# FATIMA COLLEGE (AUTONOMOUS)



Re-Accredited with "A++" Grade by NAAC (4th Cycle)
74th Rank in India Ranking 2021 (NIRF) by MHRD
Maryland, Madurai- 625 018, Tamil Nadu, India

NAME OF THE DEPARTMENT: COMPUTER APPLICATIONS

NAME OF THE PROGRAMME: B.C.A

PROGRAMME CODE : USCA

ACADEMIC YEAR : 2023-2024

FATIMA COLLEGE CAUTONOMOUS), FLADORAI - 626018 THE MINUTES OF THE BOARD OF STUDIES DEPARTMENT OF COMPUTER APPLICATIONS LEGIL POLICE TO BE IMPLEMENTED FROM 2023-2024 ONWARDS The board of Studies meet for Framing the Syllabus for Dopardment of Computer Applications [BCA & PGIDCA] was held on 03.04.2023 at 1000.Am. The members of the board were, UNIVERSITY NOMINEE CBCAD: Dr. K. SUNDARAVADIVELU, ASSISTANT PROFESSOR, DEPARTMENT OF COMPUTER SCIENCE, MADURAL KAMARAT UNIVERSITY, MADURAL. UNIVERSITY NOMINEE CPGDCAD: DY. R. RATHINASABAPATHY, ASSOCIATIE PROFESSOR, DEPARTMENT OF COMPOTER APPLICATION SCHOOL OF INFORMATION TECHNOLOGY, MADURAL KAMARAJ UNIVERSITY

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99 1	Dr. M. PUSHPARANI,
2.03	PROFESSOR & HEAD,
	DEPARTMENT OF COMPUTER SCIENCE, 3/4/
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	MANAGINION DIRECTOR,
	ESHA TECHNOLOGIES
	MADURAL.
	DEPARTMENT OF COMPOSE BEPLICONS
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	Marines Kanasan Onmercial
	Mr. A. DIVYASRI,
	SOFTWARE DEVELOPER, A.D.
	BRICKSTEEL TECHNOLOGIES PUT LTD, 3.4.
	MADURAI-16

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	DEAN OF ACADEMIC AFFAIRS:
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	ASSISTANT PROFESSOR,
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	In the beginning of the meeting the Head of the Deportment Ms. s. Selvarani welcomed all the members
	of the board and briefed them about the current
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	The members of the board expressed their high
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# Action Taken Report for 2022-2023

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Bank	for other major students.	Mark Mark College
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2.	The Gelf Learning cowne 2172511-	To develop animation techniques
16	Open Source Animation Took	and create motion movies
	was introduced for the birst-	using Alice.
	year BCA students	O Control of the cont
	in the trade	diameter Programmin
3.	The Self Leating course 2134513192	To create appropriate content
	Content Writing and Video Making	
	was introduced for the second-	
	year Bon and Imc students.	
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4.	The Self Lewining course 2136546	To know about R'Language
	Data Science was introduced for	that is widely used to do
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5.	The lab course 21PDB106 - Design	
	Jechniques was introduced.	and to improve employability
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		1 33 Tay CC 8 Web Designing
6.	The course 21PDB202 - Python	To gain knowledge in python
	Programming was introduced.	programming and do create
	Secretary of the second of the	real time applications.
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# Minuter of The Board of Studies

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12	Data Mining & Human Computer Interaction courses
	can be replaced by Digital Principles and Computer
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	charac phieth, as the core
3.	Open Source Took Fan be included for programming
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4.	Online courses like MODC, SWAYAM, MPTEL. Courses should
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3.	Dr. M. PUSHPARANI	Jun Cyp 3/4/2023
4.	Mr. V. NEETHIDEVAN	V. M. 2-4. 23.
5.	Dr. S. BALAMURUGAN	Profitions
6.	Ms. A. DIVYASRI	A. Dry 69
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12	DY. K. SANGEETHA  DEAN OF ACADEMIC AFFAIRS	Dazetto

## **COLLEGE PROFILE**

Fatima College (Autonomous), Mary Land, Madurai, is a Post Graduate and Research Institution for Women affiliated to Madurai Kamaraj University. It is a Catholic Minority institution established and run by St. Joseph's Society of Madurai (of the Congregation of the Sisters of St. Joseph of Lyons, France). This institution came into existence through the tireless efforts of the missionary sisters of St. Joseph of Lyons and the zeal and heroic sacrifice of Rev. Sr. Rose Benedicta, the Foundress of the College.

The College was started in St. Joseph's Campus Madurai as a Second Grade College with 63 students in 1953. It was upgraded into a Post Graduate College in 1964; Autonomous in 1990 and a Institute in 2004. The College now offers 21 Undergraduate Programmes, 13 Postgraduate Programmes, 2 Professional Programme, 5 M.Phil. **Programmes** 6 Departments have become Research Centres. It has strength of 4134 Students, 206 Teaching Staff and 100 Non-Teaching Staff.

The comprehensive assessment by NAAC in 1999 placed Fatima College in Five Star Status of merit. The college strives to sustain excellence, quality and relevance while equipping the students to meet the demands of higher education in India. In 2004 UGC conferred on Fatima College the status of College with Potential for Excellence. In 2006 and 2013 NAAC Re-Accredited the College with 'A' Grade. The College was ranked 94th in the All India NIRF Ranking in 2019 by MHRD.

# VISION OF THE COLLEGE

## WOMEN'S EMPOWERMENT THROUGH EDUCATION

The vision of the college is to empower women by developing human capabilities through quality education based on Christian values, making them responsible citizens who can work for the advancement of the society and promote communal harmony in the multi-religious and multi-cultural reality of India eventually evolving into women of communion.

## MISSION OF THE COLLEGE

- To enhance quality of life through the development of individuals.
- To enable women to become contributors in the economic, social and political development of India.
- To equip the students with 21st century skill-sets with a focus on problem-solving abilities
- To motivate them to work for social justice
- To give preference to the rural economically backward and first-generation learners
- To enable students to be employed in the technology oriented competitive market

### VISION OF THE DEPARTMENT

The vision of the department is to empower women by bringing out their hidden potentials by providing quality computer education to meet excellence and adapt to the challenges of the society.

## MISSION OF THE DEPARTMENT

- To bring out the inherent talents of each student & guide them to adapt to the dynamic IT world and make them responsible citizens.
- To be trained with cutting edge technologies in order to improve their personality in a supportive and caring environment.
- To build leadership traits among students.
- To inculcate ethical attitude among computer professionals.

## PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

A graduate of B.C.Aprogramme after three years,

PEO 1	Our graduates will be academic, digital and information literates, creative, inquisitive, innovative and desirous for the "more" in all aspects.
PEO 2	They will be efficient individuals and team performers, exhibiting progress, flexibility, transparency and accountability in their professional work
PEO 3	Our graduates will be effective managers in all sorts of real life and professional circumstances, making ethical decisions, pursuing excellence within the time frame and in demonstrating apt leadership skills
PEO 4	They will engage locally and globally evincing social and environmental stewardship, demonstrating civic responsibilities and employing right skills at the right moment

## **GRADUATE ATTRIBUTES (GA)**

Fatima College empowers her women graduates holistically. A Fatimite achieves all-round empowerment by acquiring Social, Professional and Ethical competencies. A graduate would sustain and nurture the following attributes:

	I. SOCIAL COMPETENCE
GA 1	Deep disciplinary expertise with a wide range of academic and digital literacy
GA 2	Hone creativity, passion for innovation and aspire excellence
GA 3	Enthusiasm towards emancipation and empowerment of humanity
GA 4	Potentials of being independent
GA 5	Intellectual competence and inquisitiveness with problem solving abilities befitting the field of research
GA 6	Effectiveness in different forms of communications to be employed in personal and professional environments through varied platforms
GA 7	Communicative competence with civic, professional and cyber dignity and decorum
GA 8	Integrity respecting the diversity and pluralism in societies, cultures and religions
GA 9	All – inclusive skill sets to interpret, analyse and solve social and environmental issues in diverse environments
GA 10	Self awareness that would enable them to recognise their uniqueness through continuous self-assessment in order to face and make changes building on their strengths and improving their weaknesses
GA 11	Finesse to co-operate exhibiting team-spirit while working in groups to achieve goals
GA 12	Dexterity in self-management to control their selves in attaining the kind of life that they dream for

GA 13 Resilience to rise up instantly from their intimidating setbacks GA 14 Virtuosity to use their personal and intellectual autonomy in being life-long learners  GA 15 Digital learning and research attributes  GA 16 Cyber security competence reflecting compassion, care and concern towards the marginalised  GA 17 Rectitude to use digital technology reflecting civic and social responsibilities in local, national and global scenario  II. PROFESSIONAL COMPETENCE  GA 18 Optimism, flexibility and diligence that would make them professionally competent  GA 19 Prowess to be successful entrepreneurs and become employees of trans-national societies  GA 20 Excellence in Local and Global Job Markets  GA 21 Effectiveness in Time Management  GA 22 Efficiency in taking up Initiatives  GA 23 Eagerness to deliver excellent service  GA 24 Managerial Skills to Identify, Commend and tap Potentials  III. ETHICAL COMPETENCE  GA 25 Integrity and be disciplined in bringing stability leading a systematic life promoting good human behaviour to build better society  GA 26 Honesty in words and deeds  GA 27 Transparency revealing one's own character as well as self-esteem to lead a genuine and authentic life  GA 28 Social and Environmental Stewardship  GA 29 Readiness to make ethical decisions consistently from the galore of conflicting choices paying heed to their conscience  GA 30 Right life skills at the right moment										
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GA 30 Right life skills at the right moment	GA 29	· ·								
	GA 30	Right life skills at the right moment								

# PROGRAMME OUTCOMES (PO)

On completion (after three years) of B.C.A programme, the students are able to:

	Model Tool Usage: Understand, analyze and apply the concepts
PO 1	of latest technologies to bring solutions to the problems in the
	areas of computer applications.
	Computer Knowledge: Analyze and synthesize computing
PO 2	systems through quantitative and qualitative techniques along
	with effective verbal and non-verbal communication.
	Environment Sustainability: Apply technical and professional
DO 2	skills practically to excel in providing solutions for solving
PO 3	complex real life problems satisfying industrial and societal
	needs.
	Team Work with Professional Skills: To promote leadership
DO 4	skills and also as an individual on working with multi-
PO 4	disciplinary projects using Modern computing tools and Open-
	Source Technologies.
	Ethics: Commit to professional ethics and cyber regulations
PO 5	considering the societal and environmental issues within local
	and global contexts for sustainable development

# PROGRAMME SPECIFIC OUTCOMES (PSO)

On completion (after three years) of B.C.A programme, the students are able:

PSO 1	To achieve significant understanding of theoretical and programming concepts in key areas of Computer Applications.
PSO 2	To expand and sharpen practical and problem solving skills to provide solutions to industry, society and business problems.
PSO 3	To apply modern practices and strategies in software project development using open source and other programming environments.
PSO 4	To inculcate the ability to analyze and interpret problems, make inferences from the resulting data and apply technical skills to solve real time problems.
PSO 5	To make graduates understand various professional, technical and ethical issues prevailing in the industry
PSO 6	To gain exposure in preventive, ethical hacking and security technologies in recent trends
PSO 7	To equip the students to meet the requirement of Corporate world and Industry standards
PSO 8	To engage in professional development and to pursue Post graduate education in the fields of Information Technology and Computer Applications
PSO 9	To generate ideas of innovation and to identify, formulate and solve problems in software solutions, outsourcing services, public and private sectors
PSO 10	To engage the students technically on par with the societal and environmental responsibilities added with professional ethics

# FATIMA COLLEGE (AUTONOMOUS), MADURAI-18 DEPARTMENT OF COMPUTER APPLICATIONS (BCA)

For those who joined in June 2021 onwards

PROGRAMME CODE: USCA

## PART - I - TAMIL / FRENCH / HINDI- 12 CREDITS

### PART – I – TAMIL

### Offered by The Research Centre of Tamil

S. NO	SEM.	COURSE	COURSE TITLE	HRS	CRE DIT	CIA Mks	ESE Mks	TOT MKs
1.	I	19TL1C1	Language-Modern Literature nghJj;jkpo; - ,f;fhy ,yf;fpak;	5	3	40	60	100
2.	II	19TL2C2	Language - Bakthi Literature nghJj;jkpo; - gf;jp ,yf;fpak;	5	3	40	60	100
3.	III	19TL3C3	Language- Epic Literature nghJj;jkpo; - fhg;gpa ,yf;fpak;	5	3	40	60	100
4.	IV	19TL4C4	Language-Sangam Literature nghJj;jkpo; - rq;f ,yf;fpak;	5	3	40	60	100
			Total	20	12	160	240	400

### PART - I - FRENCH

## Offered by The Department of French

S. NO	SEM.	COURSE CODE	COURSE TITLE	HRS	CRE DIT	CIA Mks	ESE Mks	TOT. MKs
1.	I	19RL1C1	PART 1 LANGUAGE FRENCH	5	3	40	60	100
2.	II	19RL2C2	PART 1 LANGUAGE FRENCH	5	3	40	60	100

S. NO	SEM.	COURSE CODE	COURSE TITLE	HRS	CRE DIT	CIA Mks	ESE Mks	TOT. MKs
3.	Ш	19RL3C3	PART 1 LANGUAGE FRENCH	5	3	40	60	100
4.	IV	19RL4C4	PART 1 LANGUAGE FRENCH	5	3	40	60	100
			Total	20	12	160	240	400

## PART – I – HINDI

## Offered by The Department of Hindi

S. NO	SEM.	COURSEC ODE	COURSE TITLE	HRS	CRE DIT	CIA Mks	ESE Mks	TOT. MKs
1.	I	19DL1C1	PART 1 LANGUAGE HINDI	5	3	40	60	100
2.	II	19DL2C2	PART 1 LANGUAGE HINDI	5	3	40	60	100
3.	Ш	19DL3C3	PART 1 LANGUAGE HINDI	5	3	40	60	100
4.	IV	19DL4C4	PART 1 LANGUAGE HINDI	5	3	40	60	100
			Total	20	12	160	240	400

