

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



TANSCHC-CBCS with OBE

MASTER OF COMPUTER APPLICATIONS

PROGRAMME CODE - MC

COURSE STRUCTURE

(w.e.f. 2023 – 2024 Batch onwards)



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CRITERION - I

1.2.2 Details of Programmes offered through Choice Based Credit System (CBCS) / Elective Course System

**Syllabus copies with highlights of contents focusing on
Elective Course System**



To be Noted:

HIGHLIGHTED	COURSE
<div></div>	Elective

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

To achieve excellence in Information Technology Enabled Services through Teaching, research, Extension and Consultancy.

MISSION

- To offer accredited post graduate and research programmes with the state-of-art technology throughout the Nation.
- To maintain high academic standards and teaching quality
- To be a centre of excellence for research and innovation in frontier areas of Computer Applications and technology relevant to the country.

Programme Educational Objectives (PEOs) : M.C.A

PEO	On Completion of the Programme , the student will be able to
PEO1	Utilizing strong technical aptitude and domain knowledge to develop smart softwaresolutions for the upliftment of society.
PEO2	To equip the students to meet the requirement of Corporate world and Industry standard.
PEO3	Showing continuous improvement in their professional career through life-long learning,appreciating human values and ethics.
PEO4	To engage in professional development and to pursue post graduate education in the fieldsof Information Technology and Computer Applications.
PEO5	To provide the students about computing principles and business practices in softwaresolutions, outsourcing services, public and private sectors

Programme Outcomes (POs) with Graduate Attributes

PO	Graduate Attributes	On Completion of the Programme , the students will be able to
PO1	Problem Solving Skill	Apply knowledge of Management theories and Human Resource practices to solve business problems through research in Global context.
PO2	Decision Making Skill	Foster analytical and critical thinking abilities for data-based decision-making.
PO3	Ethical Value	Ability to incorporate quality, ethical and legal value-based perspectives to all organizational activities
PO4	Communication Skill	Ability to develop communication, managerial and interpersonal skills
PO5	Employability Skill	Inculcate contemporary business practices to enhance employability skills in the competitive environment
PO6	Individual and Team Leadership Skill	Capability to lead themselves and the team to achieve organizational goals.

Programme Specific Outcomes (PSOs) with Graduate Attributes

PSO	Graduate Attributes	On Completion of the Programme, the student will be able to
PSO 1	Placement	To prepare the students who will demonstrate respectful engagement with others'' ideas, behaviors, beliefs and apply diverse frames of reference to decisions and actions
PSO 2	Entrepreneur	To create effective entrepreneurs by enhancing their critical thinking, problem solving, decision making and leadership skill that will facilitate startups and high potential organizations.
PSO 3	Research and Development	Design and implement HR systems and practices grounded in research that comply with employment laws, leading the organization towards growth and development..
PSO 4	Contribution to Business World	To produce employable, ethical and innovative professionals to sustain in the dynamic business world.
PSO 5	Contribution to the Society	To contribute to the development of the society by collaborating with stakeholders for mutual benefit

Eligibility for Admission

Qualifying Exam : Candidates should have Bachelor's Degree of three-year duration from any recognized college.

Eligibility : Candidates must have Mathematics at 10+2 or graduation level.

Duration of the Course

The students shall undergo prescribed course of study for the period of two academic years under **CBCS** semester pattern with **Outcome Based Education**.

Medium of Instruction : English

System : **TANSCH**E - Choice Based Credit System with **Outcome Based Education**.

Nature of the Course

Courses are classified according to the following nature

1. Knowledge & Skill
2. Employability Oriented
3. Entrepreneurship Oriented

Outcome Based Education (OBE) & Assessment

Students understanding must be built on and assessed for wide range of learning activities, which includes different approaches and are classified along several bases, such as

1. Based on purpose:

- Continuous Internal Assessment - **CIA** (Internal tests, Assignment, Seminar, Quiz, Documentation, ICT based Assignment, Mini Projects administered during the learning process)
- Summative (Evaluation of students learning at the end of instructional unit)

2. Based on Domain knowledge: (Post Graduate Up to K5 Levels)

- Assessment through K1, K2, K3, K4 & K5

Evaluation (Theory)

Continuous Internal Assessment Test (CIA) : 25 Marks

Summative Examination : 75 Marks

Total : 100 Marks

CIA - Continuous Internal Assessment: 25 Marks

Components	Marks
Test (Average of two tests) (I and II Assessments 60 Marks each and 120 Marks is converted into 12 Marks)	12
Application-Oriented / Innovation / Creativity Assignment	3
Assignment	5
Seminar	5
Total	25

- ✓ 2 Centralized system of Internal Assessment Tests
- ✓ There will be two Internal Assessment tests
- ✓ Duration of I and II Assessment Tests will be 2 hours 30 Minutes
- ✓ Students shall write retest on the genuine grounds if they are absent in either Test I or Test II with the approval of Head of the Department

Question Paper Pattern for Continuous Internal Assessment Test I and Test II

Section	Marks
A – Multiple Choice Questions (8 x 1 Mark)	8
B – Short Answer (6 x 2 Marks)	12
C – Either Or type (4/8 x 5 Marks)	20
D – Open Choice type (2/4 x 10 Marks)	20
Total	60

Conducted for 120 Marks and converted into 12 Marks

Question Paper Pattern for Summative Examination:

Section	Marks
A - Multiple Choice Questions type (10 x 1 Mark)	10
B - Short Answer Questions without choice (5 x 2 Marks)	10
C - Either Or type (5/10 x 5 Marks)	25
D - Open Choice type (3 out of 5 x 10 Marks)	30
Total	75

Evaluation (Practical)

Internal	:	40 Marks
External (Summative)	:	60 Marks
Total	:	100 Marks

Question Paper Pattern for Internal Practical Examination : 40 Marks and
External Practical Examination : 60 Marks

Internal	
Components	Marks
Major Question	20
Minor Question	10
Record Work	5
Program Explanation / VIVA	5
Total	40

External	
Components	Marks
Major Question	30
Minor Question	20
Record Work	5
Program Explanation / VIVA	5
Total	60

- In respect of Summative Examinations passing minimum is **45%** for Post Graduate. and in total, aggregate of **50%**.
- Latest amendments and revisions as per **UGC** and **TANSCH** norms are taken into Consideration in Curriculum Preparation.

