

DEPARTMENT OF COMPUTER APPLICATIONS (B.C.A)

CHOICE BASED CREDIT SYSTEM

OUTCOME BASED EDUCATION SYLLABUS

THREE YEARS B.C.A PROGRAMME

2021 - 2022 BATCH ONWARDS



**DWARAKA DOSS GOVERDHAN DOSS VAISHNAV COLLEGE
(AUTONOMOUS)**

College with Potential for Excellence

Linguistic Minority Institution affiliated to University of Madras

**E.V.R. PERIYAR HIGH ROAD,
ARUMBAKKAM, CHENNAI – 600106, TAMILNADU.**

VISION

Imparting quality education, equipping students with latest tools and technologies of computer science to face in computer industry and society

MISSION

M1	To provide the ambience for learning.
M2	To provide the team-spirit and leadership qualities.
M3	Strengthening the competence level in computer science through analytical learning
M4	Enhancing the entrepreneurship skills through Internship and Industrial Visit.

PROGRAM EDUCATIONAL OUTCOMES (PEOs)

PEO1	To help students to practice computer science in a broad range of industries.
PEO2	To provide student with an academic environment that fosters excellence, transparency, leadership and promote awareness of life-long learning
PEO3	To prepare students to succeed in employment/profession or to pursue postgraduate & research education in Computer Science

PEO TO MISSION STATEMENT MAPPING

MISSION STATEMENTS	PEO1	PEO2	PEO3
M1	3	3	2
M2	2	2	3
M3	2	3	3
M4	3	3	3

3: Strong

2: Medium

1: Low

-: No Correlation

PROGRAM OUTCOMES (PO) IN RELATION TO GRADUATE ATTRIBUTES

PO1	To participate in various types of employment, development activities and public discourses particularly in response to the needs of the community one serve.
PO2	To implement discipline, professionalism, team spirit, communication skills, social and ethical commitment in the under graduates in order to embellish leadership roles expediting perfection in different sector with a categorical professional distinctiveness, business savvy, international recognition and imperishable expansion.
PO3	To improve the problem-solving skill to identify possible solutions and choosing the correct solution for any problem.
PO4	To enhance the competencies to support national, regional and local development plans and to create questioning mind.
PO5	To enhance the critical thinking ability to think clearly and rationally while understanding the logical connection between ideas in a reflective and independent thinking.
PO6	To engage in Lifelong learning and enduring proficient progress.

Mapping of POs TO PEOs

PEO/PO	PO1	PO2	PO3	PO4	PO5	PO6
PEO 1	2	2	3	3	3	3
PEO 2	2	3	3	2	3	3
PEO 3	2	2	2	3	3	2

3: Strong 2: Medium 1: Low -: No Correlation

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1	Gain theoretical knowledge in computer fields.
PSO2	Apply the knowledge of computer in practice.
PSO3	Ability to design and develop an application to meet the desired.
PSO4	Enhance programming skills in student.
PSO5	Enhance the critical thinking and problem solving abilities.
PSO6	Use computer skills in different fields.

ASSESSMENT PATTERN

BLOOM'S TAXONOMY BASED ASSESSMENT PATTERN

K1-Remember; K2- Understand; K3- Apply; K4-Analyze; K5- Evaluate; K6-Create;

1. THEORY EXAMINATION

CIA- Continuous Internal Assessment (40 Marks)

Test – I & II: 25 Marks (Theory)

Bloom's Category	Section	Description	Marks	Total
K1, K2	A-10 x 1 Mark [MCQ/Short answers]	Choose/Fill ups/One word	10	50
K2,K3, K4	B-4 out of 6 x 10 Marks	250 Words	40	

Components of Continuous Internal Assessment (CIA)

Components			Calculation	CIA Total
Test	I	50	$(\text{Test1} + \text{Test2}) / 4 = 25$	40
	II	50		
Generic Skills (Group discussion/Assignment/Seminar)			10	
Attendance			05	

ESE- Semester End Examination (100 Marks; Weightage is 60%)

Bloom's Category	Section	Description	Marks	Total
K1, K2,K3,K4	A – 10 x 2 Marks	100 Words	20	100
K2,K3, K4	B– 5 (Either or pattern) x 7 Marks	250 Words	35	
K2,K3, K4	C– 1 Question Compulsory & 2 (Either or pattern) x 15 Marks	500 Words	45	

2. PRACTICAL EXAMINATION (100 Marks)

Bloom's Category	CIA	ESE		Total
	Lab Performance	Lab Performance	Record Work	
K2,K3, K4	40	50	10	100

3. MINI PROJECT VIVA-VOCE EXAMINATION (100 Marks)

Bloom's Category	CIA	ESE		Total
	Lab Performance	Viva-Voce	Project Record Work	
K2,K3, K4,K6	40	50	10	100

DEPARTMENT OF B.C.A

SCHEME OF I SEMESTER B.C.A PROGRAMME

Sl. No	Course Category	Course Code	Course	Credit Distribution				Overall Credits	Total Contact Hours /Week	Marks		
				L	T	P	S			CI A	ESE	Total
1	PART I	18-21/16101	Language Paper- I	4	0	0	0	3	4	40	60	100
2	PART II	18-21/99101	English Paper- I	4	0	0	0	3	4	40	60	100
3	PART III Core Theory I	18-21/07101	Fundamentals of Digital Electronics	4	1	0	0	4	5	40	60	100
4	PART III Core Theory II	18-21/07102	Problem Solving Techniques	4	0	0	0	4	4	40	60	100
5	PART III Core Practical I	18-21/07104	Digital Electronics Lab	0	0	3	0	2	3	40	60	100
6	Allied Paper I*	18-21/08106	Mathematical Foundation-I	6	0	0	0	4	6	40	60	100
7	PART IV Non-Major Elective- 1	Basic Tamil 18-21/16102 Computer Fundamentals 20-21/07103	NON-MAJOR ELECTIVE a) Those who have studied Tamil up to XII Std. shall take either Computer Fundamentals or Advanced Tamil. b) Those who have not studied Tamil up to XII Std. and taken a Non-Tamil Language under Part-I shall take Tamil comprising of two course (level will be at 6 th Standard).	2	0	0	0	2	2	40	60	100
8	PART IV Soft Skills**	18-21/40101	Soft Skills-1	2	0	0	0	2	2	50	50	100
Total				26	1	3	0	24	30	330	470	800

CIA-Continuous Internal Assessment

ESE-End Semester Examination

*Syllabus framed and approved by Mathematics Department

**Syllabus framed and approved by English Department

DEPARTMENT OF B.C.A

SCHEME OF II SEMESTER B.C.A PROGRAMME

Sl. No.	Course Category	Course Code	Course	Credit Distribution				Overall Credits	Total Contact Hours /Week	Marks		
				L	T	P	S			CIA	ESE	Total
1	PART I	18-21/19202	Language Paper- II	4	0	0	0	3	4	40	60	100
2	PART II	18-21/99202	English Paper- II	4	0	0	0	3	4	40	60	100
3	PART III Core Theory III	18-21/07205	C++ Programming	4	1	0	0	4	5	40	60	100
4	PART III Core Theory IV	18-21/07206	Microprocessor and its Applications	4	0	0	0	4	4	40	60	100
5	PART III Core Practical II	18-21/07208	C++ Programming Lab	0	0	3	0	2	3	40	60	100
5	Allied Paper II*	18-21/08213	Mathematical Foundation-II	6	0	0	0	4	6	40	60	100
7	PART IV Non-Major Elective- 2	Basic Tamil 18-21/16205 Intro to HTML 20-21/07207	NON-MAJOR ELECTIVE a) Those who have studied Tamil up to XII Std. shall take either Introduction to Html or Advanced Tamil. b) Those who have not studied Tamil up to XII Std. and taken a Non-Tamil Language under Part-I shall take Tamil comprising of two course (level will be at 6 th Standard).	2	0	0	0	2	2	40	60	100
8	PART IV Soft Skills**	18-21/40201	Soft Skills-2	2	0	0	0	2	2	50	50	100
9	PART ***		Field Work	0	0	0	0	1	-	-	-	-
Total				26	1	3	0	25	30	330	470	800

CIA-Continuous Internal Assessment

ESE-End Semester Examination

*Syllabus framed and approved by Mathematics Department

**Syllabus framed and approved by English Department

DEPARTMENT OF B.C.A

SCHEME OF III SEMESTER B.C.A PROGRAMME

Sl. No	Course Category	Course Code	Course	Credit Distribution				Overall Credits	Total Contact Hours /Week	Marks		
				L	T	P	S			CIA	ESE	Total
1	PART III Core Theory V	18-20/07309	Java Programming	4	1	0	0	4	5	40	60	100
2	PART III Core Theory VI	18-20/07310	Data Structures	4	1	0	0	4	5	40	60	100
3	PART III Core Theory VII	18-20/07311	Graphics and Multimedia	4	0	0	0	4	4	40	60	100
4	PART III Core Practical III	18-20/07312	Java Programming Lab	0	0	4	0	3	4	40	60	100
5	PART III Core Practical IV	18-20/07313	Data Structures using Java Lab	0	0	4	0	3	4	40	60	100
6	Allied paper III*	18-20/05314	Financial Accounting	6	0	0	0	4	6	40	60	100
7	PART IV Soft Skills**	18-20/40301	Soft Skills III	2	0	0	0	2	2	50	50	100
Total				20	2	8	0	24	30	290	410	700

CIA-Continuous Internal Assessment

ESE-End Semester Examination

*Syllabus framed and approved by Commerce Department

**Syllabus framed and approved by English Department

DEPARTMENT OF B.C.A

SCHEME OF IV SEMESTER B.C.A PROGRAMME

Sl. No.	Course Category	Course Code	Course	Credit Distribution				Overall Credits	Total Contact Hours /Week	Marks		
				L	T	P	S			CIA	ESE	Total
1.	PART III Core Theory VIII	18-20/07414	Python Programming	4	1	0	0	4	5	40	60	100
2	PART III Core Theory IX	18-20/07415	Operating Systems	4	1	0	0	4	5	40	60	100
3	PART III Core Theory X	18-20/07416	Software Engineering	4	0	0	0	4	4	40	60	100
4	PART III Core Practical V	18-20/07417	Python Programming Lab	0	0	4	0	3	4	40	60	100
5	PART III Core Practical VI	18-20/07418	Operating System and Shell Programming Lab	0	0	3	0	3	3	40	60	100
6	Allied Paper IV*	18-20/05420	Cost and Management Accounting	6	0	0	0	3	6	40	60	100
7	PART IV Soft Skills**	18-20/40401	Soft Skills- IV	2	0	0	0	2	2	50	50	100
8	PART IV Environmental Studies	18-20/13412	Environmental Studies	1	0	0	0	2	1	40	60	100
9	PART ***		Internship	0	0	0	0	1	-	-	-	-
Total				21	2	7	0	26	30	330	470	800

CIA-Continuous Internal Assessment

ESE-End Semester Examination

*Syllabus framed and approved by Commerce Department

**Syllabus framed and approved by English Department

DEPARTMENT OF B.C.A

SCHEME OF V SEMESTER B.C.A PROGRAMME

Sl. No	Course Category	Course Code	Course	Credit Distribution				Over all Credits	Total Contact Hours/ Week	Marks		
				L	T	P	S			CIA	ESE	Total
1	PART III Core Theory XI	18-19/07519	Dot Net Programming	4	1	0	0	4	5	40	60	100
2	PART III Core Theory XII	18-19/07520	Database Management System	4	1	0	0	4	5	40	60	100
3	PART III Core Theory XIII	18-19/07521	Computer Networks	5	0	0	0	4	5	40	60	100
4	PART III Core Theory XIV	18-19/07522	ELECTIVE I (DISCIPLINE SPECIFIC ELECTIVE): Data Mining (or) Artificial Intelligence and Expert Systems (or) Object Oriented Analysis and Design	5	0	0	0	4	5	40	60	100
5	PART III Core Practical VII	18-19/07523	Dot Net Programming Lab	0	0	5	0	3	5	40	60	100
6	PART III Core Practical VIII	18-19/07524	RDBMS Lab using ORACLE	0	0	5	0	3	5	40	60	100
7	PART IV	18-19/70501	Value Education	0	0	0	0	1	-	-	-	-
Total				18	2	10	0	23	30	240	360	600

CIA-Continuous Internal Assessment

ESE-End Semester Examination

DEPARTMENT OF B.C.A

SCHEME OF VI SEMESTER B.C.A PROGRAMME

Sl. No.	Course Category	Course Code	Course	Credit Distribution				Overall Credits	Total Contact Hours /Week	Marks		
				L	T	P	S			CIA	ESE	Total
1	PART III Core Theory XV	18-19/07625	PHP Programming	4	1	0	0	4	5	40	60	100
2	PART III Core Theory XVI	18-19/07626	Mobile Application Development	4	1	0	0	4	5	40	60	100
3	PART III Core Theory XVII	18-19/07627	Design and Analysis of Algorithms	5	0	0	0	4	5	40	60	100
4	PART III Core Theory XVIII	18-19/07628	ELECTIVE II (DISCIPLINE SPECIFIC ELECTIVE): Operations Research (or) Ecommerce(or) Cryptography	5	0	0	0	4	5	40	60	100
5	PART III Core Practical IX	18-19/07629	PHP Programming Lab	0	0	4	0	3	4	40	60	100
6	PART III Core Practical X	18-19/07630	Mobile Application Development Lab	0	0	4	0	3	4	40	60	100
7	PART IV Extension Activities	18-19/80601	Extension Activities	0	0	0	0	1	-	-	-	-
8	PART ***		Mini Project	0	0	2	0	3	2	40	60	100
Total				18	2	10	0	26	30	280	420	700
Grand Credit Total								148				

CIA-Continuous Internal Assessment

ESE-End Semester Examination

FIRST SEMESTER

Course Title: CORE THEORY I- FUNDAMENTALS OF DIGITAL ELECTRONICS

Course Code : 18-21/07101	Credits : 04
L:T:P:S : 4:1:0:0	CIA Marks : 40
Exam Hours : 03	ESE Marks : 60

Course Objectives:

- *To Impart the Knowledge of Fundamentals of Electronics.*
- *To discuss and utilization of Various Number Systems.*
- *Demonstration of Flip Flops associated.*
- *Instructions of Counters.*

Course Outcomes: At the end of the Course, the Student will be able to:

CO1	To demonstrate the functional codes of Binary Systems. To study about the concepts of Logic Gates.
CO2	To clarify the concepts of Boolean Functions. Construction of K-Map
CO3	Demonstrating Binary Arithmetic. Extracting the nature of Combinational Logic Circuits. To impart the applications of Encoders and Decoders.
CO4	To differentiate the types of Registers and their applications. Classification of Flip-flops.
CO5	Demonstrating the Classification of Counters. Explanation of Memory and its types.