## PART - II -ENGLISH - 12 CREDITS

## Offered by The Research Centre of English

S. NO	SEM.	COURSEC ODE	COURSE TITLE	HRS	CRE DIT	CIA Mks	ESE Mks	TOT MKs
1.	Ţ	19EL1WB	BASIC COMMUNICATIVE ENGLISH	5	3	40	60	100
2.	_	19EL1WI	INTERMEDIATE COMMUNICATIVE	5	3	40	60	100

S. NO	SEM.	COURSEC ODE	COURSE TITLE	HRS	CRE DIT	CIA Mks	ESE Mks	TOT MKs
			ENGLISH					
3.		19EL1WA	ADVANCED COMMUNICATIVE ENGLISH	5	3	40	60	100
4.		19EL2WB	ENGLISH COMMUNICATION SKILLS (BASIC)	5	3	40	60	100
5.	п	19EL2WI	ENGLISH FOR EMPOWERMENT (INTERMEDIATE)	5	3	40	60	100
6.		19EL2WA	ENGLISH FOR CREATIVE WRITING (ADVANCED)	5	3	40	60	100
7.	Ш	19EL3WN	ENGLISH FOR DIGITAL ERA	5	3	40	60	100
8.	IV	19EL4WN	ENGLISH FOR INTEGRATED DEVELOPMENT	5	3	40	60	100
			Total	20	12	160	240	400

## PART - III -MAJOR, ALLIED & ELECTIVES - 95 CREDITS

## MAJOR CORE COURSES INCLUDING PRACTICALS : 60 CREDITS

S. NO	SE M	COURSE CODE	COURSE TITLE	HRS	CRED IT	CIA Mks	ESE Mks	TOT. Mks
1.	т	19J1CC1	PROGRAMMINGIN C	6	4	40	60	100
2.	I	19J1CC2	LAB IN CPROGRAMMING	6	3	40	60	100
3.	II	19J2CC3	OBJECT ORIENTED PROGRAMMING IN C++	6	4	40	60	100
4.	11	19J2CC4	LAB IN C++ PROGRAMMING	6	3	40	60	100
5.	III	19J3CC5	OPERATING SYSTEMS	6	4	40	60	100

6.		19J3CC6	RELATIONAL DATABASE MANAGEMENT SYSTEMS	<mark>6</mark>	3	40	<mark>60</mark>	100
7.	III	21AC3ACJ3	PRINCIPLES OF FINANCIAL A/C & A/C PACKAGE	5	5	40	60	100
8.	IV	19J4CC7	DATA STRUCTURESAND ALGORITHMS	6	4	40	60	100
9.		19J4CC8	WEB PROGRAMMING	6	3	<mark>40</mark>	<mark>60</mark>	100
10.		19J5CC9	SOFTWAREENGINEERING	<mark>5</mark>	<mark>5</mark>	<mark>40</mark>	<mark>60</mark>	<mark>100</mark>
10. 11.		19J5CC9 19J5CC10	SOFTWAREENGINEERING  JAVA PROGRAMMING	<mark>5</mark> 5	<mark>5</mark> 5	40	60 60	100
	V							
11.	V	19J5CC10	JAVA PROGRAMMING  LAB IN JAVA	5	5	40	60	100
11.	V	19J5CC10 19J5CC11	JAVA PROGRAMMING  LAB IN JAVA PROGRAMMING	5	5	40	60 60	100
11. 12. 13.		19J5CC10 19J5CC11 19J5CC12	JAVA PROGRAMMING  LAB IN JAVA PROGRAMMING  DOT NET PROGRAMMING	5 5 <u>5</u>	5 3 <mark>3</mark>	40 40	60 60 60	100 100 100
11. 12. 13. 14.	V	19J5CC10 19J5CC11 19J5CC12 19J6CC13	JAVA PROGRAMMING  LAB IN JAVA PROGRAMMING  DOT NET PROGRAMMING  PYTHON	5 5 5 5	5 3 3 5	40 40 40 40	60 60 60	100 100 100 100

### **ALLIEDCOURSES- 20 CREDITS**

	ALDIED COURSES- 20 CREDITS							
S.NO	SEM.	COURSE CODE	COURSE TITLE	HRS	CREDIT	CIA Mks	ESE Mks	TOT. MKs
1.	I	21G1ACJ1	DISCRETE MATHEMATICS	5	5	40	60	100
2.	II	21G2ACJ2	OPERATIONS RESEARCH	5	5	40	60	100
3.	III	21AC3ACJ3	PRINCIPLES OF FINANCIAL ACCOUNTING AND ACCOUNTING PACKAGE	5	5	40	60	100

4.	IV	19P4ACJ4	DIGITAL PRINCIPLES AND COMPUTER ORGANIZATION	5	5	40	60	100	
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## **ELECTIVES-15 CREDITS**

S. No	SEM	COURSE	COURSE TITLE	HRS	CREDIT	CIA Mks	ESE Mks	TOT Mks
1.	V	19J5ME1 / 19J5ME2	CLOUD COMPUTING / MOBILE COMPUTING	5	5	40	60	100
2.	7.77	19J6ME3 / 19J6ME4	SECURITY PRACTICES/ DATA MINING	5	5	40	60	100
3.	VI	19J6ME5 / 19J6ME6	INTERNET OFTHINGS / HUMAN COMPUTER INTERACTION	<u>5</u>	5	40	60	100

## PART - IV - 20 CREDITS

- VALUE EDUCATION
- ENVIRONMENTAL AWARENESS
- NON MAJOR ELECTIVE
- SKILL BASED COURSES

S. No	SEM	COURSEC ODE	COURSE TITLE	HR S	CRE DIT	CIA Mks	ESE Mks	TOT. Mks
1.		19G1VE	PERSONAL VALUES	1	1	40	60	100
2.	I	21J1NME	NON MAJOR ELECTIVE – I ANIMATIONTOOLS ANDTECHNIQUES	2	2	40	60	100
3.	II	19G2VE	VALUES FOR LIFE	1	1	40	60	100
4.	11	21J2NME	NON MAJOR ELECTIVE – II	2	2	40	60	100

S. No	SEM	COURSEC ODE	COURSE TITLE	HR S	CRE DIT	CIA Mks	ESE Mks	TOT. Mks
			ANIMATIONTOOLS ANDTECHNIQUES					
5.		19G3EE	ENVIRONMENTAL EDUCATION	1	1	40	60	100
6.	III	19J3SB1	SKILL BASED – I LOGICAL REASONING AND DATA INTERPRETATION	2	2	40	60	100
7.		19G4EE	ENVIRONMENTAL EDUCATION	1	1	40	60	100
8.	IV	19J4SB2	SKILL BASED – II DATA ANALYSIS USING SPREADSHEETS	2	2	40	60	100
9.		19J5SB3	SKILL BASED -III LAB IN ANIMATIONTECHNIQUES	2	2	40	60	100
10.	V	19J5SB4	SKILL BASED – IVLAB IN E –CONTENT DEVELOPMENT	2	2	40	60	100
11.	VI	19J6SB5	PHP	2	2	40	60	100
12.	VI	19J6SB6	LINUX	2	2	40	60	100

## PART - V - 1 CREDIT

# SHIFT - II (2021 Onwards)

S. No	SEM.	COURSE CODE	COURSE TITLE	HRS	CRE DIT	TOT. Mks
1.		21S4PED	Physical Education			
2.		21S4YRC	Youth Red Cross			
3.		21S4NSS	NSS	20.7		
4.	I - IV	21S4RTC	Rotaract	30/ SEM	1	100
5.		21S4WEC	Women Empowerment Cell			
6.		21S4ACUF	AICUF			

## **OFF-CLASS PROGRAMMES**

## **ADD-ON COURSES**

COURSE	COURSE TITLE	HRS.	CR ED ITS	SEMEST ER IN WHICH THE COURSE IS OFFERE D	CIA Mks	ESE Mks	TOT AL Mks
19UADCA	COMPUTER APPLICATIONS	40	2	I & II	40	60	100
19UADFC	ONLINE SELF LEARNING COURSES- Foundation Course for Arts	40	2	I	40	60	100
	ONLINE SELF LEARNING COURSE- Foundation Course for Science	40	2	II	40	60	100
19UADES	Social & Professional Ethics	15	1	III	40	60	100
	Personality Development	15	1	IV	40	60	100
	Family Life Education	15	1	V	40	60	100
	Life Skills	15	1	VI	40	60	100
19UADHR	HUMAN RIGHTS	15	2	V	100	-	100
19UADRS	OUTREACH PROGRAMME- Reach Out to Society through ActionROSA	100	3	V & VI	100	-	100
19UADPR	PROJECT	30	4	VI	40	60	100
19UADRC	READING CULTURE	10/ Semest er	1	II-VI	-	-	-
	TOTAL		20		_		

#### **EXTRA CREDIT COURSES**

COURSE	SELF LEARNING COURSES for ADVANCED LEARNERS	HR S.	CREDI TS	SEMEST ER IN WHICH THE COURSE IS OFFERE D	CIA MK S	ESE MK S	TOT AL MA RKS
21J1SL1	OPEN SOURCEANIMATIONTOOLS	-	2	II	40	60	100
21J2SLST2	STATISTICALDATASCIENCE USING PYTHON	-	2	II	40	60	100
21J3SLST3	STATISTICSUSINGR	-	2	II	40	60	100
21J4SLJM4	CONTENT WRITINGANDVIDEO EDITING	-	2	IV	40	60	100
21J5SLAC5	EMERGING TRENDSAND TECHNOLOGIES	-	2	VI	40	60	100
21J6SLI6	DATA SCIENCE	-	2	VI	40	60	100
	MOOC COURSES / International Certified online Courses (Department Specific Courses/any other courses) * Students can opt other than the listed course from UGC-SWAYAM UGC / CEC	-	Minim um 2 Credit s	I – VI	-	-	

### **OFF CLASS PROGRAMMES**

19UGVAJ1 - Value Added Crash Course Android Application Development

19UGVAJ2 - Crash Course E-Content Development

19UAD2CA - Value Added Certificate Course VB.NET - (Only for First Years - Compulsory)

#### II B.C.A

## **OLD-10%**

## **SEMESTER - III**

## For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS / WEEK	CREDITS
USCA	19J3CC6	RELATIONAL DATABASE MANAGEMENT SYSTEMS	PRACTICAL	<mark>6</mark>	<mark>3</mark>

## **COURSE DESCRIPTION**

To learn Relational Database concepts and to work with dynamic, reflective, object-oriented concepts through Query processing

#### **COURSE OBJECTIVES**

- 1. To give in depth practical approach to the database concepts.
- 2. To populate relational database and formulate SQL queries on data.
- 3. To developing database designs

#### PROGRAM LIST

- 1. Implement Queries using DDL Commands
- 2. Implement Queries using SELECT commands
- 3. Implement Queries using Set operations
- 4. Implement Queries using Joins.
- 5. Implement Queries using Grouping Functions.
- 6. Implement Queries using Sequence.
- 7. Implement Queries using Views and Indexes
- 8. Implement Date Functions.
- 9. Implement String Functions.

#### **WEB REFERENCES:**

- 1. https://www.tutorialspoint.com/sql/sql-rdbms-concepts.htm
- 2. <a href="https://www.tutorialspoint.com/ruby/index.htm">https://www.tutorialspoint.com/ruby/index.htm</a>
- 3. https://www.javatpoint.com/ruby-tutorial

#### **OER RESOURCES:**

1. https://www.oercommons.org/authoring/14614-rdbms/1/view

## COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	RELATIONAL DATABASE MA	NAGEMEN'	r systems	
1.1	DDL commands	10	Demo & Lab	LCD
1.2	DML commands	10	Chalk & Talk	PPT & White board
1.3	Normalization Techniques	10	Lecture	PPT & White board
1.4	SELECT commands			
1.5	Set operations	10	Demo & Lab	LCD
1.6	Joins	10	Chalk & Talk	PPT & White board
1.7	Grouping Functions	8	Lecture	PPT & White board
1.8	Sequence	5	Demo & Lab	LCD
1.9	Views and Indexes	5	Chalk &Talk	PPT & White board
1.10	Cursors, Packages and Triggers	3	Lecture	PPT & White board
1.11	Date Functions	3		
1.12	String Functions	3	Chalk & Talk	PPT & White board

CIA

Scholastic 35

Non Scholastic **5** 

40

# **EVALUATION PATTERN**

	SCHOLASTIC			NON - SCHOLASTIC		MARKS		
C1	C2	С3	C4	С5	C6	CIA ESE T		Total
10	10	5	5	5	5	40	60	100

## **UG CIA Components**

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
<b>C2</b>	-	Test (CIA 2)	1		10 Mks
C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 <b>*</b>	-	5 Mks
<b>C5</b>	-	Quiz	2 *	_	5 Mks
<b>C6</b>	-	Attendance		_	5 Mks

<sup>\*</sup>The best out of two will be taken into account

## **COURSE OUTCOMES**

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

S.No	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Critique SQL commands to create tables and indexes	<b>K</b> 1	PSO1& PSO2
CO 2	Apply DDL and DML commands in real time applications	K1, K2 & K3	PSO1, PSO2, PSO3

CO 3	Understand the needs of triggering applications	K2, K3 & K4	PSO5, PSO6
CO 4	Disseminate knowledge of RDBMS and SQL, both in terms of design and implementation usage	K1, K2, K3 & K4	PSO3, PSO5, PSO6
CO 5	Write dynamic queries to demonstrate the concepts of RDBMS	K2, K3 & K4	PSO4, PSO5, PSO6

**Mapping COs Consistency with PSOs** 

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	3	3	1	2	2	1	1	2	1	1
CO2	3	3	3	2	1	1	2	2	1	2
соз	2	2	1	2	3	3	2	2	1	2
CO4	2	2	3	2	3	3	2	2	1	1
CO5	2	2	2	3	3	3	2	2	1	2

# Mapping of COs with Pos

CO/ PSO	PO1	PO2	PO3	PO4	PO5
CO1	3	1	1	1	1
CO2	1	1	3	1	2
CO3	1	2	1	3	1
CO4	1	1	1	1	1
CO5	1	1	1	1	1

#### Note:

- ☐ Strongly Correlated **3**
- $\square$  Moderately Correlated **2**
- ☐ Weakly Correlated -1

### **COURSE DESIGNER:**

1. Staff Name: Mrs. RAMYA R

### Forwarded By

(S.Selvarani)

**NEW** 

## II B.C.A SEMESTER – III

### For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS / WEEK	CREDITS
USCA	19J3CC6	RELATIONAL DATABASE MANAGEMENT SYSTEMS	PRACTICAL	<mark>6</mark>	<mark>3</mark>

#### COURSE DESCRIPTION

To learn Relational Database concepts and to work with dynamic, reflective, object-oriented concepts through Query processing

## **COURSE OBJECTIVES**

- 1. To give in depth practical approach to the database concepts.
- 2. To populate relational database and formulate SQL queries on data.
- 3. To developing database designs

#### PROGRAM LIST

- 1. Implement Queries using DDL commands
- 2. Implement Queries using DML commands
- 3. Implement Normalization Techniques.
- 4. Implement Queries using SELECT commands
- 5. Implement Queries using Set operations
- 6. Implement Queries using Joins.
- 7. Implement Queries using Grouping Functions.
- 8. Implement Queries using Sequence.
- 9. Implement Queries using Views and Indexes
- 10. Implement Queries using Cursors.
- 11. Implement Packages and Triggers.

