

Thiagarajar College

(An Autonomous Institution Affiliated to Madurai Kamaraj University)

Re-Accredited with 'A' Grade by NAAC



Thirty Eighth Academic Council Meeting

Department of Computer Application & Information Technology

Dr. Rm. Murugappan

Dean – Curriculum Development

**B.Sc.,
Information Technology
Programme Code : UIT**

THIAGARAJAR COLLEGE, MADURAI – 9.
(Re-Accredited with ‘A’ Grade by NAAC)
Curriculum structure for
B.Sc., CS, IT & BCA BBA & B.Com
(For those who joined in 2019 and after)

Category	Course	No.of Courses /paper	Credit Distribution	Hrs/ Week	Total Credits	
Part I	Tamil	2	3	-	06	
Part II	English	2	3	-	06	
		Sub Total				12
Part III	Core	-	-	-	84	
	Elective –Main	2	5	-	10	
	Elective – Generic	2+2	5	-	20	
		Sub Total				114
Part IV	AECC I &II Sem	I sem EVS II Sem .Prof.Skill Development	2	4	04	
	NME III & V Sem Horizontal Migration	2	2	8	08	
	SEC IV & VI Sem Vertical Migration	2				
	Value Education V Sem	1	1	2	01	
		Sub Total			14	13
		Total				139
Part V	NCC (Army &Navy)/ PE/ NSS / Rotaract/ Quality Circle/ Library/ SSL/ Nature Club/Value Education/ YRC/WSC				01	
		Grand Total				140
		Self-Study Paper (Optional)- -V Sem			05	145

AECC – Ability Enhancement Compulsory Course

SEC – Skill Enhancement Course

NME – Non Major Elective

For Choice based credit system (CBCS)

- For NME every department offers two papers (one in each at III & V semester)
- For SEC every department offer three papers for each course (Sem IV & VI)
- For Major elective there may be an option for choice.

THIAGARAJAR COLLEGE, MADURAI – 9.**(Re-Accredited with ‘A’ Grade by NAAC)****Curriculum structure for****BA Tamil, English & Economics****B.Sc., Maths, Physics, Chemistry, Botany, Biotechnology Microbiology and Psychology****(For those who joined in 2019 and after)**

Catergory	Course	No.of Courses /paper	Credit Distribution	Hrs/ Week	Total Credits
Part I	Tamil	4	3	12+12	12
Part II	English	4	3	12+12	12
		Sub Total		48	24
Part III	Core			72 +12	72
	Elect –Main	2	5	10	10
	Elect – Generic	2+2	5	24	20
		Sub Total		118	102
Part IV	AECC I &II Sem	I sem EVS II Sem .Prof.Skill Development	2	4	04
	NME III & V Sem Horizontal Migration	2	2	8	08
	SEC IV & VI Sem Vertical Migration	2			
	Value Education V Sem	1	1	2	1
		Sub Total		14	13
	Total				139
Part V	NCC (Army &Navy)/ PE/ NSS / Rotaract/ Quality/WSC Circle/ Library/ SSL/ Nature Club/Value Education/ YRC				1
	Grand Total				140
	Self-Study Paper (Optional)- -V Sem			05	145

AECC – Ability Enhancement Compulsory Course

SEC – Skill Enhancement Course

NME – Non Major Elective

For Choice based credit system (CBCS)

- For NME every department offers two papers (one in each at III & V semester)
- For SEC every department offer three papers for each course (Sem IV & VI)
- For Major elective there may be an option for choice.

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

Computer knowledge

Apply the knowledge of mathematics, statistics and computer Fundamentals to IT applications.

Design/Development of solutions.

Design solutions for IT applications using latest technologies and develop and implement the solutions using various latest languages.

Modern tool usage

Create, select and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex IT applications with an understanding of the limitations.

Environment and sustainability

Understand the impact of the IT analyst solutions in societal and environmental contexts, and demonstrate the knowledge and need for sustainable development.

Ethics

Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

Individual and Team work

Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

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):

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

PSO1	Acquire fundamental concepts, methods and practices of Information Technology to develop theoretical and practical skill sets.
PSO2	Justify the optimum technique to allocate memory resources, processors, I/O peripherals to provide optimal programmatic solution to a real world problem.
PSO3	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.
PSO4	Promote the students to generalize and distinguish the characters of different systems for different environment.
PSO5	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
(For those who joined in 2019 and after)
COURSE STRUCTURE- B.Sc. INFORMATION TECHNOLOGY
Semester – I

Course	Code No.	Subject	Hours	Credits	Total Hours	Max. Marks CA	Max. Marks SE	Total
Part I	U19TM11	Tamil	5	3	75	25	75	100
Part II	U19EN12	English	4	3	60	25	75	100
Core 1	UIT19C11	Programming in C	4	4	60	25	75	100
Core 2	UIT19C12	Digital Principles and Computer Organization	4	4	60	25	75	100
Core Lab 1	UIT19CL11	Programming in C Lab	3	2	45	40	60	100
Core Lab 2	UIT19CL12	Digital Design Lab	3	2	45	40	60	100
Allied 1	UMA19GE 11 IT	Mathematical Foundation for Computer Science	5	5	75	25	75	100
AECC	U19ES11	Environmental Studies	2	2	30	15	35	50
TOTAL			30	25				

Semester-II

Course	Code No.	Subject	Hours	Credits	Total No. of Hours Allotted	Max. Marks CA	Max. Marks SE	Total
Part I	U19TM21	Tamil	5	3	75	25	75	100
Part II	U19EN22	English	4	3	60	25	75	100
Core 3	UIT19C21	Object Oriented Programming with C++	4	4	60	25	75	100
Core 4	UIT19C22	Microprocessor and Assembly Language Programming	4	4	60	25	75	100
Core Lab 3	UIT19CL21	Object Oriented Programming with C++ Lab	3	2	45	40	60	100
Core Lab 4	UIT19CL22	Structure Program Logic & Design Lab	3	2	45	40	60	100
Allied 2	UMA19GE 21IT	Operations Research	5	5	75	25	75	100
AECC	UIT19AE21	Effective Communicative English	2	2	30	15	35	50
TOTAL			30	25				

Semester – III

Course	Code No.	Subject	Hours	Credits	Total No. of Hours Allotted	Max. Marks CA	Max. Marks SE	Total
Core 5	UIT19C31	Data Structures	5	4	75	25	75	100
Core 6	UIT19C32	Relational Database Management System	5	4	75	25	75	100
Core Lab 5	UIT19CL31	Data structures using C Lab	4	2	60	40	60	100
Core Lab 6	UIT19CL32	RDBMS Lab	4	2	60	40	60	100
NME	UIT19NE31	Electronic Commerce	2	2	30	15	35	50
Core Elective 1	UIT19CE31	Options given	5	5	75	25	75	100
Allied 3	UMA19GE31IT	Computational Methods	5	5	75	25	75	100
TOTAL			30	24				

Semester – IV

Course	Code No.	Subject	Hours	Credits	Total No. of Hours Allotted	Max. Marks CA	Max. Marks SE	Total
Core 7	UIT19C41	Operating System	5	4	75	25	75	100
Core 8	UIT19C42	Java Programming	5	4	75	25	75	100
Core Lab 7	UIT19CL41	Operating System Lab	4	2	60	40	60	100
Core Lab 8	UIT19CL42	Java Programming Lab	4	2	60	40	60	100
Core Elective 2	UIT19CE41	Options given	5	5	75	25	75	100
SEC	UIT19SE41	Options given	2	2	30	15	35	50
Allied 4	UIT19GE41	Quantitative Aptitude	5	5	75	25	75	100
TOTAL			30	24				

Semester – V

Course	Code No.	Subject	Hours	Credits	Total No. of Hours Allotted	Max. Marks CA	Max. Marks SE	Total
Core 9	UIT19C51	.Net Technology	5	5	75	25	75	100
Core 10	UIT19C52	Mobile Application Development	5	4	75	25	75	100
Core 11	UIT19C53	Software Engineering	5	4	75	25	75	100
Core Lab 9	UIT19CL51	Net Technology Lab	6	2	90	40	60	100
Core Lab 10	UIT19CL52	Mobile Application Development Lab	5	2	75	40	60	100
NME	UIT19NE51	Internet Security - Principles and Practices	2	2	30	15	35	50
VE 1	U19VE51	Value Education	2	1	30	15	35	50
TOTAL			30	20				

Semester – VI

Course	Code No.	Subject	Hours	Credits	Total No. of Hours Allotted	Max. Marks CA	Max. Marks SE	Total
Core 12	UIT19C61	Web Designing with PHP	5	5	75	25	75	100
Core 13	UIT19C62	Computer Networks	5	4	75	25	75	100
Core 14	UIT19C63	Data Warehousing & Mining	5	4	75	25	75	100
Core Lab 11	UIT19CL61	Web Designing with PHP Lab	5	2	75	40	60	100
Core Lab 12	UIT19CL62	Networking Lab	4	2	60	40	60	100
Project	UIT19PJ61	Major Project	4	2	60	25	75	100
SEC	UIT19SE61	Otpions given	2	2	30	15	35	50
Part V		Part V		1				
TOTAL			30	22				
TOTAL CREDITS FOR SEMESTERS I to VI				140				

Core Electives

- A. Cloud Computing
- B. Soft Computing
- C. E - Commerce
- D. Software Project Management
- E. Principles of Data Communication
- F. Computer Forensics

SEC

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

NME

1. Electronic Commerce -NME
2. Internet Security - Principles and Practices - NME

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DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those who joined in 2019 and after)

CourseCode	Course Title	Category	L	T	P	Credit
UIT19C11	Programming in C	Core-1	4	0	0	4
			L - Lecture	T - Tutorial	P-Practicals	

Year	Semester	Max. Marks CA	Max. Marks SE	Total
I	I	25	75	100

Preamble

To get knowledge on the basics of C programming and train them to develop user friendly applications code using C.

Course Outcomes

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

#	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO1	Demonstrate the types of variables constants ,datatypes,operators,looping concepts andconditional statements for developing the code.	K1,K2
CO2	Illustrate the structure of storage classes to the various types of variables and operations related with strings.	K1,K2
CO3	Implement the various types of user defined functions and the scope visibilitylifetime of variables.	K2,K3
CO4	Develop the code to apply the structures and unions for complicated problems.	K1,K3
CO5	Describe about the Pointers and the impact of address of pointers used in code development,explain the usage of File concepts in C codings.	K2,K3

K1 - Knowledge

K2 - Understand

K3 – Apply

Mapping of COs with POs

Mapping of COs with Pos	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S		S		
CO2				M	
CO3		M	S		
CO4	S				
CO5					L

(S – Strong , M – Medium , L – Low)

Blooms taxonomy

	CA		End of Semester
	First	Second	
<i>Knowledge-K1</i>	40%	40%	40%
<i>Understand-K2</i>	40%	40%	40%
<i>Apply-K3</i>	20%	20%	20%
<i>Total marks</i>	52	52	140

Programming in C

Unit - I:

12 hours

Overview of C: History of C-Importance of C –Sample Program - Printing a Message-Sample Program - Adding Two Numbers- Sample Program - Interest Calculation-Sample Program - Use of Subroutines Sample Program - Use of Math functions-Basic structure of C programs-Programming Style. **Constants, Variables and Data Types:** Introduction –Character set-C tokens-Keywords and identifiers-Constants-Variables-Data Types-Declaration of variables-Declaration of storage class-Assigning values to variables-Defining symbolic constants-Declaring a variable as constant.**Operators and Expressions:** Arithmetic operators-Relational operators-Logical operators-Assignment operators-Increment and decrement operators- Conditional operator-Bitwise operators-special operators-Arithmetic expressions-Evaluation of expressions-Precedence of arithmetic operators-Typeconversions in expressions.**Managing Input and output operations:** Reading a character-Writing a character-formatted input- formatted output.**Decision making and branching:** Introduction-Simple If statement-the If... Else statement –Nesting of If- Else statement –The Else If ladder- The switch statement –The?-operator-The goto statement.

Unit - II:

12 hours

Decision making and looping:Introduction-The while statement –The do statement -The for Statement – Jumps In Loops Array:Introduction – One- Dimensional Arrays –Declaration of One-Dimensional Arrays-Initialzation of One –Dimensional Arrays-Two Dimensional Arrays-Initializing Two- dimensional Arrays- Multi- dimensional Arrays- Dynamic Arrays –**Character Arrays and String :**Introduction–Declaring and Initializing String Variables –Reading Strings from Terminal-Writing Strings to Screen – Arithmetic Operations on Characters – Putting Strings Together – Comparison of Two Strings-String -Handling Functions.

Unit - III:

12 hours

User –Defined Functions: Introduction- Need for User- Defined Functions –A Multi-Function Program-Elements of User- Defined Functions – Definition of Functions-Return Values and Their Types –Function Calls-Function Declaration– Category of Functions –No Arguments and No Return Values-Arguments but No Return Values-Arguments with Return Values-No Arguments but Returns a Value-Functions that Return Multiple values-Nesting of Functions – Recursion-Passing Arrays to Functions – Passing Strings to Functions

Unit – IV:**12 hours**

Structures and Unions: Introduction– Defining a Structure–Declaring Structure Variables – Accessing Structure Members-Structure Initialization-Copying and Comparing Structure Variables- Operations on Individual Members-Arrays of Structures- Arrays within Structures-Structures within Structures-Unions-Size of Structures-Bit Fields.

Unit - V:**12 hours**

Pointers: Introduction-Understanding Pointers – Accessing the Address of a Variable- Declaring Pointer Variables- Initialization of Pointer Variables. Pointers and arrays. **File Management in C:**Introduction-Defining and Opening a File-Closing a File-Input/Output Operations on Files-Error Handling During I/O Operations-Random Access to Files.

Text Books

Balagurusamy.E2017.Programming in C, 7th edition, Tata McGraw – Hill Education Private Limited, New Delhi.

Unit	Chapters/Page number
I	1(page-1 to 13.), 2(page22 to 44), 3(page51to 69),4(page 81,82,85,86,94)
II	5(page111 to 136),6(page149,151,153,156,166,173)7(page189,191,192,194,200,204,212) 8(page234,235,236,242,246,248,249)
III	9(page267 to298)
IV	10 (page320 to 339).
V	11(page353 to 358) 12(page391 to 402)

Reference Books:

- 1.YashwantKanetkar, 2016, Let Us C, 14th edition, BPB Publications, New Delhi.
- 2.Byron S. Gottfried, 2010.Programming with C, 3rd edition, Tata McGraw – Hill Publications, New Delhi.
- 3.AnanthiSheshasaayee, 2009. Programming Language C with Practical, Margham Publication, Chennai.

Course designers:

1. M. Hemalatha
2. S. Kumarappan

Lecture Schedule

Chapter/ Section	Topic	Lecture hours
1.	Overview of C:	12
1.1	History of C - Importance of C - Sample Programs 1,2,3,4 and 5 - Basic Structure of C Programs - Programming Style	4
1.2	Executing a 'C' Program: Introduction - Character Set - C Tokens - Keywords and Identifiers - Constants - Variables - Data types - Declaration of Variables - Declaration of Storage Class - Assigning Values to Variables - Defining Symbolic Constant	4
1.3	Declaring a Variable. Operators and Expressions	4
2.	Managing Input and Output Operations:	12
2.1	Introduction - Reading a Character - Writing a Character-Formatted Input-Formatted Output	3
2.2	Decision Making and Branching: Introduction-Decision making with if Statement and if...else Statement	3
2.3	- The else if Ladder - The Switch Statement - The ?: Operator - The goto Statement	3
2.4	Decision Making and Looping: Introduction- The while Statement-The do Statement- The for Statement-Jumps in Loops.	3
3.	Array:	12
3.1	Array:Introduction - One-dimensional Arrays - Declaration - Initialization - Two-dimensional Arrays - Initialization - Multi-dimensional Arrays	4
3.2	Dynamic Arrays. Character Arrays and Strings: Introduction - Declaring and Initializing String Variables - Reading Strings from Terminal	4
3.3	Writing Strings to Screen - Arithmetic Operation on Characters Putting Strings Together - Comparison of Two Strings - String Handling Functions.	4
4.	User-Defined Functions:	12
4.1	Introduction - Need for User Defined Functions - A Multi-Function Program - Elements of User-Defined Functions - Returns Values and Their Types	2
4.2	Function Calls – Function Declaration - Category of Functions	5
4.3	Functions that Return Multiple Values - Nesting of Functions - Recursion- Passing Arrays to Functions - Passing Strings to Function	3
4.4	Structures and Union	2

5.	Pointers:	12
5.1	Pointers:Introduction - Understanding Pointers - Accessing the Address of a Variable -Declaring Pointer Variables - Initialization of Pointer Variables	2
5.2	Accessing a Variable through its Pointer - Chain of Pointers. Dynamic Memory Allocation and Linked List: malloc	3
5.3	calloc, Releasing the Used Space:free, Altering the Size of a Block: reallocPointers and arrays	4
5.4	File Management in C	3
Total(10+12+14+13+11)		60

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DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those who joined in 2019 and after)

CourseCode	Course Title	Category	L	T	P	Credit
UIT19C12	Digital Principles and Computer Organization	Core 2	4			4

L - Lecture

T - Tutorial

P – Practicals

Year	Semester	Max. Marks CA	Max. Marks SE	Total
I	I	25	75	100

Preamble

Provides the fundamental knowledge on digital circuits principles and Architecture of computers. Then apply them to useful, meaningful design. It presents digital logic and characteristics of modern-day computer systems.

Course Outcomes

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

#	Course Outcome	Knowledge Level
CO1	Analyze and design combinational systems using standard gates.	K1,K3
CO2	Demonstrate the binary number theory and Boolean algebra	K1,K2
CO3	Illustrate the architecture of modern computer and Execution of micro instruction of a program	K1,K2
CO4	Explain the concept of Input/output organization and the memory system in a computer	K1,K2
CO5	Sketch out the performance and creation of embedded systems	K1,K3

K1 - Knowledge

K2 - Understand

K3 – Apply

Mapping of COs with POs

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

(S – Strong , M – Medium , L – Low)

Blooms taxonomy

	CA		End of Semester
	First	Second	
<i>Knowledge-K1</i>	40%	40%	40%
<i>Understand-K2</i>	40%	40%	40%
<i>Apply-K3</i>	20%	20%	20%
<i>Total marks</i>	52	52	140

Digital Principles and Computer Organization

Unit I :

10 hours

Combinational Logic Circuits: Boolean Laws and Theorems-Sums-of-Products Method-Truth table to Karnaugh Map-Pairs,Quads,and Octets-Karnaugh Simplifications-Don't care conditions-Product-of-Sums Method-Product-of-sums Simplification.

Unit II:

12 hours

Number Systems and Codes: Binary number system-Radix representation of numbers-Binary –to-decimal conversion- Decimal –to-binary conversion-Octal numbers-Hexadecimal numbers-The ASCII code-The Excess -3 code- The Gray code. **Arithmetic circuits:** Binary addition-Binary subtraction- Unsigned Binary numbers-Sign –magnitude numbers-2's complement representation-2's complement arithmetic-Arithmetic building blocks-The adder-subtractor. **Flip-Flops:** RS Flip Flops.

Unit III:

14 hours

Basic Structure Of Computers: Computer Types– Functional Units – Basic Operational Concepts – Bus Structures-Software-Performance – Multiprocessors and Multicomputers -Historical Perspective .**Machine Instructions and Programs:** Instructions and Instruction sequencing – Addressing modes- Basic input/output operations-Stacks and Queues.

Unit IV:

13 hours

Input/Output organization : Accessing I/O devices– Interrupts – Direct Memory Access– Buses-Interface circuits.**The Memory System:** Some Basic Concepts – Semiconductor RAM Memories– Read Only Memories– Cache Memories – Virtual memories.

Unit V :

11 hours

Arithmetic: Addition and subtraction of signed numbers– Multiplication of Positive Numbers–**Embedded Systems:** Examples of Embedded systems–Processor Chips for Embedded Applications.**Basic Processing Unit:** Some Fundamental Concepts-Execution of a Complete Instruction-Multiple-Bus Organization –Hardwired control.

Text Books:

1. Donald P. Leach , Albert Paul Malvino, Goutam Saha, 2014. Digital Principles and Applications, 8th edition, Tata McGraw – Hill Publications, New Delhi.
2. Carl Hamacher, Zvonko Vranesic, Safwat Zaky, 2013. Computer Organization, 5th edition, Tata McGraw – Hill Publications, New Delhi.

Units	Chapters/Sections
I	Book1-2(2.1--2.4) -3(3.1--3.3,3.4,3.6,3.7,3.8)
II	Book1--5(5.1,5.2,5.3,5.5,5.6,5.7,5.8,5.9,5.10)-6(6.1--6.8),8(8.1--8.3)
III	Book2-1(1.1—1.8), 2(2.4,2.5,2.7,2.8)
IV	Book2-4(4.1,4.2,4.4,4.5,4.6) -5(5.1,5.2,5.3,5.5-5.5,5.7)
V	Book2-(6.1-6.3,6.6,8.1-8.3,9.1,9.2,7.1-7.4)

References:

1. Morris Mano, 2012. Digital Logic & Computer Design, 5th edition , Prentice Hall of India publishing, New Delhi.
2. John P.Hayes, 2012. Computer Architecture and Organization, 3rd edition, Tata Mcgraw-hill education private limited, Delhi.
3. Morris Mano, 2011. Computer System Architecture, 4th edition , Prentice Hall of India publishing. New Delhi.

Web Resources:

1. https://www.tutorialspoint.com/computer_logical.../boolean_algebra.html
2. www.byte-notes.com/number-system-computer

Course Designers:

1. M. Hemalatha
2. S. Kumarappan

Lecture Schedule

Chapter/ Section	Topic	Lecture hours
1.1	Combinational Logic Circuits: Boolean Laws and Theorems-Sums-of-Products Method-Truth table to Karnaugh Map-Pairs,Quads,and Octets-Karnaugh Simplifications-Don't care conditions-Product-of-Sums Method-Product-of-sums Simplification.	3
1.2	Truth table to Karnaugh Map-Pairs,Quads,and Octets	3
1.3	Don't care conditions-Product-of-Sums Method-Product-of-sums Simplification.	4
2.1	Number Systems and Codes: Binary number system-Radix representation of numbers-Binary –to-decimal conversion-Decimal –to-binary conversion-Octal numbers-Hexadecimal numbers-The ASCII code-The Excess -3 code- The Gray	3

	code.	
2.2	Arithmetic circuits: Binary addition-Binary subtraction-Unsigned Binary numbers-Sign.	3
2.3	magnitude numbers-2's complement representation-2's complement arithmetic-Arithmetic building blocks-The adder-subtractor	3
2.4	Flip-Flops: RS Flip Flops.	3
3.1	Basic Structure Of Computers: Computer Types– Functional Units –Basic Operational Concepts.	3
3.2	Bus Structures-Software-Performance	3
3.3	Multiprocessors and Multicomputers -Historical Perspective	4
3.4	Machine Instructions and Programs: Instructions and Instruction sequencing –Addressing modes- Basic input/output operations-Stacks and Queues.	4
4.1	Input/Output organization :Accessing I/O devices– Interrupts – Direct Memory Access– Buses-Interface circuits.	4
4.2	The Memory System: Some Basic Concepts – Semiconductor RAM Memories.	4
4.3	Read Only Memories– Cache Memories – Virtual memories.	5
5.1	Arithmetic: Addition and subtraction of signed numbers– Multiplication of Positive Numbers.	3
5.2	Embedded Systems: Examples of Embedded systems– Processor Chips for Embedded Applications.	4
5.3	Basic Processing Unit: Some Fundamental Concepts- Execution of a Complete Instruction-Multiple-Bus Organization –Hardwired control	4
	Total	60

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DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those who joined in 2019 and after)

CourseCode	Course Title	Category	L	T	P	Credit
UIT19CL11	Programming in C Lab	Core Lab 1	0	0	3	2

L - Lecture T - Tutorial P – Practicals

Year	Semester	Max. Marks CA	Max. Marks SE	Total
I	I	40	60	100

Preamble

To learn programming logics and to develop programs in C. To solve the problems using functions, pointers and files.

