HAJEE KARUTHA ROWTHER HOWDIA COLLEGE

(An Autonomous Institution Affiliated to Madurai Kamaraj University, Madurai.)

Uthamapalayam, Theni District. Pin Code: 625 533.

DEPARTMENT OF COMPUTER SCIENCE

BACHELOR OF SCIENCE – COMPUTER SCIENCE

SYLLABUS

Choice Based Credit System – CBCS

(As per TANSCHE/MKU Guidelines)

with

Outcome Based Education (OBE)

(Academic Year 2020 -2021 onwards)

HAJEE KARUTHA ROWTHER HOWDIA COLLEGE

(An Autonomous Institution Affiliated to Madurai Kamaraj University, Madurai.)

Uthamapalayam, Theni District. Pin Code: 625 533.

Name of the Programme: B.Sc. Computer Science

Choice Based Credit System (CBCS)
(As per TANSCHE/MKU Guidelines)
with
Outcome Based Education (OBE)
(with effect from the Academic Year 2020 – 2021)

College Vision and Mission

Vision

Our vision is to provide the best type of higher education to all, especially to students hailing from minority Muslim community, rural agricultural families and other deprived, under privileged sections of the society, inculcating the sense of social responsibility in them. Our college is committed to produce talented, duty-bound citizens to take up the challenges of the changing times.

Mission

Our mission is to impart and inculcate social values, spirit of service and religious tolerance as envisioned by our beloved Founder President Hajee Karutha Rowther.

The Vision beckons .... the Mission continues forever.

Programme Educational Objectives (PEO)

Our graduates will be progressive, efficient, value based, academically excellent, creative, collaborative, empowered and globally competent literates with the skills required for societal change.

They will demonstrate

PEO1	Comprehensive knowledge and expertise, employability, the acumen of creative and critical thinking, the spirit of enquiry and professional attitude required for a successful career
PEO2	Accountability, linguistic competence and communication skills in the work environment and beyond
PEO3	Perseverance, effective collaboration, team spirit, leadership and problem solving skills
PEO4	Keen sense of civility, professional ethics, receptivity and moral righteousness
PEO5	Commitment to address social and environmental threats and to act as responsible service-minded, duty-bound global citizens

Department Vision and Mission

Vision

The Department of Computer Science envisions to emerge as a centre for academic, software development and extension activities by producing outstanding computer professionals who can independently design, develop and implement computer applications accepting new challenges so as to contribute to the economic well-being of the nation.

Mission

✓ Strive and achieve excellent standards of quality education through a well designed curriculum in tune with the challenging software needs of the industry.

✓ Provide excellent undergraduate education in a state-of-the-art environment, preparing students for careers as computer professionals in industry, government and academia

✓ Establish institute industry interaction programs to strengthen industry academic relationships for mutual benefit.

✓ Support students for their career development, professional growth and to sustain in lifelong learning

Programme Outcomes (PO)

On completion (after three years) of B.Sc. Computer Science programme, the students are able to

PO1	Professional Skills: The ability to understand, analyze and develop computer programs in the areas related to algorithms, system software, multimedia, web design and big data analytics for efficient design of computer-based systems of varying complexity.
PO2	Hardware Knowledge: The ability to understand the digital logic levels, designing digital circuits, PC assembly, Troubleshooting, networking, working of central processing unit, input-output &memory organization, function of microprocessors and assembly language programs.
PO3	Industry Ready: Perceive technical, practical and communicative skills among the students to face the industrial needs.
PO4	Software Engineering Practices: The ability to apply standard practices and strategies in software service management using open-ended programming environments with ability to deliver a quality service for business success.
PO5	Successful Career and Entrepreneurship: The ability to employ modern computer languages, environments, and platforms in creating innovative career paths to be an entrepreneur, and a zest for higher studies.

Programme Specific Outcomes (PSO)

A graduate of B.Sc. Computer Science after three years will

PSO1	Prepared to be employed in IT industries by providing expected domain knowledge.
PSO2	Provided with practical training, hands-on and project experience to meet the industrial needs.
PSO3	Motivated in career and entrepreneurial skill development to become global leaders.
PSO4	Trained to demonstrate creativity, develop innovative ideas and to workin teams to accomplish a common goal.
PSO5	Addressed with social issues and guided to operate problems with solutions.

Programme Scheme
Eligibility

      A pass in +2 examination conducted by the Board of Higher Secondary Education, Government of Tamil Nadu with Mathematics as one of the subject OR any other examination accepted by the Syndicate as equivalent.

For Programme Completion

A Candidate shall complete:

- Part I - Language papers – Tamil/Arabic/Malayalam in semesters I, II, III and IV respectively
- Part II - Language papers - English in semesters I, II, III, IV respectively
- Part III - Core papers in semesters I, II, III, IV, V and VI respectively
- Part III - Allied papers in semesters I, II, III, and IV respectively
- Part III - Elective papers in semesters V and VI respectively
- Part IV - Non- Major Elective papers in semesters I and II respectively
- Part IV - Skill based Subject papers in semesters III, IV, V and VI respectively
- Part IV - Value Education paper in semester I
- Part IV - Environmental Studies paper in semester II
- Part V - Extension activity in semester IV

Scheme of Examinations under Choice Based Credit System

Term End Examinations (TEE)	- 75 Marks
Continuous Internal Assessment Examinations (CIAE)	- 25 Marks
Total	- 100 Marks

Pattern of Continuous Internal Assessment Examinations (CIAE)

Average of Two Internal Tests (each 20 marks)	- 20 Marks
Assignment	- 05 Marks
Total	- 25 Marks

Pattern of Term End Examinations
(Max. Marks: 75 / Time: 3 Hours)

External Examinations Question Paper Pattern for Part I & III and Part IV (Non- Major Elective & Skill based Subject)

Section – A (10 X 1 = 10 Marks)
Answer ALL questions.
- Questions 1 - 10
- Two questions from each unit
- Multiple choice questions and each question carries Four choices

Section – B (5 X 7 = 35 Marks)
Answer ALL questions choosing either A or B.
- Questions 11 - 15
- Two questions from each unit (either…. or…. type)
- Descriptive Type

Section – C (3 X 10 = 30 Marks)
Answer any THREE out of five questions.
- Questions 16 - 20
- One question from each unit
- Descriptive Type

External Examinations Question Paper Pattern for Part IV (Environmental Studies and Value Education)

Section – A: (5 X 6 = 30 Marks)
Answer ALL questions choosing either A or B.
- Questions 1 - 5
- Two questions from each unit (either…. or…. type)
- Descriptive Type

Section – B (3 X 15 = 45 Marks)
Answer any THREE out of five questions.
- Questions 6 – 10
- One question from each unit
- Descriptive Type

Part V (Extension Activities)
- Internal Evaluation

Passing Marks

Minimum 27 for External Exam

Eligibility for the degree – passing minimum is **40%**

Practical Examination

Internal   – 40 marks
External   – 60 marks
Total   – 100 marks
Passing minimum is **40%**

Weightage

Weightage for Bloom's Taxonomy	Percentage	Marks	
		CIAE	TEE
Knowledge (Remembering) – K1	40	10	30
Understanding – K2	40	10	30
Applying – K3	20	5	15
Gross Total	**100**	**25**	**75**

Assessment

Distribution of questions and marks for Continuous Internal Assessment Examinations

Bloom's Taxonomy	Section A	Section B	Section C	Total
Knowledge(K1)	2 (2)	1 (a or b) (3)	1 (5)	**25 marks**
Understanding(K2)	2 (2)	1 (a or b) (3)	1 (5)	
Apply(K3)	**Assignment (5)**			

Distribution of questions and marks for Term End Examinations

Bloom's Taxonomy	Section A	Section B	Section C	Total
Knowledge(K1)	2 (2)	4 (a or b) (28)	-------	**Total 75 Marks**
Understanding(K2)	3 (3)	1 (a or b) (7)	2 out of 3 (20)	
Apply(K3)	5 (5)	-------	1 out of 2 (10)	

