi editor	2	2
<b>3.0</b>	<b>Shell programming</b>	<b>15</b>	
3.1	Basics of shell programming	2	3
3.2	various types of shell available in Linux,comparisons between various shells	2	3
3.3	shell programming in bash. Conditional and looping statements, case statement, parameter passing and arguments	4	3
3.4	Shell variables, system shell variables, shell keywords	4	3
3.5	Creating Shell programs for automating system tasks	3	3
<b>4.0</b>	<b>System administration-</b>	<b>18</b>	
4.1	Common administrative tasks, identifying administrative files configuration and log files, Role of system administrator	3	4
4.2	Managing user accounts-adding & deleting users	2	4
4.3	creating and changing permissions and ownerships	2	4
4.4	Creating and managing groups, modifying group attributes	2	4
4.5	Temporary disabling of users accounts,creating and mounting file system	3	4
4.6	checking and monitoring system performance - file security & Permissions, becoming super user using su	3	4
4.7	Getting system information with uname, host name, disk partitions & sizes, users, kernel	3	4
4.8	installing and removing packages with rpm command	2	4
<b>5.0</b>	<b>Simple filter commands</b>	<b>12</b>	
5.1	Simple filter commands: pr, head, tail, cut, sort, uniq, tr	4	5
5.2	Filter using regular expression grep, egrep,sed	3	5
5.3	Understanding various Servers :DHCP, DNS, Squid, Apache, Telnet, FTP,Samba	5	5

#### Reference Books

1. Cristopher Negus - Red Hat Linux Bible, Wiley Dreamtech India 2005 edition.
2. Yeswant Kanethkar - UNIX Shell Programming, First edition, BPB.



<b>COURSE</b>	<b>DETAILS</b>
<b>CODE</b>	<b>CS4CRT12</b>
<b>TITLE</b>	<b>COMPUTER AIDED OPTIMIZATION TECHNIQUES</b>
<b>DEGREE</b>	<b>B.SC.</b>
<b>BRANCH</b>	<b>COMPUTER SCIENCE</b>
<b>YEAR/SEMESTER</b>	<b>II/IV</b>
<b>TYPE</b>	<b>CORE</b>
<b>INSTRUCTOR(S)</b>	<b>ANSMOL GEORGE</b>
<b>CREDITS</b>	<b>4</b>

<b>CO NO.</b>	<b>COURSE OUTCOME</b>	<b>CL</b>	<b>PSO</b>
1	Identify and develop operational research models from the verbal description of the real system	U	PSO5
2	Understand the mathematical tools that are needed to solve optimisation problems	U	PSO5
3	understand importance of optimization of industrial process management	U	PSO5
4	Apply basic concepts of mathematics to formulate an optimization problem	APPLY	PSO5
5	Analyse and appreciate variety of performance measures for various optimization problems	A	PSO5

<b>MODULE</b>	<b>COURSE DESCRIPTION</b>	<b>HR</b>	<b>CO</b>
<b>1.0</b>	<b>Linear Programming Problem- Graphical method</b>	12	2
1.1	OR: Introduction, origin and development, nature and features, scientific methods, modelling, advantages and limitations of models, Solution methods for models, methodology	3	2
1.2	OR and decision making, applications, opportunities and shortcomings.	3	2
1.3	Linear Programming Problem: Introduction, Mathematical formulation of LPP	3	2

1.4	Graphical solution method and exceptional cases, General LPP, Canonical and Standard forms of LPP.	3	2
<b>2.0</b>	<b>Linear Programming Problem – simplex method</b>	16	3,4
2.1	Linear Programming Problem: Simplex method - Introduction, Properties Computational Procedure of simplex method	4	3,4
2.2	Artificial variables, Two-Phase method, Big-M method	4	3,4
2.3	Duality in Linear Programming: Introduction, General Primal-Dual pair	4	3,4
2.4	Formulating Dual problem, Dual Simplex Method.	4	3,4
<b>3.0</b>	<b>Transportation Problem and Assignment Problems</b>	16	3
3.1	Transportation Problem: Introduction, LP formulation, Existence of solution, Transportation Table, Loops, Solution	2	3
3.2	Initial Basic Feasible Solution (North West Corner method, Least Cost method and VAM)	3	3
3.3	Optimal Solution (MODI method and Stepping Stone method)	3	3
3.4	Tran-shipment problems	3	3
3.5	Assignment Problems: Introduction, Mathematical formulation, Solution – using Hungarian method, Special case	3	3
3.6	Traveling Salesman problem	2	3
<b>4.0</b>	<b>Sequencing Problem</b>	16	1,3
4.1	Processing n jobs through 2 machines	4	1,3
4.2	Processing n jobs through k machines	4	1,3
4.3	Processing 2 jobs through k machines	4	1,3
4.4	Maintenance and Crew Scheduling	4	1,3
<b>5.0</b>	<b>Network Problems</b>	18	1,3,5
5.1	Network Routing Problems: Introduction, Network Flow Problems	3	1,3,5
5.2	Minimal Spanning Tree problem	3	1,3,5
5.3	Shortest Route problem	3	1,3,5
5.4	Maximal Flow problems – Augmenting path and Max flow- Min cut methods	3	1,3,5
5.5	Network Scheduling: Introduction, Basic Components, Logical Sequencing, Rules, Concurrent Activities, Critical Path Analysis – CPM	3	1,3,5
5.6	Probability Considerations and PERT method, Distinction between PERT and CPM, Applications, Advantages and Limitations.	3	1,3,5

<b>COURSE</b>	<b>DETAILS</b>
<b>CODE</b>	<b>CS4CRT13</b>
<b>TITLE</b>	<b>WEB PROGRAMMING USING PHP</b>
<b>DEGREE</b>	<b>B.SC.</b>

<b>BRANCH</b>	<b>COMPUTER SCIENCE</b>
<b>YEAR/SEMESTER</b>	<b>II/IV</b>
<b>TYPE</b>	<b>CORE</b>
<b>INSTRUCTOR(S)</b>	<b>ANGITHA JEESIS C</b>
<b>CREDITS</b>	<b>4</b>

<b>CO NO.</b>	<b>COURSE OUTCOME</b>	<b>CL</b>	<b>PSO</b>
1	UNDERSTAND,ANALYZE AND APPLY THE ROLE OF LANGUAGE LIKE HTML,CSS,JAVASCRIPT AND PHP	U,A, APPLY	1,2
2	UNDERSTAND,ANALYZE AND BUILD WEB APPLICATIONS USING PHP	U,A, APPLY	1,2
3	ACQUIRE DATABASE CONNECTIVITY WITH PHP	R	1,2
4	KNOWLEDGE OF CLIENT SIDE AND SERVER SIDE SCRIPTING LANGUAGE TO BUILD DYANMIC WEB PAGES	R	1,2

<b>Module</b>	<b>Course Description</b>	<b>Hrs.</b>	<b>Co</b>
<b>1.0</b>	<b>Introduction</b>	8	
1.1	Introduction To Web, Www Architecture, Fundamentals Of Html	1	1,2,3,4
1.2	Text Formatting Tags, Marquee, Inserting Images, Links,	3	1,2,3,4
1.3	Lists, Creating Tables, Frames, Working With Form Elements	4	1,2,3,4
<b>2.0</b>	<b>Css And JavaScript</b>	10	
2.1	Css Introduction, <Link> And <Style> Elements, Css Properties	2	1,2,3,4
2.2	Controlling Fonts, Text Formatting, Text- Pseudo Classes, Selectors, Links, Backgrounds, Lists	2	1,2,3,4
2.3	Introduction To Java Script, Java Script Variables, Operators, Decision Control Statements, Looping,	2	1,2,3,4
2.4	Functions, Arrays, Events, Popup Boxes-Alert, Prompt, Conform Box, Built-In Objects	2	1,2,3,4
2.5	Writing JavaScript, Form Validation	2	1,2,3,4
<b>3.0</b>	<b>Php</b>	10	
3.1	Introduction To Php, Server Side Scripting, Role Of Web Server Software, Php Comments	5	1,2,3,4
3.2	Variables, Echo And Print, Php Operators, Data Types, Branching Statements, Loops, Arrays	5	1,2,3,4

<b>4.0</b>	<b>Php Continue</b>	12	
4.1	Php Functions, Php Form, Passing Information Between Pages, \$_Get, \$_Post, \$_Request	4	1,2,3,4
4.2	String Functions, Include And Require, Session And Cookie Management	4	1,2,3,4
4.3	Error Handling In Php, Object Oriented Programming Using Php	4	1,2,3,4
<b>5.0</b>	<b>Introduction To Mysql</b>	14	
5.1	Data Types, Sql Commands-Create, Update, Insert, Delete, Select	3	1,2,3,4
5.2	Php Functions For Mysql Connectivity And Operation- Mysql_Connect, Mysql_Select_Db, Mysql_Query, Mysql_Fetch_Row, Mysql_Fetch_Array, Mysql_Result, Mysql_List_Fields, Mysql_Num_Fields	6	1,2,3,4
5.3	Insertion, Updation And Deletion Of Data Using Php, Displaying Data From Mysql In Webpage.	5	1,2,3,4

### References:

Rasmus Lerdorf and Kevin Tatore, "Programming PHP", Shroff Publishers & Distributors Pvt. Ltd