Course Outcomes

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

#	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO1	Implement the concepts of variables constants and strings in C program.	K1,K2
CO2	Demonstrate the types of arrays using data structure in C programs	K2,K3
CO3	Develop the user defined functions in C programs.	K2,K3
CO4	Make use of pointers and string arrays using C programs.	K1,K3
CO5	Apply and Manipulate the file in C programs	K1,K3

K1 - Knowledge

K2 - Understand

K3 - Apply

Mapping of COs with POs

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

(S – Strong , M – Medium , L – Low)

Simple Programs:

1. Simple Interest
2. Find the bigger from two numbers -ordinary/switch case/conditional operator methods
3. Find the biggest from three numbers

4. Check the given number is odd or even-ordinary/switch case/conditional operator methods
5. Prime no checking
6. Print all prime numbers between any two given limits
Check the given character is vowels or not
7. Perform various arithmetic operation using switch case
8. Find the sum of digits of a given number
9. Binary to decimal-decimal to binary conversion

Arrays

1. Arrange "n" numbers in ascending order and descending order
2. Arrange "n" strings in alphabetic order
3. Palindrome checking
4. Matrix addition ,subtraction and multiplication

Function and Structure

1. Calculate the factorial value by recursion
2. Reverse a string by recursion
3. Mark list processing-structure and call by value technique
4. Mark list processing-structure and call by reference technique
5. EB bill calculation- structure and call by value technique
6. EB bill calculation- structure and call by reference technique

Files

1. Create a data file to store 'n' numbers and separate odd and even numbers
2. Create a data file to store 'n' characters and separate vowels and non-vowels

Course designers:

1. M. Hemalatha
2. S. Kumarappan

THIAGARAJAR COLLEGE, MADURAI- 9
 (An Autonomous Institution, affiliated to Madurai Kamaraj University)
DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY
 (For those who joined in 2019 and after)

CourseCode	Course Title	Category	L	T	P	Credit
UIT19CL12	Digital Design Lab	Core Lab 2			3	2
			L - Lecture	T - Tutorial	P – Practicals	

Year	Semester	Max. Marks CA	Max. Marks SE	Total
I	I	40	60	100

Preamble

Introduction to Digital Circuit Ics specifications andDigital lab kit to demonstrate the working logic of digital signals. IC – 7408,7432,7400,7402,7404,74136 are verified by truth tables.

Course Outcomes

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

#	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO1	Identify the basics digital ICs specification and it's functions.	K1,K2
CO2	Implement the Boolean functions using ICs	K2,K3
CO3	Design new simple circuit for the given bollean equation.	K1,K3
CO4	Apply the working logic of Flip-Flops.	K1,K2

K1 - Knowledge

K2 - Understand

K3 – Apply

Mapping of COs with POs

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

(S – Strong , M – Medium , L – Low)

Digital Design Lab Apparatus Required

Digital lab kit, single strand wires, breadboard, TTL IC's.

Lab Schedule

Chapter/ Section	Topic
1	Verification of truth tables of logic gates using TTL ICs..
2	Implementation and verification of universal logic gates.
3	Justifying the Boolean Equation using Combinational Logic Circuits.
4	Justifying the De Morgan's Law using Combinational Logic Circuits.
5	Design, and verify the Binary Half adder and Full adder by Logic Circuits.
6	Design, and verify the Binary Half subtracter and Full subtracterbyLogic Circuits.
7	Implementation and verification of Decoder using logic gates.
8	Implementation and verification of De-multiplexer using logic gates
9	Implementation and verification of Encoder using logic gates.
10	Verification of state tables of RS,JK flip-flops using NAND & NOR gates.

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DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those who joined in 2019 and after)

CourseCode	Course Title	Category	L	T	P	Credit
UIT19CL21	Object Oriented Programming with C++	Core-3	4	0	0	4
		L - Lecture	T - Tutorial	P - Practicals		

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

Preamble

To gain fundamental knowledge on oops concepts and train to develop various application programs using C++.

Course Outcomes

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

#	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO1	Explain keywords, tokens, variables constants and datatypes. Apply different types of operators, looping concepts and conditional statements for developing the code. Discuss the concepts of oops and its benefits.	K1, K2
CO2	Develop the constructor and destructor with their types in user defined functions	K1, K2
CO3	Implement the operator overloading and function overloading concept in complicated problems.	K2, K3
CO4	Write the C++ code using inheritance, polymorphism, pointers and virtual functions in impact of application programs.	K1, K2
CO5	Utilize the files and their operations, connectivity of the data bases.	K2, K3

K1 - Knowledge

K2 - Understand

K3 - Apply

Mapping of COs with POs

Mapping of COs with Pos	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S		S		
CO2		S		M	
CO3		S			
CO4	S		S		
CO5			S		L

(S - Strong, M - Medium, L - Low)

	CA		End of Semester
	First	Second	
<i>Knowledge-K1</i>	40%	40%	40%
<i>Understand-K2</i>	40%	40%	40%
<i>Apply-K3</i>	20%	20%	20%
<i>Total marks</i>	52	52	140

Object Oriented Programming with C++**Unit-I:****12 hours**

Principles of Object Oriented Programming: Software Crisis-Software Evolution-A look at Procedure –Oriented Programming- Object Oriented programming Paradigm-Basic concepts of Object –Oriented Programming-Benefits of OOPS. **Tokens, Expressions and Control Structures:** Introduction-Tokens-Keywords-Identifiers and Constants-Basic data types-user Defined data types-Storage classes-Derived Data types-Symbolic Constants-Type compatibility-Declaration of variables-Dynamic initialization of variables-Reference variables-Operators in C++ -Scope Resolution Operator. **Classes and objects:** Introduction- C Structures Revisited-Specifying a Class-Defining Member Functions-A C++ Program with Class-Making an outside function inline-Nesting of Member Functions-Private Member Functions-Arrays with in a Class-Memory Allocation for objects-Static data member- Static member functions-Array of objects-Object as function argument-Friendly functions-Returning objects-Const member functions.

Unit-II:**12 hours**

Constructors and Destructors: Introduction-Constructors-Parameterized constructors-Multiple Constructors in a class -Constructors with default Arguments-Dynamic Initialization of objects-Copy Constructor-Dynamic Constructor-Destructors.

Unit-III:**12 hours**

Operator Overloading and Type conversions: Introduction- Defining Operator Overloading-Overloading unary operators – Overloading Binary Operators-Overloading Binary operators using friends – Manipulation of strings using operators –Some other operator overloading examples- Rules for overloading operators.

Unit-IV:**12 hours**

Inheritance:Extending Classes: Introduction-Defining Derived Classes-Single Inheritance-Making a Private Member Inheritable-Multilevel inheritance-Multiple inheritance-Hierarchical inheritance-Hybrid inheritance-Virtual Base Classes- Abstract Classes-Constructors in Derived Classes

Pointers and Virtual Functions & Polymorphism: Introduction – Pointer – Pointers to Objects – this Pointer – Pointers to Derived classes.

Working with Files: Introduction-Classes for File Stream Operations-Opening and closing a File-Detecting End-of-File-More about Open(): File Modes-File Pointers and their Manipulations-Sequential Input and output Operations-Updating a File-Random Access-Error Handling During File Operations-Command Line Arguments.

Text Books:

1. E.Balagurusamy, 2013, Object Oriented Programming With C++, 6th edition, Tata McGraw – Hill publications, New Delhi.

UNIT	Chapter /Sections
I	1(1.1 to 1.6),3(3.1 to3.15),5(5.1 to 5.17)
II	6(6.1 to 6.8,6.11)
III	7(7.1 to 7.8) , 9(9.1 to 9.6)
IV	8(8.1 to 8.11)
V	11(11.1 to11.10)

Reference Books:

1. Well Dale, Jones, 2015, C++ Plus Data structures, 6th edn, Bartlett.
2. Yashavant Kanetkar, 2012, Let us C++, Second edn, BPB Publications
3. John R. Hubbard, 2012, Data Structures with C++ Tata Mc-Graw –Hill Education Private Limited, New Delhi.

Course designers :

1. Mrs. M. Hemalatha
2. Ms. C. D. Balapriya

Lecture Schedule

Chapter/ Section	Topic	Lecture hours
1	Principles of Object Oriented Programming:	12
1.1	Software Crisis – Software Evolution – Basic Concepts of OOPS	2
1.2	Tokens -Basic Data Types –Types Compatibility – Declaration of Variables –Type Cast Operator – Expressions and Implicit Conversions	3

1.3	Specifying a class– Defining Member functions – Marking an outside function Inline – Nesting of Member functions – Private member functions	3
1.4	Arrays within a Class – memory Allocation for objects -Static Data & Function Members-Arrays of objects – Objects as function argument and as return type Friendly functions-Returning objects-Const member functions.	4
2	Constructor and Destructors:	12
2.1	Constructors in a Class and types of Constructor	3
2.2	Destructor	2
2.3	Defining Operator Overloading – Overloading unary operators – overloading Binary Operators Overloading Binary operator	3
2.4	Overloading binary operators using friends – manipulation of strings using operators - rules for overloading operators.	4
3	Inheritance :	12
3.1	Defining derived classes-single inheritance – multilevel inheritance – multiple inheritance. Hierarchical inheritance.	4
3.2	Virtual base classes – constructors in derived classes – member classes-Nesting of classes.	2
3.3	Pointers, Virtual Functions and Polymorphism: Introduction-Pointers-Pointers to Objects-this pointer- Pointers to Derived Classes-Virtual Functions	4
.4	Pure Virtual Functions-Virtual Constructor and Destructor.	2
4.	Working with Files:	12
4.1	Introduction-Classes for File Stream Operations-Opening and closing a File-Detecting End-of-File-More about Open()	4
4.2	File Modes-File Pointers and their Manipulations-Sequential Input and output Operations	2
4.3	Updating a File-Random Access-Error Handling During File Operations	3
4.4	Command Line Arguments.	3
5	Managing Console I/O Operations:	12
5.1	Introduction-C++ Streams-C++ Stream Classes-Unformatted I/O Operations-	3
5.2	Formatted Console I/O Operations-Managing output with Manipulators.	3
5.3	Templates-Introduction-Class Templates- Class Templates with multiple Parameters-Function Templates- Function Templates with Multiple Parameters	3
5.4	Overloading of Template Functions-Member Function Templates-Non Type Template Arguments.	3
Total(12+12+12+12+12)		60

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DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those who joined in 2019 and after)

CourseCode	Course Title	Category	L	T	P	Credit
UIT19C22	Microprocessor and Assembly Language Programming	Core 4	4	0	0	4

L - Lecture

T - Tutorial

P – Practicals

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

Preamble

Depict system architecture, Microprocessor, Bus organization and provides training on assembly language programming.

Course Outcomes

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

#	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO1	Describe Microprocessor history and its address and data bus.	K1,K2
CO2	Sketch out the Intel 8085 Microprocessor Architecture and explain various Assembly language Instruction set.	K2,K3
CO3	Depict Intel 8086 Microprocessor Architecture and portray Interrupt Processing and 80186 and 80826 Interrupt Processors.	K1,K2
CO4	Describe the concept assembling, linking and executing a program.	K1,K2
CO5	Explain the assembly language programming logic and various controls.	K2,K3

K1 - Knowledge

K2 - Understand

K3 - Apply

Mapping of COs with POs

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

(S – Strong , M – Medium , L – Low)

	CA		End of Semester
	First	Second	
<i>Knowledge-K1</i>	40%	40%	40%
<i>Understand-K2</i>	40%	40%	40%
<i>Apply-K3</i>	20%	20%	20%
<i>Total marks</i>	52	52	140

Microprocessor and Assembly Language Programming

Unit - I:

15 hours

System Design Using Microprocessor : Introduction - System Design – Feasibility study- Random logic vs. microprocessor- System Specification – Initial Design – Hardware Design – Software Design- Test and Debug – Integration - Documentation -Development Tools **What a Microprocessor is:** Computer and its Organization – Programming System – What is microprocessor ? – Address Bus, Data Bus and Control Bus – Tristate Bus - Clock Generation – Connecting Microprocessor to I/O Devices – Data Transfer Schemes – Architectural Advancements of Microprocessors – Evolution of Microprocessors.

Unit - II:

15 hours

Intel 8085 Microprocessor-Hardware Architecture: Introduction - Hardware Architecture –The 8085 Pin out – Instruction Execution – Direct Memory Access Timing Diagram – External Interrupts Timing Diagram - **Intel 8085Microprocessor- Instruction Set and Programming:** Introduction:Program Status Word – Operand Types – Instructions Format – Addressing Modes– Instruction Set –Arithmetic Instructions – Logical Instructions – Branch Instructions – Stack-I/O and Machine Control Instructions.

UNIT III

15 hours

Intel 8086 –Hardware Architecture :Introduction – Architecture-Pin Description-External Memory Addressing – Bus Cycles – Some Important Companion Chips – Maximum Mode Bus Cycle – Intel 8086 System Configurations – Memory Interfacing – Minimum/Maximum Mode System Configuration – Interrupt Processing – Direct Memory Access – Halt State – Wait for Test State – Comparison Between the 8086 and the 8088 – Compatibility Between the 8086 and the 8088, the 80186 and 80826 Processors .

Unit –IV :

15 hours

Fundamentals of `Assembly language:Requirements for coding in Assembly language: Introduction-Assembly language features- Conventional segment directives- Simplified segment directives – Initializing for protected mode-Defining types of data .**Assembling ,linking and executing programs:** Introduction-Preparing a program for assembling and execution- Two-pass assembler- Linking an object program- Executing a program-The cross- reference Linking- Error Diagnostics- The Assembler Location Counter-Writing . com programs.

Symbolic Instruction and Addressing: Introduction-The symbolic Instruction set-An Overview –Data transfer Instructions-Basic arithmetic Instructions – Repetitive move instructions-The Int Instruction- Addressing modes .**Program Logic and control :** Introduction- Short, Near, and Far Addresses-The JMP Instruction- The LOOP Instruction—The Flags Register- The CMP Instruction-Conditional Jump Instructions –Calling procedures-The effect of program execution on the stack- Boolean operations-Shifting Bits- Rotating Bits- Organizing a Program.

Text Books

1. Krishna Kant, 2016, Microprocessors and Microcontrollers, Second Edition by PHI Learning Private Ltd., New Delhi.
2. Peter Abel, 2015, IBM PC Assembly Language And Programming” Fifth Edition by PEARSON, New Delhi.

UNIT	CHAPTERS/SECTIONS
I	BOOK1-1(1.1- 1.3) , 2(2.1-2.11)
II	Book1-3(3.1- 3.6), 4(4.1-4.6.6)
III	Book1-5(5.1-5.17)
IV	Book2- 4(page 51-65), 5(74-86)
V	Book2-6(page92-100), 7(109-133)

Reference Books:

1. Ramesh Gaonkar, 2015, Microprocessor Architecture programming and applications with the 8085, Sixth edition, PenRam International Publishing (India) Pvt .Ltd, Mumbai.
2. Nagoor Kani.A, 2016, Microprocessor And Microcontroller, Mc –Graw Hill Education(India) Private Limited, New Delhi.

Web References:

1. https://www.tutorialspoint.com/computer_logical.../boolean_algebra.html
2. www.byte-notes.com/number-system-computer

Course Designer:

1. Mrs.M.Hemalatha
2. Mrs.P.Praveena

Chapter/ Section	Topic	Lecture hours
1	System design using microprocessor	15
1.1	Introduction-system design-Design – Feasibility study- Random logic vs. microprocessor- System Specification – Initial Design – Hardware Design – Software Design- Test and Debug – Integration - Documentation - Development Tools	6
1.2	What a Microprocessor is:	
	Computer and its Organization – Programming System – What is microprocessor ? – Address Bus, Data Bus and Control Bus – Tristate Bus - Clock Generation – Connecting Microprocessor to I/O Devices – Data Transfer Schemes – Architectural Advancements of Microprocessors – Evolution of Microprocessors.	9
2	Intel 8085 Microprocessor-Hardware Architecture:	15
2.1	Introduction - Hardware Architecture –The 8085 Pin out – Instruction Execution – Direct Memory Access Timing Diagram – External Interrupts Timing Diagram	5
2.2	Intel 8085Microprocessor- Instruction Set and Programming:	
	Introduction:Program Status Word – Operand Types – Instructions Format – Addressing Modes– Instruction Set –Arithmetic Instructions – Logical Instructions – Branch Instructions – Stack-I/O and Machine Control Instructions.	8
3	Intel 8086 –Hardware Architecture:	15
3.1	Introduction – Architecture-Pin Description-External Memory Addressing – Bus Cycles – Some Important Companion Chips – Maximum Mode Bus Cycle – Intel 8086 System Configurations – Memory Interfacing – Minimum/Maximum Mode System Configuration – Interrupt Processing – Direct Memory Access – Halt State – Wait for Test State – Comparison Between the 8086 and the 8088 – Compatibility Between the 8086 and the 8088, the 80186 and 80826 Processors .	15
4	Fundamentals of `Assembly language:	15

4.1	Requirements for coding in Assembly language: Introduction-Assembly language features- Conventional segment directives- Simplified segment directives – Initializing for protected mode-Defining types of data .	7
4.2	Assembling ,linking and executing programs:	
	Introduction-Preparing a program for assembling and execution- Two-pass assembler- Linking an object program- Executing a program-The cross- reference Linking- Error Diagnostics- The Assembler Location Counter-Writing . com programs.	8
5	Symbolic Instruction and Addressing:	15
5.1	Introduction-The symbolic Instruction set-An Overview –Data transfer Instructions-Basic arithmetic Instructions – Repetitive move instructions- The Int Instruction- Addressing modes .	6
5.2	Program Logic and control :	
	Introduction- Short, Near, and Far Addresses-The JMP Instruction- The LOOP Instruction—The Flags Register- The CMP Instruction-Conditional Jump Instructions –Calling procedures-The effect of program execution on the stack- Boolean operations-Shifting Bits- Rotating Bits- Organizing a Program.	9
	Total	75

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DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those who joined in 2019 and after)

CourseCode	Course Title	Category	L	T	P	Credit
UIT19CL21	Object Oriented Programming with C++ Lab	Core Lab 3	0	0	3	2

L - Lecture

T - Tutorial

P – Practicals

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

Preamble

Train to write oops concept codings using C++ programs, To solve the problems using constructors, virtual function ,polymorphism,pointers and file concepts.

Course Outcomes

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

#	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO1	Demonstrate the concept of classes and their types by using C++ objects.	K1,K2
CO2	Implement constructors,destructors and inheritance using C++ codings.	K2,K3
CO3	Apply the concepts of pointers, virtual functions and polymorphism in C++ programs.	K1,K3
CO4	Create and Manage the File in C++ programs	K1,K3

K1 - Knowledge

K2 - Understand

K3 – Apply

Mapping of COs with POs

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

(S – Strong , M – Medium , L – Low)

Simple Programs

1. Write a c++ program for List of odd numbers
2. Write a c++ program for Sum of N numbers
3. Write a c++ program for List of factorial values
4. Write a c++ program to print individual Digit to words
5. Write a c++ program for Pascal triangle
6. Write a c++ program to check a given number is Prime or not
7. Write a c++ program for Sum of square of N numbers
8. Write a c++ program for calculating Power value
9. Write a c++ program for Demo for break & continue

Classes & Object

1. Write a c++ program for simple Pay bill preparation
2. Write a c++ program for Invoice bill generation
3. Write a c++ program for preparing Student mark statement
4. Write a c++ program for finding Cube value using inline function
5. Write a c++ program for deriving Multiplication table
6. Write a c++ program for the demo of Constructor & destructor
7. Write a c++ program for sum of two objects using Friend function

Polymorphism

1. Write a c++ program for Function overloading process
2. Write a c++ program for unary Operator overloading process
3. Write a c++ program for Binary operator overloading Process

Inheritance

1. Write a c++ program for Single inheritance
2. Write a c++ program for hybrid inheritance

File

1. Write a c++ program for File creation and to list the file content
2. Write a c++ program for File manipulations

Course designers :

1. Mrs. M.Hemalatha
2. Ms. C.D.Balapriya

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DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those who joined in 2019 and after)

CourseCode	Course Title	Category	L	T	P	Credit
UIT19CL22	Structure Program Logic & Design Lab	Core Lab 4			3	2

L - Lecture

T - Tutorial

P – Practicals

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

Preamble

Defines the requirement of an algorithm and Program Logics. Describes the flowchart objects and its advantages and limitations. Demonstrate the states involved in designing a flow chart for a program.

Course Outcomes

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

#	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO1	Prepare the algorithm for program logic.	K1,K2
CO2	Draw the Flow Chart object with description.	K2,K3
CO3	Design new flow diagram for the given program logic.	K1,K3
CO4	Demonstrate the working logic of program through flow chart.	K1,K2

K1 - Knowledge

K2 - Understand

K3 –Apply

Mapping of COs with POs

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

(S – Strong , M – Medium , L – Low)

Sl. No.	Topic
1	General Approaches in Algorithm Design
2	Writing simple Logics using Algorithm.
3	Expressing Algorithms, Analysis of Algorithms
4	Drawing Flowcharts to Programming Logic using Flow Chart Tools
5	Advantages of Using Flowcharts, Limitations of Using Flowcharts
6	When to Use Flowcharts, Flowchart Symbols & Guidelines, Types of Flowcharts
7	Program Design
8	Activities involved in Program Design
9	Object-Oriented Formulations
10	Verification of stateinvolved in Flow Chart Design.

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DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those who joined in 2019 and after)

CourseCode	Course Title	Category	L	T	P	Credit
UIT19C31	Data Structure	Core 5	4	1	0	4

L - Lecture

T - Tutorial

P-Practicals

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

Preamble

To enable the implement learned algorithm design techniques and data structures to solve problems and obtain the basic abilities to analyze algorithms and to determine algorithm's time efficiency.