Note: Figures in parenthesis are Marks

Credits Distribution

Part	Course Category	Courses	Credits	Total Marks
I	Tamil/ Arabic/ Malayalam	4	12	400
II	English	4	12	400
III	Core, Elective & Allied	25	98	2500
IV	Non- Major Elective	2	4	200
IV	Skill based Subject	4	8	400
IV	Value Education	1	2	100
IV	Environmental Studies	1	2	100
V	Extension Activities	1	2	100
		42	**140**	**4200**

Details of Course Category, Code, Credits & Title

Course Category	Course Code	Course Title	Hrs	CIAE	TEE	Max. Marks	Credits
		Semester - I					
		Part - I					
Language - I	20UTAL11/ 20UARL11/ 20UMLL11	Tamil / Arabic / Malayalam	6	25	75	100	3
		Part - II					
English - I	20UENL11	English for Enrichment - I	6	25	75	100	3
		Part – III (OBE)					
Core – I	20UCSC11	Programming in C	4	25	75	100	4
Core – II	20UCSC1P	C & DPA Lab	6	40	60	100	4
Allied – I	20UCSA11	Digital Principles and Applications	4	25	75	100	4
		Part - IV					
NME – I	20UCSN11	Office Automation Tools-I Lab	2	25	75	100	2
VED	20UVED11	Value Education	2	25	75	100	2
		Total	30			700	22
		Semester - II					
		Part - I					
Language - II	20UTAL21/ 20UARL21/ 20UMLL21	Tamil / Arabic / Malayalam	6	25	75	100	3
		Part - II					
English - II	20UENL21	English for Enrichment - II	6	25	75	100	3
		Part – III (OBE)					
Core - III	20UCSC21	Database Management Systems	4	25	75	100	4
Core – IV	20UCSC2P	Database Management Systems Lab	4	40	60	100	4
Allied – II	20UCSA21	Mathematical Statistics	6	25	75	100	4
		Part - IV					
NME – II	20UCSN21	Office Automation Tools-II Lab	2	25	75	100	2
EVS	20UEVS21	Environmental Studies	2	25	75	100	2
		Total	30			700	22

Course Category	Course Code	Course Title	Hrs	CIAE	TEE	Max. Marks	Credits
Semester - III							
Part - I							
Language- III	20UTAL31/ 20UARL31/ 20UMLL31	Tamil / Arabic / Malayalam	6	25	75	100	3
Part - II							
English - III	20UENL31	English for Enlightenment - I	6	25	75	100	3
Part – III (OBE)							
Core - V	20UCSC31	Object Oriented Programming with Java	4	25	75	100	4
Core – VI	20UCSC3P	Programming in Java Lab	6	40	60	100	4
Allied – III	20UCSA31	Graph Theory and its Applications	6	25	75	100	4
Part - IV							
SBS – I	20UCSS3P	Office Automation Tools Lab	2	40	60	100	2
		Total	**30**			**600**	**20**
Semester – IV							
Part - I							
Language - IV	20UTAL41/ 20UARL41/ 20UMLL41	Tamil / Arabic / Malayalam	6	25	75	100	3
Part - II							
English - IV	20UENL41	English for Enlightenment - II	6	25	75	100	3
Part – III (OBE)							
Core VII	20UCSC41	Data Structures and Algorithms	4	25	75	100	4
Core VIII	20UCSC4P	DS,Algorithms& Numerical Methods Lab	8	40	60	100	4
Allied IV	20UCSA41	Numerical Methods	4	25	75	100	4
Part - IV							
SBS – II	20UCSS4P	Linux Shell Programming Lab	2	40	60	100	2
Part - V							
EA		Extension Activities**	--	100	--	100	2
		Total	**30**			**700**	**22**

Part – V
Extension Activities**

S.No.	Course Code	Course Title	Max. Marks	Credits
1.	20UNCC41	National Cadet Corps (Army)	100	2
2.	20UNCC42	National Cadet Corps (Navy)	100	2
3.	20UNSS41	National Service Scheme	100	2
4.	20UPED41	Physical Education	100	2
5.	20UYRC41	Youth Red Cross	100	2
6.	20URRC41	Red Ribbon Club	100	2
7.	20UHRC41	Human Rights Club	100	2
8.	20UCOC41	Consumer Club	100	2
9.	20UYOC41	Yoga Club	100	2
10.	20UHFC41	Health and Fitness Club	100	2
11.	20UECC41	Eco Club	100	2
12.	20ULIC41	Library & Information Science Club	100	2
13.	20USCC41	Science Communication Club	100	2
14.	20UFAC41	Fine Arts Club	100	2

Course Category	Course Code	Course Title	Hrs	CIAE	TEE	Max. Marks	Credits
Semester - V							
Part – III (OBE)							
Core IX	20UCSC51	Cloud Computing	4	25	75	100	4
Core X	20UCSC52	Operating Systems	4	25	75	100	4
Core XI	20UCSC53	Data Communication and Networking	4	25	75	100	4
Core XII	20UCSC5P	Python Programming Lab	4	40	60	100	4
Core XIII	20UCSC5Q	Multimedia Lab	4	40	60	100	4
Core XIV	20UCSC5R	Internet of Things Lab	4	40	60	100	4
Elective - I	20UCSE51	Multimedia Technology	4	25	75	100	3
	20UCSE52	Microprocessors & Applications					
	20UCSE53	Data Mining					
Part - IV							
SBS – III	20UCSS51	Quantitative Aptitude	2	25	75	100	2
		Total	**30**			**800**	**29**
Semester - VI							
Part – III (OBE)							
Core XV	20UCSC61	Computer Graphics	4	25	75	100	4
Core XVI	20UCSC62	Software Engineering	4	25	75	100	4
Core XVII	20UCSC6P	Project Work	8	40	60	100	4
Core XVIII	20UCSC6Q	Web Programming Lab	4	40	60	100	4
Core XIX	20UCSC6R	Net Programming using C# Lab	4	40	60	100	4
Elective - II	20UCSE61	Web Programming	4	25	75	100	3
	20UCSE62	Mobile Application Development					
	20UCSE63	Business Process Outsourcing					
Part - IV							
SBS - IV	20UCSS61	Technical Aptitude	2	25	75	100	2
		Total	**30**			**700**	**25**
		Grand Total	**180**			**4200**	**140**

Course Code	Course Title	Category	Total Hours	Credits
20UCSC11	**Programming in C**	Core - I	60	4

Nature of Course	
Knowledge Oriented	✔
Skill Oriented	✔
Employability Oriented	✔
Entrepreneurship Oriented	

Course Relevance	
Local	
Regional	
National	
Global	✔

Preamble

The course is designed to provide complete knowledge of C language. Students will be able to develop logics which will help them to create programs, applications in C. Also by learning the basic programming constructs they can easily switch over to any other language in future.

Course Outcomes (CO)

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

No.	Course Outcome	Knowledge Level
CO1	Illustrate the procedural paradigm with variables, constants, operations and I/O functions.	K1,K2,K3
CO2	Demonstrate the concept of control statements	K1,K2,K3
CO3	Know the concept of array and strings	K1,K2,K3
CO4	Expose the concept of functions and structures	K1,K2,K3
CO5	Reveal the importance of pointers and file	K1,K2,K3

K1-Knowledge   K2-Understand   K3-Apply

Mapping of CO with PO

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

1-Low   2-Medium   3-Strong

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	1	3	2
CO2	3	3	1	3	2
CO3	3	3	1	3	2
CO4	3	3	2	3	1
CO5	3	3	2	3	1

1-Low　　　　　　　　**2-Medium**　　　　　　　　**3-Strong**

Syllabus

UNIT I　　　　　　　　　　　　　　　　　　　　　　　　12 Hours

Basic structure of C – Programming style – Constants, variables and Data types – declaration of variables, defining symbolic constants – declaring a variable as constant. Operators and expressions: arithmetic expression – evaluation of expressions – Type conversions in expression. ***Managing I/O operations:*** Reading and writing a character – formatted input and output.

