List of courses offered by the institution that focus on employability/ entrepreneurship/ skill development during the year.

Computer Technology					
Programme: B.Sc. Computer Technology				Year -2022-23	
Course Code	**Course Title**	**Employability (EM)/ Entrepreneurship (EN)/ Skill Development (SD)**			**Year of Introduction**
		EM	**EN**	**SD**	
22 UCT 101	CORE - I : Programming In C	✓			2011
22 UCT 102	CORE II: Digital Fundamentals And Computer Organization			✓	2011
22UCT1A1	ALLIED I: Mathematics - I: Mathematical Structures For Computer Science			✓	2011
22UCT 204	CORE III: Java programming			✓	2012
22UCT205	Core IV – Data Structures	✓			2011
22UCT2A2	Allied II – Mathematics II- Operations Research			✓	2021
21UCT307	Core V: Java Programming			✓	2012
21UCT308	Core VI: Database Management System	✓			2011
21UCT309	Core VII: Operating Systems			✓	2011
21UCT3A3	Allied - III : Software Engineering		✓		2011
21UCT3N1	Skill Based NON-MAJOR ELECTIVE I - HTML LAB			✓	2011
21UCT412	Core VIII:			✓	2011

List of courses offered by the institution that focus on employability/ entrepreneurship/ skill development during the year.

	Advanced Java Programming				
21UCT413	Core IX: Linux And Shell Programming	✓			2021
21UCT414	Core X: Data Communication And Networks		✓		2011
21UCT4A4	Allied IV: Big Data Management		✓		2020
21UCT4N1	Skill Based NON-MAJOR ELECTIVE II – OFFICE AUTOMATION LAB		✓		2018
20 UCT 517	CORE XI: OPEN SOURCE TECHNOLOGIES (PHP and MYSQL)			✓	2011
20 UCT 518	CORE XII: INFORMATION SECURITY	✓			2015
20 UCT 5E1	ELECTIVE I : Cloud Computing	✓			2015
20 UCT 5E2	ELECTIVE I : Data Mining and Analytics		✓		2020
20 UCT 5E3	ELECTIVE I : Artificial Intelligence			✓	2021
20 UCT 621	CORE XIII: FRAMEWORK TECHNOLOGY	✓			2011
20 UCT 6E4	ELECTIVE-II: Embedded Systems	✓			2011
20UCT6E5	ELECTIVE-II: E-Commerce		✓		2014
20UCT6E6	ELECTIVE-II: Underwater Communication		✓		2016
20UCT6E7	Elective – III: Multimedia			✓	2011

List of courses offered by the institution that focus on employability/ entrepreneurship/ skill development during the year.

	Techniques				
20UCT6E8	Elective – III: Mobile Computing			✓	2016
20UCT6E9	Elective – III: Internet of Things (IoT)	✓			2020

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DEPARTMENT OF COMPUTER TECHNOLOGY

Syllabus

BATCH: 2020 – 2023

Faculty Members

Ms. C. Keerthana, M.Sc., M.Phil., (Ph.D).,

Ms. K. S. Leelavathi, M.Sc., M.Phil., NET., SET., (Ph.D).,

Mr. R. Jayaprakash, M.C.A., M.Phil., (Ph.D).,

Ms. A. Kalaivani, M.C.A., M.Phil., (Ph.D).,

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Programme Code:	B. Sc	**Programme Title:**	Bachelor of Science (Computer Technology)	
Course Code:	20UCT517	**Title**	**Batch:**	2020 - 23
		CORE XI: OPENSOURCE TECHNOLOGIES (PHP and MySQL)	**Semester**	V
Hrs/Week:	06		**Credits:**	04

Course Objective

On completion of the PHP Programming & MySQL for Open source course the delegate will have a good practical knowledge of how to write successful PHP code utilizing a MySQL database.

Course Outcomes (CO)

K1	CO1	To keep in mind PHP basic syntax and PHP object-oriented classes
K2	CO2	To understand functions available to deal with file and directory operations
K3	CO3	To implement cookies, sessions and headers
K4	CO4	To evaluate the database connectivity using PHP MySOL / MySQLi / SQLite extensions and to figure out the error handling methods

Syllabus

Unit - I **[13 Hours]**

Introducing PHP: History – Unique features – Basic Development Concepts – Creating your First PHP Script – Sample Applications. **Using Variables and Operators:** Storing Data in Variables – Understanding PHP's Data types – Setting and Checking Variable Data Types – Using Constants – *Manipulating Variables with Operators** – Handling Form Input.

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Unit - II **[13 Hours]**

Controlling Program Flow: Writing Simple Conditional Statements – Writing More Complex Conditional Statements – Repeating Actions with Loops – Working with String and Numeric Functions. **Working with Arrays:** Storing Data in Arrays – Processing Arrays with

[20UCT517]

Loops and Iterations – Using Arrays with Forms – Working with Array Functions – *Working with Dates and Times**.

Unit - III **[13 Hours]**

Using Functions and Classes: Creating User-Defined Functions – Creating Classes – Using Advanced OOP Concepts. **Working with Files and Directories:** Reading Files – Writing Files – Processing Directories – Performing Other File and Directory Operations.

Unit - IV **[13 Hours]**

Working with Databases and SQL: Introducing Databases and SQL – Creating and Populating a Database – Using PHP's MySQLi Extension – Adding or Modifying Data – Handling Errors. Using PHP's SQLite Extension – Using PHP's PDO Extension – Using a MySQL Database – Switching to a different Database.

Unit - V **[13 Hours]**

Python Basics: Introduction – Installation – Data types and Data structures –**Control flow* – Functions – Modules – Packages – File handling – Date/Time – Operations – Classes.

Note: **Italicized* texts are for self study

Power point Presentations, Group Discussions, Seminar, Quiz, Assignment

Books for Study

1. Vikram Vaswani, (2009), "PHP: A Beginner's Guide", Second Reprint, Tata McGraw Hill Publications, ISBN-13: 9780070140691.

Books for Reference

1. Alan Forbes, (2020),"The Joy of PHP: A Beginner's Guide to Programming Interactive Web Applications with PHP and MySQL", Kindle Edition, ISBN; 978-1522792147.

2. Rasmus Lerdorf, Kevin Tatroe, (2013),"Programming PHP", 3rd Edition, O'Reilly Media, ISBN-13: 978-1449392772.
3. Luke Welling; Laura Thomson, (2010), "PHP and MySQL-Web Development", 4th Edition, ISBN-13: 9788131729878.
4. http://cdn.phpreferencebook.com/wp-content/uploads/2008/12/php_reference_-_beginner_to_intermediate_php5.pdf

Mapping

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	H	H	H

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CO2	M	H	H	H	M
CO3	M	H	H	H	M
CO4	L	H	H	H	H

H-High; M-Medium; L-Low

[20UCT518]

Programme Code:	B. Sc.	**Programme Title:**	Bachelor of Science (Computer Technology)	
Course Code:	20UCT518	**Title**	**Batch:**	2020 - 23
		CORE XII - INFORMATION SECURITY	**Semester**	V
Hrs/Week:	06		**Credits:**	04

Course Objective

To develop the knowledge about Cyber Security, Cryptography, Symmetric/Asymmetric Key Algorithms and other security techniques.

Course Outcomes (CO)

K1	CO1	To remember about the concepts of Attacks on computers, Encryption and

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		Decryption Methods, Substitution and Transposition Techniques
K2	CO2	To understand how DES and RSA Algorithm works
K3	CO3	To apply the conceptual knowledge of Digital Certificates and Secure Socket Layer
K4	CO4	To analyze the elements related with Cryptographic Algorithms used in S/MIME and Virtual Private Network

Syllabus

Unit – I **[15 Hours]**

Attacks on Computers and Computer Security: Introduction – Need For Security –Types Of Attacks. **Cryptography - Concepts and Techniques:** Introduction – Plain Text and Cipher Text – Substitution Techniques - Transposition Techniques – Encryption and Decryption.

Unit – II **[16 Hours]**

Symmetric Key Algorithms: Introduction – Algorithm Types – An Overview Of Symmetric Key Cryptography – **Data Encryption Standard (DES)**:How DES Works? **Asymmetric**

Key Algorithms,Digital Signature and RSA: Introduction – An Overview Of Asymmetric Cryptography - The RSA Algorithm.

Unit – III **[16 Hours]**

Digital Certificate and Public Key Infrastructure (PKI): Digital Certificates: Introduction – The Concept of Digital Certificate – Certificate Authority – Technical Details. The PKIX

Model. **Internet Security Protocols:** Introduction –Secure Socket Layer – (SSL) – *Secure Hyper Text Transfer Protocol (SHTTP)*.*

Unit – IV **[15 Hours]**

Email Security: PGP – How PGP Works? **- S / MIME: Introduction –** Cryptographic Algorithms used in S/MIME – Security in GSM –Security in 3G.**User Authentication And Kerberos:** Introduction – Authentication Basics – **Passwords:** Introduction – Clear Text Passwords - Kerberos.

Unit – V **[16 Hours]**

Cryptography in JAVA: Introduction – Cryptographic Solution Using JAVA. **Network Security Firewalls and Virtual Private Networks** (VPN): Introduction – **Fire Walls**: Introduction – *Types of Firewalls**. Virtual Private Networks (VPN) – Intrusion.

Note: **Italicized* texts are for self study

Power point Presentations, Group Discussions, Seminar, Quiz, Assignment

Books for Study

1. Atul Kahate, (2007), "Cryptography and Network Security", 2nd Edition, Tata McGraw-Hill Publication, and ISBN-13: 9780070648234.

Books for Reference

1. Mark Rhodes-Ousley, Roberta Bragg, Keith Strassberg, (2017), "Network Security: The Complete Reference", 1st Edition, Tata McGraw-Hill. ISBN-13: 978-0070586710.

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2. William Stallings, (2011), "Cryptography and Network Security Principles and Practices", 5th Edition, ISBN 13: 978-0-13-609704-4.
3. Brijendra singh, (2011), "Network Security and Management", 3rd Edition, PHI Publication, ISBN - 13: 9788120344976.
4. https://www.scribd.com/doc/159080504/Cryptography-Network-Security-Atul-Kahate

Mapping

PO / CO	PO1	PO2	PO3	PO4	PO5
CO1	H	H	M	M	H
CO2	H	H	M	L	H
CO3	H	H	M	M	H
CO4	H	M	H	H	M

H-High; M-Medium; L-Low

20UCT5E1]

Programme Code:	B. Sc	**Programme Title:**	Bachelor of Science (Computer Technology)	
Course Code:	20UCT5E1	**Title**	**Batch:**	2020 - 23
		ELECTIVE I: CLOUD COMPUTING	**Semester**	V
Hrs/Week:	06		**Credits:**	05

Course Objective

To make out facts about cloud computing, developing cloud services,Cloud Storage,Cloud Computing at Work, Cloud computing Security Issues and Challenges.

Course Outcomes (CO)

K1	CO1	To recollect cloud networking concepts
K2	CO2	To understand and familiar with the basic concepts of cloud computing and python
K3	CO3	To apply cloud to large scale distributed systems
K4	CO4	To figure out security issues in cloud computing

Syllabus

Unit - I **[12 Hours]**

Introduction to Cloud Computing: Characteristics – Models – **Services Examples* – Services and Applications. **Cloud concepts and Technologies:** Virtualization – Load balancing – scalability and elasticity – Deployment – Replication – Monitoring – Software defined Networking – Network function virtualization – MapReduce – Identity and access management - Service level agreements – Billing.

Unit - II **[13 Hours]**

Cloud services and Platforms: Compute – **Storage* – Database – Application – Content Delivery – analytics – Deployment and Management – Identity and access Management – Open source Private Cloud Software. **Hadoop and MapReduce:** Apache Hadoop – MapReduce Job execution – Schedulers – Cluster setup.

Unit -III **[14 Hours]**

Cloud Application Design: Introduction **–** Design considerations – Reference Architectures – Design methodologies – Data storage approaches. **Cloud Application Benchmarking and Tuning**: Introduction – Workload Characteristics – Application Performance Metrics – Design Considerations – Benchmarking Tools – Deployment prototyping – Load Testing and Bottleneck Deduction – Hadoop Benchmarking.

Unit - IV **[13 Hours]**

Cloud Security: Introduction – CSA Cloud Security Architecture – Authentication – Authorization – Identity and Access Management – Data Security – Key Management – Auditing. **Cloud For Industry, Health Care and Education:** Health Care – Energy systems – Transportation systems – Manufacturing Industry – Education.

Unit- V **[13 Hours]**

Python for Cloud: Amazon web services – Google Platform – Windows Azure – MapReduce – Packages – Web Application Framework – Designing a RESTful Web API.Note: **Italicized* texts are for self study

Power point Presentations, Group Discussions, Seminar, Quiz, Assignment, Case Study

Books for Study

1. Arshdeep Bahga, Vijay Madisetti. (2016). Cloud Computing – A Hands-on Approach. Universities Press Pvt. Ltd.

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Books for Reference

1. Michael Miller, (2008), "Cloud Computing: Web-Based Applications That Change the way you work and Collaborate Online", Macmillan Computer Publication, 1st Edition, ISBN-13: 9780789738035.

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2. http://cs.ecust.edu.cn/~yhq/course_files/cloud/Cloud%20Computing%20Bible.pdf

Mapping

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	M	H	H
CO2	H	M	H	H	H
CO3	M	H	H	H	H
CO4	H	H	L	H	H

H-High; M-Medium; L-Low

[20UCT5E2]

Programme Code:	B. Sc	**Programme Title:**	Bachelor of Science (Computer Technology)	
Course Code:	20UCT5E2	ELECTIVE I- DATA	**Batch:**	2020 - 23

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		MINING AND WAREHOUSING	**Semester**	V
Hrs/Week:	06		**Credits:**	5

Course Objective

To give a better understanding of various concepts of Data mining includes KDD, Association rules, Classification, Clustering, different types of mining and also about big data analytics.

Course Outcomes (CO)

K1	CO1	To keep in mind the various concepts of data mining
K2	CO2	To understand the types of data mining and analytics
K3	CO3	To execute data mining algorithms for finding hidden interesting patterns in data
K4	CO4	To evaluate various data mining algorithms and analysis of big data.

Syllabus

Unit – I **[15 Hours]**

Data mining and the data warehouse: Introduction - Data mining -Kinds of data-functionalities- classification-Task primitives-Integration with database or warehouse-Major issues. **Mining frequent patterns, association and correlations**: Basic concepts. **Efficient and scalable frequent item set mining methods:** Aprior Algorithm-Generating association rules.

Unit - II **[16 Hours]**

Classification and prediction: Definition – Issues - **classification by Decision tree* Induction – Bayesian classification-rule based classification - classification by back propagation - support vector machine.

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Unit - III **[15 Hours]**

Cluster analysis: Definition - types of data in cluster analysis - categorization of major clustering methods - partitioning methods - hierarchical methods.

Unit - IV **[16 Hours]**

Spatial data mining - multimedia data mining - text mining - mining the www - **data mining Applications.*

Unit - V **[16 Hours]**

Data warehousing : Data warehousing Components – Building a Data warehouse – Mapping the Data Warehouse to a Multiprocessor Architecture – DBMS Schemas for Decision Support – Data Extraction, Cleanup, and Transformation Tools – Metadata.

Note: **Italicized* texts are for self study

Power point Presentations, Group Discussions, Seminar, Quiz, Assignment

Books for Study

1. Jiawei Han and Micheline Kamber (2005) Data Mining concepts and techniques, Elsevier publication.
2. Dr. Aravind Sathi (2012) Big Data Analytics:Disruptive Technologies for Changing the Game, first edition, MC Press publication.
3. Alex Berson and Stephen J.Smith, (2008), "Data Warehousing, Data Mining and OLAP", 13th Edition , Tata McGraw – Hill Publications.

Books for Reference

1. Margaret H. Dunham (2009), Data Mining Introductory and Advanced Topics, Pearson Education Publications.
2. Vikram Pudi, P. Radha Krishna(2009),Data Mining**,** Oxford University Press, First Edition.

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3. Anand Rajaraman and Jeffry David Ullman (2012), "Mining of Massive Datasets", Cambridge University Press.

Mapping

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	H	M	H
CO2	M	H	H	H	L
CO3	H	M	H	H	M
CO4	H	H	M	H	L

H-High; M-Medium; L-Low

Programme Code:	B. Sc	**Programme Title:**	Bachelor of Science (Computer Technology)	
Course Code:	20UCT5E3	ELECTIVE I- ARTIFICIAL INTELLIGENCE	**Batch:**	2020 - 23
			Semester	V
Hrs/Week:	06		**Credits:**	5

Course Objective

To embed a deep knowledge about search techniques, reasoning, game playing, expert systems and prolog.