<b>COURSE</b>	<b>DETAILS</b>
<b>CODE</b>	<b>CS4CRP05</b>
<b>TITLE</b>	<b>WEB PROGRAMMING USING PHP</b>
<b>DEGREE</b>	<b>B.SC.</b>
<b>BRANCH</b>	<b>COMPUTER SCIENCE</b>
<b>YEAR/SEMESTER</b>	<b>II/IV</b>
<b>TYPE</b>	<b>CORE</b>
<b>INSTRUCTOR(S)</b>	<b>ANGITHA JEESIS C</b>
<b>CREDITS</b>	<b>2</b>

<b>CO NO.</b>	<b>COURSE OUTCOME</b>	<b>CL</b>	<b>PSO</b>
1	TO DESIGN SIMPLE WEBPAGES USING HTML TAGS AND CSS.	E	2
2	TO CREATE A DYNAMIC WEBSITE.	C	2

3	CREATING A DATABASE FOR STORE CONTENT.	C	2
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Module	COURSE DESCRIPTION	HR	CO
I,II,III		26	
	CREATING SIMPLE WEBPAGES USING HTML TAGS AND CSS.	6	1,2,3
	SIMPLE VALIDATION PROGRAMS USING JAVA SCRIPT.	10	1,2,3
	PHP INCLUDING LOOPS, DECISION STATEMENTS AND ARRAYS	10	1,2,3
IV,V		26	
	PHP PROGRAMS USING SESSION	13	1,2,3
	PHP PROGRAMS USING DATA BASE CONNECTIVITY	13	1,2,3

## SEMESTER V

<b>COURSE</b>	<b>DETAILS</b>
<b>CODE</b>	CS5CRT14
<b>TITLE</b>	SYSTEM SOFTWARE AND OPERATING SYSTEMS
<b>DEGREE</b>	B.SC.
<b>BRANCH</b>	COMPUTER SCIENCE
<b>YEAR/SEMESTER</b>	III/V
<b>TYPE</b>	CORE
<b>INSTRUCTOR(S)</b>	ATHIRADEVI R
<b>CREDITS</b>	4

<b>CO NO.</b>	<b>COURSE OUTCOME</b>	<b>CL</b>	<b>PSO</b>
1	Understand The Fundamentals Of Language Processing ,Types Of Programming Language Grammars And Macros	U	3
2	Identify Different Components Of An Assembler And Assembly Language Statements.	R	3
3	Understand Finite State Automata And Parse Tree Construction	U	3
4	Identify Different Components Of A Compiler And Their Functioning.	R	3
5	Explain Code Optimization Techniques And Linking And Relocation Concepts	U	3
6	Describe The Architecture And Components Of Operating System	R	3
7	Explain The Importance Of Process Scheduling And Synchronization.	U	3
8	Summarize The Issues In Deadlocks, Memory Management And File System.	U	3

MODULE	COURSE DESCRIPTION	HR	CO
<b>1.0</b>	<b>System software</b>	<b>15</b>	
1.1	General concepts, Language processing concepts	2	1
1.2	Fundamentals of Language processing, Fundamentals of language specification	3	1
1.3	Programming Language Grammar, Classification of Grammar.	2	1
1.4	Assemblers: Elements of assembly language programming – assembly language statements	3	2
1.5	Design specification of an assembler.	2	2
1.6	Macros: Definition- Call- Expansion.	3	1
<b>2.0</b>	<b>Scanning &amp; Parsing</b>	<b>15</b>	
2.1	Finite State Automata.	1	3
2.2	Parsing - Parse trees	2	3
2.3	Top down parsing, bottom up parsing.	2	3
2.4	Compilers - Phases of compiler-Aspects of compilations-	3	4
2.5	Code optimization.	2	5
<b>2.6</b>	<b>Linkers and Loaders - Relocation and linking concepts-</b>	<b>2</b>	<b>5</b>
2.7	Design of linker	2	5
2.8	Type of loaders.	1	5
<b>3.0</b>	<b>Operating System:</b>	<b>12</b>	
3.1	OS Definition, Functions, OS as a resource manager	1	6
3.2	Types of OS, Evolution of OS, Operating System Services.	2	6
3.3	Process: Basic Concepts, Process Scheduling	2	7
3.4	Operations on Processes, Interprocess communication	2	7
3.5	CPU Scheduling - Scheduling Criteria	2	7
3.6	Scheduling Algorithms.	3	7
<b>4.0</b>	<b>Process Synchronization</b>	<b>15</b>	
4.1	-The Critical Section problem, Semaphores.	3	7
4.2	Dead Locks : System Model, Dead Lock Characterization	3	8
4.3	Methods of Handling Dead Locks	2	8
4.4	Dead Lock Prevention, Dead Lock Avoidance	3	8
4.5	Dead Lock Detection, Recovery from Dead Lock	3	8
<b>5.0</b>	<b>Memory Management</b>	<b>18</b>	
5.1	Memory Management Strategies -Swapping, Contiguous memory allocation	4	8
5.2	Paging	2	8
5.3	Segmentation	2	8
5.4	Page Replacement	4	8
5.5	File System :- File Concept, Access Methods,	3	8
5.6	Allocation Methods	3	8

## Reference Books

1. D M Dhamdhere - System programming and operating Systems, Tata McGraw Hill
2. Abraham Silberschatz, Peter Galvin and Greg Gagne - Operating System Principles, Seventh Edition, John Wiley

<b>COURSE</b>	<b>DETAILS</b>
<b>CODE</b>	CS5CRT15
<b>TITLE</b>	IT AND ENVIRONMENT
<b>DEGREE</b>	B.SC.
<b>BRANCH</b>	COMPUTER SCIENCE
<b>YEAR/SEMESTER</b>	III/V
<b>TYPE</b>	CORE
<b>INSTRUCTOR(S)</b>	ANGITHA JEESIS C
<b>CREDITS</b>	3

<b>NO</b>	<b>COURSE OUTCOME</b>	<b>CL</b>	<b>PSO</b>
1	To Create Awareness About Environmental Issues	C	4
2	To Develop An Attitude Among Students To Activities Regarding Environment Protection	APPLY	4
3	Knowledge About Search Techniques	R	4
4	Recognize The Issues Of Using It In Society And Able To Solve The Issues	A	4
5	Examine The Current And Predicted Quantities Of E-Waste Across The Globe And Investigate The Implications Of These Trends For Your Own Geographical	R	4
6	Explain Four Different Scenarios For E-Waste Disposal Around The World	U	4
7	Understand The Historical Growth Of The Idea Of Human Rights	U	4
8	Demonstrate An Awareness Of The International Context Of Human Rights	U	4
9	Analyse And Evaluate Concepts And Ideas.	A	4



<b>MODULE</b>	<b>COURSE DESCRIPTION</b>	<b>HR</b>	<b>CO</b>
<b>1.0</b>	<b>INTRODUCTION TO INTERNET AND ENVIRONMENT</b>	<b>10</b>	<b>1,2,3</b>
1.1	MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES: DEFINITION, SCOPE AND IMPORTANCE, NEED FOR PUBLIC AWARENESS.	4	1,2
1.2	INTERNET-INTERNET AS AKNOWLEDGEREPOSITORY, ACADEMIC SEARCH TECHNIQUES	3	3
1.3	CREATING CYBER PRESENCE,ACADEMIC WEBSITES	3	3
<b>2.0</b>	<b>IMPACT OF IT IN E-LEARNING.</b>	<b>12</b>	<b>4</b>
2.1	USE OF IT IN TEACHING AND LEARNING.	2	4
2.2	LEARNING MANAGEMENT SYSTEM MOODLE, EDONDO	5	4
2.3	ACADEMIC SERVICES- INFLIBNET, NPTEL, NICNET.	5	4
<b>3.0</b>	<b>IT AND SOCIETY</b>	<b>18</b>	<b>4</b>
3.1	DIGITAL DIVIDE, IT AND DEVELOPMENT, FREE SOFTWARE MOVEMENT, IT INDUSTRY NEW OPPORTUNITIES AND NEW THREATS. CYBER THREATS, CYBER SECURITY, CYBER LAWS	6	4
3.2	CYBER ADDICTIONS, INFORMATION OVERLOAD, HEALTH ISSUES, PROPER USAGE OF COMPUTER, INTERNET AND MOBILE PHONE	6	4
3.3	IMPACT OF IT ON LANGUAGE AND CULTURE	6	4
<b>4.0</b>	<b>E-WASTE AND GREEN COMPUTING</b>	<b>14</b>	<b>5,6</b>
4.1	E-WASTE PROBLEMS AND SOLUTIONS, IMPACT OF E-WASTE.	4	5,6
4.2	E-WASTE MANAGEMENT IN INDIA,	4	5,6
4.3	GREEN COMPUTING DEFINITION, MEANING AND GREEN COMPUTING IN INDIA	5	5,6
<b>5.0</b>	<b>HUMAN RIGHTS</b>	<b>18</b>	<b>7,8,9</b>
5.1	AN INTRODUCTION TO HUMAN RIGHTS, MEANING CONCEPT AND DEVELOPMENT HISTORY OF HR	3	7,8,9
5.2	DIFFERENT GENERATIONS OF HR BASIC INTERNATIONAL HR DOCUMENTS- UDHR	3	7,8,9
5.3	ICCPR,ICESCR Value dimensions of HR	3	7,8,9
5.4	HR AND UN,OHCHR TREATY BODIES	3	7,8,9
5.5	ROLE OF SECRETARIAT SIX ORGANS OF UN AND FUNCTIONS OF ECONOMIC AND SOCIAL COUNCIL	3	7,8,9
5.6	IHRC, NHRC,SHRC,CERD, CEDAW,CESCR HRC, HR IN INDIAN CONSTITUTION	3	7,8,9
	Case Study: The students need to view the film "Samaksham", a film on environment produced by Mahatma Gandhi University Creations and submit a compulsory assignment reviewing film. The review is Considered for internal mark assessment.		