UNIT II　　　　　　　　　　　　　　　　　　　　　　　　12 Hours

Decision making and branching: Conditional statements – Switch statement – goto statement. Looping statement – Jumps in loops.

UNIT III　　　　　　　　　　　　　　　　　　　　　　　　12 Hours

Arrays: One dimensional array – two dimensional arrays – multi dimensional array. ***Strings:*** String variables – reading & writing string – arithmetic operations on strings – putting strings together – comparison – string handling function – table of strings – features of string.

UNIT IV　　　　　　　　　　　　　　　　　　　　　　　　12 Hours

User defined functions: Elements of user defined function – categories of function – nesting of functions – recursion – scope visibility and life time of variables. ***Structures and unions:*** Defining a structure – arrays of structures – structures and functions – Unions – size of structures – bit fields.

UNIT V　　　　　　　　　　　　　　　　　　　　　　　　12 Hours

Pointers: Accessing the address of a variable – declaring, initialization of pointer variables – accessing a variable through its pointer. ***Files:*** Defining, opening, closing a file. I/O operations on files – command line arguments.

Text Books

C. E. Balagurusamy Edition, ***Programming in ANSI***, Tata McGraw Hill Publishing Company, 2017.

Reference Books

Herbert Schildt, Edition 4, *C: The Complete Reference,* Tata McGraw Hill Publishing Company, 2017.

Pedagogy

Chalk and Talk Lecture, Seminar, Group discussion, LMS, PPT

Teaching aids

Black Board, LCD Projector

Course Contents and Lecture Schedule

Module No.	Topic	No. of Lectures	Content Delivery Methods
UNIT - I			
1.1	Programming style	1	PPT
1.2	Constants, variables and Data types	1	Chalk and Talk
1.3	declaration of variables, defining symbolic constants	1	Chalk and Talk
1.4	declaring a variable as constant	1	Chalk and Talk
1.5	Operators and expressions	2	Chalk and Talk
1.6	arithmetic expression – evaluation of expressions	1	Chalk and Talk
1.7	type conversions in expression	1	Chalk and Talk
1.8	reading and writing a character	2	Chalk and Talk
1.9	formatted input and output	2	Chalk and Talk
UNIT - II			
2.1	Conditional statements	3	Chalk and Talk
2.2	Switch statement	2	Chalk and Talk
2.3	goto statement	1	Chalk and Talk
2.4	Looping statement	4	Chalk and Talk
2.5	Jumps in loops	2	Chalk and Talk
UNIT - III			
3.1	one dimensional array	1	Chalk and Talk
3.2	two dimensional arrays	2	Chalk and Talk
3.3	multi-dimensional array	1	Chalk and Talk
3.4	String variables	1	Chalk and Talk
3.5	reading &writing string	1	Chalk and Talk
3.6	arithmetic operations on strings	1	Chalk and Talk
3.7	putting strings together	1	Chalk and Talk

3.8	comparison	1	Chalk and Talk
3.9	string handling function	2	Chalk and Talk
3.10	table of strings – features of string	1	Chalk and Talk
UNIT - IV			
4.1	elements of user defined function	2	Chalk and Talk
4.2	categories of function	1	Chalk and Talk
4.3	nesting of functions	1	Chalk and Talk
4.4	recursion	1	Chalk and Talk
4.5	scope visibility and life time of variables	2	Chalk and Talk
4.6	defining a structure	1	Chalk and Talk
4.7	arrays of structures	1	Chalk and Talk
4.8	structures and functions	1	Chalk and Talk
4.9	Unions	1	Chalk and Talk
4.10	size of structures– bit fields	1	Chalk and Talk
UNIT - V			
5.1	accessing the address of a variable	2	Chalk and Talk
5.2	declaring, initialization of pointer variables	2	Chalk and Talk
5.3	accessing a variable through its pointer	2	Chalk and Talk
5.4	defining, opening, closing a file	2	Chalk and Talk
5.5	I/O operations on files	2	Chalk and Talk
5.6	command line arguments	2	Chalk and Talk
	Total	**60**	

Course Designer
Mr. M. Sulthan Ibrahim
Associate Professor of Computer Science

Course Code	Course Title	Category	Total Hours	Credits
20UCSC1P	C & DPA Lab	Core - II	90	4

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

Course Relevance	
Local	
Regional	
National	
Global	✓

Preamble

This lab course is designed to create programs, applications in C and leads to learn other languages to switch over to any other language in future. Students will learn and understand the Basics of digital electronics and able to design basic logic circuits, combinational and sequential circuits using Virtual Lab - An Initiative of Ministry of Human Resource Development under the National Mission on Education through ICT.

Course Outcomes (CO)

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

No.	Course Outcome	Knowledge Level
CO1	Understand and write programs using control statements	K1,K2,K3
CO2	Develop programs using arrays	K1,K2,K3
CO3	Handle files	K1,K2,K3
CO4	Design logic circuits	K1,K2,K3
CO5	Construct sequential circuits	K1,K2,K3

K1-Knowledge   **K2-Understand**   **K3-Apply**

Mapping of CO with PO

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

1-Low   **2-Medium**   **3-Strong**

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	1	3	2
CO2	3	3	1	3	2
CO3	3	3	1	3	2
CO4	3	3	2	3	1
CO5	3	3	2	3	1

1-Low   **2-Medium**   **3-Strong**

Syllabus

List of Practical for Programming in C:

1. To find Sum of Digits of a number
2. To reverse a given number and check if it is a palindrome
3. To evaluate Sine Series
4. To check if a number is Prime Number or not
5. To solve Quadratic Equation – Switch
6. To Sort an Array
7. To count the occurrences of a number in a set
8. To reverse a given string and check if it is a palindrome
9. To add and subtract two Matrices
10. To find row wise sum of a matrix of order m x n
11. To find Factorial value using Recursion
12. To find NCR and NPR values using Function
13. To calculate mean, variance and standard deviation using Function
14. To prepare Mark Sheet – Structure
15. To prepare EB Bill – File

List of practical for Digital Principles and Applications

URL 1: http://vlabs.iitkgp.ernet.in/dec/

URL2: http://vlabs.iitkgp.ernet.in/coa/exp13/index.html

1. Analysis and Synthesis of Boolean Expressions using Basic Logic Gates
2. Analysis and Synthesis of Logic Functions using Multiplexers
3. Analysis and Synthesis of Logic Functions using Decoders
4. Analysis and Synthesis of Arithmetic Expressions using Adders / Subtractors
5. Analysis and Synthesis of Sequential Circuits using Basic Flip-Flops
6. Karnaugh Map

Course Designer
Mr. M. Sulthan Ibrahim
Associate Professor of Computer Science

Course Code	Course Title	Category	Total Hours	Credits
20UCSA11	**Digital Principles and Applications**	**Allied - I**	**60**	**4**

Nature of Course		Course Relevance	
Knowledge Oriented	✓	Local	
Skill Oriented	✓	Regional	
Employability Oriented		National	
Entrepreneurship Oriented		Global	✓

Preamble

The course enables the students to learn and understand the fundamental concepts of digital principles and apply the knowledge gained to design digital circuits.

Course Outcomes (CO)

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

No.	Course Outcome	Knowledge Level
CO1	Learn and understand the various number systems and codes	**K1,K2,K3**
CO2	Understand and construct simple logic circuits	**K1,K2,K3**
CO3	Design and build converters	**K1,K2,K3**
CO4	Gain knowledge about binary arithmetic and design arithmetic building blocks	**K1,K2,K3**
CO5	Construct various flip flops	**K1,K2,K3**

K1-Knowledge   K2-Understand   K3-Apply

Mapping of CO with PO

	PO1	PO2	PO3	PO4	PO5
CO1	**1**	**3**	**2**	**1**	**2**
CO2	**1**	**3**	**2**	**1**	**2**
CO3	**2**	**3**	**2**	**1**	**2**
CO4	**2**	**3**	**2**	**1**	**2**
CO5	**2**	**3**	**2**	**1**	**2**

1-Low   2-Medium   3-Strong

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	2	2	1	2
CO2	2	2	2	1	2
CO3	2	2	2	1	2
CO4	2	2	2	1	2
CO5	2	2	2	1	2

1-Low **2-Medium** **3-Strong**

Syllabus

UNIT I 12 Hours

Binary Number system – Octal number system – Hexadecimal number system – Conversions among number systems – ASCII code – Excess-3 Code – Gray code.