Course Outcomes (CO)

K1	CO1	To keep in mind different search strategies for a problem
K2	CO2	To understand concepts of semantic net
K3	CO3	To implement a AI problem to be solved using prolog

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K4	CO4	To evaluate different knowledge representation schemes for AI problems

Syllabus

Unit – I **[15 Hours]**

Problems and search: AI Techniques-Defining the problem as a State Space Search – Production Systems – Problem Characteristics – Production system Characteristics – Heuristic Search Techniques – Generate and test – Hill Climbing – Best-first Search – Problem Reduction – Constraint Satisfaction – *Mean-Ends Analysis.

Unit - II **[16 Hours]**

Knowledge Representation: Representations and Mappings- Approaches to Knowledge Representation – Issues in knowledge representation – Representing simple Facts in Logic – Representing Instance and Isa Relationships- Procedural versus Declarative Knowledge – Logic Programming – *Forward versus Backward reasoning.

Unit - III **[15 Hours]**

Semantic Nets: Frames - Conceptual Dependency - Game Playing – Overview– The minimax search procedure – Adding Alpha - Beta cutoffs.

Unit - IV **[16 Hours]**

Expert System : Definition – Characteristics of Expert System – Architecture & Description of Modules – Backward Chaining – Knowledge Acquisition facility. Knowledge Engineering – Expert System Life Cycles – * Expert System Tools.

Unit - V **[16 Hours]**

Prolog: The Introduction-Converting English to prolog facts and rules – goals – Terminology – Variables - Control structures - Arithmetic operators - Matching in Prolog – Backtracking – cuts – Recursion – Lists - Dynamic Databases - I/O Streams - Some aspects specific to LPA Prolog.

Note: **Italicized* texts are for self study

Power point Presentations, Group Discussions, Seminar, Quiz, Assignment

Books for Study

1. Elaine Rich, Kevin Knight, (2009), Artificial Intelligence, 3rd edition, Tata McGraw Hill Publications.

Books for Reference

1. Stuart Russell, Peter Norvig, (2015), Artificial Intelligence: A Modern Approach, 3rd Edition, Pearson Education India, ISBN-13: 978-9332543515
2. Er. Rajiv Chopra, (2016), Artificial Intelligence: A Practical Approach, 1st Edition, S. Chand Publications.

Mapping

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	H	M	H
CO2	M	H	H	H	L
CO3	H	M	H	H	M
CO4	H	H	M	H	L

H-High; M-Medium; L-Low

[20UCT519]

Programme Code:	B. Sc	**Programme Title:**	Bachelor of Science (Computer Technology)	
Course Code:	20UCT519	**Title**	**Batch:**	2020 - 23

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		LAB – VII - OPEN SOURCE TECHNOLOGIES	**Semester**	V
Hrs/Week:	05		**Credits:**	03

Course Objectives

To devise and build an efficient web based applications using PHP script with MySQL on a web server.

Course Outcomes (CO)

K3	CO1	To recollect array functions, file and directory functions, date and time functions in PHP Script
K4	CO2	To understand functions and classes, cookies, sessions and about handling script errors
K5	CO3	To access the database using PHP's MySQLite/PDO extensions

Sample Programs **[Total Hrs: 52]**

1. Develop a PHP Script to find the Greatest among the given numbers using for loop.
2. Develop a PHP Script to sort the given numbers using one dimensional array.
3. Develop a PHP Script to check whether the given string is a palindrome or not.
4. Develop a PHP Script to illustrate the concept of numeric Functions
5. Develop a PHP Script to display the Array elements
6. Develop a PHP Script to illustrate the concept of Array Functions
7. Develop a PHP Script to illustrate the concept of Array Iterator
8. Develop a PHP Script to illustrate the concept of Date and Time functions
9. Develop a PHP Script to find the factorial of the number using Recursion.

[20UCT519]

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10. Develop a PHP Script to illustrate the concept of Class and extending it

11. Develop a PHP Script to illustrate the concept of Constructor and Destructor

12. Develop a PHP Script to illustrate the concept of File Functions

13. Develop a PHP Script to illustrate the concept of Directory Iterator

14. Develop a PHP Script to illustrate the concept of Default Arguments

15. Develop a PHP Script to illustrate the concept of Encryption and Decryption

16. Develop a PHP Script to read a specific segment of a file.

17. Develop a PHP Script to retrieve records from a database using MySQLite

18. Develop a PHP Script to retrieve records as objects from a database using MySQLite

19. Develop a PHP Script to Add or Modify data in a Database using PDO

20. Develop a PHP Script to illustrate the concept of Cookies

21. Develop a PHP Script to illustrate the concept of Sessions

22. Develop a PHP Script to illustrate the concept of Prepared Statements

23. Develop a PHP Script to illustrate the concept of Debugging Errors

24. Develop a PHP Script to illustrate the concept of Exception Handling

25. Develop a PHP Script to illustrate the concept of Custom Exception

Power point Presentations

Mapping

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	H	H	M
CO2	H	H	H	H	M

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CO3	M	H	H	H	M

H-High; M-Medium; L-Low

[20UCT520]

Programme Code:	B. Sc	**Programme Title:**	Bachelor of Science (Computer Technology)	
Course Code:	20UCT520	**Title**	**Batch:**	2020 - 23
		LAB – VIII -WEB DESIGNING	**Semester**	V
Hrs/Week:	05		**Credits:**	03

Course Objective

To learn and develop an efficient website using HTML, DHTML, CSS, Javascript and XML components.

Course Outcomes (CO)

K3	CO1	To recollect the html tags for designing table, frames and forms in a web page
K4	CO2	To understand style sheets and java script to create interactive web pages
K5	CO3	To validate the DHTML programs and XML programming for constructing user friendly websites

Sample Programs **[Total Hrs: 52]**

1. Prepare a webpage for our college using basic HTML tags.
2. Prepare a College Alumni Cell webpage using HTML tags.
3. Prepare a Departmental store details using OL & UL.
4. Prepare Frames which includes 4 html programs using frames.
5. Prepare an Industrial Visit agenda for Two days using tables.

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6. Prepare a webpage for seven wonders using HTML tags.
7. Prepare an Advertisement for any one high sale product using frames.
8. Prepare a Bio-data form using DHTML.
9. Prepare an E-Mail creation form using DHTML.
10. Prepare your Proctorial form details using DHTML.
11. Create a home page using xml.

[20UCT520]

12. Writing XML web Documents which make use of XML Declaration, Element Declaration, Attribute Declaration
13. Usage of Internal DTD, External DTD, Entity Declaration.
14. Design a catalog using XML.
15. Create a java script code block using arrays to generate the current data in words.
16. Create a web page which accepts user information and user commands on the web site to Check if all the text fields have been entered with data else display an alert.
17. Create a web page using image files, which switch between one another as the mouse Pointer moves over the images.
18. Using Java Script's Window and document objects and their properties and various
19. Writing Java Script snippet which make use of Java Script's inbuilt as well as user.

Power point Presentations

Mapping

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	H	H	M

CO2	H	H	H	H	M
CO3	M	H	H	H	M

H-High; M-Medium; L-Low

[20UCT5S1]

Programme Code:	B. Sc	**Programme Title:**	Bachelor of Science (Computer Technology)	
Course Code:	20UCT5S1	**Title**	**Batch:**	2020 - 23
		SKILL BASED MAJOR ELECTIVE I – PYTHON LAB	**Semester**	V
Hrs/Week:	01		**Credits:**	02

Course Objectives

To learn how to design and develop Python applications.

Course Outcomes (CO)

K3	CO1	To keep in mind about python object types.
K4	CO2	To realize about writing loops and decision statements in Python.
K5	CO3	To validate programs with structure, functions and passing arguments in Python.

Sample Programs **[Total Hrs: 13]**

1. To Write a Python program to compute the GCD of two numbers

2. To Write a Python program to find the first n prime numbers

3. To write a Python program to multiply two matrices

4. To write a Python program to find the maximum of a list of numbers

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5. To Write a Python program to find the exponentiation (Power of a number)

6. To Write a Python program to find the square root of a number

7. To write a Python program to find given number is odd or even

8. To write a Python program to develop a simple calculator.

9. To write a Python program to find given year is leap or not.

10. To write a Python program to find the factorial of the given number

[20UCT5S1]

Mapping

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	H	M	M
CO2	H	H	H	H	M
CO3	H	H	H	M	M

H-High; M-Medium; L-Low

[20UCT5S2]

Programme Code:	B. Sc	**Programme Title:**	Bachelor of Science (Computer Technology)	
Course Code:	20UCT5S2	**Title**	**Batch:**	2020 - 23
		SKILL BASED MAJOR ELECTIVE I – HTML5 WITH CSS LAB	**Semester**	V
Hrs/Week:	01		**Credits:**	02

Course Objectives

To learn and develop an interactive webpage using HTML5.

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Course Outcomes (CO)

K3	CO1	To keep in mind about various elements and attributes in HTML5
K4	CO2	To realize about canvas tags to create code based drawings in HTML5
K5	CO3	To validate programs with audio and video in HTML5, web worker, SVG

Sample Programs **[Total Hrs: 13]**

1. Write a Program to add new elements in HTML5.
2. Write a Program to illustrate <section> element in HTML5.
3. Write a Program to illustrate <nav> element in HTML5.
4. Write a Program to illustrate <fig> and <fig caption>element in HTML5.
5. Write a program to draw a Circle using canvas tag.
6. Write a program to fit an image in a cell using canvas tag.
7. Write a program to draw a star using SVG.
8. Write a program to include video/Audio file in HTML5 page
9. Write a program to Drag and Drop the content in HTML5.
10. Write a program to illustrate Web Workers in HTML5.
11. Write a program for setting different background color for elements using CSS.
12. Write a program for setting different right side border in CSS.

Mapping

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	H	M	M
CO2	H	H	H	H	M
CO3	H	H	H	M	M

H-High; M-Medium; L-Low

[20UCT621]

Programme Code:	B. Sc	**Programme Title:**	Bachelor of Science (Computer Technology)	
Course Code:	20UCT621	**Title**	**Batch:**	2020 - 23
		CORE XIII - FRAMEWORK TECHNOLOGY	**Semester**	VI
Hrs/Week:	06		**Credits:**	04

Course Objective

To address the requirements of developers to become experts in .NET environment.

Course Outcomes (CO)

K1	CO1	To keep in mind about .NET framework fundamentals
K2	CO2	To understand the control statements, arrays and procedures
K3	CO3	To implement the concept of GUI, files and streams
K4	CO4	To analyze about database connectivity with .NET framework

Syllabus

Unit – I **[13 Hours]**

Introduction to Visual Basic .NET: Visual Basic .NET- Introduction to Microsoft.NET- .NET Framework and the common language runtime.

Introduction to the Visual Studio.NET IDE: Introduction – Overview of the visual studio .NET IDE - Menu bar and Toolbar –Visual Studio.NET IDE windows.

Introduction to Visual Basic Programming: Introduction – simple programs – memory concepts- Arithmetic - Decision Making – Using a dialog to display a message.

Unit – II **[13 Hours]**

Control Structures: Introduction – Control Structures- if/then selection structure-if/then/else Selection Structure – While, Do while/loop, Do Until/Loop Repetition Structures – *Assignment Operators** – For Next – Select Case – do/loop while – do/loop until – exit key word – logical operators.

Procedures: Introduction – Modules, classes and procedures – sub procedures – function procedures – methods – Arguments Promotion – Option Strict and Data type conversions – value types and reference types – passing arguments: pass – by-value vs. pass-by-reference – duration of identifiers – scope rules.

Unit – III **[13 Hours]**

Arrays: Introduction - arrays - declaring and allocating arrays - examples - passing arrays to procedures - By Val vs By Ref. – for each/next repetition structure.

Graphical user interface concepts: Introduction – windows forms – event handling model – control properties and layout – labels, textboxes and buttons – group boxes and panels – *checkboxes and radio buttons** – picture boxes – mouse event handling – keyboard event handling.

Menus – Link labels – List boxes and checked list boxes – Combo boxes – Tree views – List views – Tab control –MDI windows – Visual inheritance – User defined controls.

Unit – IV **[13 Hours]**

Database, SQL and ADO.NET: Introduction – relational database model- SQL – ADO.NET object model – programming with ADO.NET – extracting from a database – modifying a database

Unit – V **[13 Hours]**

ASP.NET, web forms and web controls: Introduction – simple HTTP transaction – system architecture – web controls – session tracking.

Note: **Italicized* texts are for self study

Power point Presentations, Seminar, and Assignment

[20UCT621]

Books for Study

1. Deitel H.M, Deitel P.J, Nieto T.R, (2003), "Visual Basic.NET How to Program", 2nd Edition, Pearson Education, ISBN-13: 9780130389374.

Books for Reference

1. Kogent Learning Solutions Inc., (2015), ".Net 3.5 Programming: Covering.Net Framework", 1st Edition, DreamTech Press, ISBN-13: 978-8177228342.
2. Bill Evjen, Jason Beres, et.al, (2003), "Visual Basic.Net Programming – Black Book", John Wiley & Sons. 2nd Edition, ISBN-13: 978-0764544118.
3. Tim Anderson, "VB.Net programming in Easy Steps", 1st Edition, Dream Tech, ISBN-13: 9788177221930.
4. https://www.syncfusion.com/resources/techportal/details/ebooks/aspnetmultitenant

Mapping

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	H	H	L
CO2	H	H	H	M	M
CO3	H	H	H	M	H
CO4	H	H	H	H	M

H-High; M-Medium; L-Low

[20UCT6E4]

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Programme Code:	B. Sc	**Programme Title:**	Bachelor of Science (Computer Technology)	
Course Code:	20UCT6E4	**Title**	**Batch:**	2020 - 23
		ELECTIVE II: EMBEDDED SYSTEMS	**Semester**	VI
Hrs/Week:	6		**Credits:**	4

Course Objective

To introduce real-time systems and embedded computing systems.

Course Outcomes (CO)

K1	CO1	To keep in mind the basic concepts of Embedded System, Microcontroller, Ports and embedded programming in C, C ++ and Java
K2	CO2	To understand the concepts of devices and buses for device networks, internal architecture and interfacing of different peripheral devices with Microcontrollers
K3	CO3	To deploy in depth knowledge in Device drivers and Interrupts servicing mechanism, inter-process communication and synchronization of processes
K4	CO4	To analyze a vast experience about Real Time Operating Systems and its applications and program modeling concepts in a single and multi processor systems

Syllabus

Unit - I **[16 Hours]**

Introduction to Embedded System: Embedded System – Processor Embedded into the System – Embedded Hardware units and Devices in a System – Embedded Software in a system – Examples of embedded system – Embedded system on chip and use of VLSI

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circuit - Classification of embedded systems – *Skills required for an embedded System Designer*.*

Unit - II **[15 Hours]**

Devices and buses for device networks: I/O Types and Examples – Serial Communication devices: Synchronous, Iso-Synchronous and Asynchronous communication from serial devices – Parallel Device Ports - Timer and counting devices – Watchdog timer – *Real time clock** – Network Embedded Systems – Serial Bus Communication Protocol.

Unit - III **[16 Hours]**

Device drivers and Interrupts servicing mechanism: ISR concept - Device drivers – Interrupt servicing mechanism – Context and the periods for context-switching, dead-line and interrupt latency – Device Driver Programming: Writing physical device-driving ISRs in a system- Parallel port device drivers

Unit - IV **[15 Hours]**

Programming concepts and embedded programming in C and C++: Embedded programming in C++ and in Java. **Program modeling concepts in single and multi processor systems**: Program Models – DFG Models – State Machine Programming Models for Event-controlled Program Flow – Modeling of Multiprocessor Systems

Unit - V **[16 Hours]**

Inter – process communication and synchronization of processes, Threads and Tasks: Multiple processes in an application – Multiple Threads in an application – Tasks- Task States- **Real time operating systems**: Operating system services – Real time operating systems – Basic Design using RTOS: Principles – RTOS Task scheduling Models, Interrupt Latency and Response of the Tasks as Performance Metrics: Cooperative Scheduling model- Cyclic and Round Robin Scheduling models – Preemptive Scheduling model.

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Note: **Italicized* texts are for self study

Power point Presentations, Group Discussions, Seminar, Quiz, Assignment

[20UCT6E4]

Books for Study

1. Raj Kamal, (2011), "Embedded Systems – Architecture, Programming and Design", 2nd Edition, TMH, ISBN-13:978-0-07-066764-8.

