SRI RAMAKRISHNA MISSION VIDYALAYA
COLLEGE OF ARTS AND SCIENCE
COIMBATORE-641 020

DEPARTMENT OF COMPUTER APPLICATIONS

Mapping of Course Outcomes with Programme Outcomes and Programme Specific Outcomes

B.C.A.Programme

(2018 – 2019 onwards)

Program Outcomes

- ❖ Ability to apply the knowledge of Mathematics and Science to develop real time systems.
- ❖ Ability to design and conduct Experiments / Practical's.
- ❖ Ability to function on Multidisciplinary teams.
- ❖ Ability to communicate effectively and engage in lifelong learning.
- ❖ Students recognize the need for continuing Professional development, ethical and social issues and responsibilities.

Programme Specific Outcome:

- ❖ Apply the knowledge of mathematics and computing fundamentals to various real life applications for any given requirement

- ❖ Design applications for any desired needs with appropriate considerations for any specific need on societal and environmental aspects.

- ❖ Integrate and apply efficiently the contemporary IT tools to all computer applications.
- ❖ Solve and work with a professional context pertaining to ethics, social, cultural and cyber regulations

- ❖ Function effectively both as a team leader and team member on multi-disciplinary projects to demonstrate computing and management skills communicate effectively and present technical information in oral and written reports.

SRI RAMASRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE
(AUTONOMOUS) COIMBATORE – 641 020
For candidates admitted from academic year 2018 - 2019 onwards under New CBCS.

Bachelor of Computer Applications

SEMESTER - I

S.No	COURSE CODE	PART	COURSE TITLE	HRS /WK	CREDITS	EXAM HRS	INT	EXT	TOT
							...		
1	18UGC1TA1	I	Tamil – I	6	3	3	25	75	100
2	18UGC1EN1	II	English – I	6	3	3	25	75	100
3	18UCA1C01	III	Core: Programming in C	5	4	3	25	75	100
4	18UCA1AL1	III	Allied - Mathematics - I	6	5	3	25	75	100
5	18UCA1CP1	III	Core Practical : Programming in C	5	3	3	40	60	100
6	18UGC1ENS	IV	Environmental Studies	2	2	3	-	75	75
			TOTAL	30	20				575

SEMESTER – II

S.No	COURSE CODE	PART	COURSE TITLE	HRS/ WK	CREDITS	EXAM HRS	EXT	INT	TOT
1	18UGC2TA2	I	Tamil – II	6	3	3	25	75	100
2	18UGC2EN2	II	English – II	6	3	3	25	75	100
3	18UCA2C02	III	Core: Object Oriented Programming with C++	5	3	3	25	75	100
4	18UCA2AL2	III	Allied - Mathematics - II	6	5	3	25	75	100
5	18UCA2CP2	III	Core Practical: Object Oriented Programming with C++	5	3	3	40	60	100
6	18UGC2VAE	IV	Value Education	2	2	3	-	75	75
			TOTAL	30	19				575

SEMESTER – III

S. No	COURSE CODE	PART	COURSE TITLE	HRS /WK	CRE DITS	EXAM HRS	MAX MARKS		
							INT	EXT	TOT
1	18UCA3C03	III	Core: Java Programming	5	4	3	25	75	100
2	18UCA3C04	III	Core: Data Structures using C++	5	4	3	25	75	100
3	18UCA3C05	III	Core: Operating System	4	4	3	25	75	100
4	18UCA3AL3	III	Allied: Operations Research	6	5	3	25	75	100
5	18UCA3CP3	III	Core Practical : Java Programming Lab	4	3	3	40	60	100
6	18UCA3CP4	III	Core Practical : Data Structure using C++ Lab	4	3	3	40	60	100
7	18UCA3NM1	IV	NME - Grammar and Communication/ Basic Tamil-I	2	2	2	-	50	50
			TOTAL	30	25				650

SEMESTER – IV

S. No	COURSE CODE	PART	COURSE TITLE	HRS /WK	CRE DITS	EXAM HRS	MAX MARKS		
							INT	EXT	TOT
1	18UCA4C06	III	Core: Visual Programming (C#.Net)	6	5	3	25	75	100
2	18UCA4C07	III	Core: Relational Database Management Systems	6	5	3	25	75	100
3	18UCA4AL4	III	Allied - Fundamentals of Accounting	6	5	3	25	75	100
4	18UCA4CP5	III	Core Practical : Visual Programming Lab (C#.Net)	5	3	3	40	60	100
5	18UCA4CP6	III	Core Practical : Relational Database Management Systems LAB	5	3	3	40	60	100
6	18UCA4NM2	IV	NME: Data science and big Data analytics Lab	2	2	2	-	50	50
7	18UGC4NSS/SPO	V	Extension Activities - NSS/SPORTS	-	1	2	25	25	50
			TOTAL	30	24				600

SEMESTER – V

S. No.	COURSE CODE	PART	COURSE TITLE	HRS /WK	CRE DITS	EXAM HRS	MAX MARKS		
							INT	EXT	TOT
1	18UCA5C08	III	Core: Web Technology (HTML, Bootstrap. PHP and MySQL)	6	5	3	25	75	100
2	18UCA5C09	III	Core: Software Engineering	6	5	3	25	75	100
3	18UCA5C10	III	Core: Computer Networks	5	5	3	25	75	100
4	18UCA5EL1	III	Elective - From Group A	5	5	3	25	75	100
5	18UCA5CP7	III	Core Practical: Web Technology (HTML, Bootstrap. PHP and MySQL)	4	3	3	40	60	100
6	18UCA5CP8	III	Core Practical : Computer Networks Lab	4	3	3	40	60	100
			TOTAL	30	26				600

SEMESTER – VI

S. No	COURSE CODE	PART	COURSE TITLE	HRS/ WK	CRED ITS	EXAM HRS	MAX MARKS		
							INT	EXT	TOT
1	18UCA6C11	III	Core: Python Programming	6	5	3	25	75	100
2	18UCA6C12	III	Core: Mobile Computing and Android Programming	6	5	3	25	75	100
3	18UCA6EL2	III	Elective - From Group B	5	5	3	25	75	100
4	18UCA6CP9	III	Core Practical : Python Programming Lab	4	3	3	40	60	100
5	18UCA6CP10	III	Core Practical : Android Programming Lab	4	3	3	40	60	100
6	18UCA6CPR	III	Project Work and Viva Voce	5	5	-	40	60	100
			TOTAL	30	26				600

TOTAL CREDITS: 140
TOTAL MARKS: 3600

Elective – Group A:

1. **Cyber Security**
2. Computer Networks
3. Compiler Design
4. Graphics and Multimedia
5. Client / Server Computing

Elective – Group B:

6. **Data Mining and Warehousing**
7. Distributed Computing Systems
8. Embedded Systems
9. Geographical Information System
10. Design and Analysis of Algorithm

Part	Subject Types	No. of Papers	Credits	Marks
I	Tamil	2	6	200
II	English	2	6	200
III	Core- Major	23	90	2300
	Allied	4	20	400
	Elective	2	9	200
IV	Non Major Elective	2	4	100
	Environmental Studies	1	2	75
	Value Education	1	2	75
V	NSS/NCC/Sports	1	1	50

18UCA1C01	CORE: PROGRAMMING IN C

CO1	Learn the concepts of C programming	K,U
CO2	Identify the logic behind the execution of various applications	K,U
CO3	Learn &Analyse and discover bugs in the program	U,S
CO4	Develop an application using memory management functions, Pointers, Strings, Structures and Arrays.	U,S
CO5	Apply the concepts to solve a real-time problem	U,S

☞ K–Knowledge   U–Understanding   S -Skill

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	L	S	S	M	L	L
CO2	M	S	M	M	L	S	M	M	L	L
CO3	S	S	M	S	L	S	S	S	S	L
CO4	S	S	M	S	L	S	S	S	S	L
CO5	S	S	M	S	L	M	M	L	M	L

☞ S–Strong;   M – Medium; L –Low

18UCA1CP1	CORE PRACTICAL : PROGRAMMING IN C

CO1	Recall the mathematical functions while creating a program	S
CO2	Understand the fundamental programming concepts	S
CO3	Illustrate the programming technique to analyze software problems	S
CO4	Apply the concepts to find solution for the problems	S
CO5	Design and develop the simple application.	S

☞ K–Knowledge   U–Understanding   S -Skill

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	L	S	M	M	L	L
CO2	S	S	M	S	L	S	M	M	L	L
CO3	S	S	M	S	L	S	M	M	L	L
CO4	S	S	M	M	L	S	M	M	L	L
CO5	S	S	L	M	L	S	M	M	L	L

☞ S–Strong;   M – Medium; L –Low

18UCA2C02	CORE: OBJECT ORIENTED PROGRAMMING WITH C++

CO1	Ability to understand the data types and control structures.	K,U
CO2	Understanding and implementing the concepts.	K,U,S
CO3	Ability to demonstrate the use of overloading and inheritance	U,S
CO4	Deploying polymorphism using pointers and virtual functions	U,S
CO5	Ability to understand and implement the features of C++ including file handling and exception handling.	K,U,S

☞ K–Knowledge   U–Understanding   S -Skill

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	L	S	S	M	L	L
CO2	M	S	M	M	L	S	M	M	L	L
CO3	S	S	M	S	L	S	S	S	S	L
CO4	S	S	M	S	L	S	S	S	S	L
CO5	S	S	M	S	L	M	M	L	M	L

☞ S–Strong;   M – Medium; L –Low

18UCA2CP2	CORE PRACTICAL: OBJECT ORIENTED PROGRAMMING WITH C++

CO1	Ability to write a simple program using class.	S
CO2	Learn and Apply control Structure for mathematical problems	S
CO3	Ability to develop programs to solve mathematical problems	S
CO4	Capability of developing programs using OOP concepts.	S
CO5	Capable of developing programs using pointers and virtual functions.	S

☞ K–Knowledge   U–Understanding   S -Skill

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	M	M	L	S	M	M	M	L
CO2	S	S	M	S	L	S	M	M	M	L
CO3	S	M	M	S	L	S	M	M	L	L
CO4	S	M	S	S	L	S	M	M	L	L
CO5	S	M	M	M	L	S	M	M	L	L

☞ S–Strong;   M – Medium; L –Low

18UCA3C03	CORE: JAVA PROGRAMMING

CO1	Understanding the concepts of the core java and apply in simple programs.	K,U
CO2	Identifying the logic behind process handling by using threads.	U
CO3	Identifying the concept behind Network Programming.	K,U
CO4	Developing an application for Server side Programming.	U,S
CO5	Applying the concept to solve real-time problems.	U,S

☞K–Knowledge   U–Understanding   S -Skill

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	M	L	S	S	M	M	L
CO2	S	S	L	M	L	S	S	M	M	L
CO3	S	S	L	M	L	S	S	M	M	L
CO4	S	S	M	M	L	S	S	S	M	L
CO5	S	S	M	M	L	S	S	S	S	L

☞ S–Strong;   M – Medium; L –Low

18UCA3C04	CORE: DATA STRUCTURES USING C++

CO1	Ability to analyze algorithms and algorithm correctness	K,U
CO2	Ability to apply in stack, queue and linked list in data structure	K,U
CO3	Ability to have knowledge of tree and graphs concepts	U,S
CO4	Ability to work with various searching and sorting techniques	K,U,S
CO5	Able to understand the concept of Indexing and Hashing Techniques	K,U,S

☞ K–Knowledge   U–Understanding   S -Skill

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	L	M	L	S	S	M	M	L
CO2	S	S	L	M	L	S	S	M	M	L
CO3	S	S	L	M	L	S	S	M	M	L
CO4	S	S	L	M	L	S	S	M	M	L
CO5	S	S	L	M	L	S	S	S	M	L

☞ S–Strong;   M – Medium; L –Low

18UCA3C05	CORE: OPERATING SYSTEM

CO1	Ability to understand about basic concepts of Operating System, its functions and services.	K,U
CO2	Understanding about Process Management, CPU scheduling, File handling and I/O operations.	K,U,S
CO3	Ability to understand about memory management	K,U,S
CO4	Understanding about of mass storage structure	U,S
CO5	Acquiring basic knowledge about OS like Linux and Windows 7	K,U,S

☞ K–Knowledge   U–Understanding   S -Skill

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	L	M	L	S	M	M	L	L
CO2	S	S	L	M	L	S	M	M	L	L
CO3	S	S	L	M	L	S	M	M	L	L
CO4	S	S	L	M	L	S	M	M	L	L
CO5	S	S	L	M	L	S	M	M	L	L

☞ S–Strong;   M – Medium; L –Low

18UCA3AL3	ALLIED: OPERATIONS RESEARCH

CO1	remembering the formulation of Business Problems.	K
CO2	understanding the methods of problem solving	U
CO3	applying the mathematical calculations in Industrial Problems.	S
CO4	analyzing mathematical methods and applications.	U

☞ K–Knowledge   U–Understanding   S -Skill

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	L	M	M	L	L	L	L	L	L
CO2	M	M	M	L	L	M	M	L	L	L
CO3	M	M	M	M	L	L	L	L	L	L
CO4	M	M	M	M	L	L	L	L	L	L

