B.C.A.

Programme Code - UCA

Programme outcome-PO (Aligned with Graduate Attributes)- Bachelor of Computer Application

Knowledge

Able to understand and apply the fundamental principles, concepts and methods in diverse areas of computer applications, mathematics, statistics etc.,

Problem analysis and Development of Solutions

Identify, formulate, research literature and analyze real- time problems. Attain substantiated conclusions to solve the problems using fundamental principles of mathematics, computing sciences by adopting various tools and techniques.

Ethics and Social Responsibility

Understand and commit to professional ethics and cyber regulations, responsibilities and norms of professional computing practice.

Communication and Team Building

Possess interpersonal skills and communicate effectively with the professionals and with society at large on system activities. Able to comprehend and write effective reports, design documentation, make effective presentations, and give/understand instructions.

Life-long Learning

Recognize the need and have the ability, to engage in continuous reflective learning in the context of technological advancement. Create, select, adapt and apply appropriate techniques, resources, and computing tools to complex computing activities. Able to learn, adapt and apply emerging tools and technologies to meet the demand.

Innovation, Employability and Entrepreneurial skills

Identify opportunity; pursue that opportunity to create value and wealth for the betterment of the individual and society at large. Develop the capacity to study and research independently that will help to develop skills for transition to employment in hardware/software companies.

THIAGARAJAR COLLEGE, MADURAI – 9.
(Re-Accredited with 'A++' Grade by NAAC)
Department of Computer Application and Information Technology

Vision

The Department of Computer Application & Information Technology foster competent and confident student community, enriched with soft skills inculcated with managerial skills and moralvalues.

Mission

- Empower groomed software professionals with robust knowledgebase
- Achieve employability in Information Technology and non-information Technology sector
- Develop potential individuals
- Promote students to become a successful entrepreneur.

Programme Educational Objectives (PEO)

The objectives of this programme is to equip/prepare the students to

PEO1	Equip the students to meet corporate needs.
PEO2	Professionally educate the students for pursuing higher education.
PEO3	Nurture the students with skills required to become an entrepreneur.
PEO4	Adapt the students with better learning ability in the ever changing software industry.
PEO5	Manage cross culture environment and have peer recognition.

Programme specific outcomes: BCA

On the successful completion of BCA the students will

PSO1	Illustrate the key concepts in Computer Applications.
PSO2	Analyze latest technologies and apply them to solve the issues in Computer Applications.
PSO3	Clarity on both conceptual and application oriented skills in computer technologies with Quantitative and qualitative techniques.
PSO4	Build technical, professional, practical and communicative skills to face the industrial with clarity.
PSO5	Develop practical skills to provide solutions for computer oriented problems.

THIAGARAJAR COLLEGE, MADURAI – 9.
DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY
BACHELOR OF COMPUTER APPLICATION(w.e.f. 2020 batch onwards)
Programme Code-UCA
Semester – I

Course	Code No.	Subject	Hours	Credits	Total No. of Hours Allotted	Max. Marks CA	Max. Marks SE	Total
Part I	U20P111C	Tamil	5	3	75	25	75	100
Part II	U20EN11	English for Comm. I	4	3	60	25	75	100
Core 1	UCA20C11	Digital Principles and Computer Organization	4	3	60	25	75	100
Core 2	UCA20C12	Programming in C	4	3	60	25	75	100
Core Lab 1	UCA20CL11	Programming in C Lab	3	2	45	40	60	100
Core Lab 2	UCA20CL12	Multimedia Lab	3	2	45	40	60	100
Allied 1	UMA20GE11 I	Mathematical foundation for CS	5	5	75	25	75	100
AECC- I	U20ES11	Environmental Studies	2	2	30	15	35	50
Total			**30**	**23**	**450**	**220**	**530**	**750**

Semester – II

Course	Code No.	Subject	Hours	Credits	Total No. of Hours Allotted	Max. Marks CA	Max. Marks SE	Total
Part I	U20P121C	Tamil	5	3	75	25	75	100
Part II	U20EN21	English for Comm. II	4	3	60	25	75	100
Core 3	UCA20C21	Java Programming	4	3	60	25	75	100
Core 4	UCA20C22	Relational Database Management System	4	3	60	25	75	100
Core Lab 3	UCA20CL21	Java Lab	3	2	45	40	60	100
Core Lab 4	UCA20CL22	RDBMS Lab	3	2	45	40	60	100
Allied II	UMA20GE21I	Probability and Statistics	5	5	75	25	75	100
VE	U20VE21	Value Education	2	1	30	15	35	50
TOTAL			**30**	**22**	**450**	**220**	**530**	**750**

Semester –III

Course	Code No.	Subject	Hours	Credits	Total No. of Hours Allotted	Max. Marks CA	Max. Marks SE	Total
Core 5	UCA20C31	Microprocessor and Assembly Language Programming	5	4	75	25	75	100
Core 6	UCA20C32	Data Structures	5	4	75	25	75	100
Core Lab5	UCA20CL31	Data Structures Lab Using Java	4	2	60	40	60	100
Core Lab6	UCA20CL32	Web Designing with PHP Lab	4	2	60	40	60	100
Core Elective I	UCA20CE31 (a/b/c/d)	Options given	5	5	75	25	75	100
Allied III	UMA20GE31I	Computational Methods	5	5	75	25	75	100
NME-I	UCA20 NE31	E-Waste Management	2	2	30	15	35	50
TOTAL			**30**	**24**	**450**	**195**	**455**	**650**

Semester – IV

Course	Code No.	Subject	Hours	Credits	Total No. of Hours Allotted	Max. Marks CA	Max. Marks SE	Total
Core 7	UCA20C41	Software Engineering	5	4	75	25	75	100
Core 8	UCA20C42	Mobile Application Development	5	4	75	25	75	100
Core 9	UCA20C43	Operating System	4	4	60	25	75	100
Core Lab7	UCA20CL41	Mobile Application Development Lab	4	2	60	40	60	100
Core Elective II	UCA20CE41 (a/b/c/d)	Options given	5	5	75	40	60	100
Allied IV	UMA20GE41I	Operations Research	5	5	75	25	75	100
NME-II	UCA20NE41	Cybercrime and IPR issues	2	2	30	15	35	50
TOTAL			**30**	**26**	**450**	**195**	**455**	**650**

Semester V

Course	Code No.	Subject	Hours	Credits	Total No. of Hours Allotted	Max. Marks CA	Max. Marks SE	Total
Core 10	UCA20 C51	Data Communication and Network Security	5	4	75	25	75	100
Core 11	UCA20C52	Python Programming	6	5	90	25	75	100
Core 12	UCA20C53	Cloud Computing	6	5	90	25	75	100
Core Lab 8	UCA20CL51	Python Programming Lab	5	3	75	40	60	100
Project	UCA20PJ51	Project	6	4	90	25	75	100
SEC-I	UCA20SE51 (a/b/c/d/e/f/g/h)	Options given	2	2	30	15	35	50
TOTAL			**30**	**23**	**450**	**170**	**430**	**600**
		Internship		2		15	35	50

Semester VI

Course	Code No	Subject	Hours	Credits	Total No of Allotted	Max Marks CA	Max Marks SE	Total
Core 13	UCA20C61	Data Mining	5	4	75	25	75	100
Core 14	UCA20C62	Big Data and NOSQL	5	4	75	25	75	100
Core 15	UCA20C63	.Net Programming	5	4	75	25	75	100
Core 16	UCA20C64	Fundamentals of Internet of Things	4	3	60	25	75	100
Core Lab9	UCA20CL61	NOSQL Lab	4	2	60	40	60	100
Core Lab10	UCA20CL62	. Net Programming Lab	5	2	75	40	60	100
SEC-II	UCA20SE61 (a/b/c/d/e/f/ g/h)	Options given	2	2	30	15	35	50
Part _V		Part _V		1				
TOTAL			**30**	**22**	**450**	**195**	**455**	**650**
TOTAL CREDITS FOR SEMESTERS I to VI				**140**				

A) Consolidation of contact hours and credits: BCA

Semester	Contact / Week	Credits
I	30	23
II	30	22
III	30	24
IV	30	26
V	30	23
VI	30	22
Part – V	-	01
Total	180	140
V	Additional credit (Self-Study paper)	5
V	Additional credit (Internship)	2

B) Curriculum Credits: Part wise

		No of papers	Credits per paper	Total credits
Part I	**Tamil**	**2**	**3**	**06**
Part II	**English**	**2**	**3**	**06**
Part III	**Core Theory**	**16**	**3 / 4**	**61**
	Core lab	**10+ Project 1**	**2/3/4(Project)**	**25**
	Core Elective	**2**	**5**	**10**
	Generic Elective Theory	**4**	**5**	**20**
Part IV	**AECC**	**2**	**2+1**	**3**
	NME	**2**	**2**	**4**
	SEC	**2**	**2**	**4**
Part V (NSSNCC/Physical Education)				**1**
Grand total				**140**

Skill Based Electives

a) Logical Reasoning
b) Problem Solving using C
c) Machine Learning
d) Cloud Lab
e) Digital Image Processing
f) Data Mining Lab (WEKA Tool)
g) Introduction to DevOps Tools
h) R Programming

Non Major Electives

a) NME I - E-Waste Management
b) NMEII - Cybercrime and (Intellectual Property Rights) IPR issues

Core Electives

a) Web Designing With PHP
b) Artificial Intelligence
c) Ethics in Information Security
d) Operating System using Linux-Lab

Certificate Course

a) Software Testing

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DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those joined BCA on or after June 2020)

Course Code	Course Title	Category	L	T	P	Credit
UCA20C31	Microprocessor and Assembly Language Programming	Core 5	4	1	-	4

L-Lecture T-Tutorial P –Practical

Year	Semester	Internal	External	Total
II	III	25	75	100

Preamble

Introduce basic concepts and principles of 8086 microprocessor, assembly language programming, memory & I/O Interfacing, 8051 micro controller and advanced processor.

Course Outcome

On the completion of the course the student will be able to

#	Course Outcome	Expected Proficiency	Expected Attainment
CO1	Know the concepts of microcomputer and microprocessors and internal architecture of 8086 microprocessor.	73%	70%
CO2	Have a knowledge on structured assembly language programs to solve the problems using 8086 microprocessor	72%	70%
CO3	Describe memory organization of 8086, functionality of programmable peripheral interface and programmable interrupt controller.	70%	69%
CO4	Discuss the concept of micro controller and its working methodology	68%	68%
CO5	Analyze pins and signals of 8086 and advanced processors	70%	60%

Mapping of COs with PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	L	L
CO2	S	S	S	M	M
CO3	S	M	S	M	L
CO4	M	M	S	S	L
CO5	M	M	S	M	M

Mapping of COs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	M	S	L	L	L
CO2	S	S	S	M	M	M
CO3	S	M	S	M	L	M
CO4	M	M	S	S	L	L
CO5	M	M	S	M	M	L

S-Strong **M-Medium** **L-Low**

Blooms taxonomy

	CA		End of Semester
	First	Second	
Knowledge	40%	40%	40%
Understand	40%	40%	40%
Apply	20%	20%	20%

Content

Unit-I: **15 hours**

The 8086 Microprocessor: Introduction to Microprocessors - Introduction to INTEL 8086 - Introduction to 8086 Instructions - Format of 8086 Instructions - Addressing Modes of the 8086 - Instructions Affecting Flags of 8086 - Classification of 8086 Instructions - Examples of 8086 Assembly Language Instructions - Byte and String Manipulation in 8086 - Interrupt and Interrupt Service Routine in 8086 - Classification of Interrupts of 8086 - Priorities of Interrupts of 8086.

Unit-II: **15 hours**

Introduction to Assembly-Language Programming: Levels of Programming - Flow Chart - Variables and Constants Used in Assemblers - Assembler Directives - Assembly-Language Program Development Tools – Editor - Assembler - Library Builder – Linker - Debugger – Simulator - Emulator - Hand Coding of Assembly-Language Programs.

Unit-III: **15 hours**

Memory and IO Interfacing: Introduction to Memory - Memory Interfacing- IO Interfacing - Parallel Communication Interface- Programmable Peripheral Interface (INTEL 8255)- Pins-Signals and Functional block diagram of 8255 - Programmable Timer (INTEL 8254): Pins-Signals-and Functional block diagram of 8254- Programmable Interrupt Controller (INTEL 8259): Pins-Signals and Functional block diagram of 8259.

Unit-IV: **15 hours**

THE 8051 Microcontroller: Introduction to Microcontrollers - Introduction to the INTEL 8051 Microcontroller - Special Function Registers (SFR) of 8051- IO Ports and Circuits of 8051-AddressingModesin8051-Instructions Affecting Flags of 8051-Classification of 8051 Instructions.

Unit-V: **15 hours**

The 8086 microprocessor based system and advanced processor: Pins and Signals of INTEL 8086 - System Design Using the 8086 Microprocessor - System Bus Structure - IO Programming - Introduction to Multiprogramming - Multiprocessor Configurations - Introduction to Advanced Processors.

Unit	Chapters/ Section
I	1(1.1-1.8, 1.12-1.15)
II	1(1.9,1.10,1.17)
III	3(3.1-3.3,3.5.1,3.9.1,3.11.1)

IV	4(4.1- 4.7)
V	2(2.1-2.3,2.6-2.9)

TextBooks:

Nagoor Kani, 2017, Microprocessor and Microcontroller, McGraw – Hill Education (India), Private Limited.

References:

1. Krishna Kant, 2016, Microprocessor and Microcontrollers Architecture, Programming and System Design 8085,8086,8051,8096, 2nd edition, PHI Learning Private Limited, NewDelhi.
2. Douglas V Hall, SP Rao, 2016(8th Reprint), Microprocessor and Interfacing, Hill Education (India), Private Limited.
3. Ramesh S. Gaonkar, 2013, Microprocessor Architecture, Programming and Application with the 8085.

Web References:

1.https://www.tutorialspoint.com/assembly_programming/assembly_variables.htm
2.https://www.geeksforgeeks.org/microprocessor-tutorials/
3.http://examradar.com/memories-io-interfacing/

Course Designers:

1. Mrs. R.Umamaheswari
2. Dr. V.T. Meenatchi

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DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those joined BCA on or after June 2020)

Course Code	Course Title	Category	L	T	P	Credit
UCA20C32	Data Structures	Core 6	4	1	-	4

L-Lecture T-Tutorial P –Practical

Year	Semester	Internal	External	Total
II	III	25	75	100

Preamble

Bring around to understand the basic data structures and algorithms by experimental learning.

Course Outcomes

On the completion of the course the student will be able to

#	Course Outcome	Expected Proficiency	Expected Attainment
CO1	Identify the types of data structures like arrays and stacks and queues	85%	82%
CO2	Apply linear data structures which includes linked list	82%	80%
CO3	Demonstrate different representation of binary tree, operations on binary tree traversal and binary search tree.	65%	60%
CO4	Describe the basic of graph terminologies and the operations involved in graph.	75%	70%
CO5	Discuss and implement various sorting algorithms and Searching algorithms	70%	70%

Mapping of COs with PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	L
CO2	M	M	L	L	S
CO3	S	S	S	L	M
CO4	M	M	M	M	L
CO5	S	M	S	L	L

Mapping of COs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	S	S	L	L	L
CO2	S	S	M	M	M	M
CO3	M	M	M	M	L	M
CO4	S	M	S	S	L	L
CO5	M	S	L	M	M	L

S-Strong M-Medium L-Low

Blooms taxonomy

	CA		End of Semester
	First	Second	
Knowledge	40%	40%	40%
Understand	40%	40%	40%
Apply	20%	20%	20%

Contents

Unit–I: Introduction, Arrays, Stacks and Queues **15 hours**

Definitions – Concept of Data Structures – Overview of Data Structures – Implementation of Data Structures. Arrays: Definition – Terminology – One-Dimensional Array – Multi-Dimensional Arrays Introduction – Definition – Representation of a Stack – Operations on Stacks. Queues: Introduction - Definition – Representation of Queues

Unit–II: Linked List **15 hours**

Linked Lists: Definition – Single Linked List, Operations on Single Linked List – Circular Linked List – Operations on Circular Linked List-Double Linked List-Operations on Double Linked List- Applications of Linked list

Unit–III: Trees **15 hours**

Trees: Basic Terminologies-Definition and Concepts- Representation of Binary Trees – Operations on a Binary a Binary Tree-Insertion-Deletion-Traversal-Merging together Two BinaryTrees.

Unit–IV: Graphs **15 hours**

Introduction – Graph Terminologies – Representation of Graphs-Set Representation-Linked Representation – Matrix Representation – Operations on Graphs.

Unit–V: Sorting **15 hours**

Preliminaries-Insertion Sort -Shell Sort –Merge Sort – Quick Sort-Bucket Sort– Linear Searching Technique -Linear Search with array- Linear Search with linked List-Binary Search-Fibonacci Search.

UNIT	Chapter /Sections
I	Book 1: 1,2, Book 1: 4(4.1 to 4.4),5 (5.1 to 5.4)
II	Book1:3(3.1 to 3.6)
III	Book 1: 7 (7.1 to 7.4)
IV	Book 1: 8 (8.1 to 8.4)
V	Book 2: 7(7.1 to 7.4, 7.6 ,7.7) Book 1: 11(11.2.1, 11.2.2, 11.2.4, 11.2.5)

TextBooks:

1. Samanta.D , 2016, “Classic Data Structures”, Prentice-Hall India Pvt Ltd.
2. Mark Allen Weiss, 2014 Seventeenth Impression, “Data Structures and Algorithm Analysis in C“, Pearson Education, Second Edition.

References:

1. Well Dale, Jones, 2015, C++ Plus Data structures, 6 th edition, Bartlett.
2. Varsha H.Patil, 2012, Data Structures using c++ , Oxford University Press.
3. Michael T.Goodrich, Roberto Tamassia,2005, Data Strutures and algorithms in JAVA,4th edition,JohnWiley & Sons, Inc.
4. Rema thareja,2014,Data Structures using c,2nd Edition, Oxford University Press.

Web Resources

1. https://www.tutorialspoint.com/data_structures_algorithms/stack_algorithm.html.
2. http://courses.cs.vt.edu/~cs3114/Summer13/Notes/T17.SortingAlgorithms.pdf
3. https://www.geeksforgeeks.org/binary-tree-data-structure/

Course Designers:

1. Dr.T.Manikumar
2. Dr.S. Abirami

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DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those joined BCA on or after June 2020)

Course Code	Course Title	Category	L	T	P	Credit
UCA20CL31	Data Structures Lab using Java	Core Lab 5	-	-	4	2

L-Lecture T-Tutorial P –Practical

Year	Semester	Internal	External	Total
II	III	40	60	100

Preamble

Gain knowledge in various data structures and its working principles with implementation

Course Outcomes

On the completion of the course the student will be able to

#	Course Outcome	Expected Proficiency	Expected Attainment
CO1	Develop programs using linear data structures: Arrays , Stacks and Queues	75%	72%
CO2	Implement programs using doubly and circular linked list	78%	76%
CO3	Construct programs using non linear data structures: Tree and Graphs	76%	70%
CO4	Apply various sorting algorithms	81%	80%
CO5	Implement different and Searching algorithms	75%	70%

Mapping of COs with PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	M
CO2	S	S	S	S	M
CO3	S	S	S	S	M
CO4	S	S	S	S	M
CO5	S	S	S	S	M

Mapping of COs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	M	L	L	S	S
CO2	S	M	L	M	M	S
CO3	S	M	M	M	S	M
CO4	S	S	L	S	S	S
CO5	S	S	M	S	S	S

S-Strong M-Medium L-Low

Content

1. Write a java program to implement insert an element in an array.
2. Write a java program to implement delete an element in an array.
3. Write a java program to implement operations of Stack.
4. Write a java program for implementing Queueoperations.
5. Write a java program for Linked List creation, traversal, deletion of a node, insertion of node, sorting.
6. Write a java program for various operations on Circular Linked Lists.
7. Write a java program for various operations on Doubly Linked List.
8. Write a java program to represent a graph usingArray.
9. Write a java program to implement a graph using linkedList.
10. Write a java program for graph searchingoperation.
11. Write a java program to implement binarytree.
12. Write a java program to implement operations on binarytree.
13. Write a java program to implement quick sortingalgorithm.
14. Write a java program to implement insertion sorting process.