Distribution of Marks in % with K levels CIA I, II & External Assessment

Blooms Taxonomy	Internal Assessment		External Assessment
	I	II	
Knowledge(K1)	8 %	8 %	5%
Understanding(K2)	8 %	8 %	14%
Apply(K3)	24 %	24 %	27%
Analyze(K4)	30 %	30 %	27%
Evaluate(K5)	30%	30%	27%

BLUE PRINT FOR INTERNAL ASSESSMENT – I

Articulation Mapping - K Levels with Course Learning Outcomes (CLOs)

Sl. No	CLOs	K- Level	Section A		Section B		Section C	Section D	Total
			MCQs (No Choice)		Short Answers (No Choice)		(Either or Type)	(Open Choice)	
			No. of Questions	K- Level	No. of Questions	K- Level			
1	CLO 1	Up to K5	1 2	K1 K2	1 1	K1 K3	2(K3) 2(K5)	1(K4)	
2	CLO 2	Up to K5	2 1	K1 K2	1 1	K1 K2	2(K3)	1(K4) 1(K5)	
3.	CLO3	Up to K5	1 1	K1 K2	1 1	K2 K3	2(K4) (Each set of questions must be in the same level)	1(K5)	
No. of Questions to be asked			8		6		8	4	26
No. of Questions to be answered			8		6		4	2	20
Marks for each question			1		2		5	10	
Total Marks for each section			8		12		40	40	100

BLUE PRINT FOR INTERNAL ASSESSMENT – II
Articulation Mapping - K Levels with Course Learning Outcomes (CLOs)

Sl. No	CLOs	K- Level	Section A		Section B		Section C	Section D	Total
			MCQs (No Choice)		Short Answers (No Choice)		(Either or Type)	(Open Choice)	
			No. of Questions	K- Level	No. of Questions	K- Level			
1.	CLO3	Up to K5	1 2	K1 K2	1 1	K1 K3	2(K3) 2(K5)	1(K4)	
2.	CLO4	Up to K5	2 1	K1 K2	1 1	K1 K2	2(K3)	1(K4) 1(K5)	
3	CLO5	Up to K5	1 1	K1 K2	1 1	K2 K3	2(K4) (Each set of questions must be in the same level)	1(K5)	
No. of Questions to be asked			8		6		8	4	26
No. of Questions to be answered			8		6		4	2	20
Marks for each question			1		2		5	10	
Total Marks for each section			8		12		40	40	100

Distribution of Marks with choice K Levels CIA I and CIA II

CIA	K Levels	Section- A MCQ (No choice)	Section -B Short Answer (No choice)	Section- C (Either or Type)	Section-D (Open Choice)	Total Marks	% of Marks
I	K1	4	4	-	-	8	8
	K2	4	4	-	-	8	8
	K3	-	4	20	-	24	24
	K4	-	-	10	20	30	30
	K5	-	-	10	20	30	30
	Marks	8	12	40	40	100	100
II	K1	4	4	-	-	8	8
	K2	4	4	-	-	8	8
	K3	-	4	20	-	24	24
	K4	-	-	10	20	30	30
	K5	-	-	10	20	30	30
	Marks	8	12	40	40	100	100

**Articulation Mapping - K Levels with Course Learning Outcomes
(CLOs) for Internal Assessment (SEC)**

Sl. No	CLOs	K- Level	Section A		Section B		Section C	Section D	Total
			MCQs (No choice)		Short Answers (No choice)		(Either/or Type)	(Open choice)	
			No. of Questions	K- Level	No. of Questions	K- Level			
1	CLO 1	Up to K4	2	K1			2(K3&K3)	1(K3)	
2	CLO 2	Up to K4	2	K1			2(K3&K3)	1(K4)	
3	CLO 3	Up to K4			2	K2	2(K4&K4)	1(K4)	
4	CLO 4	Up to K5			2	K2	2(K5&K5)	1(K5)	
5	CLO 5	Up to K5			2	K2		1(K5)	
No. of Questions to be asked			4		3		8	5	20
No. of Questions to be answered			4		3		4	2	13
Marks for each question			1		2		5	10	
Total Marks for each section			4		6		20	20	50 (Marks)

Distribution of Section-wise Marks with K Levels for Internal Assessment (SEC)

K Levels	Section A (MCQ'S) (No choice)	Section B (Short Answer) (No choice)	Section C (Either or Type)	Section D (Open Choice)	Total Marks	% of Marks
K1	4				4	4
K2		6			6	6
K3			20	10	30	30
K4			10	20	30	30
K5			10	20	30	30
Total Marks	4	6	40	50	100	

K1- Remembering and recalling facts with specific answers.

K2- Basic understanding of facts and stating main ideas with general answers.

K3- Application oriented- Solving Problems, Justifying the statement and deriving Inferences.

K4- Examining, analyzing, presentation and make inferences with evidences.

K5- Evaluating, making Judgments based on criteria.

Articulation Mapping - K Levels with Course Learning Outcomes (CLOs) for External Assessment

Sl. No	CLOs	K-Level	Section A		Section B		Section C	Section D	Total
			MCQs (No choice)		Short Answers (No choice)		(Either/or Type)	(Open choice)	
			No. of Questions	K- Level	No. of Questions	K- Level			
1	CLO 1	Up to K4	2	K1&K2	1	K1	2 (K2 & K2)	1(K3)	
2	CLO 2	Up to K4	2	K1&K2	1	K2	2(K3 & K3)	1(K4)	
3	CLO 3	Up to K4	2	K1&K2	1	K3	2 (K3 & K3)	1(K4)	
4	CLO 4	Up to K5	2	K1&K2	1	K4	2 (K4 & K4)	1(K5)	
5	CLO 5	Up to K5	2	K1&K2	1	K5	2 (K5 & K5)	1(K5)	
No. of Questions to be asked			10		5		10	5	30
No. of Questions to be answered			10		5		5	3	23
Marks for each question			1		2		5	10	
Total Marks for each section			10		10		25	30	75 (Marks)

Distribution of Section-wise Marks with K Levels for External Assessment

K Levels	Section A (MCQ'S) (No choice)	Section B (Short Answer) (No choice)	Section C (Either or Type)	Section D (Open Choice)	Total Marks	% of Marks
K1	5	2	-	-	7	5
K2	5	2	10	-	17	14
K3	-	2	20	10	32	27
K4	-	2	10	20	32	27
K5	-	2	10	20	32	27
Total Marks	10	10	50	50	120	100

K1- Remembering and recalling facts with specific answers.

K2- Basic understanding of facts and stating main ideas with general answers.

K3- Application oriented- Solving Problems, Justifying the statement and deriving Inferences.

K4- Examining, analyzing, presentation and make inferences with evidences.

K5- Evaluate , making Judgments based on criteria.

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Sem.	Category	Course Code	Course Title	Teaching Hours / Week	Duration of Exam (hrs)	Marks Allotted			Credits
						CIA	SE	Total	
I	Core – I	23OPCA11	Discrete Mathematics	6	3	25	75	100	6
	Core – II	23OPCA12	Linux and Shell Programming	6	3	25	75	100	6
	Core - III	23OPCA13	Python Programming	6	3	25	75	100	4
	Elective –I		DSEC - 1	6	3	40	60	100	3
	Elective – II		DSEC - 2	6	3	40	60	100	3
II	Core – IV	23OPCA21	Data Structures and Algorithms	6	3	25	75	100	5
	Core – V	23OPCA22	Big Data Analytics	6	3	25	75	100	5
	Core - VI	23OPCA21P	Data Structures and Algorithms Lab	6	3	40	60	100	4
	Elective –III		DSEC - 3	5	3	40	60	100	3
	Elective – IV		DSEC - 4	5	3	40	60	100	3
	SEC 1	23OPCASEC21	Block Chain Technologies	2	3	25	75	100	2

DSEC: Discipline Specific Elective Courses:**Semester I****DSEC – 1 (Choose any One)**

