

E.M.G. YADAVA WOMEN'S COLLEGE, MADURAI – 625 014.

(An Autonomous Institution – Affiliated to Madurai Kamaraj University)

Re-accredited (**3rd Cycle**) with Grade **A+** & **CGPA 3.51** by NAAC

DEPARTMENT OF COMPUTER APPLICATIONS



TANSCHÉ - CBCS With OBE

BACHELOR OF COMPUTER APPLICATIONS

PROGRAMME CODE - J

COURSE STRUCTURE

(w.e.f. 2023 – 2024 Batch onwards)

E.M.G. YADAVA WOMEN'S COLLEGE, MADURAI -14.**(An Autonomous Institution – Affiliated to Madurai Kamaraj University)****(Re –accredited (3rd cycle) with Grade A⁺ and CGPA 3.51 by NAAC)****DEPARTMENT OF COMPUTER APPLICATIONS – UG****TANSCHÉ - CBCS with OBE****COURSE STRUCTURE****(w.e.f. 2023 – 2024 Batch onwards)**

Semester	Part	Course Code	Course Title	Teaching hrs (per week)	Duration of Exam (hrs.)	Marks allotted			Credits
						CIA	S.E	Total	
III	I	23OU1TA3	Tamil	6	3	25	75	100	3
	II	23OU2EN3	General English – III	6	3	25	75	100	3
	III	23OUCA31	Core Course 5: Data Structures and Algorithms	5	3	25	75	100	5
		23OUCA3P	Core Course 6: Data Structures and Algorithms Lab	5	3	40	60	100	5
		23OUCAGEMA3	GEC 2: Numerical Methods	4	3	25	75	100	3
	IV	23OUCASEC31	SEC 4 : Understanding Internet	1	3	25	75	100	1
		23OUCASEC32	SEC 5: Biometrics	2	3	25	75	100	2
	V		Environmental Studies	1	-	-	-	-	-
		TOTAL	30					22	
IV	I	23OU1TA4	Tamil	6	3	25	75	100	3
	II	23OU2EN4	General English – IV	6	3	25	75	100	3
	III	23OUCA41	Core Course 7: Programming in Java	5	3	25	75	100	5
		23OUCA4P	Core Course 8: Programming in Java Lab	4	3	40	60	100	5
		23OUCAGEMA4	GEC 3: Resource Management Techniques	4	3	25	75	100	3
	IV	23OUCASEC41	SEC 6 : PHP Programming	2	3	25	75	100	2
		23OUCASEC42	SEC 7: Advanced Excel	2	3	25	75	100	2
	V	23OU4EV4	Environmental Studies	1	3	25	75	100	2
		TOTAL	30					25	

Department of Computer Applications				Class: II B.C.A				
Sem	Category	Course Code	Course Title	Credits	Hours/Week	CIA	External Exam	Total
III	Core	23OUCA31	Data Structures And Algorithms	5	5	25	75	100

Nature of the Course		
Knowledge and Skill Oriented	Employability Oriented	Entrepreneurship oriented
✓	✓	--

Course Objectives:

1. To understand the concepts of ADTs.
2. To learn linear data structures-lists, stacks, queues
3. To learn Tree structures and application of trees
4. To learn graph structures and application of graphs
5. To understand various sorting and searching

Course Content:

Unit-I Abstract Data Types (ADTs)- List ADT-array-based implementation- linked list implementation -singly linked lists-circular linked lists-doubly linked lists-applications of lists-Polynomial Manipulation- All operations-Insertion-Deletion-Merge-Traversal.

Unit-II Stack ADT-Operations- Applications- Evaluating arithmetic expressions– Conversion of infix to postfix expression-Queue ADT-Operations- Circular Queue- Priority Queue- dequeues -applications of queues.

Unit-III Tree ADT-Binary Tree ADT-expression trees -tree traversals - applications of trees-binary search tree ADT- Threaded Binary Trees- AVL Trees- B-Tree- B+ Tree – Heap-Applications of heap.

Unit-IV Definition- Representation of Graph- Types of graph-Breadth first traversal – Depth first traversal-Topological sort- Bi-connectivity – Cut vertex- Euler circuits- Applications of graphs.

Unit- V Searching- Linear search-Binary search-Sorting-Bubble sort- Insertion sort- Selection sort- Radix sort –Shell sort- -Hashing-Hash functions Separate chaining- Open Addressing-Rehashing-Extendible Hashing

Book for Study:

Reema Thareja, (2014) ,—Data Structures Using C++, Oxford Universities Press, 2nd Edition

Chapters:

Unit-I : 2.4,6.1,6.2,6.3,6.8

Unit-II : 7.1,7.3,7.7 8.4,8.5

Unit-III : 9.2.3,9.2.5,9.4,9.6,10.1,10.3,10.4,11.2,11.3,12.5

Unit- IV : 13.1,13.5,13.6,13.9

Unit -V : 14.2, 14.3, 14.7, 14.8, 14.9, 14.12, 14.14,15.3,

Books for Reference:

1. D.Malik , (2009), *Data Structures using C++* , Cengage Learning , 2nd Edition , 2009
2. Mark Allen Weiss , (2006)*Data Structures and Algorithm Analysis in C++* , PHI , 3rd Edition,
3. Mark Allen weiss, (2007) *Data structures & algorithms analysis In C++*, Dorlingkindersely(India) PvtLtd, Pearson Education,1st Edtion,

Web Resources/ E.Books:

1. <https://www.geeksforgeeks.org/data-structures/#practice>
2. <https://www.codechef.com/certification/data-structures-and-algorithms/prepare>
3. <https://www.pepcoding.com/resources/>

Pedagogy:

Chalk and Talk, PPT, Group discussion, Quiz.

Rationale for nature of Course:**Knowledge and Skill:**

To make students allows storing data while maintaining the data's correctness and efficiency in a computer program.

Activities to be given:

Students shall be allowed to write program in many concepts.