Mapping of Course Outcomes to Program Specific Outcomes:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	1	-	-	2
CO2	3	3	2	2	3	2
CO3	2	2	-	1	2	3
CO4	1	3	-	-	2	2
CO5	2	3	2	-	1	2

3: Strong 2: Medium 1: Low -: No Correlation

Sl. No.	Contents of Module	Hrs	COs
1	Digital Computers and Digital Systems. Number Systems & Codes: Number System - Base Conversion - Binary Codes - Code Conversion. Digital Logic: Logic Gates - Truth Tables - Universal Gates.	9	CO1
2	Boolean algebra: Laws & Theorems - SOP, POS Methods - Simplification of Boolean Functions using theorems – Simplification of Boolean Functions using K-Map (Two, Three and Four variables).	9	CO1,CO2
3	Binary Arithmetic: Binary Addition –Binary Subtraction - Arithmetic Building Blocks. Adders: Half Adder and Full Adder. Subtractors: Half Subtractor and Full Subtractor. Combinational Logic: Multiplexers - Demultiplexers - Decoders – Encoders.	9	CO1,CO3
4	Sequential Logic: RS, JK, D and T Flip-Flops. Registers: Shift Registers - Types of Shift Registers – Implementation of Serial-In Serial-Out Shift Register and Serial-In Parallel-Out Shift Register.	9	CO4
5	Counters: Asynchronous Counters Ripple, Mod, Up-Down Counters- Synchronous Counters - Types of ROM and RAM.	9	CO5

TEXT BOOK:

1. **V.Rajaraman and T.Radhakrishnan**, “*Digital Computer Design*”, Fifth Edition, 2012, Prentice Hall of India.

REFERENCE BOOKS:

1. **D.P.Leach and A.P.Malvino**, “*Digital Principles and Applications*”, Seventh Edition, 2011, TMH.
2. **T.C.Bartee**, “*Digital Computer Fundamentals*”, Sixth Edition, Tata McGraw Hill.
3. **Floyd and Jain**, “*Digital Fundamentals*”, Ninth Edition, Pearson Education.

E-REFERENCES:

1. <http://nptel.iitm.ac.in/video.php?subjectId=117106086>
2. <http://nptel.iitm.ac.in/Onlinecourses/Srinivasan/>

FIRST SEMESTER

Course Title: CORE THEORY II -PROBLEM SOLVING TECHNIQUES

Course Code : 18-21/07102	Credits : 04
L:T:P:S : 4:0:0:0	CIA Marks : 40
Exam Hours : 03	ESE Marks : 60

Course Objectives:

- Familiarize with writing of **algorithms**, fundamentals of **C** and philosophy of **problem solving**. Implement different programming constructs and decomposition of **problems** into functions.
- Use data flow diagram, Pseudo code to implement solutions.
- Define and use of arrays with simple applications.

Course Outcomes: At the end of the Course, the Student will be able to:

CO1	Study the basic knowledge of Computers. Analyze the programming languages.
CO2	Study the data types and arithmetic operations. Know about the algorithms. Develop program using flow chart and pseudo code.
CO3	Determine the various operators. Explain about the structures. Illustrate the concept of Loops
CO4	Study about Numeric data and character-based data. Analyze about Arrays.
CO5	Explain about DFD Illustrate program modules. Creating and reading Files

Mapping of Course Outcomes to Program Specific Outcomes:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	1	-	1	-	-
CO2	-	2	3	-	-	-
CO3	-	2	1	-	2	1
CO4	1	-	-	1	1	-
CO5	-	3	1	-	-	1

3: Strong 2: Medium 1: Low -: No Correlation

Sl. No.	Contents of Module	Hrs	COs
1	Introduction: History, characteristics and limitations of Computer. Hardware/Anatomy of Computer: CPU, Memory, Secondary storage devices, Input Devices and Output devices. Types of Computers: PC, Workstation, Minicomputer, Main frame and Supercomputer. Software: System software and Application software. Programming Languages: Machine language, Assembly language, High-level language, 4 GL and 5GL-Features of good programming language. Translators: Interpreters and Compilers.	9	CO1
2	Data: Data types, Input, Processing of data, Arithmetic Operators, Hierarchy of operations and Output. Different phases in Program Development Cycle (PDC). Structured Programming: Algorithm: Features of good algorithm, Benefits and drawbacks of algorithm. Flowcharts: Advantages and limitations of flowcharts, when to use flowcharts, flowchart symbols and types of flowcharts. Pseudocode: Writing a pseudocode. Coding, documenting and testing a program: Comment lines and types of errors. Program design: Modular Programming.	9	CO2
3	Selection Structures: Relational and Logical Operators -Selecting from Several Alternatives – Applications of Selection Structures. Repetition Structures: Counter Controlled Loops –Nested Loops–Applications of Repetition Structures.	9	CO3
4	Data: Numeric Data and Character Based Data. Arrays: One Dimensional Array - Two Dimensional Arrays – Strings as Arrays of Characters.	9	CO4
5	Data Flow Diagrams: Definition, DFD symbols and types of DFDs. Program Modules: Subprograms-Value and Reference parameters-Scope of a variable - Functions – Recursion. Files: File Basics-Creating and reading a sequential file- Modifying Sequential Files.	9	CO5

TEXT BOOK:

1. **Stewart Venit**, “*Introduction to Programming: Concepts and Design*”, Fourth Edition, 2010, Dream Tech Publishers.

E- REFERENCES:

1. <http://www.nptel.iitm.ac.in/video.php?subjectId=106102067>
2. http://utubersity.com/?page_id=876

FIRST SEMESTER

Course Title: CORE PRACTICAL I -DIGITAL ELECTRONICS LAB

Course Code : 18-21/07104	Credits : 02
L:T:P:S : 0:0:3:0	CIA Marks : 40
Exam Hours : 03	ESE Marks : 60

Course Objectives:

- *Be able to do the design of Logic gates, Universal gates, K-Map.*
- *Be able to implement the circuit of Half Adder and Full Adder.*
- *Be able to design the sequential Circuits such as Flip-Flops, Registers, and Counters.*

Lab Exercises:

1. Verification of Truth Table for AND, OR, NOT, NAND, NOR and EX-OR gates.
2. Realization of NOT, AND, OR, EX-OR gates using NAND gate.
3. Realization of NOT, AND, OR, EX-OR gates using NOR gate.
4. Karnaugh Map Reduction and Logic Circuit Implementation.
5. Verification of De-Morgan's Law
6. Verification of Associative Law
7. Verification of Distributive Law
8. Implementation of Half-Adder and Full-Adder.
9. Implementation of Half-Subtractor and Full-Subtractor.
10. Four Bit Binary Adder
11. Four Bit Binary Subtractor
12. Decimal adder
13. Verification of Characteristic Table of various flip-flops
14. Design of Shift registers
15. Design of Counters

FIRST SEMESTER

Course Title: NON MAJOR ELECTIVE 1- COMPUTER FUNDAMENTALS

Course Code : 20-21/07103	Credits : 02
L:T:P:S : 2:0:0:0	CIA Marks : 40
Exam Hours : 03	ESE Marks : 60

Course Objectives:

- *Discuss the Introduction about Computer and its Components.*
- *To Perform the Microsoft Word, Excel, PowerPoint and its operations.*
- *To get Knowledge about the Internet and Intranet*

Course Outcomes: At the end of the Course, the Student will be able to:

CO1	Understand the basics of Computer and its Generations. Be able to understand the components of computer.
CO2	To Understand the introduction about MS Word. Be able to perform the Elements of window, Text Formatting, Text Manipulating options in MS Word.
CO3	To Understand the introduction about MS Excel. Be able to inserting and sizing the cells Implementing formulas and inserting worksheet.
CO4	To Understand the introduction about MS PowerPoint Be able to perform the slides manipulation. Implementing Multimedia and templates.
CO5	To Understand the introduction about Internet and Intranet. Be able to access the browsers. To get knowledge about basic components of E-Mail and E-Commerce

Mapping of Course Outcomes to Program Specific Outcomes:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	-	-	1	-	3
CO2	2	3	3	3	2	2
CO3	2	3	3	2	3	3
CO4	3	3	3	2	3	3
CO5	3	3	3	2	3	3

3: Strong 2: Medium 1: Low -: No Correlation

Sl No.	Contents of Module	Hrs	COs
1	Unit I:Introduction to Computers - Generations of Computer – Data and Information – Components of Computer – Software – Hardware – Input Devices - Output Devices — Types of Operating System.	9	CO1
2	Unit II:MS Word: Introduction – Elements of Window – Files, Folders and Directories – Text Manipulating: Cut, Copy, Paste, Drag and Drop – Text Formatting: Font – Style, Size, Face and Colors (Both foreground and background) – Alignment - Bullets and Numbering - Header and footer- watermark – inserting objects (images, other application document) – Table creation – Mail merge.	9	CO2
3	Unit III:Ms Excel: Introduction – Inserting rows and columns – Sizing rows and columns – Implementing formulas – Generating series - Functions in excel – Creation of Chart – Inserting objects – Filter – Sorting – Inserting worksheet.	9	CO3
4	Unit IV:MS PowerPoint: Introduction – Slides Manipulation (Inserting new, Copy, paste, delete and duplicate slides) – Slide show– Types of Views – Types of Animations – Inserting Objects – Implementing multimedia (Video and Audio) – Templates (Built-in and User-Defined).	9	CO4
5	Unit V:Internet: Introduction to Internet and Intranet – Services of Internet - Domain Name – URL – Browser – Types of Browsers – Search Engine - E-Mail – Basic Components of E-Mail –.How to send group mail. E-Commerce: Digital Signature – Digital Currency – Online shopping and transaction.	9	CO5

TEXTBOOKS:

1. G. Manjunath, “Computer Basics”, Vasan Publications, 2010.
2. Pradeep K. Sinha &Priti Sinha, “Computer Fundamentals”, 6th Edition, BPB Publications, 2004.

E-REFERENCES:

1. https://www.tutorialspoint.com/computer_fundamentals/index.htm
2. https://www.tutorialspoint.com/basics_of_computers/index.htm
3. <https://www.tutorialspoint.com/word/index.htm>
4. <https://www.tutorialspoint.com/excel/index.htm>
5. <https://www.tutorialspoint.com/powerpoint/index.htm>

SECOND SEMESTER

Course Title: CORE THEORY III- C++ PROGRAMMING

Course Code : 18-21/07205	Credits : 04
L:T:P:S : 4:1:0:0	CIA Marks : 40
Exam Hours : 03	ESE Marks : 60

Course Objectives:

- Discuss and elaborate the concept of OOPs.
- Analyze the problem and apply the retreated concept in Application areas.
- Usage of Inheritance.

Course Outcomes: At the end of the Course, the Student will be able to:

CO1	Revise the basics of Building any programming language. Introduction of OOPs and its Concept.
CO2	Creating programs in Conditional/Decision Making Statement Creating programs in Loop Statements. Defining programs in Jump Statements
CO3	Definition of Classes and important of Object. Benefits of using Friend Function. Define functions and its important in building the code Advantage of using Inline function.
CO4	Develop programs for overloading Unary and Binary Operators. Define the concept of constructor, destructor and its usage and its implementations.
CO5	Enhance reusability features using the concept inheritance. Avoid the duplicate of multiple inheritances using virtual base class. Access the program using polymorphism

Mapping of Course Outcomes to Program Specific Outcomes:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	-	-	1	-	3
CO2	2	2	2	3	2	2
CO3	2	3	2	2	3	3
CO4	1	3	3	2	3	3
CO5	2	3	3	2	3	3

3: Strong 2: Medium 1: Low -: No Correlation

Sl. No.	Contents of Module	Hrs	COs
1	Introduction to Object Technology: Object Oriented Programming Concepts–OOP Benefits and OOP applications. Elementary C++ Programming: Keywords- Variables- Constants/ Literals - Operators- Fundamental Data Types – Expressions-Input Statement – Output Statement – General Format of a C++ program – Arrays – Strings.	9	CO1
2	Conditional/Decision Making Statements: if, if-else, else-if ladder nested if and switch Statements. Loop Statements: while, do-while, for loop. Jump Statements: break, continue, goto statements.	9	CO2
3	Library Functions in C++: Mathematical and String functions. User-Defined Functions: Function Prototyping – Function call - Parameters Passing methods. Inline Functions - Function Overloading. Classes and Objects: -Declaring class and objects-Member functions-Friend Functions-Passing object to function – Returning object from function.	9	CO1, CO3
4	Static Data member and Static member functions – Default Arguments. Constructors: Features of constructors – Types of Constructors. Destructors: Features of Destructor. Operator Overloading: Rules for Operator Overloading – Overloading of unary and binary operators using member function and friend function.	9	CO1,CO4
5	Inheritance: Single Inheritance - Multilevel inheritance - Multiple Inheritance - Hierarchical Inheritance - Hybrid Inheritance. Polymorphism: Rules for Virtual functions and pure virtual functions. Command Line Arguments.	9	CO1,CO5

TEXT BOOKS:

1. **E.Balaguruswamy**, “*Object Oriented Programming in C++*”, Sixth Edition, 2012, TMH.