#### References:

1. K.L. James, The Internet: A User's Guide 2nd Revised edition, PHI publication.

3. Barkha and U Rama Mohan, Cyber Law & Crimes, 3 rd. Edition, Asia Law House.
4. Rakesh Johri, E-waste: Implications, regulations, and management in India and current global Best practices, Teri publications.
5. Alan Evans, Kendall Martin, Mary Anne Poatsy, Technology in Action, Pearson.

<b>COURSE</b>	<b>DETAILS</b>
<b>CODE</b>	<b>CS5CRT16</b>
<b>TITLE</b>	<b>JAVA PROGRAMMING USING LINUX</b>
<b>DEGREE</b>	<b>B.SC.</b>
<b>BRANCH</b>	<b>COMPUTER SCIENCE</b>
<b>YEAR/SEMESTER</b>	<b>III/V</b>
<b>TYPE</b>	<b>CORE</b>
<b>INSTRUCTOR(S)</b>	<b>DIVYA S</b>
<b>CREDITS</b>	<b>3</b>

<b>CO NO.</b>	<b>COURSE OUTCOME</b>	<b>Taxonomy</b>	<b>PSO</b>
C01	Understand the basic oops concept, Java evaluation, features and implementation overview.	Create	PSO2
C02	Know behaviour of primitive data types, operators and expressions, decision making and branching, decision making and looping	Create	PSO2
C03	Able to understand classes and methods, array, strings and interfaces concept instead of multiple inheritances	Create	PSO2
C04	Package of java, multithreaded programming contains synchronization, managing errors and exceptions handling.	Create	PSO2
C05	Create Java applications with graphical user interface (GUI – AWT, Applet and Swing).	Create	PSO2
C06	Create the Java event-handling model to respond to events arising from the GUI components	Create	PSO2
C07	Create database connection in Java	Create	PSO2

UNIT	COURSE DESCRIPTION	Hrs.	CO
<b>1.0</b>	<b>Introduction to Java Programming</b>	<b>10</b>	
1.1	Concepts of Object oriented programming, Benefits of OOP	2	C01
1.2	Features of Java. Java environment, Java tokens	1	C01
1.3	Constant, variables, data types, operators	2	C02
1.4	Control Statements-branching statements,	2	C02
1.5	Control Statements-looping statements,	2	C02
1.6	Jump statements, labelled loops.	1	C02
<b>2.0</b>	<b>Introduction to class, inheritance, interface</b>	<b>10</b>	
2.1	Defining a Class, Fields declaration, Method declaration, Creating object, Accessing class members,	1	C03
2.2	method overloading, Constructors, constructor overloading, super keyword,	2	C03
2.3	Inheritance,	2	C03
2.4	overriding methods, dynamic method dispatch, final(variables, methods and classes),	2	C03
2.5	static Members, abstract methods and classes,	1	C03
2.6	Interfaces, visibility control.	2	C03
<b>3.0</b>	<b>Introduction to Arrays, Sting class, Packages, Exception Handling, and Multithreading</b>	<b>12</b>	
3.1	Arrays- One dimensional arrays, declaration, creation, initialization of arrays, two dimensional arrays, String class.	3	C03
3.2	Packages: - Java API packages overview (Lang, util, io, awt, swing, applet), user defined packages-creating packages, using packages	3	C04
3.3	Exception Handling Techniques-try-catch-throw-throws-finally	3	C04
3.4	Multi-threading- creation of multi-threaded program-Thread class-Runnable interface, Thread life cycle.	3	C04
<b>4.0</b>	<b>Introduction to AWT, Event handling, Layout Manager and Swing</b>	<b>10</b>	
4.1	AWT Controls, Swing- architecture, components of swing- JLabel, JButton, JCheckBox, JRadioButton, JList, JComboBox, JPasswordField, JText Area, JPanel, JFrame,	4	C05
4.2	Layout Managers(Flow Layout, Grid Layout, Card Layout, Border Layout, Box Layout, Null Layout).	2	C05
4.3	Event Handling-Delegation Event Model-Event Classes- Sources of Events-Event Listeners- Event classes	4	C06
<b>5.0</b>	<b>Introduction to Applet, Graphics and JDBC</b>	<b>10</b>	
5.1	Applet Fundamentals -applet tag, applet life cycle, passing parameters to applets.	3	C05

5.2	Working with graphics -Line, Rectangle, Oval, Arc, color setting.	3	C05
5.3	JDBC architecture- JDBC connection, JDBC statement object, JDBC drivers.	4	C07

**Reference Book:**

1. E. Balagurusamy- Programming with Java, Third Edition, McGraw Hill Companies.
2. Patrick Naughton - Java2 The Complete Reference, Seventh Edition:
3. Java 6 Programming Black Book 2007 Edition, Dreamtech press.

<b>COURSE</b>	<b>DETAILS</b>
<b>CODE</b>	<b>CS5CRT17</b>
<b>TITLE</b>	<b>COMPUTER SECURITY</b>
<b>DEGREE</b>	<b>B.SC.</b>
<b>BRANCH</b>	<b>COMPUTER SCIENCE</b>
<b>YEAR/SEMESTER</b>	<b>III/V</b>
<b>TYPE</b>	<b>CORE</b>
<b>INSTRUCTOR(S)</b>	<b>VINU THADEVUS WILLIAMS</b>
<b>CREDITS</b>	<b>4</b>

<b>CO NO.</b>	<b>COURSE OUTCOME</b>	<b>CL</b>	<b>PSO</b>
1	UNDERSTAND PRINCIPLES OF SECURITY ,NEED FOR SECURITY ,THREAD AND ATTACK ASPECTS	U	3
2	ANALYSE DIFFERENT CRYPTOGRAPHY METHOD SUBSTITUTION AND TRANSPOSITION AND ITS ALGORITHMS	ANLZ	1
3	SUMMARIZE DIFFERENT CRYPTOGRAPHY TOOLS PKI DIGITAL SIGNATURE	U	2
4	UNDERSTAND DIFFERENT INTRUDERS AND INTRUSION DETECTION PREVENTION SYSTEM	U	1

5	ANALYSE DIFFERENT NETWORK SECURITY ASPECTS-EMAIL AND IP SECURITY	ANLZ	1
6	EXPLAIN DIFFERENT WEB SECURITY ASPECTS- GATE WAYS FIREWALLS,SSL LAYER SECURITY	U	1

MODULE	COURSE DESCRIPTION	HR	CO
<b>1.0</b>	Introduction-Principles of Security	5	1
1.1	Principles of Security	2	1
1.2	Need for Security	1	1
1.3	Threats	1	1
1.4	Attacks	1	1
<b>2.0</b>	Cryptography	20	2
2.1	Cipher Methods	2	2
2.2	Caesar cipher -One time pad – Mono alphabetic Cipher	2	2
2.3	Play fair cipher- Poly alphabetic cipher	3	2
2.4	Vigenère – Cipher	3	2
2.5	Transposition ciphers	3	2
2.6	Cryptographic Algorithms	2	2
2.7	Symmetric & Asymmetric tools	3	2
2.8	Cryptographic tools: PKI- Digital Signatures Stenography	2	2
<b>3.0</b>	System Security	15	3
3.1	Intrusion Detection and Prevention Systems	4	3
3.2	Why IDPS?	4	3
3.3	Types of IDPS	4	3
3.4	Password Management Countermeasures	3	3
<b>4.0</b>	Network Security	15	4
4.1	Electronic Mail Security	2	4
4.2	Pretty Good Privacy	3	4

4.3	S/MIME	3	4
4.4	IP Security Overview, IP Security Architecture	3	4
4.5	Authentication Header, Encapsulating Security Payload	3	4
<b>5.0</b>	<b>Web Security</b>	<b>15</b>	<b>5</b>
5.1	Web Security considerations	1	5
5.2	Secure Socket Layer	3	5
5.3	Transport layer Security	3	5
5.4	Secure electronic transaction	3	5
5.5	Firewalls-Packet filters	3	5
5.6	Application Level Gateway-Circuit Level Gateway	2	5

### References:

Behrouz A.Forouzan,Dedeeep Mukohopadhyay" cryptography and network security", second edition, Tata McGraw Hill, New Delhi, 2010.