☞ S–Strong;   M – Medium; L –Low

18UCA3CP3	Core Practical : Java Programming Lab	
CO1	Understanding the fundamental programming concepts	S
CO2	Ability to understand and applying process handling method by multithreading while developing a program.	S
CO3	Applying the Concept of java to solve the network related problems.	S
CO4	Ability to develop an application for Server side Programming.	S
CO5	Able to apply the concept to solve real-time problems.	S

☞ K–Knowledge   U–Understanding   S -Skill

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	L	M	M	L	L	L	L	L	L
CO2	S	M	M	L	L	M	M	L	L	L
CO3	S	M	M	M	L	L	L	L	L	L
CO4	S	M	M	M	L	L	L	L	L	L
CO5	S	M	M	L	L	L	L	L	L	L

☞ S–Strong;   M – Medium; L –Low

18UCA3CP4	CORE PRACTICAL : DATA STRUCTURE USING C++ LAB	
CO1	Ability to analyze algorithms and algorithm correctness.	S
CO2	Ability to perform searching and sorting techniques.	S
CO3	Ability to accomplish stack, queue and linked list operation.	S
CO4	Ability to have knowledge about file concepts.	S
CO5	Apply the data structure concepts to solve real-time problems.	S

☞ K–Knowledge   U–Understanding   S -Skill

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	L	M	M	L	L	L	L	L	L
CO2	M	M	M	L	L	M	M	L	L	L
CO3	M	M	M	M	L	L	L	L	L	L
CO4	M	M	M	M	L	L	L	L	L	L
CO5	M	M	M	M	L	L	L	L	L	L

☞ S–Strong;   M – Medium; L –Low

18UCA4C06	CORE: VISUAL PROGRAMMING (C#.NET)

CO1	Ability to work with the basic C sharp console Program to Create Console Applications	U
CO2	Ability to make familiar to develop C sharp windows application	S
CO3	Ability to work with ADO.Net and its Application	U
CO4	Ability to have knowledge of Database Connectivity and Report Generation using C Sharp.	U
CO5	Ability to working with ASP.Net and its Basic Programs.	U

☞ K–Knowledge   U–Understanding   S -Skill

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	L	L	L	M	L	M	L	L
CO2	M	S	L	M	L	M	M	M	L	L
CO3	S	M	M	M	L	S	M	M	L	L
CO4	M	S	M	S	L	M	S	S	M	L
CO5	S	S	L	M	L	S	M	M	L	L

☞ S–Strong;   M – Medium; L –Low

18UCA4C07	CORE: RELATIONAL DATABASE MANAGEMENT SYSTEMS

CO1	Know and practice the data models and schemas in DBMS	U
CO2	Develop the database designs and apply normalization techniques to normalize the database	S
CO3	Use SQL to structure the database to handle data	S
CO4	Use the PL/SQL to create, secure, populate, maintain, and query a database.	S
CO5	Get an opportunity in various positions of database administration	U

☞ K–Knowledge   U–Understanding   S -Skill

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	L	M	M	L	L	L	L	L	L
CO2	M	M	M	L	L	M	M	L	L	L
CO3	M	M	M	M	L	L	L	L	L	L
CO4	M	M	M	M	L	L	L	L	L	L
CO5	M	M	M	M	L	L	L	L	L	L

☞ S–Strong;   M – Medium; L –Low

18UCA4AL4	ALLIED 4 - FUNDAMENTALS OF ACCOUNTING

CO1	understand the role of basic Accounting Concepts and Conventions.	U
CO2	preparation financial statements in accordance with Generally Accepted Accounting Principles.	K
CO3	demonstrate knowledge of each step in the various subsidiary books of accounting.	U
CO4	support at a basic level the recording and reporting of cost accounting information for business.	K
CO5	demonstrate an understanding the Budgeting and types of Budget preparation.	S

☞ K–Knowledge   U–Understanding   S -Skill

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	L	M	M	L	L	L	L	L	L
CO2	M	M	M	L	L	M	M	L	L	L
CO3	M	M	M	M	L	L	L	L	L	L
CO4	M	M	M	M	L	L	L	L	L	L
CO5	M	M	M	M	L	L	L	L	L	L

☞ S–Strong;   M – Medium; L –Low

18UCA4CP5	CORE PRACTICAL : VISUAL PROGRAMMING LAB (C#.NET)

CO1	work with the basic concepts of C sharp console applications	S
CO2	have knowledge about Array and String Function in c sharp console	S
CO3	understand basic concepts about c sharp windows application with programs	S
CO4	understand about ADO.Net using Database Connectivity Programs	S
CO5	have knowledge to do some real time projects	S

☞ K–Knowledge   U–Understanding   S -Skill

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	L	L	M	L	S	M	M	L	L
CO2	S	S	L	M	L	S	S	L	L	L
CO3	S	M	M	M	L	S	M	S	M	L
CO4	S	M	S	S	L	S	S	S	S	L
CO5	S	S	M	M	L	S	S	S	M	L

☞ S–Strong;   M – Medium; L –Low

18UCA4CP6	CORE PRACTICAL : RELATIONAL DATABASE MANAGEMENT SYSTEMS LAB MANAGEMENT

CO1	Ability to perform DDL, DML commands in a database	S
CO2	Ability to have knowledge about various operations like set operations, relational and logical operations	S
CO3	Ability to understand the inbuilt functions like number functions, character functions, date functions	S
CO4	Ability to understand the PL/SQL structure and operations	S
CO5	Ability to apply PL/SQL concepts to solve real time problems.	S

☞ K–Knowledge   U–Understanding   S -Skill

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	L	M	M	L	L	L	L	L	L
CO2	M	M	M	L	L	M	M	L	L	L
CO3	M	M	M	M	L	L	L	L	L	L
CO4	M	M	M	M	L	L	L	L	L	L
CO5	M	M	M	M	L	L	L	L	L	L

☞ S–Strong;   M – Medium; L –Low

18UCA4NM2	NME: DATA SCIENCE AND BIG DATA ANALYTICS LAB

CO1	Ability to understand basic concepts of Data Mining	U
CO2	Ability to have knowledge about OLAP tools and k-nearest Neighbor algorithm	K
CO3	Ability to understand Basic concepts of R Programming	K
CO4	Ability to understand the Reading data into R	U
CO5	Ability to understand about the Clustering algorithms	K

☞ K–Knowledge   U–Understanding   S -Skill

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	L	M	L	S	M	M	L	L
CO2	S	S	L	M	L	S	M	M	L	L
CO3	S	S	L	M	L	S	M	M	L	L
CO4	S	S	L	M	L	S	M	M	L	L
CO5	S	S	L	M	L	S	M	M	L	L

☞ S–Strong;   M – Medium; L –Low

18UCA5C08	CORE: WEB TECHNOLOGY (HTML, BOOTSTRAP. PHP AND MYSQL)

CO1	Ability to design web page using HTML5.	K
CO2	Understanding the Features of CSS and Bootstrap CSS and how to apply this in the web page.	K,U
CO3	Understanding the concept of Server Side Scripting language PHP and MySql. Ability to write code in PHP and save the data into the MySql database Table.	K,U
CO4	Understand the concept of Java Script in web programming.	K,U
CO5	Ability to understand the functional dependencies of AJAX in PHP	S

☞ K–Knowledge   U–Understanding   S -Skill

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	M	M	S	M	L	L	L	L	L
CO2	M	M	M	S	M	M	M	L	L	L
CO3	M	M	M	M	M	L	L	L	L	L
CO4	M	L	M	M	M	L	L	L	L	L
CO5	L	M	M	S	M	L	L	L	L	L

☞ S–Strong;   M – Medium; L –Low

18UCA5C09	CORE: SOFTWARE ENGINEERING

CO1	Ability to apply software engineering techniques.	K,U
CO2	Ability to develop, maintain and evaluate software systems.	K,U,S
CO3	To produce efficient, reliable, robust and cost-effective software solutions.	K,U,S
CO4	Ability to perform independent research and analysis.	K,U,S
CO5	Ability to work as an effective member of software engineering team.	K,U,S

☞ K–Knowledge   U–Understanding   S -Skill

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	S	L	M	L	M	S	L
CO2	S	S	L	S	L	S	M	M	L	L
CO3	S	S	L	S	L	S	L	S	L	L
CO4	M	M	L	M	L	S	S	S	M	L
CO5	M	S	M	M	L	S	S	S	S	L

☞ S–Strong;   M – Medium; L –Low

18UCA5C10	CORE: COMPUTER NETWORKS

CO1	To understand the concepts of functions, components, and models of the computer networks	K,U
CO2	Understanding the concepts of IP addressing and subnetting calculation	K,U,S
CO3	Identify the different types of routing protocols and metrics	K,U,S
CO4	Understand the functionalities of VLAN and inter-VLAN routing	K,U,S
CO5	Apply Packet Tracer tool to implement advanced Networking Concept	K,U,S

☞ K–Knowledge   U–Understanding   S -Skill

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	M	M	M	M	S	M	M	L
CO2	S	S	L	L	M	S	S	S	M	L
CO3	S	S	M	M	M	S	S	S	M	L
CO4	S	M	M	M	M	S	S	S	M	L
CO5	S	S	M	M	M	S	S	M	M	L

☞ S–Strong;   M – Medium; L –Low

18UCA5EL1	ELECTIVE: 1 CYBER SECURITY

CO1	Understanding basic Mathematical tools for cryptography concepts	K,U
CO2	Understanding the concept of AES, Blowfish algorithm and its applications.	U
CO3	Analyzing the concept of public key cryptosystems.	K,S
CO4	Understanding the concept of Digital Signature Algorithms	K,S
CO5	Understanding the concept of and Firewall and its applications	K,S

☞ K–Knowledge   U–Understanding   S -Skill

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	L	M	S	M	L	L	L	L	L
CO2	M	S	M	L	L	M	M	M	L	L
CO3	S	M	S	S	S	L	M	M	M	M
CO4	M	L	M	S	M	S	L	M	S	M
CO5	S	L	M	S	M	L	L	L	L	L

☞ S–Strong;   M – Medium; L –Low

18UCA5CP7	Core Practical: Web Technology (HTML, Bootstrap. PHP and MySQL)

CO1	ability to design web page using HTML5.	S
CO2	understanding the Features of CSS and Bootstrap CSS and how to apply this in the web page.	S
CO3	apply the concept of Server Side Scripting language PHP and MySql.	S
CO4	understand the JavaScript basics and apply the validation in HTML forms.	S
CO5	ability to understand the functional dependencies of AJAX in PHP.	S

☞K–Knowledge   U–Understanding   S -Skill

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	L	M	M	L	L	L	L	L	L
CO2	M	M	M	L	L	M	M	L	L	L
CO3	M	M	M	M	L	L	L	L	L	L
CO4	M	M	M	M	L	L	L	L	L	L
CO5	M	M	M	M	L	L	L	L	L	L

☞ S–Strong;   M – Medium; L –Low

18UCA5CP8	CORE PRACTICAL : COMPUTER NETWORKS LAB

CO1	Identify the different types of static routing	S
CO2	Identify the different types of routing protocols and metrics	S
CO3	Understand the functionalities of VLAN and inter-VLAN routing	S
CO4	Understand the working principles of Ether channel and ACL	S
CO5	Apply Packet Tracer tool to implement advanced Networking Concept.	S

☞K–Knowledge   U–Understanding   S -Skill

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	L	L	M	L	S	M	M	L	L
CO2	S	S	L	M	L	S	S	L	M	L
CO3	S	M	M	M	L	S	S	S	L	L
CO4	S	M	S	S	L	S	S	S	S	L
CO5	S	S	M	M	L	S	S	S	M	L

☞ S–Strong;   M – Medium; L –Low

18UCA6C11	CORE: PYTHON PROGRAMMING

CO1	understanding the methodologies and essentials of Python programming.	K,U
CO2	understanding the basic concepts of python modules and packages.	K,U
CO3	create simple prediction programs using Python.	U
CO4	interpret and analyse the real time datasets with python packages.	U,S
CO5	understand the concept of Scikit Learn	U

☞ K–Knowledge   U–Understanding   S -Skill

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	M	L	M	M	S	M	S	M	L
CO2	M	M	L	M	M	S	M	S	S	L
CO3	L	M	M	L	M	M	L	S	S	L
CO4	S	S	M	M	M	S	M	M	M	L
CO5	L	M	M	L	M	S	M	S	L	L

☞ S–Strong;   M – Medium; L –Low

18UCA6C12	CORE: MOBILE COMPUTING AND ANDROID PROGRAMMING

CO1	Know the basic concept of mobile computing.	U
CO2	Understanding the basic idea to create android application	K,U
CO3	Understand the concept of XML and intents.	S
CO4	Understand the concept of android animation.	U,S
CO5	Apply the concepts to solve real-time android applications.	K,U

☞ K–Knowledge   U–Understanding   S -Skill

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	S	L	S	S	M	S	L
CO2	S	S	M	L	L	M	M	L	M	L
CO3	S	S	M	M	M	M	M	L	L	L
CO4	S	S	M	M	M	M	M	L	M	L
CO5	S	S	M	M	M	M	M	L	L	L