REFERENCE BOOKS:

1. **H. Schildt**, “*The Complete Reference C++*”, Fourth Edition, 2017, TMH.
2. **Y. Kanetkar**, “*Let us C++*”, Third Edition, BPB Publishers.

E-REFERENCES:

1. <http://en.highscore.de/cpp/boost/>
2. <http://bookboon.com/en/structural-programming-with-c-plus-plus-ebook>

SECOND SEMESTER

Course Title: CORE PAPER IV-MICROPROCESSOR AND ITS APPLICATIONS

Course Code : 18-21/07206	Credits : 04
L:T:P:S : 4:0:0:0	CIA Marks : 40
Exam Hours : 03	ESE Marks : 60

Course Objectives:

- To introduce students with the architecture and operation of typical microprocessors
- To familiarize the students with the programming and interfacing of microprocessors
- To provide strong foundation for designing real world applications using microprocessors

Course Outcomes: At the end of the Course, the Student will be able to

CO1	Describe the architecture and organization of microprocessor along with instruction set format. List and describe memory and addressing modes. Describe modes and functional block diagram of 8085 along with pins and their functions
CO2	Describe the microprocessor instruction set and classifications of 8085. Programming techniques like looping, counting and indexing.
CO3	List the concepts of stack and subroutine Concept of bit level programming and to do the programs using arithmetic operations.
CO4	Describe and use different types of conversions Representation of Time Delayed Programs on a Register pair and counters.
CO5	To Point out the Importance of Various types of Interrupts. Explains the uses of memory interfacing.

Mapping of Course Outcomes to Program Outcomes:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	-	2	-	-	3
CO2	3	3	3	3	2	2
CO3	3	2	3	2	2	2
CO4	3	1	3	1	3	2
CO5	3	-	2	1	3	3

3: Strong 2: Medium 1: Low -: No Correlation

Sl. No.	Contents of Module	Hrs	COs
1	UNIT I: Introduction to Microprocessors – 8085 Programming Model- Instruction Formats - Addressing Modes - Microprocessor architecture and its operations. 8085 MPU: Pinout and Signals-Functional Block Diagram.	9	CO1
2	UNIT II: 8085 Instruction Set and Classifications: Data Transfer Instructions – Arithmetic and Logic Instructions – Branching and Machine Control Instructions. Programming Techniques: Looping, Counting and Indexing–Writing Assembly Levels Programs.	9	CO2
3	UNIT III: Stack: Push and Pop. Subroutine: Call and RST. Restart, Conditional Call and Return Instructions. 8-bit, BCD, Multibyte Addition and Subtraction – 8-bit and BCD Multiplication –8-bit and BCD Division.	9	CO3
4	UNIT IV: Conversions: BCD to Binary and Binary to BCD conversions- ASCII to BCD and BCD to ASCII conversions – Binary to ASCII and ASCII to Binary conversions. Counters and Time delays: Time delays using one register, register pair and loop within loop.	9	CO4
5	UNIT V: 8085 Interrupts: EI, DI, TRAP, RST, SIM and RIM - Direct Memory Access (DMA) – Memory Interface, Memory Mapped I/O.	9	CO5

TEXT BOOK:

1. **Ramesh Gaonkar**, “*Microprocessor Architecture, Programming and Applications with 8085*”, Sixth Edition, Penram International Publishing

REFERENCE BOOK:

1. **Sunil Mathur**, “*Microprocessor 8085 and its Interfacing*”, Second Edition, 2011, PHI

E-REFERENCES:

1. www.engineerclub.in/.../8085-microprocessor-by-ramesh-s-gaonkar.html.
2. suman-beanotes.blogspot.com/.../micro-processor-notes-bysuman-raj.htm

SECOND SEMESTER

Course Title: **CORE PRACTICAL II - C++ PROGRAMMING LAB**

Course Code : 18-21/07208	Credits : 02
L:T:P:S : 0:0:3:0	CIA Marks : 40
Exam Hours : 03	ESE Marks : 60

Course Objectives:

- *Be able to create a program using basic operators, decision making statements, Loop concepts.*
- *To understand and create a program using constructor and Destructor.*
- *Be able to create a program using C++ features such as composition of objects, Operator overloading, inheritance, Polymorphism etc.*

Lab Exercise:

1. C++ Operators
2. Decision-making statements
3. Loop statements
4. Library functions
5. Inline function
6. Function overloading
7. Class and object
8. Passing object to function
9. Returning object from function
10. Constructor and Destructor
11. Static data members and member functions
12. Operator Overloading
13. Inheritance
14. Virtual function
15. Command Line Arguments

SECOND SEMESTER

Course Title: NON MAJOR ELECTIVE II - INTRODUCTION TO HTML

Course Code : 20-21/07207	Credits : 02
L:T:P:S : 2:0:0:0	CIA Marks : 40
Exam Hours : 03	ESE Marks : 60

Course Objectives:

- *Insert a graphic within a web page.*
- *Create a link within a web page*
- *Create a table within a web page*
- *Insert heading levels within a web page.*
- *Insert ordered and unordered lists within a web page.*
- *Create a web page*

Course Outcomes: At the end of the Course, the Student will be able to:

CO1	Knows the basic concept in HTML Concept of resources in HTML
CO2	Knows Design concept. Concept of Meta Data Understand the concept of save the files.
CO3	Understand the page formatting. Concept of list
CO4	Creating Links. Know the concept of creating link toe mail address
CO5	Concept of adding images Understand the table creation.

Mapping of Course outcomes to program outcomes:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	1	-	-
CO2	2	3	2	2	1	1
CO3	2	1	1	2	2	2
CO4	3	2	2	2	1	1
CO5	2	2	3	-	2	2

3: Strong 2: Medium 1: Low -: No Correlation

Sl. No.	Contents of Module	Hrs	COs
1	Introduction to HTML – Opening for writing HTML – Unicode Transformation Format – HTML 5 Resources – What is different in HTML 5? - <DOCTYPE> in HTML 5	9	CO1
2	Designing a Webpage: Design Considerations and Planning – Basic Tags and Document structure – HTML Tags <HTML> ... </HTML> - Head Tags <HEAD> ... </HEAD> - Title Tags – Body Tags <BODY> ... </BODY> - Metadata – Saving an HTML document – Actions.	9	CO2
3	Formatting: Page Formatting – Adding a New Paragraph – Adding a Line Break – Inserting Blank Space – Preformatted Text – Changing a Page's Background Color – Div Element - Text items and objects – Headings – Comments – Block Quotes – Horizontal Lines – Special Characters – Creating Lists – Numbered (Ordered) Lists – Bulleted (Unordered) Lists – Nested Lists- Definition Lists.	9	CO3
4	Links: Introduction to Links – Text Links – Image Links – Opening a web page in a new window/Tab – Setting All Links on a page to open in a new window/Tab – Linking to an area on the same page (Bookmarks) – Linking to an E-mail Address – Linking to other types of Files.	9	CO4
5	Images: Introduction to Images: Adding Images – Resizing images – Alternative (ALT) Text – Image Labels. Tables: Introduction to Tables - Inserting a Table – Table Borders - Table Headers	9	CO5

TEXT BOOK:

1. “Mastering HTML5 and CSS3 Made Easy”, TeachUComp Inc., 2014.

E-REFERENCE:

1. <https://www.teachucomp.com/samples/html/5/manuals/Mastering-HTML5-CSS3.pdf>
2. <https://www.w3schools.com/html/default.asp>

THIRD SEMESTER

Course Title: CORE THEORY V - JAVA PROGRAMMING

Course Code : 18-20/07309	Credits : 04
L:T:P:S : 4:1:0:0	CIA Marks : 40
Exam Hours : 03	ESE Marks : 60

Course Objectives:

- *To get in-depth Knowledge about the evolution of java and its Features.*
- *Bring out the difference and similarities between C, C++ and java.*
- *Develop programmers in Java with its special Features.*
- *Implementing the code in internet using Applet with AWT controls.*

Course Outcomes: At the end of the Course, the Student will be able to:

CO1	Knows the reason about the evolution of Java its development. Study the basic of Java and to develop code. Importance of Java comparing the other language.
CO2	Develop program using constructors and its types. Definition of inheritance and Writing program related to it Differentiate string class and string buffer.
CO3	Concept of packages, interface, threads. Implementing the concept Exception handling various application. Significance of exception handling. Life cycle of thread.
CO4	Explain I/O Streams. Create file using Byte Stream and character Stream classes.
CO5	Usage of Java in internet Definition of Applet and Developing code to connect to internet. Life Build Applet code using AWT controls and Layout managers

Mapping of Course Outcomes to Program Specific Outcomes:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	1	2	-	-	1
CO2	2	3	3	2	2	3
CO3	3	3	2	3	2	2
CO4	3	2	1	1	-	2
CO5	2	3	3	3	3	3

3: Strong 2: Medium 1: Low -: No Correlation

Sl. No.	Contents of Module	Hrs	COs
1	Introduction to Java - Features of Java – Java Environment - Lexical Issues or tokens- Data Types - Variables - Arrays - Operators – Conditional Statements-Iterative Statements-General Structure of a Java Program - Command Line Arguments.	9	CO1
2	Classes and Objects – Fields and Methods Declaration -Constructors – Method Overloading - Static keyword - Final keyword -String Class - String Buffer Class. Java Utilities: Scanner, Stack, Date, Vector, Enumeration, Random and String Tokenizer. Inheritance: Keyword extends-Types of Inheritance–Keyword super- Overriding of methods-Abstract class and methods.	9	CO1, CO2,
3	User-Defined Packages: Naming conventions – Creating and accessing Packages. Interface: Defining Interface-Keywrod implements -Multiple Inheritance using Interface. Exception Handling: Types of errors - Syntax of Exception handling code – Built-in Exceptions – Multiple catch statements – Nested try block – Finally statement- Throwing our own exception using throw – Method throwing exception using throws keyword. Threads: Introduction- Thread States or life cycle of thread- Creation of threads using Thread class and Runnable interface –Thread methods -Thread Priorities -Thread Synchronization.	9	CO1, CO3
4	I/O Streams: Stream classes – Byte stream classes - Character stream classes - File Streams – Using File class – I/O Exceptions–Random access files.	9	CO4
5	Applets: Difference between applet and application -Applet life cycle - Building Applet code using Applet tag – Passing parameters to Applets- Drawing various shapes using Graphics Class. AWT Controls: Buttons, Labels, TextField, TextArea, Choice, CheckBox, List, ScrollBar and Layout Managers.	9	CO5

TEXT BOOKS:

1. **E.Balagurusamy**, “*Programming with Java*”, Fifth Edition, 2014, Tata McGraw- Hill.

REFERENCE BOOKS:

1. **P Radha Krishna**, “*Object Oriented Programming through Java*”, Second Edition, 2007, Universities Press.
2. **P. Naughton and H. Schildt**, “*Java2 (The Complete Reference)*”, Ninth Edition, 2014, Tata McGraw-Hill.

E- REFERENCES:

1. www.tutorialspoint.com/java/java-quick-guide.htm
2. www.tutorialspoint.com/java/java_overview.htm

THIRD SEMESTER

Course Title: CORE THEORY VI- DATA STRUCTURES

Course Code : 18-20/07310	Credits : 04
L:T:P:S : 4:1:0:0	CIA Marks : 40
Exam Hours : 03	ESE Marks : 60

Course Objectives:

- Understand and remember algorithms and its analysis procedure.
- Introduce the concept of data structures through ADT including List, Stack, Queues
- To design and implement various data structure algorithms.
- To introduce various techniques for representation of the data in the real world.
- To develop application using data structure algorithms.

Course outcomes: At the end of course, the student will be able

CO1	Describe the various operations and applications of stacks ,arrays and queues Understands the concepts of infix, postfix and prefix
CO2	Understands the Basic operations on linked list and Applications of Linked List in Addition of Polynomials.
CO3	Describes Binary Trees and Binary Tree Traversals: Inorder, Preorder and Post order Applies the concepts of BST.
CO4	Describes and analyses Graph Traversals: Breadth First Traversal and Depth First Traversal. And Applies the concepts Graphs in Minimum Cost Spanning tree and Dijkstra's Shortest Path
CO5	Analyses and Applies the concepts of searching and sorting . Understands the concepts of Hashing and evaluates Collision Resolution.