Atul Kahate, "Cryptography and network security", second edition, Tata McGraw Hill

<b>COURSE</b>	<b>DETAILS</b>
<b>CODE</b>	<b>CS5OPT02</b>
<b>TITLE</b>	<b>COMPUTER FUNDAMENTALS, INTERNET &amp; MS OFFICE</b>
<b>DEGREE</b>	<b>B.SC.</b>
<b>BRANCH</b>	<b>COMPUTER SCIENCE</b>
<b>YEAR/SEMESTER</b>	<b>III/V</b>
<b>TYPE</b>	<b>OPEN COURSE</b>
<b>INSTRUCTOR(S)</b>	<b>DIVYA S. &amp; REMYA STEPHEN</b>
<b>CREDITS</b>	<b>4</b>

<b>CO NO.</b>	<b>COURSE OUTCOME</b>	<b>Taxonomy</b>	<b>PSO</b>
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C01	Undertand History and generation of Computers Components of computer, classification of compuer, Concept of Operating System and types of Networks	Undertand	PSO3
C02	Understand the basic concepts and applications of the Internet and World Wide Web. Also be able to create email account and send / receive emails	Undertand	PSO3
C03	Understanding basic concepts of Word processing using MS-Word	Undertand	PSO3
C04	Understanding basic concepts of Electronic spreadsheet and various types of basic entries like Charts, formulas in it	Undertand	PSO3
C05	Undertand how to create effective presentations and apply Designs to Enhance the looks of the Presentation.	Undertand	PSO3

MODULE	COURSE DESCRIPTION Computer Fundamentals	Hrs.	CO
<b>1.0</b>	<b>Computer Fundamentals</b>	<b>12</b>	
1.1	History, Generations,	2	C01
1.2	Classifications, Operating Systems,	1	C01
1.3	Types of Networks	2	C01
<b>2.0</b>	<b>Introduction to Internet</b>	<b>12</b>	
2.1	The Internet, TCP/IP, IP Addressing,	1	C02
2.2	Client Server Communication, Intra-net, WWW,,	2	C02
2.3	Web Browser and Web Server	2	C02
2.4	Hyper-links, URLs,	2	C02
2.5	Electronic Email	1	C02
<b>3.0</b>	<b>Introduction to Word Processing</b>	<b>14</b>	
3.1	Word processing: Introduction, Microsoft Word, Basic Menus	3	C03
3.2	Formatting the text & paragraph, Working with Index	3	C03
<b>4.0</b>	<b>Introduction to Spread Sheet</b>	<b>18</b>	
4.1	Spread Sheet: Introduction, Microsoft Excel, Basic Menus.	4	C04
4.2	Formulas, Basic functions,	4	C04
4.3	Charts and Graphs	2	C04
<b>5.0</b>	<b>Introduction to Microsoft Power Point</b>	<b>16</b>	
5.1	Microsoft Power Point: Introduction, Basic Menus,	3	C05
5.2	Template, Slide Basics, Charts,	3	C05
5.3	Adding Multimedia & Animation.	4	C05

### Reference Book:

“Learning Computer Fundamentals, MS Office and Internet & Web Technology”, Dinesh Maidasani, Firewall Media, Lakshmi Publications.

COURSE	DETAILS
CODE	CS5CRP06
TITLE	JAVA PROGRAMMING USING LINUX
DEGREE	B.SC.
BRANCH	COMPUTER SCIENCE
YEAR/SEMESTER	III/V
TYPE	CORE PRATICALS
INSTRUCTOR(S)	DIVYA S
CREDITS	2

UNIT	COURSE DESCRIPTION	Hrs.	CO
<b>1.0</b>	<b>Introduction to Java Programming</b>	<b>40</b>	<b>PSO</b>
<b>1.1</b>	<b>Java Programs using class and read inputs from keyboard</b>	<b>3</b>	<b>C01</b>
<b>1.2</b>	<b>Java Programs using Control structures</b>	<b>3</b>	<b>C01</b>
<b>1.3</b>	<b>To understand how to design, implement, test, debug, and document programs that use basic data types and</b>	<b>3</b>	<b>C02</b>
<b>1.4</b>	<b>Java Programs using constructors</b>	<b>3</b>	<b>C02</b>
<b>1.5</b>	<b>Implement the concept of Inheritance, interface and packages</b>	<b>4</b>	<b>C03</b>
<b>1.6</b>	<b>Implement concept of Method Overloading &amp; Method Overriding</b>	<b>4</b>	<b>C03</b>
<b>1.7</b>	<b>Java Programs using Threads.</b>	<b>4</b>	<b>C04</b>
<b>1.8</b>	<b>Structuring the code: Exception Handling</b>	<b>4</b>	<b>C04</b>
<b>1.9</b>	<b>Web based java programs using AWT &amp; Event handling</b>	<b>4</b>	<b>C05</b>
<b>1.10</b>	<b>Web based java programs using Swing &amp; Event handling.</b>	<b>4</b>	<b>C06</b>
<b>1.11</b>	<b>Use the classes and JDBC package</b>	<b>4</b>	<b>C07</b>
<b>2.0</b>	<b>Mini Project using Java</b>	<b>40</b>	<b>PSO</b>
	<b>experience of designing, implementing, testing, and debugging graphical user interfaces in Java using applet and AWT that respond to different user events.</b>	<b>Create</b>	<b>PSO2</b>
C05	To learn experience of designing, implementing, testing, and debugging graphical user interfaces in Java using applet and AWT that respond to different user events.	Create	PSO2
C06	To understand Java Swings for designing GUI applications based on MVC architecture.	Create	PSO2
C07	learn to access database through Java programs, using Java Data Base Connectivity (JDBC)	Create	PSO2
C08	Design a software	Design	PSO2



**Reference Book:**

1. E. Balagurusamy- Programming with Java, Third Edition, McGraw Hill Companies.
2. Patrick Naughton - Java2 the Complete Reference, Seventh Edition:
3. Java 6 Programming Black Book 2007 Edition, Dreamtech press.

**SEMESTER VI**

<b>COURSE</b>	<b>DETAILS</b>
<b>CODE</b>	<b>CS6CRT18</b>
<b>TITLE</b>	<b>COMPUTER GRAPHICS</b>
<b>DEGREE</b>	<b>B.SC.</b>
<b>BRANCH</b>	<b>COMPUTER SCIENCE</b>
<b>YEAR/SEMESTER</b>	<b>III/VI</b>
<b>TYPE</b>	<b>CORE PRATICALS</b>
<b>INSTRUCTOR(S)</b>	<b>ATHIRADEVI R</b>
<b>CREDITS</b>	<b>4</b>

<b>CO NO.</b>	<b>COURSE OUTCOME</b>	<b>CL</b>	<b>PSO</b>
1	Understand the basics of computer graphics, different display devices and applications of computer graphics.	U	2
2	Identify the algorithmic development of graphics primitives like: point, line, circle, ellipse etc.	R	2
3	Implement 2D and 3D transformations on graphics objects.	APPLY	2
4	Examine 2D Viewing and different clipping methods.	R	2
5	Understand the concept of animation techniques.	U	2

MODULE	COURSE DESCRIPTION	HR	CO
<b>1.0</b>	<b>Introduction</b>	<b>12</b>	
1.1	A survey of Computer Graphics	1	1
1.2	overview of graphics systems-Video display devices-Refresh CRT	2	1
1.3	Raster-Scan and Random-Scan Displays	2	1
1.4	Color CRT Monitors,DVST,Flat-Panel Displays	2	1
1.5	Raster Scan systems, Random scan systems	2	1
1.6	Input devices, Hard copy devices	2	1
1.7	Graphics software	1	1
<b>2.0</b>	<b>Output primitives:</b>	<b>14</b>	
2.1	Line drawing algorithms: DDA algorithm, Bresenham's line algorithm	5	2
2.2	Circle generating algorithm- Midpoint circle algorithm	5	2
2.3	Character generation	4	2
<b>3.0</b>	<b>2D geometric Transformations:</b>	<b>18</b>	
3.1	Basic transformations: Translation, Rotation, Scaling	3	3
3.2	Other transformations-Reflection and shear	2	3
3.3	Matrix representation and homogenous coordinates, Composite transformation	2	3
3.4	Interactive picture construction Techniques	2	3
3.5	Two-dimensional viewing: viewing pipeline, window and viewport, window to viewport transformation	3	3,4
3.6	Clipping operations- Point clipping, Line clipping:- Cohen Sutherland line clipping	3	3,4
3.7	Polygon clipping:-Sutherland- Hodgeman polygon clipping, Text Clipping.	3	3,4
<b>4.0</b>	<b>Three-dimensional concepts</b>	<b>14</b>	
4.1	Three dimensional display methods	3	3
4.2	Three dimensional object representations- Polygon surfaces, Sweep representations	5	3
4.3	Constructive solid geometry methods	3	3
4.4	Octrees and quadtrees	3	3
<b>5.0</b>	<b>Computer Animation</b>	<b>14</b>	
5.1	Design of animation sequences	2	5
5.2	raster animations	2	5
5.3	computer animation languages	2	5
5.4	key-frame systems	2	5
5.5	morphing	3	5
5.6	Motion specifications.	3	5

## Reference Books

1. Donald Hearn & M. Pauline Baker, Computer Graphics C Version, Second Edition,, PHI Pvt. Ltd.

COURSE	DETAILS
CODE	CS6CRT19
TITLE	BIG DATA ANALYTICS
DEGREE	B.SC.
BRANCH	COMPUTER SCIENCE
YEAR/SEMESTER	III/VI
TYPE	CORE
INSTRUCTOR(S)	REMYA STEPHEN
CREDITS	4

CO NO.	COURSE OUTCOME	CL	PSO
1	Understand what Big Data is and why classical data analysis techniques are no longer adequate	U	PSO1
2	Explaining about mining of data streams	U	PSO1
3	Understand the benefits that Big Data can offer to businesses and organisations	U	PSO3
4	Understand the security issues and history of hadoop environment	U	PSO1
5	Learn the applications using big data	U	PSO5