Course Learning Outcomes (CLO's):

CLO	Course Outcomes Statement	Knowledge According to Bloom's Taxonomy (Up to K level)
CLO1	Understand the concept of Dynamic memory management, data types, algorithms, Big O notation	K1 to K3
CLO2	Understand basic data structures such as arrays, linked lists, stacks and queues	K1 to K4
CLO3	Describe the hash function and concepts of collision and its resolution methods	K1 to K4
CLO4	Solve problem involving graphs, trees and heaps	K1 to K4
CLO5	Apply Algorithm for solving problems like sorting, searching, insertion and deletion of data	K1 to K4

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3	3	3	2	1	1
CLO2	1	2	1	2	1	1
CLO3	3	1	2	1	1	1
CLO4	2	2	1	2	1	1
CLO5	3	1	1	2	2	1

1-Basic Level**2- Intermediate Level****3- Advanced Level**

LESSON PLAN: TOTAL HOURS (75 HRS)

UNIT	DESCRIPTION	HRS	MODE
I	Abstract Data Types (ADTs)- List ADT- array-based implementation- linked list implementation singly linked lists-circular linked lists-doubly- linked lists- applications of lists-Polynomial Manipulation- All operations-Insertion- Deletion-Merge-Traversal.	18	Chalk and Talk, PPT, group discussion , quiz, on the spot test
II	Stack ADT-Operations- Applications- Evaluating arithmetic expressions- Conversion of infix to postfix expression-Queue ADT-Operations- Circular Queue- Priority Queue- dequeuer applications of queues.	13	Chalk and Talk, PPT, group discussion, quiz, on the spot test
III	Tree ADT-tree traversals-Binary Tree ADT-expression trees- applications of trees-binary search tree ADT- Threaded Binary Trees- AVL Trees- B-Tree- B+ Tree – Heap-Applications of heap.	13	Chalk and Talk, PPT, group discussion, quiz, on the spot test
IV	Definition- Representation of Graph- Types of graph-Breadth first traversal – Depth first traversal-Topological sort- Bi-connectivity – Cut vertex- Euler circuits-Applications of graphs.	15	Chalk and Talk, PPT, group discussion, quiz, on the spot test

V	Searching- Linear search-Binary search-Sorting-Bubble sort-Selectionsort-Insertion sort-Shellsort-Radix sort-Hashing-Hash functions Separate chaining- Open Addressing- RehashingExtendible Hashing	16	Chalk and Talk, PPT, group discussion, quiz, on the spot test
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Course Designer

DR.(Mrs.) S. VIJAYASANKARI

Department of Computer Applications				Class: II B.C.A				
Sem	Category	Course Code	Course Title	Credits	Hours/Week	CIA	External Exam	Total
III	Core	23OUCA3P	Data Structures and Algorithms Lab	5	5	40	60	100

Nature of the Course		
Knowledge and Skill Oriented	Employability Oriented	Entrepreneurship oriented
✓	✓	

PROGRAM LIST

1. Write a program to implement the List ADT using arrays and linked Lists
2. Write a programs to implement the following using a singly linked list.
 - Stack ADT
 - Queue ADT
3. Write a program that reads an infix expression, converts the expression to postfix form and then evaluates the postfix expression (use stack ADT).
4. Write a program to implement priority queue ADT.
5. Write a program to perform the following operations:
 - Insert an element into a binary search tree.
 - Delete an element from a binary search tree.
 - Search for a key element in a binary search tree.
6. Write a program to perform the following operations
 - Insertion into an AVL-tree
 - Deletion from an AVL-tree
 - Program using Functions.
7. Write a programs for the implementation of BFS and DFS for a given graph.
8. Write a programs for implementing the following searching methods:
 - Linear search
 - Binary search.
9. Write a programs for implementing the following sorting methods:
 - Bubble sort
 - Selection sort
 - Insertion sort & Radix sort.
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Books for References:

1. D.Malik , *Data Structures using C++* , Cengage Learning , 2nd Edition , 2009
2. Mark Allen Weiss , *Data Structures and Algorithm Analysis in C++* , PHI , 3rd Edition, 2006
3. Mark Allen weiss, *Data structures & algorithms analysis In C++*, Dorlingkindersely(India) PvtLtd, Pearson Education, 1st Edition, 2007.

Pedagogy

Practical Test with viva voce, Group Discussion, Interaction, Quiz.

LESSON PLAN FOR PRACTICAL: TOTAL HOURS (75 HRS)

CYCLE	DESCRIPTION	HRS	MODE
1	1. Write a program to implement the List ADT using arrays and linked Lists 2. Write a programs to implement the following using a singly linked list. <ul style="list-style-type: none"> • Stack ADT • Queue ADT 	14	Writing and executing the program in a system
2	3.. Write a program that reads an infix expression, converts the expression to postfix form and then evaluates the postfix expression (use stack ADT). 4. Write a program to implement priority queue ADT.	16	Writing and executing the program in a system
3	5. Write a program to perform the following operations: <ul style="list-style-type: none"> • Insert an element into a binary search tree. • Delete an element from a binary search tree. • Search for a key element in a binary search tree. 	17	Writing and executing the program in a system
4	6. Write a program to perform the following operations <ul style="list-style-type: none"> • Insertion into an AVL-tree • Deletion from an AVL-tree • Program using Functions. 7. Write a programs for the implementation of BFS and DFS for a given graph.	14	Writing and executing the program in a system

5	<p>8. Write a programs for implementing the following searching methods:</p> <ul style="list-style-type: none">• Linear search• Binary search <p>9. Write a programs for implementing the following sorting methods:</p> <ul style="list-style-type: none">• Bubble sort• Selection sort• Insertion sort & Radix sort.	14	Writing and executing the program in a system
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Course Designer
Mrs. K. KRISHNAVENI

EVALUATION (PRACTICAL)
Core Lab / Skill Enhancement Course Lab

Internal (Formative)	: 40 marks
External (Summative)	: 60 marks
Total	:100 marks

Question Paper Pattern for Internal Practical Examination: 40 Marks

- ✓ There will be Two Internal Practical Examination.
- ✓ Duration of Internal Examination will be 2 hours.

S.No	Components	Marks
1.	I – Writing the Program (2x8)	16
2.	II – Test and Debug the Program (2x4)	08
3.	III - Printing the Correct Output (2x4)	08
4.	IV- Viva	03
5.	V –Record book	05
	Total	40

Question Paper Pattern for External Practical Examination: 60 Marks

- ✓ Duration of External Examination will be 3 hours.