- 12. Implement Stored Procedures.
- 13. Implement Cursors using PL/SQL program
- 14. Implement Packages and Triggers using PL/SQL program
- 15. Implement Date and String Functions.
- 16. Implement Constraints Primary Key and Foreign Key.

## **WEB REFERENCES:**

- 1. https://www.tutorialspoint.com/sql/sql-rdbms-concepts.htm
- 2. https://www.tutorialspoint.com/ruby/index.htm
- 3. https://www.javatpoint.com/ruby-tutorial

### **OER RESOURCES:**

1. https://www.oercommons.org/authoring/14614-rdbms/1/view

### COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	RELATIONAL DATABASE MA	NAGEMEN'	T SYSTEMS	
1.1	DDL commands	10	Demo & Lab	LCD
1.2	DML commands	10	Chalk & Talk	PPT & White board
1.3	Normalization Techniques	10	Lecture	PPT & White board
1.4	SELECT commands			
1.5	Set operations	10	Demo & Lab	LCD
1.6	Joins	10	Chalk & Talk	PPT & White board
1.7	Grouping Functions	8	Lecture	PPT & White board
1.8	Sequence	5	Demo &	LCD

			Lab	
1.9	Views and Indexes	5	Chalk & Talk	PPT & White board
1.10	Cursors, Packages and Triggers	3	Lecture	PPT & White board
1.11	Date Functions	3		
1.12	String Functions	3	Chalk & Talk	PPT & White board
1.13	Primary Key and Foreign Key	3	Chalk & Talk	PPT & White board

CIA

Scholastic 35

Non Scholastic **5** 

40

# **EVALUATION PATTERN**

	SCHOLASTIC NON - SCHOLASTIC				NON - SCHOLASTIC		MARKS	
C1	C2	С3	C4	C5	C6	CIA ESE Tota		Total
10	10	5	5	5	5	40	60	100

# **UG CIA Components**

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
<b>C2</b>	-	Test (CIA 2)	1		10 Mks
СЗ	_	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 <b>*</b>	-	5 Mks
<b>C5</b>	_	Quiz	2 *	=	5 Mks

**C6** - Attendance - 5 Mks

# \*The best out of two will be taken into account

## COURSE OUTCOMES

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

S.No	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Critique SQL commands to create tables and indexes	<b>K</b> 1	PSO1& PSO2
CO 2	Apply DDL and DML commands in real time applications	K1, K2 & K3	PSO1, PSO2, PSO3
CO 3	Understand the needs of triggering applications	K2, K3 & K4	PSO5, PSO6
CO 4	Disseminate knowledge of RDBMS and SQL, both in terms of design and implementation usage	K1, K2, K3 & K4	PSO3, PSO5, PSO6
CO 5	Write dynamic queries to demonstrate the concepts of RDBMS	K2, K3 & K4	PSO4, PSO5, PSO6

**Mapping COs Consistency with PSOs** 

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	3	3	1	2	2	1	1	2	1	1
CO2	3	3	3	2	1	1	2	2	1	2
соз	2	2	1	2	3	3	2	2	1	2
CO4	2	2	3	2	3	3	2	2	1	1
CO5	2	2	2	3	3	3	2	2	1	2

# Mapping of COs with Pos

CO/ PSO	PO1	PO2	PO3	PO4	PO5
CO1	3	1	1	1	1
CO2	1	1	3	1	2
CO3	1	2	1	3	1
CO4	1	1	1	1	1
CO5	1	1	1	1	1

## Note:

- ☐ Strongly Correlated **3**
- ☐ Moderately Correlated 2
- $\square$  Weakly Correlated -1

### **COURSE DESIGNER:**

1. Staff Name: Mrs. RAMYA R

Forwarded By

(S.Selvarani)

# II B.C.A SEMESTER – IV

**OLD-10%** 

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS / WEEK	CREDITS
USCA	19J4CC8	WEB PROGRAMMING	PRACTICAL	<mark>6</mark>	<mark>3</mark>

### **COURSE DESCRIPTION**

To understand web design principles and technologies and to create web pages with emerging and existing technologies added with scripting.

#### **COURSE OBJECTIVES**

- 1. To impart the practical aspects in the development of web pages.
- 2. To develop an ability to design and implement static and dynamic website.
- 3. To Use scripting languages and web services to transfer data and add interactive components to web pages.

#### PROGRAM LIST:

- 1. Create website for Fatima College using Java Script.
- 2. Create website for online shopping.
- 3. Create website for online Newspaper.
- 4. Prepare a personal biodata.
- 5. Perform Form validation.
- 6. Create Employee details using database connection.
- 7. Perform bank operation using database connection.
- 8. Create a website for online test.

### **WEB REFERENCES:**

- 1. https://www.w3schools.com/html/
- 2. <a href="https://www.tutorialspoint.com/vbscript/index.htm">https://www.tutorialspoint.com/vbscript/index.htm</a>

### **OER REFERENCES:**

https://nptel.ac.in/courses/106/105/106105084/

### COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	UNIT 1: Design and Analy	vsis with D	atatypes	
1.1	Website for Fatima college	10	Demo & Lab	LCD
1.2	Website for online shopping	10	Chalk & Talk	LCD
1.3	Website for online News Paper	10	Demo & Lab	PPT & White board
1.4	Personal bio – data	10	Demo & Lab	Smart Board
1.5	Perform Form validation	10	Lecture	LCD
1.6	Employee details using database connection	10	Discussion	Google classroom
1.7	Bank operation using database connection	10	Demo & Lab	LCD
1.8	Website for online test	10	Demo & Lab	LCD

CIA

Scholastic 35

Non Scholastic **5** 

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# **EVALUATION PATTERN**

	SCHOLASTIC			NON - SCHOLASTIC		MARKS		
C1	C2	С3	C4	C5	C6	CIA ESE Tota		Total
10	10	5	5	5	5	40	60	100

## **UG CIA Components**

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
C2	-	Test (CIA 2)	1	-	10 Mks
СЗ	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 <b>*</b>		5 Mks
<b>C5</b>	-	Quiz	2 *	-	5 Mks
<b>C6</b>	=	Attendance		-	5 Mks

<sup>\*</sup>The best out of two will be taken into account

# **COURSE OUTCOMES**

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Select and apply markup languages for processing and presenting information in web pages.	<b>K</b> 1	PSO1& PSO2
CO 2	Design and implement dynamic websites with good aesthetic sense of designing.	K2	PSO2, PSO3
CO 3	Use fundamental skills to maintain web server services required to host a website.	К3	PSO3, PSO5
CO 4	Prepare the students to write a well formed DB connection	кз	PSO5, PSO8
CO 5	Create Webpages for any application	K4	PSO8

# **Mapping COs Consistency with PSOs**

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	3	3	2	1	2	1	2	2	1	2
CO2	2	3	3	3	2	1	1	2	1	2
соз	2	2	3	2	3	2	2	2	2	1
CO4	2	2	2	2	3	1	2	3	3	2
CO5	2	2	2	2	2	1	2	3	1	2

# Mapping of COs with POs

CO/ PSO	PO1	PO2	РО3	PO4	PO5
CO1	1	3	1	1	1
CO2	1	1	3	1	2
CO3	1	1	3	3	1
CO4	1	1	1	1	1
CO5	1	1	1	1	1

### Note:

- ☐ Strongly Correlated **3**
- ☐ Moderately Correlated 2
- ☐ Weakly Correlated -1

### **COURSE DESIGNER:**

1. Staff Name: Ms. S. Selvarani

2. Forwarded By

(S.Selvarani)

Selvarari

## **NEW**

# II B.C.A SEMESTER – IV

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS / WEEK	CREDITS
USCA	<b>19J4CC8</b>	WEB PROGRAMMING	PRACTICAL	<mark>6</mark>	<mark>3</mark>

#### COURSE DESCRIPTION

To provide the student with foundational programming knowledge and skills for application development on the Internet.

### UNITS

#### UNIT I: STATIC WEB PAGE DEVELOPMENT

Basics of HTML: What is Internet Language?, Understanding HTML, Create a Web page, Linking to other Web Pages, Publishing HTML Pages, Text Alignment and Lists, Text Formatting Fonts Control, Email Links and link within a Page, Creating a Table, Creating HTML Forms, Custom Backgrounds and Colors.

#### UNIT II: CASCADING STYLE SHEETS

Introduction: CSS, Defining Style with HTML Tags, Features of Style Sheet, Style Properties, Style Classes, External Style Sheet

#### UNIT III: JAVASCRIPT

Introduction to JavaScript: Writing First Java Script, External JavaScript, Variables: Rules for variable names, Declaring the variable, Assign a value to a variable, Scope of variable, Using Operators, Control Statements, JavaScript loops, JavaScript Functions: Defining a Function, Returning value from function, User define function.

#### UNIT IV: INTRODUCTION TO PHP

(6 HRS)

What does PHP do? – History – Installing PHP – Language basics – Data types – Variables – Expressions & Operators – Control flow statements – Including code – Embedding PHP in web pages.

UNIT V: (6HRS)

**DATABASE CONNECTIVITY**: Introduction – Connecting Database – Retrieving data – Updating Data – Deleting Data.

## **List of Programmes:**

- 1. Develop simple HTML pages using HTML lists
- 2. Develop simple HTML pages using HTML Links
- 3. Develop simple HTML pages using images
- 4. Develop simple HTML pages using Tables
- 5. Develop simple HTML pages using frames
- 6. Develop web pages with user interface using CSS
- 7. Develop web pages with Forms and its controls
- 8. Implement functions with JavaScript
- 9. Implement Event Handling using JavaScript
- 10. Implement form validation using JavaScript
- 11. Design and develop simple php applications
- 12. Illustrate Form Data Retrieval using PHP
- 13. Implement session & cookie management using PHP
- 14. Illustrate database and table creation using mysql
- 15. Develop web pages for data handling using PHP (Insert, Delete and Update)

#### **TEXT BOOK:**

1. "Web enabled commercial Application development using HTML, JAVA Script, DHTML and PHP" Ivan Bayross, 4thEdition, BPB Publications.

### **WEB REFERENCES:**

- 1. https://www.w3schools.com/html/
- 2. https://www.tutorialspoint.com/vbscript/index.htm

## **OER REFERENCES:**

https://nptel.ac.in/courses/106/105/106105084/

# COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	UNIT 1: Design and Analy	ysis with D	atatypes	
1.1	Website for Fatima college	10	Demo & Lab	LCD
1.2	Website for online shopping	10	Chalk & Talk	LCD
1.3	Website for online News Paper	10	Demo & Lab	PPT & White board
1.4	Personal bio – data	10	Demo & Lab	Smart Board
1.5	Perform Form validation	10	Lecture	LCD
1.6	Employee details using database connection	10	Discussion	Google classroom
1.7	Bank operation using database connection	10	Demo & Lab	LCD
1.8	Website for online test	10	Demo & Lab	LCD
1.9	Implement Event Handling using JavaScript	10	Demo & Lab	PPT & White board
1.10	Implement form validation using JavaScript	10	Demo & Lab	Smart Board
1.11	Design and develop simple php applications	10	Lecture	LCD
1.12	Illustrate Form Data Retrieval using PHP	10	Discussio n	Google classroom

1.13	Implement session & cookie management using PHP	10	Demo & Lab	LCD
1.14	Illustrate database and table creation using mysql	10	Demo & Lab	LCD
1.15	Develop web pages for data handling using PHP (Insert, Delete and Update)	10	Demo & Lab	PPT & White board

CIA

Scholastic 35

Non Scholastic **5** 

40

# **EVALUATION PATTERN**

	SCHOLASTIC			NON - SCHOLASTIC		MARKS		
C1	C2	С3	C4	C5	C6	CIA ESE To		Total
10	10	5	5	5	5	40	60	100

# **UG CIA Components**

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
<b>C2</b>	-	Test (CIA 2)	1	-	10 Mks
<b>C3</b>	-	Assignment	1	-	5 Mks
C4	_	Open Book Test/PPT	2 *	_	5 Mks

**C5** - Quiz 2 \* - 5 Mks

**C6** - Attendance - 5 Mks

# \*The best out of two will be taken into account

# COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Select and apply markup languages for processing and presenting information in web pages.	<b>K</b> 1	PSO1& PSO2
CO 2	Design and implement dynamic websites with good aesthetic sense of designing.	K2	PSO2, PSO3
CO 3	Use fundamental skills to maintain web server services required to host a website.	К3	PSO3, PSO5
CO 4	Prepare the students to write a well formed DB connection	кз	PSO5, PSO8
CO 5	Create Webpages for any application	K4	PSO8

# Mapping COs Consistency with PSOs

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	3	3	2	1	2	1	2	2	1	2
CO2	2	3	3	3	2	1	1	2	1	2
соз	2	2	3	2	3	2	2	2	2	1
CO4	2	2	2	2	3	1	2	3	3	2
CO5	2	2	2	2	2	1	2	3	1	2

# Mapping of COs with POs

CO/ PSO	PO1	PO2	РО3	PO4	PO5
CO1	1	3	1	1	1
CO2	1	1	3	1	2
CO3	1	1	3	3	1
CO4	1	1	1	1	1
CO5	1	1	1	1	1

## Note:

- ☐ Strongly Correlated **3**
- ☐ Moderately Correlated 2
- $\square$  Weakly Correlated -1

### **COURSE DESIGNER:**

- 1. Staff Name: Ms. S. Selvarani
- 2. Forwarded By

(S.Selvarani)

Selvarari

# III B.C.A SEMESTER – V

**OLD-10%** 

## For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS	CREDITS
USCA	19J5CC9	SOFTWARE ENGINEERING	THEORY	<mark>5</mark>	<mark>5</mark>

#### COURSE DESCRIPTION

Aims to provide a thorough knowledge about various phases involved insoftware development along with the testing techniques.