Books for Reference

1. Daniel W. Lewis, (2007), "Fundamentals of Embedded Software", 1stEdition, PHI Education Publications, ISBN: 81-7808-604-2.
2. Shibu K V, (2017), "Introduction to Embedded Systems", 2nd Edition, McGraw Hill Education, ISBN-13: 978-9339219680.
3. http://www.dauniv.ac.in/downloads/EmbsysRevEd_PPTs/Chap01Lesson_1Emsys.pdf

Mapping

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	H	M	H
CO2	M	H	H	H	L
CO3	H	M	H	H	M
CO4	H	H	M	H	L

H-High; M-Medium; L-Low

[20UCT6E5]

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Programme Code:	B. Sc	**Programme Title:**	Bachelor of Science (Computer Technology)	
Course Code:	20UCT6E5	**Title**	**Batch:**	2020 - 23
		ELECTIVE II: E-COMMERCE	**Semester**	VI
Hrs/Week:	06		**Credits:**	4

Course Objective

To learn E-Business revenue models, Law & taxation, online payment systems and sales.

Course Outcomes (CO)

K1	CO1	To remember basic concepts of e-commerce
K2	CO2	To understand the role of E-marketing, E-security, E-payment systems in current scenario
K3	CO3	To apply mobile payments.
K4	CO4	To analyze various portals, legal and ethical issues associated with e-commerce

Syllabus

Unit – I **[15 Hours]**

E-commerce: Introduction- Early Business information interchange efforts – Emergence of the internet – Milestones – **Advantages – Disadvantages* – Online extension of BAM model – Transition to e-commerce in India – E-transition challenges for Indian corporates. **Business Models**: Introduction – E-Business models based on the relationship of transaction parties and transaction

Unit - II **[16 Hours]**

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E-Marketing: Traditional Marketing – Identifying web presence goals – Online marketing – E- Mail Marketing - E-Advertising – Internet marketing trends – Target Markets – Marketing strategies - Search Engine Optimization.

Unit - III **[15 Hours]**

E-Security: Information system security – **Security on the internet*. **E-Payment Systems:** Internet Banking – Digital payment requirements – Digital token based e-payment systems – Classification of new payment systems – Electronic cash – Risk and e-Payment system – Online financial services in India – Online stock trading – Block Chain Technology : Cryptocurrency.

Unit - IV **[16 Hours]**

E-customer Relationship Management: CRM – Typical Business Touch Points. **E-supply Chain Management:** CISCO – supply chain. **Information Systems for Mobile Commerce:** Introduction – Mobile payments – Mobile Commerce in India.

Unit - V **[16 Hours]**

Portals for E-Business: ***Portals* – Requirements of intelligent websites – portals for mass collaborations – portals for Enterprise Resource Planning – ERP – Intranet Portals – HRM – Various HRIS modules. **Legal and Ethical Issues:** Ethical issues in Digital economy – cyberstalking – Phishing – Application fraud – Skimming – Copyright – Internet Gambling – Threats to children – Special Nature of Computer Ethics.

Note: **Italicized* texts are for self study

Power point Presentations, Group Discussions, Seminar, Quiz, Assignment

Books for Study

1. P. T. Joseph S. J., (2017), E - Commerce: An Indian Perspective, 5th Edition, PHI.

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[20UCT6E5]

Books for Reference

1. Henry Chan, Raymond Lee, Tharam Dillon, Elizabeth Chang, (2011), E-commerce Fundamentals and Applications, 1st Edition, Wiley India Pvt Ltd.
2. Gary P Schneider, (2012), E-Commerce Strategy, Technology And Implementation, 9th Edition, Engage Learning Publications.
3. https://www.bbc.co.uk/newsround/25622442 - bitcoin
4. https://www.techopedia.com/definition/27193/bitcoin-btc - bitcoin

Mapping

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	H	M	H
CO2	M	H	H	H	L
CO3	H	M	H	H	M
CO4	H	H	M	H	L

H-High; M-Medium; L-Low

[20UCT6E6]

Programme Code:	B. Sc	**Programme Title:**	Bachelor of Science (Computer Technology)	
Course Code:	20UCT6E6	**Title**	**Batch:**	2020 - 23
		ELECTIVE II: UNDER WATER COMMUNICATION	**Semester**	VI
Hrs/Week:	06		**Credits:**	4

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Course Objective

To study the feasibility and propose solutions to integrate multimedia traffic in the underwater wireless communication network paradigm.

Course Outcomes (CO)

K1	CO1	To remember the basic concepts of Underwater Environment.
K2	CO2	To understand the role of Radar, Antennas, Signals in underwater network Communication.
K3	CO3	To apply different modes of underwater applications.
K4	CO4	To analyze various issues associated with under water communications

Syllabus

Unit – I **[15 Hours]**

Underwater Acoustics: The Development – Exploring the Underwater Environment - Historical Highlights – The pioneers – Civilian developments – The Basic Oceanography – Depth variations. Outline of Underwater Applications: Military applications – Civilian applications.

Unit - II **[16 Hours]**

Underwater Networking Basics: Underwater Acoustic Infrastructure – Offshore Terrestrial Station - Radar Networks –Data Handling of an Underwater Network – Data Tabulation.

[20UCT6E6]

Types of Signals – Acoustic Modem – Boosters – Antennas – Receivers – Surface Buoy – Gliders – Yatch/Sailing Boats - Networking of submarines. Underwater electro acoustic transducers –Transducer modeling and design – installation.

Unit - III **[15 Hours]**

Underwater Sensor Networks: Ocean Sampling Networks, Pollution Monitoring, Environmental Monitoring and Tactical surveillance systems, Major challenges in design of Underwater Sensor Networks - Factors that affect the UWSN-Sensor Node Architecture-GIBS, VRAP, DABSRAPT.

Underwater Communication Protocols: Routing Protocols – GPS. Autonomous Underwater Vehicles – Topologies – Servers and Databases - Network Coding – Security issues.

Unit - IV **[16 Hours]**

Water Column Applications: Navigation – Military applications – Fishery Acoustics – Physical Oceanography – Tsunami Applications - Underwater Intervention. Marine Animal Acoustics: Marine mammal bioacoustics Fish bioacoustics – Acoustic Pollution of the Ocean.

Unit - V **[16 Hours]**

Case Study: Under Water Acoustic Software: AcTUP V2.2 L – Underwater Sound Recorder – Sail Tool Software – Sail Imaging Software.

Note: **Italicized* texts are for self study

Power point Presentations, Group Discussions, Seminar, Quiz and Assignment

Books for Study

1. Lurton and Xavier, (2010),"Introduction to Underwater Acoustics: Principles and Applications", Springer Publications.ISBN, 3540429670, 9783540429678.

Books for Reference

1. Yang Xiao, (2019),"Underwater Acoustic Sensor Networks", 1st Edition, CRC Press Publications, ISBN 9780367384067.
2. Web Resources : Curtin University : http://cmst.curtin.edu.au/products/underwater/

Mapping

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PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	H	M	H
CO2	M	H	H	H	L
CO3	H	M	H	H	M
CO4	H	H	M	H	L

H-High; M-Medium; L-Low

[20UCT6E7]

Programme Code:	B. Sc	**Programme Title:**	Bachelor of Science (Computer Technology)	
Course Code:	20UCT6E7	**Title**	**Batch:**	2020 - 23
		ELECTIVE III: MULTIMEDIA TECHNIQUES	**Semester**	VI
Hrs/Week:	06		**Credits:**	05

Course Objective

To impart knowledge about 2D Geometric Transformations and Algorithms, Unicode standard, Multimedia Components like Text, Audio, Video and Compression.

Course Outcomes (CO)

K1	CO1	To keep in mind about video display devices and output primitives
K2	CO2	To understand about text and image file formats
K3	CO3	To implement 2D transformations and viewing functions
K4	CO4	To analyze about principles of animation and data compression techniques

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Syllabus

Unit - I **[15 Hours]**

Overview of Graphics Systems: Video display devices-Cathode-Ray Tubes-Raster Scan Displays-Random Scan Display-Color CRT monitors. **Output Primitives**: Points and Lines – Line-Drawing algorithms – Loading frame Buffer – Line function – Circle-Generating algorithms. **Attributes of Output Primitives**: Line Attributes – Color and Grayscale Levels – Area-fill attributes – Character Attributes.

Unit - II **[16 Hours]**

2D Geometric Transformations: Basic Transformations – Matrix Representations – Composite Transformations – Other Transformations. **2D Viewing**: The Viewing Pipeline – Viewing Co-ordinate Reference Frame – Window-to-Viewport Co-ordinate Transformation –

[20UCT6E7]

2D Viewing Functions – Clipping Operations: Point Clipping – Line clipping: Cohen-Sutherland Line Clipping – Text Clipping.

Unit - III **[16 Hours]**

Text: Types of Text – Unicode Standard – Font – Insertion of Text – Text compression – File formats. **Image**: Image Types – Seeing Color – *Color Models** – Basic Steps for Image Processing – Scanner – Digital Camera – Interface Standards – Specification of Digital Images – CMS – Device Independent Color Models – Image Processing software – File Formats – Image Output on Monitor and Printer.

Unit - IV **[15 Hours]**

Audio: Introduction – Acoustics – Nature of Sound Waves – Fundamental Characteristics of Sound – Microphone – Amplifier – *Loudspeaker** – Digital Audio – MIDI – Basics of Staff Notation – Sound Card – Audio Transmission – Audio Recording Systems – Audio and Multimedia – Voice Recognition and Response - Audio Processing Software.

Unit - V **[16 Hours]**

Video: Analog Video Camera – Transmission of Video Signals – Video Signal Formats – Video File Formats and CODECs – Video Editing – Video Editing Software. **Animation:** Types of Animation – Computer Assisted Animation – Creating Movement – Principles of Animation – Some Techniques of Animation – Animation on the Web – Special Effects – Rendering Algorithms. **Compression:** MPEG-1 Audio – MPEG-1 Video.

Note: **Italicized* texts are for self study

Power Point Presentations, Group Discussions, Seminar, Quiz, Assignment

Books for Study

1. Donald Hearn, M.Pauline Baker, "Computer Graphics", 2nd edition, PHI, ISBN: 81-23-0944-8 (Unit I & II)
2. Ranjan Parekh, "Principles of Multimedia", 2008, TMH, ISBN-10:0-07-058833-3, (Unit III, IV & V)

[20UCT6E7]

Books for Reference

1. Amarendra N Sinha, Arun D Udai, "Computer Graphics", 2014, ISBN-13: 9780070634374 ,Tata Mcgraw Hill Publication.
2. Tay Vaughan, "Multimedia: Making it Work", 2014, 9th Edition, McGraw-Hill Publication.

Mapping

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	H	H	M

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CO2	M	M	H	M	M
CO3	M	H	H	H	L
CO4	M	H	H	H	H

H-High; M-Medium; L-Low

[20UCT6E8]

Programme Code:	B. Sc	**Programme Title:**	Bachelor of Science (Computer Technology)	
Course Code:	20UCT6E8	**Title**	**Batch:**	2020 - 23
		ELECTIVE III: MOBILE COMPUTING	**Semester**	VI
Hrs/Week:	06		**Credits:**	5

Course Objective

Understand the various concepts and techniques of WAP, GSM, CDMA, 2G, 3G

Course Outcomes (CO)

K1	CO1	To keep in mind the various networks, standards, communication medium, Spread spectrum technology
K2	CO2	To Understand the basic concepts of wireless networks.
K3	CO3	To deploy the mobile applications to the devices.
K4	CO4	To analyze the various wireless networks techniques.

Syllabus

Unit – I **[15 Hours]**

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Introduction: Mobility of Bits and Bytes–Wireless the Beginning–Mobile Computing – Dialogue Control – Networks – Middleware and Gateways – Application and services - Security in mobile computing – * *Standards* _ Why is it necessary – Standard bodies.

Mobile Computing Architecture: Architecture for mobile computing–Three-tier architecture – Mobile computing through Internet – Making existing applications mobile enabled.

Unit - II **[16 Hours]**

Mobile Computing Through Telephony: Evaluation of telephony – Multiple access procedures – Mobile computing through telephone – IVR Application – Voice XML – TAPI. **Emerging Technologies:** * *Blue Tooth* – RFID – WiMAX – Mobile IP – IPv6 – Java Card.

Unit - III **[16 Hours]**

GSM: Global System for mobile communications–GSM Architecture–GSM Entities– Call routing in GSM – PLMN Interfaces – GSM Addresses and Identifiers – Network Aspects in GSM – GSM Frequency allocations – Authentications and Security. **SMS:** Strengths – Architecture – SM MT – SM MO – VAS through SMS.

Unit - IV **[15 Hours]**

GPRS: GPRS and packet data network–Architecture–Network Operations–Data services – Applications - Limitations – * *Billing and Charging*. **WAP**: WAE – User agent & UAProf – WML – WSP – WTP – WDP – Gateway. **MMS**: Architecture – Transaction Flows.

Unit - V **[16 Hours]**

CDMA and 3G: Spread spectrum technology. **IS 95**: Speech and Channel Coding–Architecture – Channel Structure. CDMA vs. GSM – Wireless Data. **3G:** IMT & CDMA 2000 – Applications on 3G. **Wireless LAN:** Advantages – IEEE 802.11 standards – Types – 802.11 Architecture – Mobility – Deploying – Mobile Ad Hoc networks and sensor networks – Security – Wi-Fi vs. 3G

Note: **Italicized* texts are for self study

Presentation, Seminar, Assignment and Discussion

Books for Study

1. Asoke K Talukder, Roopa R Yavagal. (2005), Mobile Computing, TMH.

Books for Reference

1. Jochen Schiller, (2009), Mobile Communication, 2nd Edition, Pearson Education Asia, ISBN: 8131724263.

2. Christoffer Andersson (2002), GPRS and 3G Wireless Applications, John Wiley and son's pub.

Mapping

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	H	M	H	H
CO2	M	H	M	H	H
CO3	H	M	H	H	H
CO4	H	M	H	H	H

H-High; M-Medium; L-Low

[20UCT6E9]

Programme Code:	B. Sc	**Programme Title:**	Bachelor of Science (Computer Technology)	
Course Code:	20UCT6E9	**Title**	**Batch:**	2020 - 23

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		ELECTIVE III: INTERNET OF THINGS (IoT)	**Semester**	VI
Hrs/Week:	06		**Credits:**	5

Course Objective

Understand the IoT Architecture and Real World IoT Design Constraints, Industrial Automation in IoT.

Course Outcomes (CO)

K1	CO1	To keep in mind that the vision of IoT from a global context.
K2	CO2	To Understand the Use of Devices, Gateways and Data Management in IoT.
K3	CO3	To deploy the Building state of the art architecture in IoT.
K4	CO4	To analyze the Application of IoT in Industrial and and Real World Design Constraints.

Syllabus

Unit – I **[15 Hours]**

M2M to IoT-The Vision-Introduction, From M2M to IoT, M2M towards IoT-the global context, an use case example, Differing Characteristics**.**

Unit - II **[16 Hours]**

M2M to IoT – A Market Perspective – Introduction, Some Definitions, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT, The international driven global value chain and global information monopolies. **M2M to IoT-An Architectural Overview**– Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations.

Unit - III **[16 Hours]**

M2M and IoT Technology Fundamentals- Devices and gateways, Local and wide area networking, Data management, Business processes in IoT, Everything as a Service(XaaS), M2M and IoT Analytics, Knowledge Management

Unit - IV **[15 Hours]**

IoT Architecture-State of the Art – Introduction, State of the art, **Architecture Reference Model-** Introduction, Reference Model and architecture, IoT reference Model

Unit - V **[16 Hours]**

IoT Reference Architecture- Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views. **Real-World Design Constraints-** Introduction, Technical Design constraints-hardware is popular again, Data representation and visualization, Interaction and remote control. **Industrial Automation-** Service-oriented architecture-based device integration, SOCRADES: realizing the enterprise integrated Web of Things, IMC-AESOP: from the Web of Things to the Cloud of Things.

Note: **Italicized* texts are for self study

Presentation, Seminar, Assignment and Discussion

Books for Study

1. Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, (2014), **"From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence",** 1st Edition, Academic Press.

Books for Reference

1. Vijay Madisetti and Arshdeep Bahga,(2015), **"Internet of Things (A Hands-on-Approach)",** 1st edition, Orient Blackswan Private Limited - New Delhi, ISBN-13: 978-8173719547.