UNIT II 12 Hours

The Basic Gates – NOT, OR, AND - Universal Logic Gates – NOR, NAND. Boolean Laws and Theorems - Sum of Products method - Truth table to Karnaugh Map – Pairs, Quads, Octets – Don't Care Conditions.

UNIT III 12 Hours

Multiplexers – Demultiplexers-1-of-16 Decoder – BDC-to-decimal Decoders – Seven-segment Decoders – Encoders – Exclusive-OR Gates- Parity Generators and Checkers.

UNIT IV 12 Hours

Binary Addition – Binary Subtraction – unsigned binary numbers – sign-magnitude numbers – 2'S Complement Representation – 2'S Complement Arithmetic – Arithmetic Building Blocks: Half-adder, full-adder, controlled inverter – The adder - subtracter.

UNIT V 12 Hours

RS flip-flops – Gated flip-flops – Edge-triggered RS flip-flops – Edge-triggered D flip-flops – Edge-triggered JK flip-flops – JK Master-Slave flip-flops.

Text Books

Donald P Leach, Albert Paul Malvino, GoutamSaha, ***Digital Principals and Applications – Eighth edition***, The McGraw-Hill Companies – 2018.

Pedagogy

Chalk and Talk, Lecture, Seminar, Group discussion, LMS, PPT

Teaching aids

Black Board, LCD Projector

Course Contents and Lecture Schedule

Module No.	Topic	No. of Lectures	Content Delivery Methods
UNIT - I			
1.1	Binary Number system	2	Chalk and Talk
1.2	Octal number system	2	Chalk and Talk
1.3	Hexadecimal number system	2	Chalk and Talk
1.4	Conversions among number systems	2	Chalk and Talk
1.5	ASCII code	2	Chalk and Talk
1.6	Excess-3 Code	1	Chalk and Talk
1.7	Gray code	1	Chalk and Talk
UNIT - II			
2.1	The Basic Gates – NOT, OR, AND	1	Chalk and Talk
2.2	Universal Logic Gates – NOR,NAND	2	Chalk and Talk
2.3	Boolean Laws and Theorems	2	Chalk and Talk
2.4	Sum of Products method	2	Chalk and Talk
2.5	Truth table to Karnaugh Map	2	Chalk and Talk
2.6	Pairs, Quads, Octets	2	Chalk and Talk
2.7	Don't Care Conditions	1	Chalk and Talk
UNIT - III			
3.1	Multiplexers	2	Chalk and Talk
3.2	Demultiplexers	2	Chalk and Talk
3.3	1-of-16 Decoder	2	Chalk and Talk
3.4	BDC-to-decimal Decoders	2	Chalk and Talk
3.5	Seven-segment Decoders	1	Chalk and Talk
3.6	Encoders	1	Chalk and Talk
3.7	Exclusive-OR Gates	1	Chalk and Talk
3.8	Parity Generators and Checkers	1	Chalk and Talk
UNIT - IV			
4.1	Binary Addition	1	Chalk and Talk
4.2	Binary Subtraction	1	Chalk and Talk
4.3	unsigned binary numbers	1	Chalk and Talk
4.4	Signed magnitude numbers	1	Chalk and Talk
4.5	2'S Complement Representation	1	Chalk and Talk
4.6	2'S Complement Arithmetic	1	Chalk and Talk
4.7	Arithmetic Building Blocks	1	Chalk and Talk

4.8	Half-adder	1	Chalk and Talk
4.9	full-adder	1	Chalk and Talk
4.10	controlled inverter	1	Chalk and Talk
4.11	The adder-subtracter	2	Chalk and Talk
UNIT - V			
5.1	RS flip-flops	2	Chalk and Talk
5.2	Gated flip-flops	2	Chalk and Talk
5.3	Edge-triggered RS flip-flops	2	Chalk and Talk
5.4	Edge-triggered D flip-flops	2	Chalk and Talk
5.5	Edge-triggered JK flip-flops	2	Chalk and Talk
5.6	JK Master-Slave flip-flops	2	Chalk and Talk
	Total	**60**	

Course Designer
Ms. N. Rayshima
Assistant Professor of Mathematics

Course Code	Course Title	Category	Total Hours	Credits
20UCSC21	**Database Management Systems**	Core - III	60	4

Nature of Course		Course Relevance	
Knowledge Oriented	✓	Local	
Skill Oriented	✓	Regional	
Employability Oriented	✓	National	
Entrepreneurship Oriented	✓	Global	✓

Preamble

The course is designed to present an introduction to database management systems and the concepts of Relational Database Management systems to manipulate data efficiently, and effectively.

Course Outcomes (CO)

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

No.	Course Outcome	Knowledge Level
CO1	Describe the fundamental concepts of relational database management systems	K1,K2,K3
CO2	Explain the basic concepts of relational data model	K1,K2,K3
CO3	Manipulate the data using relational algebra and calculus	K1,K2,K3
CO4	Formulate SQL queries on data.	K1,K2,K3
CO5	Improve the database design by normalization.	K1,K2,K3

K1-Knowledge   K2-Understand   K3-Apply

Mapping of CO with PO

	PO1	PO2	PO3	PO4	PO5
CO1	2	1	2	2	2
CO2	2	1	2	2	2
CO3	2	1	2	2	2
CO4	2	1	2	2	2
CO5	2	1	2	2	2

1-Low   2-Medium   3-Strong

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	2	2	2
CO2	3	3	2	2	2
CO3	3	3	2	3	2
CO4	3	3	2	3	1
CO5	3	3	2	1	3

1-Low   **2-Medium**   **3-Strong**

Syllabus

UNIT I   14 Hours

Overview Of Database Systems: A Historical Perspective – File Systems Versus a DBMS – Advantages of a DBMS – Describing and Storing Data in a DBMS – Queries in a DBMS – Transaction Management – Structure of a DBMS – People Who Work with Databases.

Introduction to Database Design: Database Design and ER Diagrams – Entities, Attributes, and Entity Sets – Relationships and Relationship Sets – Additional Features of ER Model.

UNIT II   10 Hours

The Relational Model: Introduction to the Relational Model – Integrity Constraints over Relations – Enforcing Integrity Constraints – Querying Relational Data – Logical Database Design: ER to Relational – Introduction to Views – Destroying / Altering Tables and Views.

UNIT III   12 Hours

Relational Algebra and Calculus: Preliminaries – Relational Algebra: Selection and Projection – Set Operations –Renaming – Joins – Division- Introduction to TRC- Introduction to DRC.

UNIT IV   12 Hours

Sql: Queries, Constraints, ***Triggers:*** The Form of a Basic SQL Query - UNION, INTERSECT, and EXCEPT – Nested Queries – Aggregate Operators – Null Values – Triggers and Active Databases – Designing Active Databases.

UNIT V   12 Hours

Schema Refinement and Normal Forms: Introduction to Schema Refinement – Functional Dependencies –Normal Forms –Normalization.

Text Books

Raghu Ramakrishnan & Johannes Gehrke, ***Database Management Systems*** – McGraw Hill International Edition – Third Edition – 2003.