S.No	Components	Marks
1.	I – Writing the Program (2x10)	20
2.	II – Test and Debug the Program (2x10)	20
3.	III- Printing the Correct Output (2x5)	10
4.	IV – Viva	5
5.	V - Record book	5
	Total	60

Department of Computer Applications				Class: II B.C.A				
Sem	Category	Course Code	Course Title	Credits	Hours/ Week	CIA	External Exam	Total
III	SEC - 4	23OUCASEC31	Understanding Internet	1	1	25	75	100

Nature of the Course		
Knowledge and Skill Oriented	Employability Oriented	Entrepreneurship Oriented
✓	✓	✓

Course Objectives

1. To Understand knowledge of Internet medium
2. To Learn Internet as a mass medium
3. To Study Features of Internet Technology,
4. To Understand Internet as source of infotainment
5. To Study of internet audiences and cyber crime

Course Content:

Unit-I Introduction to Internet: What is Internet? – Evolution and History of Internet – Growth of Internet – Owners of Internet – Internet Services – Anatomy of Internet. **Internet Technology and Protocol:** ISO/ OSI Reference Model – TCP/IP Protocol Suit – Data Transmission

Unit-II Internet Connectivity: Getting Connected – Different Types of Connections – Levels of Internet Connectivity – Internet Service Provider. **Internet Tools and Multimedia:** Current Trends on Internet – Interactivity Tools – Multimedia and Animation. **WWW and Web Browser:** WWW – Evolution of Web – Basic Elements of WWW – Web Browsers – Search Engines.

Unit- III Web Publishing: Web publishing – Standard Generalized Markup- Language (SGML) – Core OpenGL (CGL) – Web Design. **HTML:** HTML – An Introduction – HTML Categories – HTML Lists –HTML Tables _ HTML Links – HTML Forms – HTML Frames.

Unit- IV E- Mail: E-Mail Basics – E-Mail System – E-Mail Protocols – E-Mail Addresses - E-Mail Security. **Computer Networks:** Computer Networks – Network Components – Network Topologies – Types of Network Architecture – Networks.

Unit -V Remote Login: Introduction to Remote Login – Introduction to Telnet – File Transfer Protocol. **Internet and Web Security:** Overview of Internet Security – Aspects and Need of security – Firewall – Cryptography – Digital Signature.

Book for Study:

Internet Technology and Web Design, (2014), ISRD Group, McGraw Hill Education (India) Private Limited, 6th Edition.

Chapters:

Unit – I : 1, 2

Unit – II : 3, 4, 5

Unit – III : 6,7

Unit IV : 8, 9

Unit V : 10,12

Books for Reference:

1. Acharya, R N [1987] Television in India. Manas Publications, New Delhi.
2. Barnouw, E [1974] Documentary – A History of Nonfiction. Oxford, OUP
3. Luthra, H R [1986] Indian Broadcasting. Ministry of I & B, New Delhi.

Web Resources / E.Books:

1. <https://www.quora.com/What-are-some-good-books-to-cover-basic-concepts-of-computers-internet-networking-etc-for-beginners>
2. <ps://www.teachucomp.com/samples/html/5/manuals/Mastering-HTML5-CSS3.pdf>
3. <ps://www.w3schools.com/html/default.asp>

Pedagogy:

Chalk and Talk, PPT, Group discussion, Quiz.

Rationale for nature of Course:

Knowledge and Skill:

The Internet functions as an extremely large, well-organized network of smaller computer networks in every country across the world.

Activities to be given:

Students shall be understanding the Internet basis

Course learning Outcomes (CLO's):

CLO	Course learning Outcomes (CLO's)	Knowledge According to Bloom's Taxonomy (Up to K level)
CLO1	Knows the basic concept in internet Concept of mass medium and world wide web	K1 to K3
CLO2	Knows the concept of internet as a technology.	K1 to K3
CLO3	Understand the concept of infotainment and classification based on content and style	K1 to K4
CLO4	Can be able to know about Demographic and psychographic description of Internet	K1 to K4
CLO5	Understand the concept of cybercrime and future possibilities	K1 to K4

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3	2	1	2	2	2
CLO2	3	1	2	1	2	2
CLO3	1	1	2	2	2	2
CLO4	2	2	2	2	2	2
CLO5	1	2	1	2	2	2

1-Basic Level**2- Intermediate Level****3- Advanced Level**

LESSON PLAN: TOTAL HOURS (15 HRS)

UNIT	DESCRIPTION	HRS	MODE
I	The emergence of internet as a mass medium–the world of world wide web‘.	3	Chalk and Talk, PPT, group discussion, OHP presentations
II	Features of internet as a technology.	3	Chalk and Talk, PPT, group discussion,
III	Internet as a source of infotainment – classification based on content and style.	2	Chalk and Talk, PPT, group discussion
IV	Demographic and psychographic descriptions of internet _audiences‘ – effect of internet on the values and life-styles.	4	Chalk and Talk, PPT, group discussion, OHP presentations, quiz
V	Present issues such as cyber crime and future possibilities.	3	Seminar

Course Designer**Mrs. G. ALAMELU**

Department of Computer Applications				Class: II B.C.A				
Sem	Category	Course Code	Course Title	Credits	Hours/ Week	CIA	External Exam	Total
III	SEC- 5	23OUCASEC32	Biometrics	2	2	25	75	100

Nature of the Course		
Knowledge and Skill Oriented	Employability Oriented	Entrepreneurship Oriented
✓	✓	

Course Objectives

1. Identify the various biometric technologies.
2. Design of biometric recognition.
3. Develop simple applications for privacy
4. Understand the need of biometric in the society
5. Understand the scope of biometric techniques

Course Content:

Unit- I Introduction: What is Biometrics, History - Types of biometric Traits - General architecture of biometric systems - Basic working of biometric matching - Biometric system error and performance measures - Design of biometric system - Applications of biometrics, Biometrics versus traditional authentication methods. **Face Biometrics:** Introduction - Background of Face Recognition - Design of Face Recognition System - Neural Network for Face Recognition - Face Detection in Video Sequences - Challenges in Face Biometrics - Face Recognition Methods - Advantages and Disadvantages.

Unit-II Retina and Iris Biometrics: Introduction - Performance of Biometrics - Design of Retina Biometrics - Design of Iris Recognition System - Iris Segmentation Method , Determination of Iris Region - Determination of Iris Region - Applications of Iris Biometrics - Advantages and Disadvantages. **Vein and Fingerprint Biometrics:** Introduction - Biometrics Using Vein Pattern of Palm - Fingerprint Biometrics - Fingerprint Recognition System - Minutiae Extraction, Fingerprint Indexing - Experimental Results - Advantages and Disadvantages.

Unit- III Privacy Enhancement Using Biometrics: Introduction - Privacy Concerns Associated with Biometric Deployments - Identity and Privacy - Privacy Concerns - Biometrics with Privacy Enhancement - Comparison of Various Biometrics in Terms of Privacy - Soft Biometrics. **Multimodal Biometrics:** Introduction to Multimodal Biometrics,

- Basic Architecture of Multimodal Biometrics - Multimodal Biometrics Using Face and Ear - Characteristics and Advantages of Multimodal Biometrics.