Course Outcomes

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

#	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO1	Explain the data structure and concepts of arrays, Linked lists and how to implement the above.	K1,K2
CO2	Demonstrate the stack, queue and implement the operations in various queue structures	K1,K2
CO3	Implement the concept of Trees and its operations and merging concepts	K1,K2
CO4	Operate out the various graph representation and its types.	K1,K2,K3
CO5	Compute the algorithm for critical sortings in large arrays and their implementation.	K1,K2,K3

K1 - Knowledge

K2 - Understand

K3 – Apply

Mapping of Cos with POs

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

(S – Strong, M – Medium, L – Low)

Blooms taxonomy

	CA		End of Semester
	First	Second	
<i>Knowledge-K1</i>	40%	40%	40%
<i>Understand-K2</i>	40%	40%	40%
<i>Apply-K3</i>	20%	20%	20%
<i>Total marks</i>	52	52	140

Data Structure

UNIT – I : Introduction

15 hours

Definitions – Concept of Data Structures – Overview of Data Structures –Implementation of Data Structures. Arrays: Definition – Terminology – One-Dimensional Array – Multi-Dimensional Arrays – Pointer Arrays. Linked Lists: Definition – Single Linked List –Circular Linked List – Double Linked List – Circular Double Linked List.

UNIT – II : Stacks

15 hours

Introduction – Definition – Representation of a Stack – Operations on Stacks. Queues: Introduction - Definition – Representation of Queues – Various Queue Structures.

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 Binary Trees. Types of Binary Trees-Binary Search Tree.

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 – Heap Sort – Merge Sort – Quick Sort- Sorting Large Structures – Bucket Sort.

Text Books:

1. D.Samanta,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

UNIT	Chapter /Sections
I	Book 1: 1,2, 3(3.1 to 3.5)
II	Book 1: 4(4.1 to 4.4),5 (5.1 to 5.4)
III	Book 1: 7 (7.1 to 7.4), 7.5 (7.5.2)
IV	Book 1: 8 (8.1 to 8.4)
V	Book 2: 7(7.1, 7.2, 7.4, 7.5, 7.6 ,7.7, 7.8, 7.10)

Reference Books:

1. Thomas H. Carman, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein 2009, "Introduction to Algorithms", 3rd Edition, U.S.A.
2. Robert L. Krus, Bruce P. Leung, Glovies L. Tondo, 1996, "Data Structures and Program Design in C", Pearson, 2nd Edition.

Course Designers:

1. M.Hemalatha C.D.Balapriya

Lecture Schedule

Chapter/ Section	Topic	Lecture hours
1.	Introduction :	15
1.1	Definitions – Concept of Data Structures – Overview of Data Structures – Implementation of Data Structures	5
1.2	. Arrays: Definition – Terminology – One-Dimensional Array – Multi-Dimensional Arrays – Pointer Arrays.	5
1.3	Linked Lists: Definition – Single Linked List – Circular Linked List – Double Linked List – Circular Double Linked List.	5
2.	Stacks :	15
2.1	Introduction – Definition – Representation of a Stack – Operations on Stacks.	8
2.2	Queues: Introduction - Definition – Representation of Queues – Various Queue Structures.	7
3.	Trees:	15
3.1	Basic Terminologies-Definition and Concepts- Representation of Binary Trees .	5
3.2	Operations on a Binary a Binary Tree-Insertion-Deletion-Traversal-Merging together Two Binary Trees.	5
3.3	Types of Binary Trees-Binary Search Tree.	5
4.	Graphs :	15
4.1	Introduction – Graph Terminologies – Representation of Graphs	5
4.2	Set Representation- Linked Representation – Matrix Representation –	5
4.3	Operations on Graphs.	5
5.	Sorting :	15
5.1	Preliminaries-Insertion Sort -Shell Sort – Heap Sort	5
5.2	Merge Sort – Quick Sort	5
5.3	Sorting Large Structures – Bucket Sort.	5
Total(15+15+15+15+15)		75

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DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those who joined in 2019 and after)

CourseCode	Course Title	Category	L	T	P	Credit
UIT19C32	Relational Database Management Systems	Core-6	4	1	0	4

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 ER model, Normalization and PL/SQL concepts.

Course Outcomes

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

#	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO1	Define Entity Relationship model, types of data models and difference between File System and Database System	K1,K2
CO2	Illustrate the basic concepts of Relations, Domains, Architecture of System R and Oracle.	K1,K2
CO3	Relate the normalization concepts, how to implement normalization in order to Create tables in Oracle. To make use of DDL, DML and SQL commands, Views in Structured Query Language and Triggers.	K1,K2,K3
CO4	Develop PL/SQL block structure, Loops, Relational Algebra, Concurrency Control and Automatic Recovery.	K1,K2,K3
CO5	Demonstrate the Features of Good Relational Designs – Atomic Domains & First Normal - Decomposition using Functional Dependencies - Decomposition using Multivalued Dependencies	K1,K2

K1 - Knowledge

K2 - Understand

K3 - Apply

Mapping of COs with POs

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

Blooms taxonomy

	CA		End of Semester
	First	Second	
<i>Knowledge-K1</i>	40%	40%	40%
<i>Understand-K2</i>	40%	40%	40%
<i>Apply-K3</i>	20%	20%	20%
<i>Total marks</i>	52	52	140

Relational Database Management Systems**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.

UNIT II:**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.

UNIT III:**16 hours**

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

UNIT IV:**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.

UNIT V:**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 Private Ltd.
2. Abraham Silberschatz, Henry F.Korth, S.Sudarshan, Reprint 2016, Database System Concepts, 6th Edition, McGraw Hill Education, New Delhi.

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. Henry F.Korth, 2005, Database System & Concepts, McGraw Hill, New Delhi.

2. Bob Bryla, Kevin Loney, 2014, Oracle Database 12c The Complete Reference, McGraw Hill, New Delhi.

Web Resources:

1. www.studytonight.com

Course Designers:

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

Lecture Schedule

Chapter/ Section	Topic	Lecture hours
1.1	Introduction: Flat file – Database System – Database – Actionable for DBA. The Hierarchical Approach –	4
1.2	The Entity Relationship Model: Introduction – The Entity Relationship Diagram.	4
1.3	Data Models: Introduction – Relational Approach	4
1.4	The Network Approach.	4
2.1	Storage Structure: Introduction – File organization and addressing schemes.	4
2.2	Relational Data Structure: Introduction Relations – Domains.	6
2.3	Architecture of System R and Oracle: Introduction Architecture of System R.	4
3.1	Normalization: Introduction- Normalization – Purpose of Normalization – Definition of Functional Dependence – Normal Forms	4
3.2	Structured Query Language: Features of SQL – Select SQL Operations	4
3.3	Grouping the output – Querying from multiple tables – Retrieval using set operators View creation	4
3.4	Nested Queries – TSQL – Triggers and Dynamic Execution: Introduction – Transact SQL.	4
4.1	Procedure Language – SQL: Introduction – PL/SQL Block Structure – PL/SQL Tables: Automatic Recovery and Backup – Backup Techniques - Advanced Backup Techniques.	4
4.2	Relational Algebra and Relational Calculus: Introduction Algebraic Operations.	4
4.3	Concurrency Control and automatic recovery: Row level Locks.	4
4.4	Advanced Backup Techniques.	4
5.1	Relational Data base Design: Features of Good Relational Designs – Atomic Domains & First Normal.	5
5.2	Decomposition using Functional Dependencies.	5
5.3	Decomposition using Multivalued Dependencies.	5
Total		75

THIAGARAJAR COLLEGE, MADURAI- 9

(An Autonomous Institution, affiliated to Madurai Kamaraj University)

DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those who joined in 2019 and after)

CourseCode	Course Title	Category	L	T	P	Credit
UIT19CL31	Data structure using C lab	Core Lab 5	0	0	3	2

L - Lecture

T - Tutorial

P – Practicals

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

Preamble

To learn a programming language and train to Design and analyze time and space efficiency of the data structure and Gain knowledge in practical applications of data structure.

Course Outcomes

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

#	Course Outcome	Knowledge Level
CO1	Demonstrate the concepts of arrays linked list programs	K1,K2
CO2	Implement stack and queue operation in a C programs	K2,K3
CO3	Compute the concept of trees and its types in various programs.	K2,K3
CO4	Implement the concepts of graphs and operation.	K1,K3
CO5	Create a coding for large array sorting in different types	K1,K3

K1 - Knowledge

K2 - Understand

K3 - Apply

Mapping of COs with Pos

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

(S – Strong , M – Medium , L – Low)

Data structure Programs

1. Write a C program to search an element in a two dimensional array
2. Using iteration and recursion concepts write programs for finding the element in the array using the Binary search method.
3. Write a C program to perform Binary tree operations.
4. Write a C program to implement Queue and perform Queue operations using an Array.
5. Write a C program to implement Stack and perform Stack operations using linked list.
6. Write a C program to create a Linked List and perform operations such as insert, delete, update.
7. Write a C program to implement Bubble Sort.
8. Write a C program to implement Shell Sort.
9. Write a C program to implement Quick Sort.
10. Write a C program to implement Merge Sort.
11. Write a C program to simulate various tree traversal techniques.

Course Designers:

1. Mrs. M.Hemalatha
2. MrsP.Praveena

THIAGARAJAR COLLEGE, MADURAI- 9

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DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those who joined in 2019 and after)

CourseCode	Course Title	Category	L	T	P	Credit
UIT19CL32	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

Offer wisdom on database definition, datamanipulation ,data control and to develop database with triggers, procedures and functions which implement security on the data.

Course Outcomes

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

#	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO1	Create table with various types of Keys.	K1,K2
CO2	Compute the various queries on DDL, DML and DCL.	K2,K3
CO3	Implement the concepts of procedure and functions.	K2,K3
CO4	Develop triggers and packages for data security	K1,K3

K1 - Knowledge

K2 - Understand

K3 - Apply

Mapping of COs with POs

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

(S – Strong , M – Medium , L – Low)

SQL

1. Implementation of queries for student Database
2. Implementation of queries for employee Database
3. Implementation of queries for employee & Department Database
4. Trigger, procedure & Function Creation.
5. Package Creation.
6. Drop command.

PL / SQL

1. Factorial of a Number
2. Check whether a number is prime or not
3. Fibonacci Series
4. Reversing the String
5. Swapping of two numbers
6. Odd or even number

Course Designers:

1. P. Praveena
2. C.D. Balapriya

THIAGARAJAR COLLEGE, MADURAI- 9

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DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those who joined in 2019 and after)

CourseCode	Course Title	Category	L	T	P	Credit
UIT19C41	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.

Course Outcomes

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

#	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO1	Define the operating system with its architecture and different types of system calls.	K1,K2
CO2	Describe the process concepts and illustrate the various scheduling algorithms.	K2,K3
CO3	Illustrate the critical section problems and the dead lock problems.	K1,K3
CO4	Explain the concept of memory management and the virtual memory management with various paging algorithms	K1,K2
CO5	Sketch out the various storage structures with different disk scheduling algorithms.	K1,K3

K1 - Knowledge

K2 - Understand

K3 – Apply

Mapping of COs with POs

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

(S – Strong , M – Medium , L – Low)

Blooms taxonomy

	CA		End of Semester
	First	Second	
<i>Knowledge-K1</i>	40%	40%	40%
<i>Understand-K2</i>	40%	40%	40%
<i>Apply-K3</i>	20%	20%	20%
<i>Total marks</i>	52	52	140

Operating System

Unit I: 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.

Unit II: 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.

Unit III: 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 Dead lock.

Unit IV: 15 hours

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

Unit V: 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.

Text Books:

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. Harvey M. Deitel, 2002, Operating Systems, 2nd Edition, Pearson Education Pvt. Ltd.,
2. William Stallings, Fourth Impression 2016, Operating System, , 7th Edition, Pearson
3. Pradeep K. Sinha, 2007, Distributed Operating Systems, PHI Learning Private Limited.

Web Resources:

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

Course Designers:

1. Mrs. P. Praveena
2. Ms. C.D. Balapriya

Lecture Schedule

Chapter/ Section	Topic	Lecture hours
1.1	Introduction: What Operating Systems Do - Computer-System Organization – Computer. User and Operating Interface - System calls	4
1.2	System Architecture - Operating System Structure - Operating System Operations.	4
1.3	System Structures: Operating - System Services -	3
1.4	Types of System calls - System Programs.	3
2.1	Process Management: Process Concept – Process Scheduling – Operation on Processes	5
2.2	Inter- process communication – Process Scheduling: Basic concepts – Scheduling Criteria	5
2.3	Scheduling Algorithms – Multiple Processor Scheduling –Real-time CPU Scheduling.	5
3.1	Synchronization: The Critical Section Problem – Synchronization Hardware – Semaphores	4
3.2	classic problems of synchronization – Monitors. Deadlocks: Dead lock characterization	4
3.3	Methods for handling Dead locks – Dead lock prevention	4
3.4	Dead lock avoidance – Dead Lock detection - Recovery from Dead lock.	4
4.1	Memory Management: Memory Management Strategies - Swapping - Contiguous Memory Allocation	3
4.2	Segmentation – Paging	4
4.3	Virtual Memory Management: Demand Paging	4
4.4	Page replacement	4
5.1	Storage Management: File System - File Concept. Implementing File Systems: File System structure- File system implementation	5
5.2	Directory implementation, Allocation Methods.	5
5.3	Mass Storage Structure :Disk structure – Disk scheduling – Disk Management.	5
	Total	75

THIAGARAJAR COLLEGE, MADURAI- 9

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DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those who joined in 2019 and after)

CourseCode	Course Title	Category	L	T	P	Credit
UIT19C42	Java Programming	Core 8	4	1		4
		L - Lecture	T - Tutorial	P – Practicals		

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

Preamble

This course guide to the Java language, describing its syntax, keywords, and fundamental programming principles. Significant portions of the Java API library and Java programming environment. To implement logic and improvements in the art of programming

Course Outcomes

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

#	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO1	Classify and apply the core programming Logics	K1,K3
CO2	State the reason of inheritance, concurrency, and usage of packages and interfaces	K1,K2
CO3	Handle Exception Cases in java programming and to perform multithreading	K1,K2
CO4	Perform enumerations, autoboxing, and string manipulation.compute the method of Java's wrappers	K1,K2
CO5	Design a Graphical user interfaces using AWT Controls, Layout Managers, and Menus in Applet Programming	K1,K3

K1 - Knowledge

K2 - Understand

K3 – Apply

Mapping of COs with POs

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

(S – Strong , M – Medium , L – Low)

Blooms taxonomy

	CA		End of Semester
	First	Second	
<i>Knowledge-K1</i>	40%	40%	40%
<i>Understand-K2</i>	40%	40%	40%
<i>Apply-K3</i>	20%	20%	20%
<i>Total marks</i>	52	52	140

Java Programming

Unit I:

13 hours

The History and Evolution of Java: Java's Lineage-The Creation of Java-How Java Changed the Internet-Java's Magic: The Bytecode - Servlets: Java on the Server Side-The Java Buzzwords-The Evolution of Java. **An Overview of Java:** Object-Oriented Programming-Two Control Statements-Using Blocks of Code-Lexical Issues-The Java Class Libraries. **Data Types, Variables, and Arrays:** Java Is a Strongly Typed Language-The Primitive Types-Integers-Floating-Point Types-Characters-Booleans-A Closer Look at Literals Variables-Type Conversion and Casting-Automatic Type Promotion in Expressions-Arrays. **Operators:** Arithmetic Operators-The Bitwise Operators-Relational Operators-Boolean Logical Operators-The Assignment Operator-The ? Operator-Operator Precedence. **Control Statements:** Java's Selection Statements-Iteration Statements-Jump Statements. **Introducing Classes:** Class Fundamentals-Declaring Objects-Assigning Object Reference Variables-Introducing Methods-Constructors-The this Keyword-Garbage Collection-The finalize() Method-A Stack Class.

Unit II:

17 hours

Inheritance: Inheritance Basics- Using super-Creating a multilevel Hierarchy-When constructor called--Method overriding-Dynamic method dispatch-Using Abstract classes-using final with inheritance. **Packages and Interfaces:** Packages - Access protection-Importing packages-interfaces-Default Interface Methods-Use static Methods in an Interface.

Unit III:

18 hours

Exception Handling: Exception Handling Fundamentals- Exception Types- Uncaught Exceptions- Using try and catch - Multiple catch Clauses-Nested try Statements-throw-throws-finally-Java's Built-in Exceptions-Creating Your Own Exception Subclasses-Chained Exceptions-Three Recently Added Exception Features-Using Exceptions. **Multithreaded Programming:** Java Thread Model-The Main Thread-Creating a Thread-Creating Multiple Threads-Using isAlive() and join()- Thread Priorities - Synchronization-Interthread Communication-Suspending, Resuming and Stopping Threads-Obtaining A Thread's State -Using Multithreading.

Unit IV:

12 hours

Enumerations, Autoboxing: Enumerations- Type Wrappers – Autoboxing. **String Handling:** String Constructors - String Length –Special String Operations -Character Extraction-String Comparison-Searching Strings-Modifying a String-Date Conversion Using ValueOf() -

Unit V:

15 hours

The Applet Class :Two Types of Applets - Applet Basics-Applet Architecture -An Applet Skeleton-Simple Applet Display Methods-Requesting Repainting -Using the Status Window-The HTML APPLET Tag-Passing Parameters to Applets. **Introducing the AWT - Working with Windows, Graphics, and Text:** AWT Classes-Window Fundamentals -Working with Frame Windows-Creating a Frame Window in an AWT-Based Applet-Creating a Windowed Program-Displaying Information Within a Window-Introducing Graphics. **Using AWT Controls, Layout Managers, and Menus:**AWT Control-Labels-Using-Applying Check Boxes CheckboxGroup-Choice Controls-Using Lists-Managing Scroll Bars-Using a TextField-Using a TextArea-Understanding Layout-Menu Bars and Menus.

Text Books:

1. Herbert Schildt, 2014, Java The Complete Reference, Ninth Edition, Oracle Press,New Delhi.

Unit	Chapters/Section
I	1, 2, 3,4,5,6.
II	8, 9.
III	10, 11.
IV	12(page 263 – page 279),16,17(page 441-page 458).
V	23 (page 747 – page 763), 25(page 797 – page 815) , 26 (page 863 –page 870).

References:

1. Bruce Eckel, 2000, *Thinking in Java*, Pearson Education Asia, 2nd Edition.
2. Patric Naughton, *JavaHand Book*, TataMcgraw Hill, New Delhi

Course Designers:

1. Mr. S. Kumarappan.
2. Ms.C.D.Balapriya

Lecture Schedule

Chapter/ Section	Topic	Lecture hours
1	The History and Evolution of Java: Java's Lineage-The Creation of Java-How Java Changed the Internet-Java's Magic: The Bytecode - Servlets: Java on the Server Side-The Java Buzzwords-The Evolution of Java.	2
1.1	Java on the Server Side-The Java Buzzwords-The Evolution of Java.	2
1.2	Overview of Java:	2
1.3	Data Types, Variables, and Arrays: Java Is a Strongly Typed Language-The Primitive Types-Integers-Floating-Point Types-Characters-Booleans-A Closer Look at Literals Variables-Type Conversion and Casting-Automatic Type Promotion in Expressions-Arrays.	2
1.4	Operators	2
1.5	Control Statements: Introducing Classes:	3
2	Inheritance: Inheritance Basics- Using super-Creating a multilevel Hierarchy-When constructor called	4
2.1	Method overriding-Dynamic method dispatch - Using Abstract classes-using final with inheritance.	4
2.2	Packages and Interfaces: Packages - Access protection-Importing packages	4
2.3	Interfaces-Default Interface Methods-Use static Methods in an Interface.	5
3	Exception Handling: Exception Handling Fundamentals-Exception Types- Uncaught Exceptions- Using try and catch	4
3.1	Multiple catch Clauses-Nested try Statements-throw-throws-finally-Java's Built-in Exceptions	4
3.2	Creating Your Own Exception Subclasses-Chained Exceptions-Three Recently Added Exception Features-Using Exceptions.	4
3.3	Multithreaded Programming: Java Thread Model-The Main Thread-Creating a Thread-Creating Multiple Threads-Using <code>isAlive()</code> and <code>join()</code> - Thread Priorities - Synchronization	6
4.	Enumerations, Autoboxing: Enumerations- Type Wrappers – Autoboxing.	3
4.1	String Handling: String Constructors - String Length – Special String Operations -Character Extraction-String Comparison-Searching Strings-Modifying a String	6
4.2	String Buffer - String Builder. Assertions	3

5	The Applet Class : Two Types of Applets - Applet Basics	4
5.1	Introducing the AWT - Working with Windows, Graphics, and Text: AWT Classes-Window Fundamentals - Working with Frame Windows-Creating a Frame Window in an AWT-Based Applet-Creating a Windowed Program-Displaying Information Within a Window	4
5.2	Introducing Graphics. Using AWT Controls, Layout Managers, and Menus: AWT Control-Labels-Using-Applying Check Boxes CheckboxGroup-Choice Controls	3
5.3	Using Lists-Managing Scroll Bars-Using a TextField-Using a TextArea-Understanding Layout-Menu Bars and Menus.	4
	Total	75

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DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those who joined in 2019 and after)

CourseCode	Course Title	Category	L	T	P	Credit
UIT19CL41	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	Knowledge Level (according to Bloom's Taxonomy)
CO1	Identify the structure and syntax, Executethe basic commands to handle files and directory.	K1,K2
CO2	Handle 'vi' editor and Create text files and to test them with various commands (grep, wc)	K1,K2
CO3	Demonstrate the shell scripts writing using arithmetic and logical operators.	K2,K3
CO4	Write shell scripts to control the operating system using various control constructs (if, while, for).	K2,K3

K1 - Knowledge

K2 - Understand

K3 – Apply

Mapping of COs with POs

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

(S – Strong , M – Medium , L – Low)

Commands:

1. Execution of various file/directory handling commands.
2. Execution of various list commands.
3. Execution of various date commands.
4. Execution of various calendar commands.
5. Execution of various grep commands.
6. Execution of various word count(wc) commands.

Shell scripts:

1. Shell script to find the biggest among given three numbers.
2. Simple shell script for basic arithmetic and logical calculations.
3. Shell scripts to check various attributes of files and directories.
4. Shell scripts to perform various operations on given strings.
5. Shell scripts to explore system variables such as PATH, HOME etc.
6. Shell scripts to check and list attributes of processes.
7. Execution of various system administrative commands.
8. Write awk script that uses all of its features.
9. Use sed instruction to process /etc/passwd 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 temporary files.
12. Write a shell script to search an element from an array using binary searching.