Pedagogy

Chalk and Talk, Lecture, Seminar, Group discussion, LMS & PPT

Teaching aids

Black Board, LCD Projector

Course Contents and Lecture Schedule

Module No.	Topic	No. of Lectures	Content Delivery Methods
UNIT - I			
1.1	A Historical Perspective	1	PPT
1.2	File Systems Versus a DBMS	1	PPT
1.3	Advantages of a DBMS	1	PPT
1.4	Describing and Storing Data in a DBMS	1	Chalk and Talk
1.5	Queries in a DBMS	1	Chalk and Talk
1.6	Transaction Management	1	Chalk and Talk
1.7	Structure of a DBMS	1	PPT
1.8	People Who Work with Databases	1	Chalk and Talk
1.9	Database Design and ER Diagrams	1	PPT
1.10	Entities, Attributes, and Entity Sets	1	Chalk and Talk
1.11	Relationships and Relationship Sets	2	Chalk and Talk
1.12	Additional Features of ER Model	2	Chalk and Talk
UNIT - II			
2.1	Introduction to the Relational Model	2	Chalk and Talk
2.2	Integrity Constraints over Relations	2	Chalk and Talk
2.3	Enforcing Integrity Constraints	2	Chalk and Talk
2.4	Querying Relational Data	1	Chalk and Talk
2.5	ER to Relational	2	Chalk and Talk
2.6	Destroying / Altering Tables and Views.	1	Chalk and Talk
UNIT - III			
3.1	Relational Algebra	1	PPT
3.2	Selection and Projection	1	PPT
3.3	Set Operations	1	PPT
3.4	Renaming	1	PPT
3.5	Joins	1	PPT
3.6	Division	1	PPT
3.7	Introduction to TRC	3	Chalk and Talk
3.8	Introduction to DRC	3	Chalk and Talk

	UNIT - IV		
4.1	Basic SQL Query	2	Chalk and Talk
4.2	UNION, INTERSECT, and EXCEPT	2	PPT
4.3	Nested Queries	2	PPT
4.4	Aggregate Operators	2	PPT
4.5	Null Values	2	PPT
4.6	Triggers and Active Databases	1	Chalk and Talk
4.7	Designing Active Databases	1	Chalk and Talk
	UNIT - V		
5.1	Introduction to Schema Refinement	2	Chalk and Talk
5.2	Functional Dependencies	2	Chalk and Talk
5.3	Normal Forms	4	Chalk and Talk
5.4	Normalization	4	Chalk and Talk
	Total	**60**	

Course Designer
Mr. M. Sulthan Ibrahim
Associate Professor of Computer Science

Course Code	Course Title	Category	Total Hours	Credits
20UCSC2P	**Database Management Systems Lab**	**Core - IV**	**60**	**4**

Nature of Course	
Knowledge Oriented	✔
Skill Oriented	✔
Employability Oriented	✔
Entrepreneurship Oriented	✔

Course Relevance	
Local	
Regional	
National	
Global	✔

Preamble

The course is designed to implement the concepts of Relational Database Management systems to manipulate data.

Course Outcomes (CO)

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

No.	Course Outcome	Knowledge Level
CO1	Design and implement a database schema for a given problem-domain	**K1,K2,K3**
CO2	Create and maintain tables using SQL	**K1,K2,K3**
CO3	Populate and query a database	**K1,K2,K3**
CO4	Manipulate Set Operations on tables	**K1,K2,K3**
CO5	Develop Application Programs using PL/SQL	**K1,K2,K3**

K1-Knowledge   **K2-Understand**   **K3-Apply**

Mapping of CO with PO

	PO1	PO2	PO3	PO4	PO5
CO1	3	1	3	3	3
CO2	3	1	3	3	3
CO3	3	1	3	3	3
CO4	3	1	3	3	3
CO5	3	1	3	3	3

1-Low   **2-Medium**   **3-Strong**

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	1
CO2	3	3	3	3	2
CO3	3	3	2	3	1
CO4	3	3	2	3	2
CO5	3	3	2	3	3

1-Low   **2-Medium**   **3-Strong**

Syllabus

SQL

Creating a Table - Creating a Table with a Primary Key - Inserting Tuples - Deleting Tuples - Updating Column values - Getting the Value of a Relation - Modifying the structure of Tables - Getting Rid of Your Tables and attributes - Getting Information about Your Database - Quitting sqlplus - Executing SQL from a File - Editing Commands in the Buffer - Working with an ASCII Editor - Recording Your Session - Oracle Data Types.

Querying the Table.

Implement the Bank Database and execute the given queries/updates

Bank Database Schema:

Account (account_number, branch_name, balance)
branch (branch name, branch_city, assets)
customer (customer_namecustomer_street, customer_city)
loan (loan_number, branch_name, amount)
depositor (customer_name, account_number)
borrower (customer_name, loan_number)

Retrieving records from a table:
1. List all branch names and their assests
2. List all accounts of Brooklyn branch
3. List all loans with amount > 1000.
4. List all accounts of Perryridge branch with balance < 1000.
5. List Numbers of accounts with balances between 700 and 900
   Updating records from a table:
6. Change the assests of Perryridge branch to 340000000.
7. Transfer the accounts and loans of Perryridge branch to Downtown branch.
8. Transfer Rs. 100 from account A-101 to A-215.

Deleting records from a table:

9. Delete the branch Perryridge.

10. Waive off all the loans with amount < 1000.

11. Delete the accounts and loans of Downtown branch.

Modifying the structure of tables:

12. Add a column phoneNo to customer table.

13. Change the size of the branch_city to varchar (20).

14. Drop the column phoneNo from customer table.

Retrieving records from multiple Tables

15. For all customers who have a loan from the bank, find their names, loan numbers, and loan amount.

16. Find the customer names, loan numbers, and loan amounts, for all loans at the Perryridge branch.

String Operations (Use %, LIKE)

17. Find the names of all customers whose street address includes the substring 'Main'.

Ordering the display of Tuples(Use ORDER BY ASC   DESC)

18. List loan data, ordered by decreasing amounts, then increasing loan numbers.

Set Operations

UNION (Use union all to retain duplicates):

19. Find all the bank customers having a loan, an account, or both at the bank. INTERSECT (Use intersect all to retain duplicates):

20. Find all the bank customers having both a loan and an account at the bank EXCEPT (Minus):

21. Find all customers who have an account but no loan at the bank. Aggregate Functions (avg, min, max, sum, count) / Group By:

22. Find the average account balance at the Perryridge branch.

23. Find the average account balance at each branch.

24. Find the number of depositors for each branch (Use distinct).

25. Find those branches where the average accounts balance is more than Rs. 1200.

26. Find the number of branches of the bank.

27. Find the average balance for each customer who lives in Harrison and has at least three accounts.

PL/SQL

28. Develop PL/SQL programs

Course Designer
Mr. M. Sulthan Ibrahim
Associate Professor of Computer Science

Course Code	Course Title	Category	Total Hours	Credits
20UCSA21	**Mathematical Statistics**	**Allied - II**	**90**	**4**

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

Course Relevance	
Local	
Regional	
National	
Global	✓

Preamble

This course is designed to provide the basic concepts of data analysis, statistical computations, attributes and index numbers.

Course Outcomes (CO)

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

No.	Course Outcome	Knowledge Level
CO1	Choose the appropriate measure and explain the measures	**K1,K2**
CO2	Apply the different measures to solve simple problems.	**K1,K2,K3**
CO3	Find the equation of the straight line and analyze the simple linear regression equation for a given set of data and know the basic assumptions behind regression analysis.	**K1,K2,K3**
CO4	Compare the association between attributes.	**K1,K2**
CO5	Acquire the knowledge on vital statistics, Index numbers and calculate an index from given data.	**K1,K2,K3**

K1-Knowledge　　　　　**K2-Understand**　　　　　**K3-Apply**

Mapping of CO with PO

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

1-Low　　　　　**2-Medium**　　　　　**3-Strong**

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	2	3	1
CO2	3	1	2	3	1
CO3	3	1	2	3	1
CO4	3	1	1	3	1
CO5	3	1	1	3	1

1-Low   **2-Medium**   **3-Strong**

Syllabus

UNIT I   18 Hours

Measures of Averages: Mean, Median, Mode, Quartiles, Deciles and Percentiles, Geometric Mean, Hormonic Mean.

UNIT II   18 Hours

Measures of Dispersion: Range, Quartile, Mean deviation and Standard deviation, Coefficient of Variation. , Curve fitting (All types of curves).