Unit- IV Watermarking Techniques: Introduction - Data Hiding Methods - Basic Framework of Watermarking - Classification of Watermarking - Applications of Watermarking - Attacks on Watermarks - Performance Evaluation - Characteristics of Watermarks - General Watermarking Process - Image Watermarking Techniques - Watermarking Algorithm - Experimental Results - Effect of Attacks on Watermarking Techniques - Attacks on Spatial Domain Watermarking.

Unit -V Scope and Future: Scope and Future Market of Biometrics - Biometric Technologies - Applications of Biometrics - Biometrics and Information Technology Infrastructure - Role of Biometrics in Enterprise Security - Role of Biometrics in Border Security - Smart Card Technology and Biometrics - Radio Frequency Identification (RFID) Biometrics - DNA Biometrics - Comparative Study of Various Biometric Techniques. **Biometric Standards:** Introduction - Standard Development Organizations - Application Programming Interface (API) - Information Security and Biometric Standards - Biometric Template Interoperability.

Book for Study:

G.R Sinha and Sandeep B. Patil, (2013), “ *Biometrics: Concepts and Applications*”, Wiley, 1st Edition.

Books for Reference:

1. Ruud M. Bolle , Sharath Pankanti, Nalinik.Ratha, Andrew W.Senior, Jonathan H. Connell, (2009) ” *Guide to Biometrics*”, Springer, 1st Edition.
2. Anil k. Jain, Arun A. Ross, Karthik Nandakumar (2011), “*Introduction to Biometrics*” Springer, 1st Edition.
3. Dijana Petrovska-Delacrétaz (2010), “*Guide to Biometric Reference Systems and Performance Evaluation*”, Springer, 1st Edition.

Web Resources / E.Books:

1. <https://www.tutorialspoint.com/biometrics/index.htm>
2. <https://www.javatpoint.com/biometrics-tutorial>
3. <https://www.thalesgroup.com/en/markets/digital-identity-and-security/government/inspired/biometrics>

Pedagogy:

Chalk and Talk, PPT, Group discussion, Quiz.

Rationale for nature of Course:**Knowledge and Skill:**

Biometrics systems specialists must have excellent organizational, time-management, problem-solving, and communications skills

Activities to be given:

Students shall be allowed to prepare the project for the recording and the playing of audio and video.

Course learning Outcomes (CLO's):

CLO	Course learning Outcomes (CLO's)	Knowledge (According to Bloom's Taxonomy) (Up to K level)
CLO1	To understand the basic concepts and the functionality of the Biometrics, Face Biometrics, Types, Architecture and Applications.	K1 to K3
CLO2	To know the concepts Retina and Iris Biometrics and Vein and Fingerprint Biometrics.	K1 to K3
CLO3	To analyze the Privacy Enhancement and Multimodal Biometrics.	K1 to K4
CLO4	To get analytical idea on Watermarking Techniques	K1 to K4
CLO5	To Gain knowledge on Future scope of Biometrics, and Study of various Biometric Techniques.	K1 to K4

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	2	2	3	2	2	1
CLO2	2	3	3	2	2	2
CLO3	1	2	3	2	3	2
CLO4	3	3	2	2	3	2
CLO5	2	3	3	2	3	2

1-Basic Level**2- Intermediate Level****3- Advanced Level**

LESSON PLAN: TOTAL HOURS (30 HRS)

UNIT	DESCRIPTION	HRS	MODE
I	Introduction: What is Biometrics, History - Types of biometric Traits - General architecture of biometric systems - Basic working of biometric matching - Biometric system error and performance measures - Design of biometric system - Applications of biometrics, Biometrics versus traditional authentication methods. Face Biometrics: Introduction - Background of Face Recognition - Design of Face Recognition System - Neural Network for Face Recognition - Face Detection in Video Sequences - Challenges in Face Biometrics - Face Recognition Methods - Advantages and Disadvantages.	7	Chalk and Talk, PPT, group discussion, OHP presentations, quiz, on the spot test and Virtual Labs.
II	Retina and Iris Biometrics: Introduction - Performance of Biometrics - Design of Retina Biometrics - Design of Iris Recognition System - Iris Segmentation Method , Determination of Iris Region - Determination of Iris Region - Applications of Iris Biometrics - Advantages and Disadvantages. Vein and Fingerprint Biometrics: Introduction - Biometrics Using Vein Pattern of Palm - Fingerprint Biometrics - Fingerprint Recognition System - Minutiae Extraction, Fingerprint Indexing -	6	Chalk and Talk, PPT

	Experimental Results - Advantages and Disadvantages.		
III	Privacy Enhancement Using Biometrics: Introduction - Privacy Concerns Associated with Biometric Deployments - Identity and Privacy - Privacy Concerns - Biometrics with Privacy Enhancement - Comparison of Various Biometrics in Terms of Privacy - Soft Biometrics. Multimodal Biometrics: Introduction to Multimodal Biometrics, - Basic Architecture of Multimodal Biometrics - Multimodal Biometrics Using Face and Ear - Characteristics and Advantages of Multimodal Biometrics.	7	Chalk and Talk, PPT, group discussion
IV	Watermarking Techniques: Introduction - Data Hiding Methods - Basic Framework of Watermarking - Classification of Watermarking - Applications of Watermarking - Attacks on Watermarks - Performance Evaluation - Characteristics of Watermarks - General Watermarking Process - Image Watermarking Techniques - Watermarking Algorithm - Experimental Results - Effect of Attacks on Watermarking Techniques - Attacks on Spatial Domain Watermarking.	5	Chalk and Talk, PPT, group discussion, presentations, Virtual Labs

V	<p>Scope and Future: Scope and Future Market of Biometrics - Biometric Technologies - Applications of Biometrics - Biometrics and Information Technology Infrastructure - Role of Biometrics in Enterprise Security - Role of Biometrics in Border Security - Smart Card Technology and Biometrics - Radio Frequency Identification (RFID) Biometrics - DNA Biometrics - Comparative Study of Various Biometric Techniques. Biometric Standards: Introduction - Standard Development Organizations - Application Programming Interface (API) - Information Security and Biometric Standards - Biometric Template Interoperability.</p>	5	Seminar
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Course Designer

Mrs. G. ALAMELU

Department of Computer Applications				Class: II B.C.A				
Sem	Category	Course Code	Course Title	Credits	Hours/ Week	CIA	External Exam	Total
IV	Core	23OUCA41	Programming in Java	5	5	25	75	100

Nature of the Course		
Knowledge and Skill Oriented	Employability Oriented	Entrepreneurship Oriented
✓	✓	✓

Course Objectives

1. To provide fundamental knowledge of object-oriented programming
2. To equip the student with programming knowledge in Core Java from the basics up.
3. To enable the students to use AWT controls, Event Handling and Swing for GUI.
4. To provide fundamental knowledge of object-oriented programming.
5. To equip the student with programming knowledge in Core Java from the basics up.