WebResources:

1.https://www.wctmgurgaon.com/wctm/dsa%20lab-it-labmanual.pdf
2.https://www.iare.ac.in/sites/default/files/lab2/DS%20LAB%20MANUAL_0.pdf

CourseDesigners:

1. Dr. T. Manikumar
2. Dr. S. Abirami

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DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those joined BCA on or after June 2020)

Course Code	CourseTitle	Category	L	T	P	Credit
UCA20CL32	Web Designing with PHP Lab	Core Lab 6	-	-	4	2

L-Lecture T–Tutorial P–Practical

Year	Semester	Internal	External	Total
II	III	40	60	100

Preamble

Bring about the knowledge of design, develop and host a user friendly website with the usage of APIs.

Course Outcomes

On the completion of the course the student will be able to

#	Course Outcome	Expected Proficiency	Expected Attainment
CO1	Develop basics kills in website creation	79%	75%
CO2	Experiment with open source technologies such as HTML, CSS, JavaScript,	82%	76%
CO3	Implement static, dynamic and interactive web pages and web applications.	79%	75%
CO4	Build applications using PHP and MySQL.	85%	70%
CO5	Data manipulation from multiple MySQL tables.	83%	76%

Mapping of COs with PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	S
CO2	S	S	S	M	S
CO3	S	S	S	M	S
CO4	S	S	S	M	S
CO5	S	S	S	M	S

Mapping of COs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	M	M	S	S	S
CO2	S	L	L	M	S	S
CO3	S	M	L	S	M	M
CO4	S	S	M	S	S	S
CO5	S	S	L	S	S	S

S-Strong M-Medium L-Low

Blooms taxonomy

	CA		End of Semester
	First	Second	
Knowledge	40%	40%	40%
Understand	40%	40%	40%
Apply	20%	20%	20%

Course Content

HTML

1. To Create List tag in HTML
2. To Create Table tag in HTML
3. To Create Form tag in HTML
4. To Create Frameset in HTML

CSS

1. To implement Inline CSS
2. To implement Internal CSS
3. To implement External CSS
4. Implementation of CSS in webpage

JAVASCRIPT

1. Write a JavaScript program for Control structure
2. Write a JavaScript program for Looping structure
3. Write a JavaScript program for Form validate
4. Write a JavaScript program for Prompt box
5. Write a JavaScript program for Alert box

XML

1. Write a XML to design the different document
2. Write a XML program for Schema structure
3. DTD to validate the XML document

PHP

1. Write a program for Basic structure of PHP
2. Write a PHP program for Conditional statement
3. Write a PHP program for Looping statement
4. Write a PHP program for Creating simple application
5. Write a PHP program for Database connectivity
6. Write a PHP program for Create website for our college.
7. Write a PHP program for Array functions.
8. Write a program for Upload, View and Download files using PHP &MYSQL.

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Course Code	CourseTitle	Category	L	T	P	Credit
UCA20C41	Software Engineering	Core7	4	1	-	4

L-Lecture T–Tutorial P–Practical

Year	Semester	Internal	External	Total
II	IV	25	75	100

Preamble

Familiar with software engineering techniques and procedures and develop software projects by applying various software engineering concepts.

Course Outcomes

On the completion of the course the student will be able to

#	Course Outcome	Expected Proficiency	Expected Attainment
CO1	Illustrate basic software engineering methods and practices, and their development process model.	82%	75%
CO2	Discuss various software cost factor and cost estimation techniques.	80%	76%
CO3	Demonstrate the basic concepts of Software requirement specification and various Languages and processors for requirements specification	72%	73%
CO4	Make use of various software design techniques ,Notations and Implementation issues	85%	75%
CO5	Construct various software testing strategies and SCM Process.	83%	74%

Mapping of COs with PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	L	L
CO2	S	M	L	L	L
CO3	S	M	M	M	L
CO4	S	M	M	S	M
CO5	S	M	M	M	M

Mapping of COs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	S	L	M	M	M
CO2	S	M	M	S	M	M
CO3	S	L	L	M	L	S
CO4	S	M	L	S	M	M
CO5	S	S	M	S	S	S

S-Strong M-Medium L-Low

Blooms taxonomy

	CA		End of Semester
	First	Second	
Knowledge	40%	40%	40%
Understand	40%	40%	40%
Apply	20%	20%	20%

Content

Unit-1: **15 hours**

Introduction to Software Engineering: Introduction –Some definitions –Some size factors– Quality and productivity factors – Managerial issues. Planning a Software Project: Introduction – Defining the problem– Developing a solution strategy – Planning the development process– Planninganorganizational structure–Other planningactivities.

Unit-II: **15 hours**

Software Cost Estimation: Introduction – Software cost factors– Software cost estimationTechniques–Staffinglevel estimation–Estimatingsoftwaremaintenancecosts.

Unit-III: **15 hours**

Software Requirements Definition: Introduction–The Software requirements specification – Formal specification techniques– Relational notations – State oriented notation –Languages and processors for requirements specification– PSL / PSA – RSL / REVS – Structuredanalysisanddesign technique(SADT)–Structured systemanalysis(SSA)–GIST.

Unit-IV: **15 hours**

Software Design: Introduction–Fundamental design concepts–Modules and modularizing criteria –Design notations–Design techniques–Design Guidelines. Implementation Issues: Structured coding techniques –coding style–Documentation guidelines.

Unit-V: **15 hours**

Software Testing Strategies: A Strategic approach to software testing– Strategic issues– Testing strategies for conventional software–Validation testing–System testing. Testing Conventional Applications: Software testing fundamentals – Internal and External views of testing –White-box testing–Basis path testing – Control structure testing – Black-box testing. Software Configuration Management: Software configuration management – The SCM repository – The SCMprocess.

Unit	Chapters/Sections
I	Book1:1(1.1-1.4),2(2.1-2.5)
II	Book1:3(3.1-3.4)
III	Book1:4(4.1-4.3)
IV	Book1:5(5.1-5.2,5.9) chapter 6(6.1,6.2,6.4)
V	Book2:17(17.1-17.3,17.6,17.7),18(18.1-18.6),22(22.1-22.3)

TextBooks:

1.Richard.E.Fairely, 2017 ,43 rd Edition, Software Engineering Concepts, Tata McGraw–Hill Education Private Limited, New Delhi.

2.Roger S.Pressman, 2018,Software Engineering A Practitioner‟s Approach, 13th edition, Tata McGraw–Hill Education Private Limited, New Delhi.

References:

1. Ian Sommerville, 2015,Software Engineering, 9th edition, Pearson Indian Education Service Private Limited, Chennai.
2. PankajJalote2015, An Integrated Approach to Software Engineering, 3rd edition , Narosa Publishing House, New Delhi.
3. Aggarwalk.k, Yogeshsingh, 2005, Software Engineering, 2ndedition, New age international Private Limited, Publishers, New Delhi.

WebResources:

1. https://www.tutorialspoint.com/software_engineering/software_engineering_quick guide.htm
2.http://moodle.autolab.unipannon.hu/Mecha_tananyag/szoftverfejlesztesi_folyamatok_angol/ch13.html
3.https://www.tutorialspoint.com/software_testing/software_testing_tutorial.pdf

CourseDesigners:

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2. Mrs. R.Umamaheswari

THIAGARAJAR COLLEGE, MADURAI- 9

An autonomous institution affiliated by Madurai Kamaraj University

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DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those joined BCA on or after June 2020)

Course Code	CourseTitle	Category	L	T	P	Credit
UCA20C42	Mobile Application Development	Core 8	4	1	-	4

L-Lecture T-Tutorial P–Practical

Year	Semester	Internal	External	Total
II	IV	25	75	100

Preamble

Acquire the concepts of android with the programming practices and able to develop simple android applications.

CourseOutcome

On the completion of the course the student will be able to

#	Course Outcome	Expected Proficiency	Expected Attainment
CO1	Discuss the introduction of Android, the manifest file, downloading with Installation of Android and executing the First Android Application.	75%	70%
CO2	Illustrate the use of activities, fragments and intents in Android, working with user interface using views and view groups, and binding data with the adapterviewclass.	75%	70%
CO3	Developing Applications using menus and internal, external file manipulations.	73%	70%
CO4	Explain the SQLite database operations with android, implementation of notification in App.	70%	65%
CO5	Incorporating network concepts in android Applications	65%	65%

Mapping of COs with PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	M	S
CO2	S	M	S	M	S
CO3	S	M	S	S	S
CO4	S	M	S	M	S
CO5	S	M	S	L	L

Mapping of COs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	S	L	L	L	L
CO2	S	S	L	S	S	M
CO3	S	M	L	S	S	S
CO4	S	S	L	L	S	S
CO5	M	L	S	L	M	S

S-Strong M-Medium L-Low

Blooms taxonomy

	CA		End of Semester
	First	Second	
Knowledge	40%	40%	40%
Understand	40%	40%	40%
Apply	20%	20%	20%

Content

Unit-I **15 hours**

Getting an Overview of Android: Introducing Android–Discussing about Android Applications –The Manifest File–Downloading and Installing Android–Exploring the Development Environment–Developing and Executing the First Android Application. Using Activities, Fragments and Intents in Android: Working with Activities.

Unit-II **15 hours**

Using Intents – Exploring Intent Objects- Exploring Intent Resolution- Exploring Intent Filters- Resolving Intent Collision-Linking Activities using Intent-Passing Data Using Intent Object-Fragments-Fragment Implementation-Finding Fragments-Adding, Removing and Replacing Fragments- Working with UserInterface Using Views and View Groups : Working with View Groups –Layouts-Working with Views -BindingData with the AdapterView Class.

Unit-III **15 hours**

Working with User Interface Using Views and View Groups: Handling UI Events – Specialized Fragments – Creating Menus- Storing the Data Persistently : Introducing the Data Storage Options – Using the Internal Storage–Using the External Storage

Unit-IV **15 hours**

Storing the Data Persistently :Using the SQLite Database-Working with Content Providers–Notifying the user – Creating Toast Notification-Creating Status Bar Notification-Creating Dialog Notification

Unit-V **15 hours**

Emailing and Networking in Android: Building an Application to send Email-Networking in android-Checking Network availability-Accessing Web Services using HTTP POST and GET Method-Working with binary data and Text Files-Consuming JSON Services-Socket Programming.

Unit	Chapter/Sections
I	2,3(Pg. 80- 104)
II	3(Pg.105-126) , 4 (Pg.136 – 178)
III	4(Pg.184-198),6(Pg.230 – 240)
IV	6(Pg.243 – 271),5(Pg.224-226)
V	7

TextBooks

Pradeep Kothari,2020, Android Application Development Black book, dreamTech

References

1. Jakob Iversen Michael Eierman-2014,A Hands-on Guide to Building Apps with iOS and Android , Pearson Education

2. J. Paul Cardle, 2017,Android App Development in Android Studio Java + Android Edition for Beginners, Manchester Academic Publisher

Web Resources

1.https://en.wikipedia.org/wiki/Android_(operating_system)
2.https://developer.android.com/guide/components/fragments
3.https://www.tutorialride.com/android/android-graphics.htm

CourseDesigners

1. Dr. S. Abirami
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DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those joined BCA on or after June 2020)

Course Code	CourseTitle	Category	L	T	P	Credit
UCA20C43	Operating System	Core9	4	-	-	4

L-Lecture T-Tutorial P–Practical

Year	Semester	Internal	External	Total
II	IV	25	75	100

Preamble

Provoking the knowledge on the basics of operating system with process, memory management and distributed processing.

Course Outcomes

On the completion of the course the student will be able to

#	Course Outcome	Expected Proficiency	Expected Attainment
CO1	Illustrate the basics of computer system, architecture and operating system Services and process scheduling	73%	70%
CO2	Explain the concept of scheduling criteria with scheduling algorithms, deadlocks and its recovery techniques	75%	70%
CO3	Discuss the background of memory management mechanisms with segmentation , paging and Demand paging	76%	73%
CO4	Describe file management with file organization, access, b-trees, file system Security and disk scheduling	70%	65%
CO5	Compare distributed processing with client-server, clusters, computer Security threats	68%	60%

Mapping of COs with PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	L
CO2	S	M	S	M	L
CO3	S	M	M	M	L
CO4	S	M	M	M	L
CO5	S	M	--	M	L

S-Strong M-Medium L-Low

Mapping of COs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	S	L	L	L	L
CO2	S	S	L	S	S	M
CO3	S	M	L	S	S	S
CO4	S	S	L	L	S	S
CO5	M	L	S	L	M	S

Blooms taxonomy

	CA		End of Semester
	First	Second	
Knowledge	40%	40%	40%
Understand	40%	40%	40%
Apply	20%	20%	20%

Content

Unit-I: **12 hours**

Introduction: Computer-System Organization–Computer-System Architecture–Operating-System Structure– Operating System Operations. Process Management- Kernel Data Structures – Computing Environments-Open Source Operating System-**Operating System Structures**: Operating System Services–User and Operating-System Interface–System Calls–Types of System Calls–System Programs–System Boot. **Process Management**: Process Concept- Process Scheduling – Operations on Processes–Inter Process Communication.

Unit-II: **12 hours**

Process Scheduling: Basic Concepts – Scheduling Criteria – Scheduling Algorithms. **Deadlocks**: System model–Deadlock Characterization–Methods for handling Deadlocks – Deadlock Prevention – Deadlock Avoidance – Deadlock Detection– Recovery from Deadlock.

Unit–III **12 hours**

Memory Management: Background–Swapping–Contiguous Memory Allocation–Segmentation – Paging – Structure of the Page Table. **Virtual Memory Management:** Background – Demand Paging– Page Replacement.

Unit–IV **12 hours**

File Management: Overview– File Organization and Access– B-Trees– File Directories– File sharing– Record Blocking – Secondary storage Management– File System Security. **Disk scheduling**: Disk Performance Parameters–Disk Scheduling Polices.

Unit–V **12 hours**

Distributed Processing, Client-Server and Clusters: Client-Server Computing–Service Oriented Architecture–Distributed Message Passing–Remote Procedure Calls. Computer Security Threats: Computer Security Concepts– Threats, Attacks, and Assets–Intruders–Malicious Software Overview–Viruses, Worms, and Bots–Rootkits.

Unit	Chapters/Section
I	Book1:1(1.1- 1.12),2 (2.1- 2.5 , 2.10) , 3(3.1-3.4)
II	Book1:6(6.1-6.3),7
III	Book1: 8(8.1-8.6),9(9.1 - 9.4)
IV	Book2:12(Pg.no.520-551) ,11 (11.5)
V	Book2: 16(16.1-16.4), 14(14.1-14.6)

TextBooks:

1. Abraham Silberschatz, Peter B Galvin, Gerg Gagne, 2018, Operating System Concepts, 9th edition,Wiley India Pvt .Ltd., New Delhi.
2. William Stallings, 2018, Operating Systems Internals and Design principles, 7th edition, Pearson Education Inc, Noida.

References:

1. Stuart E. Madnick. JohnJ. Donovan, 2016(Reprint), Operating Systems, Tata McGraw Hill Education, New Delhi.
2. Andrew S.Tanenbaum, 2015, Modern Operating Systems,4th edition, Pearson Education.
3. Charles Crowlay, 2008, Operating System, A Design-Oriented Approach, Tata McGraw Hill Education, New Delhi.

WebResources:

1.https://www.tutorialspoint.com/operating_system/os_process_scheduling.htm
2.http://www.technologyuk.net/computing/operating-systems/process-management.shtml
3.https://web.cs.wpi.edu/~cs3013/c07/lectures/Section08-Memory_Management.pdf4.https://www.tutorialspoint.com/operating_system/os_file_system.htm

CourseDesigners:

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DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those joined BCA on or after June 2020)

Course Code	CourseTitle	Category	L	T	P	Credit
UCA20CL41	Mobile Application Development Lab	Core Lab7	-	-	**4**	**2**

L-Lecture T-Tutorial P–Practical

Year	Semester	Internal	External	Total
II	**IV**	**40**	**60**	**100**

Preamble

This programming lab course provides knowledge in creation of mobile application using controls and event handling.

Course Outcomes

On the completion of the course the student will be able to

#	CourseOutcome	Expected Proficiency	Expected Attainment
CO1	Experience the Installation of Android and executing the First Android Application, implementing fragments.	75%	70%
CO2	Apply intent among the activities, Building App with different widgets.	70%	70%
CO3	Construct App for File manipulations through Event handling.	73%	70%
CO4	Develop App with SQLite database operations and notifications.	70%	65%
CO5	Implement the java networking concepts in App, Accessing mail from Android App.	65%	60%

Mapping of COs with PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	**S**	**M**	**S**	**M**	**S**
CO2	**S**	**M**	**S**	**M**	**S**
CO3	**S**	**M**	**S**	**S**	**S**
CO4	**S**	**M**	**S**	**M**	**S**
CO5	**S**	**M**	**S**	**L**	**L**

Mapping of COs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	**S**	**S**	**L**	**L**	**L**	**L**
CO2	**S**	**S**	**L**	**S**	**S**	**M**
CO3	**S**	**M**	**L**	**S**	**S**	**S**
CO4	**S**	**S**	**L**	**L**	**S**	**S**
CO5	**M**	**L**	**S**	**L**	**M**	**S**

S-Strong M-Medium L-Low

Blooms Taxonomy

	CA		End of Semester
	First	Second	
Knowledge	40%	40%	40%
Understand	40%	40%	40%
Apply	20%	20%	20%

Content

1. Create "Hello World" application. That will display "Hello World" in the middle of the screen In the green color with white background.

2. Write the code to display the sum of two numbers.

3. Write the code to check which toggle button is ON/OFF.

4. Write the code to display the rate of the selected food item by using checkbox.

5. Write the code to create and show the Alert Dialog.

6. Write the code to display it e month e spinner and perform event handling.

7. Write the code for simple implicit in tent that displays a webpage.

8. Simple option menu example that contains three menu items.

9. Write the code to display the context menu on press of the list view.

10. Simple option menu example that Create sample application with login module. (Check user name and password)

11. On successful login, go to next screen. And on failing login, alert user using Toast. Also pass username to next screen.

12. Create an application that will change color of the screen, based on selected options from the menu.

13. Demo App for file Manipulations

14. Android with SQLite database operations
15. Android App for accessing Mail
16. Android App for utilizing JSON objects.