Mapping of Course outcomes to program outcomes:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	1	2	-	1
CO2	3	3	2	3	1	-
CO3	3	3	2	1	1	1
CO4	3	3	2	2	2	2
CO5	3	-	-	-	1	1

3: Strong 2: Medium 1: Low -: No Correlation

Sl. No.	Contents of module	Hrs	COS
1	UNIT – I: Data Structures: Definition and Classification. Arrays: Array Operations – Representation of Arrays – Applications of Arrays. Stack: Operations on Stacks - Stack applications: Infix to postfix notation and Evaluation of Postfix notation. Queues: Operations on the Queues - Circular queue – Dequeue - Priority queue - Applications of queue.	9	CO1
2	UNIT – II: Introduction to the Linked List - Basic operations on linked list – Singly Linked Lists – Doubly Linked Lists – Circularly Linked Lists-Linked Stacks – Linked Queues. Applications of Linked List: Addition of Polynomials.	9	CO2
3	UNIT – III: Basic Terminology - Binary Trees - Representation of Trees and Binary trees. Binary Tree Traversals: Inorder, Preorder and Postorder. Binary Search Tree (BST): Insertion and Deletion operations in BST- Applications of Trees.	9	CO3
4	UNIT – IV: Basic Terminology – Representation of Graphs. Graph Traversals: Breadth First Traversal and Depth First Traversal. Applications of Graphs: Minimum Cost Spanning tree and Dijkstra's Shortest Path.	9	CO4
5	UNIT – V: Linear Search and Binary Search. Sorting: Bubble Sort, Selection Sort, and Insertion Sort. Hashing: Introduction – Hash table structure – Hash Functions. Collision Resolution: Linear Open Addressing and Chaining.	9	CO5

TEXT BOOKS:

1. **G.A. Vijayalakshmi Pai**, “*Data structures and Algorithms- Concepts, Techniques and Applications*”, First Edition, 2011, Tata McGraw-Hill.

REFERENCE BOOKS:

1. **Dr. A. Chitra**, “*Data Structures*”, Vijay Nicole Imprints Private Limited.
2. **S. Sahni and E. Horowitz**, “*Fundamentals of Data Structure*”, Ninth Edition, Galgotia Publications.

E- REFERENCES:

1. http://nptel.iitm.ac.in/courses/Webcourse-contents/IIT-%20Guwahati/data_str_algo/frameset.htm
2. <http://www.personal.kent.edu/~rmuhamma/Algorithms/algorithm.html>
3. en.wikibooks.org/wiki/Data_structures

THIRD SEMESTER

Course Title: CORE THEORY VII - GRAPHICS AND MULTIMEDIA

Course Code : 18-20/07311	Credits : 04
L:T:P:S : 4:0:0:0	CIA Marks : 40
Exam Hours : 03	ESE Marks : 60

Course Objectives:

- To introduce the use of the components of a graphics system and become familiar with building approach of graphics system components and Algorithms
- Ability to understand how the choice of data structures and the algorithm design methods impact the performance.

Course outcomes: At the end of course, the student will be able to

CO1	Describes Graphics and its applications .Analyses the working of the CRT. Evaluates DDA Line drawing and Bresenham's Circle drawing algorithm
CO2	Understands basics of 2D and 3D Transformations. Describes Parallel and Perspective projection.
CO3	Analyses Polygon Clipping Algorithms. Describes different Visible Surface Detection Methods. Understands the concepts of Polygon Surfaces-Polygon tables, Plane equations, Polygon meshes
CO4	Defines Multimedia and its applications. Describes Multimedia system architecture. Analyses Multimedia data interface standards and Multimedia databases.
CO5	Defines Hypermedia. Knows how to create hypermedia message. Understands the concepts of Distributed multimedia systems.

Mapping of Course outcomes to program outcomes:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	-	1	2
CO2	3	3	3	-	1	2
CO3	3	1	-	2	2	1
CO4	3	2	2	1	-	2
CO5	3	3	2	-	-	1

3: Strong 2: Medium 1: Low -: No Correlation

Sl. No.	Content of module	Hrs	COs
1	Introduction and Applications of Graphics – Video Display Devices: CRT, Raster scan display, Random scan display, Color CRT Monitors, DVST, Flat-Panel displays, Input Devices, Printers. Output Primitives: DDA Line drawing algorithm – Bresenham’s Circle drawing algorithm.	9	CO1
2	Basic Transformations of 2D: Translation, Rotation, Scaling and other transformations, Matrix Representations, Homogeneous Co-ordinates and Composite transformations. Basic Transformations of 3D: Translation, Rotation, Scaling and other transformations. Projections: Parallel projection and Perspective projection.	9	CO2
3	Polygon Clipping Algorithms: Sutherland Hodgeman Clipping. Visible Surface Detection Methods: Visible surface detection – Back Face detection – Depth-Buffer method-A Buffer method. Polygon Surfaces: Polygon tables – Plane equations- Polygon meshes. Filled Area Primitives: Boundary fill algorithm.	9	CO3
4	Multimedia Systems Design: Multimedia basics – Multimedia applications – Multimedia system architecture – Evolving technologies for multimedia – Defining objects for multimedia systems – Multimedia data interface standards – Multimedia databases.	9	CO4
5	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.	9	CO5

TEXT BOOKS:

1. **Donald Hearn and M. Pauline Baker**, “*Computer Graphics C Version*”, Pearson Education.
2. Andleigh, P.K. and KiranThakrar, “*Multimedia Systems and Design*”, PHI.

REFERENCE BOOKS:

1. **W.M. Newman and R.F.Sproull**, “*Principles of Interactive Computer Graphics*”, Tata McGraw Hill International Edition.
2. **Judith Jeffcoate**, “*Multimedia in practice: Technology and Applications*”, PHI.

E-REFERENCES:

1. npTEL.ac.in/syllabus/106102063/
2. http://www.uptu.ac.in/pdf/sub_ecs_504_30sep14.pdf
3. www.tutorialfind.com/tutorials/multimedia
4. www.pdfTutorials.com/multimedia/multimedia

THIRD SEMESTER

Course Title: **CORE PRACTICAL III- JAVA PROGRAMMING LAB**

Course Code : 18-20/07312	Credits : 03
L:T:P:S : 0:0:4:0	CIA Marks : 40
Exam Hours : 03	ESE Marks : 60

Course Objectives:

- *Use an integrated development environment to write, compile, run, and test simple object-oriented Java programs.*
- *Read and make elementary modifications to Java programs that solve real-world problems.*
- *Be able to create an application using string concept.*
- *Be able to create a program using files in application.*
- *Be able to create an Applet to create an application.*
- *Identify and fix defects and common security issues in code.*

Lab Exercises:

Applications:

1. Program using Class and Object.
2. Program using Constructors.
3. Program using Command-Line Arguments.
4. Program using Random Class.
5. Program using Vectors.
6. Program using String Tokenizer Class.
7. Program using Interface.
8. Program using all forms of Inheritance.
9. Program using String class.
10. Program using String Buffer class.
11. Program using Exception Handling.
12. Implementing Thread based applications
13. Program using Packages.
14. Program using Files.

Applets:

15. Working with Colors and Fonts.
16. Parameter passing technique.
17. Drawing various shapes using Graphical statements.
18. Usage of AWT components and Listener in suitable applications.

THIRD SEMESTER

Course Title: **CORE PRACTICAL IV- DATA STRUCTURES USING JAVA LAB**

Course Code : 18-20/07313	Credits : 03
L:T:P:S : 0:0:4:0	CIA Marks : 40
Exam Hours : 03	ESE Marks : 60

Course Objectives:

- *Understand and remember algorithms and its analysis procedure.*
- *Introduce the concept of data structures including List, Stack, Queues*
- *To design and implement various data structure algorithms.*
- *To introduce various techniques for representation of the data in the real world.*
- *To develop application using data structure algorithms.*

Lab Exercises:

1. Stack implementation using array.
2. Queue implementation using array.
3. Stack implementation using linked list.
4. Queue implementation using linked list.
5. Inorder Binary tree traversal.
6. Preorder Binary tree traversal.
7. Postorder Binary tree traversal.
8. Breadth First Graph Traversal.
9. Depth First Graph Traversal.
10. Linear search.
11. Binary search.
12. Bubble sort.
13. Selection sort.
14. Insertion sort.
15. Hashing technique.

FOURTH SEMESTER

Course Title: **CORE THEORY VIII- PYTHON PROGRAMMING**

Course Code : 18-20/07414	Credits : 04
L:T:P:S : 4:1:0:0	CIA Marks : 40
Exam Hours : 03	ESE Marks : 60

Course Objectives:

- To make students understand the concepts of PYTHON programming.
- To apply the OOPs concept in PYTHON programming.
- To make the students learn best practices in PYTHON programming.

Course Outcomes: At the end of the Course, the Student will be able to:

CO1	Learn the basics of python Do simple programs on python Learn how to use an array
CO2	Develop program using selection statement Work with Looping and jump statements Do programs on Loops and jump statements
CO3	Concept of function, function arguments. Implementing the concept strings in various application. Significance of Modules. Work with functions, Strings and modules
CO4	Work with List, tuples and dictionary Write program using list, tuples and dictionary
CO5	Usage of File handlings in python Concept of reading and writing files Do programs using files

Mapping of Course Outcomes to Program Specific Outcomes:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	1	1	-	3
CO2	2	3	2	1	-	2
CO3	3	2	3	2	2	2
CO4	1	3	3	3	3	3
CO5	2	3	2	3	2	3

3: Strong 2: Medium 1: Low -: No Correlation

Sl. No.	Contents of Module	Hrs	COs
1	UNIT I: Basics of Python Programming: History of Python-Features of Python-Literal constants-Variables - Identifiers–Keywords-Built-in Data types-Output Statements – Input Statements-Comments – Indentation-Operators-Expressions-Type conversions. Python Arrays: Defining and Processing Arrays – Array methods.	9	CO1
2	UNIT II: Control Statements: Selection/Conditional Branching statements: if, if-else, nested if and if-elif-else statements. Iterative Statements: while loop, for loop, else suite in loop and nested loops. Jump Statements: break, continue and pass statements.	9	CO1, CO2
3	UNIT III: Functions: Function Definition – Function Call – Variable Scope and its lifetime-Return Statement. FunctionArguments: Required Arguments, Keyword Arguments, Default Arguments and Variable Length Arguments- Recursion. Python Strings: String operations- Immutable Strings - Built-in String Methods and Functions - String Comparison. Modules: import statement- The Python module – dir() function – Modules and Namespace – Defining our own modules.	9	CO1, CO3
4	UNIT IV: Lists: Creating a list -Access values in list-Updating values in lists-Nested lists -Basic list operations-List Methods. Tuples: Creating, Accessing, Updating and Deleting Elements in a tuple – Nested tuples– Difference between lists and tuples. Dictionaries: Creating, Accessing, Updating and Deleting Elements in a Dictionary – Dictionary Functions and Methods - Difference between Lists and Dictionaries.	9	CO4
5	UNIT V: Python File Handling: Types of files in Python - Opening and Closing files- Reading and Writing files: write() and writelines() methods- append() method – read() and readlines() methods – with keyword – Splitting words – File methods - File Positions- Renaming and deleting files.	9	CO5

TEXT BOOK:

1. **Reema Thareja**, “*Python Programming using problem solving approach*”, First Edition, 2017, Oxford University Press.
2. **Dr. R. Nageswara Rao**, “*Core Python Programming*”, First Edition, 2017, Dreamtech Publishers.

REFERENCE BOOKS:

1. **Vamsi Kurama**, “*Python Programming: A Modern Approach*”, Pearson Education.
2. **Mark Lutz**, “*Learning Python*”, Orielly.
3. **Kenneth A. Lambert**, “*Fundamentals of Python – First Programs*”, CENGAGE Publication.

E-REFERENCES:

1. <https://www.programiz.com/python-programming>
2. <https://www.guru99.com/python-tutorials.html>

FOURTH SEMESTER

Course Title: **CORE THEORY IX- OPERATING SYSTEMS**

Course Code : 18-20/07415	Credits : 04
L:T:P:S : 4:1:0:0	CIA Marks : 40
Exam Hours : 03	ESE Marks : 60

Course Objectives:

- To understand the main components of an OS & their functions.
- To study the process management and scheduling.
- To understand various issues in Inter Process Communication (IPC) and the role of OS in IPC.
- To understand the concepts and implementation Memory management policies and virtual memory.
- To understand the working of an OS as a resource manager, file system manager, process manager, memory manager and I/O manager and methods used to implement the different parts of OS.

Course outcomes: At the end of course, the student will be able

CO1	Describe the important computer system resources and the role of operating system and scheduling of processes by CPU algorithms
CO2	Understand the process synchronisation and Dead lock algorithms
CO3	Evaluate the requirement for process synchronization and coordination handled by operating system
CO4	Describe and analyse the memory management and its allocation policies.
CO5	Identify use and evaluate the file management policies with respect to different storage management technologies

Mapping of Course outcomes to program outcomes:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	2	1	-
CO2	3	-	-	-	1	-
CO3	3	-	1	-	1	-
CO4	3	3	2	1	1	1
CO5	3	3	2	1	1	1

3: Strong 2: Medium 1: Low -: No Correlation

Sl. No.	Contents of Module	Hrs	COs
1	UNIT – I Views – Goals – Types of system – OS Structure: Components – Services – System Calls. Process Management: Process - Process Scheduling – Cooperating Process – Interposes Communication- Types of threads. CPU Scheduling: CPU Schedulers – Scheduling criteria – CPU Scheduling Algorithms.	9	CO1
2	UNIT – II: Process Synchronization: Critical-Section problem –Semaphores. Deadlocks: Characterization – Methods for handling Deadlocks – Prevention, Avoidance, and Detection of Deadlock - Recovery from deadlock.	9	CO2
3	UNIT – III:Memory Management: Address Binding – Dynamic Loading and Linking – Overlays –Swapping- Logical and Physical Address Space - Contiguous Allocation – Internal and External Fragmentation - Non-contiguous Allocation- Paging and Segmentation schemes.	9	CO3
4	UNIT – IV: Virtual Memory: Demand Paging –Page Replacement Algorithms – Thrashing. Protection: Goals-Principles-Domain of Protection –Access Matrix.	9	CO4
5	UNIT – V:File-System Interface: File Concepts – Access methods – Directory Structure –Protection and consistency semantics. File-System Implementation: File system structure- Allocation methods-Free Space Management.	9	CO5

TEXT BOOK:

1. **Silberschatz A., Galvin P.B., Gange**, “*Operating System Concepts*”, Ninth Edition, 2015, John Wiley & Sons.