Course Designers:

1. P. Praveena
2. C.D. Balapriya

THIAGARAJAR COLLEGE, MADURAI- 9

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DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those who joined in 2019 and after)

CourseCode	Course Title	Category	L	T	P	Credit
UIT19CL42	Java Programming Lab	Core Lab 8			4	2

L - Lecture

T - Tutorial

P – Practicals

Year	Semester	Max. Marks CA	Max. Marks SE	Total
II	IV	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 through problem analysis assignments. Apply the Java Swings for designing GUI applications.

Course Outcomes

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

#	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO1	Implement Object Oriented programming concept using basic syntaxes of control Structures.	K1,K2
CO2	Demonstrates how to achieve reusability using inheritance, interfaces and packages	K2,K3
CO3	Demonstrate understanding and use of different exception handling mechanisms and concept of multithreading for robust.	K1,K3
CO4	Identify, Design & develop complex Graphical user interfaces using principal Java Swing classes.	K1,K3

K1 - Knowledge

K2 - Understand

K3 – Apply

Mapping of COs with POs

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

(S – Strong , M – Medium , L – Low)

Lab Schedule

SI. No	Topic
1	Program to define a class, describe its constructor, overload the Constructors and instantiate its object.
2	Program to create Arrays and vectors
3	
4	Work with strings using String, String Buffer and String Builder classes.
5	Program to implement Vector class and its methods
6	Program to implement Wrapper classes and their methods
7	Program to implement inheritance and demonstrate use of method overriding
8	Program to demonstrate use of implementing interfaces
9	Program to implement the concept of importing classes from user defined package and creating packages.
10	Program to implement the concept of threading by extending Thread Class
11	Program to implement the concept of threading by Runnable Interface.
12	Program to implement the concept of Exception Handling using predefined exception
13	Program to implement the concept of Exception Handling by creating user defined exceptions.
14	Program using Applet for configuring Applets by passing parameters
15	Java Program to demonstrate Graphics class, Swing classes.
16	Java Program to demonstrate keyboard event ,mouse events and other events.

Course Designers:

1. MrsP. Praveena
2. MrS.Kumarappan

THIAGARAJAR COLLEGE, MADURAI- 9

(An Autonomous Institution, affiliated to Madurai Kamaraj University)

DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those who joined in 2019 and after)

CourseCode	Course Title	Category	L	T	P	Credit
UIT19AI41	Quantitative Aptitude	Allied 4	5	0	0	5

L - Lecture

T - Tutorial

P – Practicals

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

Preamble

This course requisite for clearing any competitive exam. Quantitative Aptitude skills form the bulk of most of the graduate level papers. An exhaustive coverage of all the Quantitative Aptitude topics and an in-depth understanding of this subject.

Course Outcomes

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

#	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO1	Depict the basic concepts of numbers, Decimal fractions and simplifications	K1, K2
CO2	Convert the problems into profit & Loss, Time & Work and Distance	K1, K2
CO3	Practise the problems on trains and compute the probability	K2, K3
CO4	Outline the Tabulation, Bar graphs, Pie charts and Line graphs	K2, K3
CO5	Justify the simple Interest compound Interest and select the Odd man out and permutations .	K2, K3

K1 - Knowledge

K2 - Understand

K3 – Apply

Mapping of COs with POs

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

(S – Strong , M – Medium , L – Low)

Blooms taxonomy

	CA		End of Semester
	First	Second	
<i>Knowledge-K1</i>	40%	40%	40%
<i>Understand-K2</i>	40%	40%	40%
<i>Apply-K3</i>	20%	20%	20%
<i>Total marks</i>	52	52	140

Quantitative Aptitude

Unit I: **15 hours**

Numbers, HCF & LCM of Numbers, Decimal Fractions, Simplification, Problems on Ages

Unit II: **15 hours**

Percentage, Profit & Loss, Ratio & Proportion, Time & Work, Time & Distance.

Unit III: **15 hours**

Pipes & Cistern, Alligation or Mixture, Problems on Trains, Probability

Unit IV: **15 hours**

Data Interpretation: Tabulation, Bar Graphs, Pie Charts, Line Graphs

Unit V: **15 hours**

Simple Interest , Compound Interest, Calendar, Odd man out & Series, Permutations & Combinations.

Text Books:

1. Aggarwal . R.S., 2016. Quantitative Aptitude For Competitive Examinations (Fully solved) As Per New Examination Pattern 7th Revised edition, S. Chand & Company Pvt Ltd, New Delhi.

Unit	Chapters/ Section
I	Book1: 1, 2, 3, 4, 8
II	Book1: 10, 11, 12, 15, 17
III	Book1: 16, 18, 20, 31
IV	Book1:36, 37, 38, 39
V	Book1: 21, 22, 27, 30,35,

References:

1. Abhijit Guha, 2014, Quantitative Aptitude For Competitive Examinations, 5th edition, Tata McGraw – Hill Publications, New Delhi.
2. Sijwali BS, InduSijwali, 2014. A New Approach to Reasoning Verbal & Non-Verbal Paperback ,Arihant Publication

Course Designers:

1. Mrs. M.Hemalatha
2. Mrs. P.Praveena

Lecture Schedule

Chapter/ Section	Topic	Lecture hours
1.1	Numbers	3
1.2	HCF & LCM of numbers	3
1.3	Decimal fractions	3
1.4	Simplifications	3
1.5	Problems on ages	3
2.1	Percentage	3
2.2	Profit & loss	3
2.3	Ratio and proportions	3
2.4	Time and work	3
2.5	Time and distance	3
3.1	Pipes and cistern	4
3.2	Alligation & mixture	4
3.3	Problems on trains	4
3.4	Probability	3
4.1	Data interpretation	3
4.2	Tabulation	3
4.3	Bar graphs	3
4.4	Pie charts	3
4.5	Line graphs	3
5.1	Simple interest	3
5.2	Compound interest	3
5.3	Calendar	3
5.4	Odd man out & series	3
5.5	Permutations & combinations	3
	Total	75

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DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those who joined in 2019 and after)

CourseCode	Course Title	Category	L	T	P	Credit
UIT19C51	.Net Technology	Core 9	5		0	5
		L - Lecture	T - Tutorial	P – Practicals		

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

Preamble

Familiarize with .Net frame work and to promote skills to develop console, windows and web applications on C#.NET using Visual Studio IDE.

Course Outcomes

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

#	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO1	Depicts the basic concepts of .net frame work and specify the CLR with it's features.	K1,K2
CO2	Describes the C#.Net with Object Oriented View and it's various construct like loops, decision making, classes and objects	K2,K3
CO3	Discuss the various tools on window control category1,category2 and category3 with illustrative applications.	K2,K3
CO4	Handle file, graphics features of .Net and explain how to create user control.	K2,K3
CO5	Project the ADO.Net Architecture, it's advantages and explain the various classes to develop database connected applications.	K2,K3

K1 - Knowledge

K2 - Understand

K3 - Apply

Mapping of COs with POs

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

(S – Strong , M – Medium , L – Low)

Blooms taxonomy

	CA		End of Semester
	First	Second	
<i>Knowledge-K1</i>	40%	40%	40%
<i>Understand-K2</i>	40%	40%	40%
<i>Apply-K3</i>	20%	20%	20%
<i>Total marks</i>	52	52	140

.Net Technology

Unit I: 14 hours

Overview of .Net Framework: .NET Features – The Common Language Runtime (CLR) – The .NET Framework class Library – The Common Type System – Visual Studio .NET IDE 2005.
Windows Forms: Window Forms Fundamentals – Windows MDI Forms – Creating Dialog boxes – Adding Controls to Forms – Handling Events.

Unit II: 16 hours

Decision Making and Branching – Decision making and Looping, Methods in C#, Handling array, Structures and Enumerations – Class and Objects.

Unit III: 15 hours

Windows controls – Category 1: the control class – Text boxes – Rich Text Boxes – Labels – Buttons. **Windows controls – Category 2:** Checkboxes – Radio Button – List Boxes – Combo boxes.

Windows controls – Category 3: Picture Boxes – Scroll Bars – Timers.

Unit IV: 15 hours

Advanced Windows Programming:Graphics Handling, File Handling: The File stream Class – Using stream Writer class, Binary Writer class, Binary Reader class – The file and directory classes. **User Controls:** Creating User Controls, Adding properties, methods, events, Using the ScrollableControl Class, ContainerControl class, Using System,Windows,Forms, UserControl class.

Unit V: 15 hours

Data Access with ADO.NET: ADO.NET Architecture – Advantages – ADO.NET Objects.
Handling Database in Code: Connection class – Command class – Data Adapter – The Dataset class – Data Reader class – The data table class – The data Row class – The data column class – Data Relation class.

Text Books:

1. J.G.R. Sathiaseelan, N. Sasikaladevi, 2009, Programming with C#.NET, PHI Learning Private Limited, New Delhi.
2. E. Balagurusamy, Reprint 2010, Programming in C# a primer,

Unit	Chapters
I	Book1: 1.1 to 1.6, 2.1 to 2.5
II	Book2: 6,7,8,11,12
III	Book1: 3.1 to 3.4 , 3.6 4.1, 4.2, 4.5 ,4.7,5.1, 5.2, 5.8
IV	Book1: 7.1, 7.2 , 7.3
V	Book1: 8.1 to 8.3,9.1 to 9.9

Web Resources:

1. www.w3schools.com/html
2. https://www.tutorialspoint.com/html/html_basic_tags.htm
3. https://developer.mozilla.org/en-US/docs/Learn/Getting_started_with_the_web/HTML_basics

Course Designers:

1. Ms. C.D. Balapriya
2. Mrs. P. Praveena

Lecture Schedule:

Chapter/ Section	Topic	Lecture hours
1.1	Overview of .Net Framework: .NET Features – The Common Language Runtime (CLR) – The .NET Framework class Library.	5
1.2	The Common Type System – Visual Studio .NET IDE 2005. Windows Forms: Window Forms Fundamentals.	5
1.3	Windows MDI Forms – Creating Dialog boxes – Adding Controls to Forms – Handling Events.	4
2.1	Decision Making and Branching – Decision making and Looping.	6
2.2	Methods in C#, Handling array	4
2.3	Structures and Enumerations – Class and Objects.	6
3.1	Windows controls – Category 1: the control class – Text boxes – Rich Text Boxes – Labels – Buttons.	5
3.2	Windows controls – Category 2: Checkboxes – Radio Button – List Boxes – Combo boxes.	5
3.3	Windows controls – Category 3: Picture Boxes – Scroll Bars – Timers.	5
4.1	Advanced Windows Programming: File Handling: The File stream Class – Using stream Writer class.	3
4.2	User Controls: Binary Writer class, Binary Reader class – The file and directory classes.	4
4.3	Creating User Controls, Adding properties, methods, events.	4
4.4	Using the ScrollableControl Class, ContainerControl class, Using System,Windows,Forms, UserControl class.	4
5.1	Data Access with ADO.NET: ADO.NET Architecture – Advantages – ADO.NET Objects.	5
5.2	Handling Database in Code: Connection class – Command class – Data Adapter.	5
5.3	The Dataset class – Data Reader class – The data table class – The data Row class – The data column class – Data Relation class.	5

THIAGARAJAR COLLEGE, MADURAI- 9

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DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those who joined in 2019 and after)

(For those joined B.Sc IT on or after June 2017)

CourseCode	Course Title	Category	L	T	P	Credit
UIT19C52	Mobile Application Development	Core - 10	4	1	0	4
	L - Lecture	T - Tutorial	P - Practicals			

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

Preamble

To learn the characteristics, development of Android applications, User Interface in applications and working with Graphics, Animations, Audio and Video.

Course Outcomes

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

#	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO1	Define Android Applications, Download and Install Android, Work in development environment and to execute the First Android Application.	K1,K2,K3
CO2	Explain the basic concepts of using Activities, Fragments and Intents in Android, to invoke Built-in Applications and working with User Interface Using Views and ViewGroups.	K1,K2,K3
CO3	Work with User Interface to handle Pictures and Menus, how to use the AnalogClock and DigitalClock Views, to embed Web Browser in an Activity and also to notify to the User.	K1,K2,K3
CO4	Store the Data Persistently, Internal and External Storage, Working with Graphics and Animations.	K1,K2
CO5	Work with Graphics and Animations, Audio, Video and Camera.	K1,K2

K1 - Knowledge

K2 - Understand

K3 - Apply

Mapping of COs with POs

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

(S – Strong , M – Medium , L – Low)

	CA		End of Semester
	First	Second	
<i>Knowledge-K1</i>	40%	40%	40%
<i>Understand-K2</i>	40%	40%	40%
<i>Apply-K3</i>	20%	20%	20%
<i>Total marks</i>	52	52	140

Mobile Application Development**UNIT I****14 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.

UNIT II**15 hours**

Using Activities, Fragments and Intents in Android : Working with Activities – Using Intents – Fragments – Using the Intent Object to Invoke Built-in Application. **Working with User Interface Using Views and ViewGroups :** Working with ViewGroups – Working with Views – Binding Data with the AdapterView Class.

UNIT III**17 hours**

Working with User Interface Using Views and ViewGroups : Designing the AutoTextCompleteView – Implementing Screen Orientation – Designing the Views Programmatically – Handling UI Events – Specialized Fragments – Creating Menus. **Handling Pictures and Menus with Views :** Working with Image Views – Designing Context Menu for Image View – Using the AnalogClock and DigitalClock Views – Embedding Web Browser in an Activity – Notifying the User.

UNIT IV**14 hours**

Storing the Data Persistently : Introducing the Data Storage Options – Using the Internal Storage – Using the External Storage – Using the SQLite Database - Working with Content Providers – **Working with Graphics and Animations :** Working with Graphics – Using the Drawable Object – Using the ShapeDrawable Object.

UNIT V**15 hours**

Working with Graphics and Animations : Working with the NinePatchDrawable Graphics – Understanding the concept of Hardware Acceleration – Working with Animations. **Audio, Video and Camera** – Role of Media PlayBack – Using MediaPlayer – Recording and Playing Sound.

Text Books:

1. Pradeep Kothari ,2016,Android Application Development Black BOOK, dreamTech

UNIT	Chapter / Page Nos.
I	2 (50-74)
II	3(Pg:80-126),4 (Pg: 135-172)
III	4(Pg: 178-198) ,5(206-226)
IV	6(Pg:229-262), 9(Pg: 330-340)
V	9 (Pg: 343-351),10(Pg 362-375)

References:

1. [ZigurdMednieks, Laird Dornin, G. Blake Meike, Masumi Nakamura](#), 2012, Programming Android, 2nd edn, O'Reilly Media
2. Alasdair Allan:2010. "iPhone Programming", O'Reilly.
3. Wei-Meng Lee: 2010. "Beginning iPhone SDK Programming with Objective-C", Wrox Wiley.

Web Resources:

1. <http://developer.android.com/guide/components/activities.html> 6.

Course Designers:

1. Ms. C.D. Balapriya
2. Mrs. P. Praveena

Lecture Schedule

Chapter/ Section	Topic	Lecture hours
1.1	Getting an Overview of Android : Introducing Android	2
1.2	Discussing about Android Applications	2
1.3	The Manifest File	2
1.4	Downloading and Installing Android	3
1.5	Exploring the Development Environment	3
1.6	Developing and Executing the First Android Application.	2
2.1	Using Activities, Fragments and Intents in Android : Working with Activities	2
2.2	Using Intents	2

2.3	Fragments	2
2.4	Using the Intent Object to Invoke Built-in Application.	2
2.5	Working with User Interface Using Views and ViewGroups : Working with ViewGroups	3
2.6	Working with Views	2
2.7	Binding Data with the AdapterView Class.	2
3.1	Working with User Interface Using Views and ViewGroups : Designing the AutoTextCompleteView	2
3.2	Implementing Screen Orientation	2
3.3	Designing the Views Programmatically	2
3.4	Handling UI Events	1
3.5	Specialized Fragments	1
3.6	Creating Menus.	1
3.7	Handling Pictures and Menus with Views : Working with Image Views	2
3.8	Designing Context Menu for Image View	2
3.9	Using the AnalogClock and DigitalClock Views	2
3.10	Embedding Web Browser in an Activity	1
3.11	Notifying the User	1
4.1	Storing the Data Persistently : Introducing the Data Storage Options	2
4.2	Using the Internal Storage	2
4.3	Using the External Storage	2
4.4	Using the SQLite Database	2
4.5	Working with Content Providers	2
4.6	Working with Graphics and Animations : Working with Graphics	2
4.7	Using the Drawable Object	1
4.8	Using the ShapeDrawable Object.	1
5.1	Working with Graphics and Animations :Working with the NinePatchDrawable Graphics	3
5.2	Understanding the concept of Hardware Acceleration	2
5.3	Working with Animations.	3
5.4	Audio,Video and Camera	3
5.5	Role of Media PlayBack	2
5.6	Using MediaPlayer- Recording and Playing Sound.	2
Total		75

THIAGARAJAR COLLEGE, MADURAI- 9

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DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those who joined in 2019 and after)

CourseCode	Course Title	Category	L	T	P	Credit
UIT19C53	Software Engineering	Core - 11	4	1	0	4

L - Lecture

T - Tutorial

P - Practicals

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

Preamble

Build basic knowledge on software system development process, practices, techniques and to get awareness on software testing, software verification and validation.

Course Outcomes

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

#	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO1	Define software engineering, project, system and discuss various types of projects.	K1,K2
CO2	Depicts various cost estimation techniques with their pros and cons.	K1,K2
CO3	Sketch out the steps for system analysis with different techniques.	K2,K3
CO4	Prepare system design notations with various design techniques.	K1,K2
CO5	Describe System testing and its different types to verify and validate the software project.	K2,K3

K1 - Knowledge

K2 - Understand

K3 – Apply

Mapping of COs with POs

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

(S – Strong , M – Medium , L – Low)

Blooms taxonomy

	CA		End of Semester
	First	Second	
<i>Knowledge-K1</i>	40%	40%	40%
<i>Understand-K2</i>	40%	40%	40%
<i>Apply-K3</i>	20%	20%	20%
<i>Total marks</i>	52	52	140

Software Engineering

Unit -1:

15 hours

Introduction to Software Engineering: Some definitions – Some Size factors – Quality and Productivity Factors – Managerial issues–**Planning a Software project**-Defining the Problem – Developing a solution Strategy – Planning the development process – prototype model – Planning an Organizational Structure – Other planning activities.

Unit -II:

14hours

Software Cost Estimation: Software Cost factors – Software cost estimation Techniques- Expert Judgement – Delphi Cost Estimation – Work Break Down Structure- Algorithmic Cost Model – Staffing- level estimation -Estimating Software Maintenance Costs.

Unit -III:

15hours

Software Requirements Definition: The Software Requirements Specification – Formal Specification Techniques –Language and Processor for Requirement Specification: PSL / PSA – RSL / REVS – Structured Analysis and Design Technique(SADT) – Structured System Analysis (SSA) – GIST.

Unit -IV:

16-hours

Software Design: Fundamental Design Concepts: Abstraction – Information Hiding – Structure – Modularity – Concurrency – Verification – Aesthetics – Modules and modularizing Criteria – Coupling and Cohesion – Other Modularization Criteria – Design Notations: Data Flow Diagrams – Structure Charts – HIPO Diagrams – Procedure Templates – Pseudo code – Structured Flowchart -Structure English – Decision tables– Design Techniques – Detailed Design Consideration – Real time and distributed system design – test plan – milestones, walkthrough and Inspection .

Unit-V:

15 hours

Verification and validation Techniques: Quality assurance- walkthroughs and Inspections –static Analysis- symbolic Execution unit testing and debugging—system testing—formal verification.

Text Books:

Richard.E.Fairely, 2014 Reprint. Software Engineering Concepts, Tata McGraw – Hill Education Private Limited, New Delhi.

UNIT	CHAPTER/SECTIONS)
I	1(1.1-1.4),2(2.1—2.5)
II	3(3.1-3.4)
III	4(4.1—4.4)
IV	(5.1—5.8)
V	8(8.1—8.7)

References:

1. Ian Sommerville, 2015. Software Engineering , 9th edition, Pearson Indian Education Service Private Limited, Chennai.
2. Pankaj Jalote 2015, An Integrated Approach to Software Engineering, 3rd edition, Narosa Publishing House, New Delhi.
3. Roger S.Pressman, 2015. Software Engineering A Practitioner’s Approach, 7th edition, Tata McGraw – Hill Education Private Limited, New Delhi.

Web Resources:

1. www.w3schools.com/html
2. <https://developer.mozilla.org/en-US/docs/Learn/>

Course Designers:

1. Mrs. P. Praveena
2. Ms. C.D. Balapriya

Lecture Schedule:

Chapter/ Section	Topic	Lecture hours
1.1	Introduction to Software Engineering :Some definitions – Some Size factors- Quality and Productivity Factors – Managerial issues	3
1.2	Planning a Software project -Defining the Problem – Developing a solution Strategy – Planning the development process .	4
1.3	prototype model – Planning an Organizational Structure – Other planning activities.	4
2.1	Software Cost Estimation :Software Cost factors – Software cost estimation Techniques.	4

2.2	Expert Judgement – Delphi Cost Estimation – Algorithmic Cost Model -Work Breakdown Structures.	5
2.3	Staffing. level estimation -Estimating Software Maintenance Costs.	5
3.1	Software Requirements Definition : The Software Requirements Specification – Formal Specification Techniques –Language and Processor for Requirement Specification.	3
3.2	PSL / PSA – RSL / REVS – Structured Analysis and Design Technique(SADT).	3
3.3	Structured System Analysis (SSA) – GIST.	4
4.1	Software Design: Fundamental Design Concepts: Abstraction – Information Hiding – Structure – Modularity – Concurrency – Verification .	4
4.2	Aesthetics – Modules and modularizing Criteria – Coupling and Cohesion – Other Modularization Criteria – Design Notations: Data Flow Diagrams .	4
4.3	Structure Charts – HIPO Diagrams – Procedure Templates – Pseudo code – Structured Flowchart - structure English – Decision tables– Design Techniques	4
4.4	Detailed Design Consideration – Real time and distributed system design – test plan – milestones, walkthrough and Inspection .	3
5.1	Verification and validation Techniques: Quality assurance-walkthroughs and Inspections.	3
5.2	static Analysis- symbolic Execution unit testing and debugging.	3
5.3	system testing—formal verification.	4
	Total	75

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DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those who joined in 2019 and after)

CourseCode	Course Title	Category	L	T	P	Credit
UIT19CL51	.Net Technology Lab	Core Lab 9	0	0	6	2

L - Lecture T - Tutorial P – Practicals

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

Preamble

Familiarize with .Net frame work and train to develop console, windows and web applications on C#.NET using Visual Studio IDE.