Course Content:

Unit-I The History: Java buzz words –The Evolution of Java. **An Overview of Java:** Object-Oriented Programming. **Datatypes, Variables and Array:** The primitive Types – Integers – Floating - Variables. – Arrays. **Operators:** Arithmetic Operators- The Bitwise Operators – Relational Operators – Boolean Logical Operators. **Control statements:** Java Selection Statements – iteration Statements – Jump Statements.

Unit-II Inheritance: Inheritance Basics - Member access rules – Using Super - Method Overloading – Dynamic method dispatch - Applying Method overriding – Using Abstract classes –Using final with Inheritance. **Packages:** Packages -Access Protection– Importing Packages - Interfaces- Defining an interface –Implementing Interfaces – Interface Can Be Extended. **Exception Handling:** Exception- Handling Fundamentals- Using try and catch - throw - throws – finally – Java Built-in exceptions - Creating Your own Exception Subclasses.

Unit- III Multithreaded Programming: Java Thread Model – Synchronization–Using synchronized methods– Using synchronized statement- Interthread Communication – Deadlock. **I/O Basics Streams:** I/O Basics - Reading console Input and Writing Console output. Reading and Write Files - Automatically Closing a File.

Unit- IV Event Handling: Events - Event sources - Event Listeners - Event Delegation Model (EDM) - Handling Mouse and Keyboard Events - Adapter classes - Inner classes . **AWT**

Controls: The AWT Controls Fundamentals- Labels – Using Buttons -Applying Check Boxes - Check Box Group - Choice Controls- Using List –Managing Scroll Bars - Managing Scroll Bar. Understanding Layout managers

Unit -V Swing: Introduction to Swing. Components and Containers - Top level containers –

Exploring Swing: JFrame - JWindow - JDialog - JPanel - JButton - JToggleButton - JCheckBox - JRadioButton - JLabel, JTextField - JTextArea - JList - JComboBox - JScrollPane.

Book for Study:

Herbert Schildt, (2010), Java : The Complete Reference, Tata McGraw Hill, New Delhi, 7th Edition

Chapters:

Unit – I : 1, 2, 3, 4,5

Unit – II : 8,9,10

Unit – III : 11,13

Unit IV : 24,26

Unit-V : 31,32

Books for References:

1. Hari Mohan Pandey (2012) ,*Java Programming* , 1st Edition.
2. Ken Arnold , David Holmes (2008) , *The Java Programming Language* , 3rd Edition ,Pearson Education.
3. Danny Goodman (2005), *Java Script Bible*, 4th Edition ,WILEY -Dreamtech India Pvt.ltd India.

Web Resources/ E.Books:

1. https://www.tutorialspoint.com/java/java_tutorial.pdf
2. <https://www.javatpoint.com/java-basics>
3. <https://www.coursehero.com/file/58621561/java-book-pdf-by-balaguruswamypdf/>

Pedagogy:

Chalk and Talk, PPT, group discussion, quiz, ICT tools and Peer Teaching.

Rationale for nature of Course:

Knowledge and Skill: To make students aware of the role of Programming skill in Java and improve their program writing in Java Programming

Activities to be given: Students shall be allow to write program in many concepts

Course learning Outcomes (CLO's):

CLO	Course learning Outcomes (CLO's)	Knowledge According to Bloom's Taxonomy (Up to K level)
CLO1	.Implement the basic constructs of Core Java.	K1 to K3
CLO2	Implement inheritance, packages, interfaces and exception handling of Core Java.	K1 to K3
CLO3	Implement multi-threading and I/O Streams of Core Java	K1 to K3
CLO4	Implement AWT and Event handling.	K1 to K4
CLO5	Use Swing to create GUI.	K1 to K4

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3	2	1	2	2	2
CLO2	3	1	2	1	2	2
CLO3	1	1	2	2	2	2
CLO4	2	2	2	2	2	2
CLO5	1	2	1	2	2	2

1-Basic Level**2- Intermediate Level****3- Advanced Level**

LESSON PLAN: TOTAL HOURS (75 HRS)

UNIT	DESCRIPTION	HRS	MODE
I	Introduction: Review of Object Oriented concepts – History of Java – Java buzz words – JVM architecture – Datatypes - Variables - Scope and life time of variables- arrays - operators – control statements - type conversion and casting - simple java program - constructors - methods - Static block - Static Data – Static Method String and String Buffer Classes.	15	Chalk and Talk, PPT, group discussion, OHP presentations, quiz, on the spot test and Virtual Labs.
II	Inheritance: Basic concepts - Types of inheritance - Member access rules - Usage of this and Super key word- Method Overloading - Method overriding - Abstract classes - Dynamic method dispatch - Usage of final keyword. Packages: Definition-Access Protection–Importing Packages. Interfaces: Definition–Implementation–Extending Interfaces. Exception Handling: try – catch - throw - throws – finally – Built-in exceptions - Creating own Exception classes.	15	Chalk and Talk, PPT, group discussion, OHP presentations, quiz, on the spot test and Virtual Labs.
III	Multithreaded Programming: Thread Class - Runnable interface – Synchronization–Using synchronized methods– Using synchronized statement- Inter thread Communication –Deadlock. I/O Streams: Concepts of streams - Stream classes- Byte and Character stream -	15	Chalk and Talk, PPT, group discussion, OHP presentations, quiz, on the spot test and Virtual Labs

	Reading console Input and Writing Console output - File Handling.		
IV	AWT Controls: The AWT class hierarchy - user interface components- Labels - Button - Text Components - Check Box - Check Box Group - Choice - List Box - Panels – Scroll Pane - Menu - Scroll Bar. Working with Frame class - Colour - Fonts and layout managers.Event Handling: Events - Event sources - Event Listeners - Event Delegation Model (EDM) - Handling Mouse and Keyboard Events - Adapter classes - Inner classes	16	Chalk and Talk, PPT, group discussion, OHP presentations, quiz, on the spot test and Virtual Labs
V	Swing: Introduction to Swing - Hierarchy of swing components. Containers - Top level containers - JFrame - JWindow - JDialog - JPanel - JButton - JToggleButton -JCheckBox - JRadioButton - JLabel,JTextField - JTextArea - JList - JComboBox - JScrollPane.	14	Chalk and Talk, PPT, group discussion, OHP presentations, quiz, on the spot test and Virtual Labs