REFERENCE BOOKS:

1. **Bhatt P. C. P.**, “*An Introduction to Operating Systems: Concepts and Practice*”, Third Edition, 2010, Prentice Hall of India.
2. **William Stallings**, “*Operating Systems: Internals and Design Principles*”, Pearson, 2015, Global Edition.

E-REFERENCES:

1. <http://engineeringppt.blogspot.in/2009/07/operating-system-concepts-8th-edition.html>
2. <http://www.gobookee.com/search.php?q=operating+systeem+ebook>
3. http://www.ebook3000.com/Modern-Operating-Systems--2nd-Edition-_10971.html

FOURTH SEMESTER

Course Title: **CORE THEORY X: SOFTWARE ENGINEERING**

Course Code : 18-20/07416	Credits : 04
L:T:P:S : 4:0:0:0	CIA Marks : 40
Exam Hours : 03	ESE Marks : 60

Course Objectives:

- To introduce the students to a branch of study associated with the development of a software product.
- To gain basic knowledge about the pre-requisites for planning a software project.
- To gain knowledge about the project scheduling concept in software engineering.
- To learn how to design of software.
- To enable the students to perform testing of a software.

Course outcomes: At the end of course, the student will be able

CO1	Familiarization with the concept of software engineering and its relevance
CO2	Understanding of various methods or models for developing a software product
CO3	Understand tools and techniques of software engineering
CO4	Skill to design and code a software
CO5	Verify and validate the problem of software programming

Mapping of Course outcomes to program outcomes:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	1	1	-	2	1
CO2	3	1	1	-	1	2
CO3	1	-	2	1	2	1
CO4	-	-	3	2	2	2
CO5	3	-	2	-	2	1

3: Strong 2: Medium 1: Low -: No Correlation

Sl. No.	Content of Module	Hrs	COs
1	UNIT I: Introduction to Software Engineering: Need and Software problem -Software Crises – A Process framework - Process models: The waterfall model – Incremental process models – Prototyping – The Spiral model. System Engineering Hierarchy: System modelling and simulation.	9	CO1
2	UNIT II: Project Management: The Management Spectrum – The People –The Product – The Process – The Project – The W5HH Principle. Metrics in the Process and Project Domains: Metrics in the Process and Project Domains – Process Metrics and Project Metrics – Software measurement- Size-oriented metrics – Function-oriented metrics. Project Scheduling: Defining task set and a task network– Scheduling – Timeline charts – Tracking theSchedule.	9	CO2
3	UNIT III: Software Design: Design concepts- Abstraction – Architecture Modularity. Basic Design Principles: Component-level Design Guidelines- Cohesion – Coupling- Designing Conventional Components-Graphical Design Notation – Tabular Design Notation – Program Design Language – Comparison of notations.	9	CO3
4	UNIT IV: Risk Management: Reactive and Proactive risks – Software risks – Risk identification – Risk projection- Risk Refinement – Risk mitigation, monitoring and management – The RMMM plan. Software Quality Assurance: Concepts - SQA activities – Formal Technical Reviews (FTR).	9	CO4
5	UNIT V: Software Testing: Definition- Verification and validation – Test strategies – Unit Testing – Integration Testing – Alpha and Beta testing – White Box testing – Basis path testing – Control Structure Testing – Black box testing. Software Configuration Management (SCM): Elements of SCM – Baselines – TheSCM repository	9	CO5

TEXT BOOK:

1. **Roger S. Pressman**, “*Software Engineering a Practitioner’s Approach*”, Seventh Edition, Tata McGraw Hill

REFERENCE BOOKS:

1. **Watts S. Humphrey**, “*A Discipline for Software Engineering*”, Addison Wesley Company.
2. **Sommerville**, “*Software Engineering*”, Ninth Edition, Pearson Education.

E-REFERENCES:

1. http://nptel.iitm.ac.in/courses/Webcourse-contents/IIT%20Kharagpur/Soft%20Engg/New_index1.html
2. <http://it-ebooks.info/book/2609/>

FOURTH SEMESTER

Course Title: CORE PRACTICAL V- PYTHON PROGRAMMING LAB

Course Code : 18-20/07417	Credits : 03
L:T:P:S : 0:0:4:0	CIA Marks : 40
Exam Hours : 03	ESE Marks : 60

Course Objectives:

- *Be able to design and program Python applications.*
- *Be able to create loops and decision statements in Python.*
- *Be able to work with functions and pass arguments in Python.*
- *Be able to build and package Python modules for reusability.*
- *Be able to read and write files in Python.*

Lab Exercises:

1. Program using variables, constants, I/O statements in Python.
2. Program using Operators in Python.
3. Program using Conditional Statements.
4. Program using Loops.
5. Program using Jump Statements.
6. Program using Functions.
7. Program using Recursion.
8. Program using Arrays.
9. Program using Strings.
10. Program using Modules.
11. Program using Lists.
12. Program using Tuples.
13. Program using Dictionaries.
14. Program for File Handling.

FOURTH SEMESTER

Course Title: CORE PRACTICAL VI- OPERATING SYSTEM AND SHELL PROGRAMMING LAB

Course Code : 18-20/07418	Credits : 03
L:T:P:S : 0:0:3:0	CIA Marks : 40
Exam Hours : 03	ESE Marks : 60

Course Objectives:

- *To study the process management and CPU scheduling.*
- *To study shell programming.*
- *To understand various issues in Inter Process Communication (IPC) and the role of OS in IPC.*
- *To understand the concepts and implementation Memory management policies and virtual memory.*

Lab Exercises:

1. Shell Programming

- a. Basic arithmetic Operations
- b. If statement
- c. While loop
- d. Electricity Bill
- e. Mark Sheet Processing

2. Process Management

- a. Display Process identifier
- b. Suspension of Process
- c. Producer-Consumer Problem
- d. Display the contents of a directory
- e. Interprocess Communication (IPC)

3. CPU Scheduling Algorithms

- a. First Come First Serve Algorithm
- b. Shortest Job First Algorithm
- c. Priority Scheduling Algorithm

4. Memory Management Schemes

- a. First-Fit Algorithm
- b. Best-Fit Algorithm
- c. Worst-Fit Algorithm
- d. Paging

5. Virtual Memory

- FIFO Page replacement Algorithm

FIFTH SEMESTER

Course Title: CORE THEORY XI - DOT NET PROGRAMMING

Course Code : 18-19/07519	Credits : 04
L:T:P:S : 4:1:0:0	CIA Marks : 40
Exam Hours : 03	ESE Marks : 60

Course Objectives:

- *Set up a programming concept using the basic knowledge of HTML.*
- *To learn the data types, different controls in VB.NET*
- *Creating ASP.Net applications using standard .net controls to develop a data driven web application for connecting to data sources and managing them.*
- *To maintain session and controls related information for user used in multi-user web applications.*
- *To Understand the fundamentals of developing modular application by using object oriented methodologies*
- *Course outcome s: At the end of course, the student will be able*

Course Outcomes: At the end of the Course, the Student will be able to:

CO1	To understand the basic concept of HTML language with different types tags like formatting the text, inserting the tables.
CO2	To gain the basic knowledge in VB NET with the Frame work
CO3	Enable to apply technical knowledge and perform specific technical skills
CO4	Understand to design web applications using ASP.NET 2. Successful students will be able to use ASP.NET controls in web applications
CO5	Apply the concept to create database driven ASP.NET web applications and web services

Mapping of Course Outcomes to Program Specific Outcomes:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	3	3	2
CO2	2	2	2	1	-	2
CO3	3	3	2	2	1	1
CO4	3	2	3	3	2	1
CO5	3	3	3	3	2	2

3: Strong 2: Medium 1: Low -: No Correlation

Sl. No.	Contents of Module	Hrs	COs
1	HTML: Introduction– HTML Document Structure- Header Styles – Text Formatting –Types of List –HTML Table - Linking documents using Anchor tag - Forms – Basic controls in form – Image tag.	9	CO1
2	VB.Net Basics: Dot Net Framework Basics - Visual Studio Environment — Data Types , Variables, constants ,Operators and Expressions – Decisions and Conditions - Loops - Arrays - Sub Procedures and Functions – Built-In functions.	9	CO2
3	VB.Net Advanced: Windows Forms and Basic Controls - Timer control - Graphics and Animation: The Graphics Environment – Simple Animation – Scroll Bar Controls - Menus and Status Bars- Multi Form applications - Exception Handling.	9	CO3
4	ASP.NET Basics: ASP.NET Language Structure - Page Structure - Page event, Properties & Compiler Directives. Basic Web Server Controls: Textbox, Label, Button, Checkbox, Radio Button and Link Button. Validation Controls: Required Validator, Compare Validator and RegularExpressionValidator. DataListWebserver Controls: List Box, Checkbox List, RadioButtonList, Dropdown List and Data Grid control.	9	CO4
5	ASP.NET Advanced: Request and Response Objects, Cookies, Session Management. Working with Data: OLEDB Connection class, Command class, Dataset Class and Data Adapter class - Program using database connectivity	9	CO5

TEXT BOOKS:

1. **Thomas A Powell**, “*The Complete Reference HTML*”, Fifth Edition, 2017, TMH.
2. **Julia Case Brandley, Anita C. Millsaugh**, “*Programming in Visual Basic.Net*”, 2003, Tata McGrawHill.
3. **G. Buczek**, “*ASP.NET Developers Guide*”, 2017, Tata McGrawHill.

REFERENCE BOOKS:

1. **C. Xavier**, “*World Wide Web Design with HTML*”, First Edition, TMH.
2. **Crouch**, “*ASP.NET and VB.NET Web Programming*”, 2002, Addison-Wesley Professional.

E-REFERENCES:

1. <http://www.w3schools.com/aspnet/default-asp>
2. <http://www.learnvisualstudio.net>

FIFTH SEMESTER

Course Title: CORE THEORY XII- DATABASE MANAGEMENT SYSTEM

Course Code : 18-19/07520	Credits : 04
L:T:P:S : 4:1:0:0	CIA Marks : 40
Exam Hours : 03	ESE Marks : 60

Course Objectives:

- *To understand the different issues involved in the design and implementation of a database system.*
- *To study the physical and logical database designs, database modeling, relational, hierarchical, and network models*
- *To understand and use data manipulation language to query, update, and manage a database*
- *To develop an understanding of essential DBMS concepts such as: database security, integrity, concurrency,*
- *To design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS.*

Course Outcomes: At the end of the Course, the Student will be able to

CO1	To demonstrate the characteristics of Database Management Systems. To study about the concepts and models of database. To impart the concepts of System Development Life Cycle and E-R Model.
CO2	To classify the keys and the concepts of Relational Algebra. To impart the applications of various Normal Forms Classification of Dependency.
CO3	To elaborate the different types of Functions and Joins and their applications. Introduction of Views, Sequence, Index and Procedure.
CO4	Representation of PL-SQL Structure. To impart the knowledge of Sub Programs, Functions and Procedures.
CO5	Representation of Exception and Pre-Defined Exception. To Point out the Importance of Triggers, Implicit and Explicit Cursors.

Mapping of Course Outcomes to Program Outcomes

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	1	2	1
CO2	3	3	3	1	3	-
CO3	3	2	3	2	1	-
CO4	2	1	1	2	2	2
CO5	1	1	-	2	1	1

3: Strong 2: Medium 1: Low -: No Correlation

Sl. No.	Contents of Module	Hrs	COs
1	UNIT I: Introduction: Database System-Characteristics of Database Management Systems- Architecture of Database Management Systems-Database Models-System Development Life Cycle-Entity Relationship Model.	9	CO1
2	UNIT II: Relational Database Model: Structure of Relational Model-Types of keys. Relational Algebra: Unary operations-Set operations-Join operations. Normalization: Functional Dependency-First Normal form-Second Normal Form-Third Normal form- Boyce-Codd Normal Form-Fourth Normal Form.	9	CO2
3	UNIT III: SQL: Introduction. Data Definition Language: Create, alter, drop, rename and truncate statements. Data Manipulation Language: Insert, Update and Delete Statements. Data Retrieval Language: Select statement. Transaction Control Language: Commit, Rollback and Savepoint statements. Single row functions using dual: Date, Numeric and Character functions. Group/Aggregate functions: count, max, min, avg and sum functions. Set Functions: Union, union all, intersect and minus. Subquery: Scalar, Multiple and Correlated subquery. Joins: Inner and Outer joins. Defining Constraints: Primary Key, Foreign Key, Unique, Check, Not Null.	9	CO3
4	UNIT IV: PL/SQL: Introduction-PL/SQL Basic-Character Set-PL/SQL Structure-SQL Cursor-Subprograms-Functions-Procedures.	9	CO4
5	UNIT V: Exception Handling: Introduction-Predefined Exception-User Defined Exception-Triggers-Implicit and Explicit Cursors-Loops in Explicit Cursor.	9	CO5

TEXT BOOK:

1. **Pranab Kumar Das Gupta and P. Radha Krishnan**, “*Database Management System Oracle SQL and PL/SQL*”, Second Edition, 2013, PHI Learning Private Limited.