#### **COURSE OBJECTIVES**

- 1. To impart fundamental knowledge and skills in Software Engineering.
- 2. To think critically, clearly identifying and using evidence, criteria, and values in decision making process.
- 3. To develop Software engineering skills that will enable them to create high quality of software.
- 4. To gain the techniques and skills on how to use modern software testing tools to support software testing projects.
- 5. To understand software test automation problems and solutions.

### UNITS

### UNIT I: INTRODUCTION TO SOFTWARE ENGINEERING (12 HRS)

Definitions – Size Factors – Quality and Productivity Factors – Planning a Software Project:Planning the Development Process – Planning an Organizational Structure

### UNIT II: COST ESTIMATION

(12 HRS)

Software cost Factors – Software Cost Estimation Techniques – Staffing – Level Estimation – Estimating Software Estimation Costs.

### UNIT III: SOFTWARE REQUIREMENTS DEFINITION (12 HRS)

The Software Requirements specification – Formal Specification Techniques – Software Design:Fundamental Design Concepts – Modules – Modularization Criteria.

### **UNIT IV: SOFTWARE TESTING**

(12 HRS)

Levels of Testing – Introduction – Proposal Testing – Requirement Testing–
Design Testing– Code Review – Unit testing – Module Testing – Integration
testing – Big – Bang Testing– System testing– Testing stages – Special Tests –
Complexity – GUI – Compatibility – Security – Performance – Volume – Stress
– Recovery – Installation– Manual Support – Adhoc Testing – Usability Testing

### **UNIT V: TESTING TOOLS**

(12 Hrs)

Software Testing tools an Overview: Need for automated Testing tools—Taxonomy of Testing tools—Functional — Regression testing tools—Performance Testing Tools—Testing Management tools—Source code testing tools—How to select a testing tool.

#### **UNIT VI: DYNAMISM**

Manual Test Cases – UML Diagrams – Developing Software using SDLC Model – Case Study for Test Cases – Testing Tools Online

### REFERENCE BOOKS:

- 1. Software Engineering Concepts, Richard Fairley, 2012, TMH.
- 2. Software Engineering Project Management, 2nd Edition, 2006, Wiley India.
- 3. Software testing principles , techniques and tools, M.G. LIMAYE , Tata McGraw Hill , 2009.
- 4. Software Testing Tools, Dr. K. V. K. K. Prasad, Dream Tech press, Edition 2012

#### WEB REFERENCES:

- 1. <a href="https://en.wikipedia.org/wiki/Software\_engineering">https://en.wikipedia.org/wiki/Software\_engineering</a>
- 2. https://www.tutorialspoint.com/software\_engineering/index.htm
- 3. https://www.softwaretestingmaterial.com/software-testing/

#### **OER REFERENCES:**

https://www.oercommons.org/courses/software-engineering

# COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids				
	UNIT 1: INTRODUCTION TO SO	OFTWARE E	NGINEERING	•				
1.1	Definitions – Size Factors	3	Chalk & Talk	Black Board				
1.2	Quality and Productivity Factors	3	Chalk & Talk	LCD				
1.3	Planning the Development Process	3	Lecture	PPT & White board				
1.4	Planning an Organizational Structure	3	Lecture	Smart Board				
UNIT 2: COST ESTIMATION								
2.1	Software cost Factors	3	Chalk & Talk	Black Board				
2.2	Software Cost Estimation Techniques	3	Chalk & Talk	LCD				
2.3	Staffing-Level Estimation	3	Lecture	PPT & White board				
2.4	Estimating Software Estimation Costs	3	Lecture	Smart Board				
	UNIT -3 SOFTWARE REQUIRE	EMENTS DE	FINITION					
3.1	The Software Requirements specification	3	Chalk & Talk	Black Board				
3.2	Formal Specification Techniques	3	Chalk & Talk	LCD				
3.3	Fundamental Design Concepts- Modules	2	Lecture	PPT				
3.4	Modularization Criteria	2	Lecture	PPT				

3.5	Data Flow Diagram – 0 LevelDFD – 1 Level DFD – 2 Level DFD.	2		
	UNIT -4 SOFTWAR	E TESTING		
4.1	Introduction: Purpose– Productivity and Quality in Software	2	Chalk & Talk	Black Board
4.2	Testing Vs Debugging	2	Chalk & Talk	LCD
4.3	Model for Testing	2	Lecture	PPT & White board
4.4	Bugs–Types of Bugs	3	Lecture	Smart Board
4.5	Testing and Design Style.	3	Lecture	Black Board
	UNIT -5 TESTING	rechniqu	ES	
5.1	Software Testing tools an Overview: Need for automated Testing tools	2	Chalk & Talk	Black Board
5.2	Taxonomy of Testing tools– Functional – Regression testing tools	2	Chalk & Talk	LCD
5.3	Performance Testing Tools– Testing Management tools	3	Lecture	PPT & White board
5.4	Source code testing tools– How to select a testing tool	3	Lecture	Smart Board

# INTERNAL – UG

						Total	Non	CIA	
Levels	C1	C2	С3	C4	C5	Scholasti c Marks	Scholasti c Marks	Total	
						CWAIKS	CWAIKS		

							C6		% of
									Assess
									ment
				Assig	ОРТ /				
	T1	Т2	Quiz	nmen	OBT/ PPT			40	
				t	111	35 Mks.	5 Mks.	Mks.	
	10	10 Mks.	5 Mks.	5	5			WKS.	
	Mks.	TO MKS.	J MKS.	Mks	Mks				
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
К3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non									
Schola	-	-	-	-	-		5	5	12.5 %
stic									14.5 /0
Total	10	10	5	5	5	35	5	40	100 %

# **END SEMESTER - UG**

Levels	Section A (i)	Sectio n A (ii)	Section B	Section C	Section D	Section E	Total	
	5 Mks.	5 Mks	8 Mks.	12 Mks	20 Mks.	10 Mks.	60Mks.	
K1	5	5	-	4	-	1	14	23.33 %
K2	ı	ı	8	4	ı	1	12	20 %
К3	-	-	-	-	20	ı	20	33.33 %
K4	-	-	-	4	-	10	14	23.34 %
Total	5	5	8	12	20	10	60	100 %

Scholastic 35

Non Scholastic **5** 

40

# **EVALUATION PATTERN**

	SC	HOLAS	TIC		NON - SCHOLASTIC	MARKS		
C1	C2	СЗ	C4	С5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

## **UG CIA Components**

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
C2	-	Test (CIA 2)	1	-	10 Mks
C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 <b>*</b>	-	5 Mks
<b>C5</b>	_	Quiz	2 <b>*</b>	-	5 Mks
<b>C6</b>	-	Attendance		-	5 Mks

<sup>\*</sup>The best out of two will be taken into account

# COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Compare the various software models	K1	PSO1& PSO2
CO 2	Use knowledge, techniques, skills and modern tools necessary for software engineering practice	K1, K2, K3	PSO3
CO 3	Analyze on the design factors and guidelines	K1 & K3	PSO5
CO 4	Understand the different types of testing used in software's	K1, K2, K3	PSO3, PSO5
CO 5	Understand the various types of Testing tools	K2, K3 & K4	PSO8

# **Mapping COs Consistency with PSOs**

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	3	3	1	1	1	1	2	2	1	1
CO2	2	2	3	2	2	1	1	2	1	1
соз	2	2	2	2	3	1	1	2	2	1
CO4	2	1	3	2	3	1	2	2	1	1
CO5	2	2	1	2	2	2	2	3	1	2

# Mapping of COs with POs

CO/ PSO	PO1	PO2	РО3	PO4	PO5
CO1	1	3	1	1	1
CO2	1	1	3	1	2
CO3	1	1	3	3	1
CO4	1	1	1	1	1
CO5	1	1	1	1	1

## Note:

- ☐ Strongly Correlated **3**
- ☐ Moderately Correlated 2
- ☐ Weakly Correlated -1

## **COURSE DESIGNER:**

1. Staff Name: Ms. S. Selvarani

Forwarded By

(S.Selvarani)

## **NEW**

# III B.C.A SEMESTER – V

## For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS	CREDITS
USCA	19J5CC9	SOFTWARE ENGINEERING	THEORY	<mark>5</mark>	<mark>5</mark>

#### **COURSE DESCRIPTION**

Aims to provide a thorough knowledge about various phases involved insoftware development along with the testing techniques.

#### **COURSE OBJECTIVES**

- 6. To impart fundamental knowledge and skills in Software Engineering.
- 7. To think critically, clearly identifying and using evidence, criteria, and values in decision making process.
- 8. To develop Software engineering skills that will enable them to create high quality of software.
- 9. To gain the techniques and skills on how to use modern software testing tools to support software testing projects.
- 10.

o understand software test automation problems and solutions.

### UNITS

### UNIT I: INTRODUCTION TO SOFTWARE ENGINEERING (12 HRS)

Definitions – Size Factors – Quality and Productivity Factors – Planning a Software Project:Planning the Development Process – Planning an Organizational Structure

### UNIT II: COST ESTIMATION and SOFTWARE COST FACTORS(12 HRS)

Software Cost Factors -Software Cost Estimation Techniques – Staffing – Level

Т

Estimation – Estimating Software Estimation Costs.

### UNIT III: SOFTWARE REQUIREMENTS DEFINITION (12 HRS)

The Software Requirements specification – Formal Specification Techniques – Software Design:Fundamental Design Concepts – Modules – Modularization Criteria – Data Flow Diagram – 0 Level DFD – 1 Level DFD – 2 Level DFD.

#### **UNIT IV: SOFTWARE TESTING**

(12 HRS)

Introduction: Purpose-Productivity and Quality in Software-Testing Vs Debugging – Model for Testing-Bugs-Types of Bugs – Testing and Design Style.

### **UNIT V: TESTING TECHNIQUES**

(12 Hrs)

Flow Graphs and Path Testing – Achievable paths – Path instrumentation Application Transaction Flow Testing Techniques.

### TEXT BOOKS:

- 1. Richard Fairley, "Software Engineering Concepts", 2012, TMH.
- 2. B.Beizer, "Software Testing Techniques", IIEdn., Dream Tech India, New Delhi, 2003.
- 3. K.V.K.Prasad, "SoftwareTestingTools", DreamTech.India, NewDelhi, 2005

## **REFERENCE BOOKS:**

- 1. "Software Engineering Project Management", 2nd Edition, 2006, Wiley India.
- 2. Dr. K. V. K. K. Prasad, "Software Testing Tools", Dream Tech press, 2012, Edition.

### **WEB REFERENCES:**

https://en.wikipedia.org/wiki/Software\_engineering

https://www.tutorialspoint.com/software\_engineering/index.htm

https://www.softwaretestingmaterial.com/software%E2%80%93testing/

#### **OER REFERENCES:**

https://www.oercommons.org/courses/software-engineering

### COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids				
	UNIT 1: INTRODUCTION TO SO	OFTWARE E	NGINEERING	1				
1.1	Definitions – Size Factors	3	Chalk & Talk	Black Board				
1.2	Quality and Productivity Factors	3	Chalk & Talk	LCD				
1.3	Planning the Development Process	3	Lecture	PPT & White board				
1.4	Planning an Organizational Structure	3	Lecture	Smart Board				
UNIT 2: COST ESTIMATION								
2.1	Software cost Factors	3	Chalk & Talk	Black Board				
2.2	Software Cost Estimation Techniques	3	Chalk & Talk	LCD				
2.3	Staffing-Level Estimation	3	Lecture	PPT & White board				
2.4	Estimating Software Estimation Costs	3	Lecture	Smart Board				
	UNIT -3 SOFTWARE REQUIRE	EMENTS DE	FINITION					
3.1	The Software Requirements specification	3	Chalk & Talk	Black Board				
3.2	Formal Specification Techniques	3	Chalk & Talk	LCD				
3.3	Fundamental Design Concepts- Modules	2	Lecture	PPT				
3.4	Modularization Criteria	2	Lecture	PPT				
3.5	Data Flow Diagram – 0 Level DFD – 1 Level DFD – 2 Level	2						

	DFD.			
	UNIT -4 SOFTWAR	E TESTING		
4.1	Introduction: Purpose– Productivity and Quality in Software	2	Chalk & Talk	Black Board
4.2	Testing Vs Debugging	2	Chalk & Talk	LCD
4.3	Model for Testing	2	Lecture	PPT & White board
4.4	Bugs–Types of Bugs	3	Lecture	Smart Board
4.5	Testing and Design Style.	3	Lecture	Black Board
	UNIT -5 TESTING	rechniqu	ES	
5.1	Flow Graphs and Path Testing	2	Chalk & Talk	Black Board
5.2	Achievable paths	2	Chalk & Talk	LCD
5.3	Path instrumentation	3	Lecture	PPT & White board
5.4	Application Transaction Flow Testing Techniques.	3	Lecture	Smart Board

# INTERNAL – UG

Levels	C1	C2	СЗ	C4	C5	Total Scholasti c Marks	Non Scholasti c Marks C6	CIA Total	% of Assess ment
	Т1	Т2	Quiz	Assig nmen t	OBT/ PPT	35 Mks.	5 Mks.	40 Mks.	