COURSE DESIGNER

Mrs.K. KRISHNAVENI

Department of Computer Applications				Class : II B.C.A				
Sem	Category	Course Code	Course Title	Credits	Hours/ Week	CIA	External Exam	Total
IV	Core	23OUCA4P	Programming in Java Lab	5	4	40	60	100

Nature of the Course		
Knowledge and Skill Oriented	Employability Oriented	Entrepreneurship oriented
✓	✓	✓

PROGRAM LIST

1. Write a Java program that prompts the user for an integer and then prints out all the prime numbers up to that Integer
2. Write a Java program to multiply two given matrices.
3. Write a Java program that displays the number of characters, lines and words in a text
4. Generate random numbers between two given limits using Random class and print messages according to the range of the value generated.
5. Write a program to do String Manipulation using Character Array and perform the following string operations:
 - a. String length
 - b. Finding a character at a particular position
 - c. Concatenating two strings
6. Write a program to perform the following string operations using String class:
 - a. String Concatenation
 - b. Search a substring
 - c. To extract substring from given string
7. Write a program to perform string operations using String Buffer class:
 - a. Length of a string
 - b. Reverse a string
 - c. Delete a substring from the given string
8. Write a java program that implements a multi-thread application that has three threads. First thread generates random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of cube of the number.
9. Write a threading program which uses the same method asynchronously to print the

numbers 1to10 using Thread1 and to print 90 to100 using Thread

10. Write a program to demonstrate the use of following exceptions.
 - a. Arithmetic Exception
 - b. Number Format Exception
 - c. ArrayIndexOutOfBoundsException
 - d. NegativeArraySizeException
11. Write a Java program that reads on file name from the user, then displays information about whether the file exists, whether the file is readable, whether the file is writable, the type of file and the length of the file in bytes
12. Write a program to accept a text and change its size and font. Include bold italic options. Use frames and controls.
13. Write a Java program that handles all mouse events and shows the event name at the center of the window when a mouse event is fired. (Use adapter classes).
14. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -, *, % operations. Add a text field to display the result. Handle any possible exceptions like divide by zero.
15. Write a Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with —stop|| or —ready|| or —go|| should appear above the buttons in a selected color. Initially there is no message shown.

Books for Reference:

1. Hari Mohan Pandey (2012) ,*Java Programming* , 1st Edition.
2. Ken Arnold , David Holmes (2008) , *The Java Programming Language* , 3rd Edition ,Pearson Education.
3. Danny Goodman (2005), *Java Script Bible*, 4thEdition ,WILEY -Dreamtech India Pvt.ltd India.

Web Resources/ E.Books:

1. <https://www.cs.cmu.edu/afs/cs.cmu.edu/user/gchen/www/download/java/LearnJava.pdf>
2. <https://freecomputerbooks.com/top-java-books.html>
3. https://www.rcsdk12.org/cms/lib/NY01001156/Centricity/Domain/4951/Head_First_Java_Second_Edition.pdf

Pedagogy

Practical Test with viva voce, Group Discussion, Interaction, Quiz.

LESSON PLAN FOR PRATICAL: TOTAL HOURS (60 HRS)

CYCLE	DESCRIPTION	HRS	MODE
1	<p>1. Write a Java program that prompts the user for an integer and then prints out all the prime numbers up to that Integer</p> <p>2. Write a Java program to multiply two given matrices.</p> <p>3. Write a Java program that displays the number of characters, lines and words in a text</p>	15	Writing and executing the program in a system
2	<p>4. Generate random numbers between two given limits using Random class and print messages according to the range of the value generated.</p> <p>5. Write a program to do String Manipulation using CharacterArray and perform the following string operations:</p> <p>a. String length</p> <p>b. Finding a character at a particular position</p> <p>c. Concatenating two strings</p> <p>6. Write a program to perform the following string operations using String class:</p> <p>a. String Concatenation</p> <p>b. Search a substring</p> <p>c. To extract substring from given string</p>	13	Writing and executing the program in a system
3	<p>7. Write a program to perform string operations using String Buffer class:</p> <p>a. Length of a string</p> <p>b. Reverse a string</p> <p>c. Delete a substring from the given string</p> <p>8. Write a java program that implements a multi-thread application that has three threads. First thread generates random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of cube of the number.</p>	11	Writing and executing the program in a system

	9. Write a threading program which uses the same method asynchronously to print the numbers 1to10 using Thread1 and to print 90 to100 using Thread		
4	<p>10. Write a program to demonstrate the use of following exceptions.</p> <p>a. Arithmetic Exception</p> <p>b. Number Format Exception</p> <p>c. ArrayIndexOutOfBoundsException</p> <p>d. NegativeArraySizeException</p> <p>11. Write a Java program that reads on file name from the user, then displays information about whether the file exists, whether the file is readable, whether the file is writable, the type of file and the length of the file in bytes</p> <p>12. Write a program to accept a text and change its size and font. Include bold italic options. Use frames and controls</p>	11	Writing and executing the program in a system
5	<p>13. Write a Java program that handles all mouse events and shows the event name at the center of the window when a mouse event is fired. (Use adapter classes).</p> <p>14. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -, *, % operations. Add a text field to display the result. Handle any possible exceptions like divide by zero.</p> <p>15. Write a Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with —stop or —ready or—go should appear above the buttons in a selected color. Initially there is no message shown.</p>	10	Writing and executing the program in a system

COURSE DESIGNER

Mrs. K. KRISHNAVENI

EVALUATION (PRACTICAL)**Core Lab / Skill Enhancement Course Lab****Internal** (Formative) : 40 marks**External** (Summative) : 60 marks

Total : 100 marks

Question Paper Pattern for Internal Practical Examination: 40 Marks

- ✓ There will be Two Internal Practical Examination.
- ✓ Duration of Internal Examination will be 2 hours.

S.No	Components	Marks
1.	I – Writing the Program (2x8)	16
2.	II – Test and Debug the Program (2x4)	08
3.	III - Printing the Correct Output (2x4)	08
4.	IV- Viva	03
5.	V –Record book	05
	Total	40

Question Paper Pattern for External Practical Examination: 60 Marks

- ✓ Duration of External Examination will be 3 hours.