MODULE	COURSE DESCRIPTION	HR	CO
<b>1.0</b>	<b>Introduction to Big Data Platform</b>	15	1
1.1	Challenges of Conventional Systems	2	1
1.2	Intelligent data analysis	2	1
1.3	Nature of Data	2	1
1.4	Analytic Processes and Tools	2	1
1.5	Analysis vs. Reporting	2	1
1.6	Modern Data Analytic Tools	2	1

1.7	Statistical Concepts: Sampling Distributions - Re-Sampling - Statistical Inference	2	1
1.8	Prediction Error	1	1
<b>2.0</b>	<b>Mining Data Streams-Introduction To Streams Concepts</b>	10	2
2.1	Stream Data Model and Architecture	1	2
2.2	Stream Computing	1	2
2.3	Sampling Data in a Stream	1	2
2.4	Filtering Streams	1	2
2.5	Counting Distinct Elements in a Stream	1	2
2.6	Estimating Moments	1	2
2.7	Counting Oneness in a Window – Decaying Window	1	2
2.8	Real time Analytics Platform(RTAP)-Applications	1	2
2.9	Case Studies - Real Time Sentiment Analysis, Stock Market Predictions.	2	2
<b>3.0</b>	<b>History of Hadoop</b>	20	3
3.1	The Hadoop Distributed File System	2	3
3.2	Components of Hadoop	1	3
3.3	Analysing the Data with Hadoop- Scaling Out	1	3
3.4	Hadoop Streaming	1	3
3.5	Design of HDFS-Java interfaces to HDFS	2	3
3.6	Basics-Developing a Map Reduce Application	2	3
3.7	How Map Reduce Works	2	3
3.8	Anatomy of a Map Reduce Job run	2	3
3.9	Failures	2	3
3.10	Job Scheduling	1	3
3.11	Shuffle and Sort	1	3
3.12	Task execution	1	3
3.13	Map Reduce Types and Formats	1	3
3.14	Map Reduce Features.	1	3
<b>4.0</b>	<b>Hadoop Environment</b>	15	4
4.1	Setting up a Hadoop Cluster	1	4
4.2	Cluster specification	2	4
4.3	Cluster Setup and Installation	2	4
4.4	Hadoop Configuration	2	4
4.5	Security in Hadoop	2	4
4.6	Administering Hadoop	2	4
4.7	HDFS-Monitoring-Maintenance	2	4
4.8	Hadoop benchmarks	1	4
4.9	Hadoop in the cloud	1	4
<b>5.0</b>	<b>Frameworks</b>	15	5
5.1	Applications on Big Data Using Pig and Hive	2	5
5.2	Data processing operators in Pig	2	5
5.3	Hive services –HiveQL	1	5
5.4	Querying Data in Hive	2	5
5.5	fundamentals of HBase and ZooKeeper	2	5
5.6	IBM InfoSphere BigInsights and Streams.	2	5
5.7	Visualizations	1	5

5.8	Visual data analysis techniques, interaction techniques	2	5
5.9	Systems and applications	1	5

<b>COURSE</b>	<b>DETAILS</b>
<b>CODE</b>	<b>CS6PET01</b>
<b>TITLE</b>	<b>PYTHON AND LATEX</b>
<b>DEGREE</b>	<b>B.SC.</b>
<b>BRANCH</b>	<b>COMPUTER SCIENCE</b>
<b>YEAR/SEMESTER</b>	<b>III/VI</b>
<b>TYPE</b>	<b>CORE</b>
<b>INSTRUCTOR(S)</b>	<b>DIVYA S.</b>
<b>CREDITS</b>	<b>4</b>

<b>CO NO.</b>	<b>COURSE OUTCOME</b>	<b>Taxonomy</b>	<b>PSO</b>
CO1	To understand why Python is a useful scripting language for developers and Interpret the fundamental Python syntax and semantics	U	PSO2
CO2	Describe the Numbers, Math functions, and Strings in Python	U	PSO2
CO3	Express different Control structures in Python	U	PSO2
CO4	Determine the methods to create and manipulate Python programs by utilizing the data structures like lists, dictionaries, tuples and sets.	U	PSO2
CO5	To learn about built in functions and how to write user defined functions and pass arguments in Python.	U	PSO2
CO6	Understand and summarize different File handling and exception handling operations in Python	U	PSO2
CO7	To understand the basic idea of structuring your documents using Latex.	U	PSO2

<b>UNIT</b>	<b>COURSE DESCRIPTION</b>	<b>Hrs.</b>	<b>CO</b>
<b>1.0</b>	<b>Introduction to Python Programming</b>	<b>14</b>	
1.1	Introduction to Python: The Python Programming Language , Variables, Basic expressions and statements	4	CO1

1.2	Arithmetic Operators , Data types - Type conversion	5	CO1
1.3	Numbers, Floats , String operations	5	CO2
<b>2.0</b>	<b>Introduction to Control Structures and Different Data Structures</b>	<b>14</b>	
2.1	Logical operators , if , If-Else , While loop , For loop	5	CO3
2.2	List value, length, operation and deletion	4	CO4
2.3	Dictionary operation & methods , Tuples	5	CO4
<b>3.0</b>	<b>Introduction to Functions</b>	<b>16</b>	
3.1	Functions: Basic inbuilt functions , User defined functions , Function Calls	6	CO5
3.2	Parameterized function calls , Function returns	5	CO5
3.3	Recursive functions , Scope concepts - local, global	5	CO5
<b>4.0</b>	<b>Introduction to Files and user I/O</b>	<b>14</b>	
4.1	User input , Reading files , Writing to files	5	CO6
4.2	Directories , Interactive programming , Pickling	4	CO6
4.3	Exceptions	5	CO6
<b>5.0</b>	<b>Introduction to LaTeX</b>	<b>16</b>	
5.1	Basic LaTeX :What is LaTeX , Structure -Layout - Margin	5	CO7
5.2	Header/Footer , Sectioning	6	CO7
5.3	Bullets and Numbering , Images	5	CO7

Reference Book:

1. Downey, A. et al., "How to think like a Computer Scientist: Learning with Python", John Wiley, 2015
2. Stefan Kottwitz "LaTeX: Beginner's Guide"Packt Publishing, 2011
3. Swaroop C H, "Byte of Python", Create Space Independent Publishing Platform, 2015
4. Zed Shaw, "Learn Python the Hard Way", Addison-Wesley, 2014
5. WikiBooks - <https://en.wikibooks.org/wiki/LaTeX/>

## COMPLEMENTARY COURSES

COURSE	DETAILS
TITLE	DISCRETE MATHEMATICS ( I )
DEGREE	B.Sc.
BRANCH	COMPUTER SCIENCE
YEAR/SEMESTER	I/I
TYPE	COMPLEMENTARY
INSTRUCTOR(S)	ANSMOL GEORGE
CREDITS	4

CO NO.	COURSE OUTCOME	CL	PSO
1	UNDERSTAND THE BASIC PROPOSITION AND PREDICATE LOGIC FOR IMPLEMENT HIGH LEVEL LANGUAGE TO COMPUTER LOGIC LANGUAGE	U/APPLY	PSO1
2	ANALYSE DIFFERENT RULES IN LOGIC TO CREATE BETTER MATHEMATICAL OPERATIONS WITH LEAST TIME	ANALYZE/ C	PSO1
3	IDENTIFY DIFFERENT SET OPERATIONS AND COLLECTION OF DATA FOR THE BETTER ARRANGEMENT OF THE COMPUTER DATABASE	R	PSO1
4	ANALYSE THE FUNCTIONS OF SET OPERATIONS FOR IMPLEMENT DIFFERENT REAL WORLD ACTIVITIES IN A COMPUTER LANGUAGE FORMAT	ANALYZE/ APPLY	PSO1
5	IDENTIFY DIFFERENT APPLICATION OF NUMBER THEORY AND PRIME FACTORISATION	R	PSO1
6	ANALYSE BASIC CRYPTOGRAPHICAL IDEAS TO IMPLEMENTING BETTER SECURITY IN COMPUTER SYSTEM	ANALYZE/ APPLY	PSO1
7	UNDERSTAND DIFFERENT DATAS AND ITS RELATIONSHIP FOR CREATING A BETTER DATABASE MANAGEMENT SYSTEM	U/C	PSO1

MODULE	COURSE DESCRIPTION	HOURS	CO
1.0	<b>Logic</b>	18	1,2
1.1	Propositional Logic	4	1

1.2	Propositional Equivalence	4	1
1.3	Predicates and Quantifiers	5	1
1.4	Rules of Inference	5	2
<b>2.0</b>	<b>Basic Structures</b>	15	3,4
2.1	Sets	3	3
2.2	Set Operations	4	3
2.3	Functions	4	4
2.4	Sequences and Summations	4	4
<b>3.0</b>	<b>Number Theory and Cryptosystem</b>	20	5,6
3.1	The Integers and Division	6	5,6
3.2	Primes and Greatest Common Divisors	7	5,6
3.3	Applications of Number Theory	7	5,6
<b>4.0</b>	<b>Relations</b>	19	7
4.1	Relations and Their Properties	4	7
4.2	Representing Relations	4	7
4.3	Equivalence Relations	5	7
4.4	Partial Orderings	6	7

### References:

Kenneth h Rosen: Discrete Mathematics and its Applications; 6<sup>th</sup> Edition; Tata Mc Graw-Hill publishing company limited

Frank Ayres Jr: Matrices, Schaum's Outline Series, TMH Edition.