☞ S–Strong;   M – Medium; L –Low

18UCA6EL2	ELECTIVE: DATA MINING AND WAREHOUSING

CO1	Preprocess the data for mining applications.	K
CO2	Apply the association rules for mining the data.	K,U
CO3	Design and deploy appropriate classification techniques.	K,U,S
CO4	Cluster the high dimensional data for better organization of the data	K,U,S
CO5	Evaluate various mining techniques on complex data objects.	K,S

☞ K–Knowledge   U–Understanding   S -Skill

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	L	M	M	M	S	L	M	L	M
CO2	M	M	M	L	L	M	M	L	L	M
CO3	M	M	M	M	M	M	L	M	L	L
CO4	M	M	M	M	M	M	L	M	L	M
CO5	M	M	M	M	M	S	M	L	M	L

☞ S–Strong;   M – Medium; L –Low

18UCA6CP9	CORE PRACTICAL : PYTHON PROGRAMMING LAB

CO1	Understand the essentials of Python programming	S
CO2	do basic programs using python modules and packages	S
CO3	create simple algorithms with and without using packages	S
CO4	Interpret algorithm and visualize the results with real time datasets	S

☞ K–Knowledge   U–Understanding   S -Skill

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	L	M	M	L	M	L	M	L	L
CO2	M	M	L	M	L	S	M	S	S	L
CO3	L	M	M	L	L	M	L	S	S	L
CO4	S	S	M	M	L	S	M	M	M	L

☞ S–Strong;   M – Medium; L –Low

18UCA6CP10	CORE PRACTICAL : ANDROID PROGRAMMING LAB	

CO1	Know the basic android application.	S
CO2	Implement simple applications with Notifications and alarms.	S
CO3	Analyze the android locations with map.	S
CO4	Apply the android concepts to solve real time problems	S

☞ K–Knowledge   U–Understanding   S -Skill

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	M	M	M	S	S	M	M	M
CO2	S	S	S	M	M	S	M	L	L	L
CO3	S	S	M	M	M	S	L	L	M	M
CO4	S	S	M	M	M	M	S	M	L	L

☞ S–Strong;   M – Medium; L –Low

18UCA5EL1	ELECTIVE: 1 COMPUTER NETWORKS	

CO1	To understand the concepts of functions, components, and models of the computer networks	K
CO2	To attain the basic knowledge in Datalink layer	U
CO3	To understand the concept of network layer design issue and congestion control	U
CO4	To understand the transport layer service	U
CO5	To gain knowledge in cryptography concept and Application layer protocol	K

☞ K–Knowledge   U–Understanding   S -Skill

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	M	L	L	M	S	M	M	L
CO2	M	M	M	M	M	S	M	S	L	L
CO3	S	M	M	L	L	M	S	M	M	L
CO4	M	S	M	L	L	M	M	S	L	L
CO5	S	M	M	L	L	S	S	M	M	L

☞ S–Strong;   M – Medium; L –Low

18UCA5EL1	ELECTIVE : 1 - COMPILER DESIGN	

CO1	understanding the concepts of Compilers and lexical analysis.	K
CO2	identifying the logics of symbol tables and parsing, top down translation.	K
CO3	analyzing the concepts of S&L attribute and type checking	U
CO4	analyzing the run generation and code generation.	U
CO5	applying the concepts to solve the problem for Code optimization.	S

☞ K–Knowledge   U–Understanding   S -Skill

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	M	L	M	S	M	L	L	M
CO2	M	M	L	M	L	M	L	M	L	L
CO3	S	M	S	L	M	S	L	L	L	M
CO4	M	M	M	L	M	S	M	L	M	L
CO5	S	S	L	M	L	M	L	S	M	M

☞ S–Strong;   M – Medium; L –Low

18UCA5EL1	ELECTIVE: 1 - GRAPHICS AND MULTIMEDIA	

CO1	Understanding The Concepts Of Concepts Of Multimedia.	U
CO2	Identifying The Logics Of Graphical Techniques.	K
CO3	Analysing The Concepts Of Audio And Video File Usage Techniques	U
CO4	Understanding The Concepts Of Multimedia Techniques	U
CO5	Applying The Concepts To Understand Basic Photoshop Tool Techniques.	S

☞ K–Knowledge   U–Understanding   S -Skill

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	S	L	S	L	M	M	L
CO2	S	S	S	M	L	S	M	L	S	L
CO3	S	S	M	M	L	S	M	L	M	L
CO4	S	M	S	M	L	M	S	L	M	L
CO5	S	M	S	M	L	M	M	S	M	L

☞ S–Strong;   M – Medium; L –Low

18UCA5EL1	ELECTIVE 1: CLIENT / SERVER COMPUTING

CO1	Ability to understand the concepts of client server network	U
CO2	Ability to understand the anatomy of a client and server program	U
CO3	Understanding the concept of Middleware and Distributed security	K
CO4	Ability to understand SQL databases servers	U
CO5	Understand the concept of Group Ware component, distributed objects and CORBA	U

☞ K–Knowledge   U–Understanding   S -Skill

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	L	M	L	S	S	S	L	L
CO2	M	S	L	S	L	S	S	S	M	L
CO3	L	M	L	M	L	S	S	M	L	L
CO4	S	L	L	M	L	M	S	L	L	L
CO5	S	S	M	M	L	S	S	S	M	L

☞ S–Strong;   M – Medium; L –Low

18UCA6EL2	ELECTIVE - 2: DISTRIBUTED COMPUTING SYSTEMS

CO1	Understanding the concepts of Distributed Computing Systems	U
CO2	Implementation of Distributed Systems	S
CO3	Distributed system modeling	U
CO4	Applications of Distributed Computing in Databases	K
CO5	Programming language design and algorithm for distributed computing	U

☞ K–Knowledge   U–Understanding   S -Skill

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	M	M	M	M	M	L	L
CO2	S	S	M	M	M	S	M	S	M	L
CO3	M	M	M	M	L	M	M	M	M	L
CO4	M	M	M	M	L	M	M	M	M	L
CO5	M	L	M	M	L	M	M	M	L	L

☞ S–Strong;   M – Medium; L –Low

18UCA6EL2	ELECTIVE – 2 :EMBEDDED SYSTEM

CO1	Ability to describe the differences between the general computing system and embedded system.	K
CO2	Become aware of the architecture of processor and its programming aspects.	U
CO3	Become aware of interrupts.	U
CO4	Design real time embedded system using the concepts of RTOS.	K
CO5	Analyze various examples of embedded system based on processor.	U

☞ K–Knowledge   U–Understanding   S -Skill

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	L	S	M	L	L	L	L	L	L
CO2	S	M	M	L	L	M	M	L	L	L
CO3	S	M	L	M	L	L	L	L	L	L
CO4	S	M	M	L	L	L	M	M	M	L
CO5	S	M	M	M	L	L	L	L	L	L

☞ S–Strong;   M – Medium; L –Low

18UCA6EL2	ELECTIVE: 2 GEOGRAPHICAL INFORMATION SYSTEMS

CO1	Apply the concept of GIS and spatial data.	S
CO2	Apply the usage of GIS in this current world.	S
CO3	Handling GIS spatial data, database and datasets.	K
CO4	Understanding the measurement in GIS, Queries, Reclassification, analysis ..etc.	U
CO5	Understanding physical and environmental, spatial, cartographic processed output.	U

☞ K–Knowledge   U–Understanding   S -Skill

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	L	M	M	L	L	L	L	L	L
CO2	M	M	M	L	L	M	M	L	L	L
CO3	M	M	M	M	L	L	L	L	L	L
CO4	M	M	M	M	L	L	L	L	L	L
CO5	M	M	M	M	L	L	L	L	L	L

☞ S–Strong;   M – Medium; L –Low

18UCA6EL2	ELECTIVE – 2: DESIGN AND ANALYSIS OF ALGORITHM

CO1	Apply the concept of Divide and Conquer, Finding Maximum and minimum.	S
CO2	Apply the usage of Greedy method, Knapsack problem.	S
CO3	Handling concept of Back tracking methods.	K
CO4	Understanding the usage of Branch and bound methods.	U
CO5	Understanding physical Lower bound Theory	U

☞ K–Knowledge   U–Understanding   S -Skill

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	L	M	M	L	L	L	L	L	L
CO2	M	M	M	L	L	M	M	L	L	L
CO3	M	M	M	M	L	L	L	L	L	L
CO4	M	M	M	M	L	L	L	L	L	L
CO5	M	M	M	M	L	L	L	L	L	L

☞ S–Strong;   M – Medium; L –Low

SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS) COIMBATORE – 641 020
For candidates admitted from academic year 2018 - 2019 onwards under New CBCS.

Programme: BCA   **Course Code:** 18UCA1C01

Course Title: Core: PROGRAMMING IN C   **5 Hours / week**

Year: I   **Semester: I**   **Credits: 4**

UNIT I: **(15 Hrs)**

Overview of C – Introduction-Character set – C Tokens Keywords & identifiers - Constant –Variables - Data types- Declaration of Variables- Assigning values to variables- Defining Symbolic Constants. Operators and Expressions:- Arithmetic, Relational Logical, Assignment, Conditional Bitwise, Special, Increment and Decrement operators – Arithmetic Expressions - Evaluation of expression - Precedence of arithmetic operators – Type conversion in expression-operator precedence & associative – mathematical functions. Managing Input and Output Operations:- Reading & writing a character – formatted input and output. (Page No : 1-36, 52-76, 84-107.)

UNIT II: **(15 Hrs)**

Decision making and Branching: – Decision making with IF Statement-simple IF Statement- The IF ELSE statement-Nesting of IF—ELSE statement-Else if Ladder-Switch Statement- -Conditional operator. Decision Making and Looping:- The WHILE statement- Do Statement-FOR Statement.
Arrays: The One Dimensional Array-Declarations – Initialization-Two Dimensional Array-Initialization- Multidimensional arrays. Character Arrays and strings: Declaring and initializing string variables- Reading strings from terminals-writing strings to screen - Arithmetic operation on character-putting strings together-comparison of two strings- string handling functions- table of Strings.(Page No: 112-130, 153-168, 194-216, 238-261).

UNIT III   **(15 Hrs)**

User defined functions:– Need for user Defined functions- A multi function program – Elements of User defined functions-Definition of functions-–Return values and their types- Calling a function-Function declaration- Category of functions-No Arguments and no Return values-Arguments but no return values-Arguments with return values-No Arguments but Return the value-Functions that return multiple values- nesting of functions- Recursion- Passing arrays to functions-Passing strings to functions- The scope, visibility and lifetime of
variables (Page No: 270-312)

UNIT IV   **(15 Hrs)**

Structure and Union: Defining a structure-Declaring the structure variables – Accessing structure members-Structures initialization- Copying and comparing structure variables- Arrays of Structures - Arrays with in Structures- Structures within structures – Structures and functions-unions- Size of structures- Bit fields. Pointers:- Understanding pointers- Accessing the Address of a Variable – Declaring and initializing pointers- Accessing a variable through its pointers- pointers expressions pointer increments and scale factor - pointers and arrays – pointers and character strings- pointers as functions arguments.(Page No: 324-344, 357-363,366-372,375).

UNIT V   **(15 Hrs)**

   File management in C:- Defining and opening a file- closing file-I/O operations on files-
Error handling during I/O operations-Random Access to files- Command line arguments – The
Preprocessor: Macro substitution- File inclusion- Complier control directives (Page No: 395-
416,453-461)

Text Book
   1. Balagurusamy .E, Programming in ANSI, 6th Edition, McGraw Hill 2012.

Reference Books
1. YashavantKanetkar, Let us C, 2nd Edition,Tata McGraw Hill.
2. Mullesh cooper, Sprit of C, 4th Edition, Tata McGraw Hill.
3.http://spoken-tutorial
Pedagogy
- Lectures, Group discussions, Demonstrations, Case studies

SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE
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For candidates admitted from academic year 2018 - 2019 onwards under New CBCS.

Programme: BCA   **Course Code:** 18UCA1CP1

Course Title: Core Practical: Programming in C   **4 Hours / week**

Year: I   **Semester: I**   **Credits: 3**

LIST OF PRACTICALS

1. Write a program for quadratic equation to find different types of roots.

2. Write program to find prime numbers below 1000.

3. Write program to find maximum and minimum no with the set of numbers.

4. Write a program for two-dimensional matrix addition.

5. Write a program for two-dimensional matrix multiplication.

6. Write program to find a factorial value of given numbers.

7. Write program to find Fibonacci series for n numbers.

8. Write program to convert integer into words form range 1 to100.

9. Write program to find Armstrong no for 1 to 1000.

10. Conversion of decimal to binary.

11. Conversion of binary to decimal.

12. Sum of diagonals of the matrix.

13. Find ncr value using function.

14. To calculate biggest among n numbers using function.

15. To check given string is palindrome or not, without using string reverse function.

16. To sort a given set of numbers in ascending order.

17. To sort given set of strings using pointers.

18. To count no. of words, lines, characters in a given sentence.

19. To read one file & write it into another using command line arguments.

20. Write a program to count the occurrence of a character in a given string.

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For candidates admitted from academic year 2018-2019onwards under New CBCS.