S.No	Components	Marks
1.	I – Writing the Program (2x10)	20
2.	II – Test and Debug the Program (2x10)	20
3.	III- Printing the Correct Output (2x5)	10
4.	IV – Viva	5
5.	V - Record book	5
	Total	60

Department of Computer Applications				Class: II B.C.A				
Sem	Category	Course Code	Course Title	Credits	Hours/ Week	CIA	External Exam	Total
IV	SEC - 6	23OUCASEC41	PHP Programming	2	2	25	75	100

Nature of the Course		
Knowledge and Skill Oriented	Employability Oriented	Entrepreneurship Oriented
✓	✓	✓

Course Objectives

1. To provide the necessary knowledge on basics of PHP.
2. To learn PHP Control Structures and Functions.
3. To learn PHP Number Handling.
4. To learn the MYSQL Database Integration using PHP.
5. To get a knowledge on Integrating Web Forms and Database with PHP.

Course Content:

Unit-I Introduction to PHP : Why PHP and MYSQL? – What Is PHP? – What Is MySQL? – **Server- Side Scripting Overview:** Static HTML – Client – Side Technologies – Server- Side Scripting. **Learning PHP Syntax and Variables :** Php Syntax Is C-Like - Variables

Unit-II Learning PHP Control Structures and Functions: Boolean Expressions – Branching – Looping – Function and Variables Scope. **Learning PHP String Handling:** Strings in PHP – String Functions

Unit- III Learning Arrays: The uses of arrays – what are PHP arrays? – Creating arrays – Retrieving Values – Deleting from Arrays. **Learning PHP Number Handling:** Numerical Types – Mathematical operators – Simple Mathematical Functions.

Unit- IV MYSQL Database Integration: Introducing Databases and MYSQL : What IS a Database? – Why a Database? – PHP Supported Databases. **Learning Structured query Language (SQL):** Relational Databases and SQL – SQL standards – The Workhorses of SQL – Database Design. **Learning Database administration and Design:** Basic MYSQL Client Commands – MySQL User Administration.

Unit -V performing Database Queries: HTML Tables and Database Tables – Complex Mappings. **Integrating Web Forms and Database:** HTML Forms – Basic Form Submission to a database – Self – Submission

Book for Study:

Steve Surchring Tim Converse Joyce Park, (2014.),” *PHP6 and MYSQL* “, Wiley Edition .

Chapters:

Unit – I	: 1,2,4
Unit – II	: 5,7
Unit – III	: 8,9
Unit- IV	: 11,13,14
Unit- V	: 16,17

Books for Reference:

1. Dr. Vaka Murali Mohan,S.Pratap Singh (2013),”*The Modern Approach to Web Technologies*” , Scirech Publication ,1st Edition ,.
2. Akilandeswari.J & Gopalan.NP (2014), *TCP/IP to Internet Application Architecture, PHI Publications*, New Delhi,2nd Edition,.
3. Ivan Bayross,(2012) *Web Technologies part II*, BPB publications, New Delhi, 2nd Edition.

Web Resources / E. Books:

1. <https://dpbck.ac.in/wp-content/uploads/2022/05/Programing-PHP-PDFDrive-.pdf>
2. <https://www.geeksforgeeks.org/php-introduction/>
3. <https://www.javatpoint.com/php-tutorial>

Pedagogy:

Chalk and Talk, PPT, Group discussion, Quiz.

Rationale for nature of Course:

Knowledge and Skill:

To make students allows abilities to create a web developer specializing in using PHP to write code for server-side applications.

Activities to be given:

Students shall be allowed to Creating variables and Modifying data types.

Course learning Outcomes (CLO's):

CLO	Course learning Outcomes (CLO's)	Knowledge According to Bloom's Taxonomy (Up to K level)
CLO1	Write necessary knowledge on basics of PHP.	K1 to K3
CLO2	To PHP Control Structures and Functions	K1 to K3
CLO3	Create learning PHP Number Handling	K1 to K4
CLO4	Create PHP Program using Structured query Language (SQL)	K1 to K4
CLO5	To performing Database Queries in PHP	K1 to K4

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3	3	1	1	1	1
CLO2	2	-	1	1	2	1
CLO3	3	3	1	1	2	1
CLO4	1	3	2	1	2	1
CLO5	3	2	1	1	2	1

1-Basic Level**2- Intermediate Level****3- Advanced Level**

LESSON PLAN: TOTAL HOURS (30 HRS)

UNIT	DESCRIPTION	HRS	MODE
I	Introduction to PHP : Why PHP and MYSQL? – What Is PHP? – What Is MySQL? –Server- Side Scripting Overview: Static HTML – Client – Side Technologies – Server- Side Scripting. Learning PHP Syntax and Variables : Php Syntax Is C-Like - Variables	5	Chalk and Talk, PPT, group discussion, OHP presentations, quiz, on the spot test and Virtual Labs.
II	Learning PHP Control Structures and Functions: Boolean Expressions – Branching – Looping – Function and Variables Scope. Learning PHP String Handling: Strings in PHP – String Functions	6	Chalk and Talk, PPT, group discussion, OHP presentations, quiz, on the spot test and Virtual Labs.
III	Learning Arrays: The uses of arrays – what are PHP arrays? – Creating arrays – Retrieving Values – Deleting from Arrays. Learning PHP Number Handling: Numerical Types – Mathematical operators –Simple Mathematical Functions.	5	Chalk and Talk, PPT, group discussion, OHP presentations, quiz, on the spot test and Virtual Labs
IV	MYSQL Database Integration: Introducing Databases and MYSQL : What IS a Database? – Why a Database? – PHP Supported Databases. Learning Structured query Language (SQL): Relational Databases and SQL – SQL standards – The Workhorses of SQL – Database Design. Learning Database	7	Chalk and Talk, PPT, group discussion, OHP presentations, quiz, on the spot test

	administration and Design: Basic MYSQL Client Commands – MySQL User Administration.		
V	Performing Database Queries: HTML Tables and Database Tables – Complex Mappings. Integrating Web Forms and Database: HTML Forms – Basic Form Submission to a database – Self – Submission	7	Chalk and Talk, PPT, group discussion, OHP presentations, quiz, on the spot test and Virtual Labs

COURSE DESIGNER

Mrs. G. ALAMELU

Department of Computer Applications				Class: II B.C.A				
Sem	Category	Course Code	Course Title	Credits	Hours/ Week	CIA	External Exam	Total
IV	SEC-7	23OUCASEC42	Advanced Excel	2	2	25	75	100