REFERENCE BOOKS:

1. **RamezElmasri and Shamkant B. Navathe**, “*Fundamentals of Database Systems*”, Seventh Edition, Pearson Publications.
2. **Abraham Silberschatz, Henry Korth, S. Sudarshan**, “*Database System Concepts*”, Seventh Edition, TMH.

E-REFERENCE:

1. http://www.amazon.in/DATABASE-MANAGEMENT-SYSTEM-ORACLE-SQL-ebook/dp/B00LPGBWZ0#reader_B00LPGBWZ0

FIFTH SEMESTER

Course Title: CORE THEORY XIII - COMPUTER NETWORKS

Course Code : 18-19/07521	Credits : 04
L:T:P:S : 5:0:0:0	CIA Marks : 40
Exam Hours : 03	ESE Marks : 60

Course Objectives:

- *To develop an understanding of modern network architectures from a design and performance perspective.*
- *To introduce the student to the major concepts involved in wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs).*
- *To clarify network terminology.*
- *To provide an opportunity to do network programming using **TCP/IP**.*
- *To give the students experience working in programming teams.*
- *To provide a WLAN measurement experience.*
- *To expose students to emerging technologies and their potential impact.*

Course Outcomes: At the end of the Course, the Student will be able to:

CO1	Define computer networks, Demonstrate the types of networks, Distinguish topologies, Differentiate Transmission mode, Design OSI and TCP/IP Reference model
CO2	Illustrate Transmission media, Analyze the wireless media, Create the structure of Telephone system
CO3	Formulate framing control and flow control, Explain error correcting codes and error detecting codes
CO4	Discuss store and forward switching network, Explain Routing algorithm, Examine congestion control algorithm
CO5	Summarize the elements of transport protocol, Describe DNS,EMAIL,WWW

Mapping of Course Outcomes to Program Specific Outcomes:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	1	-	-	-
CO2	2	3	2	1	-	-
CO3	-	1	3	3	2	-
CO4	-	-	1	3	3	2
CO5	-	-	1	2	3	3

3: Strong 2: Medium 1: Low -: No Correlation

Sl. No.	Contents of Module	Hrs	COs
1	Introduction: Definition and Uses of Computer Networks. Network Hardware/Categories of Networks: LAN, WAN and MAN. Line Configuration: Point to point and Multipoint. Topology: Mesh, Star, Tree, Bus, Ring and Hybrid Topologies. Transmission Mode: Simplex, Half duplex and Full Duplex. Network Software: Protocol Hierarchies-Connection Oriented and Connectionless Services – Service Primitives. Reference Models: OSI Reference Model – TCP/IP reference Model.	9	CO1
2	Physical Layer: Guided Transmission Media: Magnetic Media, Twisted Pair, Coaxial Cable and Fiber Optics. Wireless Transmission: Electromagnetic Spectrum, Radio Transmission, Microwave Transmission, Infrared Transmission and Light Waves. The Public Switched Telephone Network: Structure of a Telephone System.	9	CO2
3	Data Link Layer -Design Issues: Framing, Error Control and Flow Control. Error Correcting Codes: Hamming Codes and Convolutional Codes. Error Detecting Codes: Parity, Checksums and CRCs. Elementary Data-link Protocols: A Utopian Simplex Protocol. Sliding Window Protocols: A One-Bit Sliding Window Protocol.	9	CO3
4	Network Layer- Design Issues: Store and Forward Packet Switching – Services provided to transport layer. Routing Algorithms: The Optimality Principle, Flooding, The Shortest Path routing and Hierarchical Routing. Congestion Control Algorithms: Approaches to Congestion Control - Traffic Aware Routing and Admission Control.	9	CO4
5	Transport Layer-Elements of Transport Protocols: Addressing, Error control and Flow control, Multiplexing and Crash recovery. TCP: Introduction, TCP Service model and TCP Segment Header. Application Layer: DNS – Electronic Mail – The World Wide Web.	9	CO5

TEXT BOOKS:

1. **Andrew S. Tanenbaum and David J. Wetherall**, “*Computer Networks*”, Fifth edition, 2011, PHI.

REFERENCE BOOKS:

1. **Behrouz A. Forouzan**, “*Data Communication and Networking*”, Fifth Edition, Tata McGraw Hill.
2. **William Stallings**, “*Data and Computer Communications*”, Eighth Edition, Pearson education Asia.

E-REFERENCES:

1. http://nptel.iitm.ac.in/courses/IIT-MADRAS/Computer_Networks/index.php
2. <http://www.cse.iitk.ac.in/users/dheeraj/cs425/>
3. http://people.du.ac.in/~ngupta/teach_networks.html

FIFTH SEMESTER

Course Title: CORE PAPER XIV ELECTIVE I - OBJECT ORIENTED ANALYSIS AND DESIGN

Course Code : 18-19/07522	Credits : 04
L:T:P:S : 5:0:0:0	CIA Marks : 40
Exam Hours : 03	ESE Marks : 60

Course Objectives:

- *Discuss and elaborate the concept of OOAD.*
- *Describe the object-oriented approach to system development, modeling objects, relationships and interactions.*
- *Use the class design for creating software*
- *Use case studies of object orientation on testing for software development.*

Course Outcomes: At the end of the Course, the Student will be able to:

CO1	Demonstrate the ability to apply the knowledge of Object-Oriented Methodologies. Understand the use of UML.
CO2	Ability to Create Use case Models. Defining and Applying Objects, Attributes and Methods. Benefits of Case studies.
CO3	To describe the step by step object-oriented methodology of software development through class design and database management system.
CO4	Ability to apply the concept of different patterns for constructing software architectures through User interface design.
CO5	Apply the concept of Object orientation on testing for software development. Ability to understand the problems, communicating with application experts and user.

Mapping of Course Outcomes to Program Specific Outcomes:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	-	-	1	-	3
CO2	2	2	2	3	2	2
CO3	2	3	2	2	3	3
CO4	1	3	3	2	3	3
CO5	2	3	3	2	3	3

3: Strong

2: Medium

1: Low

-: No Correlation

Sl. No.	Contents of Module	Hrs	COs
1	Object Basics – Object Oriented methodologies: Introduction, The Unified Approach –UML.	9	CO1
2	Use Case Models – Object Analysis – Identifying Object relationships – Attributes –Methods – Case Studies.	9	CO1, CO2
3	Design Processes – Design Axioms – Class design – Object Storage: Object Oriented database management systems, Object relational systems, Designing access layer classes. Case Studies.	9	CO1, CO3
4	User interface design – View Layer Classes – Micro level processes – View Layer interface - Case Studies.	9	CO1, CO4
5	Object orientation on testing – Test cases – Test plans – Continuous testing – Debugging principles – System usability – Measuring user satisfaction – Case studies.	9	CO5

TEXT BOOK:

1. **Ali Bahrami**, “*Object Oriented System Development*”, Second Edition, Tata McGraw Hill International Edition.
2. **Grady Booch, James Rumbaugh, Ivar Jacobson**, “*The Unified Modeling Language User Guide*”, Second Edition, Addison Wesley.

REFERENCE BOOKS:

1. **Brahma Dathan, Sarnath Ramnath**, “*Object-Oriented Analysis, Design and Implementation*”, Second Edition, Universities Press.
2. **Martin Fowler**, “*UML Distilled A Brief Guide to Standard Object Modeling Language*”, Third Edition, AddisonWesley.

E-REFERENCES:

1. http://www.auupdates.com/2014/03/cs2353-object-oriented-analysis-and_3881.html
2. <http://it-ebooks.info/book/1403/>

FIFTH SEMESTER

Course Title: CORE THEORY XIV ELECTIVE I – DATA MINING

Course Code : 18-19/07522	Credits : 04
L:T:P:S : 5:0:0:0	CIA Marks : 40
Exam Hours : 03	ESE Marks : 60

Course Objectives:

- *To introduce students to the basic concepts and techniques of Data Mining*
- *To develop skills of using recent data mining software for solving practical problems.*
- *To gain experience of doing independent study and research.*
- *Develop and apply critical thinking, problem-solving, and decision- making skills.*
- *Develop and apply enthusiasm for learning. Class participation is encouraged in this course.*

Course Outcomes: At the end of the Course, the Student will be able to:

CO1	Know the basic knowledge of data mining, Study the techniques, Implement the applications
CO2	Understand the data preparations, Know the types of data and display graphically, and Compute the distance.
CO3	Know the Nalve and Apriori Algorithm. Improve the algorithm. Study of Direct Hashing and Pruning
CO4	Introduce Decision tree and Tree induction algorithm. Classified the methods. Evaluate the criteria of classification methods
CO5	Describe the cluster analysis. Study about K-means, Hierarchical and Agglomerative method. Check the quality and validity

Mapping of Course Outcomes to Program Specific Outcomes:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	-	-	1	-	-
CO2	1	1	-	-	-	2
CO3	2	-	-	1	2	-
CO4	-	1	2	-	-	-
CO5	-	-	1	2	3	-

3: Strong 2: Medium 1: Low -: No Correlation

Sl. No.	Contents of Module	Hrs	COs
1	Introduction: What is data mining? – Why data mining now? – Data mining process – Data mining applications – Data mining techniques – Practical examples.	9	CO1
2	Data Understanding and Data Preparation: Introduction – Data collection and preprocessing – Outliers – Types of data – Computing Distance – Displaying data graphically.	9	CO2
3	Association Rules Mining: Introduction - Basics – Naïve algorithm – Improved Naïve algorithm – The Apriori algorithm – Improving the efficiency of the Apriori algorithm – Direct Hashing and Pruning	9	CO3
4	Classification: Introduction – Decision tree - The Tree Induction Algorithm – Split algorithm based on Information Theory – Naïve based method - Improving accuracy of Classification Methods – Evaluation criteria of classification methods.	9	CO4
5	Cluster Analysis: Introduction – Features of Cluster Analysis – Types of Cluster Analysis – The K-Means method – Hierarchical method – Agglomerative Method - Quality and Validity of Cluster Analysis Method.	9	CO5

TEXT BOOKS:

1. **G. K. Gupta**, “Introduction to Data Mining with Case Studies”, 3rd Edition, 2014, PHI.

REFERENCE BOOKS:

1. **Jiawei Han and Micheline Kamber**, “*Data Mining Concepts & Techniques*”, Third Edition, Academic Press.
2. **Margaret H. Dunham**, “*Data Mining Introductory and Advanced Topics*”, First Edition, Pearson Education.

E-REFERENCES:

1. <http://guidetodatamining.com/>
2. http://freecomputerbooks.com/Introduction_to_Data_Mining.html
3. <http://it-ebooks.info/book/2506/>

FIFTH SEMESTER

**Course Title: CORE THEORY XIV ELECTIVE I -ARTIFICIAL INTELLIGENCE
AND EXPERT SYSTEMS**

Course Code : 18-19/07522	Credits : 04
L:T:P:S : 5:0:0:0	CIA Marks : 40
Exam Hours : 03	ESE Marks : 60

Course Objectives:

- *To get in-depth Knowledge about the evolution of AI and Expert Systems.*
- *Bring out the Features of Artificial Intelligence.*
- *Develop Heuristic Search Techniques.*
- *Implementing the Predicate Logic and Expert Systems.*

Course Outcomes: At the end of the Course, the Student will be able to:

CO1	Definition, AI Problem, AI Applications, AI Techniques and criteria for success. Defining the problem as a state space search.
CO2	Heuristic search techniques –Generate and test, simple hill climbing. Best first search –OR graph, A* Algorithm. Problem Reduction- AND OR graph, AO* Algorithm.
CO3	Knowledge representations and Mapping, Properties for Knowledge representation system, Frame Problem
CO4	Representing simple facts in logic, Representing Instance and ISA relationship, Computable function and Predicate, Resolution and Natural Deduction.
CO5	Characteristics of Expert System, Architecture of Expert Systems, Benefits and Limitations of Expert systems, Development States ,Applications and Expert systems Tools

Mapping of Course Outcomes to Program Specific Outcomes:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	1	2	-	-	1
CO2	2	3	3	2	2	3
CO3	3	3	2	3	2	2
CO4	3	2	1	1	-	2
CO5	2	3	3	3	3	3

3: Strong 2: Medium 1: Low -: No Correlation

Sl. No.	Contents of Module	Hrs	COs
1	Introduction: Definition, AI Problems, AI Applications, AI techniques, Criteria for success. Problems, Problem Spaces, Search: Defining the problem as a State Space Search – Production Systems – Problem Characteristics – Production System Characteristics.	9	CO1
2	Heuristic Search Techniques: Generate and Test – Simple Hill Climbing – Best First Search: OR graphs, The A* Algorithm. Problem Reduction: AND OR graphs, The AO* Algorithm. Constraint Satisfaction. Inheritance: Keyword extends- Types of Inheritance–Keyword super- Overriding of methods-Abstract class and methods	9	CO2
3	Knowledge Representation Issues: Representations and Mappings – Approaches to Knowledge representations: Properties for Knowledge representation systems, Simple relational knowledge- Issues in Knowledge representations – The Frame Problem.	9	CO3
4	Using Predicate Logic: Representing simple facts in logic – Representing Instance and ISA relationships – Computable functions and predicates– Resolution – Natural deduction.	9	CO4
5	Expert Systems: Definition- Characteristics of Expert Systems –Architecture of Expert Systems -Benefits and Limitations of Expert Systems – Development states of an Expert System -Applications of Expert Systems – Expert System tools	9	CO5

TEXT BOOKS:

1. **Stuart Russell & Peter Norvig**, “*Artificial Intelligence a modern Approach*”, Second Edition, Pearson Education.
2. **E. Rich, K. Knight and Shivashankar B. Nair**, “*Artificial Intelligence*”, Third Edition, TMH.