WebResources:

1. http://www.jbiet.edu.in/coursefiles/Mobile-Application Development.pdf
2. https://jnec.org/lab-manuals/cse-lab-manual.html

CourseDesigners:

1. Dr. S. Abirami
2. Mrs. R. Umamaheswari

CORE ELECTIVES

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DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those joined BCA on or after June 2020)

Course Code	CourseTitle	Category	L	T	P	Credit
UCA20CE31(a) / UCA20CE41(a)	Web Designing with PHP	Core Elective	5	-	-	5

L–Lecture T–Tutorial P–Practical

Year	Semester	Internal	External	Total
II	III/ IV	25	75	100

Preamble

This course provides knowledge about web designing tools like HTML, javascript and PHP.

Course Outcomes

On the completion of the course the student will be able to

#	Course Outcome	Expected Proficiency	Expected Attainment
CO1	Discuss the introduction of HTML document structure, javascript and VBScript.	80%	75%
CO2	Illustrate features of PHP, XHTML, advantages of PHP over other scripting languages, running a PHP script.	75%	68%
CO3	Describe the user defined function in PHP, types of arrays, traversing arrays using Loops and working with files and directories.	70%	70%
CO4	Make Use of Relational Databases, SQL, PHP/MySQL Functions andCreatingMySQLDatabases with PHP	70%	68%
CO5	Examine HTML and database tables, building forms from queries, basic formSubmissionto a Database and editingdata with an HTMLform.	70%	65%

Mapping of COs with PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	M
CO2	S	S	S	S	M
CO3	S	S	S	S	M
CO4	S	S	S	S	M
CO5	S	S	S	S	M

S-Strong M-Medium L-Low

Mapping of COs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	M	L	L	S	S
CO2	S	M	L	M	M	S
CO3	S	M	M	M	S	M
CO4	S	S	L	S	S	S
CO5	S	S	M	S	S	S

Blooms taxonomy

	CA		End of Semester
	First	Second	
Knowledge	40%	40%	40%
Understand	40%	40%	40%
Apply	20%	20%	20%

Content

Unit-I: **15hours**

HTML and JavaScript Programming: HTML–Introducing HTML document structure–Creating headings on a webpage–Working with links–Creating a paragraph–Working with images–Working with tables–Working with frames–Introduction to forms & HTML controls– Introducing-Cascading Style Sheets–Inline styles–External style sheets–Internal styles–Style classes–Multiple styles–Introducing DHTML–Introducing JavaScript–Client side benefits of using JavaScript over VBScript–Embedding JavaScript in an HTML page–Handling events–Using variables in JavaScript–Using array in JavaScript– Creating objects in JavaScript– Using Operators–Working With control flow statements–Working with functions.

Unit-II: **15hours**

Introducing PHP: Versions of PHP– Features of PHP– Introduction to HTML and XHTML–Advantages of PHP over other scripting languages– Creating a PHP script–Running a PHP script–Handling errors in a PHP script– Escape characters. Working With Variables and Constants: Usingvariables–Using constants– Exploring Data types in PHP–Exploring operators in PHP. Controlling Program Flow: Conditional statements–Looping statements–Break, Continue and Exit statements.

Unit-III: **15hours**

Working with Functions, Arrays, Files and Directories: Introduction–User Defined Function in PHP – Built-in Functions in PHP– Recursive, Variables, Callback Functions –Introducing arrays–Types of arrays –Traversing arrays using Loops and Array Iterator –Built in array functions–Exploring Cookies, Sessions- Working with Cookies – creating Cookies- Working with Session-Differentiating Cookies & Session.

Unit-IV: **15hours**

Introduction to SQL: Relational Databases and SQL–SQL Standards–The Work horses of SQL– Select–Insert–Update–Delete–Database Design–Privileges and Security. PHP/MySQL Functions – Connecting to MySQL – Making MySQL Queries – Fetching Data Sets – Getting Data about Data–Multiple Connections–Building in Error Checking–Creating MySQL Databases with PHP–MySQL data types– MySQL Functions.

Unit-V: **15hours**

Displaying Queries in Tables: HTML Tables and Database Tables– One-to-one mapping –Example: A single-table displayer–The sample tables–Improving the displayer– Complex Mappings –Multiple queries versus complex printing– A multiple-query example –A complex printing example–Creating the Sample Tables. Building Forms from Queries : HTML Forms– Basic Form Submission to a Database– Self-Submission–Editing Data with an HTML Form.

Unit	Chapters/Sections
I	Book1:2
II	Book1:3,4,5
III	Book1:6(199-218),8(Pg.262-270)
IV	Book2:13,15
V	Book2:16,17

Text Books:

1.Web Technologies Black Book, 2018,First Edition, Tata McGraw – Dream Tech Press, New Delhi.
2.Tim Converse and Joyce Park with Clark Morgan, 2017**,** PHP5 and MYSQL Bible, Wiley Publishing Inc, Indiana.

References:

1.StevenHolzner,2016(21st Reprint),The Complete reference PHP complete reference, Tata McGraw– Hill Education Private Limited, New Delhi.
2.PadmaPriyaS.,2013(Reprint), Web Technology, SCITECH Publication Chennai
3.Xavier C., 2012(Reprint), Web Technology and Design, New Age International Private Limited, Publishers, New Delhi.

Web Resources:

1.https://www.tutorialspoint.com/html/
2.https://www.siteground.com/tutorials/phpmysql/3.https://www.quackit.com/css/

Course Designers

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THIAGARAJAR COLLEGE, MADURAI- 9

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DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those joined BCA on or after June 2020)

Course Code	CourseTitle	Category	L	T	P	Credit
UCA20CE 31(b) / UCA20CE 41(b)	Artificial Intelligence	Core Elective	5	-	-	5

L -Lecture T-Tutorial P–Practical

Year	Semester	Internal	External	Total
II	III/ IV	25	75	100

Preamble

This course provides knowledge about the concept of Artificial Intelligence.

Course Outcomes

On the completion of the course the student will be able to

#	Course Outcome	Expected Proficiency	Expected Attainment
CO1	Illustrate Artificial Intelligence, the issues in the design of search programs With heuristic search techniques and means-ends analysis.	72%	60%
CO2	Describe knowledge representation issues, choosing the granularity of representation and sets of objects and the frame problem.	68%	65%
CO3	Discuss simple facts in logic, instance and ISA relationships, computable Functions and predicates, resolution in propositional logic.	70%	65%
CO4	Identify the mini max search procedure, adding alpha-beta cutoffs and Secondary search, references on specific games.	75%	70%
CO5	Analyze the representation and usage of domain knowledge, expert system Shells and knowledge acquisition.	70%	65%

Mapping of COs with PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	L	M	L
CO2	S	M	L	M	L
CO3	S	M	L	M	L
CO4	S	M	L	M	L
CO5	S	M	L	M	L

Mapping of COs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	M	M	M	L	L
CO2	S	M	M	M	L	L
CO3	S	M	M	M	L	L
CO4	S	M	M	M	L	L
CO5	S	M	M	M	L	L

S-Strong M-Medium L-Low

Blooms taxonomy

	CA		End of Semester
	First	Second	
Knowledge-K1	40%	40%	40%
Understand-K2	40%	40%	40%
Apply-K3	20%	20%	20%

Content

Unit I: 15 hours

Problems and Search :What is Artificial Intelligence: The AI problems – The UnderlyingAssumption – what is an AI Technique – The level of the model – Criteria for Success. Problems, problem Spaces and Search: Defining the problem as a state space search – production systems –problem characteristics– production system characteristics – Issues in the design of search programs. Heuristic Search Techniques: Generate and Test– Hill Climbing – Best-first Search – Problem Reduction– Constraint Satisfaction–Means-ends Analysis.

Unit II: 15 hours

Knowledge Representation: Knowledge Representation Issues: Representation and Mappings–Approaches to Knowledge Representation–Issues in Knowledge Representation–Important Attribute–Relationship among attributes–Choosing the Granularity of representation–Representing Sets of Objects – Finding the Right Structured as Needed–The Frame Problem.

Unit-III: 15 hours

Using Predicate Logic: Representing Simple Facts in Logic – Representing Instance and ISA Relationships – Computable functions and Predicates– Resolution –Conversion to clause form –The Basis of Resolutions – Resolution in Propositional logic– The Unification Algorithm – Resolution in Predicate logic –The need to try Several Substitution–Natural Deduction.

Unit IV: 15 hours

Gaming Playing: Overview–The Mini Max Search Procedure–Adding Alpha-Beta Cutoffs –Additional Refinements–Secondary Search–Using Book Moves– Alternatives to Mini max–Iterative Deepening–References on Specific Games.

Unit V: 15 hours

Expert Systems: Representing and Using Domain Knowledge–Expert System Shells–Explanation–Knowledge Acquisition.

Unit	Chapters/Section
I	1(1.1-1.5),2(2.1-2.5),3(3.1-3.6)
II	4(4.1-4.4)
III	5(5.1-5.5)
IV	12(12.1-12.6)
V	20(20.1-20.4)

TextBooks:

Elaine Rich, Kevin Knight, Shivashankar B Nair, 2015, Artificial Intelligence, 3rd Edition, McGraw–Hill Education Private Limited, New Delhi.

References:

1.Michael Negnevitsky, 2008, Artifical Intelligence: A Guide to Intelligence, 2nd edition, Pearson India Education Services Private Limited.
2.Eugene harniak, Drew McDermott, 2006,Introduction to Artificial Intelligence, Pearson India Education Services Private Limited.
3.PadhyN.P,2005,Artifical Intelligence and Intelligent System, Oxford University Press.

Web Resources:

1.www.tutorialspoint.com/artificial_intelligence/
2.http://www.cs.bham.ac.uk/~jxb/IAI/w5.pdf
3.https://searchenterpriseai.techtarget.com/definition/expert-system

Course Designers:

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DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those joined BCA on or after June 2020)

Course Code	Course Title	Category	L	T	P	Credit
UCA20CE31(c)/ UCA20CE41(c)	**Ethics in Information Security**	Core Elective	**5**	**-**	**-**	**5**

L - Lecture T - Tutorial P – Practical

Year	Semester	Internal	External	Total
II	**III / IV**	**25**	**75**	**100**

Preamble

This course facilitates the students to understand, analyze the various information security issues and security technologies.

Course Outcomes

On the completion of the course the student will be able to

#	Course Outcome	Expected Proficiency	Expected Attainment
CO1	Analyze the broad perceptive of information SECURITY	79%	70%
CO2	Explain need of information security	82%	75%
CO3	Illustrate the Risk control strategies and Risk Management	79%	70%
CO4	Describe the polices of Information security	85%	70%
CO5	Analyze the tools for biometric access	85%	75%

Mapping of COs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	**S**	**M**	**M**	**M**	**L**	**L**
CO2	**S**	**M**	**M**	**M**	**L**	**L**
CO3	**S**	**M**	**M**	**M**	**L**	**L**
CO4	**S**	**M**	**M**	**M**	**L**	**L**
CO5	**S**	**M**	**M**	**M**	**L**	**L**

Mapping of Cos with PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	**S**	**S**	**S**	**M**	**M**
CO2	M	**M**	**S**	**M**	**L**
CO3	**M**	**L**	**M**	**L**	**L**

CO4	**S**	**M**	**M**	**M**	**L**
CO5	**S**	**L**	**L**	**M**	**L**

Blooms Taxonomy

	CA		End of Semester
	First	**Second**	
Knowledge	**40%**	**40%**	**40%**
Understand	**40%**	**40%**	**40%**
Apply	**20%**	**20%**	**20%**

Content

Unit I: **15 Hours**

Introduction to Information Security-History, What is Information Security? - Components of an Information System- Balancing Information Security and- Access- The Systems Development Life Cycle-The Security- Systems Development Life Cycle- Security Professionals and Organization.

Unit II: **15 Hours**

The Need for Security-Business Needs- Threats-Attacks-Secure Software Development -Legal-Professional and Ethical Issues.

Unit III: **15 Hours**

Risk Management-Risk Identification- Risk Assessment- Risk Control Strategies- Selecting Risk Control Strategies-Quantitative versus Qualitative Risk Control Strategies- Risk Management Discussion Points.

Unit IV : **15 Hours**

Planning for Security-Information Security Planning and Governance- Information Security Policy- Standards and Practices- Information Security Blueprint- Security Education- Training and Awareness Program- Continuity Strategies.

Unit V: **15 Hours**

Security Technology-Intrusion Detection and Prevention Systems- Scanning and Analysis Tools-Biometric Access Control- Cryptographic Methods- Algorithms.

Unit	**Chapters/Pages**
Unit I	1(1-30)
Unit II	2(39-76), 3(89-92)
Unit III	4(121-164)
Unit IV	5(173-237)
Unit V	7(291-343) 8(349-372)

Text Books:

Michael E Whitman and Herbert J Mattord, "Principles of Information Security", 6th Edition, Course Technology, Cengage Learning, 2017.

References:

1.Micki Krause, Harold F. Tipton, "Handbook of Information Security Management",Vol 1-3 CRC Press LLC, 2004 (Reprint 2009)
2.Stuart McClure, Joel Scrambray, George Kurtz, "Hacking Exposed", Tata McGraw-Hill,2017.

Web Resources:

1. https://www.techopedia.com/definition/10282/information-security
2. http://bedford-computing.co.uk/learning/wp-content/uploads/2016/08/Principles-of-Information-Security-4th-ed.-Michael-E.-Whitman.pdf

Course Designers:

1. Dr.S.Abirami
2. Dr. V.T. Meenatchi

THIAGARAJAR COLLEGE, MADURAI- 9

An autonomous institution affiliated by Madurai Kamaraj University

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DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those joined BCA on or after June 2020)

Course Code	Course Title	Category	L	T	P	Credit
UCA20CE31(d)/ UCA20CE41(d)	Operating System Lab	Core Elective	-	-	5	5

L-Lecture T-Tutorial P–Practical

Year	Semester	Internal	External	Total
II	III/IV	40	60	100

Preamble

This lab course provides practical knowledge about the services of windows operating system.

Course Outcomes

On the completion of the course the student will be able to

#	Course Outcomes	Expected Proficiency	Expected Attainment
CO1	Analyze the services of windows operating System	75%	70%
CO2	Implement the installation of windows on server and clients	70%	70%
CO3	Realize the memory management in windows	73%	70%
CO4	Illustrate the device management services	70%	65%
CO5	Apply the properties of Server for getting its services	65%	60%

Mapping of COs with PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	M	S
CO2	S	M	S	M	S
CO3	S	M	S	S	S
CO4	S	M	S	M	S
CO5	S	M	S	L	L

Mapping of Cos with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	S	L	L	L	L
CO2	S	S	L	S	S	M
CO3	S	M	L	S	S	S
CO4	S	S	L	L	S	S
CO5	M	L	S	L	M	S

S-Strong M-Medium L-Low

Blooms Taxonomy

	CA		End of Semester
	First	Second	
Knowledge	40%	40%	40%
Understand	40%	40%	40%
Apply	20%	20%	20%

Contents

1. Installing Client Operating System
2. Installing Server operating system
3. Create server roles active directory services
4. Create server roles web server(its) in windows server
5. Devices and printers management in windows server
6. Installing DNS in windows server
7. Server storage management
8. Server scenario

Web Resources

1. https://www.howtogeek.com/197559/how-to-install-windows-10-on-your-pc/
2. https://computingforgeeks.com/how-to-install-active-directory-domain-services-in-windows-server/
3. https://www.youtube.com/watch?v=_BfNEuFbBW0
4. https://www.youtube.com/watch?v=-5_KGCH1nzY

Course Designers:

1. Dr.S.Abirami
2. Mrs. R.Umamaheswari

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DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those joined BCA on or after June 2020)

Course Code	CourseTitle	Category	L	T	P	Credit
UCA20 NE31	E- Waste management	NME-I	2	-	-	2

L-Lecture T–Tutorial P–Practical

Year	Semester	Internal	External	Total
II	III	15	35	50

Preamble

This course aims at facilitating the student to understand the basics of e-waste, maintain Environment neatness and manage electronic clutter free atmosphere.

Course Outcomes

On the completion of the course the student will be able to

#	Course Outcome	Expected Proficiency	Expected Attainment
CO1	Analyze the broad perceptive of information security	79%	72%
CO2	Explain need of information security	82%	75%
CO3	Illustrate the Risk control strategies and Risk Management	79%	71%
CO4	Describe the polices of Information security	85%	75%
CO5	Explain the steps in recycling of materials	80%	75%

Mapping of COs with PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	M	M
CO2	S	L	M	M	M
CO3	S	M	M	M	L
CO4	S	S	M	S	M
CO5	S	S	M	S	S

Mapping of COs with POs

B.C.A. P.O.

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	M	S	S	S	M
CO2	S	L	S	M	M	L
CO3	M	S	M	M	M	M
CO4	S	S	M	S	M	M
CO5	S	S	L	S	S	S

S-Strong M-Medium L-Low

B.Sc., P.O.

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	M	S	S	S	M	S
CO2	L	S	M	M	L	S
CO3	S	M	M	M	M	M
CO4	S	M	S	M	M	S
CO5	S	L	S	S	S	S

S-Strong M-Medium L-Low

Blooms taxonomy

	CA		End of Semester
	First	Second	
Knowledge	40%	40%	40%
Understand	40%	40%	40%
Apply	20%	20%	20%

Content

Unit I: E- Waste **15 hours**

E-waste growth- An overview, hazards of E-waste, what is E-waste, digital dump yard, how to minimize E-waste, Hazardous substances waste Electrical and Electronic Equipment, characteristics of pollutants, batteries, electrical and electronic components, plastic and flame retardants, circuit boards, pollutants in waste electrical and electronic Equipment

Unit II: E-Waste Recycling **15 hours**

Technologies for recovery of resources from electronic waste, resource recovery potential of e-waste, steps in recycling and recovery of materials-mechanical processing, technologies for recovery of materials

Unit	Chapters/Pages
Unit I	Book 1: Chap1
Unit II	Book 2: Chap 1,5,12

Text Books:

1. E-Waste Managing the Digital Dump Yard, Edited by Vishakha Munshi, ICFAI University Press
2. E-waste: Implications, Regulations and Management in India and Current Global Best Practices, Edited by Rakesh Johri, The Energy and Resources Institute, New Delhi, 2015

References:

1. Majeti Narasimha Vara Prasad, Meththika Vithanage, Anwesha Borthakur (2019), Handbook of Electronic Waste Management, 1st Edition

Web Resources:

1. https://en.wikipedia.org/wiki/Electronic_waste
2. https://ecoreco.com/services-data-destruction.aspx

Course Designers:

1. Dr. V.T.Meenatchi
2. Mrs. R.Umamaheswari

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DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those joined BCA on or after June 2020)

Course Code	Course Title	Category	L	T	P	Credit
UCA20NE41	Cybercrime and IPR issues	NME-2	**2**	**-**	**-**	**2**

L - Lecture T – Tutorial P – Practical

Year	Semester	Internal	External	Total
1I	**IV**	**15**	**35**	**50**

Preamble

The course aims at appreciating one of the important area of law closely associated with the application of computers. There are several areas of law which should be known to anyone using computers and computer networks, as the ignorance of the same will expose the users to severe legal consequences.