	10	10 Mks.	5 Mks.	5	5				
	Mks.	TO MKS.	J MKS.	Mks	Mks				
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
КЗ	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non									
Schola	-	-	-	-	-		5	5	12.5 %
stic									12.0 /0
Total	10	10	5	5	5	35	5	40	100 %

# **END SEMESTER - UG**

Levels	Section A (i) 5 Mks.	Sectio n A (ii) 5 Mks	Section B 8 Mks.	Section C 12 Mks	Section D 20 Mks.	Section E  10 Mks.	Total 60Mks.	
K1	5	5	-	4	-	-	14	23.33 %
K2	-	-	8	4	-	-	12	20 %
К3	-	-	ı	-	20	1	20	33.33 %
K4	-	-	ı	4	-	10	14	23.34 %
Total	5	5	8	12	20	10	60	100 %

Scholastic 35

Non Scholastic **5** 

40

## **EVALUATION PATTERN**

	SC	HOLAS	TIC		NON - SCHOLASTIC	MARKS		
C1	C2	С3	C4	С5	С6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

## **UG CIA Components**

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
C2	-	Test (CIA 2)	1	-	10 Mks
C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 <b>*</b>	-	5 Mks
<b>C5</b>	_	Quiz	2 *	_	5 Mks
<b>C6</b>	-	Attendance		-	5 Mks

<sup>\*</sup>The best out of two will be taken into account

# COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Compare the various software models	K1	PSO1& PSO2
CO 2	Use knowledge, techniques, skills and modern tools necessary for software engineering practice	K1, K2, K3	PSO3
CO 3	Analyze on the design factors and guidelines	K1 & K3	PSO5
CO 4	Understand the different types of testing used in software's	K1, K2, K3	PSO3, PSO5
CO 5	Understand the various types of Testing tools	K2, K3 & K4	PSO8

# **Mapping COs Consistency with PSOs**

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	3	3	1	1	1	1	2	2	1	1
CO2	2	2	3	2	2	1	1	2	1	1
соз	2	2	2	2	3	1	1	2	2	1
CO4	2	1	3	2	3	1	2	2	1	1
CO5	2	2	1	2	2	2	2	3	1	2

# Mapping of COs with POs

CO/ PSO	PO1	PO2	PO3	PO4	PO5
CO1	1	3	1	1	1
CO2	1	1	3	1	2
CO3	1	1	3	3	1
CO4	1	1	1	1	1
CO5	1	1	1	1	1

## Note:

- ☐ Strongly Correlated **3**
- ☐ Moderately Correlated **2**
- ☐ Weakly Correlated -1

### **COURSE DESIGNER:**

1. Staff Name: Ms. S. Selvarani

## Forwarded By

(S.Selvarani)

# III B.C.A SEMESTER - V

**OLD-10%** 

## For those who joined in 2021 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS /WEEK	CREDITS
USCA	19J5CC12	DOT NET PROGRAMMING	ELECTIVE PRACTICAL	<mark>5</mark>	<mark>3</mark>

### **COURSE DESCRIPTION**

To know the rapid development of powerful Window applications and Web application which makes the web development easier

#### **COURSE OBJECTIVES**

- 1. To develop web programming skills through the use of Dot Net Frameworks
- 2. To design and implement web pages for real time applications

### PROGRAM LIST:

- 1. Develop a database application to view the details of students
- 2. Develop a database application to insert, modify, update and delete operations for Employee Payment
- 3. Develop an application using Datagrid to display records.
- 4. Develop an application using Datagrid to add, edit and modify records
- 5. Create a simple web page using forms and controls
- 6. Create a web application for Room Reservations.
- 7. Create web pages with links and Custom Controls
- 8. Develop a web application to create a online newspaper
- 9. Develop a web application to create a online Quiz
- 10. Develop a web application for E-Shopping using C# with .Net

#### WEB REFERENCES:

- 1. https://dotnet.microsoft.com/languages
- 2. <a href="https://www.tutorialspoint.com/asp.net/index.htm">https://www.tutorialspoint.com/asp.net/index.htm</a>

## **OER REFERENCE:**

https://www.wisc-online.com/learn/computer-science/computer-programming/cp114/value-types-and-reference-types

# COURSE CONTENTS & LECTURE SCHEDULE:

Mod ule No.	Topic	No. of Lectu res	Teachi ng Pedago gy	Teach ing Aids
	DOT NET PROGRAMMING			
1.1	simple web page using forms and controls	8	Demo & Lab	LCD
1.2	Create web pages with links and Custom Controls	8	Demo & Lab	LCD
1.3	Develop a web application with Validators	5	Lecture	PPT & White board
1.4	Develop a web application to demonstrate File upload control	5	Demo & Lab	Smart Board
1.5	Develop a web application to demonstrate Calendar control	5	Demo & Lab	LCD
1.6	Create login page to accept user name and password, check for authentication of the user.	5	Lecture	LCD
1.7	Develop a database application to view the details of students	2	Demo & Lab	LCD
1.8	Develop a database application to insert, modify, update and delete operations for Employee Payment	3	Demo & Lab	Smart Board
1.9	Develop an application using Datagrid to display records.	3	Demo & Lab	LCD
1.10	Create a web application for Room Reservations.	2	LCD	Demo & Lab

CIA

Scholastic 35

Non Scholastic **5** 

40

# **EVALUATION PATTERN**

	SC	HOLAS	TIC		NON - SCHOLASTIC	MARKS		
C1	C2	СЗ	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

## **UG CIA Components**

			Nos		
C1	-	Test (CIA 1)	1		10 Mks
<b>C2</b>	-	Test (CIA 2)	1	-	10 Mks
C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 <b>*</b>	-	5 Mks
<b>C5</b>	=	Quiz	2 <b>*</b>	_	5 Mks
<b>C6</b>	_	Attendance		_	5 Mks

## **COURSE OUTCOMES**

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

N	ю.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED	PSOs ADDRESSED
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<sup>\*</sup>The best out of two will be taken into account

		BLOOM'S TAXONOMY)	
CO 1	Use Dot Net Framework along with the features of C#	<b>K</b> 1	PSO1& PSO2
CO 2	Create websites to explore database connectivity	K1, K2	PSO2, PSO3
CO 3	Analyze debugging webpages through case studies	K1 & K3	PSO3, PSO5
CO 4	Use the different types of master page creation	K1, K2 & K3	PSO5, PSO8
CO 5	Create different dynamic websites for applications	K3 & K4	PSO8

# **Mapping COs Consistency with PSOs**

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	3	3	1	1	2	1	1	2	1	1
CO2	2	3	3	2	1	2	1	2	1	1
соз	2	1	3	2	3	1	2	2	2	2
CO4	2	2	1	2	3	1	1	3	2	1
CO5	2	1	2	2	1	2	2	3	1	1

# Mapping of COs with POs

CO/ PSO	PO1	PO2	PO3	PO4	PO5
CO1	3	1	1	3	1
CO2	3	1	3	1	2
CO3	1	2	1	3	1
CO4	1	1	1	1	1
CO5	1	3	1	3	1

## Note:

- ☐ Strongly Correlated **3**
- ☐ Moderately Correlated 2
- ☐ Weakly Correlated -1

### **COURSE DESIGNER:**

1. Staff Name: Ms. S. Selvarani

Forwarded By

(S.Selvarani)

# III B.C.A

### NEW

### **SEMESTER - V**

### For those who joined in 2021 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS /WEEK	CREDITS
USCA	19J5CC12	DOT NET PROGRAMMING	ELECTIVE PRACTICAL	<mark>5</mark>	3

#### COURSE DESCRIPTION

To know the rapid development of powerful Window applications and Web application which makes the web development easier

#### **COURSE OBJECTIVES**

- 1. To develop web programming skills through the use of Dot Net Frameworks
- 2. To design and implement web pages for real time applications

### PROGRAM LIST:

- 1. Create a simple web page using forms and controls
- 2. Create web pages with links and Custom Controls
- 3. Develop a web application with Validators
- 4. Develop a web application to demonstrate File upload control
- 5. Develop a web application to demonstrate Calendar control
- 6. Create login page to accept user name and password, check for authentication of the user.
- 7. Develop a database application to view the details of students
- 8. Develop a database application to insert, modify, update and delete operations for Employee Payment
- 9. Develop an application using Datagrid to display records.
- 10. Develop an application using Datagrid to add, edit and modify records
- 11. Create a web application for Room Reservations.
- 12. Develop a web application to create online newspaper

- 13. Develop a web application to create online Quiz
- 14. Develop a web application for E-Shopping.
- 15. Develop a web application for Feedback Form for Students.

### **WEB REFERENCES:**

- 1. <a href="https://dotnet.microsoft.com/languages">https://dotnet.microsoft.com/languages</a>
- 2. <a href="https://www.tutorialspoint.com/asp.net/index.htm">https://www.tutorialspoint.com/asp.net/index.htm</a>

### **OER REFERENCES:**

https://nptel.ac.in/courses/106/125/1061789084/

## COURSE CONTENTS & LECTURE SCHEDULE:

Mod ule No.	Topic	No. of Lectu res	Teachi ng Pedago gy	Teach ing Aids
	DOT NET PROGRAMMING			
1.1	simple web page using forms and controls	8	Demo & Lab	LCD
1.2	Create web pages with links and Custom Controls	8	Demo & Lab	LCD
1.3	Develop a web application with Validators	5	Lecture	PPT & White board
1.4	Develop a web application to demonstrate File upload control	5	Demo & Lab	Smart Board
1.5	Develop a web application to demonstrate Calendar control	5	Demo & Lab	LCD
1.6	Create login page to accept user name and password, check for authentication of the user.	5	Lecture	LCD
1.7	Develop a database application to view the details of students	2	Demo & Lab	LCD
1.8	Develop a database application to insert,	3	Demo & Lab	Smart

	modify, update and delete operations for			Board
	Employee Payment			
1.9	Develop an application using Datagrid to display records.	3	Demo & Lab	LCD
1.10	Create a web application for Room Reservations.	2	LCD	Demo & Lab
1.11	Develop a web application to create online newspaper	2	LCD	Demo & Lab
1.12	Develop a web application to create online Quiz	3	PPT & White board	Lectur e
1.13	Develop a web application for E–Shopping.	4	Smart Board	Demo & Lab
1.14	Develop a web application for Feedback Form for Students.	5	LCD	Demo & Lab

CIA

Scholastic 35

Non Scholastic **5** 

40

# **EVALUATION PATTERN**

	SC	SCHOLASTIC			NON - SCHOLASTIC	MARKS		
C1	C2	С3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

## **UG CIA Components**

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
<b>C2</b>	-	Test (CIA 2)	1	-	10 Mks
СЗ	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 <b>*</b>	-	5 Mks
<b>C</b> 5	-	Quiz	2 *	_	5 Mks
<b>C6</b>	-	Attendance		-	5 Mks

## **COURSE OUTCOMES**

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Use Dot Net Framework along with the features of C#	<b>K</b> 1	PSO1& PSO2
CO 2	Create websites to explore database connectivity	K1, K2	PSO2, PSO3
CO 3	Analyze debugging webpages through case studies	K1 & K3	PSO3, PSO5
CO 4	Use the different types of master page creation	K1, K2 & K3	PSO5, PSO8
CO 5	Create different dynamic websites for applications	K3 & K4	PSO8

<sup>\*</sup>The best out of two will be taken into account

# **Mapping COs Consistency with PSOs**

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	3	3	1	1	2	1	1	2	1	1
CO2	2	3	3	2	1	2	1	2	1	1
соз	2	1	3	2	3	1	2	2	2	2
CO4	2	2	1	2	3	1	1	3	2	1
CO5	2	1	2	2	1	2	2	3	1	1

## Mapping of COs with POs

CO/ PSO	PO1	PO2	PO3	PO4	PO5
CO1	3	1	1	3	1
CO2	3	1	3	1	2
соз	1	2	1	3	1
CO4	1	1	1	1	1
CO5	1	3	1	3	1

### Note:

- ☐ Strongly Correlated **3**
- ☐ Moderately Correlated 2
- ☐ Weakly Correlated -1

### **COURSE DESIGNER:**

1. Staff Name: Ms. S. Selvarani

Forwarded By

(S.Selvarani)

## III B.C.A SEMESTER – VI

**OLD-10%** 

## For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS	CREDITS
USCA	19J6ME5	INTERNET OF THINGS	ELECTIVE	<mark>5</mark>	<mark>5</mark>

#### COURSE DESCRIPTION

This helps to connect things to the internet which provide many advantages and also to understand the characteristics of IoT.

### **COURSE OBJECTIVES**

- 1. To assess the vision and introduction of IoT.
- 2. To learn the evolution, principles, communications of internet
- 3. To understand building blocks of Internet of Things and characteristics
- 4. To discover the devices used in IoT.