Nature of the Course		
Knowledge and Skill Oriented	Employability Oriented	Entrepreneurship Oriented
✓	✓	

Course Objectives

1. Handle large amounts of data
2. Aggregate numeric data and summarize into categories and subcategories.
3. Filtering, sorting, and grouping data or subsets of data.
4. Create pivot tables to consolidate data from multiple files
5. Presenting data in the form of charts and graphs

Course Content:

Unit-I Basics of Excel- Customizing common options- Absolute and relative cells- Protecting and un-protecting worksheets and cells- Working with Functions - Writing conditional expressions - logical functions - lookup and reference functions- VlookUP with Exact Match, Approximate Match- Nested VlookUP with Exact Match- VlookUP with Tables, Dynamic Ranges- Nested VlookUP with Exact Match- Using VLookUP to consolidate Data from Multiple Sheets

Unit-II Data Validations - Specifying a valid range of values - Specifying a list of valid values- Specifying custom validations based on formula - Working with Templates Designing the structure of a template- templates for standardization of worksheets - Sorting and Filtering Data - Sorting tables- multiple-level sorting- custom sorting- Filtering data for selected view - advanced filter options- Working with Reports Creating subtotals- Multiple-levelsubtotal.

Unit- III Creating Pivot tables Formatting and customizing Pivot tables- advanced options of Pivot tables-Pivot charts- Consolidating data from multiple sheets and files using Pivot tables- external data sources- data consolidation feature to consolidate data- Show Value As % of Row, % of Column, Running Total, Compare with Specific Field-Viewing Subtotal under Pivot- Creating Slicers.

Unit- IV More Functions Date and time functions- Text functions- Database functions- Power Functions - Formatting Using auto formatting option for worksheets- Using conditional formatting option for rows, columns and cells- What If Analysis - Goal Seek- Data Tables- Scenario Manager

Unit -V Charts - Formatting Charts- 3D Graphs- Bar and Line Chart together- Secondary Axis in Graphs- Sharing Charts with PowerPoint / MS Word, Dynamically- New Features Of Excel Spark lines, Inline Charts, data Charts- Overview of all the new features.

Books for Study:

1. Excel 2019 All
2. Microsoft Excel 2019 Pivot Table Data Crunching

Books for Reference:

1. John Michaloudis , Bryan Hong (2022),” 101 Best Excel Tips & Tricks”, MyExcel online,1st Edition.
2. Alan Murray, (2022), Advanced Excel Formulas: Unleashing Brilliance with Excel Formulas, Apress,1st Edition,.
3. Lokesh Lalwani, (2019), Excel 2019 All-In-One: Master the new features of Excel 2019 / Office 365BPB publications, New Delhi, 1st Edition.

Web Resources / E. Books:

1. <https://sunsreynat.files.wordpress.com/2014/06/excel-2010-advanced.pdf>
2. https://www.tutorialspoint.com/advanced_excel/advanced_excel_tutorial.pdf
3. <http://www.advancedexcelbook.com/>

Pedagogy:

Chalk and Talk, PPT, Group discussion, Quiz.

Rationale for nature of Course:

Knowledge and Skill:

To make students allows to use spreadsheets, graphing, tables, calculations, and automation efficiently to process large quantities of data relevant to business tasks.

Activities to be given:

Students shall be allowed to working with PivotTables, using INDEX MATCH functions

Course learning Outcomes (CLO's):

CLO	Course learning Outcomes (CLO's)	Knowledge According to Bloom's Taxonomy (Up to K level)
CLO1	Work with big data tools and its analysis techniques.	K1 to K3
CLO2	Analyze data by utilizing clustering and classification algorithms.	K1 to K3
CLO3	Learn and apply different mining algorithms and recommendation systems for large volumes of data.	K1 to K4
CLO4	Perform analytics on data streams.	K1 to K4
CLO5	Learn No-SQL databases and management	K1 to K4

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3	3	1	1	1	1
CLO2	2	-	1	1	2	1
CLO3	3	3	1	1	2	1
CLO4	1	3	2	1	2	1
CLO5	3	2	1	1	2	1

1-Basic Level**2- Intermediate Level****3- Advanced Level**

LESSON PLAN: TOTAL HOURS (30 HRS)

UNIT	DESCRIPTION	HRS	MODE
I	Basics of Excel- Customizing common options- Absolute and relative cells- Protecting and un-protecting worksheets and cells- Working with Functions - Writing conditional expressions - logical functions - lookup and reference functions- VlookUP with Exact Match, Approximate Match- Nested VlookUP with Exact Match- VlookUP with Tables, Dynamic Ranges- Nested VlookUP with Exact Match- Using VLookUP to consolidate Data from Multiple Sheets	5	Chalk and Talk, PPT, group discussion, OHP presentations, quiz, on the spot test and Virtual Labs.
II	Data Validations - Specifying a valid range of values - Specifying a list of valid values- Specifying custom validations based on formula - Working with Templates Designing the structure of a template- templates for standardization of worksheets - Sorting and Filtering Data - Sorting tables- multiple-level sorting- custom sorting- Filtering data for selected view - advanced filter options- Working with Reports Creating subtotals- Multiple-level subtotal	6	Chalk and Talk, PPT, group discussion, OHP presentations, quiz, on the spot test and Virtual Labs.
III	Creating Pivot tables Formatting and customizing Pivot tables- advanced options of Pivot tables- Pivot charts- Consolidating data from multiple sheets and files using Pivot tables- external data sources- data consolidation	5	Chalk and Talk, PPT, group discussion, OHP presentations, quiz, on the spot test and Virtual Labs

	feature to consolidate data- Show Value As % of Row, % of Column, Running Total, Compare with Specific Field- Viewing Subtotal under Pivot- Creating Slicers.		
IV	More Functions Date and time functions- Text functions- Database functions- Power Functions - Formatting Using auto formatting option for worksheets- Using conditional formatting option for rows, columns and cells- What If Analysis - Goal Seek- Data Tables- Scenario Manager	7	Chalk and Talk, PPT, group discussion, OHP presentations, quiz, on the spot test
V	Charts - Formatting Charts- 3D Graphs- Bar and Line Chart together- Secondary Axis in Graphs- Sharing Charts with PowerPoint / MS Word, Dynamically- New Features Of Excel Spark lines, Inline Charts, data Charts- Overview of all the new features.	7	Chalk and Talk, PPT, group discussion, OHP presentations, quiz, on the spot test and Virtual Labs

Course Designer

Mrs. G. ALAMELU