[20UCT6E9]

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2. Francis daCosta, (2014), **"Rethinking the Internet of Things: A Scalable Approach to Connecting Everything",** 1st Edition, Apress Publications, ISBN-13: 978-1430257400.

Mapping

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	H	M	H	H
CO2	M	H	M	H	H
CO3	H	M	H	H	H
CO4	H	M	H	H	H

H-High; M-Medium; L-Low

[20UCT622]

Programme Code:	B. Sc	**Programme Title:**	Bachelor of Science (Computer Technology)	
Course Code:	20UCT622	**Title**	**Batch:**	2020 - 23
		LAB – IX - FRAMEWORK TECHNOLOGY	**Semester**	VI
Hrs/Week:	05		**Credits:**	03

Course Objective

To utilize the .NET framework to build distributed enterprise applications.

Course Outcomes (CO)

K3	CO1	To recollect the concept of control statements, arrays, functions
K4	CO2	To understand the basic concepts of .NET framework and then develop console and windows application
K5	CO3	To validate the concept of files and exception handling mechanism

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Sample Programs **[Total Hrs: 52]**

VB.NET – Console Application

1. Create a Console Application for a simple stack operation in VB.Net
2. Create a Console Application for a simple queue operation in VB.Net
3. Develop a console application to illustrate the concept of exception handling using VB.Net
4. Develop a console application to illustrate the concept of Hash table using VB.Net
5. Develop a console application to illustrate the concept of Inheritance
6. Develop a console application to illustrate the concept of File handling

VB.NET – Windows Application

1. Develop a Windows Form Application to generate the Bio-Data of a student
2. Develop a Windows Form Application to illustrate the concept of Tree-Node Control
3. Develop a Windows Form Application to perform the operations of a calculator
4. Develop a Windows Form Application to calculate and generate a telephone a bill
5. Develop a Windows Forms application to create and generate an E.B. Bill
6. Develop a Windows Form application to perform the operations of a Banking System.
7. Develop a windows forms application to create a notepad.
8. Create a Windows form application to develop a Basic Login form
9. Create a Windows Form application to develop an Employee Pay slip
10. Create a Windows Form application to develop a Vehicle invoice generation System
11. Create a Windows Form application to develop a Library book issue details system.

Power point Presentations

Mapping

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	H	H	M
CO2	H	H	H	M	H
CO3	H	H	H	M	H

H-High; M-Medium; L-Low

[20UCT623]

Programme Code:	B. Sc	**Programme Title:**	Bachelor of Science (Computer Technology)	
Course Code:	20UCT623	**Title:**	**Batch:**	2020 - 23
		INDUSTRY ORIENTED PRACTICALS	**Semester:**	VI
Hrs/Week:	05		**Credits:**	04

Course Objective

The objective of the industry oriented practical is aimed at enhancing the technical, soft skills and practical knowledge of the students by developing real time applications.

Course Outcomes (CO).

K3	CO1	To recollect the programming language concepts to think objectively, analytically, critically in developing industry oriented applications
K4	CO2	To comprehend about the data base connectivity using front end and back end tools
K5	CO3	To validate the application software by various types of testing and its implementation in real environment

Guidelines for Industry Oriented Practical

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- Both the Internal (Respective Guides) and External Examiners should Conduct the Viva-Voce Examination jointly to award the mark.
- Candidate are asked to submit the project title in the beginning of the sixth semester, after that no alterations are allowed.
- For those absent on genuine grounds a common supplement End-Semester Viva-Voce may be conducted at our College by obtaining prior permission from the COE on the recommendations from the HOD before the commencement of the next semester Final Viva.
- Candidate should periodically meet the guide.

[20UCT623]

- Out of 100 marks, 20 (4 Reviews, each carries 5 marks) for Project Evaluation and 80 for Viva.
- For awarding a pass, a candidate should have obtained 40% of the Total 100 marks.

Power point Presentations

Mapping

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	H	H	H
CO2	H	M	H	H	H
CO3	H	H	H	H	H

H-High; M-Medium; L-Low

[20UCT6S3]

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Programme Code:	B. Sc	**Programme Title:**	Bachelor of Science (Computer Technology)	
Course Code:	20UCT6S3	**Title**	**Batch:**	2020 - 23
		SKILL BASED MAJOR ELECTIVE II – DATA ANALYTICS (BIG DATA) LAB	**Semester**	VI
Hrs/Week:	01		**Credits:**	02

Course Objective

To educate the basic techniques for extracting information from large datasets such as the web and large document repositories.

Course Outcomes (CO)

K3	CO1	To keep in mind about the data analysis using Excel
K4	CO2	To realize about sorting, cost benefit analysis, calculating mean and standard deviation.
K5	CO3	To validate the use of analysis tools to conduct regression and forecasting and calculate descriptive statistics

Sample Programs **[Total Hrs: 13]**

1. Illustrates how to create a basic spreadsheet by entering text, numbers, and formulas.
2. Illustrate the formatting of cells and columns.
3. Create a spreadsheet to perform "what if?" calculations using Built-in functions.
4. Demonstrate the ease of creating charts.
5. Sort the data and print portions of a worksheet.
6. Illustrates how to dress up a table using special formats and how to export a table or chart into a Microsoft Word document.
7. Demonstrate a basic cost-benefit analysis using Excel.

[20UCT6S3]

8. Consolidate several worksheets into one and to link several worksheets to a master worksheet.
9. Illustrate the use of analysis tools for conducting bivariate regression and forecasting.
10. Use a worksheet to calculate descriptive statistics (e.g., mean, standard deviation).

Mapping

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	H	H	H	M
CO2	H	H	H	M	M
CO3	H	H	H	M	M

H-High; M-Medium; L-Low

[20UCT6S4]

Programme Code:	B. Sc	**Programme Title:**	Bachelor of Science (Computer Technology)	
Course Code:	20UCT6S4	**Title**	**Batch:**	2020 - 23
		SKILL BASED MAJOR ELECTIVE II - DREAMWEAVER LAB	**Semester**	VI
Hrs/Week:	01		**Credits:**	02

Course Objective

To focus on using Adobe Dreamweaver to create high quality websites.

Course Outcomes (CO)

K3	CO1	To keep in mind about the efficient use of Dreamweaver tools to create a website that adheres to current HTML and CSS
K4	CO2	To realize appropriate terminology to describe both web development and basic programming concepts and advanced aspects of the Dreamweaver interface and paradigm
K5	CO3	To validate programs by implementing PHP, CSS, JavaScript, JSP, HTML in Dream Weaver

Sample Programs **[Total Hrs: 13]**

Using Dreamweaver,

1. Create a picture gallery
2. Create a template
3. Create a CSS text rollover
4. Create a Mail-To links
5. Create a website
6. Create a link to different pages from the same image
7. Create List Menus
8. Create Submit buttons
9. Create Links without an Underline using CSS
10. Create a program using CSS
11. Working PHP, CSS, JavaScript, JSP, HTML in Dream Weaver.

Mapping

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	H	H	M	M
CO2	H	H	H	H	M
CO3	M	H	H	M	M

H-High; M-Medium; L-Low

Department of Computer Technology

Syllabus

2021 – 2024 Batch

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DEPARTMENT OF COMPUTER TECHNOLOGY

Syllabus

BATCH: 2021 – 2024

Faculty Members

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Ms. C. Keerthana, M.Sc., M. Phil., (Ph.D).,

Ms. K. S. Leelavathi, M.Sc., M. Phil., NET., SET., (Ph.D).,

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SEMESTER- III

Programme Code:	B.Sc. CT			**Programme Title:**	Bachelor of Science (Computer Technology)	
Course Code:	21UCT307			**Title**	**Batch:**	2021 – 2024
				CORE V: JAVA PROGRAMMING	**Semester:**	III
Lecture Hrs./Week or Practical Hrs./Week	05	**Tutorial Hrs./Sem.**	06		**Credits:**	04

Course Objective

To provide profound coverage on classes, multithreading, exception handling, applets and file handling in Java.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Remember aboutclasses, objects, members of a class and relationships among them needed for a specific problem	K1
CO2	Comprehend the concepts of inheritance, interface and package	K2
CO3	Examine error handling techniques using exception handling	K3
CO4	Evaluate the concepts of thread, applet and files	K4
CO5	Developed skills in designing abstract window toolkit	K5

Mapping

PO /PSO / CO	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	H	H	H	H	H	H	H	L	H	H	H
CO2	H	M	H	M	H	H	M	H	M	H	M	L

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CO3	H	M	H	M	H	L	M	H	M	H	M	H
CO4	M	H	L	H	M	M	H	M	H	M	H	M
CO5	H	L	H	M	H	H	M	H	M	L	M	H

*H-High; M-Medium; L-Low

21UCT307

Units	Content	Hrs
Unit I	**Java Evolution** – History Features and How Java differs from C and C++, Java support systems, Java environment – Overview of Java Language – Constants, Variables and Data Types - Operators and Expressions– Decision Making and Branching.	15
Unit II	Classes, Objects and Methods– Arrays, Strings and Vectors – Interfaces: Multiple Inheritances – Packages: Putting Classes Together.	15
Unit III	**Multithreaded Programming:** Creating Threads – Extending the Thread Class – Stopping and Blocking a Thread – Life Cycle of a Thread – Using Thread Methods – Thread Exceptions. **Managing Errors and Exceptions**: Types of Errors – Exceptions – Syntax of Exception Handling Code.	15
Unit IV	**Applet Programming:** How Applets Differ From Applications – Preparing to Write Applets – Building Applet Code – Applet Life Cycle – Creating an Executable Applet – Applet Tag – Adding Applet to HTML File – Running the Applet – Passing Parameters to Applets – Aligning the Display– Displaying Numerical Values – Getting Input From the User - Event Handling. **Graphics Programming –**The Graphics Class – Lines and Rectangles – Circles and Ellipses – Drawing Arcs.	15
Unit V	**Managing Input / Output Files in Java:** Concept of Streams – Stream Classes – Byte Stream Classes – Serialization – Character Stream Classes – Using Streams – Other Useful I/O Classes – Using the File Class – Creation of Files – Reading / Writing	15

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	Characters –Handling Primitive Data Types – Concatenating and Buffering Files .	
	Total Contact Hrs	**75**

Pedagogy

Direct Instruction, Flipped Class, Digital Presentation

Assessment Methods

Seminar, Quiz, Assignments, Group Task.

21UCT307

Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Balagurusamy. E	Programming With JAVA A Primer	6th Edition, Tata McGraw Hill Publications, ISBN-13: 9780070141698.	2019

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	John R. Hubbard	Programming with Java	2nd Edition, Schaum's Outline Series, Tata McGraw Hill Publications, ISBN-13: 9780070589421.	2013

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2	Timothy Budd	Understanding Object Oriented Programming with Java	2nd Edition, Pearson Education, ISBN-13: 9780201308815.	2016
3	Deitel&Deitel	Java TM: How to Program	9th Edition, PHI, ISBN-13: 9780136123712	2010

Web References

1.	iiti.ac.in/people/~tanimad/JavaTheCompleteReference.pdf
2.	http://www.onlineprogrammingbooks.com/learning-java-4th-edition/
3.	https://www.javatpoint.com/serialization-in-java
4.	https://www.journaldev.com/2452/serialization-in-java
5.	https://www.tutorialspoint.com/java/index.htm

Programme Code:	B.Sc. CT			**Programme Title:**	Bachelor of Science (Computer Technology)	
Course Code:	21UCT308			**Title**	**Batch:**	2021 – 2024
				CORE VI: DATABASE MANAGEMENT SYSTEM	**Semester:**	III
Lecture Hrs./Week or Practical Hrs./Week	05	**Tutorial Hrs./Sem.**	08		**Credits:**	04

Course Objective

The learner would have to understood the fundamental concepts of database systems & use the features available in a DBMS package

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Keep in mind Queries in a DBMS, Structure of a DBMSattributes and entity sets	K1
CO2	Comprehend deep knowledge about the basics of Relational Model and ACID properties	K2
CO3	Apply joins and set operators, control structures and embedded SQL for data management and retrieval techniques	K3
CO4	Analyze the basic issues of transaction processing, concurrency control and understand the importance of Normalization	K4
CO5	Familiarity on Parallel, Object Oriented & Distributed databases	K4

21UCT308

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	H	H	H	H	H	H	H	H	H	H	H
CO2	H	M	H	M	H	M	H	M	H	M	H	H
CO3	H	M	H	M	H	M	H	M	H	M	H	L
CO4	M	H	M	H	L	H	M	H	L	H	M	M
CO5	H	L	H	L	H	M	H	L	H	M	H	H

*H-High; M-Medium; L-Low

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Units	Content	Hrs
Unit I	Overview of database systems: Managing data – A historical perspective file systems versus a DBMS – Advantages of a DBMS – Describing and storing data in a DBMS – Queries in a DBMS– Structure of a DBMS. Database design & ER diagrams – Entities attributes and entity sets – Relationships and Relationship sets – Additional features of the ER model – conceptual database design with the ER model.	15
Unit II	Relational Model: Integrity constrains over relations – Enforcing integrity constraints – Querying relational data – Logical database design; ER to relational introduction to views – Destroying / Altering Tables & Views. Relational algebra and calculus: Relational Algebra – Relational Calculus.	15
Unit III	SQL: Queries, Programming Triggers: The form of a basic SQL Query – UNION, INTERSECT and EXCEPT – Nested Queries – Aggregate operators – Null values – Complex integrity constraints in SQL – Triggers & Active data bases. Transaction Management Overview: The ACID properties – Transactions & Schedules – Concurrent execution of transactions – Lock-based concurrency control – performance of locking – Transaction support in SQL.	15
Unit IV	Schema Refinement and normal forms: Introduction to schema refinement – Functional dependencies – Reasoning about functional dependencies – Normal forms – Properties of Decompositions – Normalization – Schema refinement in data base design – Other kinds of dependencies. Security: Introduction to database security – Access control – Discretionary access control – Mandatory access control – Additional issues to security	15

Unit V	Parallel & Distributed databases: Introduction – Architecture for parallel databases – Parallel Query evaluation – Parallel zing individual operations – Parallel query optimization – Introduction to distributed databases – Distributed DBMS architecture sorting data in a distributed DBMS. Object Database Systems: Motivation Example – Structured data types – Operation on structured data types – Encapsulation & ADTS – Inheritance – Objects, OIDS and reference Types – Database design for and ORDBMS – OODBMS – comparing RDBMS OODBMS and ORDBMS.	15
	Total Contact Hrs	**75**

Pedagogy

Direct Instruction, Flipped Class, Digital Presentation

Assessment Methods

Seminar, Quiz, Assignments, Group Task.

Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Raghu Ramakrishnan, Johannes Gehrke	Database Management Systems	Third edition, McGraw-Hill Higher Education.	2014

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	ArunMajumdar and Pritimoy Bhattacharya	Database Management Systems	1st Edition, TMH, ISBN-13: 978-0074622391.	2017

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2	Gerald V. Post	Database Management Systems	3rd Edition, TMH Publication, ISBN-13: 9780070635265	2018
3	Jonathan Gennick	Oracle SQLPlus Pocket Reference	2nd Edition, E.H. J. Pallett Publication, ISBN-13: 978-0596526887.	2019

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Web References

1. http://freecomputerbooks.com/An-Introduction-to-Relational-Database-Theory.html
2. https://swayam.gov.in/nd2_cec19_cs05/preview
3. https://www.featuredcustomers.com
4. https://onlinecourses.nptel.ac.in/noc19_cs46/preview
5. https://www.slideshare.net/NILESHX/database-management-system-28774171

Programme Code:	B.Sc. CT			**Programme Title:**	Bachelor of Science (Computer Technology)
Course Code:	21UCT309			**Title**	**Batch:** 2021 – 2024
				CORE VII: OPERATING SYSTEMS	**Semester:** III
Lecture Hrs./Week or Practical Hrs./Week	05	**Tutorial Hrs./Sem.**	04		**Credits:** 04

Course Objective

To recognize the concepts and principles, techniques and approaches which constitute a coherent body of knowledge in operating systems.