Programme: BCA   **Course Code:** 18UCA2C02

Course Title: Core: Object Oriented Programming with C++   **5 Hours / week**

Year: I   **Semester: II**   **Credits: 3**

UNIT I   **(15 Hrs)**
Introduction to C++: Key concepts of OOPs – Advantages – object oriented languages –Input and output in C++: Streams in C++ - Pre- Defined Streams – Unformatted console I/O operation – Formatted console I/O operations – C++Declarations – Control structures: Decision Makingstatements –If….Else – Jump – GOTO – Break – Continue – Switch case statements – Loops in C++ : For – While – Do… While Loops – Functions in C++ - In Line Functions – Function Overloading.(Page No. 7-31, 77-119, 125-148, 152-176)

UNIT II   **(15 Hrs)**
Class and Object: Declaring objects – Defining Member Functions – Static Member Variables and Functions – Array of Object – Friend Functions – Overloading Member Functions – Bit Fields and Class. **Constructor and Destructors:**Characteristics – Calling Constructor and Destructors – Constructors and Destructors with Static Member.(Page No. 195-253, 258-296)

UNIT III   **(15 Hrs)**
Operator Overloading: Overloading Unary – Binary Operators – Overloading Friend Functions – Type Conversion – **Inheritance:** Types of Inheritance – Single – Multilevel – Multiple – Hierarchical – Hybrid and Multi Path Inheritance – Virtual Base Classes – Abstract Classes.(Page No. 302-331, 340-385)

UNIT IV   **(15 Hrs)**
Pointers: Declaration – Pointer to Class – Object – THIS Pointer – Pointer to Derived Classes and Base Classes – **Arrays:** Characteristics – Arrays of Classes – Memory Models – New and Delete Operators – Dynamic Object – Binding – Polymorphisms and Virtual Functions.(PageNo. 397-412, 428-431, 438-448, 457-474)

UNIT V   **(15 Hrs)**
Files: File Stream Classes – File Modes – Sequential Read/ Write Operations – Binary and ASCII Files – Random Access Operation – Command Line Arguments - **Exception Handlings :**Principles of Exception Handling – The Keywords try, Throws and Catch – Exception Handling Mechanism – Multiple Catch Statements – Catching Multiple Exceptions – Rethrowing Exception – **Strings:** Declaring and Initializing String Objects – Strings Attributes –Miscellaneous Functions.(Page No. 496-539, 579-588, 607-625)

Text Book
1. Ashok N Kamthane, "Object Oriented Programming with ANSI and Turbo C++", Pearson Education Publications 2006.

Reference Books
1. Balagurusamy. E, Object Oriented Programming with C++ - TMH Pub 1998.
2. John R Hubbard, Programming with C++ - TMH Publ. II Edition 2002.

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Programme: BCA   **Course Code:** 18UCA2CP2

Course Title: Core Practical: Object Oriented Programming with C++**5 Hours / week**

Year: I   **Credits: 3**   **Semester: II**

LIST OF PRACTICALS

1. Write a C++ program to read an integer and reverse it. Having reversed it check whetherit is prime or not.
2. Write a C++ program to find the Largest and smallest value in 'n' numbers.
3. Write a C++ program to count the number of characters, words and lines in a givensentence without using string functions.
4. Write a C++ program to sort the given set of strings.
5. Construct class for primitive data structure Stack operation.
6. Construct class for primitive data structure Queue operation.
7. Write a C++ program for binary search.
8. Write a C++ program to implement Constructors and Destructors in factorial of 'n'numbers.
9. Write a C++ program to implement Copy Constructor.
10. Write a C++ program to implement unary operator overloading.
11. Write a C++ program to implement Binary Operator (+) Overloading for the addition ofComplex numbers.
12. Write a C++ program to implement Multiple Inheritance for Student details.
13. Write a C++ program to implement Friend function for Employee details.
14. Write a C++ program to implement pure virtual function for Student details.
15. Write a C++ program on accessing the Data Members using "this" pointer.
16. Write a C++ program to create a binary file "mark.dat" and store student name, rollnoand marks in three subjects using structure.
17. Write a C++ program to find maximum of two data using template function.
18. Write a C++ program to create two different types of objects using class template.

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For candidates admitted from academic year 2018-2019onwards under New CBCS.

Programme: BCA   **Course Code:**18UCA3C03

Course Title: Core: Java Programming   **5 Hours / week**

Credits: 4   **Year: II**   **Semester: III**

Unit I   **(15 Hrs)**
        Object Oriented Fundamentals and Java Revolution: Object Oriented Programming –
Encapsulation – Inheritance – Polymorphism – Java Genesis – Characteristics – Java Programming
Techniques – Lexical Issues – Variables – Types – Simple Types – Arrays - Operators.(Page
Number: 17-87)

Unit II   **(15 Hrs)**
        Flow Control and Classes: Branching: If-else, Break, Switch, Return Statements –Looping:
While, Do-while, for, comma statements, Continue – Classes: Object References –
Instance Variables – New Operator – Dot Operator – Method Declaration – Method Calling – This
Operator .

Constructors – Method Overloading – Inheritance – Super Class – Method overriding – Dynamic
Method Dispatch – Final, Finalize, Static, Abstract Classes (Page Number: 89-127)

Unit III   **(15 Hrs)**
        Packages and Inheritance: Packages: The Package Statement – Compiling Classes in
Packages – The Import Statement – Access Protection – Interfaces: The Interface Statement –
The Implements Statement – Variables in Interfaces – String Handling – Constructors – String
Creation – String Concatenation – Character Extraction.
        Exception Handling Fundamentals – Exception Types – Uncaught Exceptions – Nested Try
Statements – The Java Thread Model – Thread Priorities, Synchronization, Messaging – Thread –
Runnable – Synchronization – Inter Thread Communication – Thread API summary. (Page
Number: 165-197)

Unit IV   **(15 Hrs)**
Utilities and Files: Simple Type Wrappers – Enumerations – Runtime – System – Date – Math –
Random – Input and Output – File – Directory – Filename filter – Input Stream – Output Stream –
File Streams.(Page Number: 201-230)

Unit V   **(15 Hrs)**
Applets: HTML – Applet Tag – Order of Applet Initialization – Sizing Graphics – Simple Graphics
Methods – Drawling – Draw Arc and Fill Arc – Font Manipulation – Imaging – Simple Image
Loader – Image Observer.(Page Number: 253 – 313)

Text Book
  1. Patrick Naughton, The JAVA Hand Book, TATA McGraw Hill..

Reference Books
  1. Herbert Schildt, The Complete Reference- Java 2, 5th Edition, TATA McGraw Hill,2002.
  2. Harley Haim, The Internet Computer reference, 2nd Edition, TATA McGraw Hill, 1998.
  3. http://spoken-tutorial.org/

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For candidates admitted from academic year 2018-2019onwards under New CBCS.

Programme: BCA   **Course Code: 18UCA3C04**

Course Title: Core: Data Structures using C++   **5 Hours / week**

Year: II   **Semester: III**   **Credits: 4**

Unit-I   **(15 Hrs)**
Algorithm Specification**(25-32)**-Performance Analysis**(38-61)**. Arrays: Array as an ADTPolynomial ADT- Polynomial Representation–Polynomial Addition –Sparse Matrices-Representation of Arrays**(84-112)**. Stacks and Queues: Stacks ADT- Queues ADT. **(134-147)**

Unit-II   **(15 Hrs)**
Linked lists: Singly Linked Lists and Chains-Representing Chains in C++ **(170-183)**-Circular Lists-Available Space List-Linked Stacks and Queues-Polynomials-Equivalence Classes **(194-215)**-Doubly Linked List-Generalized Lists **(224-240)**.

Unit-III   **(15 Hrs)**
Trees: Introduction – Binary Trees – Binary Tree Traversal and Tree Iterators **(243-269)** – Threaded binary trees **(274-277)** - Graphs: Graphs ADT – Elementary Graph Operation: Depth First Search – Breadth First Search – Connected components – Spanning Trees – Biconnected Components – Minimum Cost Spanning Tree - Shortest Path and Transitive Closure **(324-372).**

Unit-IV   **(15 Hrs)**
Internal Sorting:Insertion Sort – Quick Sort **(399-405)**-Merge Sort-Heap Sort **(407-416)**. External Sorting: Introduction- k way Merging Buffer Handling for Parallel Operation-Run Generation-Optimal Merging of Runs **(438-457)**.

Unit-V   **(15 Hrs)**
Hashing: Introduction-Static Hashing: Hash Table-Hash Function **(458-463)**-Dynamic Hashing **(477-482)**-Efficient Binary Search Trees: Optimal Binary Search Tree- AVL Trees **(553-577)**. Multiway Search Tree **(606-635)**.

Text Book
1. Ellis Horowitz and SartajSahni, Fundamentals of Data Structures, Computer Science Press, 2002 (All Units).

Reference Books
1. Tanenbaum A. M. and Augestine M. J., Data Structures Using Pascal, Prentice hall, 2nd edition, 1996.
2. YashwantKanetkar, Data Structures through C, BPB publication, 2003.
3. SartajSahni, Data Structures, Algorithms & Applications in C++. McGraw-Hill, 1998.
4. Samuktha, Data and File Structures, Addison Wesley, 1999.
5. http://spoken-tutorial.org

SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS) COIMBATORE – 641 020
For candidates admitted from academic year 2018-2019onwards under New CBCS.

Programme: BCA   **Course Code: 18UCA3C05**

Course Title: Core: Operating System   **4 Hours / week**

Credits: 4   **Year: II**   **Semester: III**

Unit I   **(15 Hrs)**
         Introduction-Defining Operating System-Computer-System Organization-Computer-System- Computer-System Organization- Computer-System Architecture- Operating-System Structure- Operating-System Operations- Process Management- Memory Management- Storage Management- Protection and Security- Kernel Data Structures- Computing Environments- Open-Source Operating Systems.(Pages:28-71).

Unit II   **(16 Hrs)**
Processes Management: Process Concept- Process Scheduling- Operations on Processes-Interprocess Communication- Examples of IPC Systems- Communication in Client–Server Systems- (Pages:130-171)
Deadlocks: System Model- Deadlock Characterization- Methods for Handling Deadlocks-Deadlock Prevention- Deadlock Avoidance- Deadlock Detection- Recovery from Deadlock(Pages:340-362)

Unit III   **(14 Hrs)**
Main Memory: Background- Swapping- Contiguous Memory Allocation- Segmentation- Paging-Structure of the Page Table(Pages:375-402)
Virtual Memory: Background- Demand Paging- Page Replacement- Allocation of Frames -Thrashing- Memory Mapped Files- Allocating Kernel Memory(Pages:421-460)

Unit IV   **(16 Hrs)**
Mass Storage Structure: Overview of Mass-Storage Structure- Disk Structure- Disk Attachment-Disk Scheduling- Disk Management- Swap-Space Management- RAID Structure- Stable-Storage Implementation(Pages:491-518)
File –System Interface: File Concept- Access Methods- Directory and Disk Structure- File-System Mounting- File Sharing- Protection(Pages:527-557)

Unit V   **(14 Hrs)**
The Linux System: Linux History- Design Principles- Kernel Modules- Process Management-Scheduling- Memory Management- File Systems- Input and Output- Interprocess Communication-Network Structure- Security(Pages:405-445)
Windows 7: History- Design Principles- System Components- Terminal Services and Fast User Switching- File System- Networking- Programmer Interface(Pages:853-898)

Text Book
   1. Silberschatz, Galvin Gagne, Operating System Concepts, 9th Edition, Wiley India Edition,2013

Reference Books
1. DeitelDeitelChoffnes, Operating Systems, 3rd Edition, Pearson Education, 2003.
2. Stuart E. Madnick, John J.Donovan. Operating Systems, 3rd Edition, Tata McGraw Hill,2003.
3. http://spoken-tutorial.org/

**SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE
(AUTONOMOUS) COIMBATORE – 641 020**
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Programme: BCA   Course Code: 18UCA3AL3

Course: Allied: Operations Research   Hours / week: 6

Year: II   Semester: III   Credits: 5

UNIT I   (16 Hours)
Linear Programming Problem: Introduction – Mathematical formulation of L.P.P. - *Graphical solution method* – Simplex method – Method of penalties/ Big-M method – Two phase method.   (Chapter 2,3& 4, Page No. 39 - 113)

UNIT II   (14 Hours)
Transportation problem: Introduction - *finding initial basic feasible solution* – moving towards optimality – the transportation algorithm. (Chapter 10, Page No. 247-281)
Assignment problem: Method for solving an assignment problem –Variation of assignment problem – Traveling salesman problem – degeneracy. (Chapter 11, Page No. 295-324)

UNIT III   (16 Hours)
Queueing theory: Introduction - Queueing system – Characteristics of the Queueing system – Operating characteristics of a Queueing system - *Classification of queues* – Poisson queues– (M/M/1) : (∞/FIFO) , (M/M/1) : (N/FIFO) , (M/M/C) : (∞/FIFO) , (M/M/C) : (N/FIFO). (Chapter 21, Page No. 589-621)

UNIT IV   (16 Hours)
Inventory: Introduction – Inventory control– Cost associated with inventories – *Economic lot size problem* – Problems of EOQ with shortage allowed – Purchase inventory problem with price breaks. (Chapter 19, Page No. 507-538)
Replacement problem: replacement of items that deteriorates with time – replacement of items that fail completely. (Chapter 18, Page No. 477-494)

UNIT V   (13 Hours)
Networking scheduling by PERT/CPM: Introduction – Basic concepts - Critical path method – pertcalculations – *pert algorithm* – construction of network – critical path analysis - *statistical considerations in PERT* . (Chapter 25, Page No. 763-784)

Book for study:
   KantiSwarup, P.K. Gupta, Man Mohan, Operations Research, Sultan Chand &   Sons, 2007,Thirteen Edition.