- | | | |
|---------------------------------------|---|--------------|
| 1.Data Engineering and Management Lab | - | 23OPCADSE1AP |
| 2. Architecture and Frameworks Lab | - | 23OPCADSE1BP |

DSEC –2 (Choose any One)

- | | | |
|-----------------------------------------|---|--------------|
| 1.Software Development Technologies Lab | - | 23OPCADSE1CP |
| 2.Soft Computing Lab | - | 23OPCADSE1DP |

Semester II**DSEC – 3 (Choose any One)**

- | | | |
|--------------------------|---|--------------|
| 1.Internet of Things Lab | - | 23OPCADSE2AP |
| 2.Computer Vision Lab | - | 23OPCADSE2BP |

DSEC – 4 (Choose any One)

- | | | |
|------------------------------------------|---|--------------|
| 1. Cryptography and Network Security Lab | - | 23OPCADSE2CP |
| 2. Block Chain Technologies Lab | - | 23OPCADSE2DP |

Department of Computer Applications				Class : I M.C.A				
Sem.	Category	Course Code	Course Title	Credits	Hrs.	CIA	Ext	Total
I	Elective –I (DSEC - 1)	23OPCADSE1AP	Data Engineering and Management Lab	3	6	40	60	100

Nature of the Course

Knowledge and Skill Oriented	Employability Oriented	Entrepreneurship Oriented
√	√	

Course Objectives :

- 1.To acquire basic scripting knowledge in MongoDB.
- 2.To learn CRUD Operation on MongoDB database.
- 3.To comprehend MongoDB using DbVisualizer.
- 4.To be familiar with Zoho CRM features.
- 5.To customize your application using Zoho CRM.

Course Content :

Unit	Content	Hours	K-Level	CLO
I	1.Write a script to create a MongoDB database and perform insert operation 2.Write a MongoDB script to perform query operations	18	Up to K5	CLO1
II	3.Write a MongoDB Script to perform update operations 4.Write a MongoDB Script to update documents with aggregation pipeline	18	Up to K5	CLO2
III	5. Write a MongoDB script to delete single and multiple Documents 6. Write a MongoDB script to perform string aggregation Operations	18	Up to K5	CLO3
IV	7.Design a Data Model for MongoDB using DbVisualizer 8.Perform CRUD operations using DbVisualizer	18	Up to K5	CLO4

V	9.Create a Zoho CRM account and organize your Tasks, Meetings and Deals	18	Up to K5	CLO5
	10. Create and maintain a project using Zoho CRM features			

Books for Study :

- 1.Shannon Bradshaw, Eoin Brazil, Kristina Chodorow, MongoDB: The Definitive Guide, 3rd Edition, O'Reilly Media, Inc, Edition, 2019.
- 2.Peter Membrey , David Hows , Eelco Plugge , MongoDB Basics, Apress; 1st ed. Edition 2014

Books for Reference:

- 1.Kyle Banker Peter Bakkum Shaun Verch Douglas Garrett Tim Hawkins , MongoDB in Action , Manning Shelter Island , Second Edition
- 2.Amit Phaltankar , Juned Ahsan , Michael Harrison , Liviu Nedov , MongoDB Fundamentals: A Hands-On Guide To Using MongoDB And Atlas In The Real World, Packt Publishing Edition 2020
- 3.Alex Giamas , Mastering MongoDB 4.x, Packt Publishing; 2nd Edition.
- 4.Daniel Coupal , Pascal Desmarests , Steve Hoberman .MongoDB Data Modeling and Schema Design, Technics Publications Edition 2023
- 5.Ajit Singh , Sultan Ahmad , MongoDB Simply In Depth, Priharc Innovations Pvt Ltd. Edition 2019

Web Resources :

1. <https://www.mongodb.com/cloud/atlas>
2. <https://www.w3schools.com/mongodb/>
3. <https://www.mongodb.com/docs/manual/tutorial/getting-started/>

e_Books :

1. <https://www.openmymind.net/mongodb.pdf>
2. <https://pepa.holla.cz/wp-content/uploads/2016/07/MongoDB-in-Action-2nd-Edition.pdf>
3. https://www.tutorialspoint.com/mongodb/mongodb_tutorial.pdf

Pedagogy :

Projector Demonstration and Practical sessions.

Rationale for Nature of the course

Developing logic and structured program, organizing data in software development.

Activities to be Given :

- Practice to Code Programs
- Software Development

Course Learning Outcomes(CLO):

On successful Completion of the course Students will be able to

CLOs	Course Learning Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CLO1	Comprehend the scripting knowledge in MongoDB and perform basic operations in shell prompt	Up to K5
CLO2	Implement, Create, Read, Update and Delete Operations on MongoDB database	Up to K5
CLO3	Analyze MongoDB using DbVisualizer	Up to K5
CLO4	Assess Zoho CRM features for managing the customer relationships	Up to K5
CLO5	Create a customized application in Zoho CRM	Up to K5

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3 – Application oriented – Solving Problems

K4 –Examining, analyzing, presentation and make inferences with evidences

K5 – Evaluate , making Judgments based on criteria.

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

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

1 – Basic Level

2 – Intermediate Level

3- Advanced Level

LESSON PLAN :

UNIT	Programs	Hours	Mode of Teaching
I	1. Write a script to create a MongoDB database and perform insert operation 2. Write a MongoDB script to perform query operations	18	Demo & Practical Session
II	3. Write a MongoDB Script to perform update operations 4. Write a MongoDB Script to update documents with aggregation pipeline	18	Demo & Practical Session
III	5. Write a MongoDB script to delete single and multiple Documents 6. Write a MongoDB script to perform string aggregation operations	18	Demo & Practical Session
IV	7. Design a Data Model for MongoDB using DbVisualizer 8. Perform CRUD operations using DbVisualizer	18	Demo & Practical Session
V	9. Create a Zoho CRM account and organize your Tasks, Meetings and Deals 10. Create and maintain a project using Zoho CRM features.	18	Demo & Practical Session

Course Designer
Mrs.M.Murugeswari

Department of Computer Applications				Class : I M.C.A				
Sem.	Category	Course Code	Course Title	Credits	Hrs.	CIA	Ext	Total
I	Elective –I (DSEC - 1)	23OPCADSE1BP	Architecture and Frameworks Lab	3	6	40	60	100

Nature of the Course

Knowledge and Skill Oriented	Employability Oriented	Entrepreneurship Oriented
√	√	

Course Objectives :

- 1.To understand and implement the basic concepts of Software architecture and its functions.
2. To acquire programming skills to develop Implement various technologies and services associated with network protocols along with the challenges of data transfer.
- 3.To Implement the importance and functioning of Routing Protocols over communication service.
- 4.To acquire skills to connect two routers and any two switches.
- 5.To comprehend related to SSH protocols and accessing the remote device.