<b>COURSE</b>	<b>DETAILS</b>
<b>CODE</b>	<b>CS1CRT01</b>
<b>TITLE</b>	<b>COMPUTER FUNDAMENTALS AND BASICS OF COMPUTER HARDWARE</b>
<b>DEGREE</b>	<b>B.Sc.</b>
<b>BRANCH</b>	<b>COMPUTER SCIENCE</b>
<b>YEAR/SEMESTER</b>	<b>I/I</b>
<b>TYPE</b>	<b>COMPLEMENTARY</b>
<b>INSTRUCTOR(S)</b>	<b>VINU THADEVUS WILLIAMS</b>
<b>CREDITS</b>	<b>4</b>



CO NO.	COURSE OUTCOME	CL	PSO
1	Understand Introduction to Computer and Booting Process	U	PSO1
2	Explain Introduction to Computer Hardware	U	PSO1
3	Understand Expansion Slots	U	PSO1
4	Explain about Input Devices, Data Scanning Devices, Voice Recognition Device, Output Devices	U	PSO1
5	Explain Memory, Secondary memory ,PC memory Units	U	PSO1

MODULE	COURSE DESCRIPTION	HR	CO
<b>1.0</b>	<b>Introduction to Computer</b>	<b>20</b>	<b>1</b>
1.1	Generations of Computer (I-V)	3	1
1.2	Classification of Computers: Analog, Digital and Hybrid Computers	3	1
1.3	Micro, Mini, Mainframe, Super Computers, Servers, Laptop	3	1
1.4	Block Diagram of a Computer	3	1
1.5	Functions of the Different Units: Input unit, Output unit, Memory unit, CPU (ALU+CU).	3	1
1.6	Booting Process- POST, BIOS, clock speed, memory speed, memory capacity.	5	1
<b>2.0</b>	<b>Introduction to Computer Hardware</b>	<b>15</b>	<b>2</b>
2.1	DC regulated power supply- Block Diagram	3	2
2.2	Concepts of Switch Mode Power supply	3	2
2.3	Inverters, UPS and their applications	3	2
2.4	Basic Components of CPU	3	2
2.5	Mother Board.	3	2
<b>3.0</b>	<b>Expansion Slots</b>	<b>10</b>	<b>3</b>
3.1	ISA, EISA, MCA, VESA, PCI local bus	3	3

3.2	Processor, Connectors, CMOS memory	3	3
3.3	SMPS, Serial and Parallel Ports, USB BIOS chip	3	3
3.4	Steps for assembling a PC	1	3
<b>4.0</b>	<b>Input Devices, Data Scanning Devices, Voice Recognition Device Output Devices</b>	<b>15</b>	<b>4</b>
4.1	Keyboard, Point and draw devices	2	4
4.2	mouse, joystick, track ball, light pen	2	4
4.3	image scanner, OCR, OMR, MICR, Bar code reader	3	4
4.4	Microphone	3	4
4.5	Monitor- CRT displays, Non-CRT displays, TFT: LED, LCD, Plasma	3	4
4.6	Printer, Impact and non-impact, Character, line and Page Printers	2	4
<b>5.0</b>	<b>Memory Secondary memory PC memory Units</b>	<b>15</b>	<b>5</b>
5.1	Primary Memory, RAM- SRAM, DRAM, ROM, PROM, EPROM, EEPROM, flash memory	3	5
5.2	Hard Disk: Structure of a hard disk, how data is stored in a hard disk	3	5
5.3	concept of tracks, sectors, clusters, cylinders	3	5
5.4	CD-R, RW, DVD-RW, Blue-ray disk, HVD	3	5
5.5	SIMM, DIMM, RIMM	2	5

**Reference:**

1. Balagurusamy - Fundamentals of Computer, First Edition- 2009, McGraw-Hill
2. Anita Goel - Computer Fundamentals, First Edition-2010, Pearson.
3. Peter Norton, "Introduction to Computers", McGraw Hill

<b>COURSE</b>	<b>DETAILS</b>
<b>CODE</b>	<b>CS1CMT01</b>
<b>TITLE</b>	<b>FUNDAMENTALS OF DIGITAL SYSTEMS</b>
<b>DEGREE</b>	<b>B.Sc.</b>
<b>BRANCH</b>	<b>COMPUTER SCIENCE</b>

<b>YEAR/SEMESTER</b>	I/I
<b>TYPE</b>	COMPLEMENTARY
<b>INSTRUCTOR(S)</b>	REMYA STEPHEN
<b>CREDITS</b>	4

CO NO.	COURSE OUTCOME	CL	PSO
1	Understand the concepts of different types of number system and its conversion from one type to another	U	PSO1
2	Summarize different types of logic gates and its digital wave forms	U	PSO1
3	Describe laws and rules of Boolean algebra and Boolean operations	U	PSO1
4	Implementing combinational logic circuit	APPLY	PSO1
5	Explain synchronous and asynchronous circuits and flip flops	U	PSO1

MODULE	COURSE DESCRIPTION	HR	CO
1.0	Number Systems, Operation and codes	20	1
1.1	Decimal Number, Binary Numbers: Decimal to binary conversion	2	1
1.2	Binary Arithmetic	2	1
1.3	Ones and twos complement of binary numbers	2	1
1.4	Signed Numbers : Arithmetic operation with signed numbers	2	1
1.5	Hexa decimal numbers : Binary to hexadecimal conversion Hexadecimal to binary conversion Hexadecimal to decimal conversion Decimal to hexadecimal conversion Hexadecimal addition and subtraction	4	1
1.6	Octal Numbers: Octal to decimal conversion Decimal to octal conversion Octal to binary conversion Binary to octal conversion	2	1
1.7	Binary Coded Decimal : 8421 BCD code, BCD Addition	2	1
1.8	Digital codes – Grey code, Binary to grey code conversion	2	1
1.9	Alphanumeric codes- Parity codes	2	1

<b>2.0</b>	Logic gates, Logic Levels and Wave forms	10	2
2.1	Logic levels and digital waveforms, Logic Gates : AND, OR, NOT, XOR, XNOR, NAND	3	2
2.2	Universal property of NAND and NOR gates	3	2
2.3	Logic gate operation with pulse waveform	4	2
<b>3.0</b>	Boolean Algebra and logic Simplification	15	3
3.1	Boolean operation and expression, Law and rules of Boolean algebra	2	3
3.2	De-morgans theorems	1	3
3.3	Boolean analysis of logic circuits	1	3
3.4	Simplification using Boolean algebra	1	3
3.5	Standard forms of Boolean expression	2	3
3.6	Boolean expressions and truth tables	2	3
3.7	The Karnaugh Map	2	3
3.8	K-Map SOP minimization and POS minimization	2	3
3.9	Five variable k - map	2	3
<b>4.0</b>	Combinational logic and its functions	15	4
4.1	Basic combinational logic circuit, Implementing combinational logic	2	4
4.2	Combinational logic using NAND and NOR gates	2	4
4.3	Basic overview of logic functions	2	4
4.4	Basic adders: Parallel binary address,	2	4
4.5	Comparator decoders, encoders, code converters	3	4
4.6	Multiplexers, demultiplexers	2	4
4.7	Parity generators/checkers	2	4
<b>5.0</b>	Sequential Circuit	15	5
5.1	Latches, RTS flip flop using NAND and NOR gates	3	5
5.2	Clocked RS,D, JK, and T flip flops, Edge triggered flip flops Master slave flip flops	2	5
5.3	Asynchronous counter operation	3	5
5.4	Synchronous counter operation : up down synchronous counter Design of synchronous counter	3	5
5.5	Basic shift register functions	2	5
5.6	Serial in parallel out shift register Parallel in serial out shift register Serial in Serial out shift register parallel in parallel out shift register	2	5

**Reference:**

A P Malvino and D P Leach - Digital Principles and Applications, Fourth edition, Tata McGraw Hill Publishers, co Ltd.