Books for reference:
   Prof V.Sundaresan, K.S. Ganapathy Subramanian, K.Ganesan, Resource Management Techniques, A.R.Publications, 2004, Second Edition.

   Handy A.Taha, Operations Research,CollierMacmillan,Third Edition.

E-resources:
   https://roughan.info/notes/oorii/06tutorials.html

SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE
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For candidates admitted from academic year 2018-2019onwards under New CBCS.

Programme: BCA   **Subject Code: 18UCA3CP3**

Title: Core Practical: Java Programming Lab   **Hours: 4 hrs/week**

Year: II   **Semester : III**   **Credits: 3**

LIST OF PRACTICALS

1. Write a java program for an Inheritance Concept?

2. Write a java program for using Interface?

3. Write a java program for using 2 Packages?

4. Write a java program for Constructor using method overloading?

5. Write a java program to handle all Exceptions?

a) Catch b) Try c) Throws and d) Finally.

6. Write a java program for all String handling methods?

7. Write a java program for a) Single Multithreading b) Multiple multithreading?

8. Write a java program to pass message between 2 clients using TCP/IP Protocol?

9. Write a java program for finding the IP Addresses?

10. Write a java Applet program for displaying the Human face?

11. Write a java program using AWT events?

12. Write a java program using Swing to create a MDI form?

13. Write a java program to create Student Mark list using data base using Swing?

14. Write a java program to create personal information?

15. Write a java program to create calculator using Swing?

16. Write a java program to connect 2 clients system using RMI concept?

17. Write a java program using datagram with socket concept?

18. Write a java program to retrieve IP address of the system using RMI concept (client side)?

19. Write a java program to create the Basic Bean concept (text)?

20. Write a java program to create a Bean tool?

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Programme: BCA   **Subject Code: 18UCA3CP4**

Title: Core Practical : Data Structure using C++ Lab   **Hours: 4 hrs/week**

Year : II   **Semester : III**   **Credits: 3**

LIST OF PRACTICALS

1. Write a C++ program to create a stack.

2. Write a C++ program to convert an Infix to Postfix Notation.

3. Write a C++ program to Evaluate of expression.

4. Write a C++ program to create a stack using Linked List

5. Write a C++ program to create a Queue.

6. Write a C++ program to create a circular queue.

7. Write a C++ program to create a Queue using Linked List

8. Write a C++ program to construct a Binary Tree Traversal.

9. Write a C++ program for Depth First Search

10. Write a C++ program to Breath First Search.

11. Write a C++ program for Warshall's Algorithm.

12. Write a C++ program for Dijkstra's Algorithm.

13. Write a C++ program to Huffman's Algorithm.

14. Write a C++ program to make an Insertion Sort.

15. Write a C++ program to make a Merge Sort.

SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS) COIMBATORE – 641 020
For candidates admitted from academic year 2018-2019onwards under New CBCS.

Programme: BCA   Subject Code: 18UCA4C06

Title: Core :Visual Programming (C#.Net)   Hours: 6 hrs/week

Year : II   Semester : IV   Credits: 5

Unit I   **(15 Hrs)**
Console Application
Introduction to C# **(1-5)** – Understanding .Net: The C# Environment**(11-16)** – Overview ofC# **(18-21)** – Adding Comments – Command Line Arguments **(21-25)** – Literals, Variablesand Data Types**(34-49)** – Operators and Expressions**(55-73)** - Decision Making andBranching **(80-96)** – Decision Making and Looping**(102-118)** – Methods in C# **(125-137)** –Handling Arrays **(145-160)** – Manipulating Strings **(168-181)** – Classes and Objects **(212-233)**.

Unit II   **(15 Hrs)**
Graphical User Interfaces with Windows Forms: Part I
Introduction – Windows Forms – Event Handling **(399-409)** – Control Properties and Layout
– Labels, TextBoxes and Buttons – GroupBoxes and Panels – CheckBoxes and RadioButtons
– PictureBoxes – Tooltips – NumericUpDown Control – Mouse-Event Handling – Keyboard-
Event Handling **(410-440)**

Unit III   **(15 Hrs)**
Graphical User Interfaces with Windows Forms: Part 2
Introduction – Menus – MonthCalendar Control – DateTimePicker Control – LinkLabelControl –
ListBox Control – CheckedListBox Control **(441-465)** – ComboBox Control –
TreeView Control – ListView Control – TabControl – Multiple Document Interface (MDI)
Windows – Visual Inheritance **(466-501)**

Unit IV   **(15 Hrs)**
Data Access with .NET
ADO.NET Overview**(685-687)** – Using Database Connections**(688-692)** – Fast Data Access:
The Data Reader – Managing Data and Relationships: The DataSet Class **(701-714)-**Populating a
DataSet – Persisting DataSet Changes – Working with ADO.NET **(721-733)** –
The DataGrid Control **(735-749)** – Data Binding – Visual Studio.Net and Data Access **(750-769)**

Unit V   **(15 Hrs)**
ASP.Net
Web forms – Buttons, Text boxes, Labels, Literals, Place holders, Check boxes, Radio
buttons, Tables, Panels, Images, Image buttons, List boxes, Drop down lists, Hyperlinks and
link buttons, HTML controls.**(643-646, 677-706, 711-738, 781-820)**

Text Book
1. E.Balagurusamy, Programming in C#, 3rd Edition, Tata McGraw-Hill, 2011. **(UNIT I)**
2. Paul Deitel and Harvey Deitel, C# 2010 for Programmers, 4th Edition, Pearson, 2011.
(UNIT II - III)
3. Simon Robinson, Christian Nagel, Karli Watson, Jay Glynn, Professional C#, 3rd
Edition, Wrox Publisher, 2007. **(UNIT IV)**
4. Steven Holzner, Visual Basic.NET Black Book, Platinum Edition, Dream Tech, 2011.**(UNIT V)**
Reference Books
1. GeetanjaliArora ,BalasubramaniamAiswamy ,and Nitin Pandey, Microsoft C#
Professional Projects,Prentice Hall of India Private Limited, 2002.
2. Herbert Schildt, C# 4.0 Complete References, 1st Edition, Tata McGraw-Hill, 2010.

SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS) COIMBATORE – 641 020
For candidates admitted from academic year 2018-2019onwards under New CBCS.

Programme: BCA   Course Code: 18UCA4C07

Course Title: Core: Relational Database Management Systems   6 Hours / week

Credits: 5   Year: II   Semester: IV

Unit I   (15 Hrs)

   Introduction to Database Systems: – Database System Applications, Purpose of Database Systems – View of Data – Data Models – Database Languages – Relational Databases, Database Design (Chapter 1, Page No.:1 - 19)

   Entity-Relationship Model :- Basic Concepts – Constraints – Keys – E-R Design Issues – Weak Entity Sets– Extended E-R Features (Chapter 6, Page No.:204 - 226)

Unit II   (15 Hrs)
   Relational Model: – Structure of Relational Databases – The Fundamental Relational Algebra Operations – Additional Relational-Algebra Operations – Extended Relational-Algebra Operations – Null Values – Modification of the Database (Chapter 2, Page No.: 37 – 70)

Unit III   (15 Hrs)
   SQL :– Background – Data Definition – Basic Structure of SQL Queries - Set Operations – Aggregate functions – Null Values – Nested Subqueries – Complex Queries - Views – Modification of the database - Transactions (Chapter 3, Page No.: 75-114)

Unit IV   (15 Hrs)
   Relational Database Design :- Features of Good Relational Designs – Atomic Domains and First Normal Form –Decomposition Using Functional Dependencies – Functional-Dependency Theory – Decomposition Using Functional Dependencies – Decomposition Using Multivalued Dependencies – Database-Design Process (Chapter 7, Page No.: 263 - 302)

Unit V   (15 Hrs)
   Object Oriented Databases :– Overview – Complex Data Types - Structured Types and Inheritance in SQL – Table Inheritance – Array and Multiset Types in SQL – Object-Identity and Reference Types in SQL – Implementing O-R Features – Persistent Programming Languages – Object-Oriented versus Object-Relation (Chapter 9, Page No.: 361 -388)

   Storage and File Structure:- Overview of Physical Storage Media – Magnetic Disks – RAID – Tertiary Storage – Storage Access – File Organization – Organization of Records in Files – Data- Dictionary Storage (Chapter 9, Page No.: 441 -474)

Text Book
1. A.Silberschatz, H.Korth and S.Sudarsan, Database System Concepts, 5th Edition, TATA
      McGraw Hill Inc., 2009.

Reference Books

1. Bipin.C.Desai, An Introduction to Database System,West Publishing Company, 2004.
2. C.J.Date, An Introduction to Database Systems, 8th Edition, Addition – Wesley, 2007.
3. http://spoken-tutorial.org/

SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS) COIMBATORE – 641 020

For candidates admitted from academic year 2018-2019onwards under New CBCS.

Programme:BCA
Course Title: Core Practical : Visual Programming Lab (C#.Net)
Subject Code: 18UCA4CP5

Year: II   **Semester: IV**
5 Hours / week   **Credits: 3**

LIST OF PRACTICALS

1. Write a C# Console Program to perform palindrome.

2. Write a C# Console Program to perform command line argument.

3. Write a C# Console Program to perform simple calculator.

4. Write a C# Console Program to perform string functions.

5. Write a C# Console Program to find second largest number.

6. Write a C# Console Program to jagged array.

7. Write a C# Console Program to perform Simple Math Calculator with Memory

8. Write a C# Console Program to perform Simple Dictionary and Spell Check

9. Write a C# Console Program to Create a MS Windows Notepad Application with Menus and ToolBar

10. Write a C# Console Program Create a MS Windows Word Pad Application

11. Write a C# Console Program Creating a Windows Explorer

12. Write a C# Console Program Creating an Image List View based Album

13. Write a C# Console Program to create web browser application.

14. Write a C# Console Program a Sample Inventory Application for a Hostel Store with Transactions

15. Write a C# Console Program a Sample Application for Student Progress Card.

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For candidates admitted from academic year 2018-2019onwards under New CBCS.

Programme:BCA
Course Title: Core Practical : Relational Database Management Systems Lab
Subject Code: 18UCA4CP6
Year: II   **Semester: IV**
5 Hours / week   **Credits: 3**

LIST OF PRACTICALS

1. Exploring the Simple queries with DDL Commands using SQL.

2. Exploring the Simple queries with DML Commands using SQL.

3. Exploring the Comparison (relational) operator and Logical operator using SQL.

4. Exploring the Set operations and sorting and grouping operator using SQL.

5. Exploring the built-in functions i) Count Function ii) Character Function using SQL.

6. Exploring the built-in functions i) Number Function ii) Date function using SQL.

7. Create a student table contains reg-no, stud-name, class, subjects to perform an Aggregate operations using SQL.

8. Create a table PASSENGER with the fields Ticket no (Primary Key), name, age, gender and fare. Write a PL/SQL procedure to print the details of all the passenger, name, age, gender and fare.

9. Write a PL/SQL recursive functions for finding Factorial Series for the given no of terms.

10. Write a PL/SQL recursive functions for Generating Fibonacci Series for the given no.

11. Write PL/SQL statements to perform arithmetic operations.

12. Write a PL/SQL statements to print "n" numbers using while loop / For loop.

13. Write a PL/SQL code to calculate the area of a circle.

14. Create a function to return a fare from tickets booking table which containsbus_code, origin,fare,destinations,time of departure, data of travelling.

15. Create a function to return a current stock value for a given product.

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For candidates admitted from academic year 2018 - 2019 onwards under New CBCS.

Programme: BCA   **Course Code:** 18UCA4NM2
Course Title:NME : Data Science and Big data Analytics   **2 Hours / week**
Year: II   **Semester: III**   **Credits: 2**

Unit-I

Expanding universe of data – production factor – computer systems that can learn – data mining – data mining versus query tools – data mining in marketing – practical application. (Chapter:1, Page No.:1-10). Learning – Self Learning Computer Systems – machine learning and the methodology of science – concept learning. (Chapter:2, Page No.:11-22)

Unit- II

Knowledge discovery process – data selection – cleaning – enrichment – coding – data mining – preliminary analysis of the data set using traditional query tools – visualization techniques – likelihood and distance – OLAP tools – K-nearest neighbor – Decision trees – Association rules – Neural networks – Genetic algorithms – Reporting. (Chapter:4, Page No.:37-78)

Basis of R: Basic Math – Variables – Data Types – Calling Functions – Function Documentation – Missing Data – Pipes. (Page No: 39 – 54) **Advanced Data Structures:**data.frames – Lists – Matrices – Arrays. (Page No: 57 -74)

Unit - III

Reading Data into R : Reading CSVs – Excel Data – Reading from Databases –Data from Other Statistical Tools – R Binary Files – Extract Data from Web Sites. (Page No: 75 – 90). **Statistical Graphics:** Base Graphics – ggplot2 (Page No: 93 – 110).