Course Outcomes

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

#	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO1	Explain how to use Visual Studio IDE to develop different types of application such as console applications, windows applications, web applications and so on.	K1,K2
CO2	Describes the C#.Net with Object Oriented View and it's various construct like loops, decision making, classes and objects	K1,K3
CO3	Discuss the various tools on window control category1,category2 and category3 with illustrative applications.	K2,K3
CO4	Handle file ,graphics features of .Net and explain how to create user control.	K2,K3
CO5	Project the ADO.Net Architecture, it's advantages and explain the various classes to develop database connected applications.	K2,K3

K1 - Knowledge

K2 - Understand

K3 - Apply

Mapping of COs with POs

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

Net Technology Lab

1. Develop a Console application to check whether the given number is odd or even.
2. Develop a Console application to implement method over loading.
3. Develop a Console application to convert the decimal number to binary and vice versa.
4. Develop a Console application for constructor over loading.
5. Develop a Console application to count number of positives, negatives and zeros in an array
6. Develop a Console application for Bubble sort.
7. Develop a Console application for Matrix Addition.
8. Create a windows application that allows the user to enter a number in the text box named 'getnum'. Check 'getnum' is palindrome or not print the result in a label when the user clicks on a button.
9. Create a windows application which will ask the user to input his/her name and a message, display the two items concatenated in a label and change the format of the label using radio buttons and check boxes for selection, the user can make the labels' text bold, underlined or italic and change it's color. Include buttons to display the message in the label, clear the text boxes & label & exit.
10. Create a windows application which generates Fibonacci series in to a list box.
11. Create a windows application to add and delete items to and from the combo box.
12. Create a windows application to generate even numbers and odd numbers in separate list boxes.
13. Create a windows application for property implementation.
14. Create a windows application to set font style and font color using check boxes and radio buttons.
15. Create a windows application to check whether the given number is Armstrong or not.
16. Create a windows application to implement a word processor using Rich text box.
17. Create a MDI application to generate number of forms at runtime and arrange them using vertical and cascade layout.
18. Create a windows application to identify the scrollbar selection and the scrolling position.
19. Create a window application To display all the Employee records from the database using SQL source control & bind it to Grid view.
20. Create a window Application to Insert 5 records inside the SQL Database table having following fields, Dept _Id, Dept_Name, Emp_Name, Salary. Update the salary for as employee and perform delete operation on one record.

Course Designers:

1. P. Praveena
2. C.D. Balapriya

THIAGARAJAR COLLEGE, MADURAI- 9

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DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those who joined in 2019 and after)

CourseCode	Course Title	Category	L	T	P	Credit
UIT19CL52	Mobile Application Development Lab	Core Lab-10	0	0	5	2

L - Lecture T - Tutorial P - Practicals

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

Preamble

To develop an Mobile application that uses GUI Components, Fonts ,Colors,LayoutManagers,Event Listeners and makes use of database.

Course Outcomes

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

#	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO1	Create the project on Eclipse IDE , Android Studio and SDK tools	K1,K2
CO2	Buid an application using GUI Components, Fonts ,Colors,LayoutManagers,Event Listeners	K1,K3
CO3	Connect Database and Maintain datas	K2,K3
CO4	Develop a mobile applications for the end user needs	K2,K3

K1 - Knowledge

K2 - Understand

K3 – Apply

Mapping of COs with POs

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

(S – Strong , M – Medium , L – Low)

Mobile Application Development

1. Develop an application that uses GUI components, Font and Colors.
2. Develop an application that uses Layout Managers and event listeners.
3. Develop a native calculator application.
4. Write an application that draws basic graphical primitives on the screen.
5. Develop an application that makes use of database.
6. Develop an application that makes use of RSS Feed.
7. Implement an application that implements Multi threading.
8. Develop a application that give information to the user need.
9. Implement an application that writes data to the SD card.
10. Implement an application that creates an alert message.

Course Designers:

1. C.D. Balapriya
2. P. Praveena

THIAGARAJAR COLLEGE, MADURAI- 9

(An Autonomous Institution, affiliated to Madurai Kamaraj University)

DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those who joined in 2019 and after)

CourseCode	Course Title	Category	L	T	P	Credit
UIT19C61	Web Designing with PHP	Core-12	4	1	0	5
			L - Lecture	T - Tutorial	P –Practicals	

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

Preamble

Provoke knowledge on the basics of web programming and to train the abilities to develop user friendly applications using PHP with it's Database connectivity.

Course Outcomes

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

#	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO1	Describe various essential operators on PHP with it's precedence using programmatic examples.	K1, K2
CO2	Illustrate the control and loop structure available on PHP.	K2, K3
CO3	Work with strings, arrays and functions.	K2, K3
CO4	Handle web development controls and performs the data validation.	K1, K2
CO5	Connect DataBase and manipulate data.	K2, K3

K1 - Knowledge

K2 - Understand

K3 – Apply

Mapping of COs with POs

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

(S – Strong , M – Medium , L – Low)

Blooms taxonomy

	CA		End of Semester
	First	Second	
<i>Knowledge-K1</i>	40%	40%	40%
<i>Understand-K2</i>	40%	40%	40%
<i>Apply-K3</i>	20%	20%	20%
<i>Total marks</i>	52	52	140

Web Designing with PHP

Unit I :

16 hours

HTML programming: HTML- working with list, working with Images, Introduction to Forms.

Essential PHP: Enter PHP - Getting PHP - Operators and Flow Control – PHP’s Math Operators – Working with the Assignment Operators – Incrementing and Decrementing Values – The PHP String Operators – The Bitwise Operators – The Execution Operator – PHP Operator precedence.

Unit II :

15 hours

Using the If statement - The PHP Comparison Operators – The PHP Logical Operators - The else statement - The else if statement, The ternary Operator - switch statement, Using for Loops, Using while Loop, using do...while statement, using the foreach loop, Terminating Loops Early – Skipping Iterations.

Unit III :

15 hours

Strings and Arrays : The String Functions – Converting to and from Strings – Formatting Text Strings – Building Yourself Some Arrays – Modifying the Data in Arrays –Deleting Array Elements **Creating Functions:** Creating Functions in PHP – Passing Functions Some Data – Passing Arrays to Functions – Passing by Reference –Using Default Arguments – Passing Variable Numbers of Arguments – Returning data from functions – Returning Arrays

Unit IV:

14 hours

Reading Data in web pages: Setting Up Web Pages to Communicate with PHP – Handling Text Fields, Text Areas, Check Boxes, Radio Buttons, List boxes, Password control, Hidden control, Image Maps, File Uploads, Button. PHP Browser – Handling Power: Using PHP’s Server Variables - Using HTTP Headers - Getting the User’s Browser Type – Redirecting Browser Type – Dumping a Form’s Data All at Once – Handling Form Data with custom arrays – Putting it all in one page - Performing Data Validation – Checking if the User Entered Required Data – Requiring Numbers, Text.

Unit V :

15 hours

Working with Databases: What is a Database, Some Essential SQL, Creating a MySQL Database, Creating a New Table – Putting Data into the New Database – Accessing the Database in PHP – Updating Databases – Inserting New Data Items into a Database – Deleting Records – Creating New Tables, New Database.

Text Books:

1. Kogent Learning Solutions, 2013, Web Technologies Black book, Dream Tech Press, New Delhi.
2. Steven Holzner, Reprint 2016, The complete Reference PHP, Tata McGraw Hill Education (India) Private Limited.

Unit	Chapters(pages)
I	Book 1: chapter 1 (1 to 23 pages) Book 2: 1 (1 to 37), 2 (41 to 54)
II	Book2: 2 (55 to 79)
III	Book2: 3 (81 to 98) Book2: 4 (123 to 139)
IV	Book2:5 (161 to 192) Book2: 6 (203 to 234)
V	Book2: 10 (361 to 392)

References:

1. Kevin Tetrol and 'O' Reilly, 2014, Programming PHP, Pearson Education, Prentice Hall of India, New Delhi.
2. Ivan Bayross, SharanamShah ,Eleventh Print 2013, PHP 5.1 for beginners, Shrofff publishers.

Web Resources:

1. <https://www.c-sharpcorner.com/article/how-to-design-a-web-page-using-php/>
2. <https://www.w3schools.com/>
3. <https://www.php-web-design.com/>

Course Designers:

1. Mrs. P. Praveena
2. Ms. C.D. Balapriya

Lecture Schedule

Chapter/ Section	Topic	Lecture hours
1.1	Essential PHP: Enter PHP - Getting PHP - Operators and Flow Control	4
1.2	PHP's Math Operators – Working with the Assignment Operators – Incrementing and Decrementing Values	6
1.3	The PHP String Operators – The Bitwise Operators – The Execution Operator – PHP Operator precedence.	6
2.1	Using the If statement - The PHP Comparison Operators – The PHP Logical Operators - The else statement	3
2.2	The else if statement, The ternary Operator - switch statement	4
2.3	Using for Loops, Using while Loop, using do...while statement,	4

2.4	using the foreach loop, Terminating Loops Early – Skipping Iterations.	4
3.1	Strings and Arrays : The String Functions – Converting to and from Strings – Formatting Text Strings —Using Default Arguments	3
3.2	Building Yourself Some Arrays – Modifying the Data in Arrays – Deleting Array Elements	4
3.3	Creating Functions: Creating Functions in PHP – Passing Functions Some Data – Passing Arrays to Functions – Passing by Reference	4
3.4	Passing Variable Numbers of Arguments – Returning data from functions – Returning Arrays	4
4.1	Reading Data in web pages: Setting Up Web Pages to Communicate with PHP – Handling Text Fields, Text Areas, Check Boxes, Radio Buttons, List boxes, Password control, Hidden control, Image Maps, File Uploads, Button. PHP Browser –	6
4.2	Handling Power: Using PHP’s Server Variables - Using HTTP Headers - Getting the User’s Browser Type – Redirecting Browser Type – Dumping a Form’s Data All at Once	4
4.3	Handing Form Data with custom arrays – Putting it all in one page - Performing Data Validation – Checking if the User Entered Required Data – Requiring Numbers, Text	4
5.1	Working with Databases: What is a Database, Some Essential SQL, Creating a MySQL Database, Creating a New Table — Inserting New Data Items into a Database	5
5.2	Putting Data into the New Database – Accessing the Database in PHP – Updating Databases	5
5.3	Deleting Records – Creating New Tables, New Database	5
	Total	75

THIAGARAJAR COLLEGE, MADURAI- 9

(An Autonomous Institution, affiliated to Madurai Kamaraj University)

DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those who joined in 2019 and after)

CourseCode	Course Title	Category	L	T	P	Credit
UIT19C62	Computer Networks	Core-12	4	1	0	4

L - Lecture

T - Tutorial

P - Practicals

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

Preamble

To gain knowledge on network, protocols, transmission media. Demonstrate how to detect and correct errors in the network. Give knowledge of network security and to use digital signature.

Course Outcomes

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

#	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO1	Identify Data Communications, Network and its Types, Internet History and The OSI Model.	K1,K2
CO2	Describe the basic concepts of Physical Layer, Transmission Media, switching Data Link Layer, Error Detection and Correction.	K1,K2
CO3	Explain Data Link Layer, Wired LANS and Ethernet.	K1,K2
CO4	Relate the various routing algorithms, Unicast routing and multicast routing techniques.	K1,K2
CO5	Compute Cryptography, Network Security and digital signature.	K1,K2

K1 - Knowledge

K2 - Understand

K3 - Apply

Mapping of COs with POs

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

(S – Strong , M – Medium , L – Low)

Bloos taxonomy

	CA		End of Semester
	First	Second	
<i>Knowledge-K1</i>	40%	40%	40%
<i>Understand-K2</i>	40%	40%	40%
<i>Apply-K3</i>	20%	20%	20%
<i>Total marks</i>	52	52	140

Computer Networks

UNIT I

15 hours

Introduction: Data Communications – Networks – Network Types – Internet History -
Protocol Layering: TCP/IP Protocol Suite - The OSI Model.

UNIT II:

15 hours

Physical Layer: Data and Signals - Transmission Impairment – Performance -**Transmission Media** : Introduction - Guided Media – Unguided Media:Wireless- **Switching:** Circuit Switched Networks - Packet Switching – **Data Link Layer** : Introduction – Link Layer Addressing – **Error Detection And Correction** : Introduction - Types of Errors – Block Coding – Cyclic Codes – Checksum.

UNIT III:

15 hours

Data Link Control: DLC Services - Data Link Layer Protocols – HDLC – Point to Point Protocol (PPP) – **Wired LANs : Ethernet** : Ethernet Protocol – Standard Ethernet – Fast Ethernet – Gigabit Ethernet.

UNIT IV:

15 hours

Unicast Routing : Introduction - Routing Algorithms – Unicast Routing Protocols – **Multicast Routing** : Introduction – Multicasting Basics – IntraDomain Multicast Protocols – InterDomain Multicast Protocols.

UNIT V:

15 hours

Cryptography and Network Security: Introduction – Confidentiality – Other Aspects of Security – **Internet Security** – Firewall.

Text Books:

1. Behrouz A. Forouzan : 2013. "Data Communications And Networking", Fifth Edition, Tata Mcgraw Hill Education (India) Private Ltd.

Units	Chapters/Sections
I	1(1.1 to 1.4), 2(2.1 to 2.3)
II	3(3.1, 3.4, 3.6), 7(7.1,7.2,7.3), 8(8.2, 8.3),9(9.1, 9.2), 10(10.1,10.1.1, 10.2, 10.3, 10.4)
III	11(11.1, 11.2, 11.3, 11.4), 13(13.1, 13.2, 13.3, 13.4)
IV	20(20.1, 20.2, 20.3), 21(21.1, 21.2, 21.3, 21.4)
V	31(31.1 to 31.3), 32(32.4)

References:

1. Andrew S. Tanenbaum:2003. "Computer Networks", Fourth Edition, Pearson Prentice Hall.
2. TularamM.Bansod: 2013. "Computer Networks", Kogent Learning Solutions Inc, Dreamtech Press.

Web Resources:

<https://www.geeksforgeeks.org/computer-network-tutorials>

Course Designers:

1. Ms. C.D. Balapriya
2. Mrs. P. Praveena

Lecture Schedule

Chapter/ Section	Topic	Lecture hours
1.1	Introduction	1
1.2	Data Communications	2
1.3	Networks	2
1.4	Network Types	2
1.5	Internet History	2
1.6	Protocol Layering	2
1.7	TCP/IP Protocol Suite	2
1.8	The OSI Model.	2
2.1	Physical Layer: Data and Signals	1

2.2	Transmission Impairment - Performance	2
2.3	Transmission Media – Introduction - Guided Media	2
2.4	Unguided Media:Wireless	2
2.5	Switching – Circuit Switched Networks	1
2.6	Packet Switching	2
2.7	Data Link Layer – Introduction	1
2.8	Link Layer Addressing	2
2.9	Error Detection And Correction – Introduction - Types of Errors – Block Coding	1
2.10	Cyclic Codes – Checksum.	1
3.1	Data Link Control – DLC Services	1
3.2	Data Link Layer Protocols	1
3.3	HDLC – Point to Point Protocol (PPP)	1
3.4	Wired LANs : Ethernet	1
3.5	Ethernet Protocol	1
3.6	Standard Ethernet	2
3.7	Fast Ethernet – Gigabit Ethernet	2
4.1	Unicast Routing	2
4.2	Routing Algorithms	3
4.3	Unicast Routing Protocols	2
4.4	Multicast Routing	2
4.5	Introduction – Multicasting Basics	2
4.6	IntraDomain Multicast Protocols	2
4.7	InterDomain Multicast Protocols	2
5.1	Cryptography and Network Security	2
5.2	Introduction	3
5.3	Confidentiality	3
5.4	Other Aspects of Security	3
5.5	Internet Security	2
5.6	Firewall	2
Total		75

THIAGARAJAR COLLEGE, MADURAI- 9

(An Autonomous Institution, affiliated to Madurai Kamaraj University)

DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY**(For those who joined in 2019 and after)**

CourseCode	Course Title	Category	L	T	P	Credit
UIT19C63	Data Warehousing and Mining	Core-14	4	1	0	4

L - Lecture

T - Tutorial

P-Practicals

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

Preamble

Ensure to learn the concepts of Data mining principles and Data warehousing to identify Business applications for better organization and retrieval of data .

Course Outcomes

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

#	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO1	Explain the basic concepts of what kind of data can be mined, process the data, data cleaning and how to integrate and transform the data.	K1,K2
CO2	Describes familiarity of various multidimensional data models like Star, Snowflake and Fact constellations and Data Warehouse architecture.	K1,K2
CO3	Illustrate algorithm and apply it to find frequent itemsets using candidate generation and without candidate generation. Analyze association rule mining for handling large data.	K1,K2,K3
CO4	Evaluate the core information of Data Classification by Decision tree, rule based, Bayesian and Back propagation for the retrieval purposes and also to examine Data Prediction and error measures.	K1,K2,K3.
CO5	Summarize the facts about Cluster Analysis and Clustering methods like partitioning, hierarchical, density based, grid based and model based for better organization.	K1,K2,K3

K1 - Knowledge

K2 - Understand

K3 - Apply

Mapping of COs with POs

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

(S – Strong , M – Medium , L – Low)

Blooms taxonomy

	CA		End of Semester
	First	Second	
<i>Knowledge-K1</i>	40%	40%	40%
<i>Understand-K2</i>	40%	40%	40%
<i>Apply-K3</i>	20%	20%	20%
<i>Total marks</i>	52	52	140

Data Warehousing and Mining

UNIT I

15 hours

Introduction – So, What is Data Mining – Data Mining - On What Kind of Data? - Data Mining Functionalities-What kind of Patterns can be mined? - **Data Preprocessing:** Why Preprocess the Data – Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization and Concept Hierarchy Generation.

UNIT II

15 hours

Data Warehouse and OLAP Technoogy: An Overview : What is a Data Warehouse – Differences between Operational Database Systems and Data Warehouses – A Multidimensional Data Model – Star, Snowflakes and Fact Constellations, Schemas for Multidimensional Databases – OLAP Operations in the Multidimensional Data Model – Data Warehouse Architecture – Data Warehouse Implementation: Indexing OLAP data – Efficient Processing of OLAP Queries.

UNIT III

15 hours

Mining Frequent Patterns, Associations and Correlations – The Apriori Algorithm: Finding Frequent Itemsets using Candidate Generation - Mining Frequent Itemsets without Candidate Generation - Mining Various Kinds of Association Rules - Constraint-Based Association Mining.

UNIT IV

15 hours

Classification and. Prediction – Preparing the Data for Classification and Prediction – Classification by Decision Tree Introduction – Bayesian Classification – Rule Based Classification – Classification by Back Propagation – Prediction – Accuracy and Error Measures.

UNIT V

15 hours

Cluster Analysis: What is Cluster Analysis - Types of Data in Cluster Analysis – A Categorization of Major Clustering Methods – Partitioning Methods – Hierarchical methods – Density-Based Methods – Grid-Based Methods –Model-Based Clustering Methods..

Text Books:

Units	Chapters
I	1(1.2, 1.3, 1.4), 2(2.1, 2.3, 2.4, 2.5, 2.6)
II	3(3.1, 3.1.1, 3.2, 3.2.2, 3.2.6,3.3, 3.4, 3.4.2, 3.4.3)
III	5(5.2.1, 5.2.4, 5.3, 5.5)
IV	6(6.1, 6.2.1, 6.3 to 6.6,6.11,6.12)
V	8(8.1 to 8.7,8.9)

References:

1.G. K. Gupta: 2006. "Introduction to Data Mining with Case Studies", Easter Economy Edition, Prentice Hall of India.

2.BERSON, ALEX & SMITH, STEPHEN J : 2012. "Data Warehousing, Data Mining, and OLAP", TMH Pub. Co. Ltd, New Delhi.

3. K.P. Soman, ShyamDiwakar and V. Ajay: 2006. "Insight into Data mining Theory and Practice", Easter Economy Edition, Prentice Hall of India.

Web Resources:

www.tutorialspoint.com

Course Designers:

1.Ms. C. D. Balapriya

2.Mrs. P.Praveena

Lecture Schedule

Chapter/ Section	Topic	Lecture hours
1.1	Introduction – So, What is Data Mining	2
1.2	Data Mining - On What Kind of Data?	2
1.3	Data Mining Functionalities	2
1.4	Data Preprocessing: Why Preprocess the Data	2
1.5	Data Cleaning	2
1.6	Data Integration and Transformation	2
1.7	Data Reduction	1
1.8	Data Discretization and Concept Hierarchy Generation.	2
2.1	What is a Data Warehouse	2
2.2	Differences between Operational Database Systems and Data Warehouses	2
2.3	A Multidimensional Data Model	2

2.4	Star, Snowflakes and Fact Constellations, Schemas for Multidimensional Databases	2
2.5	OLAP Operations in the Multidimensional Data Model	2
2.6	Data Warehouse Architecture	2
2.7	Data Warehouse Implementation: Indexing OLAP data - Efficient Processing of OLAP Queries.	3
3.1	Mining Frequent Patterns, Associations and Correlations	3
3.2	The Apriori Algorithm: Finding Frequent Itemsets using Candidate Generation	3
3.3	Mining Frequent Itemsets without Candidate Generation	3
3.4	Mining Various Kinds of Association Rules	3
3.5	Constraint-Based Association Mining.	3
4.1	Classification and. Prediction – Preparing the Data for Classification and Prediction	2
4.2	Classification by Decision Tree Introduction	2
4.3	Bayesian Classification	2
4.4	Rule Based Classification	2
4.5	Classification by Back Propagation	3
4.6	Prediction	2
4.7	Accuracy and Error Measures	2
5.1	Cluster Analysis: What is Cluster Analysis	2
5.2	Types of Data in Cluster Analysis	2
5.3	A Categorization of Major Clustering Methods	1
5.4	Partitioning Methods	2
5.5	Hierarchical methods	2
5.6	Density-Based Methods	2
5.7	Grid-Based Methods	2
5.8	Model-Based Clustering Methods	2
Total		75

THIAGARAJAR COLLEGE, MADURAI- 9

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DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those who joined in 2019 and after)

CourseCode	Course Title	Category	L	T	P	Credit
UIT19CL61	Web Designing with PHP Lab	Core Lab - 11	0	0	5	2
			L - Lecture	T - Tutorial	P – Practicals	

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

Preamble

Focus the basics of web programming and train to develop user friendly applications using PHP with its Database connectivity.