Course Content :

Unit	Content	Hours	K-Level	CLO
I	1.Find the WebID profile document and display the necessary attributes 2.Set and access the primary authentications with account recovery mechanisms	18	Up to K5	CLO1
II	3.Set and access the secondary authentications with account recovery mechanisms 4.Design authorization and web access control	18	Up to K5	CLO2
III	5.Find the content representation 6.Reading resources from HTTP REST API and WebSockets API	18	Up to K5	CLO3

IV	7.Writing resources from HTTP REST API and WebSockets API 8.Data notification using Social Web App protocol	18	Up to K5	CLO4
V	9.Managing subscriptions and friends list using Social Web App protocol 10. Managing list of followers and following list using Social Web App protocol	18	Up to K5	CLO5

Book for Study :

Joseph Ingeno, “Software Architect’s Handbook” Packt Publishing 2018

Books for Reference:

1. Oliver Vogel, Indo Arnold, ArifChughtaiandTimoKehrer, “Software Architecture”Springer Verlag, 2011.
- 2.Ian Gorton, “Essential Software architecture”, Second Edition, Springer, 2011
- 3.Len Bass, Paul Clements and Rick Kazman, “Software architecture in practice”, Third edition, Addison- Wesley, 2013
- 4.Mark Richards, Neal Ford , Fundamentals of Software Architecture , O'Reilly Media, Inc., 2020
- 5.Robert C. Martin , Theodore O'Brien , Upfront Books ,A Handbook of Agile Software Craftsmanship,Upfront Books,2021

Web Resources :

- 1.<https://github.com/gg-daddy/ebooks/blob/master/software-architecture-patterns>.
- 2.<https://github.com/mhadidg/software-architecture-books>
- 3.https://storage.pardot.com/1009792/1685141235Z8bRQIn3/Software_Architecture_Patterns.pdf

e_books :

- 1.https://edisciplinas.usp.br/pluginfile.php/5922722/mod_resource/content/1/2013%20-%20Book%20-%20Bass%20-%20Kazman-Software%20Architecture%20in%20Practice.pdf
- 2.<https://dl.ebooksworld.ir/books/Software.Architecture.The.Hard.Parts.Neal.Ford.OReilly.9781492086895.EBooksWorld.ir.pdf>
- 3.https://canvas.gu.se/files/4891694/download?download_frd=1

Pedagogy :

Projector Demonstration and Practical sessions.

Rationale for Nature of the course

Developing logic and structured program, organizing data in software development.

Activities to be Given :

- Practice to Code Programs
- Software Development

Course Learning Outcomes(CLO):

On successful Completion of the course Students will be able to

CLOs	Course Learning Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CLO1	Comprehend the programming skills of Software architecture tools and packages	Up to K5
CLO2	Understand and implement the user profiles and authentication with recovery mechanism.	Up to K5
CLO3	Comprehend and evaluate the access control and content representation use of FTP server	Up to K5
CLO4	Understand and implement reading and writing resources for various applications	Up to K5
CLO5	Identify and examine the notifications, friends, and follower list of social application protocols.	Up to K5

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3 – Application oriented – Solving Problems

K4 –Examining, analyzing, presentation and make inferences with evidences

K5 – Evaluate , making Judgments based on criteria.

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

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3	3	2	1	2	3
CLO2	3	2	3	3	3	2
CLO3	3	2	4	2	4	2
CLO4	3	2	1	3	2	1
CLO5	2	3	2	1	3	1

1 – Basic Level

2 – Intermediate Level

3- Advanced Level

LESSON PLAN :

UNIT	Programs	Hours	Mode of Teaching
I	1.Find the WebID profile document and display the necessary attributes 2.Set and access the primary authentications with account recovery mechanisms	18	Demo & Practical Session
II	3.Set and access the secondary authentications with account recovery mechanisms 4.Design authorization and web access control	18	Demo & Practical Session
III	5.Find the content representation 6.Reading resources from HTTP REST API and WebSockets API	18	Demo & Practical Session
IV	7.Writing resources from HTTP REST API and WebSockets API 8.Data notification using Social Web App protocol	18	Demo & Practical Session
V	9.Managing subscriptions and friends list using Social Web App protocol 10. Managing list of followers and following list using Social Web App protocol	18	Demo & Practical Session

Course Designer
Dr.(Mrs.)S.Vijayasankari

Department of Computer Applications				Class : I M.C.A				
Sem.	Category	Course Code	Course Title	Credits	Hrs.	CIA	Ext	Total
I	Elective –II (DSEC - 2)	23OPCADSE1CP	Software Development Technologies Lab	3	6	40	60	100

Nature of the Course

Knowledge and Skill Oriented	Employability Oriented	Entrepreneurship Oriented
√	√	

Course Objectives :

1. To understand the concept of DevOps with associated technologies and methodologies.
2. To be familiarized with Jenkins, which is used to build & test software Applications
3. To understand Continuous integration in Devops environment.
4. To understand Docker to build, ship and run containerized images
5. To use Docker to deploy and manage Software applications running on Container.

Course Content :

Unit	Content	Hours	K-Level	CLO
I	1. Deploy Version Control System / Source Code Management, install git and create a GitHub account. 2. Perform various GIT operations on local and Remote repositories using GIT Cheat-Sheet.	18	Up to K5	CLO1
II	3. Continuous Integration: install and configure Jenkins with Maven/Ant/Gradle to setup a build Job. 4. Build the pipeline of jobs using Maven / Gradle / Ant in Jenkins, create a pipeline script to Test and deploy an application over the tomcat server.	18	Up to K5	CLO2
III	5. Implement Jenkins Master - Slave Architecture and Scale your Jenkins standalone implementation by implementing slave nodes. 6. Setup and Run Selenium Tests in Jenkins Using Maven	18	Up to K5	CLO3
IV	7. Implement Docker Architecture and Container Life Cycle, install Docker and execute docker commands to manage images and interact with containers. 8. Implement Dockerfile instructions, build an image for a sample web application using Dockerfile.	18	Up to K5	CLO4

V	9. Install and Configure Pull based Software Configuration Management and provisioning tools using Puppet. 10. Implement LAMP/MEAN Stack using Puppet Manifest.	18	Up to K5	CLO5
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Books for Study :

1. Harsh Chawla and Hemant Kathuria, Building Microservices Applications on Microsoft Azure-Designing, Developing, Deploying, and Monitoring, Apress, 2019.
2. Jeffrey Palermo , NET DevOps for Azure A Developer's Guide to DevOps Architecture the Right Way, Apress, 2019.
3. Thurupathan and Vijayakumar, Practical API Architecture and Development with Azure and AWS - Design and Implementation of APIs for the Cloud, Apress, 2018.

Books for Reference:

1. Karl Matthias and Sean P. Kane, Docker: Up and Running, O'Reilly Publication, Second Edition 2018.
2. Len Bass, Ingo Weber, Liming Zhu, "DevOps, A Software Architects Perspective", Addison Wesley-Pearson Publication, First Edition 2015.
3. John Ferguson Smart, "Jenkins, The Definitive Guide", O'Reilly Publication, First Edition 2011.
4. Adora Nwodo , Beginning Azure DevOps, Wiley; 1st Edition , 2023.
5. Mikael Krief , Learning DevOps, Packt Publishing; 2nd Edition 2022.