Course Outcome

On the completion of the course the student will be able to

#	Course Outcome	Expected Proficiency	Expected Attainment
CO1	Exhibit familiarity with the concept of cyber space and its special characteristics, the need for regulation	72%	68%
CO2	Discuss the differences between unsecure and secure electronic documents and the provisions of IT Act ,2000 in respect of digital signatures	75%	65%
CO3	Define crimes and fix criminal liability on the basis of facts of a hypothetical case	70%	65%
CO4	Gain familiarity with the concepts of contract and the rules governing validity of contracts and apply the same to electronic contracts	68%	60%
CO5	Discuss the concepts of Trademark and Copyright	70%	65%

Mapping of CO with PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	**S**	**S**	**L**	**M**	**S**
CO2	**S**	**S**	**L**	**M**	**S**
CO3	**S**	**S**	**M**	**M**	**S**
CO4	**S**	**S**	**M**	**M**	**S**
CO5	**M**	**S**	**S**	**S**	**L**

S-Strong M- Medium L- Low

Mapping of CO with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	L	S	L	S	M
CO2	S	M	S	M	S	M
CO3	S	M	S	M	S	M
CO4	S	M	S	M	S	M
CO5	S	M	S	M	M	L

Blooms taxonomy

	CA		End of Semester
	First	Second	
Knowledge	40%	40%	40%
Understand	40%	40%	40%
Apply	20%	20%	20%

Content

Unit I: **15 Hours**

Introduction to Cybercrime - Introduction· Cybercrime: Definition and Origins of the Word- Cybercrime and Information Security- Who are Cybercriminals? - Classifications of Cybercrimes- Cybercrime: The Legal Perspectives-Cybercrimes: An Indian Perspective-Cybercrime and the Indian ITA 2000-A Global Perspective on Cybercrimes-Cybercrime Era: Survival Mantra for the Netizens.

Unit II: **15 Hours**

Intellectual Genesis-Conceptualization of Property - Classification of Property - Industrial Property as Intellectual Property-Various types of intellectual property rights: The First look - Trademark – Copyright.

Unit	Chapters/Section
Unit I	Book 1: Chap1
Unit II	Book 2: Chap 1,2

Text Books

1. Nina Godbole and Sunit Belapore; "Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives", Wiley Publications, 2011.
2. N.S. Sreenivasulu, Law Relating to Intellectual Property, Patridge Publishing, 2013.

References

1. Sharma, Vakul. Information Technology: Law & Practice. 2nd Edition, New Delhi: Universal Law Publishing Co.
2. Singh, Yatindra Justice. Cyber Laws. 3rd Edition, Universal Law Publishing.
3. Jayashankar K. K., and Philip Johnson. Cyber Law. Pacific Books International, 2011.

Web Resources

1. http://www.legalserviceindia.com/legal/article-3233-intellectual-property-issues-in-cyberspace.html#:~:text=Nowadays%2C%20cyber%20crimes%20do%20not,online%20content%20must%20be%20protected.
2. http://docs.manupatra.in/newsline/articles/Upload/19A86CE4-2FBD-432B-B166-AFBA9087A834.pdf
3. https://www.lkouniv.ac.in/site/writereaddata/siteContent/20200413150518205 0sanjana_mittal_law_IPR_and_Cyber_law.pdf

Course Designers

1.Mrs.R.Umamaheswari
2. Mrs. M.B.C.Ashavani

B.Sc. Information Technology

Programme Code - UIT

Programme outcome-PO (Aligned with Graduate Attributes) - Bachelor of Science(B.Sc.,)

Scientific Knowledge and Critical Thinking

Apply the knowledge of Life Science, Physical and Chemical Science, Mathematics, statistics, Computer science and humanities for the attainment of solutions to the problems that come across in our day-to-daylife/activities.

Problem Solving

Identify and analyze the problem and formulate solutions for problems using the principles of mathematics, natural sciences with appropriate consideration for the public health, safety and environmental considerations.,

Communication and Computer Literacy

Communicate the fundamental and advanced concepts of their discipline in written and oral form.Ableto make appropriate and effective use of information and information technology relevant to their discipline

Life-Long Learning

Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Ethical, Social and Professional Understanding

Commitment to principles, codes of conduct and social responsibility in order to behave consistently with personal respect. Acquire the responsibility to contribute for the personal development and for the development of the community. Respect the ethical values, social responsibilities anddiversity.

Innovative, Leadership and Entrepreneur Skill Development

Function as an individual, and as a member or leader in diverse teams and in multidisciplinary settings. Become an entrepreneur by acquiring technical, communicative, problem solving, intellectual skills.

B.Sc. Information Technology

Vision:

- To exhibit innovative and heuristic knowledge in every IT arena with quality and holistic approach.

Mission:

- To facilitate the students to grab knowledge on various sectors of IT industry.
- To enhance the students to present their wisdom on governmental as well as non-governmental services.
- To equip the student to adapt and apply their skill set to acquire higher education opportunities.

Programme Educational Objectives (PEO):

The objectives of this programme is to equip/prepare the students to

PEO1	Equip the students to grab knowledge on various sectors of IT industry.
PEO2	Promote the students with cumulative skill set to provide solutions to a given real world problem using current trends and technology.
PEO3	Deliver a new generation with proficient on fundamental knowledge and recent trends on different disciplines in Information Technology.
PEO4	Facilitate the student to adapt and apply their skill set to acquire higher education opportunities.
PEO5	Enhance the students to present their wisdom on governmental as well as non-governmental services.

Programme Specific Outcomes – B.Sc.(Information Technology)

On the successful completion of B.Sc., Information the students will

PO1	Acquire fundamental concepts, methods and practices of Information Technology to develop theoretical and practical skill sets.
PO2	Justify the optimum technique to allocate memory resources, processors, I/O peripherals to provide optimal programmatic solution to a real world problem.
PO3	Support to gain skills on basic as well as trendy software languages and packages to design web sites, web apps and real time software projects.
PO4	Promote the students to generalize and distinguish the characters of different systems for different environment.
PO5	To trigger the students to enroll in to the research areas of IT industry like cloud computing and data analysis.

THIAGARAJAR COLLEGE, MADURAI – 9.
DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY
B.Sc. INFORMATION TECHNOLOGY(w.e.f. 2020 batch onwards)
Programme Code-UIT

Semester – I

Course	Code No.	Subject	Hours	Credits	Total No. of Hours Allotted	Max. Marks CA	Max. Marks SE	Total
Part I	U20TM11	Tamil	5	3	75	25	75	100
Part II	U20EN11	English	4	3	60	25	75	100
Core 1	UIT20C11	Programming in C	4	4	60	25	75	100
Core 2	UIT20C12	Digital Principles and Computer Organization	4	4	60	25	75	100
Core Lab 1	UIT20CL11	Programming in C Lab	3	2	45	40	60	100
Core Lab 2	UIT20CL12	Digital Design Lab	3	2	45	40	60	100
Generic Elective 1	UMA20GE 11IT	Mathematical foundation for CS	5	5	75	25	75	100
AECC	U20ES11	Enivironmental Studies	2	2	30	15	35	50
TOTAL			**30**	**25**	**450**	**220**	**530**	**750**

Semester-II

Course	Code No.	Subject	Hours	Credits	Total No. of Hours Allotted	Max. Marks CA	Max. Marks SE	Total
Part I	U20TM21	Tamil	5	3	75	25	75	100
Part II	U20EN22	English	4	3	60	25	75	100
Core 3	UIT20C21	Data Structures	4	4	60	25	75	100
Core 4	UIT20C22	Microprocessor and Assembly Language Programming	4	4	60	25	75	100
Core Lab 3	UIT20CL21	Data Structures using C Lab	3	2	45	40	60	100
Core Lab 4	UIT20CL22	Basics of Web Technology Lab	3	2	45	40	60	100
Generic Elective2	UMA20GE 21IT	Probability and Statistics	5	5	75	25	75	100
AECC	U20VE21	Value Education	2	1	30	15	35	50
TOTAL			**30**	**24**	**450**	**220**	**530**	**750**

Semester – III

Course	Code No.	Subject	Hours	Credits	Total No. of Hours Allotted	Max. Marks CA	Max. Marks SE	Total
Core 5	UIT20C31	Java Programming	5	4	75	25	75	100
Core 6	UIT20C32	Relational Database Management System	5	4	75	25	75	100
Core Lab 5	UIT20CL31	JavaProgramming Lab	4	2	60	40	60	100
Core Lab 6	UIT20CL32	RDBMS Lab	4	2	60	40	60	100
Core Elective I	UIT20CE31 (A/B/C/D)	Options given	5	5	75	25	75	100
Generic Elective 3	UMA20GE 31IT	Computational Methods	5	5	75	25	75	100
NME I	UIT20NE31	Open Source Technology	2	2	30	15	35	50
TOTAL			**30**	**24**	**450**	**195**	**455**	**650**

Semester – IV

Course	Code No.	Subject	Hours	Credits	Total No. of Hours Allotted	Max. Marks CA	Max. Marks SE	Total
Core 7	UIT20C41	Operating System	5	4	75	25	75	100
Core 8	UIT20C42	Python Programming	5	4	75	25	75	100
Core Lab 7	UIT20CL41	Operating System Lab	4	2	60	40	60	100
Core Lab 8	UIT20CL42	Python Programming Lab	4	2	60	40	60	100
Core Elective II	UIT20CE41 (/E/F/G/H)	Options given	5	5	75	25	75	100
Generic Elective4	UIT20GE41	Operations Research	5	5	75	25	75	100
NME II	UIT20NE41	Internet Security - Principles and Practices	2	2	30	15	35	50
TOTAL			**30**	**24**	**450**	**195**	**455**	**650**

Semester – V

Course	Code No.	Subject	Hours	Credits	Total No. of Hours Allotted	Max. Marks CA	Max. Marks SE	Total
Core 9	UIT20C51	Web Designing with PHP	5	4	75	25	75	100
Core 10	UIT20C52	Computer Networks	5	4	75	25	75	100
Core 11	UIT20C53	Software Engineering	5	4	75	25	75	100
Core Lab 9	UIT20CL51	Web Designing with PHP Lab	5	2	75	40	60	100
Core Lab 10	UIT20CL52	Networking Lab	4	2	60	40	60	100
Project	UIT20PJ51	Major Project	4	2	60	40	60	100
SEC I	UIT20SE51	Options given	2	2	30	15	35	50
TOTAL			**30**	**20**	**450**	**195**	**455**	**650**
		Internship		2		15	35	50

Semester – VI

Course	Code No.	Subject	Hours	Credits	Total No. of Hours Allotted	Max. Marks CA	Max. Marks SE	Total
Core 12	UIT20C61	**.**Net Technology	6	6	90	25	75	100
Core 13	UIT20C62	Mobile Application Development	5	4	75	25	75	100
Core 14	UIT20C63	Data Warehousing & Mining	6	5	90	25	75	100
Core Lab 11	UIT20CL61	**.**Net Technology Lab	5	2	75	40	60	100
Core Lab 12	UIT20CL62	Mobile Application Development Lab	6	3	90	40	60	100
SEC II	UIT20SE61	Options given	2	2	30	15	35	50
Part V				1		**75**	**25**	100
TOTAL			**30**	**23**	**450**	**170**	**380**	**550**
TOTAL CREDITS FOR SEMESTERS I to VI				**140+2**				

A) Consolidation of contact hours and credits: UG

Semester	ContactHrs/ Week	Credits
I	30hrs	25
II	30hrs	24
III	30hrs	24
IV	30hrs	24
V	30hrs	20
VI	30hrs	23
Part– V	-	01
Total	180hrs	140
V	Internship	2
V	Additionalcredit (Self study - paper)	5

B) Curriculum Credits: Part wise

		Noof papers	Creditsperpaper	Totalcredits
Part I	**Tamil**	**2**	**3**	**06**
PartII	**English**	**2**	**3**	**06**
PartIII	**CoreTheory**	**1+1+12**	**6/5/4**	**59**
	Corelab	**1+11**	**3/2**	**25**
	CoreElective	**2**	**5**	**10**
	GenericElective Theory	**4**	**5**	**20**
	Project	**1**	**2**	**2**
PartIV	**AECC**	**2**	**2+1**	**03**
	NME	**2**	**2**	**04**
	SEC	**2**	**2**	**04**
Part-V(NSS / NCC/PhysicalEducation)				**01**
Internship				**2**
Grandtotal				**140+2**

Core Electives

A. Soft Computing
B. E - Commerce
C. Software Project Management
D. Digital Image Processing

E. Cloud Computing
F. Principles of Data Communication
G. Computer Forensics
H. Big Data Analytics

SBE

A. Robotics
B. Desk Top Publishing Lab (Photoshop, Corel Draw, Flash)
C. Embedded System
D. Cassandra Lab
E. Logical Reasoning
F. R-Programming

NME

1. Open Source Technology – NME I
2. Internet Security - Principles and Practices - NME II

Thiagarajar College (Autonomous):: Madurai – 625 009

DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those joined B.Sc. IT on or after June 2020)

Programme Code - UIT

CourseCode	Course Title	Category	L	T	P	Credit
UIT20C31	Java Programming	Core 5	4	1	-	4

L - Lecture T - Tutorial P – Practicals

Year	Semester	Max. Marks CA	Max.Marks SE	Total
II	III	25	75	100

Preamble

This coursewill guide to the Java language, describing its syntax, keywords, and fundamental programming principles. It significancesthe java latest API library and programming environment.To implement logic and improvements the art of programming

Course Outcomes

On the completion of the course the student will be able to

#	Course Outcome	Expected Proficiencey	Expected Attainment
CO1	Classify and apply the core programming Logics with inference variable and varargs.	75%	70%
CO2	State the reason of inheritance, concurrency, and usage o nested and inner Class.	75%	70%
CO3	Able to create user define package and interface, Handl Exception Cases in java programming.	73%	65%
CO4	Perform Multi Threading.Compute the method of Java's wrappers classes and String Manipulation.	68%	62%
CO5	Design a Graphical user interfaces using AWT Controls and Exploring Swing.	65%	60%

Mapping of Course Outcomes with Program Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	**S**	**S**	**M**	**M**	**S**	**M**
CO2	**S**	**S**	**S**	**M**	**S**	**M**
CO3	**S**	**S**	**M**	**M**	**M**	**S**
CO4	**S**	**S**	**M**	**M**	**S**	**S**
CO5	**S**	**S**	**M**	**M**	**M**	**S**

(S – Strong , M – Medium , L – Low)

Mapping of Course Outcomes with ProgramSpecificOutcomes

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	**S**	**M**	**S**	**M**	**M**
CO2	**S**	**S**	**M**	**M**	**M**
CO3	**M**	**M**	**S**	**S**	**S**
CO4	**S**	**M**	**S**	**M**	**L**
CO5	**S**	**S**	**S**	**M**	**L**

(S – Strong , M – Medium , L – Low)

Blooms taxonomy: Assessment Pattern

	CA		End of Semester
	First	Second	
Knowledge-K1	40%	40%	40%
Understand-K2	40%	40%	40%
Apply-K3	20%	20%	20%

Java Programming

Unit I: 14 hours

The History and Evolution of Java: TheCreationofJava-HowJavaImpacted the Internet - JavaApplets-Security – Portability - Java'sMagic:TheBytecode – MovingBeyondApplets – AFasterReleaseSchedule Servlets:JavaontheServerSide – TheJavaBuzzwords – **An Overview of Java:** Object-OrientedProgramming -Two Paradigms – Abstraction – TheThreeOOPPrinciples. **Data Types, Variables, and Arrays:** JavaIs a StronglyTypedLanguage – ThePrimitiveTypes – ACloserLookatLiterals –Dynamic Initialization -TheScopeandLifetimeofVariables – TypeConversionandCasting – TheTypePromotionRules - Arrays- AlternativeArrayDeclarationSyntax - Introducing Type Inference with Local Variables - Some var Restrictions**Operators – Control Statements- Introducing Classes Class Fundamentals:** The General Form ofaClass -ASimple Class – Constructors – Parameterized Constructors - GarbageCollection – AStackClass

Unit II: 16 hours

A Closer Look at Methods and Classes : Overloading Methods – Overloading Constructors Using Objects as Parameters - Understanding static - Introducing final - **Introducing Nested and Inner Classes** – Using Command-Line Arguments - **Varargs:** Variable Length Arguments Overloading –Vararg Methods – **Inheritance** : Inheritance Basics Using super - Method Overriding – Dynamic Method Dispatch. – Using Abstract Classes – Local Variable Type Inference and Inheritance - The Object Class.

Unit III: 16 hours

Packages and Interfaces: Packages – DefiningaPackage – FindingPackages and CLASSPATH – AShortPackage - Example PackagesandMemberAccess - An Access –Example – ImportingPackages- Interfaces - Definingan Interface – ImplementingInterfaces - - NestedInterfaces – Applying Interfaces Variables inInterfaces. **ExceptionHandling:** Exception –Handling Fundamentals – Exception Types- Uncaught Exceptions - Multiple catchClauses – Nested try Statements - throw – throws- finally - Java'sBuilt-inExceptions.CreatingYour OwnException.

Unit IV: 14 hours

Multithreaded Programming: The Java Thread Model – ThreadPriorities - Synchronization- TheThreadClassand theRunnableInterface - The Main Thread - Creating a Thread–Implementing Runnable - Extending Thread- Choosing an Approach – Creating Multiple Threads. **Autoboxing :**Types Wrappers – Character – Boolean –TheNumericTypeWrappers.Autoboxingand Methods- Autoboxing/Unboxing Occurs inExpressions. **String Handling:** The String Constructors- StringLength - StringOperations –StringBuffer –StringBuffer methods - StringBuilderClasses.

Unit V: 15 hours

Introducing the AWT: Workingwith Windows, Graphics, andText - AWT Classes – WindowFundamentals - Component – Container – Panel – Window - Frame. Canvas.- WorkingwithFrameWindows.**Introducing Graphics:** DrawingLines – DrawingRectangles – DrawingEllipses and Circles - Drawing Arcs- DrawingPolygons.**Introducing GUI Programming withSwing:** Introducing Swing – The Origins of Swing – Swing Is Built on the AWT - TwoKeySwingFeatures - Components and Containers –TheSwingPackages – A Simple Swing

Application- Exploring Swing - JLabel and ImageIcon - JTextField - TheSwingButtons – Jbutton - JToggleButton – CheckBoxes - RadioButtons - JTabbedPane –JscrollPane - JListJComboBox –Trees -JTable -JMenuBar.

Text Books:

1. Herbert Schildt, 2019,"*Java The Complete Reference"*, Elevength Edition, Oracle Press,New Delhi.

Unit	Chapters/Section
I	1, 2, 3,4,5,6.
II	7,8.
III	9, 10.
IV	11,12(page 466 – page 475), 17.
V	25, 31,32,33 (page 1622 –page 1630).

References:

1. Allen B. Downey & Chris Mayfield., 2020, *Think Java*, O'reilly Media IncSebastopol,CA.
2. E Balagurusamy, 2019, *A Programming with JAVA*, McGraw Hill Education (India) Private Limited, 6th Edition.
3. D.T. Editorial Services, 2015, *Java 8 Programming Black Book*, Dreamtech Press, New Delhi
4. Kathy Sierra, , Bert Bates,2005, *Head First Java 2e*, Shroff/O'Reilly, Boston

Web Resources:

1. https://www.tutorialspoint.com/java/index.htm
2. https://www.w3schools.com/java/
3. https://www.javatpoint.com/java-tutorial
4. https://docs.oracle.com/javase/tutorial/

Course Designers:

1. Mr. S. Kumarappan.
2. Mrs. P.Praveena

Thiagarajar College (Autonomous):: Madurai – 625 009

DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those joined B.Sc. IT on or after June 2020)

Programme Code - UIT

CourseCode	Course Title	Category	L	T	P	Credit
UIT20C32	Relational Database Management Systems	Core-6	4	1	0	4

L - Lecture T - Tutorial P – Practicals

Year	Semester	Max. Marks CA	Max.MarksSE	Total
II	III	25	75	100

Preamble

Disseminate the knowledge on various Data models, Normalization of data, Relational algebra, Relational data design, SQL, PL/SQL features.