Course Outcomes

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

#	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO1	Explain the basics of PHP and its different operators.	K1,K3
CO2	Develop and Control loop structures available on PHP.	K2,K3
CO3	Manipulate strings, arrays and functions.	K1,K3
CO4	Develop web programs, Connect PHP with DataBase and manipulate data.	K2,K3

K1 - Knowledge

K2 - Understand

K3 – Apply

Mapping of COs with POs

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

(S – Strong , M – Medium , L – Low)

Web Designing with PHP Lab

1. Write a program to check & print whether a given number is even or odd.
2. Write a program to find the largest among 3 numbers using ternary operation.
3. Write a program to print the sum of digits of a given number (using while loop)
4. Write a program to print Fibonacci series.
5. Write a program to enter number till the user wants. At the end it should display count of positive, negative and zeros entered. (using do – while loop)
6. Write a function which finds the Number times each word Occurs on the given input sentence.
7. Write a Menu-Driver program to implement a calculator which performs only addition, subtraction, multiplication and division. (Using switch case)
8. Write a function to swap two strings using call by value & call by reference.
9. Write a program to create a file & write contents to it and display it. Then append some data to it.
10. Create a login form which verifies user name and password to a particular strings (User name: Thiagarajar, password: art&science) if they are correct, it should be redirected to welcome. HTML page or it should be redirected to sorry HTML Page.
11. Write a program to arrange the given number in ascending order (Using array)
12. Write a program to perform matrix addition
13. Create a form which gets inputs from user and redirect the user to another page which contains content based on the user input.
14. Create a form which accepts a number from 2 to 1000 and check whether it is Armstrong or not.
15. Develop an application to implement database connectivity.

Course Designers:

1. P. Praveena
2. C.D. BalaPriya

THIAGARAJAR COLLEGE, MADURAI- 9

(An Autonomous Institution, affiliated to Madurai Kamaraj University)

DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those who joined in 2019 and after)

CourseCode	Course Title	Category	L	T	P	Credit
UIT19CL62	Networking Lab	Core Lab-12	0	0	4	2
	L - Lecture	T - Tutorial			P – Practicals	

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

Preamble

Focus the basics of network programming , Train to connect and configure basic networking devices through LAN.

Course Outcomes

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

#	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO1	Demonstrate the basics commands of networking.	K1,K3
CO2	Connect the different devices through LAN	K2,K3
CO3	Develop the networking program using TCP/IP and UDP protocol.	K1,K3
CO4	Develop the networking program using Java Networking Classes	K2,K3

K1 - Knowledge

K2 - Understand

K3 - Apply

Mapping of COs with POs

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

(S – Strong , M – Medium , L – Low)

Networking Lab

1. Study of different types of Network cables and practically implement the cross-wired cable and straight through cable using clamping tool.
2. Study of Network Devices in Detail.
3. Study of network IP.
4. Connect the computers in Local Area Network.
5. Study of basic network command and Network configuration commands.
6. Configure a Network topology using packet tracer software.
7. Configure a Network topology using packet tracer software.
8. Configure a Network using Distance Vector Routing protocol.
9. Develop networking program using java networking classes.
10. Develop networking program using java by TCP/IP , UDP protocols

Course Designers:

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

THIAGARAJAR COLLEGE, MADURAI- 9

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DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those who joined in 2019 and after)

CourseCode	Course Title	Category	L	T	P	Credit
UIT19PJ61	Major Project				4	2

L - Lecture T - Tutorial P – Practicals

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

Preamble

This course offer real world problems and challenges that need IT based solutions. To introduce the vast array of literature available of the various research challenges in the field of IT. To improve the team building, communication and management skills of the students.

Course Outcomes

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

#	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO1	Conduct a survey of several available literature in the preferred field of study.	K1,K2
CO2	Create very precise specifications of the IT solution to be designed.	K1,K2
CO3	Use all concepts of IT in creating a solution for a problem	K1,K3
CO4	Demonstrate an ability to work in teams and manage to develop a software project.	K1,K2

K1 - Knowledge

K2 - Understand

K3 – Apply

Mapping of COs with POs

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

(S – Strong , M – Medium , L – Low)

CORE ELECTIVE

THIAGARAJAR COLLEGE, MADURAI- 9

(An Autonomous Institution, affiliated to Madurai Kamaraj University)

DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those who joined in 2019 and after)

Course Code	Course Title	Category	L	T	P	Credit
UIT19CE31(A)/ UIT19CE41(A)	Cloud Computing	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

Ensure to learn the general concepts of Cloud Computing and to familiarize with Virtualization and Cloud Applications.

Course Outcomes

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

#	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO1	Explain cloud computing reference model, Service oriented computing, Utility oriented Computing and Application development and System development	K1,K2
CO2	Differentiate between Parallel and Distributed computing, Architecture for Parallel Processing and Elements of Distributed Computing, RPC, Service Oriented Computing, Models of Inter Process Communication.	K1,K2
CO3	Discuss basic idea of Virtualization, characteristics of Virtualized environments, Pros and Cons of Virtualization	K1,K2
CO4	Illustrate the Cloud Reference Model, Types of Clouds,- Private, Public, Hybrid and Community Clouds, Cloud Interoperability and Standards	K1,K2
CO5	Demonstrate Cloud Applications like Scientific, Business and Consumer Applications, CRM and ERP, Social Networking, Media Applications, Multiplayer Online Gaming.	K1,K2,K3

K1 - Knowledge

K2 - Understand

K3 - Apply

Mapping of COs with POs

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

(S – Strong , M – Medium , L – Low)

Blooms taxonomy

	CA		End of Semester
	First	Second	
<i>Knowledge-K1</i>	40%	40%	40%
<i>Understand-K2</i>	40%	40%	40%
<i>Apply-K3</i>	20%	20%	20%
<i>Total marks</i>	52	52	140

Cloud Computing

UNIT I

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 Oriented Computing - Building Cloud Computing Environments – Application Development – Infrastructure and System Development – Computing Platforms and Technologies – Amazon Web Services – Google AppEngine – Microsoft Azure – Hadoop.

UNIT II

15 hours

Principles of Parallel and Distributed Computing – Eras of Computing – Parallel Vs. Distributed Computing – Elements of Parallel Computing – What is Parallel Processing? – Hardware Architecture for Parallel Processing – Approaches to Parallel Programming – Levels of Parallelism – Elements of Distributed Computing – General Concepts and Definitions – Components of a Distributed System – Architectural Styles for Distributed Computing – Models for InterProcess Communication – Technologies for Distributed Computing – Remote Procedure Call – Distributed Object Frameworks – Service Oriented Computing.

UNIT III

15 hours

Virtualization :Introduction – Characteristics of Virtualized Environments – Taxonomy of Virtualization Techniques – Execution Virtualization – Other Types of Virtualization – Virtualization and Cloud Computing – Pros and Cons of Virtualization – Technology Examples – Xen: Para Virtualization, VMWare: Full Virtualization, Microsoft Hyper-V .

UNIT IV

15 hours

Cloud Computing Architecture – Introduction – Cloud Reference Model – Architecture – Infrastructure / Hardware as a Service – Platform as a Service – Software as a Service - Types of Clouds – Public Clouds – Private Clouds – Hybrid Clouds – Community Clouds - Economics of the Cloud – Open Challenges – Cloud Definition – Cloud Interoperability and Standards – Scalability and Fault Tolerance - Security, Trust and Privacy – Organizational Aspects.

UNIT V

15 hours

Cloud Applications : Scientific Applications – Healthcare: ECG Analysis in the Cloud – Biology : Protein Structure Prediction – Geoscience : Satellite Image Processing– Business

and Consumer Applications – CRM and ERP – Productivity – Social Networking – Media Applications – Multiplayer Online Gaming.

Text Books:

RajkumarBuyya, Christian Vecchiola, S.ThamaraiSelvi :2016. “Mastering Cloud Computing” MC Graw Hill Education(India) Private Ltd

Units	Chapters
I	1 (1.1, 1.1.1, 1.1.2, 1.1.4, 1.1.5, 1.2, 1.2.1 to 1.2.5, 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	10 (10.1, 10.1.1, 10.1.2, 10.1.4, 10.2, 10.2.1 to 10.2.5)

References:

- 1.RajkumarBuyya, James Broberg, Andrzej Goscinski:2016. Cloud Computing Principles and Paradigms”, Wiley India Pvt Ltd.
- 2.TobyVelte, Anthony Velte, Robert Elsenpeter :2009. “Cloud Computing - A Practical Approach”, TMH.
- 3.George Reese: 2009. “Cloud Application Architectures: Building Applications and Infrastructure in the Cloud: Transactional Systems for EC2 and Beyond (Theory in Practice)”, O'Reilly.

Web Resources:

www.ibm.com/cloud/learn/what-is-cloud-computing

www.webopedia.com

Course Designers:

1. Ms. C.D. Balapriya
2. Mrs.P.Praveena

Lecture Schedule

Chapter/ Section	Topic	Lecture hours
1.1	Introduction - Cloud Computing at a Glance	2
1.2	The Vision of Cloud Computing- Defining a Cloud	1

1.3	Cloud Computing Reference Model	1
1.4	Characteristics and Benefits	1
1.5	Historical Developments – Distributed Systems	1
1.6	Virtualization – Web 2.0	1
1.7	Service Oriented Computing – Utility Oriented Computing	2
1.8	Building Cloud Computing Environments – Application Development	2
1.9	Infrastructure and System Development – Computing Platforms and Technologies	2
1.10	Amazon Web Services – Google AppEngine – Microsoft Azure – Hadoop.	2
2.1	Principles of Parallel and Distributed Computing – Eras of Computing	1
2.2	Parallel Vs. Distributed Computing – Elements of Parallel Computing	2
2.3	What is Parallel Processing? – Hardware Architecture for Parallel Processing	2
2.4	Approaches to Parallel Programming – Levels of Parallelism	2
2.5	Elements of Distributed Computing – General Concepts and Definitions	2
2.6	Components of a Distributed System – Architectural Styles for Distributed Computing	2
2.7	Models for InterProcess Communication – Technologies for Distributed Computing	2
2.8	Remote Procedure Call – Distributed Object Frameworks	1
2.9	Service Oriented Computing.	1
3.1	Virtualization :Introduction	1
3.2	Characteristics of Virtualized Environments	3
3.3	Taxonomy of Virtualization Techniques	3
3.4	Execution Virtualization – Other Types of Virtualization	2
3.5	Virtualization and Cloud Computing – Pros and Cons of Virtualization	3
3.6	Technology Examples – Xen: Para Virtualization, VMWare: Full Virtualization, Microsoft Hyper-V	3
4.1	Cloud Computing Architecture – Introduction	2
4.2	Cloud Reference Model – Architecture	1
4.3	Infrastructure / Hardware as a Service	1
4.4	Platform as a Service	1
4.5	Software as a Service	1
4.6	Types of Clouds – Public Clouds – Private Clouds – Hybrid Clouds – Community Clouds	3
4.7	Economics of the Cloud – Open Challenges – Cloud Definition	2
4.8	Cloud Interoperability and Standards	1
4.9	Scalability and Fault Tolerance	1
4.10	Security, Trust and Privacy	1
4.11	Organizational Aspects	1
5.1	Cloud Applications : Scientific Applications	2
5.2	Healthcare: ECG Analysis in the Cloud	2
5.3	Biology : Protein Structure Prediction	2
5.4	Geoscience : Satellite Image Processing	2
5.5	Business and Consumer Applications – CRM and ERP	2
5.6	Productivity	1
5.7	Social Networking	2
5.8	Media Applications	1
5.9	Multiplayer Online Gaming.	1
Total		75

THIAGARAJAR COLLEGE, MADURAI- 9

(An Autonomous Institution, affiliated to Madurai Kamaraj University)

DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those who joined in 2019 and after)

Course Code	Course Title	Category	L	T	P	Credit
UIT19CE31(B)/ UIT19CE41(B)	Soft Computing	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

To introduce the ideas of fuzzy sets, fuzzy logic and familiarize with neural networks and learning methods for neural networks. Describes the basics of genetic algorithms and their applications in optimization and planning. To develop skills thorough understanding of the theoretical and practical aspects of Soft Computing.

Course Outcomes

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

#	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO1	Illustrate the need of Neural Networks and Implementation.	K1,K3
CO2	Demonstrate the adaptive resonance theory and its purpose	K1,K3
CO3	Sketch out the performance steps of Generic Algorithms.	K2,K3
CO4	Discuss the working strategy of Fuzzy Set	K1,K3
CO5	Demonstrate the concept of Fuzzy Reasoning and Clustering	K1,K2

K1 - Knowledge

K2 - Understand

K3 – Apply

Mapping of COs with POs

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

(S – Strong , M – Medium , L – Low)

Blooms taxonomy

	CA		End of Semester
	First	Second	
<i>Knowledge-K1</i>	40%	40%	40%
<i>Understand-K2</i>	40%	40%	40%
<i>Apply-K3</i>	20%	20%	20%
<i>Total marks</i>	52	52	140

Soft Computing

Unit I:

16 hours

Fundamentals of Neural Networks: Basic Concepts of Neural Network-Human Brain-Model of an Artificial Neuron - Neural Network Architectures-Characteristics of Neural Networks-Learning Methods. **Back propagation Networks:** Architecture of Back propagation Network-The Perceptron Model - The Solution – Single Layer Artificial Neural Network – Model for Multilayer Perceptron-Back propagation Learning-Input Layer Computation-Hidden Layer Computation-Output Layer Computation-Calculation of Error-Training of Neural Network – Method of Steepest Descent – Effect of Learning Rate ‘n’-Adding a Momentum Term - Back propagation Algorithm .

Unit II:

14 hours

Adaptive Resonance Theory: Introduction – Cluster Structure-Vector Quantization-Classical ART Networks-Simplified ART Architecture- ART1- Architecture of ART1- Special Features of ART1 Models-ART1 Algorithm- ART2- Architecture of ART2- ART2 Algorithm –Application-Character Recognition Using ART1-Classification of Soil – Prediction of Load from Yield Line Patterns of Elastic-Plastic Clamped Square Plate-Chinese Character Recognition-Sensitivities of Ordering Data.

Unit III:

15 hours

Introduction to Generic Algorithms: Working Cycle of a Generic Algorithm- Binary – Coded GA-GA-Parameters Setting- Constraints Handling in GA-Advantages and disadvantages of Generic Algorithms-Combination of local and Global Optimum Search Algorithms.

Unit IV:

16 hours

Introduction to Fuzzy Sets: Crisp Sets-Notations Used in Set Theory-Crisp Set Operations-Properties of Crisp Set-Fuzzy Set-Representation of a Fuzzy Set-Difference Between Crisp Set and Fuzzy Set-A Few Definitions in Fuzzy Sets-Measures of Fuzziness and Inaccuracy of Fuzzy set.

Unit V:

14 hours

Fuzzy Reasoning and Clustering: Introduction-Fuzzy Logic controller-Two Major Forms of Fuzzy Logic controller-Hierarchical Fuzzy Logic Controller-Sensitivity Analysis-Advantages and Disadvantages of Fuzzy Logic Controller-Fuzzy clustering-Fuzzy C-Means clustering-Entropy-based Fuzzy Clustering

Text Books:

1. Rajasekaran. S and VijayalakshmiPai, 2011, “Neural Networks, Fuzzy Logic and Genetic Algorithms Synthesis and Applications”, PHI Learning Private Limited, New Delhi.

- Dilip K. Pratihar, 2015, "Soft Computing, Fundamentals and Applications", Narosa Publishing House, Chennai.

Unit	Chapters/Section
I	Book 1: 2(2.1-2.6),3(3.1-3.2)
II	Book 1: 5
III	Book 2: 3
IV	Book 2: 7
V	Book 2: 8

References:

- J.S.R.Jang, C.T. Sun and E.Mizutani, 2004, "Neuro-Fuzzy and Soft Computing", PHI / Pearson Education.
- George J. Klir, Ute St. Clair, Bo Yuan, 1997, "Fuzzy Set Theory: Foundations and Applications" Prentice Hall.
- David E. Goldberg, 2013, "Genetic Algorithm in Search Optimization and Machine Learning" Pearson Education India..

Course Designers:

- Mr. S. Kumarappan.
- Ms.C.D.Balapriya

Lecture Schedule

Chapter/Section	Topic	Lecture hours
1.1	Fundamentals of Neural Networks: Basic Concepts of Neural Network-Human Brain-Model of an Artificial Neuron - Neural Network Architectures-Characteristics of Neural Networks-Learning Methods.	6
1.2	Back propagation Networks: Architecture of Back propagation Network-The Perceptron Model - The Solution – Single Layer Artificial Neural Network – Model for Multilayer Perceptron-Back propagation Learning-Input Layer Computation	6
1.3	Hidden Layer Computation-Output Layer Computation-Calculation of Error-Training of Neural Network – Method of Steepest Descent – Effect of Learning Rate 'n'-Adding a	4

	Momentum Term - Back propagation Algorithm .	
2.1	Adaptive Resonance Theory: Introduction – Cluster Structure-Vector Quantization-Classical ART Networks-Simplified ART Architecture- ART1- Architecture of ART1-Special Features of ART1 Models-ART1 Algorithm	5
2.2	ART2- Architecture of ART2- ART2 Algorithm –Application-Character Recognition Using ART1	4
2.3	Classification of Soil – Prediction of Load from Yield Line Patterns of Elastic-Plastic Clamped Square Plate-Chinese Character Recognition-Sensitivities of Ordering Data.	5
3.1	Introduction to Generic Algorithms: Working Cycle of a Generic Algorithm- Binary –Coded GA-GA-Parameters Setting	3
3.2	Constraints Handling in GA-Advantages and disadvantages of Generic Algorithms-Combination of local and Global Optimum Search Algorithms.	4
4.1	Introduction to Fuzzy Sets: Crisp Sets-Notations Used in Set Theory-Crisp Set Operations-Properties of Crisp Set-Fuzzy Set	5
4.2	Representation of a Fuzzy Set-Difference Between Crisp Set and Fuzzy Set-	5
4.3	A Few Definitions in Fuzzy Sets-Measures of Fuzziness and Inaccuracy of Fuzzy set.	5
5.1	Fuzzy Reasoning and Clustering: Introduction-Fuzzy Logic controller-Two Major Forms of Fuzzy Logic controller	5
5.2	Hierarchical Fuzzy Logic Controller-Sensitivity Analysis	5
5.3	Advantages and Disadvantages of Fuzzy Logic Controller-Fuzzy clustering-Fuzzy C-Means clustering-Entropy-based Fuzzy Clustering	4
	Total	75

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DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY
 (For those who joined in 2019 and after)

Course Code	Course Title	Category	L	T	P	Credit
UIT19CE31(C)/ IT19CE41(C)	E-Commerce	Core Elective	4	1		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 cryptography, firewall etc.

Course Outcomes

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

#	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO1	Illustrate E-commerce and its types and the relationship between management and customer.	K1,K2
CO2	Compare the Internet types for electronic commerce	K1,K2
CO3	Interpret the security services and mechanisms in web security	K1,K2
CO4	Formulate the electronic fund transfer mechanism	K1,K2
CO5	Describe of mobile mechanism protocol for e-commerce	K1,K3

K1 - Knowledge K2 - Understand K3 – Apply

Mapping of COs with POs

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

(S – Strong , M – Medium , L – Low)

Blooms taxonomy

	CA		End of Semester
	First	Second	
<i>Knowledge-K1</i>	40%	40%	40%
<i>Understand-K2</i>	40%	40%	40%
<i>Apply-K3</i>	20%	20%	20%
<i>Total marks</i>	52	52	140

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 – Electronic payment 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, New Delhi.
2. Pete Loshin, Jhon Vacca, 2004, Electronic Commerce, Laxmi Publications Pvt. Ltd, New Delhi

Course Designers:

1. Mrs.M.Hemalatha
2. Mrs.P.Praveena

Lecture Schedule

Chapter/ Section	Topic	Lecture hours
1.1	Fundamentals of e-Commerce: e-Commerce and its types - Driving forces behind e-Commerce	4
1.2	Impacts - benefits and limitations of e-Commerce - Consumer behavior in e-Commerce	5
1.3	Electronic Data Interchange(EDI) - Supply Chain Management; Just-in-time - Procurement Management and Customer Relationship Management.	6
2.1	Network Infrastructure for E-commerce: Access Equipment	5
2.2	Access Media and Network Infrastructure for e-Commerce	5
2.3	Internet, Intranet and Extranet	5
3.1	Web Security: Security threats on the Internet and their impact	5
3.2	Security services - Security mechanisms	6
3.3	Cryptography - Firewalls	4
4.1	Electronic Payments: Electronic Funds Transfer and types of Electronic payments	5
4.2	Electronic payment mechanisms such as credit cards	5
4.3	Smart cards - electronic cash and electronic checks.	5
5.1	Mobile Commerce: Mobile computing and wireless	4
5.2	Wireless technologies and Wireless Application Protocol (WAP)	6
5.3	WAP gateway	5
	Total	75

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CourseCode	Course Title	Category	L	T	P	Credit
UIT19CE31(D)/ UIT19CE41(D)	Software Project Management	Core Elective	4	1	0	5

L - Lecture

T - Tutorial

P - Practicals

Year	Semester	Max. Marks CA	Max. Marks SE	Total
II	III/IV	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	Knowledge Level (according to Bloom's Taxonomy)
CO1	Explain Project Planning like Select Project, Identifying Project Scope and Objectives, Infrastructure, Project Products and Activities, Estimate efforts, Activity Risks.	K1,K2
CO2	Demonstrate the basic concepts of Project Evaluation and Programme Management, Selection of an Appropriate Projects from various process models like The Waterfall Model, The Spiral Model and Software Prototyping.	K1,K2
CO3	judge how to overcome problems with over and under estimations, Software Estimation Techniques, Expert Judgment, Estimating by analogy and also Project Schedules, Project Activities	K1,K2
CO4	Identify the various risk factors to assign resources for the projects and monitoring and control the cost and prioritizing.	K1,K2
CO5	Discuss the Software Quality Management System, Testing and Software Reliability.	K1,K2

K1 - Knowledge

K2 - Understand

K3 - Apply

Mapping of COs with POs

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

(S – Strong , M – Medium , L – Low)

Blooms taxonomy

	CA		End of Semester
	First	Second	
<i>Knowledge-K1</i>	40%	40%	40%
<i>Understand-K2</i>	40%	40%	40%
<i>Apply-K3</i>	20%	20%	20%
<i>Total marks</i>	52	52	140

Software Project Management

UNIT I

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.

UNIT II

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.

UNIT III

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.

UNIT IV

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.

UNIT V

15 hours

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

Text Books:

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. Richard H. Thayer: 2008. “Software Engineering Project Management,”: IEEE Computer Society
2. Futrel : 2008. “Quality Software Project Management”, Pearson Education India.
3. S. A. Kelkar : 2013. “Software Project Management” PHI, New Delhi, Third Edition.