Course Outcomes

On the successful completion of the course, students will be able to

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CO Number	CO Statement	Knowledge Level
CO1	Keep in mind about operating system services, process, scheduling and memory allocations	K1
CO2	Comprehend the various process management concepts including scheduling, synchronization, and deadlocks	K2
CO3	Implement CPU Scheduling algorithms for process scheduling and deploy a deep knowledge about the memory management concepts including swapping, paging and segmentation	K3
CO4	Review synchronization problems, accessing methods in Files, Disk scheduling	K4
CO5	Demonstrate an understanding of different I/O techniques in operating system.	K4

1UCT309

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	M	M	H	H	H	H	H	H	H	H	L	H
CO2	H	M	H	M	H	M	H	H	M	H	M	H
CO3	M	M	H	M	H	M	H	L	M	H	M	H
CO4	M	H	M	H	L	H	M	M	H	M	H	M
CO5	M	L	H	L	H	M	H	H	M	H	M	L

*H-High; M-Medium; L-Low

Units	Content	Hrs

Unit I	Introduction: What is an Operating System – Evolution of Operating system**Operating-System Structures:** System Components- Operating System Services –System Calls – System Programs – System Structure.	15
Unit II	**Process Management**: Process Concept – Process scheduling. **Threads:** Overview – Benefits- User and Kernel Threads- Multithreading Models. **CPU Scheduling**: Scheduling Criteria – Scheduling Algorithms. **Process Synchronization:** The Critical-Section Problem – Semaphores – Classic problems of Synchronization.	15
Unit III	**Deadlocks**: Deadlock Characterization – Methods for handling Deadlock – Deadlock prevention – Deadlock avoidance – Deadlock detection – Recovery from Deadlock – **Storage Management**: Swapping – Contiguous Memory allocation – Paging – Segmentation.	15
Unit IV	**Virtual memory**: Demand Paging –Page Replacement: FIFO Page Replacement – Optimal Page Replacement – LRU Page Replacement. **File-System Interface**: File concept – Access methods – Directory Structure.	15
Unit V	**File-System Implementation**: File System Structure – Allocation methods. **Mass Storage Structure:** Disk Structure – Disk Scheduling. **Case study:** Linux, Windows XP, Android OS (Memory management).	15
	Total Contact Hrs	**75**

21UCT309

Pedagogy

Direct Instruction, Flipped Class, Digital Presentation

Assessment Methods

Seminar, Quiz, Assignments, Group Task.

Text Book

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S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Abraham Silberschatz, Peter Baer Galvin, Greg Gagne	Operating System Concepts	9th Edition, John Wiley and Sons, ISBN-13 9789812530554	2013

Reference Books

S.No	Author	Title of The Book	Publishers \ Edition	Year Of Publication
1	Achyut.SGodbole	Operating Systems	1st Edition, TMH Publications, ISBN- 9780070591134.	2010
2	H. M Deitel	Operating Systems	3rd Edition, Pearson Education Publication, ISBN 13: 9780536212153.	2012

Web References

1. http://nptel.ac.in/courses/106108101/13
2. https://developer.android.com/topic/performance/memory-overview.html
3. https://www.geeksforgeeks.org/operating-system-types-operating-systems-awaiting-author/
4. https://www.slideshare.net/ashanrajpar/operating-system-presentation-60556413
5. https://www.os-book.com/OS9/slide-dir/index.html

Programme Code:	B.Sc. CT	**Programme Title:**	Bachelor of Science (Computer Technology)

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Course Code:	21UCT 3A3			Title	Batch:	2021 – 2024
				ALLIED III:	Semester:	III
Lecture Hrs./Week or Practical Hrs./Week	05	Tutorial Hrs./Sem.	06	SOFTWARE ENGINEERING	Credits:	04

Course Objective

To enhance the basic software engineering methods and practices and to learn the techniques for developing software systems

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Keep in mind layers of process models, Requirement gathering phases design concepts and testing strategies	K1
CO2	Picture out the main aspects of software engineering and evaluate requirements for a software system and analyzing the requirements through modeling	K2
CO3	Apply the process of analysis and design using the object-oriented approach	K3
CO4	Interpret the design engineering and various Testing tactics	K4
CO5	Inculcate knowledge on Software engineering concepts in turn gives a roadmap to design a new software project.	K4

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	H	H	H	H	H	H	H	L	H	H	H
CO2	H	M	H	M	H	H	M	H	M	H	M	L
CO3	H	M	H	M	H	L	M	H	M	H	M	H
CO4	M	H	L	H	M	M	H	M	H	M	H	M
CO5	H	L	H	M	H	H	M	H	M	L	M	H

*H-High; M-Medium; L-Low

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Units	Content	Hrs
Unit I	**Introduction to Software Engineering**: The evolving role of software - Changing Nature of Software - Software myths. **A Generic view of process**: Software engineering - A layered technology - a process framework - The Capability Maturity Model Integration (CMMI).**Process models**: The waterfall model -Incremental process models - Evolutionary process models.	15
Unit II	**System Engineering**: Computer-Based Systems – The system engineering Hierarchy. **Requirements Engineering:** A bridge to design and construction- Requirements Engineering Tasks – Initiating the Requirements Engineering Process - Eliciting Requirements – Building the Analysis Model.	15
Unit III	**Building the Analysis Model**: Requirement analysis – Analysis Modeling approaches – Data modeling concepts – Object-Oriented Analysis- Scenario-Based Modeling – Flow - Oriented Modeling – Class-Based Modeling – Creating a Behavioral Model.	16
Unit IV	**Design Engineering**: Design process and Design quality - Design concepts - the design model. **Creating an architectural design**: Software architecture - Data design - Architectural Design.	13
Unit V	**Testing Strategies**: Software Testing Lifecycle- Test strategies for conventional software, Validation testing, System testing - The art of Debugging. **Testing Tactics**: Black - Box and White-Box Testing - Basis path Testing – Control Structure Testing - Black-Box Testing. **Testing for Web Apps**: Performance testing: Performance testing objectives - Load testing – Stress Testing	16
	Total Contact Hrs	**75**

Pedagogy

Direct Instruction, Flipped Class, Digital Presentation

Assessment Methods

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Seminar, Quiz, Assignments, Group Task.

21UCT 3A3

Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Roger S. Pressman	Software Engineering, A Practitioner's Approach	6th Edition, TATA McGraw-Hill Publications, ISBN-13 : 978-0071267823	2013

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Ian Sommerville	Software Engineering	9th Edition, Addison Wesley, ISBN-13: 978-0137035151	2010
2	Stephen Schacht	Software Engineering	7th Edition, New Delhi, Tata McGraw Hill Publishing Company, ISBN-13: 9780070647770.	2012

Web References

1. https://nptel.ac.in/courses/106/105/106105218/
2. https://swayam.gov.in/nd1_noc19_cs70/preview
3. https://freevideolectures.com/course/4071/nptel-software-project-management
4. https://www.nptelvideos.com/video.php?id=918

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5. https://www.w3schools.in/sdlc-tutorial/software-development-life-cycle-sdlc/

Programme Code:	B.Sc. CT			**Programme Title:**	Bachelor of Science (Computer Technology)	
Course Code:	21UCT310			**Title**	**Batch:**	2021 – 2024
				LAB – III - JAVA PROGRAMMING LAB	**Semester:**	III
Lecture Hrs./Week or Practical Hrs./Week	04	**Tutorial Hrs./Sem.**	0		**Credits:**	02

Course Objective

To utilize java programming concepts for developing, compiling and running java applications and applets.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic concepts of Java Programming with emphasis on ethics and principles of professional coding	K3
CO2	Demonstrate the creation of objects, classes and methods and the concepts of constructor, methods overloading, Arrays, branching and looping	K4
CO3	Create data files and Design a page using AWT controls and Mouse Events in Java programming Implement the concepts of code reusability and debugging.	K3
CO4	Develop applications using Strings, Interfaces and Packages and applets	K4
CO5	Construct Java programs using Multithreaded Programming and Exception Handling	K4

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Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	H	H	H	H	H	H	H	H	H	H	H
CO2	H	M	H	M	H	M	H	H	M	H	M	H
CO3	H	M	H	M	H	M	H	H	M	H	M	H
CO4	M	H	L	H	M	H	L	M	H	L	H	M
CO5	H	L	H	M	H	H	H	H	H	H	H	M

*H-High; M-Medium; L-Low

21UCT310

Content	Hrs
Sample Programs 1. Write a java program to illustrate the concept of Package creation. 2. Write a java program to illustrate the concept of threading. 3. Write a java program to illustrate the concept of synchronization. 4. Write a java program to illustrate the concept of Exception Handling Mechanism. 5. Write a java program to develop an Applet. 6. Write a java program to implement to the concept of decision making statements. 7. Write a java applet program to illustrate the concept of multithreading. 8. Write a java program using file concept. 9. Write a java program to illustrate the concept of control statements 10. Write a java program to illustrate the concept of Useful I/O Classes	**60**
Total Contact Hrs	**60**

Pedagogy

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Direct Instruction, Flipped Class, Digital Presentation

Assessment Methods

Seminar, Quiz, Assignments, Group Task.

Programme Code:	B.Sc. CT			**Programme Title:**	Bachelor of Science (Computer Technology)	
Course Code:	21UCT311			**Title**	**Batch:**	2021 – 2024
				LAB-IV-DATABASE MANAGEMENT SYSTEM LAB	**Semester:**	III
Lecture Hrs./Week or Practical Hrs./Week	04	**Tutorial Hrs./Sem.**	0		**Credits:**	02

Course Objective

To enable the students to know about database concepts with practical Knowledge

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Recollect the basic commands such as DDL, DML, TCL	K3
CO2	Understand about various set, join operations and group functions in PL/SQL	K4
CO3	Develop various set and join operation in SQL	K4
CO4	Use PL/SQL stored procedure, stored functions, cursors and packages to query the database.	K4
CO5	Validate the PL/SQL cursors, GROUPBY clauses	K4

Mapping

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PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	H	H	H	H	H	H	H	H	H	H	H
CO2	H	M	H	H	H	M	H	M	H	H	M	H
CO3	H	M	H	H	H	M	H	M	H	L	M	H
CO4	M	H	L	M	M	H	L	H	M	M	H	M
CO5	H	L	H	H	H	L	H	M	H	H	M	H

*H-High; M-Medium; L-Low

21UCT311

Content	Hrs

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Sample Programs **Sample Programs** 1. Write a query for DDL and DML commands. 2. Write a query for TCL commands. 3. Write a query for NOT NULL, CHECK, UNIQUE constraints. 4. Write a query to implement functions in SQL. 5. Write a query for JOIN operations. 6. Write a query to implement set operator 7. Write a SQL program for user-defined exception 8. Write a SQL block to delete and update using trigger. 9. Write a query for the HAVING clause. 10. Write a query for GROUP BY clause	**60**
Total Contact Hrs	**60**

Pedagogy

Direct Instruction, Flipped Class, Digital Presentation

Assessment Methods

Seminar, Quiz, Assignments, Group Task.

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Programme Code:	B.Sc. CT			**Programme Title:**	Bachelor of Science (Computer Technology)	
Course Code:	21UCT3N1			**Title**	**Batch:**	2021 – 2024
				Skill Based NON-MAJOR ELECTIVE I - HTML LAB	**Semester:**	III
Lecture Hrs./Week or Practical Hrs./Week	01	**Tutorial Hrs./Sem.**	04		**Credits:**	02

Course Objective

To understand the principles of creating an effective web page using HTML.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Keep in mind the concept of Basic HTML tags	K3
CO2	Understand about ordered list and unordered list, creation of table, creations of forms	K4
CO3	Validate the creation of a simple webpage using basic HTML	K4
CO4	Use scripting Techniques for dynamic effects and to validate form input entry	K3
CO5	Analyze to Use appropriate client-side or Server-side applications	K4

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	H	H	H	H	H	H	H	L	H	H	H

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CO2	H	M	H	M	H	H	M	H	M	H	M	L
CO3	H	M	H	M	H	L	M	H	M	H	M	H
CO4	M	H	L	H	M	M	H	M	H	M	H	M
CO5	H	L	H	M	H	H	M	H	M	L	M	H

*H-High; M-Medium; L-Low

21UCT3N1

Content	**Hrs**
Sample Programs 1. Create a HTML document using basic HTML tags. 2. Create a HTML program with text formatting tags. 3. Create a HTML program to set the background color. 4. Create a link by using HTML tags. 5. Create a HTML program to insert an image in a document. 6. Create a HTML program to create a table. 7. Create a HTML program to implement ordered list with numbers. 8. Create a HTML program to implement ordered list with alphabets. 9. Create a HTML program to implement unordered list. 10. Create a Form with input box and submit button.	**15**
Total Contact Hrs	**15**

Pedagogy

Direct Instruction, Flipped Class, Digital Presentation

Assessment Methods

Seminar, Quiz, Assignments, Group Task.

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Programme Code:	B.Sc. CT			**Programme Title:**	Bachelor of Science (Computer Technology)	
Course Code:	21UCT3N2			**Title**	**Batch:**	2021 – 2024
				Skill Based NON-MAJOR ELECTIVE I - MULTIMEDIA LAB	**Semester:**	III
Lecture Hrs./Week or Practical Hrs./Week	01	**Tutorial Hrs./Sem.**	0		**Credits:**	02

Course Objective

To offer the knowledge of creating and working with digital images and to manipulate them and to develop a presentation package using multimedia tools

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Keep in mind the concept of Basic Multimedia Techniques	K3
CO2	Discuss the application of multimedia concepts in the development of information visualization and business applications.	K4
CO3	Validate the creation of a simple applications using multimedia tools	K4
CO4	Use scripting Techniques for dynamic effects and to validate form input entry	K3
CO5	Comprehend and analyse the fundamentals of animation, virtual reality, underlying technologies, principles and applications.	K4

Mapping

PO /PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2

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CO												
CO1	H	H	H	H	H	H	H	H	L	H	H	H
CO2	H	M	H	M	H	H	M	H	M	H	M	L
CO3	H	M	H	M	H	L	M	H	M	H	M	H
CO4	M	H	L	H	M	M	H	M	H	M	H	M
CO5	H	L	H	M	H	H	M	H	M	L	M	H

*H-High; M-Medium; L-Low

21UCT3N2

Content	Hrs
Sample Programs 1. Cropping images using Lasso Tool 2. Designing Pictures using Paint Tools 3. Designing Text using Text Tools 4. Applying Layer Effects to Images and Texts 5. Designing an Employee or Student ID card 6. Designing a seasonal greetings 7. Design a photograph applying Filter effects 8. Design an invitation for a conference 9. Design a brochure or poster for a technical symposium 10. Designing a Flexible banner for your college	**15**
Total Contact Hrs	**15**

Pedagogy

Direct Instruction, Flipped Class, Digital Presentation

Assessment Methods

Seminar, Quiz, Assignments, Group Task.

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SEMESTER- IV

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Programme Code:	B.Sc. CT			**Programme Title:**	Bachelor of Science (Computer Technology)	
Course Code:	21UCT412			**Title**	**Batch:**	2021 – 2024
				CORE VIII: ADVANCED JAVA PROGRAMMING	**Semester:**	IV
Lecture Hrs./Week or Practical Hrs./Week	05	**Tutorial Hrs./Sem.**	04		**Credits:**	04

Course Objective

To inculcate the students to understand the advanced JAVA concepts and develop Java based applications by applying these advanced concepts to implement in web based applications.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Create Applications using Swing Components.	K4
CO2	Understand about Servlets and Server Side Includes	K2
CO3	Implement JDBC connectivity and Java Server Pages	K3
CO4	Review the various types of beans	K4
CO5	Understand and apply Well-Formed XML and different types of XML Schemas	K5

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	H	H	H	H	H	H	H	H	H	H	H
CO2	H	M	H	M	H	H	M	H	M	H	H	M

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CO3	H	M	H	M	H	H	M	H	M	H	L	M
CO4	M	H	L	H	M	M	H	L	H	M	M	H
CO5	H	L	H	M	H	H	L	H	M	H	H	M

*H-High; M-Medium; L-Low

21UCT412

Units	Content	Hrs
Unit I	Tour of Swing: JApplet- Icons and Labels – JText Fields – JButtons – JCombo Boxes - JTabbed Panes – JScroll Panes – JTrees – JTables– Exploring Swing.	15
Unit II	Servlet Overview and Architecture, Movement to Server-Side Java – Java Servlet - Practical applications for Java Servlets – Java Servlet Alternatives – Reasons to Use Java Servlets – Java Servlet Architecture. Servlet Basics – The Life Cycle of a Servlet – A Basic Servlet – Basic Servlet Source – Building and Installing the Basic Servlet – The HTML Required to Invoke the Servlet – Dissecting the Basic Servlet.	15
Unit III	JSP –Conditions – Directives – Declarations- Implicit Variables – Scriptlets – Expressions. Servlet Sessions: Session Tracking – Working with Cookies.	15
Unit IV	Enterprise Java Bean: Introduction – Enterprise Java Bean Technology - Types of Bean - Examples of EJB. Server-Side includes - Servlet chaining: Uses for Servlet chain - Invoking a Servlet Chain– A practical Example using Servlet Chaining.	15
Unit V	Servlets and JDBC– Two and Three-tier Database Access Models – JDBC Driver Types – JDBC Basics – A Basic JDBC Servlet – JDBC RMI.	15
	Total Contact Hrs	**75**

Pedagogy

Direct Instruction, Flipped Class, Digital Presentation

Assessment Methods

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Seminar, Quiz, Assignments, Group Task.