Course Outcomes

On the completion of the course the student will be able to

#	Course Outcome	Expected Proficiencey	Expected Attainment
CO1	Define Entity Relationship model, types of data models and difference between File System and DatabaseSystem	75%	75%
CO2	Illustrate the basic concepts of Relations, Domains, Architecture of System R and Oracle.	72%	70%
CO3	Relate the normalization concepts, how to implement normalization in order toCreate tables in Oracle. To make use of DDL, DML and SQL commands,Views in Structured Query Language and Triggers.	73%	65%
CO4	DevelopPL/SQL block structure, Loops, Relational Algebra, ConcurrencyControl and Automatic Recovery.	68%	62%
CO5	Demonstrate the Features of Good Relational Designs – Atomic Domains & First Normal-DecompositionusingFunctional Dependencies-Decomposition using Multivalued Dependencies	65%	60%

Mapping of Course Outcomes with Program Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	**S**	**S**	**M**	**M**	**S**	**M**
CO2	**S**	**S**	**S**	**M**	**S**	**M**
CO3	**S**	**S**	**M**	**M**	**M**	**S**
CO4	**S**	**S**	**M**	**M**	**S**	**S**
CO5	**S**	**S**	**M**	**M**	**M**	**S**

(S – Strong , M – Medium , L – Low)

Mapping of Course Outcomes with ProgramSpecificOutcomes

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	**S**	**M**	**S**	**M**	**M**
CO2	**S**	**S**	**M**	**M**	**M**
CO3	**M**	**M**	**S**	**S**	**S**
CO4	**S**	**M**	**S**	**M**	**L**
CO5	**S**	**S**	**S**	**M**	**L**

(S – Strong , M – Medium , L – Low)

Bloomstaxonomy: Assessment Pattern

	CA		End of Semester
	First	Second	
Knowledge-K1	40%	40%	40%
Understand-K2	40%	40%	40%
Apply-K3	20%	20%	20%

Relational DatabaseManagementSystems

UNIT I: **16 hours**

Introduction: Flat file – Database System – Database – Actionable for DBA. **The Entity Relationship Model:** Introduction – The Entity Relationship Diagram. **Data Models:** Introduction – Relational Approach – The Hierarchical Approach – The Network Approach.

UNITII: **14 hours**

Storage Structure: Introduction – File organization and addressing schemes. Relational Data Structure: Introduction Relations – Domains. **Architecture of System R and Oracle:** Introduction Architecture of System R.

UNITIII: **16 hours**

Normalization: Introduction- Normalization – Purpose of Normalization – Normal Forms – **Structured Query Language:** Features of SQL – Select SQL Opeations – Grouping the output – Querying from multiple tables – Retrieval using set operators– Nested Queries – View creation. TSQL – Triggers and Dynamic Execution: Introduction – Transact SQL.

UNITIV: **14 hours**

Procedure Language – SQL: Introduction – PL/SQL Block Structure – PL/SQL Tables: Relational Algebra and Relational Calculus: Introduction – Algebraic Operations. **Concurrency Control and automatic recovery:** Row level Locks, Automatic Recovery and Backup – Backup Techniques - Advanced Backup Techniques.

UNITV: **15 hours**

Relational Data base Design: Features of Good Relational Designs – Atomic Domains & First Normal - Decomposition using Functional Dependencies - Decomposition using Multivalued Dependencies

Text Books:

1. Rajesh Narag, 2011, Database Management Systems, PHI Learning PrivateLtd.
2. Abraham Silberschatz, Henry F.Korth, S.Sudarshan, Reprint 2016, Database System Concepts, 6th Edition, McGraw Hill Education, NewDelhi.

Unit	Chapter
I	Book1: 1,2,3.
II	Book1: 4,5,6
III	Book1: 7,8,9
IV	Book1: 10,12,13
V	Book2: 8.1,8.2,8.3,8.6

References:

1. BobBryla, Kevin Loney, 2014, Oracle Database 12c The Complete Reference, McGraw Hill, NewDelhi.
2. "SQL and Relational Theory: How to Write Accurate SQL Code" byChristopher J. Date , 2009, O' Reilly Media Inc.
3. "Six-Step Relational Database Design: A Step by Step Approach to Relational Database Design and Development" by Fidel A. Captain, 2011, Richard W. Georges

Web Resources:

1. www.studytonight.com
2. https://www.tutorialspoint.com/sql/sql-rdbms-concepts.htm
3. https://www.javatpoint.com/what-is-rdbms
4. https://beginnersbook.com/2015/04/rdbms-concepts/
5. https://intellipaat.com/blog/tutorial/sql-tutorial/rdbms/

Course Designers:

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Thiagarajar College (Autonomous):: Madurai – 625 009

DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those joined B.Sc. IT on or after June 2020)

Programme Code - UIT

CourseCode	Course Title	Category	L	T	P	Credit
UIT20CL31	JavaProgramming Lab	Core Lab 5	0	**0**	4	2

L - Lecture T - Tutorial P - Practicals

Year	Semester	Max. Marks CA	Max. Marks SE	Total
II	III	40	60	100

Preamble

Demonstrate the working of Classes & objects along with constructors, Arrays and Vectors.Understanding the principles of inheritance, interface and packages and demonstrate though problem analysis assignments.Apply theJava Swings for designing GUI applications.

Course Outcomes

On the completion of the course the student will be able to

#	Course Outcome	Expected Proficiencey	Expected Attainment
CO1	Implement Object Oriented programming concept using basic syntaxes of control Structures.	75%	75%
CO2	Demonstrates how to achieve reusability using inheritance, interfaces and packages	75%	70%
CO3	Demonstrate understanding and use of differen exception handling mechanisms and concept o multithreading for robust.	70%	65%
CO4	Identify, Design & develop complex Graphical use interfaces using principal Java Swing classes.	68%	65%
CO5	Implement MenuBarcompenetsin a small applications.	65%	60%

Mapping of Course Outcomes with Program Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	**S**	**S**	**M**	**L**	**S**	**M**
CO2	**S**	**S**	**M**	**L**	**M**	**M**
CO3	**S**	**M**	**M**	**M**	**L**	**L**
CO4	**M**	**L**	**L**	**M**	**L**	**L**
CO5	**S**	**M**	**L**	**M**	**M**	**S**

(S – Strong , M – Medium , L – Low)

Mapping of Course Outcomes with Program Specific Outcomes

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	**S**	**M**	**S**	**L**	**S**
CO2	**S**	**M**	**M**	**M**	**S**
CO3	**S**	**L**	**M**	**L**	**S**
CO4	**S**	**M**	**L**	**M**	**M**
CO5	**S**	**M**	**L**	**M**	**M**

(S – Strong , M – Medium , L – Low)

Blooms taxonomy: Assessment Pattern

	CA		End of Semester
	First	**Second**	
Knowledge	**40%**	**40%**	**40%**
Understand	**40%**	**40%**	**40%**
Apply	**20%**	**20%**	**20%**

Java Programming Lab

SI. No	**Topic**
1	Program to define a class, andinstantiate its object
2	Demostrating Method Overloading and Constructor Overloading
3	Program to create Arrays and vectors
4	Program to DemostrateVar-Args
5	Working with strings using String, String Buffer and String Builder classes.
6	Program to implement inner class.
7	Program to implement Wrapper classes and their methods
8	Program to implement inheritance and demonstrating method overriding
9	Creating Interface and implementingpolymormhism.
10	Program to Demonstrate Local Variable Type Inference
11	Creating and importing user defined packages.
12	Developing Multithreading by extending Thread Class
13	Program to perform multithreading by implementing Runnable Interface.
14	Exception Handling using multiple try catch
15	Creating user defined exceptions and handling using throe keywoard.
16	Desing Graphical User Interface by using AWT Classes
17	Java Program to demonstrate Graphics class, Swing classes.
18	Java Program to demonstrate keyboard event ,mouse events
19	Developing Mini Calcullator using Swing
20	Java Program to create MenuBar.

Course Designer:

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2. Mrs. P.Praveena

Thiagarajar College (Autonomous):: Madurai – 625 009

DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those joined B.Sc. IT on or after June 2020)

Programme Code - UIT

CourseCode	Course Title	Category	L	T	P	Credit
UIT20CL32	RDBMS Lab	Core Lab 6	0	**0**	4	2

L - Lecture T - Tutorial P - Practicals

Year	Semester	Max. Marks CA	Max. Marks SE	Total
II	III	40	60	100

Preamble

To learn the creation of database and be familiarized with a query languages. To have hands on experience on DDL, DML and DCL commands.

Course Outcomes

On the completion of the course the student will be able to

#	Course Outcome	Expected Proficiencey	Expected Attainment
CO1	Design and implement a database schema for a given problem-domain	75%	75%
CO2	Populate and query a database	75%	70%
CO3	Create and maintain tables using PL/SQL	70%	65%
CO4	Prepare reports.	68%	65%
CO5	Application Development	65%	60%

Mapping of Course Outcomes with Program Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	**S**	**S**	**M**	**L**	**S**	**M**
CO2	**S**	**S**	**M**	**L**	**M**	**M**
CO3	**S**	**M**	**M**	**M**	**L**	**L**
CO4	**M**	**L**	**L**	**M**	**L**	**L**
CO5	**L**	**L**	**M**	**M**	**M**	**L**

(S – Strong , M – Medium , L – Low)

Mapping of Course Outcomes withProgramSpecificOutcomes

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	**S**	**M**	**S**	**L**	**S**
CO2	**S**	**M**	**M**	**M**	**S**
CO3	**S**	**L**	**M**	**L**	**S**
CO4	**S**	**M**	**L**	**M**	**M**
CO5	**L**	**L**	**M**	**M**	**M**

(S – Strong , M – Medium , L – Low)

Blooms taxonomy: Assessment Pattern

	CA		End of Semester
	First	Second	
Knowledge	**40%**	**40%**	**40%**
Understand	**40%**	**40%**	**40%**
Apply	**20%**	**20%**	**20%**

RDBMS LAB

SQL

1. Creation of a database and writing SQL queries to retrieve information from the database.
2. Performing Insertion, Deletion, Modifying, Altering, Updating and Viewing records based onconditions.
3. Creation of Views, Synonyms, Sequence, Indexes, Save point.
4. Creating database to set various constraints
5. Creating relationship between the databases.

PL / SQL

1. Write a PL/SQL block to satisfy some conditions by accepting input from the user.
2. Write a PL/SQL block that handles all types of exceptions.
3. Creation of Procedures.
4. Creation of database triggers and functions.

Course Designer:

1. Mrs. J.I. Christy Eunaicy
2. Mrs.P.Praveena

Thiagarajar College (Autonomous):: Madurai – 625 009

DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those joined B.Sc. IT on or after June 2020)

Programme Code - UIT

CourseCode	Course Title	Category	L	T	P	Credit
UIT20C41	Operating System	Core-7	4	1	0	4

L-Lecture T-Tutorial P –Practicals

Year	Semester	Max. Marks CA	Max. Marks SE	Total
II	IV	25	75	100

Preamble

Provides the fundamentals of the different types of operating systems and to make proficient on the concepts of process, memory and file management with various scheduling techniques.

CourseOutcomes

On the completion of the course the student will be ableto

#	Course Outcome	Expected Proficiencey	Expected Attainment
CO1	Define the operating system with it‘s architecture and different types of system calls.	80%	75%
CO2	Describe the process concepts and illustrate the various scheduling algorithms.	75%	70%
CO3	Illustrate the critical section problems and the dead lock problems.	75%	70%
CO4	Explain the concept of memory management and the virtual memory management with various paging algorithms	70%	65%
CO5	Sketch out the various storage structures with different disk schedulingalgorithms.	70%	60%

Mapping of Course Outcome with Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	**S**	**M**	**M**	**L**	**L**	**M**
CO2	**M**	**S**	**M**	**M**	**M**	**L**
CO3	**M**	**S**	**L**	**L**	**M**	**L**
CO4	**S**	**S**	**M**	**M**	**L**	**L**
CO5	**S**	**S**	**L**	**L**	**M**	**M**

(S – Strong , M – Medium , L – Low)

Mapping of Course Outcomes with ProgramSpecificOutcomes

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	**S**	**L**	**L**	**M**	**L**
CO2	**M**	**S**	**M**	**M**	**L**
CO3	**S**	**M**	**S**	**S**	**L**
CO4	**M**	**S**	**M**	**S**	**M**
CO5	**S**	**S**	**S**	**M**	**L**

(S – Strong , M – Medium , L – Low)

Bloomstaxonomy: Assessment Pattern

	CA		End of Semester
	First	Second	
Knowledge-K1	40%	40%	40%
Understand-K2	40%	40%	40%
Apply-K3	20%	20%	20%

OperatingSystem

UnitI: **14 hours**

Introduction: What Operating Systems Do - Computer-System Organization - Computer- System Architecture - Operating System Structure - Operating System Operations. System Structures: Operating - System Services - User and Operating Interface - System calls - Types of System calls - System Programs.

UnitII: **15 hours**

Process Management: Process Concept – Process Scheduling – Operation on Processes – Inter- process communication – Process Scheduling: Basic concepts – Scheduling Criteria – Scheduling Algorithms – Multiple Processor Scheduling –Real-time CPU Scheduling.

UnitIII: **16 hours**

Synchronization: The Critical Section Problem – Synchronization Hardware – Semaphores- classic problems of synchronization –Monitors.Deadlocks: Dead lock characterization – Methods for handling Dead locks – Dead lock prevention - Dead lock avoidance – Dead Lock detection - Recovery from Deadlock.

UnitIV: **15 hours**

Memory Management: Memory Management Strategies - Swapping - Contiguous Memory Allocation – Segmentation – Paging - Virtual Memory Management: Demand Paging – Page replacement

UnitV: **15 hours**

Storage Management: File System - File Concept. Implementing File Systems: File System structure – File system implementation – Directory implementation, Allocation Methods. Mass- Storage Structure: Disk structure – Disk scheduling – Disk Management.

TextBooks:

1. Abraham Silberschatz, Peter B Galvin & Greg Gagne, Reprint 2016, Operating System Concepts, 9th Edition, John Wiley & Sons (ASIA) Pvt.Ltd.

Unit	Chapters
I	1.1 to 1.5,2.1 to 2.5
II	3.1 to 3.4, 5.1, 5.2, 5.3, 5.5, 5.6
III	6.2,6.4,6.6,6.7,6.8, 7.2 to 7.7
IV	8.2,8.3,8.4,8.5,9.2,9.4,9.6
V	10.1,11.1 to 11.4, 12.2,12.4,12.5

References:

1. William Stallings, Fourth Impression 2016, Operating System, , 7th Edition,Pearson
2. Operating Systems: Three Easy Pieces Book by Andrea Arpaci-Dusseau and RemziArpaci-Dusseau, 2015, Google Books.
3. Pradeep K. Sinha, 2007, Distributed Operating Systems, PHI Learning PrivateLimited.

WebResources:

1. 1.https://www.tutorialspoint.com/computer_fundamentals/computer_operating_system/
2. https://computer.howstuffworks.com/operating-system/
3. https://www.studytonight.com/operating-system/

CourseDesigners:

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Thiagarajar College (Autonomous):: Madurai – 625 009

DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those joined B.Sc. IT on or after June 2020)

Programme Code - UIT

CourseCode	Course Title	Category	L	T	P	Credit
UIT20C42	Python Programming	Core -8	4	1	0	4

Year	Semester	Max. Marks CA	Max. Marks SE	Total
II	IV	25	75	100

Preamble

To understand the various elements of Python and able to create simple python application.

Course Outcomes

On the completion of the course the student will be able to

#	Course Outcome	Expected Proficiencey	Expected Attainment
CO1	Demonstrate the basic concepts of variables expressions	75%	75%
CO2	Explain the concepts of cases strings and repetitions	70%	65%
CO3	Sketch out the strings and lists	70%	65%
CO4	Illustrate the concept of functions and loopings and counters.	68%	65%
CO5	Application of File Handling and Exceptions	65%	60%

Mapping of Course Outcomes with Program Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	**S**	**M**	**S**	**L**	**S**	**S**
CO2	**S**	**M**	**M**	**M**	**S**	**S**
CO3	**S**	**L**	**M**	**L**	**S**	**M**
CO4	**S**	**M**	**L**	**M**	**M**	**L**
CO5	**S**	**M**	**M**	**L**	**M**	**L**

(S – Strong , M – Medium , L – Low)

Mapping of Course Outcomes with ProgramSpecificOutcomes

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	**S**	**L**	**S**	**S**	**M**
CO2	**M**	**M**	**S**	**M**	**L**
CO3	**S**	**M**	**S**	**M**	**L**
CO4	**S**	**S**	**L**	**M**	**M**
CO5	**S**	**M**	**M**	**L**	**M**

(S – Strong , M – Medium , L – Low)

Blooms taxonomy:Assessment Pattern

	CA		End of Semester
	First	Second	
Knowledge-K1	40%	40%	40%
Understand-K2	40%	40%	40%
Apply-K3	20%	20%	20%

Python Programming

Unit-I: **15hours**

Introduction:-The History of Python – Getting started with Python – Programming Style and Documentation – Programming Errors. **Elementary Programming:-** Introduction – Writing a Simple Program – Reading input from the console – Identifiers – Variables, Assignment statements and Expressions – Simultaneous Assignments – Named Constants – Numeric Data Types and Operators – Evaluating Expression and Operator Precedence – Augmented Assignment Operators – Type Conversion and Rounding.

Unit-II: **15hours**

Mathematical Functions, Strings, and Objects:-Introduction – Common Python Functions – Strings and Characters – Introduction to objects and Methods – Formatting Numbers and Strings – Drawing Various Shapes – Drawing with colors and fonts. **Selections:-** Introduction – Boolean Types, Values and Expressions – Generating Random Numbers – If Statements – Two way if-else statement – Nested If and Multiway – If - elif – else statements – Common errors in selection statements – Logical operators – Conditional Expression - Operator precedence and Associativity.

Unit –III: **15hours**

Loops:-Introduction – The while loop – The for loop – Nested loop – Keywords break and continue. **Functions:-** Introduction – Defining a function – Calling a function – Functions with/without return values – Positional and keyword Arguments – Passing Arguments by reference values – the scope of variables – default arguments – Returning multiple values – Function Abstraction and software refinement.

Unit – IV: **15hours**

Lists:-Introduction – List Basics – Copying Lists – Passing lists to function – Returning a list from a function – Searching lists – Sorting Lists. **Multidimensional Lists:-**Introduction – Processing Two-Dimensional Lists – Passing Two-Dimensional Lists to functions – Multidimensional Lists

Unit – V: **15hours**

Files and Exception Handling:-Introduction – Text Input and Output – File Dialogs – Exception Handling - Raising Exceptions – Processing Exceptions using Exception objects – Delining Custom Exception classes – Binary I/O using Pickling. **Tuples, Sets and Dictionaries:-**Introduction – Tuples – Sets – Comparing the performance of Sets and Lists – Dictionaries. **Recursion: -** Introduction – Problem solving using recursion – Recursive helper function – Recursion vs Iteration – Tail Recursion.