Writing R Functions : Hello, World! – Function Arguments – Return Values – do.call(Page No: 111 – 115).**Clustering:** K-means – PAM – Hierarchical Clustering (Page No: 389 – 407)

TEXT BOOK

1. Peter Adrians and DOLF Zantinge, Data Mining, 4th Edition, Addition Wesley, 2002(unit I,II)

2. Jared P. Lander "R for Everyone Advanced Analytics and Graphics", Second Edition, 2018(unit III, IV & V)

REFERENCE BOOKS

1. Vipin Kumar, Data Mining with R Learning with Case Studies, Chapman & Hall/CRC, Data Mining and Knowledge Discovery Series, SERIES EDITOR, CRC Press
2. Nina Zumel John Mount, "Practical Data Science with R", Dreamtech Press, 2018

Program List

1. To Write a R Program on adding two matrixes using array
2. To Write a R Program on simple Calculator.
3. To Write a R Program on Multiplication Table.
4. To write a R Program on Find Sum, Mean and Product of Vector.
5. To write a R Program to convert Decimal into Binary using Recursion.
6. To write a R Program to implement k-means clustering technique.
7. To write a R program to implement any one Hierarchal Clustering.
8. To write a R program to implement any one Partitioning around Medoid(PAM) Clustering.
9. To write a R program to implement the Linear Regression.
10. To write a R program to Visualize the data using histogram.
11. To write a R program to Visualize the data using Box plot.
12. To write a R program to Visualize the Scatter plot

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For candidates admitted from academic year 2018-2019onwards under New CBCS.

Programme: BCA   **Course Code: 18UCA5C08**

Course Title: Core: Web Technology (HTML, Bootstrap. PHP and MySQL)

6 Hours / week

Credits: 5   **Year: III**   **Semester: V**

Unit I   **(15 Hrs)**
Overview of HTML5 – HTML5 and its Essentials – Exploring New Features of HTML5 – Fundamentals of HTML (1-59) – Working with Text (77-94) – Organizing Text in HTML (113-117) – Working with Links and URLs (129-135) – Creating Tables (145-151) – Working with Forms (189-205) – Working with Multimedia (245-252).

Unit II   **(15 Hrs)**
Overview of CSS – ExploringCSS Selectors – Inserting CSS in an HTML Document (465-476) – Background and Color Gradients in CSS (487-504) – Fonts and Text Styles (521-530) – Creating Boxes and Columns Using CSS (545-566) – Displaying, Positioning and Floating an Element (597-603)
Bootstrap Overview – Bootstrap Environment Setup – Bootstrap Grid System – Bootstrap CSS Overview – Bootstrap Typography – Bootstrap Tables – Bootstrap Forms – Bootstrap Images – Bootstrap Dropdowns – Bootstrap Navigation Elements – Bootstrap Jumpotron – Bootstrap Alerts

Unit III   **(15 Hrs)**
Introducing PHP (1-18) – Using Variables and Operators (21-45) – Controlling program flow (49-82) – Working with cookies, sessions and headers (293 – 308).Working with arrays (85-118) – Using functions and classes (121-148) – Working with files and directories (159-180) – Working with databases and SQL (185-246)

Unit IV   **(15 Hrs)**
JavaScript Introduction – Comments – Variables – Operators – Control Statements – Functions – Events – Arrays – Number – Strings – Date – Math – Forms and Validations.

Unit V   **(15 Hrs)**
Getting started with Ajax (433-435) – Writing Ajax (435) – Creating and Opening XMLHttpRequest object (436-440) – Handling & Starting the Downloaded data (441-447) – Ajax with Some PHP (448) – Passing Data to the Server with GET & POST (449-455).

Text Book
1. VikramVaswani, A Beginner's Guide PHP,1st Edition, Tata McGraw Hill, 2008.
2. Steven Holzner, PHP Complete Reference, Tata McGraw Hill Edition, 2008.
3. Jen Kramer, Joomla! Start to Finish, John Wiley & Sons, 2010.

Reference Books
1. Kogent Learning Solutions Inc., HTML5 Black Book Covers CSS3, JavaScript, XML, XHTML, AJAX, PHP and JQuery, 2012
2. http://spoken-tutorial.org/
3. http://tutorialspoint.com – Bootstrap Tutorial

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Programme: BCA   **Course Code: 18UCA5C09**

Course Title : core: Software Engineering   **6 Hours / week**

Year: III   **Semester: V**   **Credits: 5**

Unit I   **(15 hrs)**
Defining Software-Software Application Domain-Legacy Software (3-9) Process Model-Waterfall Model-Incremental Process Models-Spiral Model-Specialized Process Models-The Unified Process(39-56)

Unit II   **(15 hrs)**
Requirements Engineering: Establishing TheGroundwork-Eliciting Requirements-Developing Use Cases- Building The Requirements Model-Negotiating Requirements-Validating Requirements(120-145)

Unit III   **(15 hrs)**
Design Concepts: The Design Process-Design concepts-Design Model(215-238)Architectural Design: Software Architecture- Architectural Genres-Architectural Styles-Architectural Design-Assessing Alternative Architectural Designs-Architectural Mapping Using Data Flow (243- 273)

Unit IV   **(15 hrs)**
SoftwareTesting: Software Testing Fundamentals-White Box Testing-Basis Path Testing-Control Structure Testing-Black Box Testing-Graph based testing method-Equivalence Partitioning-Boundary value analysis-Orthogonal Array Testing.(482 - 502)
        Web Application Testing: Testing Concepts for Web Apps-Content Testing-User Interface Testing-Configuration Testing-Component Level Testing-Navigation Testing-Performance Testing.(529 - 553)

Unit V   **(15 hrs)**
Risk Management: Software Risks-Risk Identification-Risk Projection-Risk Refinement-RMMM (745-759).
Software Quality Assurance-Background Issues-Elements of SQA-SQA Tasks-Formal Approaches to SQA-Statistical Software Quality Assurance-Software Reliability-The SQA Plan(432 - 446).

TEXT BOOKS:

1. ROGER S.PRESSMAN,SOFTWARE ENGINEERING A practitioner's Approach, 7[th]Edition,McGRAW-HILL,2014.

REFERENCE BOOKS:
1. Richard fairly, Software Engineering concepts,TATA McGRAW HILL, 1965.
2. http://spoken-tutorial.org/

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Programme: BCA   **Course Code: 18UCA5C10**
Course Title: Core: Computer Networks   **5 Hours / week**
Year: III   **Semester: V**   **Credits: 5**

Unit – I   **(15 Hrs)**
Introduction: The use of computer networks - Network architectures -Components of the Network -
Types of Networks - **Transmission Media:** Classification of transmission media -**Overview of
TCP / IP & OSI:**benefits of a Layered Model – TCP/IP Model – OSI Model – Comparing the
TCP/IP & OSI Model- Application layer Services and Protocols Function- Transport Layer
Protocols: TCP and UDP – Port Addressing.

Unit – II   **(15 Hrs)**
OSI Network Layer: process and Protocols –address management - Types of Address in IPv4 -
NAT - Public and Private Address –ISP -Overview of IPv6 – Subnet Mask – Subnetting -**OSI Data
link layer:** service - Data Link Sublayers - Ethernet Frame Size and Fields - MAC Address
Structure

Unit III   **(15 Hrs)**
        Routing : Static Routing- Configuring Static routes - Modifying Static Routes -
Summarizing Routes - Configuring a Summary Route and Troubleshooting-Dynamic routing :
purpose - advantage - Metric -Types -RIP configuration -EIGRP configuration-EIGRP Tuning -
Single Area OSPF configuration - Multi Area OSPF configuration - OSPF Tuning

Unit IV   **(15 Hrs)**
        Introduction :LAN Design - VTP: purpose- configuration -VLAN: types - benefits -
Configuration -Inter-VLAN: features- types - traditional -router on a stick - Using multilayer
switch

Unit V   **(15 Hrs)**
        STP: Uses - configuration - Ether channel: Advantage- LACP configuration -PAgP
Configuration **-** ACL: Purpose - types -Standard ACL Configuration - Extended ACL configuration
TEXTBOOK:
   1. Cisco Networking Academy, CCNA 1 and 2 Companion Guide, Pearson Education, Third Edition,
       2003.
   2. Cisco Networking Academy, CCNA 3 and 4 Companion Guide, Pearson Education, Third Edition,
       2003. (Unit-5)
   3. Todd Lammle -CCNA Routing and Switching Complete Study Guide 2nd Edition - John
       Wiley & Sons, 2016
REFERENCE BOOK:
   1. https://www.netacad.com/group/resources/ccna-rs-scaling/6.0
   2. https://www.netacad.com/group/resources/ccna-rs-connect/6.0
   3. Andrew S Tanenbaum - Computer Networks 3rd Edition - Prentice Hall of India, 2003

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(AUTONOMOUS) COIMBATORE – 641 020
For candidates admitted from academic year 2018-2019onwards under New CBCS.

Programme: BCA   Course Code: 18UCA5CP7

Course Title: Core Practical : Web Technology (HTML, Bootstrap.PHP andMySql)

4 Hours / week

Credits: 3   Year: III   Semester: V

LIST OF PRACTICALS

1. Write a HTML5 Program to create student information form with following details (Reg No, Student Name,Date of Birth,Age,Course)
2. Write a HTML with Bootstrap program to create employee information form with following details (EmpNo , Employee Name , Employee Age, Designation , Department)
3. Write a JavaScript validation for employee information form with following details (EmpNo , Employee Name , Employee Age, Designation , Department)
4. Write a HTML with Bootstrap program to create your college website as responsive website by using Bootstrap nav, Bootstrap Jumpotron, …. etc.
5. Using PHP program read and print a file character by character, until the end of file reached.
6. Using PHP string function to convert lower case, upper case, string length, string compare string reverse, and string shuffle.
7. Using PHP connect MySql and save the following data into the respective MySql table.
    (Student Name , Student Reg No , Age , Department)
8. Using PHP connect MySql and view contents of the previous program saved details.
9. Using PHP connect MySql and view contents and made delete operation in it.
10. Using PHP connect MySql and view contents and made edit operation in it.
11. Using PHP with MySql develop one small application in online job portal.
12. Using PHP with MySql develop online exam.
13. Using PHP with MySql develop an alumni registration form with image uploading.
14. Using PHP, AJAX and MySql create your class profile using add, view, edit and delete modes with image and music file uploading.

SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS) COIMBATORE – 641 020

For candidates admitted from academic year 2018 - 2019 onwards under New CBCS.

Programme: BCA **Course Code: 18UCA5CP8**

Course Title: Core Practical: Computer Networks Lab   **4 Hours / week**

Credits: 3   **Year: III**   **Semester: V**

Practical List

1. Create and troubleshoot DNS network topology.
2. Create and troubleshoot DHCP network topology
3. Create router based network topology
4. Create network topology using IPv4 subnetting address
5. Create network topology using static route
6. Create network topology using default route
7. Create and troubleshoot network topology using RIP Protocol
8. Create and troubleshoot network topology using EIGRP Protocol
9. Create and troubleshoot network topology using Single Area OSPF Protocol
10. Create and troubleshoot network topology using Multi Area OSPF Protocol
11. Create and troubleshoot VLAN network.
12. Create and troubleshoot traditional Inter-VLAN network
13. Create and troubleshoot Router on a Stick Inter-VLAN network
14. Create and troubleshoot Inter-VLAN network using multilayer switch
15. Create and troubleshoot etherchannel network topology.
16. Create and troubleshoot standard ACL network
17. Create and troubleshoot extended ACL network

**SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE
(AUTONOMOUS) COIMBATORE – 641 020
For candidates admitted from academic year 2018 - 2019 onwards under New CBCS.**

Programme: BCA   **Course Code: 18UCA5EL1**

Course Title: Elective : Cyber Security   **5 Hours / week**

Credits: 5   **Year: III**   **Semester: V**

Unit I   **(15 Hrs)**
Introduction and Data Encryption Standards:

   Introduction(1-10) – Data Encryption Techniques(10-15) – Substitution Ciphers(15-26) – Transposition Ciphers(26-28) – Steganography(28-30) –Data Encryption Standards: Block ciphers, Block Cipher Modes of Operation(32-40) – Feistel Ciphers(40-41) – Data Encryption Stand(42-67) - Triple DES(67-69) – DES Design Criteria(69-71).

Unit II   **(15 Hrs)**
Advanced Encryption Standard and Symmetric Ciphers

   Introduction, Advanced Encryption Standard(74-75) – Overview of Rijndael(75-83) – Advantages and Limitations of Rijndael, Comparison of AES with other ciphers(84-85) – Blowfish Encryption Algorithm(87-92) - RC5(92-95) – RC4(95-98) – RC6(98-100) – Comparison Between RC6 and RC5(100-101) – IDEA(101-104).