REFERENCE BOOKS:

1. **V S Janaki Raman, K Sarukesi, P Gopalakrishnan**, “*Foundations of Artificial Intelligence and Expert Systems*”, MacMillan India limited.
2. **D.W. Patterson**, “*Introduction to AI and Expert Systems*”, PHI.

E-REFERENCES:

1. www.vssut.ac.in/lecture_notes/lecture1428643004.pdf
2. http://vfu.bg/en/e-Learning/Artificial-Intelligence--AI_and_ES_Nowledge_base_systems.pdf

FIFTH SEMESTER

Course Title: CORE PRACTICAL VII - DOT NET PROGRAMMING LAB

Course Code : 18-19/07523	Credits : 03
L:T:P:S : 0:0:5:0	CIA Marks : 40
Exam Hours : 03	ESE Marks : 60

Course Objectives:

- *To explain basics of HTML concepts and controls*
- *To demonstrate the design VB.NET form with controls.*
- *To demonstrate the design ASP.NET form with controls.*
- *To explain the table creation and manipulation*
- *To demonstrate the creation and uses of cookies*
- *To facilitate students in Database design*

Lab Exercises:

1. Creation of a personal web page (with multiple html documents and appropriate links)
2. Preparation of a bio data using various HTML Controls
3. Design a VB.Net form for Student manipulation.
4. Design a VB.Net form for Inventory control system.
5. Create an ASP.Net application form to apply for a new course in a college, fill the information and submit it(Use Basic webserver controls).
6. Design Sign Up form and validate the values: User Name (Minimum 8 character Maximum 15 and only characters and underscore), Password (Minimum 8 Characters) and Confirm Password (Both should be same), Phone No (Only digits), Email-id(should contain @ symbol) etc.
7. Demonstration of Request and Response Objects
8. Create an employee database and manipulate the records.
9. Demonstration of Cookies.
10. Create a web form for Online Library data entry using Session variables.

FIFTH SEMESTER

Course Title: CORE PRACTICAL VIII - RDBMS LAB USING ORACLE

Course Code : 18-19/07524	Credits : 03
L:T:P:S : 0:0:5:0	CIA Marks : 40
Exam Hours : 03	ESE Marks : 60

Course Objectives:

- *To explain basic database concepts, applications, data models, schemas and instances.*
- *To demonstrate the use of constraints and relational algebra operations*
- *Describe the basics of SQL and construct queries using SQL.*
- *To emphasize the importance of normalization in databases*
- *To facilitate students in Database design*

Lab Exercises:

SQL:

1. DDL commands.
2. Specifying constraints-Primary Key, Foreign Key, Unique, Check, Not Null.
3. DML commands.
4. Set Operations.
5. Joins.
6. Sub-queries.

PL/SQL:

7. Control Constructs.
8. Exception Handlers.
9. Implicit Cursor.
10. Explicit Cursor.
11. Procedures.
12. Functions.
13. Triggers.
14. TCL Commands usage (Commit, Rollback, Savepoint)

SIXTH SEMESTER

Course Title: **CORE THEORY XV - PHP PROGRAMMING**

Course Code : 18-19/07625	Credits : 04
L:T:P:S : 4:1:0:0	CIA Marks : 40
Exam Hours : 03	ESE Marks : 60

Course Objectives:

- Understand the usage of PHP and MySQL in dynamic web development.
- Understand PHP language data types, logic controls, built-in and user-defined functions
- Be able to setup and configure MySQL, PHP, Apache web server development environment.
- Select, insert, update and delete data using SQL language.
- Understand Object oriented programming paradigm in PHP.
- Build a simple, yet functional web application using PHP/MySQL

Course Outcomes: At the end of the Course, the Student will be able to:

CO1	Discuss the basic concepts, Creating basic scripts, Implement data types, variables and operators
CO2	Illustrate the conditional statements, Implementing String and numeric functions
CO3	Create and processing array functions, Express the date and time functions
CO4	Creating User-Defined Functions and classes, Implement files and directories
CO5	Demonstrate database connectivity, Examine the user input through Database layer and Application layer, Construct query output with Character, Numeric, Date and time.

Mapping of Course Outcomes to Program Specific Outcomes:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	-	-	-	-
CO2	2	3	1	-	-	-
CO3	1	1	3	3	2	-
CO4	-	-	1	3	3	2
CO5	-	-	-	2	3	3

3: Strong 2: Medium 1: Low -: No Correlation

Sl. No.	Contents of Module	Hrs	COs
1	Introducing PHP – Basic development Concepts – Creating first PHP Scripts – Using Variable and Operators – Storing Data in variable – Understanding Data types – Setting and Checking variables Data types – Using Constants – Manipulating Variables with Operators.	9	CO1
2	Controlling Program Flow: Writing Simple Conditional Statements - Writing More Complex Conditional Statements – Repeating Action with Loops – Working with String and Numeric Functions.	9	CO2
3	Working with Arrays: Storing Data in Arrays – Processing Arrays with Loops and Iterations – Using Arrays with Forms - Working with Array Functions – Working with Dates and Times	9	CO3
4	Using Functions and Classes: Creating User-Defined Functions - Creating Classes – Using Advanced OOP Concepts. Working with Files and Directories: Reading Files-Writing Files- Processing Directories – Cookies – Session Management.	9	CO4
5	Working MySQL with PHP: Database connectivity- Usage of MYSQL commands in PHP- Processing result sets of queries- Validating user input through Database layer and Application layer- Formatting query output with Character, Numeric, Date andtime.	9	CO5

TEXT BOOKS:

1. **VikramVaswani**, "*PHP A Beginner's Guide*", First Edition, TMH.
2. **Mike Mcgrath**, "*PHP and MySQL*", 2012, TMH.

REFERENCE BOOKS:

1. **RasmusLerdorf, Kevin Tatro**, "*Programming PHP*", Third Edition, O'Reilly.
2. **Robin Nixon**, "*PHP, MySQL, and JavaScript: A Step-By-Step Guide to Creating Dynamic Websites*", First Edition, O'ReillyMedia.
3. **Leon Atkinson**, "*Core PHP Programming*", Prentice Hall, ISBN0130463469.
4. **W. Jason Gilmore**, "*Beginning PHP5 and MySQL: From Novice to Professional*", 2004, Apress, ISBN:1-893115-51-8.
5. **Steven Holzner**, "*The PHP Complete Reference*", TataMcGraw-Hill.

E-REFERENCES:

1. <http://www.w3schools.com/php/>
2. <http://www.codingunit.com/php-tutorial-language-introduction>

SIXTH SEMESTER

Course Title: CORE THEORY XVI - MOBILE APPLICATION DEVELOPMENT

Course Code : 18-19/07626	Credits : 04
L:T:P:S : 4:1:0:0	CIA Marks : 40
Exam Hours : 03	ESE Marks : 60

Course Objectives:

- *Develop in-depth Knowledge about the architecture and features of Android.*
- *Implementing the various options available in views.*
- *Understand the file handling concepts and thereby enabling to manage data efficiently.*
- *Able to describe clearly the features of SMS messaging.*
- *Illustrate the concepts of Location Based Services.*

Course outcomes: At the end of course, the student will be able to

CO1	Understand the Overview, Architecture and Features of Android. Study the setting up of Android environment. Developing simple Android application.
CO2	Understand the concepts of Android user interface. Exploring the different types of views available.
CO3	Understand the concepts of Saving and Loading User Preferences. Studies the File Handling methods and thereby able to manage data.
CO4	Able to Send and Receive messages .Understands how to send E-mail .Explores the concepts of Networking thereby able to download Binary Data and Text Files.
CO5	Explore the concepts of Location Based Services thereby able to Display maps and zoom control and add Markers Able to get the location – Geocoding. Understand Publishing Android Applications concepts

Mapping of Course outcomes to program outcomes:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	1	-	-	-
CO2	3	2	1	-	-	-
CO3	3	3	3	2	1	1
CO4	3	2	2	2	1	1
CO5	3	3	3	2	2	2

3: Strong 2: Medium 1: Low -: No Correlation

S. No.	Content of module	Hrs	COs
1	Android Fundamentals: Android overview and Versions – Features of Android – Architecture of Android - Setting up Android Environment (Eclipse/Android Studio, SDK, AVD)- Anatomy of an Android Application - Simple Android Application Development.	9	CO1
2	Android User Interface: Layouts: Linear, Relative, Frame and Scrollview- Managing changes to Screen Orientation. Views: TextView, Button, ImageButton, EditText, CheckBox, RadioButton, RadioGroup, ProgressBar, AutoCompleteTextView, ListViews and WebView	9	CO2
3	Data Persistence: Saving and Loading User Preferences. File Handling: File System-Internal and External Storage-Permissions-File Manipulation- Managing Data using Sqlite: Creation of database-Insertion, Retrieval and Updation of records.	9	CO3
4	SMS Messaging: Sending and Receiving messages - Sending E-mail – Networking: Downloading Binary Data – Downloading Text Files.	9	CO4
5	Location Based Services: Displaying maps- Displaying zoom control- Changing view – Adding Markers- Getting the location – Geocoding. Publishing Android Applications: Preparing for publishing-Deploying APK Files.	9	CO5

TEXT BOOK:

1. **WeiMeng Lee (2012)**, “*Beginning Android Application Development*”, Wrox Publications (John Wiley, New York)

REFERENCE BOOKS:

1. **Ed Burnette**, “*Hello Android: Introducing Google's Mobile Development Platform*”, 3rd edition, 2010, The Pragmatic Publishers.
2. **Reto Meier**, “*Professional Android 4 Application Development*”, 2012, Wrox Publications (John Wiley, New York).

E-REFERENCES:

1. https://www.tutorialspoint.com/mobile_development_tutorials.htm
2. <https://www.tutorialspoint.com › Android › Android - Home>

SIXTH SEMESTER

Course Title: **CORE THEORY XVII - DESIGN AND ANALYSIS OF ALGORITHMS**

Course Code : 18-19/07627	Credits : 04
L:T:P:S : 5:0:0 :0	CIA Marks : 40
Exam Hours : 03	ESE Marks : 60

Course Objectives:

- Ability to analyze the performance of algorithms.
- Ability to choose appropriate algorithm design techniques for solving problems.
- To clear up troubles the usage of set of rules design methods including the grasping approach, divide and overcome, dynamic programming, backtracking and department and certain

Course outcome: At the end of course, the student will be able to

CO1	Knows how to solve the basic Problems. Derive asymptotic runtime bounds for reasonably straightforward pseudo-code with nested loop Concept of Space complexity, Time complexity
CO2	Knows sorting and searching. Concept of Knap sack problems, Job sequencing with deadlines Definition of Optimal Merge Patterns.
CO3	Know the basic representation of undirected and directed graphs. Understand the shortest path problems and their applications Usage of 0/1 Knapsack
CO4	Concept of Backtracking Knows to solve the N-Queens Problem Definition of Hamiltonian Cycle Problem.
CO5	Understand the Travelling Salesman Problem. Definition of Branch and Bound general method.

Mapping of Course outcomes to program outcomes:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	2	1	-	1
CO2	3	3	2	2	1	2
CO3	2	-	1	2	3	2
CO4	3	2	2	2	-	1
CO5	2	2	3	-	2	2

3: Strong 2: Medium 1: Low - : No correlation

Sl. No.	Content of Module	Hrs	COs
1	Introduction: Problem solving – Procedure – Top-Down and Bottom-up approaches to algorithm design – Use of algorithms in problem solving– Characteristics of algorithmic language. Developing an algorithm: Design of algorithms – Implementation of algorithm – Verification of algorithm. Efficiency analysis of algorithms: Space complexity, Time complexity, and Frequency count – Analysis of Linear Search.	9	CO1
2	Divide and Conquer: General Method – Binary Search – Finding Maximum and Minimum – Merge Sort. Greedy Method: General method – Optimal storage on tapes – Knap sack problems – Job sequencing with deadlines – Optimal Merge Patterns.	9	CO2
3	Dynamic Programming: General Method – Multistage Graphs – All-Pair Shortest Paths – 0/1 Knapsack.	9	CO3
4	Backtracking: General Method – N-Queens Problem – Sum of Subsets – Graph Coloring - Hamiltonian Cycle Problem.	9	CO4
5	Branch and Bound: General Method (FIFO and LC) – 0/1 Knapsack Problem – Travelling Salesman Problem.	9	CO5

TEXT BOOKS:

1. A.A Puntambekar, “*Analysis and Design of Algorithms*”, Technical Publications.
2. I. Chandra Mohan, “*Design and Analysis of Algorithms*”, PHI Learning Pvt. Ltd.

REFERENCE BOOKS:

1. Ellis Horowitz, SartajSahni and SanguthevarRajasekaran, “*Computer Algorithms*”, Second Edition, Universities Press.
2. K. RaghavRao, “*Introduction to Design Analysis of Algorithms*”, 2013, SmashWords.