UNIT III   18 Hours

Correlation and Regression: Karl Pearson's coefficient of correlation - Rank Correlation Coefficient, Regression.

UNIT IV   18 Hours

Theory of Attributes: Attributes, Consistency of data, independence and association of data.

UNIT V   18 Hours

Index numbers: Aggregate method, Average of Price Relatives Method, Weighted aggregative method, Weighted average of price relatives method, Consumer of price index numbers, Conservation of Chain Base Index Number into fixed base index and conversely.

Text Books

S. Arumugam, *Statistics*, SciTech Publications, 2009.

Reference Books

Dr. M. Manoharan, *Statistical methods*, Palani Paramount Publications.

C B Gupta and Vijay Gupta, *An introduction to Statistical methods*, Vikas Publishing House PVT. LTD.

B. L. Agarwal, *Basic Statistics*, Second Edition.

Pedagogy

Chalk and Talk, Lecture, Seminar, Group discussion, LMS & PPT

Teaching aids

Black Board, LCD Projector

Course Contents and Lecture Schedule

Module No.	Topic	No. of Lectures	Content Delivery Methods
UNIT - I			
1.1	Classification of data	2	Discussion
1.2	Frequency Distribution	2	Lecture
1.3	Arithmetic Mean	3	Chalk and Talk
1.4	Median	2	Chalk and Talk
1.5	Quartiles,	3	Chalk and Talk
1.6	Deciles and mode	4	Chalk and Talk
1.7	Geometric and Harmonic Mean	2	Chalk and Talk
UNIT - II			
2.1	Measures of dispersion	2	Chalk and Talk
2.2	Standard deviation	6	Chalk and Talk
2.3	Fitting a straight line	5	Chalk and Talk
2.4	Fitting a second degree parabola	5	Chalk and Talk
UNIT - III			
3.1	Correlation	6	Chalk and Talk
3.2	Rank Correlation	6	Chalk and Talk
3.3	Regression	6	Chalk and Talk
UNIT - IV			
4.1	Attributes	6	Chalk and Talk
4.2	Consistency of Data	6	Chalk and Talk
4.3	Independence And Association of Data	6	Chalk and Talk

UNIT - V			
5.1	Aggregate method	3	Discussion
5.2	Average of price relative method	3	Chalk and Talk
5.3	Weighted index number	3	Chalk and Talk
5.4	Simple weighted index number	4	Chalk and Talk
5.5	Consumer price index number	3	Chalk and Talk
5.6	Conservation of Chain Base Index Number into fixed base index and conservation	2	Chalk and Talk
	Total	**90**	

Course Designer
Dr. P. Anitha
Assistant Professor of Mathematics

Course Code	Course Title	Category	Total Hours	Credits
20UCSC31	**Object Oriented Programming With Java**	**Core - V**	**60**	**4**

Nature of Course	
Knowledge Oriented	✔
Skill Oriented	✔
Employability Oriented	✔
Entrepreneurship Oriented	✔

Course Relevance	
Local	
Regional	
National	
Global	✔

Preamble

The course is designed to provide complete knowledge of Java language. Students will be able to develop logics which will help them to create object oriented programs applications in Java. Also by learning the basic programming constructs they can easily switch over to any other object oriented language in future.

Course Outcomes (CO)

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

No.	Course Outcome	Knowledge Level
CO1	Illustrate the procedural paradigm with variables, constants, and simple Java program.	**K1,K2,K3**
CO2	Demonstrate Class, Methods and constructors.	**K1,K2,K3**
CO3	Discuss the concept of Arrays, Inheritance and packages.	**K1,K2,K3**
CO4	Know the concept of Thread, Errors & Exceptions.	**K1,K2,K3**
CO5	Reveal the importance of Graphics program & Managing Input / Output files in Java.	**K1,K2,K3**

K1-Knowledge   K2-Understand   K3-Apply

Mapping of CO with PO

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

1-Low   2-Medium   3-Strong

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	1	2	3	3
CO2	2	1	2	3	3
CO3	3	1	3	3	3
CO4	3	1	3	2	3
CO5	3	1	3	2	3

1-Low   **2-Medium**   **3-Strong**

Syllabus

UNIT I   12 Hours

Overview of Java Language: Simple Java Program – Java Program Structure – Java Tokens- Java Statements – Implementing a Java Program – Java Virtual Machine – Command Line Arguments. Constants- Variables- Data types- Declaration of Variables- Giving Values to variables- Scope of Variables-Symbolic Constants-Type Casting.

UNIT II   12 Hours

Operators and Expressions: Operators –Mathematical Functions Class, Objects and Methods: Defining a Class – Fields Declaration – Methods Declaration – Creating Objects – Accessing class members – Constructors – Methods Overloading – Static Members – Nesting of Methods – Inheritance – Overriding Methods – Final Variables and Methods – Final Classes – Finalizer Methods – Abstract Methods and Classes – Visibility Control.

UNIT III   12 Hours

Arrays, Strings and Vectors: One-dimensional Arrays-creating an Array – Two dimensional Arrays – Strings – Vectors – Wrapper Classes – Enumerated Types. Multiple Inheritance: Defining Interfaces – Extending Interfaces – Implementing Interfaces – Accessing Interface Variables. Packages: Java API Packages – Using system Packages – Naming Conventions – Creating Packages – Accessing a Package – Using a Package – Adding a Class to a Package – Hiding Classes – Static Import.

UNIT IV   12 Hours

Multithreaded Programming: Creating Threads – Extending the Thread Class – Stopping and Blocking a Thread – Life Cycle of a Thread – Using Thread Methods – Thread Exceptions – Thread Priority – Synchronization- Implementing the Runnable Interface. Managing Errors and Exceptions: Types of Errors – Exceptions – Syntax of Exception Handling Code – Multiple Catch Statements – Using Finally Statement – Throwing our own Exceptions – Using Exceptions for debugging.

UNIT V   12 Hours

Graphics Programming: The Graphics Class- Lines and Rectangles- Circles and Ellipses, Drawing Arcs Drawing Polygons- Line Graphs- Drawing Bar Charts. Managing Input/ Output Files in Java: Concept of Streams-Stream Classes-Byte Stream Classes Character Stream Classes- Using Streams-Other Useful I/O Classes-Using the file Class- I/O Exceptions- Creation of Files-Reading / Writing Characters- Reading / Writing Bytes- Handling Primitive Data Types - Concatenating and Buffering Files-Random Access Files – Interactive Input and Output.

Text Books

E. Balagurusamy 3 Edition, ***Programming with Java, A primer,*** Tata McGraw-Hill Company, 2008.

Reference Books

Naughton and Herbert Schildt ***the Complete Reference JAVA, Patrick***, Tata McGraw Hill.

Ken Arnold, James Gosling and David Holmes, the ***Java Programming Language***, Pearson Education.