Web Resources:

www.tutorialspoint.com

Course Designers:

1. Ms. C.D. Balapriya
2. Mrs. P. Praveena

Lecture Schedule

Chapter/Section	Topic	Lecture hours
1.1	Introduction to Software Project Management : An Overview of Project Planning:	1
1.2	Select Project	2
1.3	Identifying Project scope and Objectives	2
1.4	Identifying Project Infrastructure	2
1.5	Identify Project Products and Activities	2
1.6	Estimate efforts for Each Activity	2
1.7	Identify Activity Risks	2
1.8	Allocate Resources	2
2.1	Project Evaluation: Project Portfolio Management	2
2.2	Evaluation of Individual Projects	1
2.3	Cost-benefit Evaluation Techniques	2
2.4	Risk Evaluation	2
2.5	Selection of an Appropriate Project approach: Choosing Methodologies and Technologies	2

2.6	Choice of process models	1
2.7	The Waterfall Model	2
2.8	The Spiral Model	1
2.9	Software Prototyping	2
3.1	Software Effort Estimation: Problems with over and under estimations	1
3.2	Basis of software Estimation	1
3.3	Software estimation techniques	2
3.4	Expert Judgment	2
3.5	Estimating by analogy.	2
3.6	Activity Planning:Project schedules	2
3.7	Projects and activities	2
3.8	Sequencing and scheduling Activities	1
3.9	Networks planning models	1
3.10	Formulating a network model	1
4.1	Risk Management: Introduction	1
4.2	Categories of Risk	1
4.3	Risk Identification	2
4.4	Risk Assessment	2
4.5	Risk Planning	2
4.6	Risk Management	2
4.7	Resource Allocation: Scheduling resources	2
4.8	Monitoring and Control: Creating Framework	1
4.9	Cost Monitoring	1
4.10	Prioritizing monitoring.	1
5.1	Software Quality: Defining Software Quality	2
5.2	ISO9126	2
5.3	Product and Process Metrics	2
5.4	Quality Management Systems	3
5.5	Process Capability Models	2
5.6	Testing	2
5.7	Software reliability.	2
Total		75

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DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY
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CourseCode	Course Title	Category	L	T	P	Credit
UIT19CE31(E)/ UIT19CE41(E)	Principles of Data Communication	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

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 through understanding data compression, Error control and performance analysis.

Course Outcomes

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

#	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO1	Describe the basics of data communication	K1,K2
CO2	Authenticate data and control errors	K2,K3
CO3	Explain the working logic of Video transmission and storage.	K1,K2
CO4	Sketch out the performance steps of Compression data algorithms	K1,K3
CO5	Demonstrate the concept of Lossy Graphics Compression.	K1,K2

K1 - Knowledge K2 - Understand K3 – Apply

Mapping of COs with POs

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

(S – Strong , M – Medium , L – Low)

Blooms taxonomy

	CA		End of Semester
	First	Second	
<i>Knowledge-K1</i>	40%	40%	40%
<i>Understand-K2</i>	40%	40%	40%
<i>Apply-K3</i>	20%	20%	20%
<i>Total marks</i>	52	52	140

Principles and Data Communication

Unit I : 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.

Unit II: 18 hours

Data encryption: Authentication – Integrity – Digital Signature. **Error Control coding:** Introduction – Hamming distance and codeword weight – (n,k) block codes – Probability of error in n – digit codeword – Linear group codes, Nearest neighbor decoding of block codes – Syndrome decoding – Cyclic codes – Encoding of convolutional codes – Viterbi decoding of convolutional codes – Practical coder.

Unit III: 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.

Unit IV: 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

Unit V: 12 hours

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

Text Books:

1. Lan glover, Peter M. Grant , 3rd Edition,2010, Digital Communications, Pearson Education, Prentice Hall of India, New Delhi
2. Mark Nelson, Jean – Loup Gaily,2nd Edition, The Data compression Book, M & T Publications, New Delhi.

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. William Stallings, 2002, Data & Computer

- Communication, 6th Edition, Pearson Education, Prentice Hall of India, New Delhi,
2. PrakeshC.Gupta, 2002, Data Communications, Prentice Hall of India, New Delhi.
 3. Herbert Taub& D.L. Schilling, 2002, Principles of communication Systems, Tata Mc Graw Hill, New Delhi.

Course Designers:

1. Mrs. P. Praveena
2. Ms.C.D.Balapriya

Web Resources:

1. www.cs.utexas.edu

Lecture Schedule

Chapter/ Section	Topic	Lecture hours	Method
1.1	Digital communication overview: Electronic Communications – Sources and sinks of information – Digital communication equipment.	5	
1.2	Information theory, source coding and encryption: Introduction – Information and entropy – Conditional entropy and redundancy	5	
1.3	Information loss and entropy due to noise – Source coding – Variable length coding.	4	
2.1	Data encryption: Authentication – Integrity – Digital Signature.– Linear group codes, Nearest neighbor decoding of block codes	6	
2.2	Error Control coding: Introduction – Hamming distance and codeword weight – (n,k) block codes – Probability of error in n –digit codeword	6	
2.3	Syndrome decoding – Cyclic codes – Encoding of convolutional codes – Viterbi decoding of convolutional codes – Practical coder.	6	
3.1	Video transmission and storage: Introduction – Color representation – Video data compression	5	
3.2	High definition TV – Digital Video	3	
3.3	Compression standards – Digital Video broadcast – Packet video	5	
3.4	Other multimedia services.	2	
4.1	LZ78 Compression: Can LZ77 Improve? – Enter LZ78 – An Effective Variant	5	
4.2	Decompression: The Catch – LZW Implementation – Tree Maintenance and Navigation.	5	
4.3	Speech Compression: Digital Audio Concepts – Lossless Compression of Sound Problems – Companding - Other techniques	6	
5.1	Lossy Graphics Compression: Enter Compression – A Standard That Works: JPEG – Why Bother? –	6	
5.2	Implementing the DCT – Continued Improvements – Coding.	6	
	Total	75	

THIAGARAJAR COLLEGE, MADURAI- 9

(An Autonomous Institution, affiliated to Madurai Kamaraj University)

DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those who joined in 2019 and after)

CourseCode	Course Title	Category	L	T	P	Credit
UIT19CE31(F)/ UIT19CE41(F)	Computer Forensics	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

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	Knowledge Level (according to Bloom's Taxonomy)
CO1	Describe the basics of Computer Forensics Fundamentals.	K1,K2
CO2	Differentiate the security measure in Computer Forensics Systems	K1,K3
CO3	Recover data and collect evidence in cyber	K2,K3
CO4	Preserve the collected evidences in Computer Forensics Systems	K1,K3
CO5	Demonstrate the concept of Forensics Analysis.	K1,K2

K1 - Knowledge K2 - Understand K3 – Apply

Mapping of COs with POs

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

(S – Strong , M – Medium , L – Low)

	CA		End of Semester
	First	Second	
<i>Knowledge-K1</i>	40%	40%	40%
<i>Understand-K2</i>	40%	40%	40%
<i>Apply-K3</i>	20%	20%	20%
<i>Total marks</i>	52	52	140

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

Text Books:

1. John R. Vacca, 2005, 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, Stuart, 2008, "Computer Forensics and Investigations", Cengage Learning, India Edition, 2008.
2. Richard E. Smith, 2008, "Internet Cryptography", 3rd Edition Pearson Education.
3. Marjie T. Britz, 2013, "Computer Forensics and Cyber Crime": An Introduction", 3rd Edition, Prentice Hall.

Course Designers:

1. Mr. S. Kumarappan.
2. Mrs. M. Hemalatha.

Lecture Schedule

Chapter/Section	Topic	Lecture hours
1.1	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?.	5
1.2	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	5
1.3	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.	5

2.1	Types of Computer Forensics Systems: Internet Security Systems - Intrusion Detection Systems -Firewall Security Systems -Storage Area Network Security Systems -Network Disaster Recovery Systems	5
2.2	Public Key Infrastructure Systems -Wireless Network Security Systems - Satellite Encryption Security Systems -Instant Messaging (IM) Security Systems	4
2.3	Net Privacy Systems -Identity Management Security Systems -Identity Theft -Biometric Security Systems -Homeland Security Systems.	4
3.1	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.	5
3.2	Evidence Collection and Data Seizure: Why Collect Evidence? - Collection Options -Obstacles -Types of Evidence -	6
3.3	The Rules of Evidence -Volatile Evidence -General Procedure - Collection and Archiving	3
3.4	Methods of Collection -Artifacts -Collection Steps -Controlling Contamination: The Chain of Custody -Reconstructing the Attack.	2
4.1	Duplication and Preservation of Digital Evidence: Preserving the Digital Crime Scene-Computer Evidence Processing Steps	5
4.2	Legal Aspects of Collecting and Preserving Computer Forensic Evidence	5
4.3	Computer Image Verification and Authentication: Special Needs of Evidential Authentication -Practical Considerations –Practical Implementation.	4
5.1	Computer Forensics Analysis:Discovery of Electronic Evidence: Electronic Document Discovery: A Powerful New Litigation Tool	5
5.2	Identification of Data: Timekeeping -Forensic Identification and Analysis of	4
5.3	Reconstructing Past Events: How to Become a Digital Detective - Useable File Formats -Unusable File Formats -Converting Files.	4
5.4	Networks: Network Forensics Scenario -A Technical Approach - Destruction of Email -Damaging Computer Evidence -Tools Needed for Intrusion Response to the Technical Surveillance Devices. Destruction of Data -System Testing.	4
	Total	75

SkilbaseElective Course

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DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those who joined in 2019 and after)

CourseCode	Course Title	Category	L	T	P	Credit
UIT19SE41(A)/UIT19SE61(A)	Robotics	SEC	2	0	0	2

L - Lecture T - Tutorial P-Practicals

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

Preamble

To develop an ability to analyze and design the motion for articulated systems and acquire to develop an ability to use software tools for analysis and design of robotic system.

Course Outcomes

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

#	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO1	Illustrate the basic concepts of robotics and analysis	K1,K2
CO2	Extend the various mathematical applications in robotics	K1,K3
CO3	Discuss the various manipulators in robotics	K1,K2
CO4	Implement the manipulators and its types	K1,K2

K1 - Knowledge

K2 - Understand

K3 - Apply

Mapping of COs with POs

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

(S – Strong , M – Medium , L – Low)

Blooms taxonomy

	CA		End of Semester
	First	Second	
<i>Knowledge-K1</i>	40%	40%	40%
<i>Understand-K2</i>	40%	40%	40%
<i>Apply-K3</i>	20%	20%	20%
<i>Total marks</i>	52	52	140

Robotics:

UNIT I:

15hours

Introduction-Brief history-Types of robots-Technology of robots-Basic principles in robotics-Notation-symbolic computation and numerical analysis.**Mathematical Representation of Robots**:Introduction-Position and orientation of a Rigid body-Some properties of rotation matrices-Successive rotations of a rigid body-Representation of orientation by three angles-Other representation of orientation-Transformation between coordinate systems-Homogeneous transformation-Properties of AB[T]-Representation of joints-rotary joint-prismatic joint-Screw joint-Cylindrical joint-Spherical joint-Spherical-Spherical joint pair-Other joints-Representation of Links Using Denavit-Hartenberg Parameters-Link parameters of intermediate links-First and last links-Summary of link parameters-Link Transformation Matrices- Homogeneous coordinates, Lines, Screws, and Twists.

UNIT II:

15 hours

Kinematics of Serial Manipulators:Introduction-Degrees of Freedom of a Manipulator-Inverse Kinematics of serial Manipulators – Manipulator with non-intersecting Wrist .**Kinematics of Parallel Manipulators**: Introduction – Degrees of freedom – Loop-closure constraint equations – Direct Kinematics of parallel manipulators-mobility of parallel Manipulators- Inverse Kinematics of parallel manipulators.

Text Book

Ashitava Ghosal, Reprint 2012, **Robotics Fundamental concepts and Analysis**, Seventh impression, Published by Oxford University press New Delhi.

UNIT	CHAPTER/SECTIONS
I	1(1.1 to 1.7), 2(2.1 to 2.8)
II	3(3.1 to 3.5),4(4.1 to 4.4,4.6 to 4.7)

Reference Book

1. David Cook, 2009, Robot Building For Beginners, Second Edition.
2. www.electronicteacher.com/robotics/robotics-tutorial/robotics-beginners
3. www.instructables.com/simple-robotics-for-beginners

Course designer :

1. M. Hemalatha
2. S. Kumarappan

Lecture Schedule

Chapter/ Section	Topic	Lecture hours
1.1	Introduction -Brief history-Types of robots-Technology of robots-Basic principles in robotics- Notation-symbolic computation and numerical analysis.	3
1.2	Mathematical Representation of Robots: Introduction-Position and orientation of a Rigid body-Some properties of rotation matrices-Successive rotations of a rigid body-Representation of orientation by three angles-Other representation of orientation.	3
1.3	Transformation between coordinate systems-Homogeneous transformation-Properties of AB[T].	3
1.4	Representation of joints-rotary joint-prismatic joint-Screw joint-Cylindrical joint-Spherical joint-Spherical-Spherical joint pair-Other joints.	3
1.5	Representation of Links Using Denavit-Hartenberg Parameters-Link parameters of intermediate links-First and last links-Summary of link parameters-Link Transformation Matrices- Homogeneous coordinates, Lines, Screws, and Twists.	3
2.1	Kinematics of Serial Manipulators: Introduction-Degrees of Freedom of a Manipulator.	3
2.2	Inverse Kinematics of serial Manipulators – Manipulator with non-intersecting Wrist .	4
2.3	Kinematics of Parallel Manipulators: Introduction – Degrees of freedom – Loop-closure constraint equations .	4
2.4	Direct Kinematics of parallel manipulators-mobility of parallel Manipulators- Inverse Kinematics of parallel manipulators.	4
	Total	30

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DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those who joined in 2019 and after)

CourseCode	Course Title	Category	L	T	P	Credit
UIT19SEL41(B)/ UIT19SEL61(B)	Desktop Publishing Lab	SEC			2	2

L - Lecture

T - Tutorial

P – Practicals

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

Preamble

This lab assignment will provide a brief introduction to desktop publishing software such as Photoshop, CorelDraw, and Flash. Understand the importance of good interface design. This course trains to handle the rich tools in designing software's.

Course Outcomes

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

#	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO1	Work in the Photoshop and develop their skills in editing and altering photographs.	K1,K2
CO2	Handle the tool bar, layers, and the adjustments panel in Photoshop.	K1,K2
CO3	Design and produce print material manually using Corel Draw.	K1,K3
CO4	Create and view "multimedia rich" content on the web.	K1,K2

K1 - Knowledge

K2 - Understand

K3 – Apply

Mapping of COs with POs

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

(S – Strong , M – Medium , L – Low)

Exercices

Topic	PHOTOSHOP
1	Mastering the effects of the clone and healing brush tools Understanding and working with Layers and the Adjustments Panel Understanding the basics of Masking Transforming and maximizing Smart Objects Employing Smart Filters to create interesting effects Color correction Working with text and vector shapes
Topic	COREL DRAW
2	Design a visiting card Design a postcard Design a poster Design a brochure Design a magazine (at least 16 pages) Prepare a tabloid Prepare a front page of a newspaper
Topic	FLASH
3	Create an animation to represent the growing moon. Create an animation to indicate a ball bouncing on steps. Movement of a cloud Display the background given (filename: tulip.jpg) through your name. Create an animation with the following features. Letters should appear one by one Fill the color, The text should change to a different color after the displaying full word

Course designer :

1. M. Hemalatha
2. S. Kumarappan

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DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those who joined in 2019 and after)

CourseCode	Course Title	Category	L	T	P	Credit
UIT19SE41(C)/UIT19SE61(C)	Embedded Systems	SEC	2	0	0	2

L - Lecture T - Tutorial P - Practicals

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

Preamble

To learn the basic concepts of Embedded Systems and 8051 Microcontroller and the basics of RTOS and to learn the method of designing Real Time Systems.

Course Outcomes

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

#	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO1	Illustrate the concepts of embedded systems, how to embed Hardware units and Software in a system.	K1,K2
CO2	Describe about various classifications and examples of Embedded Systems.	K1,K2
CO3	Discuss the Real Time Operating System I, Multiple Processes and Multiple Threads in an Application, Inter Process Communication.	K1,K2
CO4	Explain Synchronization and RTOS II Operating System Services, Process Management and Memory Management.	K1,K2

K1 - Knowledge

K2 - Understand

K3 – Apply

Mapping of COs with POs

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

(S – Strong , M – Medium , L – Low)

Blooms taxonomy

	CA		End of
	First	Second	Semester
<i>Knowledge-K1</i>	40%	40%	40%
<i>Understand-K2</i>	40%	40%	40%
<i>Apply-K3</i>	20%	20%	20%
<i>Total marks</i>	52	52	140

Embedded Systems

UNIT I

15 hours

Introduction to Embedded Systems: Embedded Systems- Processor Embedded Into A System-Embedded Hardware Units and Devices in a System – Embedded Software in a System and an Overview of Programming Languages- Introduction to Embedded System design - Introduction to Embedded System Architecture - Introduction to Embedded System Model - Classification of Embedded Systems – Examples of the Embedded Systems. **8051:** Introduction to Microcontrollers and Microprocessors - Examples of a Microcontroller – 8051 Architecture.

UNIT II

15 hours

Real – Time Operating System I: Multiple Processes in an Application – Multiple Threads in an Application - Inter Process Communication and Synchronization – Signals – Queues and Mailboxes – Pipe and Socket functions. **Real – Time Operating System II:** Operating System Services – Process Management - Timer Function –Event Function – Memory Management – Device, Files And I/O Subsystem Management– Basic Design using a RTOS.

Text Books:

Rajkamal, 2015. “Embedded Systems Architecture, Programming And Design” Tata McGraw-Hill Education Private Ltd, Third Edition.

Units	Chapters
I	1 (1.1 to 1.8, 1.10), 3 (3.1, 3.3)
II	9 (9.1, 9.2, 9.7, 9.8, 9.12, 9.13), 10 (10.1 to 10.6, 10.9)

References:

- 1.Marilyn Wolf : 2012. “Computers As A Components”,Third Edition, Morgan Kaufman Series.
- 2.A.P.Godse&A.O.Mulani : 2009. ”Embedded Systems”,ThirdEdition, Technical publications
3. B.Kanth Rao, 2011: “Embedded Systems”, PHI Learning Private Limited.

Web Resources:

www.tutorialspoint.com

Course Designers:

1. Ms. C.D. Balapriya
2. Mrs. P. Praveena

Lecture Schedule

Chapter/ Section	Topic	Lecture hours
1.1	Introduction to Embedded Systems: Embedded Systems	1
1.2	Processor Embedded Into A System	1
1.3	Embedded Hardware Units and Devices in a System	2
1.4	Embedded Software in a System and an Overview of Programming Languages	1
1.5	Introduction to Embedded system Architecture	2
1.6	Introduction to Embedded system Model	2
1.7	Classification of Embedded systems	1
1.8	Examples of the Embedded Systems	1
1.9	8051: Introduction to Microcontrollers and Microprocessors	1
1.10	Example of a Microcontroller	1
1.11	8051 Architecture	2
2.1	Real – Time Operating Systems I: Multiple Processes in an Application	1
2.2	Multiple Threads in an Application	1
2.3	Inter Process Communication and Synchronization	2
2.4	Signals	1
2.5	Queues and Mailboxes	1
2.6	Pipes and Socket functions	1
2.7	Real – Time Operating System II: Operating System Services	1
2.8	Process Management	1
2.9	Timer Function	1
2.10	Event Function	1
2.11	Memory Management	1
2.12	Device, Files And I/O Subsystem	2
2.13	Basic Design Of RTOS.	1
Total		30

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DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those who joined in 2019 and after)

CourseCode	Course Title	Category	L	T	P	Credit
UIT19SE41(D)/ UIT19SE61(D)	Python Programming	SEC	2	0	0	2

L - Lecture

T - Tutorial

P-Practicals

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

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	Knowledge Level (according to Bloom's Taxonomy)
CO1	Demonstrate the basic concepts of variables expressions	K1,K2
CO2	Explain the concepts of cases strings and repetitions	K1,K2
CO3	Sketch out the strings and lists	K1,K3
CO4	Illustrate the concept of functions and loopings and counters.	K1,K2

K1 - Knowledge

K2 - Understand

K3 – Apply

Mapping of COs with POs

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

(S – Strong , M – Medium , L – Low)

Blooms taxonomy

	CA		End of Semester
	First	Second	
<i>Knowledge-K1</i>	40%	40%	40%
<i>Understand-K2</i>	40%	40%	40%
<i>Apply-K3</i>	20%	20%	20%
<i>Total marks</i>	30	30	65

Python Programming

Unit-I:

15 hours

The way of the program- Variables, expressions and statements-Functions-Case study: interface design: Turtle World -Simple repetition- Exercises- Encapsulation – Generalization-Interface design- Refactoring - A development plan -docstring-Conditionals and recursion.

Unit-II:

15 hours

Fruitful functions – Iteration-Strings-Lists:A list is a sequence -Lists are mutable- Traversing a list - List operations –List Methods-List arguments-Dictionaries: Dictionary as a set of counters - Looping and dictionaries-Global Variable.

Text Books:

1. Allen Downey, 2012,Think Python, Green Tea Press

UNIT	Chapter /Sections
I	1,2,3,4,5
II	6,7,8,10

Reference Books:

- 1.PaulGries , Jennifer Campbell, Jason Montojo, 2014, Practical Programming: An Introduction to Computer Science Using Python, Pragmatic Bookshelf.
2. Gutttag john V ,2014, Introduction To Computation And Programming Using Python ,PHI Learning Private Limited New Delhi.

Course Designer:

1. Mrs. M. Hemalatha
2. Mr. S. Kumarappan

Lecture Schedule

Chapter/ Section	Topic	Lecture hours
1	The way of the program	15
1.1	Variables, expressions and statements-Functions-Case study: interface design: Turtle World -Simple repetition- Exercises.	4
1.2	Encapsulation – Generalization.	3
1.3	Interface design- Refactoring - A development plan – docstring.	3
1.4	Conditionals and recursion.	4
2	Fruitful functions	15
2.1	Iteration-Strings-Lists:A list is a sequence -Lists are mutable.	3
2.1	Traversing a list - List operations –List Methods-List arguments-	4
2.3	Dictionaries: Dictionary as a set of counters.	4
2.4	Looping and dictionaries-Global Variable.	4
	Total	30

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DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those who joined in 2019 and after)

CourseCode	Course Title	Category	L	T	P	Credit
UIT19SE41(E)/UIT19SE61(E)	Logical Reasoning	SEC	2	0	0	2

L - Lecture

T - Tutorial

P-Practicals

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

Preamble

To Solve various logical reasoning problems for Clear competitive examinations with high score and Improve their verbal and non-verbal ability.