#### UNITS

### UNIT I: INTRODUCTION TO INTERNET OF THINGS(15 HRS)

Introduction –Definition & Characteristics of IOT - Physical Design of IoT – Things in IoT- IoT Protocols - Logical Design of IoT – IoT Functional Blocks – IoT Communication models – IoT Communication APIs - IoT enabling Technologies – Wireless sensor Networks – Cloud Computing – Big Data Analytics- Communication Protocols – Embedded Systems - IoT levels and deployment templates – IoT Level–1 - IoT Level–2 - IoT Level–3 - IoT Level–4 - IoT Level–5 - IoT Level–6

### UNIT II: DOMAIN SPECIFIC IOTs(15 HRS)

Home Automation – Smart Lighting – Smart Appliances – Intrusion Detection – Smoke / Gas detectors - Cities – Smart parking – Smart Lighting – Smart Roads – Structural Health Monitoring – Surveillance – Emergency response-Environment – Weather monitoring – Air pollution monitoring – Noise pollution monitoring – Forest fire detection – River Flood detection – Energy – Smart Grids – Renewable energy system – prognostics-Retail – Inventory Management – smart Payments – Smart vending machines- Logistics- Route Generation & Scheduling – Fleet Tracking – Shipment monitoring – Remote vehicle Diagnostics - Agriculture – Smart Irrigation – Greenhouse Control – Industry – Machine Diagnosis & Prognosis – Indoor Air Quality Monitoring – Health & Iifestyle- Health & Fitness Monitoring – Wearable Electronics.

## UNIT III: IOT AND M2M(15 HRS)

Introduction – M2M – Difference between IoT and M2M – SDN and NFV for IoT – Software Defined Network – Network Function Virtualization – IoT System Management with NETCONF- YANG – Need for IoT Systems Management – Simple Network Management Protocol (SNMP) – Limitations of SNMP – Network Operator requirement – NETCONF – IoT systems Management with NETCONF – YANG – NETOPEER.

### UNIT IV: IOT PHYSICAL DEVICES & ENDPOINTS(15 HRS)

What is an IoT Device - Basic building blocks of an IoT Device - Exemplary Device: Raspberry Pi - About the board - Linux on Raspberry Pi - Raspberry Pi interfaces - Serial - SPI - I2C - Programming Raspberry Pi with Python - Controlling LED with Raspberry Pi .

### UNIT V:PROTOTYPING &DATA ANALYTICS (15 HRS)

Preparation – Sketch, Iterate, and Explore – Non digital Methods – Laser Cutting – Choosing a Laser Cutter – Software – Hinges and Joints – 3D Printing – Types of 3D Printing – Software – CNC Milling – Repurposing/Recycling Introduction – Apache Hadoop – MapReduce Programming Model - HadoopMapReduce Job Execution – MapReduce Job Execution Workflow - Hadoop Cluster Setup

#### **UNIT VI: DYNAMISM**

Rasperry Pi – Edge Computing – Virtual Reality – Augmented Reality – Auto Machine Learning – IoT Security – Real Time Applications in IOT – Case Study – Mini Project

### **REFERENCE BOOKS:**

- 1. ArshdeepBahga, Vijay Madisetti, "Internet of things: A Hands on Approach", ArshdeepBahga, Vijay Madisetti, 2014 Edition.
- 2. Marco Schwartz, "Internet of Things with the ArduinoYún", Packt Publishing, 2014.
- 3. David Boswarthick, Olivier Hersent, Omar Elloumi, "The Internet of Things: Key Applications and Protocols", Wiley Publication, 2015.
- 4. James Weaver, Stephen Chin, "Raspberry Pi with Java: Programming the Internet of Things (IoT)", McGraw Hill, 2015.

### **WEB REFERNCES:**

- 1. <a href="https://www.iotforall.com/what-is-iot-simple-explanation/">https://www.iotforall.com/what-is-iot-simple-explanation/</a>
- 2. <a href="https://internetofthingsagenda.techtarget.com/definition/Internet-of-Things-IoT">https://internetofthingsagenda.techtarget.com/definition/Internet-of-Things-IoT</a>
- 3. https://www.ibm.com/blogs/internet-of-things/what-is-the-iot/

#### **OER REFERNCE:**

https://nptel.ac.in/courses/106/105/106105166/

## COURSE CONTENTS & LECTURE SCHEDULE:

Module	Topic	No. of	Teaching	Teaching
No.		Lectures	Pedagogy	Aids
	UNIT 1:INTRODUCTION TO	INTERNET	OF THINGS	

		<u></u>	Г	
1.1	Introduction –Definition & Characteristics of IOT – Physical Design of IoT	1	Chalk & Talk	Black Board
1.2	Things in IoT- IoT Protocols - Logical Design of IoT - IoT Functional Blocks	2	Chalk & Talk	LCD
1.3	IoT Communication models – IoT Communication APIs - IoT enabling Technologies	2	Lecture	PPT & White board
1.4	Wireless sensor Networks – Cloud Computing – Big Data Analytics	2	Lecture	Smart Board
1.5	Communication Protocols – Embedded Systems - IoT levels and deployment templates	2	Lecture	Smart Board
1.6	IoT Level-1 - IoT Level-2	2	Lecture	Smart Board
1.7	IoT Level-3 - IoT Level-4	2	Lecture	Smart Board
1.8	IoT Level–5 - IoT Level–6	2	Lecture	Smart Board
	UNIT 2: DOMAIN S	PECIFIC IO	OTs	
2.1	Home Automation – Smart Lighting – Smart Appliances – Intrusion Detection – Smoke / Gas detectors - Cities – Smart parking Smart Lighting – Smart Roads –	2	Chalk & Talk	Black Board
2.2	Structural Health Monitoring – Surveillance – Emergency response- Environment – Weather monitoring	2	Chalk & Talk	LCD
2.3	Air pollution monitoring – Noise	2	Lecture	PPT &

	1		T		
	pollution monitoring - Forest			White board	
	fire detection – River Flood			board	
	detection - Energy - Smart				
	Grids – Renewable energy				
	system				
	prognostics-Retail – Inventory				
	Management – smart Payments				
	- Smart vending machines-			Smart	
2.4	Logistics- Route Generation &	3	Lecture	Board	
	Scheduling				
	Fleet Tracking - Shipment				
2.5	monitoring – Remote vehicle	2	Lecture	Smart	
	Diagnostics - Agriculture			Board	
	Smart Irrigation - Greenhouse				
	Control - Industry - Machine	2	Chalk &	Black	
2.6	Diagnosis & Prognosis – Indoor		Talk	Board	
	Air Quality Monitoring				
	Health & lifestyle- Health &				
2.7	Fitness Monitoring – Wearable	2	Lecture	Smart	
	Electronics.			Board	
	UNIT -3 IOT a	and M2M			
	Introduction – M2M –				
3.1	Difference between IoT and	2	Chalk & Talk	Black	
	M2M -		Taik	Board	
	SDN and NFV for IoT – Software				
3.2	Defined Network - Network	2	Chalk & Talk	LCD	
	Function Virtualization		Iaik		
	IoT System Management with			PPT &	
3.3	NETCONF- YANG – Need for IoT	3	Lecture	White	
	Systems Management			board	
3.4	Simple Network Management	2	Lecture	Smart	
	_	_		Board	

	Protocol (SNMP) – Limitations of			
	SNMP			
	Network Operator requirement			
3.5	- NETCONF	2	Chalk & Talk	Black Board
3.6	IoT systems Management with NETCONF	2	Chalk & Talk	Black Board
3.7	YANG – NETOPEER.	2	Lecture	Smart Board
	UNIT -4 IOT PHYSICAL DEVI	CES AND	END POINTS	
4 1	What is an IoT Device - Basic	0	Chalk &	Black
4.1	building blocks of an IoT Device	2	Talk	Board
4.2	Exemplary Device: Raspberry Pi	2	Chalk & Talk	LCD
4.3	About the board – Linux on Raspberry Pi	2	Lecture	PPT & White board
4.4	Raspberry Pi interfaces – Serial – SPI	2	Lecture	Smart Board
4.5	I2C - Programming Raspberry Pi with Python	3	Lecture	Black Board
4.6	Controlling LED with Raspberry Pi .	3	Lecture	Black Board
	UNIT -5 DATA ANALY	YTICS FOR	R IOT	
5.1	Introduction – Apache Hadoop	3	Chalk & Talk	Black Board
5.2	MapReduce Programming Model	4	Chalk & Talk	LCD
5.3	HadoopMapReduce Job Execution	3	Lecture	PPT & White board
5.4	MapReduce Job Execution	4	Lecture	Smart Board

Workflow -	Hadoop	Cluster		
Setup				

# INTERNAL - UG

	C1	C2	C3	C4	C5	Total Scholasti c Marks	Non Scholasti c Marks C6	CIA Total	% of Assess
Levels	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assig nmen t 5 Mks	OBT/ PPT  5 Mks	35 Mks.	5 Mks.	40 Mks.	ment
K1	2	2	-	-	-	4	_	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
К3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Schola stic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

Levels	Section A (i)	Sectio n A (ii)	Section B	Section C	Section D	Section E	Total	
	5 Mks.	5 Mks	8 Mks.	12 Mks	20 Mks.	10 Mks.	60Mks.	
K1	5	5	-	4	-	-	14	23.33 %
K2	-	-	8	4	-	-	12	20 %
К3	-	-	-	-	20	-	20	33.33 %
K4	-	-	-	4	-	10	14	23.34 %
Total	5	5	8	12	20	10	60	100 %

CIA

Scholastic 35

Non Scholastic **5** 

40

## **EVALUATION PATTERN**

	SCHOLASTIC				NON - SCHOLASTIC		MARKS		
C1	C2	С3	C4	C5	C6	CIA	ESE	Total	
10	10	5	5	5	5	40	60	100	

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
<b>C2</b>	-	Test (CIA 2)	1	-	10 Mks
C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 <b>*</b>	-	5 Mks
<b>C5</b>	-	Quiz	2 *	-	5 Mks
C6	_	Attendance		_	5 Mks

# **COURSE OUTCOMES**

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

NO	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Design IOT based Prototypes	K1 & K2	PSO1, PSO2
CO 2	Explain how sensors and embedded systems work	K1 & K2	PSO1, PSO2,PSO3
CO 3	Analyze and visualize sensor data	K1, K2 & K3	PSO3, PSO4
CO 4	Formulate real World IoT design Constraints and Industrial Automation in IoT	K1, K2, K3 & K4	PSO4, PSO5
CO 5	Work with IoT	K2, K3 & K4	PSO5, PSO6

<sup>\*</sup>The best out of two will be taken into account

## **Mapping COs Consistency with PSOs**

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	3	3	1	2	1	1	1	2	1	1
CO2	3	3	3	1	1	1	1	2	1	1
соз	2	2	3	3	2	1	2	2	2	1
CO4	2	2	2	3	3	1	2	2	1	1
CO5	2	2	2	2	3	3	2	2	1	1

## Mapping of COs with POs

CO/ PSO	PO1	PO2	РО3	PO4	PO5
CO1	1	3	1	1	1
CO2	1	1	1	1	2
CO3	1	3	1	1	1
CO4	1	1	1	1	3
CO5	1	1	1	1	1

### Note:

- ☐ Strongly Correlated **3**
- ☐ Moderately Correlated 2
- ☐ Weakly Correlated -1

## **COURSE DESIGNER:**

1. Staff Name: Ms. K. P. Maheswari

Forwarded By

(S.Selvarani)

Selvarari

## III B.C.A

#### NEW

### **SEMESTER - VI**

## For those who joined in 2019 onwards

USCA	19J6ME5	INTERNET OF THINGS	ELECTIVE	<b>5</b>		
PROGRAMME CODE	COURSE	COURSE TITLE	CATEGORY	HRS	CREDITS	

#### COURSE DESCRIPTION

This helps to connect things to the internet which provide many advantages and also to understand the characteristics of IoT.

#### **COURSE OBJECTIVES**

- 5. To assess the vision and introduction of IoT.
- 6. To learn the evolution, principles, communications of internet
- 7. To understand building blocks of Internet of Things and characteristics
- 8. To discover the devices used in IoT.

#### UNITS

## UNIT I: INTRODUCTION TO INTERNET OF THINGS(15 HRS)

Introduction –Definition & Characteristics of IOT - Physical Design of IoT – Things in IoT- IoT Protocols - Logical Design of IoT – IoT Functional Blocks – IoT Communication models – IoT Communication APIs - IoT enabling Technologies – Wireless sensor Networks – Cloud Computing – Big Data Analytics- Communication Protocols – Embedded Systems - IoT levels and deployment templates – IoT Level–1 - IoT Level–2 - IoT Level–3 - IoT Level–4 - IoT Level–5 - IoT Level–6

### UNIT II: DOMAIN SPECIFIC IOTs(15 HRS)

Home Automation – Smart Lighting – Smart Appliances – Intrusion Detection – Smoke / Gas detectors - Cities – Smart parking – Smart Lighting – Smart

Roads – Structural Health Monitoring – Surveillance – Emergency response-Environment – Weather monitoring – Air pollution monitoring – Noise pollution monitoring – Forest fire detection – River Flood detection - Energy – Smart Grids – Renewable energy system – prognostics-Retail – Inventory Management – smart Payments – Smart vending machines- Logistics- Route Generation & Scheduling – Fleet Tracking – Shipment monitoring – Remote vehicle Diagnostics - Agriculture – Smart Irrigation – Greenhouse Control – Industry – Machine Diagnosis & Prognosis – Indoor Air Quality Monitoring – Health & Iifestyle- Health & Fitness Monitoring – Wearable Electronics.

## UNIT III: IOT AND M2M(15 HRS)

Introduction – M2M – Difference between IoT and M2M – SDN and NFV for IoT – Software Defined Network – Network Function Virtualization – IoT System Management with NETCONF- YANG – Need for IoT Systems Management – Simple Network Management Protocol (SNMP) – Limitations of SNMP – Network Operator requirement – NETCONF – IoT systems Management with NETCONF – YANG – NETOPEER.