Pedagogy

Chalk and Talk Lecture, Seminar, Group discussion, LMS & PPT

Teaching aids

Black Board, LCD Projector

Course Contents and Lecture Schedule

Module No.	Topic	No. of Lectures	Content Delivery Methods
UNIT - I			
1.1	Programming structure	1	PPT
1.2	Simple Java Program	2	Chalk and Talk
1.3	Java tokens	1	Chalk and Talk
1.4	Java statements	1	Chalk and Talk
1.5	Implementing Java Program	2	Chalk and Talk
1.6	Command line Argument	1	Chalk and Talk
1.7	Data types	1	Chalk and Talk
1.8	Constants, variables and Data types	1	Chalk and Talk
1.9	Declaration of variables, defining symbolic constants	1	Chalk and Talk
1.10	declaring a variable as constant	1	Chalk and Talk

	UNIT - II		
2.1	Operators and expressions	2	Chalk and Talk
2.2	Class, object	1	Chalk and Talk
2.3	Methods declaration	2	Chalk and Talk
2.4	Method overloading	1	Chalk and Talk
2.5	Constructors	2	Chalk and Talk
2.6	Nesting of Methods	1	Chalk and Talk
2.7	Overriding Methods	1	Chalk and Talk
2.8	Final variables and methods	1	Chalk and Talk
2.9	Finalizer Methods	1	Chalk and Talk
	UNIT - III		
3.1	One dimensional arrays	1	Chalk and Talk
3.2	Two dimensional arrays	2	Chalk and Talk
3.3	String	2	Chalk and Talk
3.4	Multiple inheritance	2	Chalk and Talk
3.5	Java API Packages	2	Chalk and Talk
3.6	Creating Packages	1	Chalk and Talk
3.7	Accessing Packages	1	Chalk and Talk
3.8	Using Packages	1	Chalk and Talk
	UNIT - IV		
4.1	Creating threads	2	Chalk and Talk
4.2	Extending the Thread Class	2	Chalk and Talk
4.3	Stopping and Blocking a Thread	1	Chalk and Talk
4.4	Implementing the Runnable Interface	1	Chalk and Talk
4.5	Types of Errors	2	Chalk and Talk
4.6	Exceptions	2	Chalk and Talk
4.7	Multiple Catch Statements	1	Chalk and Talk
4.8	Using Finally statement	1	Chalk and Talk

UNIT - V			
5.1	The Graphics Class	2	Chalk and Talk
5.2	Lines and Rectangles	1	Chalk and Talk
5.3	Circle and ellipses	1	Chalk and Talk
5.4	Drawing Arcs	1	Chalk and Talk
5.5	Drawing Bar Chart	1	Chalk and Talk
5.6	Concept of Streams	2	Chalk and Talk
5.7	Stream Classes	2	Chalk and Talk
5.8	File class I/O Exceptions	1	Chalk and Talk
5.9	Reading/Writing Bytes	1	Chalk and Talk
	Total	**60**	

Course Designer
Mr. S. Peer Mohaideen Mudalali
Associate Professor of Computer Science

Course Code	Course Title	Category	Total Hours	Credits
20UCSC3P	Programming in Java Lab	Core – VI	90	4

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

Course Relevance	
Local	
Regional	
National	
Global	✓

Preamble

This lab course is designed to create object oriented programs, applications in Java and leads to learn other languages to switch over to any other language in future.

Course Outcomes (CO)

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

No.	Course Outcome	Knowledge Level
CO1	Understand and write programs using control statements.	K1,K2,K3
CO2	Object oriented concept.	K1,K2,K3
CO3	Discuss Arrays and inheritance.	K1,K2,K3
CO4	Demonstrate Threaded Programming, Errors and Exception.	K1,K2,K3
CO5	Construct Graphics Programming and Files.	K1,K2,K3

K1-Knowledge   **K2-Understand**   **K3-Apply**

Mapping of CO with PO

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

1-Low   **2-Medium**   **3-Strong**

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	2	3	3
CO2	3	2	3	2	3
CO3	3	1	3	3	3
CO4	2	1	2	3	3
CO5	2	1	3	2	3

1-Low   **2-Medium**   **3-Strong**

Syllabus

List of Practical for Programming in Java:

1. To perform volume calculation using method overloading
2. To illustrate the command line argument.
3. Write an object oriented program to convert the given temperature in Fahrenheit to Celsius using the conversion formula c=f-32/1.8
4. Write an object oriented program using decision making statement (IF statement).
5. Illustrate the Nesting of Methods
6. Illustrate the applications of single inheritance.
7. Sorting a List of numbers.
8. Manipulations of strings
9. Multiple inheritance.
10. User defined Package.
11. Thread methods
12. Catching invalid command line argument.
13. Interactive input to an APPLET.
14. Graphics Programming.
15. File Program.

Text Books

E. Balagurusamy 3rd Edition, ***Programming with Java, A primer,*** Tata McGraw-Hill Company, 2008.

Course Designer
Mr. S. Peer Mohaideen Mudalali
Associate Professor of Computer Science

Course Code	Course Title	Category	Total Hours	Credits
20UCSA31	Graph Theory	Allied – III	90	4

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

Course Relevance	
Local	
Regional	
National	
Global	✓

Preamble

This Course is an introductory course to the basic concepts of Graph theory. This includes definition of graphs, vertex, degrees, trees, connectivity, paths, planar graphs and colouring.

Course Outcomes (CO)

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

No.	Course Outcome	Knowledge Level
CO1	Explain the basic concepts in Graph Theory	K1
CO2	Understand the concepts of connectedness in graph	K1, K2
CO3	Identify the various types of graphs	K1, K2, K3
CO4	Obtain knowledge on trees and matchings	K1, K2, K3
CO5	Acquire the concepts of planer graphs and colouring	K1, K2

K1-Knowledge   **K2-Understand**   **K3-Apply**

Mapping of CO with PO

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

1-Low   **2-Medium**   **3-Strong**

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	2	3	3
CO2	3	2	3	2	3
CO3	3	1	2	3	3
CO4	3	2	2	2	3
CO5	3	1	3	2	3

1-Low   **2-Medium**   **3-Strong**

Syllabus

UNIT I   18 Hours

Graphs – Degrees – Sub graphs – Isomorphism – Intersection Graphs and line graphs – Matrices of graphs – operation on graphs. (Sec. 2.0 -2. 4, 2.7-2.9).

UNIT II   18 Hours

Degree sequences – Graphic sequences – walks, trials and paths – connectedness and components – Blocks – Connectivity. (Sec. 3.0-3.2, 4.0-4.4).

UNIT III   18 Hours

Eulerian graphs – Hamiltonian graphs. (Sec. 5. 0 - 5. 2).

UNIT IV   18 Hours

Trees–characterization of trees–centre of a tree–Matchings–Matchings in Bipartite graphs. (Sec. 6.0 -6.2,7.0-7.2)

UNIT V   18 Hours

Planar graphs and properties––chromatic number and chromatic index–five colour Theorem and four colour theorem. (Sec. 8.0 – 8.1, 9.0-9.3).

Text Books

S. Arumugam and S. Ramachandran ***Invitation to Graph theory***, Scitech Publication, Chennai, June-2012 (Reprint).

Reference Books

Narsing Deo, ***Graph theory***, Prentice Hall of India, 1997

Pedagogy

Chalk and Talk, Lecture, Seminar, Group discussion, LMS and PPT

Teaching aids

Black Board, LCD Projector

Course Contents and Lecture Schedule

Module No.	Topic	No. of Lectures	Content Delivery Methods
UNIT - I			
1.1	Graphs	3	LCD Projector
1.2	Degrees	3	Black board
1.3	Isomorphism	3	Black board
1.4	Intersection Graphs and line graphs	3	Black board
1.5	Matrices of graphs	3	Black board
1.6	operation on graphs	3	Black board
UNIT - II			
2.1	Degree sequences	3	LCD Projector
2.2	Graphic sequences	3	Black board
2.3	Walks, trials and paths	3	Black board
2.4	Blocks	3	Black board
2.5	Connectivity	3	Black board
2.6	Connectedness and components	3	Black board
UNIT - III			
3.1	Eulerian graphs	9	LCD Projector
3.2	Hamiltonian graphs	9	Black board
UNIT - IV			
4.1	Trees	3	LCD Projector
4.2	Characterization of trees	4	Black board
4.3	Centre of a tree	4	Black board
4.4	Matchings	4	Black board
4.5	Matchings In Bipartite graphs.	3	Black board
UNIT - V			
5.1	Planar graphs and properties	6	LCD Projector
5.2	Chromatic number and chromatic index	6	Black board
5.3	Five colour Theorem and four colour theorem	6	Black board
	Total	**90**	

Course Designer
Ms. N. Rayshima
Assistant Professor of Mathematics

Course Code	Course Title	Category	Total Hours	Credits
20UCSS3P	**Office Automation Tools Lab**	SBS - I	30	2

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

Course Relevance	
Local	
Regional	
National	
Global	✓

Preamble

An office automation system is a tool that enables data to move from one system to another on its own without human intervention and inaccuracies. These tools help organizations collect, manage, and analyze securely to accomplish everyday tasks and processes. It optimizes and automates existing business processes and procedures.