Course Outcomes

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

#	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO1	Describe the basic concepts of Number series and alphabetic series	K1,K2
CO2	Explain the concepts of pattern analog and letter coding	K1,K2
CO3	Identify the Blood relations and jumbled up descriptions	K1,K3
CO4	Evaluate the concepts of relation process and mathematical operations	K1,K3

K1 - Knowledge

K2 - Understand

K3 - Apply

Mapping of COs with POs

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

(S – Strong , M – Medium , L – Low)

Blooms taxonomy

	CA		End of Semester
	First	Second	
<i>Knowledge-K1</i>	40%	40%	40%
<i>Understand-K2</i>	40%	40%	40%
<i>Apply-K3</i>	20%	20%	20%
<i>Total marks</i>	30	30	65

Logical Reasoning

UNIT I: SERIES AND CODING

15 Hours

Series compilation – Number series- Alpha numeric series- Alphabetic series- Patterns- analog – Direct and simple analogs – pair analogies – Alphabet analog- Letter coding-Direct letter coding – number/symbol coding

UNIT II: RELATION AND MATHEMETICAL OPERATION

15 Hours

Blood relations – Jumbled up descriptions- Relation process- Mathematical Operation – problem by substitution Interchanges of sign and numbers

Text Book

1. Aggarwal . R.S., 2015. Modern Approach to Verbal and Nonverbal Reasoning (Fully solved) Revised edition, S. Chand & Company Pvt. Ltd, New Delhi

UNIT	Chapter/Section
I	Part A, Section I , 1A to 1E, 2A to 2G, 4A to 4E
II	Part A, Section I,5A to 5B, 13A to 13C

Reference Book

1. Abhijit Guha, 2014, Quantitative Aptitude For Competitive Examinations, 5th edition, Tata McGraw – Hill Publications, New Delhi.
2. Sijwali BS, InduSijwali, 2014. A New Approach to Reasoning Verbal & Non-Verbal Paperback ,Arihant Publication

Course Designer

1. Mr. G. Gowtham
2. Mrs. M.Hemalatha

Lecture Schedule

Chapter/ Section	Topic	Lecture hours
1.1	Series: Series compilation – Number series- Alpha numeric series	5
1.2	Alphabetic series- Patterns	5
1.3	analog – Direct and simple analogs – pair analogies – Alphabet analog.	5
2.1	Coding-Decoding :Letter coding-Direct letter coding	5
2.2	number/symbol coding	5
2.3	Blood relations – Jumbled up descriptions- Relation process.	5
	Total	30

THIAGARAJAR COLLEGE, MADURAI- 9

(An Autonomous Institution, affiliated to Madurai Kamaraj University)

DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those who joined in 2019 and after)

CourseCode	Course Title	Category	L	T	P	Credit
UIT19SE41(F)/UIT19SE61(F)	Software Testing Foundation	SEC	2			2

L - Lecture

T - Tutorial

P – Practicals

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

Preamble

This course provides a basic understanding of software testing and its types. Defines software quality factors and how do we test. Demonstrate the testing techniques and its process. Helps to write testing reports.

Course Outcome

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

#	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO1	Demonstrate the need of testing and its types.	K1,K2
CO2	Identify suitable tests to be carried out in Software Development.	K1,K2
CO3	Document test plans and test cases designed.	K2,K3
CO4	Illustrate the use of automatic testing tools.	K2,K3

K1 - Knowledge

K2 - Understand

K3 – Apply

Mapping of COs with POs

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

(S – Strong , M – Medium , L – Low)

Blooms taxonomy

	CA		End of Semester
	First	Second	
<i>Knowledge-K1</i>	40%	40%	40%
<i>Understand-K2</i>	40%	40%	40%
<i>Apply-K3</i>	20%	20%	20%
<i>Total marks</i>	30	30	65

Software Testing Foundation

Unit I:

15 hours

Principles of Testing :Context of Testing in Producing Software – The Incomplete Car – Dijkstra’s Doctrine – A Test in Time! – The Cat and the Saint – Test the Tests First! – The Pesticides Paradox. **White Box Testing**: What is White Box Testing? - Static Testing –Structural Testing – Challenges in White Box Testing. **Black Box Testing**: What is Black Box Testing – Why Black Box Testing – When to do Black Box Testing? **Testing of Object-Oriented Systems**: Introduction – Primer on Object-Oriented Software – Differences in OO Testing.

Unit II:

15 hours

Test Planning, Management, Execution, and Reporting: Introduction- Test Planning - Test Management –Test Process -Test Reporting. **Software Test Automation**: What is Test Automation? – Terms Used in Automation – Skills Needed for Automation – What to Automate, Scope for Automation -Design and Architecture for Automation – Generic Requirements for Test Tool/Framework – Process Model For Automation – Selecting a Test Tool –Automation for Extreme Programming Model – Challenges in Automation.

Text Books:

1. Srinivasan Desikan, Gopaldaswamy Ramesh, 2014, “Software Testing Principles and Practices”,Pearson Education, New Delhi.

Unit	Chapters/Section
I	1 (1.1 – 1.8), 3,4,11.
II	15,16.

References:

1. RenuRasani, PradeepOak, 2011, “Software Testing Effective Methods, Tools and Techniques , Tata McGrawHill Education Private Limited, New Delhi.
2. Ilene Burnstein,2003,“Practical Software Testing”,Springer, New York.

Course Designers:

1. Mr. S. Kumarappan.
2. Mrs. M. Hemalatha.

Lecture Schedule

Chapter/ Section	Topic	Lecture hours
1.1	Principles of Testing :Context of Testing in Producing Software – The Incomplete Car – Dijkstra’s Doctrine – A Test in Time! – The Cat and the Saint – Test the Tests First! – The Pesticides Paradox.	4
1.2	White Box Testing: What is White Box Testing? - Static Testing –Structural Testing –Challenges in White Box Testing	4
1.3	Black Box Testing: What is Black Box Testing – Why Black Box Testing – When to do Black Box Testing?	4
1.4	Testing of Object-Oriented Systems: Introduction – Primer on Object-Oriented Software – Differences in OO Testing.	3
2.1	Test Planning, Management, Execution, and Reporting: Introduction- Test Planning - Test Management –Test Process -Test Reporting.	3
2.1	Software Test Automation: What is Test Automation? – Terms Used in Automation	4
2.3	– Skills Needed for Automation – What to Automate, Scope for Automation - Design and Architecture for Automation – Generic Requirements for Test Tool/Framework	4
2.4	Process Model For Automation – Selecting a Test Tool – Automation for Extreme Programming Model – Challenges in Automation.	4
	Total	30

Non Major Elective

THIAGARAJAR COLLEGE, MADURAI- 9
 (An Autonomous Institution, affiliated to Madurai Kamaraj University)
DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY
 (For those who joined in 2019 and after)

Course Code	Course Title	Category	L	T	P	Credit
UIT19NE31	Electronic Commerce		2			2

L - Lecture T - Tutorial P –Practicals

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

Preamble

Depict the Electronic commerce's features and portray how the internet technology play a vital role on electronic commerce.

Course Outcomes

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

#	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO1	Describe the basic of commerce and it's types	K1,K2
CO2	Portray the Infrastructure of Internet, Intranet and Extranet	K1,K2
CO3	Project the various types of payments systems and it's working principles.	K1,K2
CO4	Express the mobile commerce principles and it's standards.	K1,K2

K1 - Knowledge K2 - Understand K3 – Apply

Mapping of COs with POs

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1					
CO2					
CO3					
CO4					

(S – Strong , M – Medium , L – Low)

Blooms taxonomy

	CA		End of Semester
	First	Second	
<i>Knowledge-K1</i>	40%	40%	40%
<i>Understand-K2</i>	40%	40%	40%
<i>Apply-K3</i>	20%	20%	20%
<i>Total marks</i>	30	30	65

Electronic Commerce

Unit I :

15 hours

Foundations of E-Commerce - Business to Consumer(B2C) Electronic Commerce - Business to Business Electronic Commerce - Network Infrastructure for E- Commerce - The Internet , Intranet and Extranets as E - Commerce Infrastructure.

Unit II :

15 hours

Electronic Payment Systems - Mobile Commerce - WAP (Wireless Application Protocol).

Text Books:

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

Unit	Chapters(pages)
1	1-69,71-91
2	159-177,179-202

References:

1. Gray P. Schneider, 2008, Electronic commerce, 8th Edition, Course Technology.
2. Tanner Larson, 2016, E-Commerce Evolved, Kindle Edition.
3. V. Rajaraman, 2011, Essentials of E-Commerce Technology, PHI Learning Private Ltd.

Web Resources:

1. https://www.tutorialspoint.com/e_commerce
2. <https://www.htmlgoodies.com/beyond/webmaster/projects/electronic-commerce-tutorial.html>
3. <https://www.slideshare.net/selvagkm24/e-commerce-tutorial-45180083>

Course Designers:

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

Lecture Schedule

Chapter/ Section	Topic	Lecture hours
1.1	Foundations of E-Commerce - Business to Consumer(B2C) Electronic Commerce - Business to Business Electronic Commerce	5
1.2	Network Infrastructure for E- Commerce	5
1.3	The Internet , Intranet and Extranets as E - Commerce Infrastructure.	5
2.1	Electronic Payment Systems	5
2.2	Mobile Commerce	5
2.3	WAP (Wireless Application Protocol)	5
	Total Hours (15+15)	30

THIAGARAJAR COLLEGE, MADURAI- 9

(An Autonomous Institution, affiliated to Madurai Kamaraj University)

DEPARTMENT OF COMPUTER APPLICATION & INFORMATION TECHNOLOGY

(For those who joined in 2019 and after)

Course Code	Course Title	Category	L	T	P	Credit
UIT19NE51	Internet Security – Principles & Practices	NME	2	0	0	2

L - Lecture

T - Tutorial

P – Practicals

Year	Semester	Max. Marks CA	Max. Marks SE	Total
III	V	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	Knowledge Level (according to Bloom's Taxonomy)
CO1	Describe various attacks & threats on Internet	K1,K2
CO2	Explain the cryptography and describes message security	K1,K2
CO3	Demonstrate various hash functions on internet security	K1,K2
CO4	Discuss different types of message authentication codes and it's implementation issues.	K1,K2

K1 - Knowledge

K2 - Understand

K3 – Apply

Mapping of COs with POs

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1					
CO2					
CO3					
CO4					

(S – Strong , M – Medium , L – Low)

Blooms taxonomy

	CA		End of Semester
	First	Second	
<i>Knowledge-K1</i>	40%	40%	40%
<i>Understand-K2</i>	40%	40%	40%
<i>Apply-K3</i>	20%	20%	20%
<i>Total marks</i>	30	30	65

Internet Security – Principles and Practices

UNIT I

15 hours

Introduction – content of cryptography – introduction to cryptography – Message security – Block ciphers

UNIT II

15 hours

Hash functions – Message Authentication codes – The Secure channel – Implementation Issues.

Text Books:

1. N. Ferguson, B. Schneier, and T. Kohno, 2015, Cryptography Engineering, Wiley Publication

Unit	Chapters
I	1,2,3,4
II	5,6,7,8

References:

1. R. Anderson, Security Engineering, Second Edition, Wiley 2008.
2. C. Kaufman, R. Perlman and M. Speciner, Network Security: Private Communication in a Public World, Second Edition, Prentice Hall PTR 2003.
3. D. B. Chapman and E. D. Zwicky, Building Internet Firewalls. Second Edition, O'Reilly & Associates 2000.

Web Resources:

1. <https://www.tutorialspoint.com/cryptography/>
2. <https://www.guru99.com/how-to-make-your-data-safe-using-cryptography.html>
3. <https://www.geeksforgeeks.org/computer-network-message-authentication-code-works/>

Chapter/ Section	Topic	Lecture hours
1.1	Introduction – content of cryptography – introduction to cryptography	5
1.2	Message security	5
1.3	Block ciphers	5
2.1	Hash functions	5
2.2	Message Authentication codes	5
2.3	The Secure channel – Implementation Issues.	5
	Total Hours (15+15)	30

THIAGARAJAR COLLEGE, MADURAI – 9.
(Re-Accredited with ‘A’ Grade by NAAC)
ENVIRONMENTAL STUDIES

(For those joined B.A., B.Sc., B.Com., B.B.A., B.C.A on or after June 2019)

Course Code	Course Title	Category	L	T	P	Credit
U19EVS11	Environmental Studies	AECC1	2	-	-	2

Year	Semester	Int. Marks	Ext.Marks	Total
First	First	15	35	50

Preamble

Students acquire knowledge on the basic concepts, components and importance of environment.

Course Outcomes

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

	Course outcomes	Knowledge Level
CO1	Define the structure and functions of ecosystem	K1
CO2	Explain the benefits of biodiversity conservation	K2
CO3	Summarise the sources, effects and control measures of various types of Pollutants	K1
CO4	Perceive the environment legislations in India for sustainable development.	K3

K1: Knowledge K2: Understand K3: Apply

Blooms taxonomy: Assessment Pattern

	CA		End of Semester
	First	Second	
<i>Knowledge</i>	40%	40%	40%
<i>Understand</i>	40%	40%	40%
<i>Apply</i>	20%	20%	20%

Unit I

Definition and Scope of Environmental Studies – Ecology and Ecosystem – Structure of an Ecosystem – Food chains, food webs and ecological pyramids – Causes of Biodiversity Loss – Benefit and Conservation of Biodiversity

Unit II

Environmental problems and Management: Causes, effects and Control measures of : Air Pollution – Water Pollution – Noise Pollution – Nuclear Hazards. Solid waste management and Waste Disposal methods. Climate change and Global Warming causes and Measures. Waste and Plastics. Urban environmental problems and measures. Environmental Legislations in India. Sustainable development and Inclusive growth.

Text Book

1. Kanagasabai, C.S. 2005. Environmental Studies. Rasee publishers. Madurai.

Reference Books

1. Yogendra, N. and Srivastava, N. 1998. Environmental Pollution, Ashish Publishing House. New Delhi.
- Sapru R.K.2001. Environment Management in India, Vol. I & Vol. II Ashish publishers house, New Delhi.

THIAGARAJAR COLLEGE, MADURAI – 9.
(Re-Accredited with ‘A’ Grade by NAAC)
VALUE EDUCATION

(For those joined B.A., B.Sc., B.Com., B.B.A., B.C.A on or after June 2019)

Course Code	Course Title	Category	L	T	P	Credit
U19VE51	Value Education	AECC1	2	-	-	2

Year	Semester	Int. Marks	Ext.Marks	Total
Third	Fifth	15	35	50

Preamble

Students acquire knowledge on the basic concepts, components and importance of environment.

Course Outcomes

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

	Course outcomes	Knowledge Level
CO1	Define the structure and functions of ecosystem	K1
CO2	Explain the benefits of biodiversity conservation	K2
CO3	Summarise the sources, effects and control measures of various types of Pollutants	K1
CO4	Perceive the environment legislations in India for sustainable development.	K3

K1: Knowledge K2: Understand K3: Apply

Blooms taxonomy: Assessment Pattern

	CA		End of Semester
	First	Second	
<i>Knowledge</i>	40%	40%	40%
<i>Understand</i>	40%	40%	40%
<i>Apply</i>	20%	20%	20%

Unit I

Self Development – Introduction - Definition and Types of Values – Self Assessment – Values needed for self development - Values needed for family life –Principles of happy living

Character development- Good character – Good relationships - Legendary people of highest character – The quest for character –Developing character -The key to good character.

Unit II:

Positive Thinking and Self Esteem - Types of thoughts - Areas of thinking - Developing thought pattern - External influences on Thoughts - Methods to keep outlook positive – Meaning of Self Esteem – Self empowerment.

Stress free living – Illusions and causes - Symptoms and stages of stress – Self confidence– Role models and leadership qualities – Critical thinking - Communication skills – Happy and successful life.

Reference

Study material / Course material

Values for Excellence in Life|| Compiled by then Curriculum Development Cell Thiagarajar College, Madurai, in collaboration with the Education wing, Brahma Kumaris, Madurai.

விழுமியக் கல்வி

கூறு - 1

சுய முன்னேற்றம்

அறிமுகம் - விழுமியங்களின் விளக்கம் மற்றும் வகைகள் - சுயமதிப்பீடு - சுய முன்னேற்றத்திற்கு விழுமியங்களின் தேவை - குடும்ப வாழ்க்கைக்கு விழுமியங்களின் தேவை - மகிழ்ச்சியான வாழ்க்கைக்கான கொள்கைகள்

பண்பு வளர்ச்சி

நற்பண்பு - நல்லுறவு - உயரிய பண்புகளால் உயர்ந்த பெருமக்களாதல் - பண்புகளைத் தேடல் - பண்புகளை வளர்த்தல் - நற்பண்புகளுக்கான திறவுகோல்.

கூறு - 2

சுயமரியாதையும் நேர்மறைச் சிந்தனையும்

சிந்தனையின் வகைகள் - சிந்தனைப் பகுதிகள் - சிந்தனையை வளர்க்கும் முறை - சிந்தனையில் புறத்தாக்கங்கள் - நேர்மறைப் பண்பை வெளித்தோற்றத்தில் காட்டும்முறை - சுயமரியாதையின் பொருள் - சுய அதிகாரமளித்தல்

அழுத்தமில்லா வாழ்க்கை

பிரமைகளும் காரணங்களும் - அழுத்த நிலைகளுக்கான அறிகுறிகள் - தன்னம்பிக்கை - தலைமைப் பண்பில் முன்னுதாரணங்கள் - விமர்சனச் சிந்தனை - தொடர்புத் திறன்கள் - மகிழ்ச்சி மற்றும் வெற்றிகரமான வாழ்க்கை

Reference

Study material / Course material

“Values for Excellence in Life” Compiled by then Curriculum Development Cell Thiagarajar College, Madurai, in collaboration with the Education wing, Brahma Kumaris, Madurai

Self Study Paper

Thiagarajar College (Autonomous) :: Madurai – 625 009

SELF STUDY PAPER

(For those joined UG on or after June 2019)

Course Code	Course Title	Category	L	T	P	Credit
U19SS51	Soft Skills	Self Study Paper	-	-	-	5

Year	Semester	Int. Marks	Ext.Marks	Total
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Third	Fifth	----	100	100
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*** Carries Extra 5 credits that do not form part mandatory credits (140) required for completion of the course. Optional paper not compulsory for all UG students.**

Preamble

Prepare the students to develop skills, provide training to face interview .prepare themselves with the right skill-sets and attitude

Course Outcomes

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

	Course outcomes	Knowledge Level
CO1	Possess a basic idea on the understanding of nature, cause, effect and ways to deal with critical challenges in everyday life	K1,K2
CO2	Overcome the aspects such as Communication barriers, Stress management, Emotions.	K3
CO3	Gain insights into high-in-demand soft skills and prepare themselves with the right skill-sets and attitude	K1,K2
CO4	Develop or take part inteam work, Thinking skills, Creativity and time management.	K3
CO5	Prepare themselves to face different levels of interviews. Develop skills to manage an organization	K3

K1: Knowledge K2: Understand K3: Apply

Blooms taxonomy: Assessment Pattern

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

Unit - 1

Self Awareness (Concept of Self-esteem, Positive and Negative self esteem) Motivation (Nature and types, Factors enhancing and affecting Motivation, Needs and Drives) (Creativity Introduction, Nature of Creativity, Stages of Creativity, Enhancing Creativity, Verbal and Non Verbal Creativity) Values and Ethics (Nature and Significance, Values, Ethics, Work Ethics, Character building, Manners and Ethics)

Self Management (Self management skills and Social Competency, Social Competency Behaviour, Value Orientation, Life goals)

Unit 2

Communication and Thinking Communication (Definition, Types, Styles, Culture and Communication); Thinking (Nature, Types, Problem Solving, Proactive thinking, Positive Thinking, Assertiveness)

Unit 3

Emotions (Nature of emotions, Emotional Intelligence and its strategies, Attachment, Love, Happiness, Introduction to Anger – Causes, Types, Functions and Consequences, Anger management)

Stress (Nature of stress, Relation between Demands and Coping, Types and Causes, Effects and Indicators, Management of Stress, Time management and Stress reduction) Empathy (Definition, Nature and Factors enhancing empathy)

Unit4

Excelling through a placement process(Resume writing; Taking a written test; Group discussion – Need, Types, Tips and techniques; Interview handling – Tips and Techniques)

Unit 5

Being effective in an organisation

50 rules of work, Professional Etiquettes and Mannerism, Building relationship within an organisation, Communication skills, Working in teams, Managing conflicts, Effective negotiation skills, Problem solving using creativity.

Text book

1. Life Skills for Success – AlkaWadkar – 2016 Edition SAGE | TEXTS Sagepublishing.com
2. Campus to Corporate – Roadmap to Employability – Gangadhar Joshi – 2015 Edition SAGE | TEXTS Sagepublishing.com

Reference textbook

- 1 ACE of Soft skills – Gopalaswamy Ramesh and Mahadevan Ramesh, Pearson Publication
- 2 Bridging the soft skills gap – Bruce Tulgan – 2015 Edition – Wiley Publication

B.Sc. Information Technology

Assessment values of course learning outcomes and their mapping with program specific outcomes (PSOs)

Title of the courses	PSO1	PSO2	PSO3	PSO4	PSO5
Programming in C	6	2	6	2	1
Digital Principles and Computer Organization	3	4	3	4	1
Programming in C Lab	3	2	9	4	1
Digital Design Lab	3	4	6	1	1
Object Oriented Programming with C++	6	6	9	2	1
Microprocessor and Assembly Language Programming	6	2	6	2	4
Object Oriented Programming with C++ Lab	3	2	6	2	1
Structure Program Logic & Design Lab	6	2	3	3	2
Data Structures	9	7	4	9	2
Relational Database Management System	6	2	6	4	1
Data structures using C Lab	6	6	10	6	3
RDBMS Lab	9	4	9	6	2
Operating System	9	6	6	6	2
Java Programming	3	4	6	4	1
Operating System Lab	6	4	9	4	1
Java Programming Lab	6	2	6	2	2
.Net Technology	6	9	6	6	3
Mobile Application Development	9	2	9	2	2
Software Engineering	9	6	4	3	2
Net Technology Lab	9	6	12	4	2
Mobile Application Development Lab	6	4	6	2	1
Web Designing with PHP	9	4	9	4	3
Computer Networks	5	3	5	6	3
Data Warehousing & Mining	6	6	4	4	3
Web Designing with PHP Lab	6	2	9	4	1
Networking Lab	9	4	9	4	3
Major Project	6	2	3	2	3

Core Elective Papers

Title of the courses	PSO1	PSO2	PSO3	PSO4	PSO5
Cloud Computing	6	2	4	5	3
Soft Computing	5	4	3	5	3
E - Commerce	9	2	2	4	2
Software Project Management	6	3	5	4	3
Principles of Data Communication	9	3	2	4	2
Computer Forensics	9	5	4	2	3

SBE / NME Papers

Title of the courses	PSO1	PSO2	PSO3	PSO4	PSO5
Robotics	8	6	4	2	4
Desk Top Publishing Lab (Photoshop, Corel Draw, Flash)	6	5	8	2	2
Embedded System	6	3	2	3	2
Python Programming	9	4	6	4	2
Logical Reasoning	6	5	4	4	1
Software Testing Foundation	6	2	2	5	1
Electronic Commerce - NME	6	2	4	2	1
Internet Security - Principles and Practices - NME	6	2	4	2	1

Allied Papers

Title of the courses	PSO1	PSO2	PSO3	PSO4	PSO5
Mathematical Foundation for					
Computer Science					
Operations Research					
Computational Methods					
Quantitative Aptitude	9	6	9	4	2