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Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Herbert Schildt	JAVA 2: The Complete Reference	5th Edition, Tata-McGraw Hill, ISBN-13: 9780070495432	2017
2	James Goodwill	Developing Java Servlets	2nd Edition, Tech media, ISBN-13 : 978-0672321078	2014
3	Rima Patel Sriganesh, Gerald Brose, Micah Silverman.	Mastering Enterprise Java Beans 3.0	Wiley India Edition, Wiley India Pvt. Ltd, ISBN-13 : 978-0471785415 .	2011

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	SubrahmanyamAllara maju,Cedric Buest , Marc Wilcox, Sameer Tyagi	Professional Java Server Programming J2EE	1.3 Edition, WROX Press Ltd, ISBN-13: 9781861005373	2001
2	Jayson Falkner and Kevin Jones.	The J2EE Technology Web Tier	1stEdition,Addison-Wesley Professional ISBN: 0321136497.	2004

Web References

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1. https://www.tutorialspoint.com/javascript
2. https://www.w3schools.com/
3. https://www.swayaminfotech.com/blog/tag/j2ee/
4. https://onlinecourses.nptel.ac.in/noc19_cs84/preview
5. https://www.tutorialspoint.com/listtutorial/Web-Application-J2EE-perspective/3142

Programme Code:	B.Sc. CT			**Programme Title:**	Bachelor of Science (Computer Technology)	
Course Code:	21UCT413			**Title**	**Batch:**	2021 – 2024
				CORE IX: LINUX AND SHELL PROGRAMMING	**Semester:**	IV
Lecture Hrs./Week or Practical Hrs./Week	05	**Tutorial Hrs./Sem.**	4		**Credits:**	04

Course Objective

This course introduces basic understanding of Linux OS, Linux commands and File system and to Familiarize students with the Linux environment.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Remember the operating system architecture and low level interfaces that are required to build Linux systems	K1
CO2	Understand different commands used by system administrator and file related commands	K2
CO3	Apply various Linux operating system commands and utilities in Linux systems	K3
CO4	Evaluate the shell scripts with different programming goals	K4
CO5	Analyze different types of shell associated commands	K5

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Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	H	H	H	H	H	H	H	H	H	H	H
CO2	H	M	H	M	H	M	H	M	H	H	M	H
CO3	H	M	H	M	H	M	H	M	H	H	M	H
CO4	M	H	L	H	M	H	L	H	M	M	H	L
CO5	H	L	H	M	H	L	H	M	H	H	L	H

*H-High; M-Medium; L-Low

21UCT413

Units	Content	Hrs
Unit I	**Introduction:** Hardware Requirements for Linux – Salient Features – Multiuser Capability, Multitasking Capability, Communication, Security, Portability –Linux System Organization – Types of Shells – Bourne Shell, C shell, Korn Shell - Unix Commands. **Unix File System:** Creating Files – Indulging in File Play – Listing Files and Directories – Masking File Permissions – Directory Permissions – Removing File Forcibly – Directory Related Commands – Miscellaneous Commands.	15
Unit II	**File System:**The Boot Block, The Super Block, The Inode Table, Data Blocks – Storage of Files – Disk Related Commands – Disk Usage. **Essential Linux Commands:** Password - cal command – banner command –touch command – file command – Links with DOS – File Related Commands –wc, sort, cut, grep, dd – Viewing Files – File Compression.	15
Unit III	**VI Editor:** Modes of Operations – Learning the Ropes – Adding Text, Delete Text, Overwriting Text, Quitting vi – Block Commands – Search Strings – Find and Replace, Delete and Paste, Yank and Paste – Set Command – Customizing vi Environment – Multiple File Editing in vi. **Processes in Linux:**ps command – Background Process – The nohupCommand Killing	15

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	a Process – Changing Process Priorities – Scheduling of Processes –'at' command – 'batch' command – 'crontab' command. **Communication**: 'Write' command – ''wall' command –'mail' Command	
Unit IV	**Programming with Shell:** Introduction to shell script-creation and execution-system variables-profile-read statement-command line arguments-logical operators && and ||-exit-if conditional-case-while statement-for set-shift-trap statement-shell variables-cd command-merging stream-expr command-eval command-shell programs.	15
Unit V	**System Administration:** System Administrator-Booting and shutting down-super user status (su) - security-user services - disk management (fsck) - operation -file system administration-backups utilities - cpio- afio- shutdown – mount –unmount – df - find commands-creating device files-installing and managing printers.	15
	Total Contact Hrs	**75**

21UCT413

Pedagogy

Direct Instruction, Flipped Class, Digital Presentation

Assessment Methods

Seminar, Quiz, Assignments, Group Task.

Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	YashavantKanetkar	UNIX Shell Programming (Unit I – III)	BPB Publications, 3rd Edition	2016

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2	Sumitabha das	UNIX System Concepts and Applications(Unit IV,V)	Tata McGraw - Hill, Fourth edition	2014

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Mark.G.Gobell	Red Hat LINUX-Reference Manual	Pearson education	2014

Web References

1. https://www.tutorialspoint.com/unix
2. https://lecturenotes.in/subject/455/linux-programming-lp
3. https://linuxconfig.org/linux-command-line-tutorial
4. https://www.guru99.com/unix-linux-tutorial.html
5. https://onlinecourses.swayam2.ac.in/aic20_sp26/preview

Programme Code:	B.Sc. CT			**Programme Title:**	Bachelor of Science (Computer Technology)	
Course Code:	21UCT414			**Title**	**Batch:**	2021 – 2024
				CORE X: DATA COMMUNICATION AND NETWORKS	**Semester:**	IV
Lecture Hrs./Week or Practical Hrs./Week	05	**Tutorial Hrs./Sem.**	03		**Credits:**	04

Course Objective

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1. To identify various components in a data communication system and understand state-of- the-art in network protocols, architectures and applications.
2. To enable students through the concepts of computer networks, different models and their involvement in each stage of network communication.
3. To educate the concepts of terminology and concepts of the OSI reference model and the TCP/IP reference model and protocols such as TCP, UDP and IP.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Remember the organization of computer networks, factors influencing computer network development and the reasons for having variety of different types of networks.	K1
CO2	Understand Internet structure and can see how standard problems are solved and the use of cryptography and network security.	K2
CO3	Apply knowledge of different techniques of error detection and correction to detect and solve error bit during data transmission.	K3
CO4	Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies	K4
CO5	Knowledge about different computer networks, reference models and the functions of each layer in the models	K5

21UCT414

Mapping

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PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	H	H	H	H	H	H	H	H	H	H	H
CO2	H	M	H	M	H	H	M	H	M	H	H	M
CO3	H	M	H	M	H	H	M	H	M	H	L	M
CO4	M	H	L	H	M	M	H	L	H	M	M	H
CO5	H	L	H	M	H	H	L	H	M	H	H	M

*H-High; M-Medium; L-Low

Units	Content	Hrs
Unit I	**Introduction to Data Communications and Networking:** Data Communications- Protocols - Analog and Digital Signals. Analog and Digital Transmission Methods – Modes of Data Transmission and Multiplexing.	15
Unit II	**Transmission Errors:** Detection and Correction. **Transmission Media**: Guided Media, Unguided Media. **Network Topologies**: Mesh, Star, Tree, Ring, Bus. Switching Basics- Circuit switching - Packet switching - Message switching - Router and Routing.	15
Unit III	**Network Protocols and OSI Model:** OSI layer Functions. Local Area Networks (LAN), Metropolitan Area Networks (MAN) and Wide Area Networks (WAN) –Frame Relay.	15
Unit IV	**Internetworking Concepts, Devices, Internet Basics, History and Architecture:** Internetworking Devices, Repeaters, Bridges, Routers and Gateways. **An Introduction to TCP / IP, IP:** TCP/IP Basics, TCP/IP Example, The concept of IP Address– IPV6.	15
Unit V	**TCP/IP Part II:** User Datagram Protocol (UDP) - UDP Packet, Difference between UDP and TCP – Domain Name System (DNS) – Electronic Mail (Email) – Introduction – E-Mail Transfer protocols – MIME – E-Mail Privacy – Spam in E-Mail and Phishing.	15
	Total Contact Hrs	**75**

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Pedagogy

Direct Instruction, Flipped Class, Digital Presentation

Assessment Methods

Seminar, Quiz, Assignments, Group Task.

Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Achyut S.Godbole	Data Communications and Networks	2nd ed. Tata McGraw-Hill Publishing Company Limited, ISBN-13: 978-0-07-047297.	2017

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Behrouz A. Forouzan	Data Communications and Networking	4th Edition, Tata McGraw-Hill Publishing Company Limited, ISBN-13: 978-0070634145.	2017
2	Andrew S. Tanenbaum	Computer Networks	5th Edition, Prentice Hall, ISBN-13: 978-9332518742	2013

Web References

1. https://onlinecourses.swayam2.ac.in/cec19_cs07/preview

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2. https://www.tutorialspoint.com/data_communication_computer_network/index.htm

Programme Code:	B.Sc. CT			**Programme Title:**	Bachelor of Science (Computer Technology)	
Course Code:	21UCT4A4			**Title**	**Batch:**	2021 – 2024
				ALLIED IV: BIG DATA MANAGEMENT	**Semester:**	IV
Lecture Hrs./Week or Practical Hrs./Week	05	**Tutorial Hrs./Sem.**	03		**Credits:**	04

3. http://www.engppt.com/2009/12/networking-fourozan-ppt-slides.html
4. https://www.slideshare.net/SalihinNirbhoy/basic-computer-networking-tutorial
5. https://www.slideshare.net/HarpreetDhaliwal/presentation-on-data-communication

Course Objective

1. The students will possess the skills necessary for utilizing tools (including deploying them on Hadoop/ Map Reduce to handle a variety of big data analytics.
2. The students will be able to apply the analytics techniques on a variety of applications.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Keep in mind Evolution of Data Management, Architecture, Structured and Unstructured Data.	K1
CO2	Comprehend deep knowledge about the Distributed Computing, Digging into Big Data Technology Components, Big Data Applications.	K2

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CO3	Apply techniques of Virtualization, Distributed Computing, Databases, and Columnar Databases in various applications.	K3
CO4	Analyze the concepts of Tracing the Origins of Map Reduce, Adding the reduce Function, Analysis andExtraction Techniques.	K4
CO5	Evaluate the need and fundamentals of HBase. Apply the Cassandra data model for different applications.	K4

21UCT4A4

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	H	H	H	H	H	H	H	L	H	H	H
CO2	H	M	H	M	H	H	M	H	M	H	M	L
CO3	H	M	H	M	H	L	M	H	M	H	M	H
CO4	M	H	L	H	M	M	H	M	H	M	H	M
CO5	H	L	H	M	H	H	M	H	M	L	M	H

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Units	Content	Hrs

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Unit I	**Grasping the Fundamentals of Big Data :**The Evolution of Data Management - Understanding the waves of Managing Data -Defining Big Data -Building a Successful Big Data Management Architecture **Examining Big Data Types:** Defining Structured Data- Defining Unstructured Data- Putting Big Data Together.	15
Unit II	**Old Meets New- Distributed Computing:** A Brief History of Distributed Computing- Understanding the Basics of Distributed Computing- **Digging into Big Data Technology Components:** Exploring the Big Data Stack- Layer 0: Redundant Physical Infrastructure- Layer 1:Security Infrastructure - Layer 2: Operational Databases- Layer 3: Organizing Data Services and Tools - Layer 4: Analytical Data Warehouses -Big Data Analytics -Big Data Applications.	15
Unit III	**Virtualization and How It Supports Distributed Computing:** Understanding the Basics of Virtualization- Importance of virtualization of Big Data. Big Data management: Document Databases: MongoDB –CouchDB .**Columnar Databases** : Hbase columnar database.	15
Unit IV	**Map Reduce Fundamentals:** Tracing the Origins of Map Reduce -Understanding the map Function- Adding the reduce Function -Putting map and reduce Together.	15
Unit V	**Understanding Text Analytics and Big Data:** Exploring Unstructured Data- Understanding Text Analytics- Analysis and Extraction Techniques – Characteristics of Big data analysis - Characteristics of Big data analysis framework.	15
	Total Contact Hrs	**75**

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Pedagogy

Direct Instruction, Flipped Class, Digital Presentation

Assessment Methods

Seminar, Quiz, Assignments, Group Task.

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Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Judith Hurwitz, Alan Nugent, Dr. Fern Halper and Marcia Kaufman.	Big Data for Dummies	John Wiley & Sons, Inc.	2013

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Bill Franks	Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with advanced analytics	John Wiley & sons.	2012
2	DT Editorial Services	Big Data Black Book	1st edition, Dreamtech Press. ISBN – 13: 9789351197577.	2015
3	Seema Acharya, SubhashiniChellappan,	Big Data and Analytics	1st edition, Wiley Publication.	2016
4	O'Reilly Media	"Big Data now: Current Perspective"	O'Reilly Media	2013

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Web References

1. https://www.edureka.co/blog/big-data-tutorial
2. http://statweb.stanford.edu/~tibs/ElemStatLearn/
3. https://www.coursera.org/learn/big-data-introduction
4. https://nptel.ac.in/courses/106/104/106104189/
5. http://statweb.stanford.edu/~tibs/ElemStatLearn/

Course Objective

Programme Code:	B.Sc. CT			Programme Title:	Bachelor of Science (Computer Technology)	
Course Code:	21UCT415			Title	Batch:	2021 – 2024
				LAB - V: ADVANCED JAVA PROGRAMMING LAB	Semester:	IV
Lecture Hrs./Week or Practical Hrs./Week	04	Tutorial Hrs./Sem.	0		Credits:	02

To build GUI applications and connect to JDBC, create Web applications using server side programming languages – Servlets, JSP and Java beans**.**

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Recollect the concept of Swing Components and cookies	K3
CO2	Understand and integrate Servlets, JDBC and JSP to develop web applications	K4
CO3	Validate the idea of Java Beans to build enterprise applications	K3
CO4	Develop an request object method using enterprise applications	K4
CO5	Illustrate the concept of Server-side Includes and Servlet chaining	K4

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	H	H	H	H	H	H	H	L	H	H	H
CO2	H	M	H	M	H	H	M	H	M	H	M	L
CO3	H	M	H	M	H	L	M	H	M	H	M	H
CO4	M	H	L	H	M	M	H	M	H	M	H	M
CO5	H	L	H	M	H	H	M	H	M	L	M	H

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*H-High; M-Medium; L-Low

21UCT415

Content	Hrs.
List of Programs 1. Create a program to illustrate the concept of Introspection. 2. Create a bean program to design a simple property of the bean. 3. Create a java program to illustrate the concept of Generic Servlet. 4. Create a java program to illustrate the concept of Http Servlet. 5. Create a java program to illustrate the concept of Servlet chaining. 6. Create a java program to illustrate the concept of Server-side Includes. 7. Create a java program to illustrate the concept of Request Object Method. 8. Create a java program to illustrate the concept of JDBC Connectivity. 9. Create a jsp program to illustrate the concept of Implicit Objects. 10. Create a program to illustrate the concept of Sessions in JSP.	60
Total Contact Hrs.	**60**

Pedagogy

Direct Instruction, Flipped Class, Digital Presentation

Assessment Methods

Seminar, Quiz, Assignments, Group Task.