### UNIT IV: IOT PHYSICAL DEVICES & ENDPOINTS(15 HRS)

What is an IoT Device - Basic building blocks of an IoT Device - Exemplary Device: Raspberry Pi - About the board - Linux on Raspberry Pi - Raspberry Pi interfaces - Serial - SPI - I2C - Programming Raspberry Pi with Python - Controlling LED with Raspberry Pi .

### UNIT V: DATA ANALYTICS FOR IOT

(15 HRS)

Introduction – Apache Hadoop – MapReduce Programming Model HadoopMapReduce Job Execution – MapReduce Job Execution Workflow Hadoop Cluster Setup

### TEXT BOOK:

1. ArshdeepBahga, Vijay Madisetti, "Internet of things: A Hands on Approach",

2014 Edition.

Unit I – Chapter 1, Unit II – Chapter 2, Unit III - Chapter 3 & 4,

Unit IV - Chapter 7.1 to 7.6.1, Unit V - Chapter 10.1 to 10.2.4

### **REFERENCE BOOKS:**

- 1. Marco Schwartz, "Internet of Things with the ArduinoYún", Packt Publishing, 2014.
- 2. David Boswarthick, Olivier Hersent, Omar Elloumi, "The Internet of Things: Key Applications and Protocols", Wiley Publication, 2015.
- 3. James Weaver, Stephen Chin, "Raspberry Pi with Java: Programming the Internet of Things (IoT)", McGraw Hill, 2015.

#### **WEB REFERNCES:**

- 1. <a href="https://www.iotforall.com/what-is-iot-simple-explanation/">https://www.iotforall.com/what-is-iot-simple-explanation/</a>
- 2. <a href="https://internetofthingsagenda.techtarget.com/definition/Internet-of-Things-IoT">https://internetofthingsagenda.techtarget.com/definition/Internet-of-Things-IoT</a>
- 3. <a href="https://www.ibm.com/blogs/internet-of-things/what-is-the-iot/">https://www.ibm.com/blogs/internet-of-things/what-is-the-iot/</a>

#### **OER REFERENCE:**

https://nptel.ac.in/courses/106/105/106105166/

### COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic  UNIT 1:INTRODUCTION TO	No. of Lectures	Teaching Pedagogy OF THINGS	Teaching Aids
1.1	Introduction –Definition & Characteristics of IOT – Physical Design of IoT	1	Chalk & Talk	Black Board
1.2	Things in IoT- IoT Protocols - Logical Design of IoT - IoT Functional Blocks	2	Chalk &Talk	LCD

1.3	IoT Communication models – IoT Communication APIs - IoT enabling Technologies	2	Lecture	PPT & White board
1.4	Wireless sensor Networks – Cloud Computing – Big Data Analytics	2	Lecture	Smart Board
1.5	Communication Protocols – Embedded Systems - IoT levels and deployment templates	2	Lecture	Smart Board
1.6	IoT Level-1 - IoT Level-2	2	Lecture	Smart Board
1.7	IoT Level-3 - IoT Level-4	2	Lecture	Smart Board
1.8	IoT Level–5 - IoT Level–6	2	Lecture	Smart Board
	UNIT 2: DOMAIN S	PECIFIC IC	)Ts	
2.1	Home Automation – Smart Lighting – Smart Appliances – Intrusion Detection – Smoke / Gas detectors - Cities – Smart parking	2	Chalk & Talk	Black Board
2.2	Smart Lighting – Smart Roads – Structural Health Monitoring – Surveillance – Emergency response- Environment – Weather monitoring	2	Chalk & Talk	LCD
2.3	Air pollution monitoring – Noise pollution monitoring – Forest fire detection – River Flood detection – Energy – Smart Grids – Renewable energy system	2	Lecture	PPT & White board
2.4	prognostics-Retail – Inventory	3	Lecture	Smart

	Management – smart Payments – Smart vending machines- Logistics- Route Generation & Scheduling			Board
2.5	Fleet Tracking - Shipment monitoring - Remote vehicle Diagnostics - Agriculture	2	Lecture	Smart Board
2.6	Smart Irrigation – Greenhouse Control - Industry – Machine Diagnosis & Prognosis – Indoor Air Quality Monitoring	2	Chalk & Talk	Black Board
2.7	Health & lifestyle- Health & Fitness Monitoring – Wearable Electronics.	2	Lecture	Smart Board
	UNIT -3 IOT a	and M2M		
3.1	Introduction – M2M – Difference between IoT and	2	Chalk & Talk	Black Board
	M2M -			Doard
3.2	M2M –  SDN and NFV for IoT – Software  Defined Network - Network  Function Virtualization	2	Chalk & Talk	LCD
3.2	SDN and NFV for IoT – Software  Defined Network - Network	3		
	SDN and NFV for IoT – Software Defined Network - Network Function Virtualization IoT System Management with NETCONF- YANG – Need for IoT		Talk	LCD PPT & White
3.3	SDN and NFV for IoT – Software Defined Network - Network Function Virtualization IoT System Management with NETCONF- YANG – Need for IoT Systems Management Simple Network Management Protocol (SNMP) – Limitations of	3	Talk Lecture	LCD PPT & White board Smart

	NETCONF		Talk	Board
3.7	YANG – NETOPEER.	2	Lecture	Smart Board
	UNIT -4 IOT PHYSICAL DEVI	CES AND	END POINTS	
4.1	What is an IoT Device - Basic building blocks of an IoT Device	2	Chalk & Talk	Black Board
4.2	Exemplary Device: Raspberry Pi	2	Chalk & Talk	LCD
4.3	About the board – Linux on Raspberry Pi	2	Lecture	PPT & White board
4.4	Raspberry Pi interfaces – Serial – SPI	2	Lecture	Smart Board
4.5	I2C - Programming Raspberry Pi with Python	3	Lecture	Black Board
4.6	Controlling LED with Raspberry Pi .	3	Lecture	Black Board
	UNIT -5 DATA ANALY	YTICS FOR	OT	
5.1	Introduction – Apache Hadoop	3	Chalk & Talk	Black Board
5.2	MapReduce Programming Model	4	Chalk & Talk	LCD
5.3	HadoopMapReduce Job Execution	3	Lecture	PPT & White board
5.4	MapReduce Job Execution Workflow - Hadoop Cluster Setup	4	Lecture	Smart Board

# INTERNAL - UG

	C1	C2	C3	C4	C5	Total Scholasti c Marks	Non Scholasti c Marks C6	CIA Total	% of Assess
Levels	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assig nmen t 5 Mks	OBT/ PPT  5 Mks	35 Mks.	5 Mks.	40 Mks.	ment
K1	2	2	_	-	-	4	_	4	10 %
K2	2	2	5	_	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Schola stic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

## **END SEMESTER - UG**

Levels	Section A (i)	Sectio n A (ii)	Section B	Section C	Section D	Section E	Total	
	5 Mks.	5 Mks	8 Mks.	12 Mks	20 Mks.	10 Mks.	60Mks.	
K1	5	5	-	4	-	-	14	23.33 %
K2	-	-	8	4	-	-	12	20 %
К3	-	-	-	-	20	-	20	33.33 %
K4	-	-	-	4	-	10	14	23.34 %
Total	5	5	8	12	20	10	60	100 %

CIA

Scholastic 35

Non Scholastic **5** 

40

## **EVALUATION PATTERN**

SCHOLASTIC				NON - SCHOLASTIC		MARKS		
C1	C2	С3	C4	С5	C6	CIA ESE Tota		Total
10	10	5	5	5	5	40	60	100

## **UG CIA Components**

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
C2	-	Test (CIA 2)	1	-	10 Mks
СЗ	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 <b>*</b>	-	5 Mks
<b>C5</b>	-	Quiz	2 <b>*</b>	-	5 Mks
<b>C6</b>	_	Attendance		-	5 Mks

## **COURSE OUTCOMES**

<sup>\*</sup>The best out of two will be taken into account

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

NO	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Design IOT based Prototypes	K1 & K2	PSO1, PSO2
CO 2	Explain how sensors and embedded systems work	K1 & K2	PSO1, PSO2,PSO3
CO 3	Analyze and visualize sensor data	K1, K2 & K3	PSO3, PSO4
CO 4	Formulate real World IoT design Constraints and Industrial Automation in IoT	K1, K2, K3 & K4	PSO4, PSO5
CO 5	Work with IoT	K2, K3 & K4	PSO5, PSO6

# **Mapping COs Consistency with PSOs**

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	3	3	1	2	1	1	1	2	1	1
CO2	3	3	3	1	1	1	1	2	1	1
соз	2	2	3	3	2	1	2	2	2	1
CO4	2	2	2	3	3	1	2	2	1	1
CO5	2	2	2	2	3	3	2	2	1	1

CO/ PSO	PO1	PO2	РО3	PO4	PO5
CO1	1	3	1	1	1
CO2	1	1	1	1	2
CO3	1	3	1	1	1
CO4	1	1	1	1	3
CO5	1	1	1	1	1

## Note:

- ☐ Strongly Correlated **3**
- $\square$  Moderately Correlated **2**
- $\square$  Weakly Correlated -1

### **COURSE DESIGNER:**

1. Staff Name: Ms. K. P. Maheswari

Forwarded By

(S.Selvarani)

# III B.C.A

## **OLD-10%**

### **SEMESTER - VI**

### For those who joined in 2021 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS	CREDITS
USCA	19J6ME6	HUMAN COMPUTER INTERACTION	ELECTIVE	<mark>5</mark>	<mark>5</mark>

#### COURSE DESCRIPTION

The main purpose is to provide the most fundamental knowledge about Artificial Intelligence, Fuzzy Logic and Virtual Reality.

## **COURSE OBJECTIVES**

- 1. To learn the methods of solving problems using Artificial Intelligence.
- 2. To have a basic proficiency in a traditional AI language Search Techniques
- 3. To provide knowledge on the features of virtual reality.
- 4. To impart expertise in the technologies of VR environment in real time

### UNITS

#### UNIT I: AI PROBLEMS AND CHARACTERISTICS

(12 HRS)

The AI Problems – The underlying assumption – AI techniques – The level of the model – Criteria for success – Problems – Problem Space and State Space search – Problem Characteristics – System Characteristics – Issues of search programs– Additional problems.

### **UNIT II: SEARCH TECHNIQUES**

(12 HRS)

Heuristic search techniques – Generate and test – Hill climbing – Best first search – Problem Reduction – Constraint Satisfaction – Mean Ends Analysis – Knowledge Representation Issues – Representations and Mappings – Approaches – Issues – The Frame Problem.

### UNIT III: INTRODUCTION AND ARCHITECTURE

(12 HRS)

Three I's of Virtual Reality – History – Commercial VR Technology – VR becomes Industry – Classic Components – Architecture – Rendering Pipeline

- Graphics Rendering - Haptics Rendering - PC Graphics Architecture.

#### UNIT IV: HUMAN FACTORS IN VR

(12 HRS)

Methodology – Terminology – Data Collection – Analysis – Usability – User Performance Studies – Testbed Evaluation – Feedback Multi Modality – VR Health and Safety Issues – Direct Effects of VR Simulation – Cybersickness – Adaptation and Aftereffects – Guidelines for proper Usage – VR and Society – Impact on Professional Life – Impact on Public Life

### UNIT V: VIRTUAL REALITY AND AUGMENTED REALITY (12 HRS)

Human Factors in VR-Cybersickness in VR -Testbed Evaluation - VR Safety and Healthy Issues - Effects of VR on Society - Augmented Reality - Applications of AR - How AR Works - AR's Key Capabilities - Combining AR and VR.

### **TEXTBOOKS:**

- Artificial Intelligence Elaine Rich, Kevin Knight III Edition
   UNIT I Chapter 1 and Chapter 2
   UNIT II Chapter 3 and Chapter 4
- 2. Grigore C. Burdea, Philippe Coiffet, "Virtual Reality Technology", Wiley Student Second Edition, Reprint 2014. (Study Material)

UNIT III - Chapter 1 and Chapter 4.1 & 4.2

UNIT IV - Chapter 7

UNIT V – Chapter 9

#### REFERENCES:

1. Dan Patterson W., Artificial Intelligence and Expert systems, PHI

### **WEB REFERNCES:**

- 1. https://www.u-aizu.ac.jp/~qf-zhao/TEACHING/AI/AI.html
- 2. <a href="https://en.wikipedia.org/wiki/Virtual\_reality">https://en.wikipedia.org/wiki/Virtual\_reality</a>
- 3. <a href="https://www.marxentlabs.com/what-is-virtual-reality/">https://www.marxentlabs.com/what-is-virtual-reality/</a>

### **OER REFERNCES:**

https://nptel.ac.in/courses/106/103/106103115/#

## COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	UNIT 1: AI PROBLEMS AND	CHARACTI	ERISTICS	
1.1	The AI Problems – The underlying assumption	2	Chalk & Talk	Black Board
1.2	AI techniques – The level of the model	2	Chalk & Talk	LCD
1.3	Criteria for success - Problems	2	Lecture	PPT & White board
1.4	Problem Space and State Space search	2	Lecture	Smart Board
1.5	Problem Characteristics – System Characteristics	2	Lecture	Smart Board
1.6	Issues of search programs- Additional problems.	2	Lecture	Smart Board
	UNIT 2: SEARCH 1	TECHNIQUE	ES	
2.1	Heuristic search techniques	1	Chalk & Talk	Black Board
2.2	Generate and test – Hill climbing	1	Chalk & Talk	LCD
2.3	Best first search – Problem Reduction	2	Lecture	PPT & White board
2.4	Constraint Satisfaction – Mean Ends Analysis	2	Lecture	Smart Board
2.5	Knowledge Representation Issues	2	Lecture	Smart Board
2.6	Representations and Mappings– Approaches	2	Chalk & Talk	Black Board
2.7	Issues– The Frame Problem	2	Lecture	Smart Board