COURSE	DETAILS
TITLE	DISCRETE MATHEMATICS ( II )
DEGREE	B.Sc.
BRANCH	COMPUTER SCIENCE
YEAR/SEMESTER	I/II
TYPE	COMPLEMENTARY
INSTRUCTOR(S)	ANSMOL GEORGE
CREDITS	4

CO NO.	COURSE OUTCOME	CL	PSO
1	Understand and analyse different graph theory applications for the better implementation of computer algorithm	U/Analyse	PSO1
2	Implement different tree structure for the computer searching algorithm	Apply	PSO1
3	Create different switching and logic gates applications for the implementation of increase the performance of computer components	C	PSO1
4	Evaluate different matrix operations for analysing data orientation of computers	E	PSO1

MODULE	COURSE DESCRIPTION	HOURS	CO
<b>1.0</b>	<b>Graphs</b>	18	1
1.1	Graphs and Graph Models	4	1
1.2	Graph Terminology and Special types of Graphs	4	1
1.3	Representing Graphs and Graph Isomorphism,	5	1
1.4	Connectivity, Euler and Hamilton Paths	5	1
<b>2.0</b>	<b>Trees</b>	17	2
2.1	Introduction to Trees	4	2
2.2	Application of Trees	4	2
2.3	Tree Traversal	4	2
2.4	Spanning Trees.	5	2
<b>3.0</b>	<b>Boolean Algebra</b>	17	3
3.1	Boolean Function,	3	3
3.2	Representing Boolean Functions	4	3

3.3	Logic Gates	10	3
<b>4.0</b>	<b>Matrices</b>	20	4
4.1	Definitions and examples of Symmetric, Skew-symmetric, Conjugate, Hermitian, Skew hermitian matrices	3	4
4.2	Rank of Matrix , Determination of rank by Row Canonical form and Normal form	4	4
4.3	Linear Equations, Solution of non-homogenous equations using Augmented matrix and by Cramer's Rule , Homogenous Equations	5	4
4.4	Characteristic Equation, Characteristic roots and Characteristic vectors of matrix ,	5	4
4.5	Cayley Hamilton theorem and applications	3	4

<b>COURSE</b>	<b>DETAILS</b>
<b>CODE</b>	<b>CS2CRT03</b>
<b>TITLE</b>	<b>DATA COMMUNICATION</b>
<b>DEGREE</b>	<b>B.Sc.</b>
<b>BRANCH</b>	<b>COMPUTER SCIENCE</b>
<b>YEAR/SEMESTER</b>	<b>I/II</b>
<b>TYPE</b>	<b>COMPLEMENTARY</b>
<b>INSTRUCTOR(S)</b>	<b>VINU THADEVUS WILLIAMS</b>
<b>CREDITS</b>	<b>4</b>

<b>CO NO.</b>	<b>COURSE OUTCOME</b>	<b>CL</b>	<b>PSO</b>
1	UNDERSTAND AND ANALYSE PRINCIPLES OF DATA AND SIGNALS FOR BETTER DATA TRANSMISSION	U	3
2	ANALYSE DIFFERENT TRANSMISSION MEDIA FOR CONTROL THE DATA COMMUNICATION IN EFFECTIVE MANNER	ANLZ	1
3	SUMMARIZE DIFFERENT ANALOG AND DIGITAL TRANSMISSIONS FOR PROPER COMMUNICATION	U	2

4	UNDERSTAND DIFFERENT SWITCHING TECHNOLOGY AND CABLE CONNECTION FOR COMMUNICATION IMPLEMENTATION	U	1
5	ANALYSE DIFFERENT COMPLETE DATA COMMUNICATION SCHEMES FOR BETTER DATA TRANSMISSION THROUGH COMMUNICATION CHANEL	ANLZ (COMMON)	1

MODULE	COURSE DESCRIPTION	HR	CO
<b>1.0</b>	<b>Data and Signals</b>	20	1
1.1	Analog and Digital Data, Analog and Digital Signals, Periodic and Non periodic, Periodic Analog signals,	5	1
1.2	Time and Frequency Domains, Composite Signals, Bandwidth, Digital Signals, Bit Rate, Digital Signal as a Composite Analog Signal, Transmission of Digital and Analog Signals	5	1
1.3	Transmission Impairment, Attenuation, Distortion, Noise, Data rate limits, Noiseless channel: Nyquist bit rate	5	1
1.4	Noisy Channel: Shannon Capacity, Simplified Communication & Data Communication models. Data Flow-Simplex, Half Duplex, Full Duplex.	5	1
<b>2.0</b>	<b>Transmission Media</b>	10	2
2.1	Guided media, Twisted-pair cable – UTP, STP, Connectors Coaxial Cable, Connectors Fiber-Optic Cable	5	2
2.2	Propagation Modes, Unguided Media - Wireless Transmission – Terrestrial Microwave, Satellite Microwave, Radio Waves. Infrared.	5	2
<b>3.0</b>	<b>Digital Transmission</b>	15	3
3.1	Analog to Digital Conversion: Block Diagram of Digital Communication System. Parallel and serial ports	5	3
3.2	Pulse Code Modulation(PCM), Sampling, Sampling Rate, Quantization, Delta modulation, Adaptive Delta Modulation	5	3
3.3	Transmission modes, Parallel Transmission, Serial Transmission, Asynchronous Transmission, Synchronous Transmission	5	3
<b>4.0</b>	<b>Analog Transmission</b>	15	3

4.1	Digital to Analog Conversation, Modulation of Digital Data, Bit Rate, Baud Rate, Carrier signal	5	3
4.2	ASK, FSK, PSK, QAM. Analog to Analog modulation, Amplitude Modulation, Frequency Modulation	2	3
4.3	Phase Modulation. Bandwidth Utilization : Multiplexing and Spectrum Spreading : Multiplexing	3	3
4.4	FDM, WDM, TDM, Synchronous TDM, Digital Signal Services, Statistical TDM, Spread Spectrum, FHSS, DSSS	5	3
<b>5.0</b>	<b>Switching</b>	15	5
5.1	Circuit-Switched Networks, Three Phases, Packet Switching, Datagram Networks	1	5
5.2	Three Phases, Connection Oriented and Connectionless Services.	3	5
5.3	Telephone Network :Major Components, Local Loops, Trunks, Switching Offices	3	5
5.4	Dial-Up service, Digital Subscriber Line,	3	5
5.5	Virtual-Circuit networks, HFC Network, Cable TV for data transfer	3	5
5.6	Cable Networks, Traditional Cable Networks	2	5

**Book of Study:**

1. Behrouz A.Forouzan - Data Communications and Networking, Fifth Edition, TATA McGraw Hill Education.

**References:**

1. William Stallings- Data and Computer communications, Eighth Edition, Pearson.
2. William L.Sechwebar- Data Communications, First Edition, Tata McGraw Hill Publishing Co Ltd



<b>COURSE</b>	<b>DETAILS</b>
<b>CODE</b>	<b>ST3CMT01</b>
<b>TITLE</b>	<b>STATISTICAL METHODS AND PROBABILITY THEORY</b>
<b>DEGREE</b>	<b>B.SC.</b>
<b>BRANCH</b>	<b>COMPUTER SCIENCE</b>
<b>YEAR/SEMESTER</b>	<b>II/I</b>
<b>TYPE</b>	<b>COMPLEMENTARY</b>
<b>INSTRUCTOR(S)</b>	<b>ANSMOL GEORGE</b>
<b>CREDITS</b>	<b>4</b>

<b>CO NO.</b>	<b>COURSE OUTCOME</b>	<b>CL</b>	<b>PSO</b>
1	UNDERSTAND THE COCEPTS OF POPULATION AND SAMPLE	U	PSO5
2	UNDERSTAND DIFFERENT TYPES OF DATA, DIFFERENT TYPES OF SCALE, COLLECTION OF DATA AND DIFFERENT TYPES OF RANDOM SAMPLES	U	PSO5
3	RECOGNISE CENTRAL TENDENCY AND VARIOUS MEASURES OF CENTRAL TENDENCY	R	PSO5
4	EVALUATE MEASURES OF DISPERSIONS AND CHECK VARIABILITY AND CONSISTENCY	E	PSO5
5	EVALUATE PROBABILITIES AND CONDITIONAL PROBABILITIES	E	PSO5
6	EVALUATE EXPECTATIONS OF RANDOM SAMPLES	E	PSO5
7	APPLY SELECTED PROBABILITY DISTRIBUTIONS TO SOLVE PROBLEMS.	APPLY	PSO5
8	APPLY PROBLRM SOLVING TECHNIQUES TO SOLIVING REAL WORLD EVENTS	APPLY	PSO5
9	DEVELOP PROBLEM SOLVING TECHNIQUES NEEDED TO ACCURATELY CALCULATE PROBABILITIES	ANALYZE	PSO5
10	DESIGNS BOX PLOT	C	PSO5

<b>MODULE</b>	<b>COURSE DESCRIPTION</b>	<b>HR</b>	<b>CO</b>
<b>1.0</b>	<b>Different aspects of data, and its collection</b>	16	1,2
1.1	Concepts of a statistical population and sample	3	1

1.2	Different types of characteristics and data qualitative and quantitative, cross-sectional and time-series, discrete and continuous, frequency and non-frequency	3	2
1.3	Different types of scale- nominal and ordinal, ratio and interval	2	2
1.4	Collection of data- census and sampling	4	2
1.5	Different types of random samples- simple random sample, systematic, stratified and cluster	4	2
<b>2.0</b>	<b>Central tendency and Dispersion.</b>	16	3,4,10
2.1	Averages- Arithmetic Mean, Median, Mode, Geometric Mean, Harmonic Mean and Weighted averages	6	3
2.2	Quantiles- quartiles, deciles, percentiles	3	3
2.3	Measures of absolute dispersion - Range, Quartile Deviation, Mean Deviation and Standard Deviation. Relative measures. C.V.	6	4
2.4	Box plot	1	10
<b>3.0</b>	<b>Probability</b>	20	5,6,8, 9
3.1	Random experiments	2	9
3.2	Complement, union and intersection of events and their meaning	3	9
3.3	Mutually exclusive, equally likely and Independent events	3	9
3.4	Classical, Frequency and Axiomatic approaches to probability. Monotone property, Addition theorem (up to 3 events)	3	5, 9
3.5	Conditional probability. Multiplication theorem(up to 3 events)	3	5,8,9
3.6	Independence of events. Total probability law. Bayes' theorem	3	8, 9
3.7	Expectation of random variables and their functions. mean and variance	3	6
<b>4.0</b>	<b>Standard Probability Distributions</b>	20	7,8
4.1	Uniform(discrete/continuous) distribution	1	7,8
4.2	Bernoulli distribution, Binomial distribution	6	7,8
4.3	Poisson distribution	6	7,8
4.4	Normal distribution	7	7,8