Web Resources :

1. <https://azure.microsoft.com/en-in/solutions/devops/tutorial>
2. <https://intellipaat.com/blog/tutorial/microsoft-azure-tutorial/azure-devops-tutorial/>
3. <https://www.devopsschool.com/blog/azure-devops-tutorial-for-beginners-and-its-work-process/>

e_books :

1. [https://edu.anarcho-copy.org/GNU%20Linux%20-%20Unix-Like/DevOps/A Practical Guide to Azure DevOps Learn by doing.pdf](https://edu.anarcho-copy.org/GNU%20Linux%20-%20Unix-Like/DevOps/A%20Practical%20Guide%20to%20Azure%20DevOps%20Learn%20by%20doing.pdf)
2. <http://mukeshkumar.net/Upload/ebook/Azure-DevOps-CI-CD-Pipeline-Practical-Guide.pdf>
3. <https://online-pmo.com/wp-content/Education/Learning%20DevOps.pdf>

Pedagogy :

Projector Demonstration and Practical sessions.

Rationale for Nature of the course

Developing logic and structured program, organizing data in software development.

Activities to be Given :

- Practice to Code Programs
- Software Development

Course Learning Outcomes(CLO):

On successful Completion of the course Students will be able to

CLOs	Course Learning Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CLO1	To Understand and analyse the importance of Jenkins to Build, Deploy and Test Software Applications	Up to K5
CLO2	To synthesis and summarize the importance of Software Configuration Management in DevOps	Up to K5
CLO3	To identify, analyze and illustrate the Containerization of OS images and deployment of applications over Docker	Up to K5
CLO4	To design, analyze and develop the Pull based Software Configuration Management	Up to K5
CLO5	To design, analyze and develop Puppet Manifest	Up to K5

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3 – Application oriented – Solving Problems

K4 –Examining, analyzing, presentation and make inferences with evidences

K5 – Evaluate , making Judgments based on criteria.

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

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

1 – Basic Level

2 – Intermediate Level

3- Advanced Level

LESSON PLAN :

UNIT	Programs	Hours	Mode of Teaching
I	1. Deploy Version Control System / Source Code Management, install git and create a GitHub account. 2. Perform various GIT operations on local and Remote repositories using GIT Cheat-Sheet.	18	Demo & Practical Session
II	3. Continuous Integration: install and configure Jenkins with Maven/Ant/Gradle to setup a build Job. 4. Build the pipeline of jobs using Maven / Gradle / Ant in Jenkins, create a pipeline script to Test and deploy an application over the tomcat server.	18	Demo & Practical Session
III	5. Implement Jenkins Master-Slave Architecture and scale your Jenkins standalone implementation by implementing slave nodes. 6. Setup and Run Selenium Tests in Jenkins Using Maven	18	Demo & Practical Session
IV	7. Implement Docker Architecture and Container Life Cycle, install Docker and execute docker commands to manage images and interact with containers. 8. Implement Dockerfile instructions, build an image for a sample web application using Dockerfile.	18	Demo & Practical Session
V	9. Install and Configure Pull based Software Configuration Management and provisioning tools using Puppet. 10. Implement LAMP/MEAN Stack using Puppet Manifest.	18	Demo & Practical Session

Course Designer
Mrs.M.Murugeswari

Department of Computer Applications				Class : I M.C.A				
Sem.	Category	Course Code	Course Title	Credits	Hrs.	CIA	Ext	Total
I	Elective –II (DSEC - 2)	23OPCADSE1DP	Soft Computing Lab	3	6	40	60	100

Nature of the Course

Knowledge and Skill Oriented	Employability Oriented	Entrepreneurship Oriented
√	√	

Course Objectives :

1. To implement various Supervised Neural Network-based approaches
2. To apply the fuzzy-based logical operations and arithmetic operations
3. To implement unsupervised neural network approaches .
4. To solve a problem using a simple genetic algorithm
5. To implement logic gates.

Course Content :

Unit	Contents	Hours	K-Level	CLO
I	1.Implementation of Logic gates using Artificial Neural Network. 2..Implementation of Perception Algorithm.	18	Up to K5	CLO1
II	3. Implementation of Back Propagation Algorithm. 4.Implementation of Self Organizing Maps.	18	Up to K5	CLO2
III	5. Implementation of Radial Basis Function Network. 6.Implementation of De-Morgan's Law.	18	Up to K5	CLO3

IV	7. Implementation of McCulloch Pits Artificial Neuron model 8. Implementation of Simple genetic algorithm	18	Up to K5	CLO4
V	9 Implementation of fuzzy based Logical operations 10. Implementation of fuzzy based arithmetic operations.	18	Up to K5	CLO5

Book for Study :

Principles of Soft Computing, S.N. Sivanandam, S.N.Deepa, Wiley, Third Edition, 2019.

Books for Reference:

1. Das, A. (2018). Artificial Intelligence and Soft Computing for Beginners.
2. Amit, K. (2018). Artificial intelligence and soft computing: behavioral and cognitive modeling of the human brain. CRC press.
3. Rajasekaran, S., & Pai, G. V. (2011). Neural networks, fuzzy logic and genetic algorithm: synthesis and applications (with cd). PHI Learning Pvt. Ltd.
4. Jang, J. S. R., Sun, C. T., & Mizutani, E. (2004). Neuro-fuzzy and soft computing-a computational pproach to learning and machine intelligence [Book Review]. IEEE Transactions on automatic control, 42(10), 1482-1484.
5. Gupta, M. M. (2004). Soft computing and intelligent systems: theory and applications. Elsevier.

Web Resources :

1. <https://www.techopedia.com/best-artificial-intelligence-learning-resources-online-in>
2. https://www.tutorialspoint.com/fuzzy_logic/fuzziness_in_neural_networks.htm
3. http://www.scholarpedia.org/article/Fuzzy_neural_network

E_books :

1. <https://www.uc.edu/content/dam/uc/ce/docs/OLLI/Page%20Content/ARTIFICIAL%20INTELLIGENCEr.pdf>
2. https://www.dcehvpmpm.org/E-Content/BCA/BCA-III/artificial_intelligence_tutorial.pdf
3. https://people.engr.tamu.edu/guni/csce421/files/AI_Russell_Norvig.pdf

Pedagogy :

Projector Demonstration and Practical sessions.

Rationale for Nature of the course

Developing logic and structured program, organizing data in software development.

Activities to be Given :

- Practice to Code Programs
- Software Development

Course Learning Outcomes(CLO):

On successful Completion of the course Students will be able to

CLOs	Course Learning Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CLO1	To apply supervised learning algorithms for real datasets	Up to K5
CLO2	To implement Unsupervised Learning techniques	Up to K5
CLO3	To apply fuzzy based arithmetic and logical operations	Up to K5
CLO4	To find solutions for problems using Genetic algorithm	Up to K5
CLO5	To implement DeMorgan's Law	Up to K5

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3 – Application oriented – Solving Problems

K4 –Examining, analyzing, presentation and make inferences with evidences

K5 – Evaluate , making Judgments based on criteria.