	UNIT -3 INTRODUCTION A	AND ARCH	ITECTURE						
3.1	Three I's of Virtual Reality – History	2	Chalk & Talk	Black Board					
3.2	Commercial VR Technology – VR becomes Industry	2	Chalk & Talk	LCD					
3.3	Classic Components – Architecture	2	Lecture	PPT & White board					
3.4	Rendering Pipeline	2	Lecture	Smart Board					
3.5	Graphics Rendering – Haptics Rendering	2	Chalk & Talk	Black Board					
3.6	PC Graphics Architecture	2	Chalk & Talk	Black Board					
UNIT -4 HUMAN FACTORS IN VR									
4.1	Methodology – Terminology	1	Chalk & Talk	Black Board					
4.2	Data Collection – Analysis – Usability	1	Chalk & Talk	LCD					
4.3	User Performance Studies – Testbed Evaluation	2	Lecture	PPT & White board					
4.4	Feedback Multi Modality – VR Health and Safety Issues	2	Lecture	Smart Board					
4.5	Direct Effects of VR Simulation – Cybersickness	2	Lecture	Black Board					
4.6	Adaptation and Aftereffects – Guidelines for proper Usage	2	Lecture	Black Board					
4.7	VR and Society – Impact on Professional Life – Impact on Public Life	2	Lecture	Black Board					
	UNIT -5 EMERGING APP	LICATION	S OF VR						
5.1	VR Applications in Manufacturing	2	Chalk & Talk	Black Board					

5.2	Virtual Prototyping	2	Chalk & Talk	LCD
5.3	VR in Robotics – Robot Programming	2	Lecture	PPT & White board
5.4	Robot Teleoperation – Information Visualization	2	Lecture	Smart Board
5.5	Oil Exploration – Well Management	2	Chalk & Talk	LCD
5.6	Volumetric Data Visualization	2	Chalk & Talk	LCD

# INTERNAL - UG

	C1	C2	СЗ	C4	C5	Total Scholasti c Marks	Non Scholasti c Marks C6	CIA Total	% of Assess
Levels	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assig nmen t 5 Mks	OBT/ PPT  5 Mks	35 Mks.	5 Mks.	40 Mks.	ment
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
КЗ	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Schola stic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

# **END SEMESTER - UG**

Levels	Section A (i)	Sectio n A (ii)	Section B	Section C	Section D	Section E	Total	
	5 Mks.	5 Mks	8 Mks.	12 Mks	20 Mks.	10 Mks.	60Mks.	
K1	5	5	-	4	1	-	14	23.33 %
K2	-	-	8	4	-	-	12	20 %
К3	-	-	-	-	20	-	20	33.33 %
K4	-	-	-	4	-	10	14	23.34 %
Total	5	5	8	12	20	10	60	100 %

CIA

Scholastic 35

Non Scholastic **5** 

40

## **EVALUATION PATTERN**

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	С3	C4	C5	C6	CIA ESE TO		Total
10	10	5	5	5	5	40	60	100

## **UG CIA Components**

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
C2	-	Test (CIA 2)	1	-	10 Mks
C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 <b>*</b>	-	5 Mks
<b>C5</b>	-	Quiz	2 <b>*</b>	-	5 Mks

**C6** - Attendance - 5 Mks

## \*The best out of two will be taken into account

## **COURSE OUTCOMES**

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

NO	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Identify problems that are amenable to solution by AI methods	K1 & K2	PSO1, PSO2
CO 2	Formulate search problems and implement search algorithms using admissible heuristics	K1 & K2	PSO1, PSO2,PSO3
CO 3	Analyze on the basics and architecture of VR systems	K1, K2 & K3	PSO3, PSO4
CO 4	Identify the human factors, effects and impact of VR	K1, K2, K3 & K4	PSO5, PSO8
CO 5	Apply the VR technology in different applications	K2, K3 & K4	PSO8

## **Mapping COs Consistency with PSOs**

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	3	3	1	1	1	2	1	2	1	1
CO2	3	3	3	2	1	1	1	2	1	1
соз	2	2	3	3	2	1	2	2	2	1
CO4	2	2	2	2	3	1	2	3	2	1
CO5	2	2	2	2	2	2	2	3	1	2

# Mapping of COs with POs

CO/ PSO	PO1	PO2	PO3	PO4	PO5
CO1	1	3	1	1	1
CO2	1	1	1	1	2
CO3	1	3	1	1	1
CO4	1	1	1	1	3
CO5	1	1	1	1	1

## Note:

- ☐ Strongly Correlated **3**
- ☐ Moderately Correlated 2
- ☐ Weakly Correlated -1

### **COURSE DESIGNER:**

1. Staff Name: Ms. P.Renganayagi

Forwarded By

(S.Selvarani)

Selvarari

## **NEW**

## III B.C.A SEMESTER – VI

## For those who joined in 2021 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS	CREDITS
USCA	19J6ME6	HUMAN COMPUTER INTERACTION	ELECTIVE	<mark>5</mark>	<mark>5</mark>

#### **COURSE DESCRIPTION**

The main purpose is to provide the most fundamental knowledge about Artificial Intelligence, Fuzzy Logic and Virtual Reality.

#### **COURSE OBJECTIVES**

- 5. To learn the methods of solving problems using Artificial Intelligence.
- 6. To have a basic proficiency in a traditional AI language Search Techniques
- 7. To provide knowledge on the features of virtual reality.
- 8. To impart expertise in the technologies of VR environment in real time

### UNITS

#### UNIT I: AI PROBLEMS AND CHARACTERISTICS

(12 HRS)

The AI Problems – The underlying assumption – AI techniques – The level of the model – Criteria for success – Problems – Problem Space and State Space search – Problem Characteristics – System Characteristics – Issues of search programs– Additional problems.

### UNIT II: SEARCH TECHNIQUES

(12 HRS)

Heuristic search techniques – Generate and test – Hill climbing – Best first search – Problem Reduction – Constraint Satisfaction – Mean Ends Analysis – Knowledge Representation Issues – Representations and Mappings – Approaches – Issues – The Frame Problem.

### UNIT III: INTRODUCTION AND ARCHITECTURE

(12 HRS)

Three I's of Virtual Reality - History - Commercial VR Technology - VR

becomes Industry - Classic Components - Architecture - Rendering Pipeline - Graphics Rendering - Haptics Rendering - PC Graphics Architecture.

#### UNIT IV: HUMAN FACTORS IN VR

(12 HRS)

Methodology – Terminology – Data Collection – Analysis – Usability – User Performance Studies – Testbed Evaluation – Feedback Multi Modality – VR Health and Safety Issues – Direct Effects of VR Simulation – Cybersickness – Adaptation and Aftereffects – Guidelines for proper Usage – VR and Society – Impact on Professional Life – Impact on Public Life

### UNIT V: EMERGING APPLICATIONS OF VR

(12 HRS)

VR Applications in Manufacturing – Virtual Prototyping – VR in Robotics – Robot Programming – Robot Teleoperation – Information Visualization – Oil Exploration – Well Management – Volumetric Data Visualization

### **TEXTBOOKS:**

- Artificial Intelligence Elaine Rich, Kevin Knight III Edition
   UNIT I Chapter 1 and Chapter 2
   UNIT II Chapter 3 and Chapter 4
- **4.** Grigore C. Burdea, Philippe Coiffet, "Virtual Reality Technology", Wiley Student Second Edition, Reprint 2014. *(Study Material)*

UNIT III - Chapter 1 and Chapter 4.1 & 4.2

UNIT IV - Chapter 7

UNIT V - Chapter 9

#### REFERENCES:

2. Dan Patterson W., Artificial Intelligence and Expert systems, PHI

### **WEB REFERNCES:**

- 1. https://www.u-aizu.ac.jp/~qf-zhao/TEACHING/AI/AI.html
- 2. https://en.wikipedia.org/wiki/Virtual reality
- 3. <a href="https://www.marxentlabs.com/what-is-virtual-reality/">https://www.marxentlabs.com/what-is-virtual-reality/</a>

### **OER REFERNCES:**

https://nptel.ac.in/courses/106/103/106103115/#

## COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	UNIT 1: AI PROBLEMS AND	CHARACTI	ERISTICS	
1.1	The AI Problems – The underlying assumption	2	Chalk & Talk	Black Board
1.2	AI techniques – The level of the model	2	Chalk & Talk	LCD
1.3	Criteria for success - Problems	2	Lecture	PPT & White board
1.4	Problem Space and State Space search	2	Lecture	Smart Board
1.5	Problem Characteristics – System Characteristics	2	Lecture	Smart Board
1.6	Issues of search programs- Additional problems.	2	Lecture	Smart Board
	UNIT 2: SEARCH 1	TECHNIQUE	ES	
2.1	Heuristic search techniques	1	Chalk & Talk	Black Board
2.2	Generate and test – Hill climbing	1	Chalk & Talk	LCD
2.3	Best first search – Problem Reduction	2	Lecture	PPT & White board
2.4	Constraint Satisfaction – Mean Ends Analysis	2	Lecture	Smart Board
2.5	Knowledge Representation Issues	2	Lecture	Smart Board
2.6	Representations and Mappings– Approaches	2	Chalk & Talk	Black Board
2.7	Issues– The Frame	2	Lecture	Smart

	Problem			Board
	UNIT -3 INTRODUCTION A	AND ARCH	ITECTURE	
3.1	Three I's of Virtual Reality – History	2	Chalk & Talk	Black Board
3.2	Commercial VR Technology – VR becomes Industry	2	Chalk & Talk	LCD
3.3	Classic Components – Architecture	2	Lecture	PPT & White board
3.4	Rendering Pipeline	2	Lecture	Smart Board
3.5	Graphics Rendering – Haptics Rendering	2	Chalk & Talk	Black Board
3.6	PC Graphics Architecture	2	Chalk & Talk	Black Board
	UNIT -4 HUMAN FACTO	RS IN VR		
4.1	Methodology – Terminology	1	Chalk & Talk	Black Board
4.2	Data Collection – Analysis – Usability	1	Chalk & Talk	LCD
4.3	User Performance Studies – Testbed Evaluation	2	Lecture	PPT & White board
4.4	Feedback Multi Modality – VR Health and Safety Issues	2	Lecture	Smart Board
4.5	Direct Effects of VR Simulation – Cybersickness	2	Lecture	Black Board
4.6	Adaptation and Aftereffects – Guidelines for proper Usage	2	Lecture	Black Board
4.7	VR and Society – Impact on Professional Life – Impact on Public Life	2	Lecture	Black Board
	UNIT -5 EMERGING APP	PLICATION	S OF VR	

5.1	VR Applications in Manufacturing	2	Chalk & Talk	Black Board
5.2	Virtual Prototyping	2	Chalk & Talk	LCD
5.3	VR in Robotics – Robot Programming	2	Lecture	PPT & White board
5.4	Robot Teleoperation – Information Visualization	2	Lecture	Smart Board
5.5	Oil Exploration – Well Management	2	Chalk & Talk	LCD
5.6	Volumetric Data Visualization	2	Chalk & Talk	LCD

# INTERNAL - UG

	C1	1 C2 C3 C4 C5 Scholasti c Marks	Non Scholasti c Marks C6	CIA Total	% of Assess				
Levels	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assig nmen t 5 Mks	OBT/ PPT 5 Mks	35 Mks.	5 Mks.	40 Mks.	ment
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
КЗ	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Schola stic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

## **END SEMESTER - UG**

Levels	Section A (i)	Sectio n A (ii)	Section B	Section C	Section D	Section E	Total	
	5 Mks.	5 Mks	8 Mks.	12 Mks	20 Mks.	10 Mks.	60Mks.	
K1	5	5	-	4	ı	-	14	23.33 %
K2	-	-	8	4	-	-	12	20 %
К3	-	-	-	-	20	-	20	33.33 %
K4	-	-	-	4	-	10	14	23.34 %
Total	5	5	8	12	20	10	60	100 %

CIA

Scholastic 35

Non Scholastic **5** 

40

# **EVALUATION PATTERN**

SCHOLASTIC			NON - SCHOLASTIC					
C1	C2	С3	C4	C5	C6	CIA ESE 7		Total
10	10	5	5	5	5	40	60	100

## **UG CIA Components**

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
<b>C2</b>	-	Test (CIA 2)	1	-	10 Mks
<b>C3</b>	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 <b>*</b>	-	5 Mks
<b>C</b> 5	_	Quiz	2 <b>*</b>	-	5 Mks
<b>C6</b>	-	Attendance		_	5 Mks

<sup>\*</sup>The best out of two will be taken into account

## **COURSE OUTCOMES**

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

NO	COURSE OUTCOMES	E OUTCOMES  E OUTCOMES  TO REVISED BLOOM'S TAXONOMY)	
CO 1	Identify problems that are amenable to solution by AI methods	K1 & K2	PSO1, PSO2
CO 2	Formulate search problems and implement search algorithms using admissible heuristics	K1 & K2	PSO1, PSO2,PSO3
CO 3	Analyze on the basics and architecture of VR systems	K1, K2 & K3	PSO3, PSO4
CO 4	Identify the human factors, effects and impact of VR	K1, K2, K3 & K4	PSO5, PSO8
CO 5	Apply the VR technology in different applications	K2, K3 & K4	PSO8

# **Mapping COs Consistency with PSOs**

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	3	3	1	1	1	2	1	2	1	1
CO2	3	3	3	2	1	1	1	2	1	1
соз	2	2	3	3	2	1	2	2	2	1
CO4	2	2	2	2	3	1	2	3	2	1
CO5	2	2	2	2	2	2	2	3	1	2

## Mapping of COs with POs

CO/ PSO	PO1	PO2	РО3	PO4	PO5
CO1	1	3	1	1	1
CO2	1	1	1	1	2
CO3	1	3	1	1	1
CO4	1	1	1	1	3
CO5	1	1	1	1	1

### Note:

- ☐ Strongly Correlated **3**
- ☐ Moderately Correlated 2
- ☐ Weakly Correlated -1

### **COURSE DESIGNER:**

1. Staff Name: Ms. P.Renganayagi

Forwarded By

(S.Selvarani)