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Programme Code:	B.Sc. CT			**Programme Title:**	Bachelor of Science (Computer Technology)	
Course Code:	21UCT416			**Title**	**Batch:**	2021 – 2024
				LABVI: LINUX AND SHELL PROGRAMMINGLAB	**Semester:**	IV
Lecture Hrs./Week or Practical Hrs./Week	04	**Tutorial Hrs./Sem.**	0		**Credits:**	02

Course Objective

To enable the students to write program in Linux for solving specified problems.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Apply the various Linux distributions.	K3
CO2	Evaluate the basic set of commands and utilities in Linux systems.	K4
CO3	Validate various shell scripts with different programming concepts.	K3
CO4	Apply and change the ownership and file permissions using advance Unix commands.	K4
CO5	Create shell scripts for real time applications.	K4

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	H	H	H	H	H	H	H	H	H	H	H
CO2	H	M	H	M	H	M	H	M	H	M	H	M

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CO3	H	M	H	M	H	M	H	M	H	M	H	M
CO4	M	H	L	H	M	H	L	H	M	H	L	H
CO5	H	L	H	M	H	L	H	M	H	L	H	M

*H-High; M-Medium; L-Low

21UCT416

Content	Hrs.
List of Programs 1. Write a shell script to stimulate the file commands: rm, cp, cat, mv, cmp, wc, split 2. Write a Shell Script to implement the following: pipes, Redirection and commands. 3. Write a shell script for displaying current date, user name, file listing and directories by getting user choice. 4. Write a shell script to implement the filter commands. 5. Write a shell script to remove the files which has file size as zero bytes. 6. Write a shell script to find the sum of the individual digits of a given number. 7. Write a shell script to implement command line arguments. 8. Write a shell script for executing control statements 9. Write a shell script to print the multiplication table of the given argument using for loop. 10. Write a shell script to show the following system configuration : a. currently logged user and his log name b. current shell , home directory , Operating System type , current Path setting c. show currently logged number of users, show all available shells d. show CPU information like processor type , speed e. show memory information	60
Total Contact Hrs.	**60**

Pedagogy

Direct Instruction, Flipped Class, Digital Presentation

Assessment Methods

Seminar, Quiz, Assignments, Group Task.

Programme Code:	B.Sc. CT			**Programme Title:**	Bachelor of Science (Computer Technology)	
Course Code:	21UCT4N1			**Title**	**Batch:**	2021 – 2024
				Skill Based NON-MAJOR ELECTIVE II – OFFICE AUTOMATION LAB	**Semester:**	IV
Lecture Hrs./Week or Practical Hrs./Week	01	**Tutorial Hrs./Sem.**	0		**Credits:**	02

Course Objective

To familiarize the students in preparation of documents and presentations with office automation tools

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Keep in mind about the menus and icons functionalities in MS Word	K3
CO2	Understand and apply mathematical functions to calculate mean, median and standard deviation using Excel	K3
CO3	Apply different build in functions and their usage.	K4
CO4	Prepare a power point presentation for a range of events	K4
CO5	Include graphs, tables and images to power point presentation	K3

Mapping

PO /PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2

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CO												
CO1	H	H	H	H	H	H	H	H	L	H	H	H
CO2	H	M	H	M	H	H	M	H	M	H	M	L
CO3	H	M	H	M	H	L	M	H	M	H	M	H
CO4	M	H	L	H	M	M	H	M	H	M	H	M
CO5	H	L	H	M	H	H	M	H	M	L	M	H

*H-High; M-Medium; L-Low

Content	Hrs.
MS WORD 1. Type the text, check spelling and grammar, bullets and numbering list items, align the text to left, right, justify and centre. 2. Prepare a job application letter enclosing your bio-data. 3. Performing mail merge operation and preparing labels. 4. Preparing a neatly aligned, error free document, add header and footer, also perform find and replace operation. 5. Prepare a document in newspaper column layout. **MS EXCEL** 6. Worksheet Using formulas. 7. Worksheet Manipulation for electricity bill preparation. 8. Drawing graphs to illustrate class performance. 9. An excel worksheet contains monthly Sales Details of five companies. **MS POWER POINT** 10. Prepare a power point presentation for Department inaugural function.	15
Total Contact Hrs.	**15**

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Pedagogy

Direct Instruction, Flipped Class, Digital Presentation

Assessment Methods

Seminar, Quiz, Assignments, Group Task.

Programme Code:	B.Sc. CT			**Programme Title:**	Bachelor of Science (Computer Technology)	
Course Code:	21UCT4N2			**Title**	**Batch:**	2021 – 2024
				Skill Based NON-MAJOR ELECTIVE II - CORELDRAW LAB	**Semester:**	IV
Lecture Hrs./Week or Practical Hrs./Week	01	**Tutorial Hrs./Sem.**	0		**Credits:**	02

Course Objective

To equip the students with the basic knowledge of CorelDraw graphics suites

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Keep in mind about CorelDraw workspace, tools and panels	K3
CO2	Comprehend a variety of images using crop tools, zooming, curve and smart fill tools	K4
CO3	Validate the animation works using CorelDraw	K3
CO4	Develop different animations with help of Corel tools	K4
CO5	Create variety of techniques for designing methods	K4

Mapping

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PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	H	H	H	H	H	H	H	L	H	H	H
CO2	H	M	H	M	H	H	M	H	M	H	M	L
CO3	H	M	H	M	H	L	M	H	M	H	M	H
CO4	M	H	L	H	M	M	H	M	H	M	H	M
CO5	H	L	H	M	H	H	M	H	M	L	M	H

*H-High; M-Medium; L-Low

Content	Hrs.
1. Create a program using drawing tools. 2. Create a program to work with layers 3. Develope a program for Text tools 4. Create a program to work with frames 5. Create a model using Freehand Tool 6. Create a program for masking a picture 7. Create a program using bitmap files 8. Create a program to develop a layers 9. Create a program for transformation of an object 10. Develope a program for animation effects	15
Total Contact Hrs.	15

Pedagogy

Direct Instruction, Flipped Class, Digital Presentation

Assessment Methods

Seminar, Quiz, Assignments, Group Task.

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DEPARTMENT OF COMPUTER TECHNOLOGY

Syllabus

BATCH: 2022 – 2025

Faculty Members

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Ms. C. Keerthana, M.Sc., M. Phil., (Ph.D).,

Ms. K. S. Leelavathi, M.Sc., M. Phil., NET., SET., (Ph.D).,

Dr. R. Jayaprakash, M.C.A., M.Phil., Ph.D.,

Ms. A. Kalaivani, M.C.A., M. Phil., (Ph.D).,

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SEMESTER- I

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Programme Code:	B.Sc.			**Programme Title:**	Bachelor of Science (Computer Technology)		
Course Code:	22UCT101			**Title**	**Batch:**	2022 - 2025	
				Title	**Semester:**	I	
Lecture Hrs./Week or Practical Hrs./Week	4	**Tutorial Hrs./Sem.**	-	CORE I: PROGRAMMING IN C	**Credits:**	4	

Course Objective

To focus on the language and syntax of C programming concepts.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To remember data types, identifier, arrays, strings and pointers	K1
CO2	To understand how to write and use control statements and functions in C	K2
CO3	To implement the concept of pointers, structure and union	K3
CO4	To evaluate string functions and file Operations in Cprogramming for agiven application	K4
CO5	To evaluate random file operations, preprocessor and command line arguments	K5

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	M	M	M	L	H	M	M	M	M	M	M
CO2	H	L	H	M	M	M	L	M	M	M	M	M
CO3	H	H	M	M	L	H	H	H	L	H	M	H

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CO4	H	M	H	H	H	M	H	H	H	H	L	H
CO5	M	M	L	H	M	H	M	M	M	M	H	M

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Units	Content	Hrs
Unit I	**Introduction to C** :Overview of C – History and Importance of C – Basic Structure ofC programs -Development of program logic skills through Flowchart and Algorithm – Programming Style– Executing a'C'program – Character set –C Tokens–Keywords – Identifiers – Constants– Variables – Rules for defining variables- Data types, – Declaring and initializing variables–Operators & Expressions–Precedence of arithmetic – Type conversion in expressions– Mathematical functions – **Managing Input and output operations**: Introduction – Readinga character–Writing a character Formatted input-Formatted output Simple Programs	12
Unit II	**Control Statements:** IF, IF..ELSE Statements, ELSE...IF ladder – Switch Statement – GOTO Statement – WHILE Statement – Do Statement – FOR Statement.-Jumps in loops. **Arrays:** One dimensional Arrays – Two Dimensional Arrays –simple Structures: Arrays within Structures–Union.	12
Unit III	**Functions:** User-defined functions- -Elements of user defined function, definition of function - Return value &their types, function calls &declarations-Category of functions: No arguments & No return values-arguments that No return values – Arguments with return values-No arguments that return a value-Nesting of functions-Recursion	12
Unit IV	**String manipulation:** Introduction- Declaring & Initializing String variables –Reading string from terminal, Writing string to screen – String handling Functions. **Pointers:** Introduction - Accessing, Declaring & Initializing pointer Variables	12
Unit V	**Files:** Defining and opening a file – Closing a file –I/O operations on sequential file– Command line arguments- Programs using Files and CommandLine Arguments	12
	Total Contact Hrs	**60**

Pedagogy

Direct Instruction, Flipped Class, Digital Presentation

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Assessment Methods

Seminar, Quiz, Assignments, Group Task.

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Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	E.Balagurusamy	Programming in ANSI C	Tata McGraw-Hill Publishing Co&Ltd., Eighth Edition	2019

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Greg Perry, Dean Miller	C Programming – Absolute Beginner's Guide	Third Edition	2013
2	Yashvant Kanetkar	Let us C	17th Edition	2020

Web References

1. https://www.javatpoint.com/data-types-in-c
2. https://www.tutorialspoint.com/cprogramming/c_arrays.html
3. https://www.programiz.com/c-programming/c-functions
4. https://www.programiz.com/c-programming/c-pointers
5. https://www.geeksforgeeks.org/basics-file-handling-c/

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Programme Code:	B.Sc.			**Programme Title:**	Bachelor of Science (Computer Technology)	
Course Code:	22UCT102			**Title**	**Batch:**	2022 - 2025
				Title	**Semester:**	I
Lecture Hrs./Week or Practical Hrs./Week	4	**Tutorial Hrs./Sem.**	–	CORE II: DIGITAL FUNDAMENTALS AND COMPUTER ORGANIZATION	**Credits:**	4

Course Objective

To convert the knowledge on digital circuits, logic gates and about interfacing of various components.

To cover the various digital components used in the Organization and Hardware design of digital computers

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To recollect number system, Binary Codes concepts	K1
CO2	To understand the concepts of Boolean laws, logic gates, Karnaugh map for Minimization of POS and SOP form of Boolean expressions.	K2
CO3	To apply arithmetic and logic circuits, different sequential circuits with flipflops, registers.	K3
CO4	To analyze the concept of Register Organization, Data Transfer and Manipulation, Registers and Memory Organization.	K4
CO5	To evaluate memory hierarchy and types of memory	K5

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Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	M	H	M	L	H	M	H	H	M	M	M
CO2	H	L	H	M	M	M	L	M	M	M	H	M
CO3	H	H	L	M	L	M	H	H	L	H	M	H
CO4	H	L	H	H	H	M	H	M	H	H	L	H
CO5	M	M	L	H	M	H	M	M	M	M	H	L

*H-High; M-Medium; L-Low

Units	Content	Hrs
Unit I	Number Systems and Binary Codes: Digital Electronics – Integrated circuits or Chip - Decimal System - Binary system – Octal System – Hexadecimal System – Binary addition – Binary Multiplication and Division – 1's Complement of a binary Number-9's Complement - 10's Complement - BCD – Gray Code - Excess-3 Code — Alphanumeric codes – Parity method for error detection and correction.	12
Unit II	Boolean Algebra-Logic Gates– Karnaugh Map and Minimization: Boolean Algebra – Gates – Inverter or NOT Gate – OR Gate – AND Gate – NOR Gate – NAND Gate – De Morgan's Theorems – Exclusive OR Gate – Exclusive NOR Gate – Karnaugh Map – Canonical Form I – Karnaugh Map - Construction and Properties – Minimization of SOP form using Karnaugh map - Minimization of POS form using Karnaugh map.	12
Unit III	Arithmetic and Logic circuits: Half Adder – Full Adder — Half- Subractor – Full-Subtractor - Sequential Circuits, Flip-Flops: Flip-Flops- R-S Flip- Flops- Positive Edge Triggered J-K Flip-Flop- Registers: Register – Decoder – Encoder – Multiplexer – Demultiplexer.	12
Unit IV	Central Processing Unit: General Register Organization – Stack Organization – Instruction Formats – Data Transfer and Manipulation – Reduced Instruction Set Computer (RISC).	12

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Unit V	Memory Organization: Memory Hierarchy – Main Memory – Auxiliary Memory – Associative Memory – Cache Memory – Virtual Memory.	12
	Total Contact Hrs	**60**

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Pedagogy

Direct Instruction, Flipped Class, Digital Presentation

Assessment Methods

Seminar, Quiz, Assignments, Group Task.

Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Puri.V.K	Digital Electronics Circuits and Systems	22nd Reprint, TATA Mc-Graw Hill Publications, ISBN-13: 978-0074633175	2017
2	Morris Mano. M	Computer System Architecture	3rd Edition	2017

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Donald P Leach, Albert Paul Malvino, Gautam Saha	Digital Principles and Applications	8th Edition, TATA McGraw-HillPublications.	2014
2	Mandal S K	Digital Electronics: Principles and Applications	1st Edition, ISBN-13:978-0070153820.	2017
3	Saini S.P.S	Computer System Architecture and Organization	S. K. Kataria & Sons Publication, ISBN-13:978-8189757731	2015

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4	Hamacher.C, Zvonko.V, Zaky.S	Computer Organization	5th Edition Tata Mc Graw Hill Publication, ISBN-13:9781259005275	2017

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Web References

1. https://circuitglobe.com/number-system-in-digital-electronics.html
2. https://www.tutorialspoint.com/digital_circuits/digital_circuits_logic_gates.html
3. https://www.tutorialspoint.com/digital_circuits/digital_circuits_flip_flops.html
4. https://www.tutorialspoint.com/computer_fundamentals/computer_cpu.htm
5. https://www.tutorialsmate.com/2020/04/types-of-computer-memory.html

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Programme Code:	B.Sc.			**Programme Title:**	Bachelor of Science (Computer Technology)	
Course Code:	22UCT1A1			**Title**	**Batch:**	2022 - 2025
				ALLIED 1: MATHEMATICS – I - MATHEMATICAL STRUCTURE FOR COMPUTER SCIENCE	**Semester:**	I
Lecture Hrs./Week or Practical Hrs./Week	5	**Tutorial Hrs./Sem.**	–		**Credits:**	4

Course Objective

To gain knowledge of the concepts of matrices, algebraic equations, numerical differentiation, integration and correlation for computer applications.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To remember an in-depth knowledge in Matrices, Determinants, Inverse of a matrix, Rank of a Matrix and Eigen value Problems	K1
CO2	To understand the concepts of numerical differentiation and integration	K2
CO3	To apply an appropriate numerical method for solving algebraic	K3
CO4	To figure out the concept of Mean, Median, Mode, Measures of dispersion and the law relating to Correlation and Regression	K4
CO5	To evaluate the concept of correlation and correlation evaluation regression	K5

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Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	M	M	M	L	H	M	H	H	M	M	M
CO2	M	H	H	M	M	M	L	M	H	H	H	M
CO3	H	H	L	H	L	M	H	H	L	H	L	H
CO4	L	L	H	H	H	M	H	M	H	H	L	H
CO5	M	M	L	L	M	H	M	M	H	M	H	L

*H-High; M-Medium; L-Low

Units	Content	Hrs
Unit I	**Matrices** – Introduction – Determinants – Inverse of a matrix – Rank of a Matrix – EigenValue problems	15
Unit II	**System of Simultaneous Linear algebraic Equation:** Gauss elimination, Gauss Jordan. **The solution of Numerical Algebraic and Transcendental equation** – Bisection method – Newton Raphson method.	15
Unit III	**Numerical Differentiation:** Newton's forward Difference - Backward Difference – **Startling formula Numerical Integration**: Trapezoidal Rule and Simpson's rule - **Numerical solution of ordinary differential equations:** Taylor method.	15
Unit IV	**Measures of central tendency:** Mean (Individual Series), Median Discrete Series) and Mode (Continuous Series) – Relationship among mean, median and mode. Case study: Calculate mean, median and mode for students mark list. **Measures of dispersion:** Range, quartile deviation, mean deviation and Standard deviation.	15
Unit V	**Correlation**: Karl Pearson's coefficient of correlation – **Rank correlation regression:** Regression Equations – Difference between Correlation and Regression.	15

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	Total Contact Hrs	**75**

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Pedagogy

Direct Instruction, Flipped Class, Digital Presentation

Assessment Methods

Seminar, Quiz, Assignments, Group Task.

Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Dr. Venkataraman. M. K	Engineering Mathematics	Volume II, Third Edition, NPC – (Unit I).	2001
2	Kandasamy.P, Thilagavathi.K, Gunavathi. K	Numerical Methods	Revised Edition, New Delhi, S. Chand and Company Ltd, ISBN-13: 9788121914383.	2013
3	Pillai.R.S.N, Bagavathi.V	Statistical Methods	New Delhi, Sultan Chand and Sons Company Limited, (Unit IV &V). ISBN-13: 978-9352533091	2016

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	N. P. Bali., Dr. Manish Goyal	A text book of Engineering Mathematics	Vol1, 9th edition, University science Press, New Delhi. ISBN 13:- 9788131808320.	2013

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2	Gupta .S.C, Kapoor .V.K	Fundamental of Mathematical Statistics	Sultan Chand and Sons-Tb,ISBN-13:9788180549687.	2018

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Web references:

1. https://www.vedantu.com/maths/types-of-matrices
2. https://byjus.com/maths/gauss-elimination-method/
3. http://www.math.pitt.edu/~sparling/052/23052/23052notes/23052notestojan14th/node3.html
4. https://statistics.laerd.com/statistical-guides/measures-central-tendency-mean-mode-median.php
5. https://www.bmj.com/about-bmj/resources-readers/publications/statistics-square-one/11-correlation-and-regression

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Programme Code:	B.Sc.			**Programme Title:**	Bachelor of Science (Computer Technology)	
Course Code:	22UCT103			**Title**	**Batch:**	2022 - 2025
				LAB – I - PROGRAMMING IN C	**Semester:**	I
Lecture Hrs./Week or Practical Hrs./Week	4	**Tutorial Hrs./Sem.**	–		**Credits:**	2

Course Objective

On successful completion of this subject the students will be able to enhance their analyzing and problem solving skills and use the same for writing programs in C.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To remember the concept of data types, decision making and looping control statements	K1
CO2	To get the idea of array, strings and functions in C	K2
CO3	To access the file information through open/close and reading/writing operations in a file	K3
CO4	To remember the concept of pointers	K4
CO5	To get the idea of file functions	K5

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Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	M	M	M	L	H	M	H	H	M	H	M
CO2	M	M	H	L	M	M	L	H	H	H	H	M
CO3	H	H	L	H	H	M	H	H	L	H	L	H
CO4	L	H	H	H	H	H	H	M	H	H	L	H
CO5	M	M	L	L	M	H	M	L	H	M	H	L

*H-High; M-Medium; L-Low

Content	Hrs
Sample Programs 1. Write a C program to illustrate the concept of operators in C. 2. Write a C program to illustrate the concept of conditional and unconditional control statements. 3. Write a C program to illustrate the concept of Arrays. 4. Write a C program to illustrate the concept of string and its functions. 5. Write a C program to illustrate the concept of Functions. 6. Write a C program to illustrate the concept of call by value. 7. Write a C program to illustrate the concept of call by reference. 8. Write a C program to illustrate the concept of pointers. 9. Write a C program to illustrate the concept of File and its Operations. 10. Write a C program to illustrate the concept of Command line Arguments.	60

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Total Contact Hrs	**60**

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Pedagogy

Direct Instruction, Flipped Class, Digital Presentation

Assessment Methods

Seminar, Quiz, Assignments, Group Task.

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SEMESTER- II

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Programme Code:	B.Sc.			**Programme Title:**	Bachelor of Science (Computer Technology)	
Course Code:	22UCT204			**Title**	**Batch:**	2022 - 2025
				CORE III: JAVA PROGRAMMING	**Semester:**	II
Lecture Hrs./Week or Practical Hrs./Week	4	Tutorial Hrs./Sem.	_		**Credits:**	4

Course Objective

To provide profound coverage on classes, multithreading, exception handling, applets and file handling in Java

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Remember about classes, objects, members of a class and relationships among them needed for a specific problem	K1
CO2	Comprehend the concepts of inheritance, interface and package	K2
CO3	Examine error handling techniques using exception handling	K3
CO4	Evaluate the concepts of thread, applet and files	K4
CO5	Developed skills in designing abstract window toolkit	K5

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	H	H	H	H	H	H	H	L	H	H	H
CO2	H	M	H	M	H	H	M	H	M	H	M	L
CO3	H	M	H	M	H	L	M	H	M	H	M	H

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CO4	M	H	L	H	M	M	H	M	H	M	H	M
CO5	H	L	H	M	H	H	M	H	M	L	M	H

*H-High; M-Medium; L-Low

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Units	Content	Hrs
Unit I	Fundamentals of Object – oriented programming – Introduction – Object-object oriented programming –Objects and Classes – Data abstraction and Encapsulation – Inheritance – Polymorphism – Dynamic Binding – Message Communication – Benefits of OOP – Applications of OOP – Java Evolution – History –Java features – How java differs from C and C++ - Java and the Internet – Java and World Wide Web – WebBrowsers – Java Environment – Overview of Java Language – Simple Java Program – Java Program Structure – Java Tokens – Java Statements – Implementing Java – Java Virtual Machine – Command LineArguments.	12
Unit II	Constants, Variables and Data Types – Declaration of variables – Scope of Variables – Symbolic Constants –Type Casting – Operators and Expressions – Arithmetic Operators – Relational Operators – Logical Operators – Assignment Operators – Increment and Decrement Operators –Conditional Operator – Bitwise operator – Special Operators – Arithmetic Expressions – Evaluation of Expressions – Precedence of Arithmetic Operators - Type Conversions in Expressions – Operator Precedence and Associativity – Decision Making and Branching – Decision Making with If statement – Simple If statement – if-Else statement – Nesting of if-Else statement – The Else if ladder – the switch statement – the ?: operator.	12
Unit III	Decision Making and Looping – The While Statement – the Do statement – The For statement – Jumps in Loops – Labeled Loops – Classes, Objects and Methods – Defining a Class – Fields Declaration – Methods Declaration – Creating Objects – Accessing Objects – Constructors – Method Overloading – static members – Nesting of Methods – Inheritance – Overriding methods – Final Variables – Final Classes – Finalizer Methods – Abstract Methods and classes – Methods with Varargs – Visibility Control – Arrays and Strings – Wrapper classes – Enumerated types.	12

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Unit IV	Interfaces – Defining Interfaces – Extending Interfaces – Implementing Interfaces – Accessing Interface variables – Packages – Java API Packages – Naming Conventions – Creating Packages – Accessing a Package – Using a Package – Adding a class to a package – Hiding classes – static import – Multithreaded	12

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	Programming – Creating Threads – Extending the Thread classes – Stopping and Blocking a Thread – Lifecycle of Thread – Using Thread methods	
Unit V	Types of Errors – Exception – Syntax of Exception handling code – Multiple catch statements – Using Finally statement – Throwing our own Exceptions - Applet Programming – How Applet differs from Applications –Building Applet Code – Applet Lifecycle – Creating an Executable Applet – Concept of Streams – Stream Classes – Byte-Stream classes – Character Stream classes – Using Streams – other useful I/O classes – Using the file class – I/O functions – Creating of files – Reading / Writing characters – Reading /writing bytes – Handling Primitive data types – Random Access files – Interactive I/O – Other stream classes.	12
	Total Contact Hrs	**60**

Pedagogy

Direct Instruction, Flipped Class, Digital Presentation

Assessment Methods

Seminar, Quiz, Assignments, Group Task.

Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Balagurusamy. E	Programming With JAVA A Primer	6th Edition, Tata McGraw Hill Publications, ISBN-13: 9780070141698.	2019

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Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	John R. Hubbard	Programming with Java	2nd Edition, Schaum's Outline Series, Tata McGraw Hill Publications, ISBN-13: 9780070589421.	2013
2	Timothy Budd	Understanding Object Oriented Programming with Java	2nd Edition, Pearson Education, ISBN-13: 9780201308815.	2016
3	Deitel&Deitel	Java TM: How to Program	9th Edition, PHI, ISBN-13: 9780136123712	2013

Web references:

1. iiti.ac.in/people/~tanimad/JavaTheCompleteReference.pdf
2. http://www.onlineprogrammingbooks.com/learning-java-4th-edition/
3. https://www.javatpoint.com/serialization-in-java
4. https://www.journaldev.com/2452/serialization-in-java
5. https://www.tutorialspoint.com/java/index.htm

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Dr. R. MUTHUKUMARAN, M.A.,M.Phil.,B.T.,Ph.D.,
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Programme Code:	B.Sc.			**Programme Title:**	Bachelor of Science (Computer Technology)	
Course Code:	22UCT205			**Title**	**Batch:**	2022 – 2025
				CORE IV: DATA STRUCTRES	**Semester:**	II
Lecture Hrs./Week or Practical Hrs./Week	4	**Tutorial Hrs./Sem.**	–		**Credits:**	4

Course Objective

To understand the concepts of array, stack, queue, list, linked list, tree and their computer applications.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To remember arrays, stack/queue operations and trees	K1
CO2	To understand and develop skills to analyze simple linear and non linear datastructures	K2
CO3	To apply the concept of linked lists, graphs and trees for the realworldproblems	K3
CO4	To evaluate file organizations, various searching and sorting methodologies	K4
CO5	To apply the concept of Binary trees	K5

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	M	H	M	L	H	M	H	H	M	M	M
CO2	M	H	H	L	H	M	L	H	H	M	H	M

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CO3	H	H	L	H	H	L	H	M	L	H	L	H
CO4	L	H	M	H	H	H	H	M	H	H	M	H
CO5	M	M	L	L	M	H	M	L	H	M	H	M

*H-High; M-Medium; L-Low

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Units	Content	Hrs
Unit I	**Introduction** - Definition – Structure and properties of Algorithms – Development of an Algorithm – Data structures and Algorithms – Data structure – Definition and Classification. **Arrays:** Introduction – Array Operations - Number of elements in an array, representation of Arrays in memory, Applications	12
Unit II	Stacks: Introduction – Stack Operations – Applications .Queues: Circular Queues – Other types of Queues – Applications.	12
Unit III	Linked Lists: Introduction – Singly Linked Lists – Circular Linked Lists – Doubly Linked Lists – Applications.	12
Unit IV	**Trees**: Introduction – Trees – Basic Terminologies - Representation of Trees. **Binary Trees**: Basic Terminologies and Types - Representation of Binary Trees - Binary Tree Traversals – Applications. **Graphs**: Introduction – Definition and basic Terminologies.	12
Unit V	File Organizations: Introduction – Files - Keys – Basic File Operations – Sequential File Organizations – Indexed sequential File Organizations – Direct File Organizations. Searching: Linear search– Binary search. Sorting: Merge sort and Quick sort.	12
	Total Contact Hrs	**60**

Pedagogy

Direct Instruction, Flipped Class, Digital Presentation

Assessment Methods

Seminar, Quiz, Assignments, Group Task.

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Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	GAV Pai	Data Structures and Algorithms – Concepts, Techniques and Applications	Tata MCGrawHill Publications ISBN-10: 0070667268	2017

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Aaron M Tanenbaum, Yedidyeh langsam, Moshe J Augenstein,	Data Structure using C	Facsimile Edition, Pearson India, ISBN-13:978-8131702291.	2018
2	Ashok N Kamthane	Programming and Data Structures	PearsonEducation, 1st Indian Print, ISBN-13:978-131724224.	2009

Web references:

1. https://www.w3schools.in/cplusplus-tutorial/working-with-files/
2. https://www.javatpoint.com/ds-stack-vs-queue
3. https://www.javatpoint.com/ds-linked-list

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4. https://www.javatpoint.com/binary-tree

5. https://www.javatpoint.com/bubble-sort

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Programme:	B.Sc.			**Programme Title:**	Bachelor of Science (Computer Technology)	
Course Code:	22UCT2A2			**Title**	**Batch:**	2022 - 2025
				ALLIEDII: MATHEMATICS – II - OPERATIONS RESEARCH	**Semester:**	II
Lecture Hrs./Week or Practical Hrs./Week	4	**Tutorial Hrs./Sem.**	–		**Credits:**	4

Course Objective

Every industrial organization faces multifaceted problems to identify best possible solution to their problems. OR aims to help the executives to obtain optimal solution with the use of OR techniques and to locate best or optimal solution.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To recollect the modeling tools and computational tools as well as analytic skills to evaluate the problems.	K1
CO2	To understand how to translate real world problem given in words into a mathematical formulation.	K2
CO3	To apply mathematical optimization techniques, existing optimization tool kits to write computer programs and to implement algorithms and solve problems.	K3
CO4	To analyze the problem situation leading to better control, better co-ordination, better systems and finally better decisions.	K4
CO5	To analyze the concept of CPM and PERT	K5

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	M	H	M	L	H	M	H	H	M	M	H

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CO2	M	M	H	L	MH	M	L	H	H	H	H	M
CO3	H	H	L	H	H	M	H	M	L	H	L	H
CO4	L	H	M	H	H	H	H	M	H	H	L	L
CO5	M	M	L	L	M	H	M	L	H	M	H	M

*H-High; M-Medium; L-Low

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Units	Content	Hrs
Unit I	Linear Programming Problem: Graphical Solution Method- General Linear Programming Problem (Definition alone) - Canonical and Standard forms of LPP. Simplex Method: Basic Solution and Degenerate Solutions to Linear Equation- Simplex Method.	12
Unit II	Transportation Problem: North West Corner Method- Least Cost Method- Vogel's Approximation Method- Moving towards optimality UV Method. Assignment Problem: Definition- Assignment Algorithm.	12
Unit III	Inventory Control: Introduction – Types of Inventory – Inventory Decision- Economical Order Quantity (EOQ) - Deterministic Inventory Problems.(Simple Problems)	12
Unit IV	Sequencing Problems: Introduction- Problems with n Jobs and 2 Machines- Problems with n Jobs and k Machines.	12
Unit V	Network Scheduling: Introduction- Network and Basic Components- Rules of Network Construction- Time calculation in Networks-CPM-PERT- PERT Calculations- Difference between CPM and Pert Network.	12
	Total Contact Hrs	**60**

Pedagogy

Direct Instruction, Flipped Class, Digital Presentation

Assessment Methods

Seminar, Quiz, Assignments, Group Task.

Text Book

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S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	KantiSwarup, P.K.Gupta, Man Mohan	Operations Research	Sultan Chand & Sons, Seventh Edition ISBN-13: 978-8180547713	2010

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Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	R. Paneer Selvam,	Operation Research	Prentice Hall of India Pvt Ltd, second edition	2016

Web references:

1. https://ncert.nic.in/ncerts/l/lemh206.pdf
2. https://www.mygreatlearning.com/blog/transportation-problem-explained/
3. https://www.researchgate.net/publication/245280760_Deterministic_Inventory_Models_for_Variable_Production
4. https://link.springer.com/chapter/10.1007%2F978-3-662-08011-5_10
5. https://en.wikipedia.org/wiki/Network_congestion

Programme Code:	B.Sc.			**Programme Title:**	Bachelor of Science (Computer Technology)
Course Code:	22UCT206			**Title**	**Batch:** 2022 - 2025
				LAB – II: JAVA PROGRAMMING Lab	**Semester:** II
Lecture Hrs./Week or Practical Hrs./Week	4	**Tutorial Hrs./Sem.**	–		**Credits:** 2

Course Objective

To utilize java programming concepts for developing, compiling and running java applications and applets.

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Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic concepts of Java Programming with emphasis on ethics and principles of professional coding	K3
CO2	Demonstrate the creation of objects, classes and methods and the concepts of constructor, methods overloading, Arrays, branching and looping	K4
CO3	Create data files and Design a page using AWT controls and Mouse Events in Java programming Implement the concepts of code reusability and debugging.	K3
CO4	Develop applications using Strings, Interfaces and Packages and applets	K4
CO5	Construct Java programs using Multithreaded Programming and Exception Handling	K4

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	H	H	M	L	H	M	M	H	M	M	H
CO2	M	H	H	L	H	M	L	H	H	M	H	M
CO3	H	H	L	H	H	L	H	M	L	H	L	H
CO4	L	H	M	M	H	H	H	M	H	H	M	H
CO5	M	M	L	L	M	H	M	L	H	M	H	M

*H-High; M-Medium; L-Low

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Content	Hrs
Sample Programs 1. Write a java program to illustrate the concept of Package creation. 2. Write a java program to illustrate the concept of threading. 3. Write a java program to illustrate the concept of synchronization. 4. Write a java program to illustrate the concept of Exception Handling Mechanism. 5. Write a java program to develop an Applet. 6. Write a java program to implement to the concept of decision making statements. 7. Write a java applet program to illustrate the concept of multithreading. 8. Write a java program using file concept. 9. Write a java program to illustrate the concept of control statements 10.Write a java program to illustrate the concept of Useful I/O Classes	60
Total Contact Hours	**60**

Pedagogy

Direct Instruction, Flipped Class, Digital Presentation

Assessment Methods

Seminar, Quiz, Assignments, Group Task.

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Principal

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