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

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

1 – Basic Level

2 – Intermediate Level

3- Advanced Level

LESSON PLAN :

UNIT	Programs	Hours	Mode of Teaching
I	1. Deploy Version Control System / Source Code Management, install git and create a GitHub account. 2. Perform various GIT operations on local and Remote repositories using GIT Cheat-Sheet.	18	Demo & Practical Session
II	3. Continuous Integration: install and configure Jenkins with Maven/Ant/Gradle to setup a build Job. 4. Build the pipeline of jobs using Maven / Gradle / Ant in Jenkins, create a pipeline script to Test and deploy an application over the tomcat server.	18	Demo & Practical Session
III	5. Implement Jenkins Master-Slave Architecture and scale your Jenkins standalone implementation by implementing slave nodes. 6. Setup and Run Selenium Tests in Jenkins Using Maven	18	Demo & Practical Session
IV	7. Implement Docker Architecture and Container Life Cycle, install Docker and execute docker commands to manage images and interact with containers. 8. Implement Dockerfile instructions, build an image for a sample web application using Dockerfile.	18	Demo & Practical Session
V	9. Install and Configure Pull based Software Configuration Management and provisioning tools using Puppet. 10. Implement LAMP/MEAN Stack using Puppet Manifest.	18	Demo & Practical Session

Course Designer
Dr. (Mrs.) J.CHINNA

Department of Computer Applications				Class : I M.C.A				
Sem.	Category	Course Code	Course Title	Credits	Hrs.	CIA	Ext	Total
II	Elective –III (DSEC - 3)	23OPCADSE2AP	Internet of Things Lab	3	5	40	60	100

Nature of the Course

Knowledge and Skill Oriented	Employability Oriented	Entrepreneurship Oriented
√	√	

Course Objectives :

- 1.To create IoT program to turn ON/OFF LED.
- 2.To implement IoT program for object detection.
- 3.To develop IoT programs for agricultural purpose.
- 4.To create web server program for local hosting.
- 5.To design IoT application for health monitoring.

Course Content :

Unit	Content	Hours	K-Level	CLO
I	1.To develop an IoT program to turn ON/OFF LED light (3.3V) 2.To develop an IoT program using IR sensor (Smart Garbage Monitoring, Detecting Parking Availability, etc.)	15	Up to K5	CLO1
II	3. To develop an IoT program using Humidity and Temperature Monitoring (Forest fire Detection, Weather Monitoring) 4. To develop an IoT web server program for local hosting	15	Up to K5	CLO2
III	To develop an IoT program using Soil Moisture Sensor To develop an IoT program using Ultrasonic Sensor (Distance Measurement, etc.)	15	Up to K5	CLO3

IV	To develop an real-time IoT program using Relay Module (Smart Home Automation with 230V) To develop an IoT program for Fire Detection (Home, Industry, etc.)	15	Up to K5	CLO4
V	To develop an IoT program for Gas Leakage detection (Home, Industry, etc.) To develop an IoMT program using Heartbeat Sensor	15	Up to K5	CLO5

Book for Study :

Adrian McEwen and Hakim Cassimally, “Designing the Internet of Things”, Wiley, 2014

Books for Reference:

1. Ovidiu Vermesan and Peter Friess, “Internet of Things – From Research and Innovation to Market Deployment” , River Publishers, 2014.
2. Peter Waher, “Learning Internet of Things” ,Packt Publishing, 2015.
3. Donald Norris, “The Internet of Things: Do-It-Yourself at Home Projects for Arduino, Raspberry Pi and BeagleBoneBlack”, McGraw Hill, 2015.
4. David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Rob Barton and Jerome Henry, —IoT Fundamentals: Networking Technologies, Protocols and Use Cases for Internet of Things, Cisco Press, 2017 (UNIT I and II)
5. Raj Kamal, Internet Of Things Architecture and Design Principles, Mcgraw Hill Education (India) Pvt Ltd, First Edition, 2017

Web Resources :

1. <https://www.arenasolutions.com/blog/10-valuable-iot-web-resources/>
2. <https://geekflare.com/internet-of-things-iot-learning-resources/>
3. <https://www.techtarget.com/iotagenda/resources/Internet-of-Things-IoT-Platform>

e_Books :

1. <https://pg.its.edu.in/sites/default/files/KCA043%20Internet%20of%20things%20-IoT%20by%20Raj%20Kamal%20Text%20Book.pdf>
2. http://uru.ac.in/uruonlinelibrary/Internet_of_Things/Architecting_the_Internet_of_Things.pdf
3. https://books.google.co.in/books?id=Vka_DwAAQBAJ&pg=PA1&source=gbv_toc_r&cad=2#v=onepage&q&f=false

Pedagogy :

Projector Demonstration and Practical sessions.

Rationale for Nature of the course

Developing logic and structured program, organizing data in Internet of Things

Activities to be Given:

- Practice to Code Programs
- Software Development

Course Learning Outcomes(CLO):

On successful Completion of the course Students will be able to

CLOs	Course Learning Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CLO1	Implement IoT programs to turn ON/OFF LED	Up to K5
CLO2	Develop IoT programs for object detection	Up to K5
CLO3	Understand and analyse the elements of trust in a Block chain: validation, verification, and consensus.	Up to K5
CLO4	Comprehend and evaluate the alternate coin, Ethereum and smart contract.	Up to K5
CLO5	Grasp and apply the knowledge of Tools and languages for applications	Up to K5

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3 – Application oriented – Solving Problems

K4 –Examining, analyzing, presentation and make inferences with evidences

K5 – Evaluate, making Judgments based on criteria.

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

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

1 – Basic Level

2 – Intermediate Level

3-Advanced Level

LESSON PLAN:

UNIT	Programs	Hours	Mode of Teaching
I	1. To develop an IoT program to turn ON/OFF LED light (3.3V) 2. To develop an IoT program using IR sensor (Smart Garbage Monitoring, Detecting Parking Availability, etc.)	15	Demo & Practical Session
II	3. To develop an IoT program using Humidity and Temperature Monitoring (Forest fire Detection, Weather Monitoring) 4. To develop an IoT web server program for local hosting	15	Demo & Practical Session
III	5. To develop an IoT program using Soil Moisture Sensor 6. To develop an IoT program using Ultrasonic Sensor (Distance Measurement, etc.)	15	Demo & Practical Session
IV	7. To develop an real-time IoT program using Relay Module (Smart Home Automation with 230V) 8. To develop an IoT program for Fire Detection (Home, Industry, etc.)	15	Demo & Practical Session
V	9. To develop an IoT program for Gas Leakage detection (Home, Industry, etc.) 10. To develop an IoMT program using Heartbeat Sensor	15	Demo & Practical Session

Course Designer
Dr.(Mrs.) J. CHINNA

Department of Computer Applications				Class : I M.C.A				
Sem.	Category	Course Code	Course Title	Credits	Hrs.	CIA	Ext	Total
II	Elective –III (DSEC - 3)	23OPCADSE2BP	Computer Vision Lab	3	5	40	60	100

Nature of the Course

Knowledge and Skill Oriented	Employability Oriented	Entrepreneurship Oriented
√	√	

Course Objectives :

- 1.To get an idea of how to build a computer vision application with Python language.
- 2.To learn the basic image handling and processing
- 3.To get familiar with various Computer Vision fundamental algorithms and how to implement and apply.
- 4.To get an idea of how to implement the image transforms.
- 5.To understand various image segmentation algorithms.