Unit III   **(15 Hrs)**
Public Key Cryptosystems, Key Management and Authentication

       Introduction, Public key Cryptosystems(118-125) – **The RSA algorithm**(125-130) – Timing Attacks(130-134) – Key Distribution, Diffie-Hellman Key Exchange(138-145) – Elliptic Curve Arithmetic(145-154) – Elliptic Curve Cryptography(154-155) – Elliptic Curve Security and Efficiency, Zero Knowledge Proof(155-157) – Authentication: Introduction, authentication methods(162-172) – Message Digest(172-184) – Kerberos(184-199) – X.509 Authenticaiton Service(199-200).

Unit IV   **(15 Hrs)**
Digital Signatures, Electronic Mail Security and Web Security

       Introduction, **Digital Signature Algorithms**(204-213) – Digital Signature Standards(DSS)(213-214) – Authentication Protocols(214) – Pretty Good Privacy(PGP)(216-223) – S/MIME(223-224) – MIME(224-232) – History of S/MIME(232-236) – Comparison PGP and S/MIME(237) – Secure Socket Layer(SSL)(267-269) – SSL session and connection(269-270) – SSL Record Protocol(270-275) – SSL in practice(275-277) – Secure electronic Transactions(277-279)

Unit V   **(15 Hrs)**
Malicious Software and Firewall

   Malicious Code, viruses(306-313) – Worms(313-316) –Trojans(316-317) – Spyware(317) – Best Practices(317-318) – Digital Immune System(318-319) – Attacks(319 -327) – Introduction, Packet Filters(329-331) – Application level gateways(331-333) – Circuit level gateways(333-334) – **Firewall Architectures**(334-341) – Trusted System(341-342) – Access Control(342-344)

TEXT BOOKS:

  1. V. K. Pachghare, Cryptography and Information Security, PHI.

REFERENCE BOOKS:

  1. William Stalling, Cryptography and Network Security, 4th Edition, PHI.
  2. Schneierand Bruce, Applied Cryptography: Protocols & Algorithms, 1st Edition, MGH.

SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS) COIMBATORE – 641 020
For candidates admitted from academic year 2018-2019onwards under New CBCS.

Programme: BCA	**Course Code: 18UCA6C11**
Course Title: Core: Python Programming	**6 Hours / week**
Credits: 5 **Year: III**	**Semester: VI**

Unit-I

Introduction to Python: Python Overview-Getting Started with Python-Python Identifiers-Reserved Keywords-Variables-Standard Data Types-Operators- Statement and Expression-String Operations-Boolean Expressions-Control Statements-Iteration-while Statement-Input.

Unit-II

Functions: Introduction-Built-in Functions-Composition of Functions-User Defined Functions-Parameters and Arguments-Function Calls- The Return Statement-Python Recursive Function-The Anonymous Functions-Writing Python Scripts.

Unit-III

Strings: Strings-Compound data types- len function- String Slices-Strings are Immutable-String Traversal-Escape Characters-String formatting operators and functions.Lists:Values and accessing elements-lists are mutable-Traversing and deleting elements –Built-in operators and methods.

Unit-IV

Tuples: Creating tuples-accessing values-tuple assignment-tuples as return values- variable length argument tuples-basic tuple operations-built-in tuple functions.Dictionaries: Creating and accessing values in a dictionary-updating and deleting elements -operations and built-in dictionary methods.Files: Opening and Closing a file-Reading and Writing a file.

Unit-V

Introduction to NumPy – Computation – Pandas – Data manipulation with pandas – Reading / Writing of CN, XML files – Aggregation and Grouping – **Matplotlib**– Visualization with Matplotlib – Simple line plots – Scatter plots – Multi sub plots.

Text Book
1. E.Balagurusamy, "Introduction to Computing and Problem Solving Using Python", McGraw Hill Education Private Limited, 1st Edition, New Delhi.

Reference Books
1. Martin C. Brown, "PYTHON: The Complete Reference", McGraw-Hill, 2001.
2. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist", 2nd edition, Shroff/O'Reilly Publishers, 2016 (http://greenteapress.com/wp/think- python/).
3. Mark Summerfield. "Programming in Python 3: A Complete introduction to the Python Language", Addison-Wesley Professional, 2009.
4. http://spoken-tutorial.org/
5. http://tutorialspoint.com/

SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE
(AUTONOMOUS) COIMBATORE – 641 020
For candidates admitted from academic year 2018 - 2019 onwards under New CBCS.

Programme: BCA   **Course Code: 18UCA6C12**

Course Title: Core: Mobile Computing and Android Programming   **6 Hours / week**

Year: III   **Semester:** VI   **Credits:** 5

Unit I   **(15 Hrs)**
        Introduction – Enabling concepts for mobile and personal communication- Present, Past and Future Mobile Communication.
        Cellular concepts and implementation: Cellular concepts-multiple access technologies for cellular system- Cellular system operation and planning general principles. **Chapter 1 (1- 11) ,Chapter 2 (15-20)**

Unit II   **(15 Hrs)**
        Introducing Android: Before we get started – Advantages of android – Preparing SDK tools to download – Android development IDE – Java, XML and how android works – Android application framework – Screen layout design – User Interface Design – Graphics and animation Design – Interactivity – Content providers – Intent and intent filters. **(1-19)**

Unit III   **(15 Hrs)**
        Setting up your android development environment – Installing Java, Eclipse and Android – Setting up AVDs and Smart Phone – Understanding Java SE and the Dalvik Virtual Machine – The directory structure of an android project – Leveraging android XML – Using your android application resources – The AndroidManifest.xml file – Creating your first android application.**(21-85)**
        Android application components – **Android Intent Objects:** Messaging for Components – **Android Manifest XML:** Declaring Your Components – Android View Hierarchies – Defining Screen Layouts: Using XML. **(115-160)**

Unit IV   **(15 Hrs)**
        UI Design: Buttons, Menus and Dialogs – Using Android UI Elements (Widgets) – Adding an Image Button to Your Layout – Adding a TextView Widget to Your Layout – Adding an Image – Using Menus in Android – Creating the Menu Structure with XML – Defining Menu Item Strings – Inflating the Menu Structure via Java – Running the Application in the Android Emulator – Making the Menu Work – Adding Dialogs – Using Custom Dialog Subclasses – Displaying an Alert Dialog. **(163-207)**

Unit V   **(15 Hrs)**
        Adding Interactivity: Handling UI Events – An Overview of UI Events in Android – HandlineonClick Events – **Android Touchscreen Events:**onTouch – **Android Right-click Equivalent:**onLongClick – **Key Event Listeners:**onKeyUp and onKeyDown – **Context Menus in Android:**onCreateContextMenu.**(235-266)**
        Understanding Content Providers: An Overview of Android Content Providers – Defining a Content Provider – Working with a Database.

Text Book
  2. Raja Pandya, Mobile and Personal Communication Services and Systems, Prentice Hall of India, 2000. **(Chapter –1)**
  3. WallaceJackson,AndroidAppsforAbsoluteBeginners,2^nd^Edition,APress,2013. **(Chapter – 2)**
Reference Books
  1. Shawn Van Every "Pro Android Media: Developing Graphics, Music, Video, and Rich Media Apps for Smartphones and Tablets"
  2. http://spoken-tutorial.org/

SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS) COIMBATORE – 641 020

For candidates admitted from academic year 2018-2019 onwards under New CBCS.

Programme: BCA   **Course Code: 18UCA6CP9**
Course Title: Core Practical: Python Programming Lab   **4 Hours / week**
Year: III   **Semester: VI**   **Credits : 3**

Practical List

1. Expressions, conditionals, loops, list, dictionary, and strings.
2. Functions: scope, parameter passing
3. Data objects, pass arrays to functions, return values
4. Functions using libraries: mathematical, and string functions.
5. File handling: open and close a file, read, write,
6. File processing: append to a file, standard input, output, and error streams, relative and absolute paths.
7. Using Python libraries: create and import Python libraries
8. Recursion: simple algorithms with recursion: factorial, Fibonacci numbers;
9. Recursion on arrays: binary search
10. Pandas: Importing package and Arrays
11. Data visualization Pyplot: line chart, pie chart, and bar chart.

SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS) COIMBATORE – 641 020
For candidates admitted from academic year 2018 - 2019 onwards under New CBCS.

Programme: BCA	**Course Code: 18UCA6CP10**
Course Title: Core Practical : Android Programming Lab	**4 Hours / week**
Credits: 3	**Year: III**	**Semester: VI**

LIST OF PRACTICALS

1. Write the steps for installation and configuration of android in Windows OS.
2. Write a program to demonstrate usage of two textbox (Edit Text), Label (Text view) and Button widgets in android and perform addition of two numbers.
3. Write a program and demonstrate the graphical layout orientation.
4. Write a program and fetch the IMEI number of your mobile phone.
5. Write a program to demonstrate usage of DateTimePicker with Toast(Message Box).
6. Write a program to demonstrate usage of List Box, Combo Box, Snippers with Toast(Message Box).
7. Write a program to demonstrate AutoCompleteTextView.
8. Write a program, create and send notification message in your mobile phone.
9. Write a program to demonstrate usage of Text Area, Checkbox, and Radio Button with Toast (Message Box).
10. Write a program and calculate the simple interest and compound interest using its API controls.
11. Write a program and create phone call activity using android.
12. Write a program for sending SMS using android.
13. Write a simple program to demonstrate the contact manager using Contacts ContractAPI (Insert, Delete, Edit, View).
14. Write a simple program to demonstrate connecting with SQLite Database.
15. Write a program and save employee details with SQLite Database.
16. Write a program and view employee details from SQLite Database.

SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE

(AUTONOMOUS) COIMBATORE – 641 020
For candidates admitted from academic year 2018 - 2019 onwards under New CBCS.

Programme: BCA	**Course Code: 18UCA6EL2**

Course Title: Elective:Data Mining and warehousing   5 Hours / week

Credits: 5	**Year: III**	**Semester: VI**

Unit I

Expanding universe of data – production factor – computer systems that can learn – data mining – data mining versus query tools – data mining in marketing – practical application. (Chapter:1, Page No.:1-10). Learning – Self Learning Computer Systems – machine learning and the methodology of science – concept learning. (Chapter:2, Page No.:11-22).

Unit II

Data warehouse – need- designing decision support systems – integration with data mining- Client/Server and data warehousing–multi-processing machines – cost justification. (Chapter:3, Page No.:25-36).

Unit III

Knowledge discovery process – data selection – cleaning – enrichment – coding – data mining – preliminary analysis of the data set using traditional query tools – visualization techniques – likelihood and distance – OLAP tools – K-nearest neighbor – Decision trees – Association rules – Neural networks – Genetic algorithms – Reporting. (Chapter:4, Page No.:37-78).

Unit IV

Different forms of knowledge – Getting started – Data Selection – Cleaning – Enrichment – Coding – Data mining - Reporting – KDD environment – Ten golden rules. (Chapter:5, Page No.:79-93).

Unit V

Customer Profiling – Predicting bid behavior of pilots – Discovering foreign key relationships-Results. (Chapter:6, Page No.:95-110) Learning as compression of data sets – The information content of message – Noise and redundancy – significance of noise – Fuzzy databases – The traditional theory of the relational database – from relations to tables – from keys to statistical development Dependencies – Denormalization – Data Mining Primitives. (Chapter:7, Page No.:111-126).

Text Book

1. Peter Adrians and DOLF Zantinge, Data Mining, Addition Wesley, 2002, Fourth Edition (All Units).

Reference Books
1. K.P.Soman, ShyamDivakar, V.Ajay, Insight into Data Mining (Theory and Practice), Prentice Hall of India, 2006, Second Edition.

SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE

(AUTONOMOUS) COIMBATORE – 641 020
For candidates admitted from academic year 2018 - 2019 onwards under New CBCS.

Programme: BCA   **Course Code: 18UCA6CPR**
Course Title: Project Work and Viva-Voce   **5 Hours / week**
Credits: 5   **Year: III**   **Semester: VI**

The Final Year Students are assigned tothe project Supervisor and they are asked to submit an individual project report at the end semester.TheBroader areas of the project are website creation, order processing, Billing Software, Multimedia, Artificial Intelligence, and Machine Learning based projects.

The student has to approach the nearby companies to get approval from the company to undergo his project work for the period of 8 to 9 months.

The students have to submit the project Completion Letter from the organization.

The project work done by the student is periodically reviewed.

Elective:Computer Networks

Programme: BCA   **Course Code: 18UCA5EL1**

5 Hours / week

Credits: 4   **Year: III**   **Semester: V**

Unit I

Introduction: The use of computer networks - Network structures -Network architectures - The OSI Reference model - services. Transmission Media : Magnetic Media - Twisted pair - Base band Coaxial cable - Broad band Coaxial cable - Fiber optics Narrow band - ISDN : ISDN - Services - ISDN System Architecture - ISDN Interface - Perspective on N-ISDN

Unit II

Datalink Layer :Datalink Layer Design Issues : Services Provided to Network Layer - Framing - Error control - flow control Error Detection and Correction : Error Correcting Codes - Error Detecting Codes Elementary Datalink Protocols : An Unrestricted Simplex Protocol - A Simplex Stop and Wait Protocol - A Simplex Protocol for a noisy Channel.