E-REFERENCES:

1. http://people.du.ac.in/~ngupta/teach_algorithms_cs301.html#301
2. http://www.uptu.ac.in/pdf/sub_ecs_502_30sep14.pdf

SIXTH SEMESTER

Course Title: CORE THEORY XVIII ELECTIVE II - OPERATIONS RESEARCH

Course Code : 18-19/07628	Credits : 04
L:T:P:S : 5:0:0:0	CIA Marks : 40
Exam Hours : 03	ESE Marks : 60

Course Objectives:

- To get in-depth Knowledge about the evolution of operations research and its Features
- Understand the characteristics of OR
- How to apply OR in industry
- Understanding how OR helps in decision making

Course outcomes: At the end of course, the student will be able

CO1	Applying features of OR in decision making for industries. Develop formulations for Linear programming problem
CO2	Obtain the Algebraic Solution using Simplex method and Big M method
CO3	Obtain solution for Transportation Model and Assignment Model Problems and also understand the difference between the same
CO4	Understanding Sequencing Problem and Processing each of 'n' jobs through m machines Understanding the characteristics of game theory and obtaining the algebraic solution for solving games.
CO5	Applying PERT and CPM computations and thereby scheduling the resources

Mapping of Course outcomes to program outcomes:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	-	1	1
CO2	1	2	3	-	3	-
CO3	2	1	3	-	3	-
CO4	3	2	3	-	3	1
CO5	3	1	3	-	3	1

3: Strong 2: Medium 1: Low -: No Correlation

Sl. No.	Content of module	Hrs	COs
1	Basics of Operations Research (OR): Characteristics of O.R- Necessity of O.R in Industry-OR and Decision making- Role of computers in O.R.. Linear Programming: Formulations and Graphical solution canonical and standard terms of LPP.	9	CO1
2	Algebraic Solution: Simplex method -Charnes method of penalties – Two Phase Simplex Method – Big-M Method – Concept of Duality- Properties of Duality.	9	CO2
3	Transportation Model: Definition –n formulation and solution of transportation models- North–West Corner Method- the row – minima, column – minima, matrix minima and Vogel’s approximation methods (Note: no optimal solution problems). Assignment Model: Definition of Assignment Model – comparison with Transportation Model – solution of Assignment model –Variations of Assignment problem – Finding Optimal Solution of Assignment Problem.	9	CO3
4	Sequencing Problem: Processing each of ‘n’ jobs through m machines – Processing ‘n’ jobs through 2 machines – Processing ‘n’ jobs through 3 machines – Processing 2 jobs through ‘m’ machines – Processing ‘n’ jobs through ‘m’ machines – Travelling Salesman Problem. Game Theory: Characteristics of games – Maximin, Minimax criteria of optimality – Dominance property – Algebraic solution of solving games.	9	CO4
5	Pert – CPM Networks- Fulkerson’s Rule- Measure of activity – PERT and CPM computation – Resource Scheduling – Floats Calculations.	9	CO5

TEXTBOOK:

1. **KantiSwarub, P.K.Gupta, Manmohan**, “*Operations Research*”, S. Chand & Sons.

REFERENCE BOOKS:

1. **Ackoff R. L. and Sasieni M.W**, “*Fundamentals of Operations Research*”, John Wiley & Sons, New York.
2. **Charnes A. Cooper W. and Hendersen A.**, “*Introduction to Linear Programming*”, Wiley & Sons. New York.
3. **Srinath L.S.**”*PERT and CPM Principles and Applications*”, Affiliated East West Press Pvt. Ltd., New York.

E-REFERENCES:

1. https://en.wikipedia.org/wiki/Operations_research

SIXTH SEMESTER

Course Title: CORE THEORY XVIII ELECTIVE II– CRYPTOGRAPHY

Course Code : 18-19/07628	Credits : 04
L:T:P:S : 5:0:0:0	CIA Marks : 40
Exam Hours : 03	ESE Marks : 60

Course Objectives:

- To understand the fundamentals of Cryptography
- To acquire knowledge on standard algorithms used to provide confidentiality, integrity and authenticity.
- To understand the various key distribution and management schemes.
- To understand how to deploy encryption techniques to secure data in transit across data networks
- To design security applications in the field of Information technology

Course Outcomes: At the end of the Course, the Student will be able to:

CO1	Analyze the vulnerabilities in any computing system and hence be able to design a security solution.
CO2	Apply the different cryptographic operations of symmetric cryptographic algorithms
CO3	Apply the different cryptographic operations of public key cryptography
CO4	Apply the various Authentication schemes to simulate different applications.
CO5	Understand various Security practices and System security standards

Mapping of Course Outcomes to Program Specific Outcomes:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	1	2	1
CO2	3	3	2	1	3	-
CO3	3	2	2	2	1	-
CO4	2	1	1	1	2	1
CO5	1	1	-	2	1	1

3: Strong 2: Medium 1: Low -: No Correlation

Sl. No.	Contents of Module	Hrs	COs
1	Introduction: The OSI security Architecture – Security Attacks – Security Mechanisms – Security Services – A model for network Security.	9	CO1
2	Classical Encryption Techniques: Symmetric cipher model – Substitution Techniques: Caesar Cipher – Monoalphabetic cipher – Play fair cipher – Poly Alphabetic Cipher – Transposition techniques – Steganography	9	CO2
3	Block Cipher and DES: Block Cipher Principles – DES – The Strength of DES – RSA: The RSA algorithm.	9	CO3
4	Network Security Practices: IP Security overview - IP Security architecture – Authentication Header. Web Security: Secure Socket Layer and Transport Layer Security – Secure Electronic Transaction.	9	CO4
5	Intruders – Malicious software – Firewalls.	9	CO5

TEXT BOOKS:

1. **William Stallings**, “*Cryptography and Network Security Principles and Practices*”.

REFERENCE BOOKS:

1. **Behrouz A. Foruzan**, “*Cryptography and Network Security*”, Tata McGraw-Hill, 2007.
2. **AtulKahate**, “*Cryptography and Network Security*”, Second Edition, 2003,TMH.
3. **M.V. Arun Kumar**, “*Network Security*”, 2011, First Edition,USP.

E-REFERENCES:

1. <https://www.tutorialspoint.com/cryptography/>
2. <https://gpgtools.tenderapp.com/kb/how-to/introduction-to-cryptography>

SIXTH SEMESTER

Course Title: CORE THEORY XVIII ELECTIVE II- E-COMMERCE

Course Code : 18-19/07628	Credits : 04
L:T:P:S : 5:0:0:0	CIA Marks : 40
Exam Hours : 03	ESE Marks : 60

Course Objectives:

- *Understanding of the foundations and importance of E-commerce*
- *Understanding of retailing in E-commerce by in terms of branding and pricing strategies and determining the effectiveness of market research*
- *Implement the impact of E-commerce on business models and strategy*
- *Assess the Internet trading relationships including Business to Consumer, Business- to-Business, Intra-organizational.*
- *Knowing key features of Internet, Intranets and Extranets and how they relate to each other.*
- *Understanding legal issues and privacy in E-Commerce*
- *Assess electronic payment systems*
- *Recognize and discuss global E-commerce issues*

Course Outcomes: At the end of the Course, the Student will be able to:

CO1	Demonstrate E-Commerce Frameworks. Distinguish E-Commerce and media Convergence. Illustrate E-Commerce Applications.
CO2	Describe the E-Commerce Networks and Research Networks, Analyze the Internet Commercialization
CO3	Evaluate the E-Commerce how incorporate the Internet, Construct the Web Security
CO4	Distinguish the different payment system. Illustrate the data interchange
CO5	Understanding the Advertising and Marketing on the Internet, Describe Software Agents

Mapping of Course Outcomes to Program Specific Outcomes:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	-	-	-	-
CO2	2	3	3	1	-	-
CO3	2	2	3	3	-	-
CO4	2	1	-	3	3	-
CO5	1	1	-	-	3	3

3: Strong 2: Medium 1: Low -: No Correlation

Sl. No.	Contents of Module	Hrs	COs
1	E-Commerce Framework – E-Commerce and Media Convergence – The anatomy of E-commerce applications - E-Commerce Consumer Applications - E-Commerce Organization Applications.	9	CO1
2	The Internet Terminology – NSFNET – Architecture and Components – National Research and Education Network – Internet Governance – An overview of Internet Applications. The Business of Internet Commercialization: Telco/Cable/Online companies - National Independent ISPs – Regional level ISPs – Local level ISPs.	9	CO2
3	E-Commerce and the World Wide Web: Architectural Framework for E-commerce – WWW as the architecture – Technology behind the web – Security and the web.	9	CO3
4	Electronic Payment Systems: Types of Electronic Payment Systems – Digital token Electronic Payment Systems – Credit Card Based Electronic Payment Systems – Risk and Electronic Payment Systems. Electronic Data Interchange: Legal, Security and Privacy issues.	9	CO4
5	Advertising and Marketing on the Internet: E-Commerce Catalogs – Information Filtering – Consumer Data Interface – Emerging tools. Software Agents: Characteristics and Properties of Software Agents – Technology behind Software Agents - Applets, Browsers, and Software Agents.	9	CO5

TEXT BOOKS:

1. **Ravi Kalakota & Andrew Whinston**, “*Frontiers of Electronic-Commerce*”, Addison Wesley.

REFERENCE BOOKS:

1. **EfraimTurvanJ.Lee, David Kug and Chung**, “*Electronic Commerce*”, Pearson Education, Asia.
2. **Manlyn Greenstein and Miklos**, “*Electronic Commerce*”, TMH.

E-REFERENCES:

1. <https://www.the-reference.com/en/expertise/creation-and.../e-commerce>
2. <https://en.wikipedia.org/wiki/E-commerce>
3. https://www.tutorialspoint.com/e_commerce/index.htm

SIXTH SEMESTER

Course Title: CORE PRACTICAL IX -PHP PROGRAMMING LAB

Course Code : 18-19/07629	Credits : 03
L:T:P:S : 0:0:4:0	CIA Marks : 40
Exam Hours : 03	ESE Marks : 60

Course Objectives:

- To explain basics PHP variables, constants and controls
- To demonstrate the use of String, math and date functions.
- To demonstrate the creation of arrays and type of arrays
- To explain user defined functions and the concepts of class.
- To demonstrate the creation cookies and sessions
- To facilitate the creation of Database and validate the user inputs

Lab Exercises:

1. PHP Variables and constants
2. PHP IF Statement
3. PHP Switch-case statement
4. PHP looping statement
5. PHP String functions
6. PHP mathematical functions
7. PHP numeric array
8. PHP associative array
9. PHP Multidimensional array
10. Array with forms
11. PHP Date and time functions
12. PHP User-defined functions
13. PHP Scope of variables
14. PHP Class and Object
15. PHP Cookies
16. PHP Sessions
17. Insertion of records into database using form
18. Viewing of records from database using form
19. Validating user-input using application layer
20. Validating user-input using database layer

SIXTH SEMESTER

Course Title: CORE PRACTICAL X - MOBILE APPLICATION DEVELOPMENT LAB

Course Code	: 18-19/07630	Credits	: 03
L:T:P:S	: 0:0:4:0	CIA Marks	: 40
Exam Hours	: 03	ESE Marks	: 60

Course Objectives:

- *To explain user defined functions and the concepts of class.*
- *To demonstrate the creation cookies and sessions*
- *To facilitate the creation of Database and validate the user inputs*

Lab Exercises:

1. Develop an application for Simple Counter.
2. Develop an application to display your personal details using GUI Components.
3. Develop a Simple Calculator that uses radio buttons and text view.
4. Develop an application that uses Intent and Activity.
5. Develop an application that uses Dialog Boxes.
6. Develop an application to display a Splash Screen.
7. Develop an application that uses Layout Managers.
8. Develop an application that uses different types of Menus.
9. Develop an application that uses to send messages from one mobile to another mobile.
10. Develop an application that uses to send E-mail.
11. Develop an application that plays Audio and Video.
12. Develop an application that uses Local File Storage.
13. Develop an application for Simple Animation.
14. Develop an application for Login Page using Sqlite.
15. Develop an application for Student Marksheet processing using Sqlite.

SIXTH SEMESTER

Course Title: **CORE PROJECT X - MINI PROJECT WORK**

Course Code	:	Credits	: 03
L:T:P:S	: 0:0:2:0	CIA Marks	: 40
Exam Hours	: 03	ESE Marks	: 60

Course Objectives:

Students will be able to:

- *Implement the solution for the chosen problem using the concepts and the techniques learnt in the curriculum.*
- *Develop software applications*
- *Record the research results for a given problem*
- *Identify, formulate and implement computing solutions.*
- *Design and conduct experiments, analyze and interpret data.*
- *Analyze a system, component or process as per needs and specification.*
- *Work on multidisciplinary tasks and will be aware of the new and emerging disciplines.*
- *Demonstrate skills to use modern tools, software and equipments to analyze problems.*

Course Outcomes: At the end of the Course, the Student will be able to:

CO1	Demonstrate a sound technical knowledge, skills and attitude of their selected project topic.
CO2	Understand problem identification, formulation and solution.
CO3	Design solutions to complex problems utilizing a systems approach.
CO4	Communicate with engineers and the community at large in written and oral forms.

Mapping of Course Outcomes to Program Specific Outcomes:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	3	3	3
CO2	3	3	3	2	2	3
CO3	3	3	3	2	3	3
CO4	2	3	3	3	3	3

3-Strong 2-Medium 1-Low

Procedure:

- The Head of the Department will assign an Internal Guide for each student.
- As soon as the student gets project, the student should submit the contact details of the organization to their guide.
- During regular intervals, student should report about his/her progress of the project work.
- After the submission of the final report, an external examiner will evaluate the project document and conduct the viva voce examination.