Course Content .:

Unit	Contents	Hours	K-Level	CLO
I	1.Image Loading, Exploring, and displaying an Image. 2.Access and Manipulate of Image Pixels.	15	Up to K5	CLO1
II	3. Image Transformations. i) Resizing ii)Rotation 4. Addition operation of Two Images.	15	Up to K5	CLO2
III	5.Image filtering operations i)Mean Filtering ii)Gaussian Filtering 6.Image Binarization Using Simple Thresholding method	15	Up to K5	CLO3
IV	7. Edge Detection operation using Sobel and Scharr Gradients 8.Find Grayscale and RGB Histograms of an Image.	15	Up to K5	CLO4

V	9. Segment an Image using K-means Clustering algorithm 10. Write a program to classify an Image using KNN Classification algorithm.	15	Up to K5	CLO5
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Book for Study:

Richard Szeliski, Computer Vision Algorithms and Applications, Second Edition, 2021

Books for Reference:

1. Jan Erik Solem, Programming Computer Vision with Python: Tools and algorithms for analyzing images, 1st Edition, Kindle Edition
2. Manas Kamal Bhuvan, Computer Vision and Image Processing: Fundamentals and Applications, 2019
3. Pavithra. G, Sandeep Srivastava, S. Kalarani, Saravana Balaji. B, Computer Vision and Techniques, 2021
4. Forsyth/ Ponce, Computer Vision: A Modern Approach, Second edition, 2015
5. Suganya, Robert, Hariharasitaraman, Introduction to Computer Vision, 2022

Web Resources :

1. <https://viso.ai/computer-vision/the-most-popular-computer-vision-tools/>
2. <https://www.eduonix.com/opencv-complete-dummies-guide-to-computer-vision-with-python>
3. https://digitalsocietyschool.org/wp/wp-content/uploads/2020/09/1807ESIEA_ComputerVision-1.pdf

e_Books :

1. https://www.amazon.in/Programming-Computer-Vision-Python-algorithms-book/dp/B008GCNGVE/ref=sr_1_7?keywords=computer+vision+books&qid=1695808531&sr=8-7
2. https://www.amazon.in/Computer-Vision-Principles-Algorithms-Applications-ebook/dp/B077LQ3LQC/ref=sr_1_8?keywords=computer+vision+books&qid=1695808531&sr=8-8
3. https://amazon.in/Computer-Vision-Approach-Forsyth-Ponce/dp/9332550115/ref=sr_1_13?keywords=computer+vision+books&qid=1695808531&sr=8-13

Pedagogy :

Projector Demonstration and Practical sessions.

Rationale for Nature of the course

Design programs using image transformation and image filtering, and image segmentation algorithms

Activities to be Given :

- Practice to Code Programs
- Software Development

Course Learning Outcomes(CLO):

On successful Completion of the course Students will be able to

CLOs	Course Learning Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CLO1	To develop and implement the image loading and exploring	Up to K5
CLO2	To Evaluate the image transforms	Up to K5
CLO3	To apply and analyze for image processing denoising algorithms	Up to K5
CLO4	To design and develop the Image Segmentation using Edge detection and	Up to K5
CLO5	To apply and analyze image clustering and classification algorithms	Up to K5

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3 – Application oriented – Solving Problems

K4 –Examining, analyzing, presentation and make inferences with evidences

K5 – Evaluate , making Judgments based on criteria.

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

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

1 – Basic Level

2 – Intermediate Level

3- Advanced Level

LESSON PLAN :

UNIT	Programs	Hours	Mode of Teaching
I	1.Image Loading, Exploring, and displaying an Image. 2.Access and Manipulate of Image Pixels.	15	Demo & Practical Session
II	3.Image Transformations. i) Resizing ii) Rotation 4.Addition operation of Two Images.	15	Demo & Practical Session
III	5.Image filtering operations Mean Filtering Gaussian Filtering 6.Image Binarization Using Simple Thresholding method	15	Demo & Practical Session
IV	7. Edge Detection operation using Sobel and Scharr Gradients 8.Find Grayscale and RGB Histograms of an Image.	15	Demo & Practical Session
V	9.Segment an Image using K-means Clustering algorithm 10.Write a program to classify an Image using KNN Classification algorithm.	15	Demo & Practical Session

Course Designer
Dr.Mrs.S.Vijayasankari

Department of Computer Applications				Class : I M.C.A				
Sem.	Category	Course Code	Course Title	Credits	Hrs.	CIA	Ext	Total
II	Elective –IV (DSEC - 4)	23OPCADSE2CP	Cryptography and Network Security Lab	3	5	40	60	100

Nature of the Course

Knowledge and Skill Oriented	Employability Oriented	Entrepreneurship Oriented
√	√	

Course Objectives :

- 1.To develop in classical encryption techniques and advanced encryption standards.
- 2.To acquire programming skills to implement various cryptographic algorithms including secret key cryptography.
- 3.To develop hashes, message digests and public key algorithms.
- 4.To Implement different encryption and decryption techniques.
- 5.To comprehend related to confidentiality and authentication techniques

Course Content :

Unit	Content	Hours	K-Level	CLO
I	1. Write a program that contains a string (char pointer) with a value „Hello world“. The program should XOR each character in the string with 0 and display the result 2. Write a program to perform encryption and decryption using the Ceaser Cipher	15	Up to K5	CLO1
II	3. Write a program to perform encryption and decryption using the Hill Cipher 4. Write a program to perform encryption and decryption using the Substitution Cipher	15	Up to K5	CLO2
III	5. Write a program to perform encryption and decryption using the DES algorithm 6. Connect to switch with a computer and enable the port security	15	Up to K5	CLO3

IV	7. Defeating malware using Building Trojans and Rootkit hunter 8. Implement signature scheme – Digital Signature Standard	15	Up to K5	CLO4
V	9. Identify and capture the user name and password in a same network using Wireshark 10. Implement Man-in-the-middle attack and Session hijacking	15	Up to K5	CLO5

Book for Study :

William Stallings, *Cryptography and Network Security*, Pearson Education, 7th Edition, 2018

Books for Reference:

1. Atul Kahate, *Cryptography and Network Security*, 4th Edition, Tata Mc Graw Hill, 2019.
2. Behrouz A. Ferouzan, *Cryptography & Network Security*, Tata Mc Graw Hill, 2015.
3. Bernard L. Menezes and Ravinder Kumar, *Cryptography, Network Security, and CyberLaws*, 1st Edition Cengage Learning India Pvt. Ltd., 2018.
4. Gupta Prakash C, *Cryptography And Network Security*, PH Learning, 1st Edition 2014.
5. William Stallings, *Cryptography and Network Security: Principles and Practice*, Pearson Education, 2018.

Web Resources :

1. <http://williamstallings.com/NetworkSecurity/NetSec5e-Instructor/>
2. <http://williamstallings.com/NetworkSecurity/styled/>
3. <https://slideplayer.com/slide/7484008/>

e_Books :

1. <https://www.pdfdrive.com/network-security-books.html>
2. https://www.vssut.ac.in/lecture_notes/lecture1428550736.pdf
3. <https://indianpdf.com/cryptography-and-network-security-pdf/>

Pedagogy :

Projector Demonstration and Practical sessions.