Unit III

Network Layer: Network Layer Design Issues - Services provided to the Transport Layer Routing Algorithm: Optimality Principle - Shortest path routing - Flooding - Flow based routing - Hierarchical routing - Broadcast routing- Multicast routing

Congestion Control : General Principles of Congestion Control - Congestion Prevention Policies - Traffic Shapping - Flow Specification - Congestion Control in Virtual Circuit Subnets - Choke Packets - Load Shedding

Unit IV

Transport Layer: Transport Services: Services provided to the Upper layers - Quality of Service - Transport Service Primitives -Elements of Transport Protocols: Addressing - Establishing a connection -Releasing a Connection - Flow Control and Buffering - Multiplexing- Crash Recovery.

Unit V

Application Layer : Network Security : Traditional Cryptography -Two Fundamental Cryptographic Principles - Secret-key Algorithm - Public key Algorithm - Authentication Protocol - Digital Signatures - Domain Name System : DNS Namespace - Resource Record - Name Server -Electronic Mail : Architecture and Services - User Agent - Message Formats - Message   Transfer   - E-mail Privacy.

CASE STUDIES: CISCO Packet Tracer, NS2 simulator, Cloonex, CORE, GNS3, Psimulator.

TEXT BOOKS:
1. Andrew S Thenanbaum, Computer Networks, 3rd Edition, Prentice Hall of India, 2003.
2. Douglas E.Comer,David L.Stevens, Internetworking with TCP/IP, Prentice Hall of India, 2003.
3. http://www.cisco.com

REFERENCE BOOKS:
1. William Stallings, Data and Computer Communications, 5thEdition, Prentice Hall of India, New Delhi, 1999.

Elective:Compiler Design

Programme: BCA   **Course Code: 18UCA5EL1**

5 Hours / week   **Credits: 4**   **Year: III**

                                                       Semester: V

Unit I

Introduction: Compilers: Analysis of source program – Phases of compiler- cousins of compiler – grouping of phases. Simple one – pass compiler : Overview – Syntax definition – syntasx – directed translation – parsing – translator for simple expressions.

Lexical Analysis: removal of white space and comments – constant – recognizing identifiers and keyboards – a lexical analyzer – role of lexical analyzer – input buffering – specification of tokens – recognition of tokens (section 1.1 to 1.5, 2.5, 2.6, 3.1 to 3.4)

Unit II

Symbol tables – incorporating a symbol table – symbol tables – entries – list data structures for symbol table – hash tables – scope information – Parsing – Principles topdown parsing – predictive parsing, left recursion – role of parser – context-free grammars – writing a grammar – top down parsing – simple bottom up parsing – shift reduce parsing. (section 2.7 to 7.6, 2.4 and 4.1 to 4.5)

Unit III

Syntax – directed translation – A translator for simple expressions – abstract and concrete syntax, adapting translations scheme, optimizing translator – syntax – directed definitions – construction of syntax trees– bottom up evaluation of S- attributed definitions – L-attributed definitions – top-down translation.Type checking: type system, specifications of simple type checker. (section 2.5 , 5.1 to 5.5 and 6.1)

Unit IV

Runtime Organization: Source language issues – storage organization – storage allocation strategies.Intermediate code generation: Intermediate languages – declarations – assignment statements. (section 7.1 to 7.3, 8.1 to 8.3)

Unit V

Code generation – issues in design of code generator – target machine – run-time storage management – basic blocks and flow graphs.Code optimization introduction – Principle sources of optimization. (section 9.1 to 9.4, 10.1,10.2)

TEXT BOOKS:

1. A.V. Aho, R. Sethi, and J. D. Uliman, Compilers, Principles, Techniques and Tools, Addison Wesley Publishing Company

Elective:Graphics and Multimedia

Programme: BCA   **Course Code: 18UCA5EL1**

5 Hours / week

Credits: 4   **Year: III**   **Semester: V**

Unit I

Point-Plotting techniques-r Line drawing displays – Two dimensional Transformations: Transformation principles – Concatenation – Matrix representation – Clipping and Windowing: A Line clipping algorithm – Midpoint subdivision – Polygon clipping – Viewing transformation – Windowing transformations.

Unit II

Graphical Input Devices – Graphical Input Techniques Positioning techniques – Pointing and selection – Inking and painting – On Line character recognition – Raster graphics fundamentals : Representing a Raster Image – Scan converting line drawings – Displaying characters Three dimensional transformations and Perspective: Transformations – Three dimensional clipping – Homogeneous coordinate representations projective transformations.

Unit III

Definition – Multimedia Hardware – Multimedia Software – Multimedia Networking – Multimedia Applications – Multimedia Standards – Text Elements of text – tet technology – Fonts – Graphics Elements of graphics – Pictures and images – Raster images – Vector images – Images and Color – Bitmap, Vector, Compressed Formats – hypertext – Hyper picture – Various CD Formats.

Unit IV

Audio: Natural sound – Digital audio – Calculating the digital audio data size – Digital audio systems – Digital Representation of Sound – Time domain representation of sound – Transformation of digital sound – Video :Analog video – Digital video – Calculating the digital video data size – video file formats.

Unit V

Digital video and Image Compression: Video compression techniques –JPEG image compression standard – MPEG video compression standard. Photoshop: File types – Tool box – Importing and Exporting images – Image mode Rotate canvas – Extract – Layers – Feather – Extract –Layers – Feather – Filters – Zooming images – Navigator – Color – Styles – Channels.

TEXT BOOKS:

1. William M. Newman and Robert F Sproull, Principles of Computer Graphics, Tata McGraw Hill Company Ltd.
2. Multimedia Making it work, Toy Vaughon. 2002.
3. John F Koegel Buford, Multimedia Systems, Addison Wesley, 2002.
4. Mastering in Photoshop, 2002.

Elective: Clients / Server Computing

Programme: BCA   Course Code: 18UCA5EL1

5 Hours / week Credits: 4   Year: III

Semester: V

UNIT I

Introduction: - Clinet/Server computing era –File server – database server – transaction sever – GroupWare server – object server – web sever. (Page no. 7 – 15). Client/Server Building blocks: - Intergalactic client/server – 2-tier-Client/server building blocks. (Page no. 20 – 32)

UNIT II

Operating Systems: - Anatomy of a sever program – base service – extended service – scalability. (Page no.57 – 65). Clients: - Clients anatomy – non-GUI client's – GUI clients – 00121 Clients – GUI versus OOUI – OOUI's on steroids.(Page no. 66 – 74)

UNIT III

NOS: - NOS Middleware – extending the local OS's reach – Global directory services Ldistributed time services – Distributed security (page no. 99 – 112). RPC: peer-to-peercommunications – sockets – Names – pipes-RPC-MOM middleware –MOM versus RPC (Page no. 115 – 130)

UNIT IV

SQL databases servers: - Fundamentals of SQL & relational databases – ISO standards – stored procedure triggers and rules. (Page no. 150 – 170). Data Warehousing: - OLTP data warehouse – data mining – TP monitors (Page no. 200 – 234, 276 – 282)

UNIT V

Client/Server Group Ware: - Group Ware – components of Group Ware (Page no. 319 – 352). Client server with distributed objects: - Distributed objects to components – CORBA OMG's object management architecture client/server and the Internet (Page no. 376 – 426)

TEXT BOOKS:

1. Robert Orali Dan Harkey and Jeri Edwards, The Essential Client/Server Survival Guide, 2nd Edition, Galgotia Publications Pvt. Ltd.,

Elective: Distributed Computing Systems

Programme: BCA   **Course Code: 18UCA6EL2**

5 Hours / week

Credits: 5   **Year: III**   **Semester: VI**

Unit I

Introduction: Introduction to distributed computing system – Ensley's models of distributed system. Computer networks and operating system requirements for distributed computing systems. – Computing organization for distributed computing:

Pipeline and vector processors – multiprocessors and multicomputer – massively parallel processor.

Unit II

Computer networks and communications for distributed system – computer network architecture-network topology OS for distributed computing: Network operating system – distributed operating systems – inter-process communications resource sharing.

Unit III

Distributed System Modeling: Graphs – finite state automata – pettiness – formal methods – examples – system- Distributed database systems

Basic concepts, the client server model, the case for distribution, the distribution – problem and pattern.

Unit IV

Queries and Updates in DDBS: Queries, update and integrity issue – updates with replication and without replication – example systems.

Distributed and Multidatabase design: The general data allocation problem – fragmentation – data allocation strategies practical allocation.

Unit V

Programming language design and algorithm for distributed computing – distributed processes – examples.

Software and Hardware Environment for MPP's: EXPESS – PVM-LINDA – OCCAM – Case studies.

TEXT BOOKS:

1. Joel M.Chichiow, An Introduction to Distributed and Parallel Computing, Prentice Hall of India, 2000.

Elective:Embedded Systems

Programme: BCA   **Course Code: 18UCA6EL2**

5 Hours / week

Credits: 5   **Year: III**   **Semester: VI**

Unit I

Hardware Fundamentals: Terminology - Gates - Timing Diagrams - Memory Advance Hardware Fundamentals: Microprocessors- Microprocessor architecture - Direct Memory Access - Conventions used on Schematics.

Unit II

Interrupts: Interrupt Basics - Interrupt Service Routines. Survey of Software: Architectures: Round Robin with Interrupts- Function- Queue-Scheduling Architecture-Real Time Operating System Architecture.

Introduction to Real Time Operating Systems - Selecting an RTOS - Tasks and Task States - Tasks and Data - Semaphores and Shared Data

Unit III

More Operating System Services: Interrupt PROCESS Communication – Message Queues, Mailboxes and Pipes - Timer Functions - Events - Memory Management -Interrupt Routines in an RTOS Environment. Basic Design Using a Real Time Operating Systems: Principles - Encapsulating Semaphores and Queues-Hard Real Time Scheduling Considerations - Saving Memory Space and Power - Introduction to RTL & QNX

Unit IV

Embedded Software Development Tools: Hosts and Target Machines - Linker/Locators for Embedded Software - Getting Embedded Software into Target Systems.

Unit V

Debugging Techniques: Testing on your Host Machines - Instruction Set Simulators - The Asset Macro - Using Laboratory Tools - Case Studies

TEXT BOOKS:

1. David.E.Simson, An Embedded Software Primer, Addision Wesley, 2001.

Elective: Geographical Information Systems

Programme: BCA   **Course Code: 18UCA6EL2**

5 Hours / week

Credits: 5   **Year: III**   **Semester: VI**

Unit I

Introduction – Defining GIS – Component of GIS – Spatial Data – Maps and their influence on the characteristic of spatial data – Thematic characteristic of spatial data – Other sources of spatial data.

Unit II

Spatial data Modeling – Entity definition – Spatial data model – Spatial data structures – Modeling surfaces – Modeling networks – Building computer worlds – Modeling the third dimension – Modeling the fourth dimension.

Unit III

Introduction – Database data models – Creating a database – GIS database applications – developments in databases – Methods of data input – Data editing – Towards an integrated database.

Unit IV

Measurements in GIS – lengths perimeters and areas – Queries – Reclassification – Buffering and neighbourhood functions – Integrating data map overlay – spatial interpolation – Analysis of surfaces – Network analysis.

Unit V

Analytical modeling in GIS – Process Models – Modeling physical and environmental process – Modeling human process – modeling the decision making process – Problems with using GIS to model spatial process – Maps as output – Non-cartographic output – GIS and spatial decision support.

TEXT BOOKS:

1. Ian Heywood, Sarah Cornelius, An introduction to GIS, 2nd Edition, Pearson Education, 2003.

Elective:Design and Analysis of Algorithm

Programme: BCA   **Course Code: 18UCA6EL2**

5 Hours / week

Credits: 5   **Year: III**   **Semester: VI**

Unit I

Introduction – overview – how to create programs and analyze them. Divide and Conquer: Algorithm - Complexity analysis - introduction to random algorithms - General Method - Finding maximum and minimum - Strassen's matrix multiplication - Quick sort - Selection sort.

Unit II

Greedy Method: General Method - Tree vertex splitting - job sequencing with dead lines - shortest Path - Knapsack01. Dynamic Programming: General Method - multistage graphs - string Editing - Travelling Salesman Problem.

Unit III

Back Tracking: General Method - sum of subsets - Graph Coloring - Depth First Search - Breadth First Search.

Unit IV

Branch and Bound:General Method - I/O knapsack Problem - Travelling Salesperson - Algebraic manipulation - Fourier Transformation

Unit V

Lower Bound Theory: Comparison trees - Oracles and advisory arguments - Lower bounds through reduction - Basic Concepts of Np-Hard and Np-Complete.

TEXT BOOKS:

1. E.Horowitz, S.Sahni and S. Rajasekaran, Computer Algorithms, Galgotia Publications, 2003.

REFERENCE BOOKS:

1. G.Brassard and P.Bratley, Fundamentals of Algorithmic, PHI, 2003.

2. Kunth, Fundamentals of Algorithms.

3. http://spoken-tutorial.org/