TextBooks:

1. Introduction To Programming using Python, Y.Daniel Liang, 2017, Pearson India Education Services Pvt.Ltd

UNIT	Chapter /Sections
I	1(1.5-1.6, 1.7-1.8) 2(2.1-2.11)
II	3(3.1-3.3, 3.5-3.8) 4(4.1-4.8, 4.11,4.14,4.15)
III	5(5.1-5.4), 5.7, 6(6.1-6.6,6.9 -6.11,6.13)
IV	10(10.1-10.2, 10.6 -10.8, 10.10,10.11) 11(11.1-11.3, 11.9)
V	13(13.1-13.3, 13 .6 – 13.10), 14(14.1-14.4, 14.6) 15(15.1, 15.4-15.5,15.10-15.11)

ReferenceBooks:

1. PaulGries , Jennifer Campbell, Jason Montojo, 2017, Practical Programming: An Introduction to Computer Science Using Python, PragmaticBookshelf.

2. Guttag john V ,2021, Introduction To Computation And Programming Using Python ,PHI Learning Private Limited NewDelhi.

3. Dr.S.A. Kulkarni, Problem Solving and Python Programming, Second Edition, 2017, Yes Dee Publishing

CourseDesigner:

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Thiagarajar College (Autonomous):: Madurai – 625 009

DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those joined B.Sc. IT on or after June 2020)

Programme Code - UIT

CourseCode	Course Title	Category	L	T	P	Credit
UIT20CL41	Operating System Lab	Core Lab 7	0	0	4	2

L - Lecture T - Tutorial P – Practicals

Year	Semester	Max. Marks CA	Max. Marks SE	Total
II	IV	40	60	100

Preamble

Construct fundamental skills on Linux operating systems and train to write shell scripts with various control construct of Linux.

Course Outcomes

On the completion of the course the student will be able to

#	Course Outcome	Expected Proficiency	Expected Attainment
CO1	Identify the structure and syntax; Execute the basic commands to handle files and directory.	85%	75%
CO2	Handle _vi‘ editor and Create text files and to test them with variouscommands (grep,wc)	75%	70%
CO3	Demonstrate the shell scripts writing using arithmetic and logical operators.	75%	70%
CO4	Write shell scripts to control the operating system using various controlconstructs (if, while, for).	80%	70%
CO5	Demostrating authentication measures in Linux	75%	70%

Mapping of Course Outcome with Programme Outcomes

Mapping of COs with Pos	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	M	S	M	M	S
CO2	S	M	M	M	L	M
CO3	S	S	M	S	M	L
CO4	S	S	M	S	L	L
CO5	M	M	M	S	L	L

(S – Strong , M – Medium , L – Low)

Mapping of Course Outcomes with ProgramSpecificOutcomes

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	M	L
CO2	M	S	S	L	S
CO3	S	M	M	M	S
CO4	M	M	S	L	L
CO5	L	L	M	S	M

(S – Strong , M – Medium , L – Low)

Blooms taxonomy

	CA		End of Semester
	First	Second	
Knowledge-K1	40%	40%	40%
Understand-K2	40%	40%	40%
Apply-K3	20%	20%	20%

Operating SystemLab

Commands:

1. Execution of various file/directory handlingcommands.
2. Execution of various listcommands.
3. Execution of various datecommands.
4. Execution of various calendarcommands.
5. Execution of various grepcommands.
6. Execution of various word count(wc)commands.

Shell scripts:

1. Shell script to find the biggest among given threenumbers.
2. Simple shell script for basic arithmetic and logicalcalculations.
3. Shell scripts to check various attributes of files anddirectories.s
4. Shell scripts to perform various operations on given strings.
5. Shell scripts to explore system variables such as PATH, HOMEetc.
6. Shell scripts to check and list attributes ofprocesses.
7. Execution of various system administrativecommands.
8. Write awk script that uses all of itsfeatures.
9. Use seed instruction to process /etc/password file on a shell Script
10. Write a shell script to display list of users currently logged in.
11. Write a shell script to delete all the temporaryfiles.
12. Write a shell script to search an element from an array using binary searching.

CourseDesigners:

1. Mrs.M.Gayathiri
2. Mrs.J.I.ChristyEunaicy

Thiagarajar College (Autonomous):: Madurai – 625 009

DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those joined B.Sc. IT on or after June 2020)

Programme Code - UIT

CourseCode	Course Title	Category	L	T	P	Credit
UIT20CL42	Python Programming Lab	Core Lab 8	0	**0**	4	2

L - Lecture T - Tutorial P - Practicals

Year	Semester	Max. Marks CA	Max. Marks SE	Total
II	III	40	60	100

Preamble

Running instructions in Interactive interpreter and a Python Script.

Course Outcome

On the completion of the course the student will be able to

#	Course Outcome	Expected Proficiencey	Expected Attainment
CO1	Explain Project Planning like Select Project, Identifying Project Scope and Objectives, Infrastructure, Project Products and Activities, Estimate efforts, Activity Risks.	75%	75%
CO2	Demonstrate the basic concepts of Project Evaluation and ProgrammeManagement,Selection of an Appropriate Projectsfrom various process modelslikeTheWaterfallModel,TheSpiralModelandSoftware Prototyping.	70%	60%
CO3	judge how to overcome problems with over and under estimations, Software Estimation Techniques, Expert Judgment, Estimating by analogy and also Project Schedules, ProjectActivities	70%	60%
CO4	Identify the various risk factors to assign resources for the projects and monitoring and control the cost and prioritizing.	65%	60%
CO5	Discuss theSoftware Quality Management System, Testing and Software Reliability.	K1,K2	65%

Mapping of Course Outcomes with Program Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	**S**	**S**	**M**	**L**	**S**	**M**
CO2	**S**	**S**	**M**	**L**	**M**	**M**
CO3	**S**	**M**	**M**	**M**	**L**	**L**
CO4	**M**	**L**	**L**	**M**	**L**	**L**
CO5	**S**	**M**	**M**	**L**	**L**	**L**

(S – Strong , M – Medium , L – Low)

Mapping of Course Outcomes withProgramSpecificOutcomes

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	**S**	**M**	**S**	**L**	**S**
CO2	**S**	**M**	**M**	**M**	**S**
CO3	**S**	**L**	**M**	**L**	**S**
CO4	**S**	**M**	**L**	**M**	**M**
CO5	**M**	**S**	**M**	**L**	**L**

(S – Strong , M – Medium , L – Low)

Blooms taxonomy

	CA		End of Semester
	First	**Second**	
Knowledge	**40%**	**40%**	**40%**
Understand	**40%**	**40%**	**40%**
Apply	**20%**	**20%**	**20%**

Python Programming Lab

1. Write a program that reads a Celsius degree from the console and converts it to Fahrenheit and displays the result.
2. Write a Program for checking whether the given number is a even number or not
3. Using a for loop, write a program that prints out the decimal equivalents of 1/2, 1/3, 1/4, . 1/10.
4. Write a program using a while loop that asks the user for a number, and prints a countdown from that number to zero.
5. Write a program to count the numbers of characters in the string and store them in a dictionary data structure.
6. Write a program to use split and join methods in the string and trace a birthday with a dictionary data structure.
7. Write a program combine_lists that combines two lists into a dictionary.
8. Write a program to count frequency of characters in a given file
9. Write a program to print each line of a file in reverse order.
10. Write a program to compute the number of characters, words and lines in a file.
11. Find mean, median, mode for the given set of numbers in a list.
12. Write a function nearly_equal to test whether two strings are nearly equal
13. Write a function dups to find all duplicates in the list.
14. Write a function reverse to reverse a list. Without using the reverse function
15. Write a simple script that serves a simple HTTPResponse and a simple HTML Page.

Course Designer:

1. Mrs. J.I. Christy Eunaicy
2. Mrs.M.Gayathiri

Thiagarajar College (Autonomous):: Madurai – 625 009

DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those joined B.Sc. IT on or after June 2020)

Programme Code – UIT

CourseCode	CourseTitle	Category	L	T	P	Credit
UIT20CE31(A)	SoftComputing	CoreElective	5			5

L - Lecture T - Tutorial P – Practicals

Year	Semester	Max. MarksCA	Max. MarksSE	Total
II	IV	25	75	100

Preamble

To introduce the ideas of fuzzy sets, fuzzy logic and familiarize with neural networks andlearning methods for neural networks. Describes the basics of genetic algorithms and theirapplications in optimization and planning.To develop skills thorough understanding of the theoreticalandpractical aspects of Soft Computing.

CourseOutcomes

On the completion of the course the student will be able to

#	Course Outcome	Expected Proficiencey	Expected Attainment
CO1	IllustratetheneedofNeuralNetworksand Implementation.	85%	82%
CO2	Demonstratethe adaptiveresonancetheoryanditpurpose	82%	80%
CO3	Sketchout theperformancesteps of GenericAlgorithms.	78%	70%
CO4	Discuss the workingstrategyofFuzzySet	75%	70%
CO5	Demonstratethe conceptofFuzzyReasoningandClustering	70%	65%

Mapping of Course Outcomes with Program Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	**S**	**S**	**M**	**M**	**S**	**M**
CO2	**S**	**S**	**S**	**M**	**S**	**M**
CO3	**S**	**S**	**M**	**M**	**M**	**S**
CO4	**S**	**S**	**M**	**M**	**S**	**S**
CO5	**S**	**S**	**M**	**M**	**M**	**S**

(S – Strong , M – Medium , L – Low)

Mapping of Course Outcomes with ProgramSpecificOutcomes

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	**S**	**M**	**S**	**M**	**M**
CO2	**S**	**S**	**M**	**M**	**M**
CO3	**M**	**M**	**S**	**S**	**S**
CO4	**S**	**M**	**S**	**M**	**L**
CO5	**S**	**S**	**S**	**M**	**L**

(S – Strong , M – Medium , L – Low)

Bloomstaxonomy

	CA		End ofSemester
	First	Second	
Knowledge-K1	40%	40%	40%
Understand-K2	40%	40%	40%
Apply-K3	20%	20%	20%

SoftComputing

UnitI: **16 hours**

FundamentalsofNeuralNetworks:BasicConceptsofNeuralNetwork-HumanBrain-Model of an Artificial Neuron - Neural Network Architectures-Characteristics of Neural Networks-Learning Methods. **Back propagation Networks:** Architecture of Back propagation Network-ThePerceptron Model -The Solution – Single Layer Artificial Neural Network – Model for MultilayerPerceptron-Back propagation Learning-Input Layer Computation-Hidden Layer Computation-OutputLayer Computation-Calculation of Error-Training of Neural Network – Method of Steepest Descent –EffectofLearningRate_n‘-AddingaMomentumTerm-Backpropagation Algorithm.

UnitII: **14 hours**

Adaptive Resonance Theory: Introduction – Cluster Structure-Vector Quantization-ClassicalART Networks-Simplified ART Architecture- ART1- Architecture of ART1- Special Features ofART1 Models-ART1 Algorithm- ART2- Architecture of ART2- ART2Algorithm–Application-Character Recognition Using ART1-Classification of Soil – Prediction of Load from Yield LinePatternsofElastic-PlasticClampedSquarePlate-ChineseCharacterRecognition-SensitivitiesofOrderingData.

UnitIII: **15 hours**

Introduction toGeneric Algorithms: WorkingCycle of a Generic Algorithm-Binary –Coded GA-GA-Parameters Setting- Constraints Handling in GA-Advantages and disadvantages ofGenericAlgorithms-Combination oflocaland Global OptimumSearch Algorithms

.

UnitIV: **16 hours**

Introduction to Fuzzy Sets: Crisp Sets-Notations Used in Set Theory-Crip Set Operations-Properties ofCrisp Set-Fuzzy Set-Representation ofa Fuzzy Set-Difference Between Crisp Set andFuzzySet-A FewDefinitionsin FuzzySets-Measures ofFuzziness andInaccuracyofFuzzyset**.**

UnitV:

14hours

Fuzzy Reasoning and Clustering: Introduction-Fuzzy Logic controller-Two Major Forms ofFuzzy Logic controller-HierarchicalFuzzy Logic Controller-Sensitivity Analysis-AdvantagesandDisadvantages of Fuzzy Logic Controller-Fuzzy clustering-Fuzzy C-Means clustering-Entropy-basedFuzzyClustering

TextBooks:

1. Rajasekaran.SandVijayalakshmiPai,2017,―NeuralNetworks,FuzzyLogicand GeneticAlgorithms SynthesisandApplications‖,

PHILearningPrivateLimited,NewDelhi.

2. DilipK.Pratihar,2015,‖SoftComputing,FundamentalsandApplications‖,NarosaPublishing House,Chennai.

Unit	Chapters/Section
I	Book1:2(2.1-2.6),3(3.1-3.2)
II	Book1:5
III	Book2:3
IV	Book2:7
V	Book2:8

References:

1. Samir chakrabortyroy , Udit chakraborty,2013, Soft Computing ,Pearson Education India

2. David E. Goldberg, 2013, ―Genetic Algorithm in Search Optimization and Machine Learning‖ Pearson Education India..

3. J.S.R.Jang, C.T. Sun and E.Mizutani, 2004, ―Neuro-Fuzzy and Soft Computing‖, PHI / Pearson Education.

CourseDesigners:

1. Dr.T.Manikumar
2. Mrs. M.Gayathri

Thiagarajar College (Autonomous):: Madurai – 625 009

DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those joined B.Sc. IT on or after June 2020)

Programme Code - UIT

Course Code	Course Title	Category	L	T	P	Credit
UIT20CE31(B)	E-Commerce	Core Elective	5			5

L - Lecture T - Tutorial P – Practicals

Year	Semester	Max. Marks CA	Max. Marks SE	Total
II	III/IV	25	75	100

Preamble

Build knowledge on different categories of e - commerce, exhibit various technologies which are essential for electronic commerce and projects various security mechanisms for doing e - commerce such as crytography, firewall etc

.

Course Outcomes

On the completion of the course the student will be able to

#	Course Outcome	Expected Proficiencey	Expected Attainment
CO1	Illustrate E-commerce and its types and the relationshi between management and customer.	75%	70%
CO2	Compare the Internet types for electronic commerce	70%	65%
CO3	Interpret the security services and mechanisms in wel security	70%	65%
CO4	Formulate the electronic fund transfer mechanism	68%	65%
CO5	Describe of mobile mechanism protocol for e-commerce	65%	60%

Mapping of COs with Program Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	**S**	**M**	**L**	**M**	**S**	**M**
CO2	**M**	**M**	**M**	**S**	**M**	**S**
CO3	**S**	**S**	**M**	**M**	**S**	**M**
CO4	**L**	**M**	**S**	**M**	**L**	**M**
CO5	**S**	**L**	**L**	**M**	**L**	**M**

(S – Strong , M – Medium , L – Low)

Mapping of Course Outcomes with ProgramSpecificOutcomes

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	**S**	**M**	**S**	**M**	**M**
CO2	**S**	**S**	**M**	**M**	**M**
CO3	**M**	**M**	**S**	**S**	**S**
CO4	**S**	**M**	**S**	**M**	**L**
CO5	**S**	**S**	**S**	**M**	**L**

(S – Strong , M – Medium , L – Low)

Blooms taxonomy

	CA		End of Semester
	First	Second	
Knowledge-K1	40%	40%	40%
Understand-K2	40%	40%	40%
Apply-K3	20%	20%	20%

E-Commerce

Unit I: **15 hours**

Fundamentals of e-Commerce: e-Commerce and its types - Driving forces behind e-Commerce – Impacts - benefits and limitations of e-Commerce - Consumer behavior in e-Commerce - Electronic Data Interchange(EDI) - Supply Chain Management; Just-in-time - Procurement Management and Customer Relationship Management.

Unit II: **15 hours**

Network Infrastructure for E-commerce: Access Equipment - Access Media and Network Infrastructure for e-Commerce - Internet, Internet and Extranet

Unit III: **15 hours**

Web Security: Security threats on the Internet and their impact - Security services - Security mechanisms – Cryptography - Firewalls

Unit IV: **15 hours**

Electronic Payments: Electronic Funds Transfer and types of Electronic payments – Electronicpayment mechanisms such as credit cards - smart cards - electronic cash and electronic checks.

Unit V: **15 hours**

Mobile Commerce: Mobile computing and wireless - Wireless technologies and Wireless Application Protocol (WAP) and WAP gateway

Text Books:

MamtaBhusry, Edition: First, 2018, *"E-Commerce"*Published by Firewall/Laxmi Publications (P) Ltd., New Delhi,

Unit	Chapters/Section
I	1,2,3
II	4,5.
III	6,7,8.
IV	9.
V	10,11.

References:

1. P. T. Joseph, S. J., 2008, E-Commerce,Prentice Hall of India Pvt, NewDelhi.
2. Pete Loshin, JhonVacca, 2004, Electronic Commerce, Laxmi Publications Pvt. Ltd, NewDelhi

Course Designers:

1. Mr.S.Kumarappan
2. Mrs.P.Praveena

Thiagarajar College (Autonomous):: Madurai – 625 009

DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those joined B.Sc. IT on or after June 2020)

Programme Code - UIT

CourseCode	Course Title	Category	L	T	P	Credit
UIT20CE31 (C)	Software Project Management	Core Elective	5			5

L - Lecture T - Tutorial P - Practicals

Year	Semester	Max. Marks CA	Max. Marks SE	Total
II	III	25	75	100

Preamble

Ensure to learn the general concepts of Project Planning, Evaluation, Cost Estimation, Risk Factors and Quality during Software Development.

Course Outcomes

On the completion of the course the student will be able to

#	Course Outcome	Expected Proficiency	Expected Attainment
CO1	Explain Project Planning like Select Project, Identifying Project Scope and Objectives, Infrastructure, Project Products and Activities, Estimate efforts, Activity Risks.	75%	75%
CO2	Demonstrate the basic concepts of Project Evaluation and ProgrammeManagement,Selection of an Appropriate Projectsfrom various process modelslikeTheWaterfallModel,TheSpiralModelandSoftware Prototyping.	70%	65%
CO3	judge how to overcome problems with over and under estimations, Software Estimation Techniques, Expert Judgment, Estimating by analogy and also Project Schedules, ProjectActivities	70%	65%
CO4	Identify the various risk factors to assign resources for the projects and monitoring and control the cost and prioritizing.	68%	65%
CO5	Discuss theSoftware Quality Management System, Testing and Software Reliability.	65%	60%

Mapping of Course Outcomes with Program Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	S	M	L	S	M
CO2	S	S	M	L	M	M
CO3	S	M	M	M	L	L
CO4	M	L	L	M	L	L
C05	S	S	M	L	L	M

(S – Strong , M – Medium , L – Low)

Mapping of Course Outcomes withProgramSpecificOutcomes

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	L	M	S
CO2	S	L	M	L	S
CO3	S	M	L	M	M
CO4	S	L	M	M	S
CO5	S	L	S	M	L

(S – Strong , M – Medium , L – Low)

Bloomstaxonomy

	CA		End of Semester
	First	Second	
Knowledge-K1	40%	40%	40%
Understand-K2	40%	40%	40%
Apply-K3	20%	20%	20%

Software ProjectManagement

UNITI **15 hours**

Introduction to Software Project Management: Introduction. **An Overview of Project Planning:** Select Project, Identifying Project Scope and Objectives, Identify Project Infrastructure, Identify Project Products and Activities - Estimate efforts for Each Activity, Identify Activity Risks, and Allocate Resources.