Rationale for Nature of the course

Developing DES algorithms and digital signature standard, performing encryption and decryption in program writing.

Activities to be Given :

- Practice to Code Programs
- Software Development

Course Learning Outcomes(CLO):

On successful Completion of the course Students will be able to

CLOs	Course Learning Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CLO1	Comprehend the programming skills in classical encryption techniques and to develop advanced encryption standards	Up to K5
CLO2	Understand and implement the various cryptographic algorithms including secret key cryptography, hashes and message digests	Up to K5
CLO3	Evaluate the use of different encryption and decryption techniques	Up to K5
CLO4	Design to Solve related confidentiality and authentication problems	Up to K5
CLO5	Create public key algorithms	Up to K5

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3 – Application oriented – Solving Problems

K4 –Examining, analyzing, presentation and make inferences with evidences

K5 – Evaluate , making Judgments based on criteria.

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

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

1 – Basic Level

2 – Intermediate Level

3- Advanced Level

LESSON PLAN :

Unit	Programs	Hours	Mode of Teaching
I	1. Write a program that contains a string (char pointer) with a value „Hello world“. The program should XOR each character in the string with 0 and display the result 2. Write a program to perform encryption and decryption using the Ceaser Cipher	15	Demo & Practical Session
II	3. Write a program to perform encryption and decryption using the Hill Cipher 4. Write a program to perform encryption and decryption using the Substitution Cipher	15	Demo & Practical Session
III	5. Write a program to perform encryption and decryption using the DES algorithm 6. Connect to switch with a computer and enable the port security	18	Demo & Practical Session
IV	7. Defeating malware using Building Trojans and Rootkit hunter 8. Implement signature scheme – Digital Signature Standard	15	Demo & Practical Session
V	9. Identify and capture the user name and password in a same network using wireshark 10. Implement Man-in-the-middle attack and Session Hijacking	15	Demo & Practical Session

Course Designer
Mrs.M.Murugeswari

Department of Computer Applications				Class : I M.C.A				
Sem.	Category	Course Code	Course Title	Credits	Hrs.	CIA	Ext	Total
II	Elective –IV (DSEC - 4)	23OPCADSE2DP	Block Chain Technologies Lab	3	5	40	60	100

Nature of the Course

Knowledge and Skill Oriented	Employability Oriented	Entrepreneurship Oriented
√	√	

Course Objectives :

1. To learn the basics of Blockchain and apply cryptographic algorithms
2. To design, build, and deploy smart contracts and distributed applications,
3. To deploy Private Blockchain and smart contracts on Ethereum.
4. To understand and deploy cryptocurrencies and their functions in applications
5. To implement Blockchain for various use cases.

Course Content :

Unit	Content	Hours	K-Level	CLO
I	1. Create a Public Ledger and Private Ledger with the various attributes like Access, Network Actors, Native token, Security, Speed and examples. 2. Building and Deploying MultiChain private Blockchain 3. Creating ERC20 token	15	Up to K5	CLO1
II	4. Creation of Block 5. Write Hello World smart contract in a higher programming language (Solidity) 6. Construct the Naïve block chain	15	Up to K5	CLO2
III	7. Construct and deploy your contract (Use deploy method) 8. Set up a Regtest environment 9. Peer-to-Peer implementation using Blockchain	15	Up to K5	CLO3

IV	10. Build a payment request URI 11. Hashcash implementation 12. Blockchain implementation using Merkle Trees	15	Up to K5	CLO4
V	13. Develop a toy application using Blockchain 14. Create simple wallet transaction from one account to another account using Metamask. 15. Creating Crypto-currency Wallet	15	Up to K5	CLO5

Book for Study :

ImranBashir.Mastering_Blockchain, ,Packt Publications, 2nd_Edition, 2018

Books for Reference :

1. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller, Steven Goldfeder. Bitcoin and Cryptocurrency Technologies. Princeton University Press, 2016.
2. Andreas Antonopoulos. Mastering Bitcoin: Programming the open block chain. Oreilly Publishers, 2017.
3. Joseph J.Bambara,Paul R. Allen ,A Block Chain, A Practical Guide to Developing Business, Law, and Technology Solutions,McGraw Hill education ,2018.
4. Bikramaditya Sigal,Gautam Dhameja,Priyansu sekharPanda,,Beginning Blockchain, Apress Publications, 2018
5. Primavera DeFilippi ,Aaron Wright , Block chain and the law,the Rule of Code, Harcard University Press, London,2018

Web Resources :

1. <https://geekflare.com/learn-blockchain/>
2. <https://www.java67.com/2020/07/top-5-websites-to-learn-blockchain-in.html>
3. <https://www.developerupdates.com/blog/best-websites-to-learn-blockchain-technologies-in-2022>

e_Books :

1. <https://drive.google.com/file/d/1jfmcmh3zMMiHFLJ5iJqOtLiqPnrk1II6/view>
2. <https://drive.google.com/file/d/1zAbGOkHG8N4xCroWH-Kva936-nDNW7Y4/view>
3. <https://drive.google.com/file/d/19NJ1WGCmEl39VLCgLtXDk4tv8oWErrxh/view>

Pedagogy :

Projector Demonstration and Practical sessions.

Rationale for Nature of the course

Developing logic and structured program, organizing data in Block Chain development.

Activities to be Given:

- Practice to Code Programs
- Software Development

Course Learning Outcomes(CLO):

On successful Completion of the course Students will be able to

CLOs	Course Learning Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CLO1	Understand, apply and examine the characteristics of block chain, bitcoin and consensus algorithm in centralized and decentralized methods.	Up to K5
CLO2	Comprehend and demonstrate the application of hashing and public key cryptography in protecting the block chain.	Up to K5
CLO3	Understand and analyse the elements of trust in a Block chain: validation, verification, and consensus.	Up to K5
CLO4	Comprehend and evaluate the alternate coin, Ethereum and smart contract.	Up to K5
CLO5	Grasp and apply the knowledge of Tools and languages for applications	Up to K5

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3 – Application oriented – Solving Problems

K4 –Examining, analyzing, presentation and make inferences with evidences

K5 – Evaluate, making Judgments based on criteria.

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

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

1 – Basic Level

2 – Intermediate Level

3-Advanced Level

LESSON PLAN:

UNIT	Programs	Hours	Mode of Teaching
I	1.Create a Public Ledger and Private Ledger with the various attributes like Access, Network Actors, Native token, Security, Speed and examples. 2.Building and Deploying Multi Chain private Block chain 3.Creating ERC20 token	15	Demo & Practical Session
II	4. Creation of Block 5. Write Hello World smart contract in a higher programming language (Solidity) 6. Construct the Naïve block chain	15	Demo & Practical Session
III	7. Construct and deploy your contract (Use deploy method) 8. Set up a Reg test environment 9. Construct Peer-to-Peer implementation using Block chain	15	Demo & Practical Session
IV	10. Build a payment request URI 11. Hashcash implementation 12. Blockchain implementation using Merkle Trees	15	Demo & Practical Session
V	13. Develop a toy application using Blockchain 14. Create simple wallet transaction from one account to another account using Metamask. 15. Creating Crypto-currency Wallet	15	Demo & Practical Session

Course Designer
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