<b>COURSE</b>	<b>DETAILS</b>
<b>CODE</b>	<b>CS3CRT08</b>
<b>TITLE</b>	<b>NETWORKING FUNDAMENTALS</b>
<b>DEGREE</b>	<b>B.SC.</b>
<b>BRANCH</b>	<b>COMPUTER SCIENCE</b>
<b>YEAR/SEMESTER</b>	<b>II/III</b>
<b>TYPE</b>	<b>COMPLEMENTARY</b>
<b>INSTRUCTOR(S)</b>	<b>REMYA STEPHEN</b>
<b>CREDITS</b>	<b>4</b>

CO NO.	COURSE OUTCOME	CL	PSO
1	Know the basic of networks and connections in network	U	PSO2
2	Learn the network types reference model and layers in network	U	PSO2
3	Summarize the different types of protocols such as RPP, DHCP, ARP, RAP	U	PSO2
4	Understand the routing algorithm and protocols that are used in network communication.	U	PSO1
5	Explain various information security techniques to safe guard the valuable information from one end to another	U	PSO4

MODULE	COURSE DESCRIPTION	HR	CO
<b>1.0</b>	<b>Definition- Models</b>	<b>20</b>	<b>1</b>
1.1	LAN, WAN, MAN, Network criteria	2	1
1.2	Types of connection: point to point, multipoint	1	1
1.3	Topology- Categories : MESH, STAR, BUS, RING	2	1
1.4	Internet history	2	1
1.5	Service providers	2	1
1.6	Protocol and standards	2	1
1.7	Connecting devices: Hubs, Repeaters, Bridges, Switches, Gateways.	2	1
1.8	Connecting remote LANS	2	1
<b>2.0</b>	<b>Reference model</b>	<b>15</b>	<b>2</b>
2.1	OSI Reference model, TCP/IP reference model, Addressing	3	2
2.2	Data link layer : Error detection and correction	3	2
2.3	Block coding : Linear block codes, Cyclic codes	3	2
2.4	Cyclic redundancy check - Advantage	3	2
2.5	Checksum- One's complement	3	2
<b>3.0</b>	<b>Framing</b>	<b>10</b>	<b>3</b>
3.1	Flow control, Error control, Noisy and Noiseless channels	2	3
3.2	Network layer : Logical Addressing	1	3
3.3	IPV4 Address – Address space notation	2	3
3.4	Network Address Translation	1	3
3.5	IPV6 address – Structure, address space, advantages,	2	3
3.6	Tunnelling, Address mapping	2	3
<b>4.0</b>	<b>Routing and forwarding</b>	<b>15</b>	<b>4</b>
4.1	Routing and forwarding : Forwarding technique, Routing table	2	4
4.2	Distance vector routing	2	4
4.3	Multicast Routing and Routing protocols	3	4
4.4	User Datagram protocol : ports, user datagram, uses	3	4
4.5	TCP – Features, segment, connection	3	4
<b>5.0</b>	<b>Congestion control</b>	<b>15</b>	<b>5</b>
5.1	Congestion control – Open loop and closed loop, Quality of service	3	5
5.2	Application layer – Domain Name Space, Distribution	3	5

5.3	TELNET,FTP,SMTP,URL,COOKIES	3	5
5.4	HTTP definition	3	5
5.5	proxy server	3	5

**References:**

1. Andrew S Tanenbaum - Computer Networks, Fourth Edition, Prentice Hall.
2. .William Stallings- Data and Computer Communications , Eighth Edition, Prentice Hall
3. Fred Halsall, Lingana Gauda Kulkarni - Computer Networking & Internet, Fifth Edition, Addison-Wesley

<b>COURSE</b>	<b>DETAILS</b>
<b>CODE</b>	<b>CS4CRT11</b>
<b>TITLE</b>	<b>MICROPROCESSORS AND ASSEMBLY LANGUAGE PROGRAMMING</b>
<b>DEGREE</b>	<b>B.SC.</b>
<b>BRANCH</b>	<b>COMPUTER SCIENCE</b>
<b>YEAR/SEMESTER</b>	<b>II/IV</b>
<b>TYPE</b>	<b>COMPLEMENTARY</b>
<b>INSTRUCTOR(S)</b>	<b>REMYA STEPHEN</b>
<b>CREDITS</b>	<b>4</b>

<b>CO NO.</b>	<b>COURSE OUTCOME</b>	<b>CL</b>	<b>PSO</b>
1	Learn 8085architecture and programming in assembly language	U	PSO3
2	Understand the basic concepts of interfacing memory and peripheral devices to a microprocessor	U	PSO3
3	Know the procedures and operations in 8086	U	PSO3
4	Explain various advanced processor architectures	U	PSO3
5	Explain 80286 microprocessor	U	PSO3

<b>MODULE</b>	<b>COURSE DESCRIPTION</b>	<b>HR</b>	<b>CO</b>
<b>1.0</b>	<b>Microprocessor architecture and its operations</b>	15	1
1.1	Microprocessor initiated operations and 8085 bus	2	1

	organization		
1.2	Internal data operations	3	1
1.3	8085 registers, externally initiated operations	2	1
1.4	Memory – memory map	2	1
1.5	Memory and instructions	2	1
1.6	Peripheral mapped I/O	2	1
1.7	8085 Microprocessor and its architecture	2	1
<b>2.0</b>	<b>8086 Internal architecture</b>	25	2
2.1	Basic 8086 microcomputer system, system overview	2	2
2.2	8086 bus	1	2
2.3	Read machine cycle, Write machine cycle	2	2
2.4	Assembly language programming-program development steps	2	2
2.5	8086 instructions – data transfer instructions, arithmetic instructions, bit manipulation instructions, string instructions.	2	2
2.6	Constructing the machine codes for 8086 instructions	2	2
2.7	Implementing standard program in 8086	2	2
2.8	unconditional jump instructions, While-do	2	2
2.9	condition flags	2	2
2.10	If-then, If-then else, and multiple if-then-else	2	2
2.11	Repeat-until	2	2
2.12	loop instructions	1	2
2.13	Instruction timing and delay loops.	2	2
2.14	conditional jump instructions	1	2
<b>3.0</b>	<b>Strings, Procedures and Macros</b>	10	3
3.1	8086 string instructions,	1	3
3.2	Writing and using procedures	1	3
3.3	CALL and RET instructions	2	3
3.4	Stack	1	3
3.5	Using PUSH and POP to save register contents	1	3
3.6	Passing parameters	1	3
3.7	Re-entrant and recursive procedures	2	3
3.8	Writing and using macros.	1	3
<b>4.0</b>	<b>8086 interrupts</b>	15	4
4.1	8086 interrupts-program examples	2	4
4.2	Interrupt Types	1	4
4.3	8254 software	2	4
4.4	Programmable TIMER/ COUNTER	2	4
4.5	Basic 8253 and 8254 operations	2	4
4.6	8255A, 8259A Priority interrupt controller	2	4
4.7	Direct Memory Access data transfer	1	4
4.8	circuit connections and operations of the Intel 8257 DMA controller	2	4
4.9	DMA transfer timing diagram.	1	
<b>5.0</b>	<b>Intel 80286 microprocessor</b>	10	5
5.1	Architecture, signals and system connections	2	5
5.2	Real address mode operation, protected mode operation	2	5
5.3	Intel 80386 32-bit microprocessor – architecture, pins and signals	2	5

5.4	Introduction to 80486 microprocessor	2	5
5.5	Introduction to RISC machines.	2	5

**References:**

1. Barry B.Brey - Architecture, Programming and Interfacing, Eighth Edition, Prentice – Hall India.
2. The Intel Microprocessors 8086 / 8088, 80186 / 80188, 80286, 80386, 80486, Pentium, and Pentium Pro processor

<b>COURSE</b>	<b>DETAILS</b>
<b>CODE</b>	<b>CS4CRP04</b>
<b>TITLE</b>	<b>MICROPROCESSORS AND ASSEMBLY LANGUAGE PROGRAMMING</b>
<b>DEGREE</b>	<b>B.SC.</b>
<b>BRANCH</b>	<b>COMPUTER SCIENCE</b>
<b>YEAR/SEMESTER</b>	<b>II/IV</b>
<b>TYPE</b>	<b>COMPLEMENTARY PRATICALS</b>
<b>INSTRUCTOR(S)</b>	<b>REMYA STEPHEN</b>
<b>CREDITS</b>	<b>2</b>

<b>CO NO.</b>	<b>COURSE OUTCOME</b>	<b>CL</b>	<b>PSO</b>
1	Learn assembling and disassembling of PC	U	PSO1
2	Experience with Assembly Language programming	U	PSO1
3	Study interfacing of peripheral devices with 8086 microprocessor.	U	PSO3
4	Understand techniques for faster execution of instructions and improve speed of operation and performance of microprocessors.	U	PSO1
5	Learn fundamentals of designing embedded systems	U	PSO5

<b>MODULE</b>	<b>COURSE DESCRIPTION</b>	<b>HR</b>	<b>CO</b>
1	Simple Arithmetic Calculations	2	1,2
2	Conditional Statements	2	3,4
3	Control Statements	2	<u>3,4</u>

4	Loop and Arrays	2	4
5	Character Strings	2	3,4
6	Subroutines and Stack Operations	2	1,2,5