UNITII **15 hours**

Project Evaluation and Programme Management: Project Portfolio Management, Evaluation of Individual Projects, Cost-benefit Evaluation Techniques, Risk Evaluation. **Selection of an Appropriate Project approach**: Choosing Methodologies and Technologies, Choice of process models, The Waterfall Model, The Spiral Model, Software Prototyping.

UNITIII **15 hours**

Software Effort Estimation: Problems with over and under estimations, Basis of software Estimation, Software Estimation Techniques, Expert Judgment, Estimating by analogy. **Activity Planning:** Project Schedules, Projects and Activities, Sequencing and Scheduling Activities, Networks Planning Models, Formulating a network model.

UNITIV **15 hours**

Risk Management: Introduction, Risk, Categories of Risk, Risk Identification, Risk Assessment, Risk Planning, Risk Management. **Resource Allocation:** Scheduling resources, Creating Critical Paths, Cost Schedules. **Monitoring and Control:** Creating Framework, Cost Monitoring, Prioritizing Monitoring.

UNITV **15 hours**

Software Quality: Defining Software Quality, ISO9126, Product and Process Metrics, Quality Management Systems, Process Capability Models, Testing, Software Reliability.

TextBooks:

Bob Hughes &Mike Cotterell: Special Indian Edition 2018 – Software Project Management, Tata McGraw- Hill Publications, FifthEdition.

Units	Chapters/Sections
I	1(1.1), 3(3.1,3.2,3.3,3.4,3.6,3.7,3.8,3.9)
II	2(2.3,2.4,2.5,2.6), 4(4.3,4.5,4.7,4.8,4.9)
III	5(5.3,5.4,5.5,5.8,5.9),6(6.4,6.5,6.6,6.7,6.8)
IV	7(7.1 to 7.3,7.5 to 7.8), 8(8.4, 8.5, 8.9), 9(9.2,9.7,9.9)
V	13(13.4,13.5,13.6,13.8,13.9,13.11,13.12)

References:

1.Ruhe, Gunther, Wohlin, Claes:2015. – Software Project Management in a Changing World, Springer

2. Adolfo Villafiorita2016,Introduction to Software Project Management,O'Reilly

3. S.A.Kelkar: 2013. –SoftwareProject Management‖PHI, NewDelhi,Third Edition.

WebResources:

https://www.javatpoint.com/software-project-management
https://www.tutorialspoint.com/software_engineering/software_project_management.htm
https://www.geeksforgeeks.org/software-engineering-software-project-management-spm/
https://www.projectengineer.net/tutorials/project-management/

CourseDesigner:

1. Mrs. J.I. Christy Eunaicy
2. Mr.S.Kumarappan

Lecture Schedule

Chapter/ Section	Topic	Lecture Hours	Mode of Teaching
1	**Introduction to Software Project Management**	**15**	
1.1	An Overview of Project Planning: Select Project, Identifying Project Scope and Objectives	4	
1.2	Identify Project Infrastructure, Identify Project Products and Activities	6	
1.3	Estimate efforts for Each Activity, Identify Activity Risks, and Allocate Resources	5	
2	**Project Evaluation and Programme Management, Selection of an Appropriate Project approach**	**15**	
2.1	Project Portfolio Management, Evaluation of Individual Projects	4	
2.2	Cost-benefit Evaluation Techniques, Risk Evaluation	4	
2.3	Choosing Methodologies and Technologies, Choice of process models	3	
2.4	The Waterfall Model, The Spiral Model, Software Prototyping.	4	
3	**Software Effort Estimation & Activity Planning**	**15**	
3.1	Problems with over and under estimations,	2	

	Basis of software Estimation		
3.2	Software Estimation Techniques, Expert Judgment, Estimating by analogy	5	
3.3	Project Schedules, Projects and Activities, Sequencing and Scheduling Activities	5	
3.4	Networks Planning Models, Formulating a network model.	3	
4	**Risk Management, Resource Allocation & Monitoring and Control**	**15**	
4.1	Introduction, Risk, Categories of Risk, Risk Identification	3	
4.2	Risk Assessment, Risk Planning, Risk Management	4	
4.3	Scheduling resources, Creating Critical Paths, Cost Schedules	4	
4.4	Creating Framework, Cost Monitoring, Prioritizing Monitoring.	4	
5	**Software Quality**	**15**	
5.1	Defining Software Quality, ISO9126	3	
5.2	Product and Process Metrics	3	
5.3	Quality Management Systems, Process Capability Models	4	
5.4	Testing, Software Reliability	5	
Total	**(15+15+15+15+15)**	75	

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DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those joined B.Sc. IT on or after June 2020)

Programme Code - UIT

Course Code	Course Title	Category	L	T	P	Credit
UIT20CE31(D)	Digital Image Processing	Core Elective	4	1		5

L - Lecture T - Tutorial P - Practicals

Year	Semester	Max. Marks CA	Max. Marks SE	Total
II	III	25	75	100

Preamble

Ensure to learn the general concepts of digital image processing including visual perception, image formation, spatial transformations, image enhancement, color image representation and processing, edge detection, image segmentation, and morphological image processing.

CourseOutcomes

On the completion of the course the student will be ableto

#	Course Outcome	Expected Proficiency	Expected Attainment
CO1	Explain the fundamental techniques and algorithms used for acquiring, processing and extracting useful information from digital images and used for image sampling and quantization	75%	75%
CO2	Understand the meaning of spatial domain processing, and how it differs from transform domain processing.	70%	65%
CO3	Discuss basic idea of Color Image Processing Fundamentals and Smoothing and Sharpening.	75%	70%
CO4	Illustrate basic concepts of mathematical morphology, and how to apply them to digital image processing and with the tools used for binary image morphology, including erosion, dilation, opening, closing, and how to combine them to generate more complex tools	60%	55%
CO5	Illustrate the Boundary Detection, Thresholding and Region-Based Segmentation. Demonstrates how to apply the methods to solve real-world problems in several areas including medical, remote sensing and surveillance.	60%	50%

Mapping of Course Outcome with Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	M	S	L	L	L
CO2	S	M	M	M	S	L
CO3	S	M	S	L	L	L
CO4	S	S	L	M	L	S
CO5	S	S	L	L	M	M

(S – Strong , M – Medium , L – Low)

Mapping of Course Outcome with Programme Specific Outcomes

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	M	L	L
CO2	S	S	M	M	L
CO3	S	M	S	L	M
CO4	S	M	M	L	S
CO5	S	S	L	M	S

(S – Strong , M – Medium , L – Low)

Bloomstaxonomy

	CA		End of Semester
	First	Second	
Knowledge-K1	40%	40%	40%
Understand-K2	40%	40%	40%
Apply-K3	20%	20%	20%

Digital Image Processing

UNITI **15 hours**

Digital Image Fundamentals - The Origins of Digital Image - Fundamental Steps in Digital Image Processing -Elements of Visual Perception - Light and the Electromagnetic Spectrum. - Image Sensing and Acquisition. - Image Sampling and Quantization. - Some Basic Relationships between Pixels.

UNITII **15 hours**

Intensity Transformations and Spatial Filtering -Some Basic Intensity Transformation Functions - Histogram Processing - Fundamentals of Spatial Filtering - Smoothing (Lowpass) Spatial Filters - Sharpening (Highpass) Spatial Filters.

UNITIII **15 hours**

Color Image Processing - Color Fundamentals. - Color Models. - Pseudocolor Image Processing. - Basics of Full-Color Image Processing. - Color Transformations. - Smoothing and Sharpening. - Color Segmentation.

UNITIV **15 hours**

Morphological Image Processing - Preliminaries - Erosion and Dilation - Opening and Closing - The Hit-or-Miss Transform - Some Basic Morphological Algorithms - Morphological Reconstruction

UNITV **15 hours**

Image Segmentation - Fundamentals - Point, Line, and Edge Detection - Thresholding - Segmentation by Region Growing and by Region Splitting and Merging - Region Segmentation Using Clustering and Superpixels.

TextBooks:

R.C. Gonzalez, R.E.Woods, 2018, Digital Image processing, 4th edition, Pearson Education.

Units	Chapters
I	1(1.2,1.4),2(2.1-2.4)
II	3(3.1-3.6)
III	6(6.1-6.7)
IV	9(9.1-9.6)
V	10 (10.1-10.5)

References:

1. Pratt. W.K., 2014, Digital Image Processing, 1st edition, John Wiley & Sons.
2. Chanda, BhabatoshMajumder, DwijeshDutta 2011 Digital Image Processing And Analysis 1st Edition, PHI
3. Annadurai, Shanmuga Lakshmi, 2007, Fundamentals of Digital Image Processing, Pearson Education.

WebResources:

1. https://www.tutorialspoint.com/dip/image_processing_introduction.htm
2.http://ultra.sdk.free.fr/docs/DxO/Fundamentals%20of%20Digital%20Image%20Processing.pdf
3. https://www.geeksforgeeks.org/digital-image-processing-basics/
4. https://www.javatpoint.com/digital-image-processing-tutorial

CourseDesigners:

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2. Mrs.P.Praveena

Thiagarajar College (Autonomous):: Madurai – 625 009

DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those joined B.Sc. IT on or after June 2020)

Programme Code - UIT

CourseCode	CourseTitle	Category	L	T	P	Credit
UIT20CE41(E)	Cloud Computing	CoreElective	5			5

L - Lecture T - Tutorial P – Practicals

ear	Semester	Max. MarksCA	Max. MarksSE	Total
II	IV	25	75	100

Preamble

EnsuretolearnthegeneralconceptsofCloudComputingandtofamiliarizewithVirtualizatio nand CloudApplications.

CourseOutcomes

On thecompletion ofthecoursethestudent will beable to

#	Course Outcome	Expected Proficiency	Expected Attainment
CO 1	Explaincloudcomputingreferencemodel,Serviceorientedcomputi ng,Utility orientedComputingandApplicationdevelopmentandSystemdevel opment	75%	75%
CO 2	DifferenciatebetweenParallelandDistributedcomputing,Architec tureforParallelProcessingandElementsofDistributedComputing, RPC,Service OrientedComputing,Modelsof InterProcessCommunication.	75%	70%
CO 3	Discuss basic idea of Virtualization,characteristics of Virtualizedenvironments,Pros andCons of Virtualization	75%	70%
CO 4	IllustratetheCloudReferenceModel, TypesofClouds,- Private,Public,Hybridand CommunityClouds,Cloud Interoperabilityand Standards	65%	60%
CO 5	DemostrateCloud Platforms in Industry and CloudApplicationslikeScientific,BusinessandConsumerApplicat ions,CRMandERP,SocialNetworking,MediaApplications, MultiplayerOnlineGaming.	60%	50%

Mapping of Course Outcome with Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	**M**	**M**	**S**	**S**	**L**	**L**
CO2	**S**	**M**	**S**	**M**	**L**	**L**
CO3	**S**	**L**	**S**	**M**	**L**	**L**
CO4	**S**	**L**	**M**	**L**	**M**	**M**
CO5	**M**	**M**	**S**	**L**	**M**	**S**

(S – Strong , M – Medium , L – Low)

Mapping of Course Outcomes withProgramme Specific Outcomes

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	L	M	M
CO2	S	L	M	S	L
CO3	L	M	L	S	S
CO4	M	L	M	M	S
CO5	M	L	M	S	S

(S – Strong , M – Medium , L – Low)

Bloomstaxonomy

	CA		End of Semester
	First	Second	
Knowledge-K1	40%	40%	40%
Understand-K2	40%	40%	40%
Apply-K3	20%	20%	20%

CloudComputing

UNITI **15 hours**

Introduction - Cloud Computing at a Glance – The Vision of Cloud Computing- Defining a Cloud –Cloud Computing Reference Model – Characteristics and Benefits– Historical Developments –Distributed Systems – Virtualization – Web 2.0 – Service Oriented Computing – Utility OrientedComputing - Building Cloud Computing Environments – Application Development – Infrastructureand System Development.

UNITII **15 hours**

Principles of Parallel and Distributed Computing – Eras of Computing – Parallel Vs.Distributed Computing – Elements of Parallel Computing – What is Parallel Processing? – HardwareArchitecture for Parallel Processing – Approaches to Parallel Programming – Levels of Parallelism –ElementsofDistributedComputing– GeneralConceptsandDefinitions–ComponentsofaDistributed System–Architectural StylesforDistributed Computing– Models forInterProcessCommunication – Technologies for Distributed Computing – Remote Procedure Call – DistributedObjectFrameworks– ServiceOriented Computing.

UNITIII **15 hours**

Virtualization:Introduction–CharacteristicsofVirtualizedEnvironments– Taxonomy of Virtualization Techniques – Execution Virtualization – Other Types of Virtualization –Virtualization and Cloud Computing – Pros and Cons of Virtualization.

UNITIV **15 hours**

CloudComputingArchitecture–Introduction–CloudReferenceModel– Architecture–Infrastructure/HardwareasaService–PlatformasaService–SoftwareasaService - Typesof Clouds–Public Clouds–Private Clouds– HybridClouds–Community Clouds- EconomicsoftheCloud–OpenChallenges–CloudDefinition– CloudInteroperabilityandStandards–Scalabilityand FaultTolerance-Security, TrustandPrivacy– OrganizationalAspects.

UNITV **15 hours**

Cloud Platforms in Industry: Amazon web services – Google AppEngine – Microsoft Azure. **Cloud Applications**: Scientific Applications – Healthcare: ECG Analysis in theCloud–Biology:ProteinStructureProtection– Geoscience:SatelliteImageProcessing–Business andConsumerApplications– CRMandERP–Productivity–SocialNetworking–MediaApplications – Multiplayer OnlineGaming.

TextBooks:

RajkumarBuyya, ChristianVecchiola, S.ThamaraiSelvi:2016. –Mastering CloudComputingMCGrawHillEducation(India)PrivateLtd

Units	Chapters
I	1(1.1,1.1.1,1.1.2,1.1.4,1.1.5,1.2,1.2.1to1.2.5,1.3,1.3.1,1.3.2,1.4, 1.4.1 to 1.4.4)
II	2(2.1, 2.2, 2.3, 2.3.1 to 2.3.4, 2.4, 2.4.1 to 2.4.4, 2.5, 2.5.1 to 2.5.3)
III	3(3.1, 3.2, 3.3, 3.3.1, 3.3.2, 3.4, 3.5, 3.6, 3.6.1 to 3.6.3)
IV	4(4.1,4.2,4.2.1 to 4.2.4, 4.3,4.3.1 to 4.3.4, 4.4,4.5,4.5.1 to 4.5.5)
V	9(9.1-9.3)10(10.1, 10.1.1, 10.1.2, 10.1.4, 10.2, 10.2.1 to 10.2.5)

References:

1. RajkumarBuyya,JamesBroberg,AndrzejGoscinski:2016.CloudComputingPrinciplesand Paradigms‖,WileyIndiaPvtLtd.
2. TobyVelte,AnthonyVelte,RobertElsenpeter:2009.–CloudComputing-APracticalApproach‖, TMH.
3. GeorgeReese:2009.–CloudApplicationArchitectures:BuildingApplicationsandInfrastructurein the Cloud:TransactionalSystems forEC2andBeyond(TheoryinPractice)‖, O'Reilly.

WebResources:

www.ibm.com/cloud/learn/what-is-cloud-computing
https://azure.microsoft.com/en-in/overview/what-is-cloud-computing/
https://aws.amazon.com/what-is-cloud-computing/

CourseDesigners:

1. Mrs.M.Gayathiri
2. Mrs.J.I.ChristyEunaicy

Thiagarajar College (Autonomous):: Madurai – 625 009

DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those joined B.Sc. IT on or after June 2020)

Programme Code - UIT

CourseCode	Course Title	Category	L	T	P	Credit
UIT20CE41(F)	Principles of Data Communication	Core Elective	5			5

L-Lecture T-Tutorial P –Practicals

Year	Semester	Max. Marks CA	Max. Marks SE	Total
II	IV	25	75	100

Preamble

This course provides an introduction to the field of data communications and security. It describes fundamentals of signalling, basic transmission concepts, transmission media, circuit control, physical and data link layer protocols. It develops the skills thorough understanding data compression, Error control and performance analysis.

CourseOutcomes

On the completion of the course the student will be able to

#	Course Outcome	Expected Proficiencey	Expected Attainment
CO1	Describe the basics of data communication	70%	70%
CO2	Authenticate data and control errors	70%	70%
CO3	Explain the working logic of Video transmission and storage.	68%	60%
CO4	Sketch out the performance steps of Compression data algorithms	65%	60%
CO5	Demonstrate the concept of Lossy Graphics Compression.	65%	60%

Mapping of Course Outcomes with Program Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	**S**	**S**	**M**	**M**	**S**	**M**
CO2	**S**	**S**	**S**	**M**	**S**	**M**
CO3	**S**	**S**	**M**	**M**	**M**	**S**
CO4	**S**	**S**	**M**	**M**	**S**	**S**
CO5	**S**	**S**	**M**	**M**	**M**	**S**

(S – Strong , M – Medium , L – Low)

Mapping of Course Outcomes with ProgramSpecificOutcomes

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	**S**	**S**	**M**	**M**	**L**
CO2	**S**	**S**	**M**	**M**	**S**
CO3	**S**	**S**	**S**	**M**	**M**
CO4	**S**	**S**	**M**	**M**	**S**
CO5	**S**	**S**	**M**	**M**	**S**

(S – Strong , M – Medium , L – Low)

Blooms taxonomy

	CA		End of Semester
	First	Second	
Knowledge	40%	40%	40%
Understand	40%	40%	40%
Apply	20%	20%	20%

Principles andDataCommunication

UnitI : **14 hours**

Digital communication overview: Electronic Communications – Sources and sinks of information – Digital communication equipment. **Information theory, source coding and encryption:** Introduction – Information and entropy – Conditional entropy and redundancy – Information loss and entropy due to noise – Source coding – Variable length coding.

UnitII: **18 hours**

Dataencryption: Authentication–Integrity–DigitalSignature.**ErrorControlcoding:** Introduction – Hamming distance and codeword weight – (n,k) block codes – Probability of error inn–digit codeword – Linear group codes, Nearest neighbor decoding of block codes – Syndrome decoding – Cyclic codes – Encoding of convolutional codes – Viterbi decoding of convolutional codes – Practicalcoder.

UnitIII: **15 hours**

Video transmission and storage: Introduction – Color representation – High definition TV – Digital Video – Video data compression – Compression standards – Digital Video broadcast – Packet video – Other multimedia services.

UnitIV: **16 hours**

LZ78 Compression: Can LZ77 Improve? – Enter LZ78 – An Effective Variant – Decompression: The Catch – LZW Implementation – Tree Maintenance and Navigation. **Speech Compression:** Digital Audio Concepts – Lossless Compression of Sound Problems – Companding **-**Other techniques

UnitV: **12 hours**

Lossy Graphics Compression: Enter Compression – A Standard That Works: JPEG – Why Bother? – Implementing the DCT – Continued Improvements – Coding.

TextBooks:

1. Lan glover, Peter M. Grant , 3rd Edition,2014, Digital Communications, Pearson Education, Prentice Hall of India, NewDelhi
2. Mark Nelson, Jean – Loup Gaily,2nd Edition, 2015, The Data compression Book, M & T Publications, NewDelhi.

Unit	Chapters
I	Book 1:1.1,1.2,1.3, 9.1 to 9.7
II	Book 1:9.8 to 9.11, 10.1 to 10.11
III	Book 1:16.1,16.2, 16.4 to 16.10
IV	Book 2 : 9,10
V	Book 2 : 11

References:

1. "Data & Computer Communication" by William Stalling, 2017, 6th Edition, Pearson Education, Prentice Hall of India, New Delhi
2. "Cryptography and Network Security: Principles and Practice" by William Stallings, 2017, Pearson Indian Education Services.
3. "Cybersecurity for Beginners" byRaefMeeuwisse , 2015, Cyber Simplicity ltd.

WebResources:

1. **https://www.tutorialspoint.com/digital_communication/index.htm**
2. **https://electronicspost.com/communication-tutorials/**
3. **https://www.wisdomjobs.com/e-university/digital-communication-tutorial-1983/digital-communication-error-control-coding-26029.html**
4. **https://www.tutorialspoint.com/dip/introduction_to_jpeg_compression.htm**
5. **https://music.tutsplus.com/tutorials/a-master-guide-to-voice-compression-how-to--compress-voice-recordings--cms-25105**

CourseDesigners:

1. Mrs. P.Praveena
2. Mrs.M.Gayathiri

Thiagarajar College (Autonomous):: Madurai – 625 009

DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those joined B.Sc. IT on or after June 2020)

Programme Code - UIT

CourseCode	Course Title	Category	L	T	P	Credit
UIT20CE41(G)	Computer Forensics	Core Elective	**5**			5

L - Lecture T - Tutorial P – Practicals

Year	Semester	Max. Marks CA	Max.Marks SE	Total
II	**III**	25	75	100

Preamble

This course provides an introduction to Computer Forensics -Use of Computer Forensics in Law Enforcement -Types of Computer Forensics Systems - Benefits of Professional Forensics Methodology -Steps taken to find Evidences.

Course Outcomes

On the completion of the course the student will be able to

#	Course Outcome	Expected Proficiencey	Expected Attainment
CO1	Describe the basics of Computer Forensic Fundamentals.	75%	70%
CO2	Differentiate the security measure in Compute Forensics Systems	72%	65%
CO3	Recover data and collect evidence in cyber	73%	60%
CO4	Preserve the collected evidences in Computer Forensics Systems	68%	60%
CO5	Demonstrate the concept of Forensics Analysis.	65%	60%

Mapping of Course Outcomes with Program Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	**S**	**S**	**M**	**M**	**S**	**M**
CO2	**S**	**S**	**S**	**M**	**S**	**M**
CO3	**S**	**S**	**M**	**M**	**M**	**S**
CO4	**S**	**S**	**M**	**M**	**S**	**S**
CO5	**S**	**S**	**M**	**M**	**M**	**S**

(S – Strong , M – Medium , L – Low)

Mapping of Course Outcomes withProgramSpecificOutcomes

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	**S**	**M**	**S**	**M**	**M**
CO2	**S**	**S**	**M**	**M**	**M**
CO3	**M**	**M**	**S**	**S**	**S**
CO4	**S**	**M**	**S**	**M**	**L**
CO5	**S**	**S**	**S**	**M**	**L**

(S – Strong , M – Medium , L – Low)

Blooms taxonomy

	CA		End of Semester
	First	Second	
Knowledge-K1	40%	40%	40%
Understand-K2	40%	40%	40%
Apply-K3	20%	20%	20%

Computer Forensics

Unit I: 15 hours

Computer Forensics Fundamentals: Introduction to Computer Forensics -Use of Computer Forensics in Law Enforcement -Computer Forensics Assistance to Human Resources-Employment Proceedings -Computer Forensics Services -Benefits of Professional Forensics Methodology -Steps Taken by Computer Forensics Specialists -Who Can Use Computer Forensic Evidence?.**Types of Computer Forensics Technology:** Types of Computer Forensics Technology - Types of Military Computer Forensic Technology -Types of Law Enforcement: Computer Forensic Technology -Types of Business Computer Forensic Technology -Specialized Forensics Techniques -Hidden Data and How to Find It -Spyware and Adware -Encryption Methods and Vulnerabilities -Protecting Data from Being Compromised -Internet Tracing Methods -Security and Wireless Technologies -Avoiding Pitfalls with Firewalls -Biometric Security Systems.

Unit II: 13 hours

Types of Computer Forensics Systems: Internet Security Systems -Intrusion Detection Systems -Firewall Security Systems -Storage Area Network Security Systems -Network Disaster Recovery Systems -Public Key Infrastructure Systems -Wireless Network Security Systems -Satellite Encryption Security Systems -Instant Messaging (IM) Security Systems -Net Privacy Systems -Identity Management Security Systems -Identity Theft -Biometric Security Systems -Homeland Security Systems.

Unit III: 17 hours

Computer Forensics Evidence and Capture-Data Recovery: Data Recovery Defined-Data Backup and Recovery -The Role of Backup in Data Recovery -The Data-Recovery Solution -Hiding and Recovering Hidden Data. **Evidence Collection and Data Seizure:**Why Collect Evidence? -Collection Options -Obstacles -Types of Evidence -The Rules of Evidence -Volatile Evidence -General Procedure -Collection and Archiving -Methods of Collection -Artifacts -Collection Steps -Controlling Contamination: The Chain of Custody -Reconstructing the Attack.

Unit IV: 14 hours

Duplication and Preservation of Digital Evidence: Preserving the Digital Crime Scene-Computer Evidence Processing Steps -Legal Aspects of Collecting and Preserving Computer Forensic Evidence -**Computer Image Verification and Authentication:**Special Needs of Evidential Authentication -Practical Considerations –Practical Implementation.

Unit V: 16 hours

Computer Forensics Analysis:Discovery of Electronic Evidence: Electronic Document Discovery: A Powerful New Litigation Tool- **Identification of Data:** Timekeeping -Forensic Identification and Analysis of Technical Surveillance Devices. **Reconstructing Past Events:** How to Become a Digital Detective -Useable File Formats -Unusable File Formats -Converting Files.**Networks:** Network Forensics Scenario -A Technical Approach -Destruction of Email -Damaging Computer Evidence -Tools Needed for Intrusion Response to the Destruction of Data -System Testing.

Text Books:

1. John R. Vacca, 2008,Computer Forensics: Computer Crime Scene Investigation,Second Edition,Charles River Media, Inc. Boston, Massachusetts.

Unit	Chapters/Section
I	1,2.
II	3.
III	5,6.
IV	7,8.
V	9,10,11,12.

References:

1. Nelson, Phillips, Enfinger, Steuart, 2008 ,"Computer Forensics and Investigations", Cengage Learning, India Edition, 2008.
2. Richard E.Smith, 2008, "Internet Cryptography", 3rd Edition Pearson Education.
3. MarjieT.Britz, 2013 ,"Computer Forensics and Cyber Crime": An Introduction", 3rd Edition, Prentice Hall.

Course Designers:

1. Mr. S. Kumarappan.
2. Dr. T. Manikumar

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DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those joined B.Sc. IT on or after June 2020)

Programme Code - UIT

CourseCode	Course Title	Category	L	T	P	Credit
UIT20CE41(H)	Big Data Analytics	Core Elective	5			5

L - Lecture T - Tutorial P - Practicals

Year	Semester	Max. Marks CA	Max.Marks SE	Total
II	IV	25	75	100

Preamble

Familiarize the concept of Bigdataand Data Analytics using the Bigdata tools such as Hadoop, Cassandra &MongoDB.

Course Outcomes

On the completion of the course the student will be able to

#	Course Outcome	Expected Proficiency	Expected Attainment
CO1	Classify the digital Data, their Characteristics and Introduce Big data and it's evolution.	75%	75%
CO2	Characterize the Data Analytics and classification of Analytics.	70%	70%
CO3	Portray the needs of Hadoop, Processing Data with Hadoop.	70%	60%
CO4	illustrate the Features of Cassandra with its various commands.	68%	60%
CO5	Express the MapReduce Programming & applies MapReucer in MongoDB	68%	60%

Mapping of Course Outcomes with Program Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	S	M	M	S	M
CO2	S	S	S	M	S	M
CO3	S	S	M	M	M	S
CO4	S	S	M	M	S	S
CO5	S	S	M	M	M	S

(S – Strong , M – Medium , L – Low)

Mapping of Course Outcomes withProgramSpecificOutcomes

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	M	L
CO2	S	S	M	M	S
CO3	S	S	S	M	M
CO4	S	S	M	M	S
CO5	S	S	M	M	S

(S – Strong , M – Medium , L – Low)

Blooms taxonomy

	CA		End of Semester
	First	Second	
Knowledge	40%	40%	40%
Understand	40%	40%	40%
Apply	20%	20%	20%

Big Data Analytics

UnitI : **15 hours**

Types of Digital Data: Classification of **Digital Data Introduction to Big Data :** Characteristics of Data – Evolution of Big Data – Definition of Big Data – Challenges of with Big Data – What is Big Data? – Other Characteristics of Data Which are not Definitional Traits of Big Data – Why Big Data? Are We Just an Information Consumer or Do We also
Produce information? Traditional Business Intelligence (BI) versus Big Data – A Typical Data Warehouse Environment – A Typical Hadoop Environment – What is New Today – What is Changing in the Realms of Big Data?

Unit II : **15 hours**

Big Data Analytics: Where do we Begin? – What is Big Data Analytics? – What Big Data Analytics isn't? – Why this sudden Hype Around Big Data Analytics? – Classification of Analytics? – Classification of Analytics – Greatest Challenges that Prevent Businesses from capitalizing on Big Data – Top Challenges Facing Big Data – Why is Big Data Analytics Important? – What kind of Technologies are we looking toward to help meet the challenges posed by Big Data? – Data Science – Data Scientists ..Your New Best Friend- Terminologies used in Big Data Environment – Basically Available Soft State Eventual Consistency (BASE) – Few Top Analytics Tools – The Big Data Technology Landscape – NoSQL (Not Only SQL)

Unit III : **15 hours**

Hadoop **– Introduction to Hadoop:** Introducing Hadoop – Why Hadoop – Why Hadoop? – Why not RDBMS? – RDBMS versus Hadoop – Distributed Computing Challenges – History of Hadoop – Hadoop Overview – Use Case of Hadoop – Hadoop Distributors – HDFS (Hadoop Distributed File System) – Processing Data with Hadoop – Managing Resources and Applications with Hadoop YARN (Yet Another Resource Negotiator) – Interacting with Hadoop Ecosystem.

Unit IV: **15 hours**

Introduction to Cassandra: Apache Cassandra – An Introduction – Features of Cassandra–CQL Data type – CQLSH – Keyspaces – CRUD (Create, Read, Update, Delete) operations – Collections – Using Counter- Time To Live (TTL) - Alter Commands – Import and Export.

Unit V: **15 hours**

Introduction to MAPREDUCE Programming: Introduction – Mapper – Reducer – Combiner – Partitioner – Searching – Sorting – Compression - **Introduction to MongoDB:** What is MongoDB? – Why MongoDB? – MongoDb Query Language – Aggregate functions – Map Reduce function -

Text Books:

1. "Big Data and Anaytics", SeemaAcharya, SubhashiniChellappan, 2015, Wiley India Pvt. Ltd., Ansari Road, Daryaganj, New Delhi.

Unit	Chapters(pages)
1	1 (1.1.1, 1.1.2, 1.1.3)2 (2.1 to 2.13)
2	3 (3.1 to 3.14)4 (4.1)
3	4 (4.2)5 (5.1 to 5.13)
4	7 (7.1 to 7.11)
5	8 (8.1 to 8.8)6 (6.1, 6.2, 6.5.9,6,5.10)

References:

1. "Big Data at Work: Dispelling the Myths, Uncovering the Opportunities" , Thomas H. Davenport, 2014, Havard Business Review Press
2. "Big Data in Practice" by Bernard Marr, 2016, John Wiley & Sons
3. "Big Data: Principles and Best Practices of Scalable Realtime ..." by James Warren and Nathan Marz , 2015, Manning Publications.

Web Resources:

1. https://www.edureka.co/blog/big-data-tutorial/
2. https://intellipaat.com/blog/big-data-tutorial-for-beginners/
3. https://www.edureka.co/blog/big-data-tutorial/
4. https://www.javatpoint.com/what-is-big-data/
5. https://www.tutorialspoint.com/big_data_tutorials.htm

Course Designers:

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DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those joined B.Sc. IT on or after June 2020)

Programme Code – UIT

CourseCode	Course Title	Category	L	T	P	Credit
UIT20NE31	Open Source Technology	NME	2	0	0	2

L - Lecture T - Tutorial P – Practicals

Year	Semester	Max. Marks CA	Max.Marks SE	Total
II	III	15	35	50

Preamble

The objective of this course is to utilize and contribute to open source projects. To make the students to gain experience using open source tools, languages and frameworks to prepare for careers in software development

Course Outcomes

On the completion of the course the student will be able to

#	Course Outcome	Expected Proficiencey	Expected Attainment
CO1	DescribevariousOpen source principles	85%	82%
CO2	Explainthe Methodologyof Open source Techniques	82%	80%
CO3	DemonstratevariousOpen source Products	75%	72%
CO4	Discuss different types Softwares,it'simplementationissues.	60%	70%
CO5	Interact with the open source community	75%	65%

Mapping of Course Outcomes with Program Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	S	M	M	S	M
CO2	S	S	S	M	S	M
CO3	S	S	M	M	M	S
CO4	S	S	M	M	S	S
CO5	S	S	L	M	M	S

(S – Strong , M – Medium , L – Low)

B.C.A. P.O.

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	S	M	M	S	M
CO2	S	M	S	M	S	M
CO3	M	L	M	M	M	S
CO4	S	S	M	M	S	M
CO5	S	S	M	M	M	S

Mapping of Course Outcomes with ProgramSpecificOutcomes

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	M	S	M
CO2	S	M	S	M	L
CO3	M	L	M	S	M
CO4	M	S	M	M	M
CO5	M	L	S	M	L

(S – Strong , M – Medium , L – Low)

Blooms taxonomy

	CA		End of Semester
	First	Second	
Knowledge-K1	40%	40%	40%
Understand-K2	40%	40%	40%
Apply-K3	20%	20%	20%

Open Source Technology

UNITI: **15 hours**

Introduction- Open source Principles – Open Standard requirements for software- Open source Successes – Free Software – Free Software Vs. Open Source Software – public domain software- Proprietary Vs. Open source Licensing Model- Open Standards Principles – methodologies – open source software development model – Legal Issues in open source

UNITII **15 hours**

Methodology – Languages used to develop open source products – cross platform code – implementation roles – open source impact on team issues – implementation process – implementation principles – key documents – migration – interacting with the open source community - support

TextBooks:

1. KailashVedera, Bhavyesh Gandhi ,2009,"Open Source Technology" , University Science Press, New Delhi,

Unit	Chapters
I	1
II	2,3

References:

1. Paul Kavanagh,2004 "Open Source Software: Implementation and Management", Elsevier Digital Press

WebResources:

1. https://madhavuniversity.edu.in/open-source-echnology.html#:~:text=Open%20source%20software%20is%20software,its%20design%20is%20publicly%20accessible.
2. https://www.computerscience.org/resources/computer-programming-languages/

Course Designers:

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2. Mr. S.Kumarappan

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DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those joined B.Sc. IT on or after June 2020)

Programme Code - UIT

CourseCode	Course Title	Category	L	T	P	Credit
UIT20NE41	Internet Security – Principles & Practices	NME	2			2

L - Lecture T - Tutorial P – Practicals

Year	Semester	Max. Marks CA	Max.Marks SE	Total
II	IV	15	35	50

Preamble

Equip foundational understanding of the threats to the Internet infrastructure and to understand the practical principles, models, cryptographic methods for protecting Internet from various forms of attacks

Course Outcomes

On the completion of the course the student will be able to

#	Course Outcome	Expected Proficiencey	Expected Attainment
CO1	Project the Security Policies & Techniques for security attacks	75%	75%
CO2	Express Data Encryption Techniques, Digital Signature, Email Security	72%	70%
CO3	Deal out Web Security & Malicious Software	72%	65%
CO4	Dispense the concept of digital immune system & Firewall Protection	68%	62%
CO5	Explain the Firewall Protectionsystems	72%	70%

Mapping of Course Outcomes with Program Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	S	M	M	M	S
CO2	S	S	S	M	M	S
CO3	S	S	S	M	M	S
CO4	S	S	S	M	M	S
CO5	S	M	S	M	M	M

(S – Strong , M – Medium , L – Low)

B.C.A. P.O.

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	M	M	M	S	S
CO2	S	S	S	M	M	M
CO3	M	S	S	M	S	S
CO4	S	S	S	S	M	S
CO5	S	M	S	M	S	M

Mapping of Course Outcomes with ProgramSpecificOutcomes

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	M	M
CO2	S	S	S	M	M
CO3	S	M	S	M	M
CO4	S	S	M	M	M
CO5	M	S	S	M	M

(S – Strong , M – Medium , L – Low)

Blooms taxonomy

	CA		End of Semester
	First	Second	
Knowledge	40%	40%	40%
Understand	40%	40%	40%
Apply	20%	20%	20%

Internet Security Principles & Practices

UnitI : 15 hours

Introduction: Security – Elements of Information Security – Security Policy – Security Techniques – Steps for Better Security – Category of Computer Security – The operational model of Network Security – Security Services – Basic Network Security Terminology – Security Attacks – **Data Encryption Techniques**: Introduction – Encryption Methods – Cryptography – **Authentication :** Introduction – Authentication Methods – **Digital Signatures –** Introduction **- Electronic Mail Security:** Introduction – Pretty Good Privacy – MIME – S/MIME – Comparison of PGP & S/MIME.

Unit II : 15 hours

Web Security: Secure Electronic Transaction – Importance of SET – Set Mechanism – Key Elements of SET – Key elements of SET – Strengths of SET – Weaknesses of SET.

Malicious Software: Introduction – Malicious code – Viruses – Worms – Trojans or Trojan Horses – Spyware – Bots – Best Practices – Digital Immune System – Attacks. **Firewall:** Introduction – Characteristics of Firewall – Types of Firewall – Benefits of Firewall – Limitations of Firewall

Text Books:

1. V.K.Pachghare , 2015 "*Cryptography and Information Security*" , PHI Learning Private Limited, Delhi.

Unit	Chapters(pages)
1	1(1.1 to 1.10)
	2(2.1 to 2.3)
	9(9.1 to 9.2)
	10 (10.1.1 to 10.1.3)
	11 (11.1 to 11.5)
2	13(13.8)
	15(15.1 to 15.10)
	16(16.1 to 16.5)

References:

1. William Stallings, 2017, "*Cryptography and Network Security: Principles and Practice*",Pearson Indian Education Services.
2. RaefMeeuwisse , 2015, "*Cybersecurity for Beginners*" ,Cyber Simplicity ltd.
3. William Stalling, 6th Edition, 2013,"*Data & Computer Communication*", Pearson Education,

Prentice Hall of India, New Delhi.

Web Resources:

1. https://www.tutorialspoint.com/internet_technologies/internet_security_overview.htm
2. https://www.slideshare.net/iuvmtech/internet-security-tutorial
3. https://www.digitalvidya.com/blog/cyber-security-tutorial/
4. https://www.w3schools.in/category/cyber-security/
5. http://patrickmcdaniel.org/pubs/www04-tutorial.pdf

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