Syllabus

List of Practicals

1. **Microsoft Office Word 2010**
   Text Formatting, Borders and Shading, Find and Replace, Header and Footer, Page Formatting, Tables, Pictures, Clip Art, Shapes, Text Box, Equation & Symbols, Mail Merge, and Spelling and Grammar.

2. **Microsoft Office Excel 2010**
   Creating a Worksheet, Copying the formula, Creating Chart in Excel, Worksheet fitting on a Page, Typing with Auto Fill, Changing the size of Rows & Columns, Adding and Deleting Rows & Columns, Functions in excel and Sort & Filter.

3. **Microsoft Office PowerPoint 2010**
   Creating presentation from templates, changing the color, adding graphics to a Slide.

Text Books

Dinesh Maidasani, *Learning Computer Fundamentals, MS Office and Internet & Web Technology* – Firewall Media, 3rd Edition 2016.

Course Designer
Mr. S. Sirajudeen
Associate Professor in Computer Science.

Course Code	Course Title	Category	Total Hours	Credits
20UCSC41	**Data Structures and Algorithms**	**Core - VII**	**60**	**4**

Nature of Course		Course Relevance	
Knowledge Oriented	✓	Local	
Skill Oriented	✓	Regional	
Employability Oriented	✓	National	
Entrepreneurship Oriented		Global	✓

Preamble

The course on Data Structures and Algorithms, stresses much on effective programming than focusing on the syntax/semantics of any programming language. In other words, this course views the problem solving not just as solving the problem somehow but about solving the problem in the most efficient way. Choice of an appropriate data structure and an appropriate algorithmic technique greatly influences the characteristics of the obtained solution such as performance, space requirements, scalability, reuse, robustness etc...

Course Outcomes (CO)

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

No.	Course Outcome	Knowledge Level
CO1	Summarize the basic data structures concepts such as arrays, structures, unions, pointers, strings and dynamic memory allocation functions.	**K1,K2,K3**
CO2	Make use of stacks to evaluate mathematical expressions and queues for mazing problem.	**K1,K2,K3**
CO3	Choose linked lists to implement of lists, stacks, queues, polynomials and sparse matrix.	**K1,K2,K3**
CO4	Construct various types of trees using linked lists and apply tree traversal methods for expressions evaluation.	**K1,K2,K3**
CO5	Utilize BFS, DFS, searching, sorting, hashing and files concepts to develop various applications.	**K1,K2,K3**

  K1-Knowledge   **K2-Understand**   **K3-Apply**

Mapping of CO with PO

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

1-Low   **2-Medium**   **3-Strong**

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	2	3	3
CO2	3	2	3	2	3
CO3	3	1	2	3	3
CO4	3	2	2	2	3
CO5	3	1	3	2	3

1-Low   **2-Medium**   **3-Strong**

Syllabus

UNIT I   12 Hours

Introduction to Data Structure: Introduction - Basic terminology-Elementary Data Organization-Data Structures-Data Structure Operations-Arrays-Introduction-Linear Arrays-Representation of linear arrays in Memory-Traversing Linear Arrays-Inserting and Deleting-Searching-Linear search and Binary search.

UNIT II   12 Hours

Linked List: Introduction – Representation of Linked List in Memory-Traversing a linked list- Searching a linked list- Memory allocation-insertion and deletion in a linked list.

UNIT III   12 Hours

Stacks: Array representation of stacks-linked representation of Stacks-**Queues**-Array representation of Queues-linked representation queues-**Trees:** Introduction- Binary trees- types Binary trees- representation of Binary trees- Binary tree traversal- Binary search trees.

UNIT IV   12 Hours

Algorithms: The importance of developing efficient Algorithms–Complexity analysis - Divide and Conquer: Binary search-Merge sort–Quick Sort.

UNIT V   **1**2 Hours

The Greedy Method: Minimum spanning trees: Prim's Algorithm – Kruskal Algorithm –Single source shortest paths –scheduling – Huffman codes.

Text Books

Seymour Lipschut, *Data Structures,* Tata McGraw Hill.

Richard Neapolitan Kumarss Naimipour, *Foundations of Algorithms using C++ Pseudocode,* Narosa Publications, Third Edition, 2004.

Reference Books

S. Sharanya, *Data Structures & Algorithms,* Charulatha Publications.

Data Structure & Algorithms Concepts, Techniques and applications, GAVPAI, Tata McGraw Hill.

Pedagogy

Chalk and Talk Lecture, Seminar, Group discussion, LMS & PPT

Teaching aids

Black Board, LCD Projector

Course Contents and Lecture Schedule

Module No.	Topic	No. of Lectures	Content Delivery Methods
UNIT - I			
1.1	Introduction: Basic terminology	2	PPT
1.2	Elementary Data Organization	1	Chalk and Talk
1.3	Data Structures	1	Chalk and Talk
1.4	Data Structure Operations	1	Chalk and Talk
1.5	Arrays	1	Chalk and Talk
1.6	Representation of linear arrays in Memory	1	Chalk and Talk
1.7	Traversing Linear Arrays	1	Chalk and Talk
1.8	Inserting and Deleting	1	Chalk and Talk
1.9	Searching	1	Chalk and Talk
1.10	Linear search	1	Chalk and Talk
1.11	Binary search	1	Chalk and Talk
UNIT - II			
2.1	**Linked List:** Introduction	2	Chalk and Talk
2.2	Representation of Linked List in Memory	2	Chalk and Talk

2.3	Traversing a linked list	2	Chalk and Talk
2.4	Searching a linked list	2	Chalk and Talk
2.5	Memory allocation	2	Chalk and Talk
2.6	Insertion and deletion in a linked list	2	Chalk and Talk
UNIT - III			
3.1	**Stacks**: Array representation of stacks	1	Chalk and Talk
3.2	linked representation of Stacks	2	Chalk and Talk
3.3	**Queues:** Array representation of Queues	1	Chalk and Talk
3.4	linked representation queues	2	Chalk and Talk
3.5	**Trees:** Introduction- Binary trees	2	Chalk and Talk
3.6	Types Binary trees	1	Chalk and Talk
3.7	Representation of Binary trees	1	Chalk and Talk
3.8	Binary tree traversal	1	Chalk and Talk
3.9	Binary search trees	1	Chalk and Talk
UNIT - IV			
4.1	The importance of developing efficient Algorithms	2	Chalk and Talk
4.2	Complexity analysis	2	Chalk and Talk
4.3	Divide and Conquer	2	Chalk and Talk
4.4	Binary search	2	Chalk and Talk
4.5	Merge sort	2	Chalk and Talk
4.6	Quick Sort	2	Chalk and Talk
UNIT - V			
5.1	Minimum cost spanning trees	2	Chalk and Talk
5.2	Prim's Algorithm	2	Chalk and Talk
5.3	Kruskal Algorithm	2	Chalk and Talk
5.4	Single source shortest paths	2	Chalk and Talk
5.5	Scheduling	2	Chalk and Talk
5.6	Huffman codes	2	Chalk and Talk
	Total	**60**	

Course Designer
Mr. S. Peer Mohaideen Mudalali
Associate Professor of Computer Science.

Course Code	Course Title	Category	Total Hours	Credits
20UCSC4P	**DS, Algorithms & Numerical Methods Lab**	**Core - VIII**	**120**	**4**

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

Course Relevance	
Local	
Regional	
National	
Global	✓

Preamble

     The course elaborates on basic data structure concepts with different ways of organizing data and developing algorithms for various operations on data structures.

Course Outcomes (CO)

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

No.	Course Outcome	Knowledge Level
CO1	Create programs to sort numbers and strings sequential search and binary search.	**K1,K2,K3**
CO2	Explain stack and queue data structure and their practical application.	**K1,K2,K3**
CO3	Application of link list real application like dynamic storage management.	**K1,K2,K3**
CO4	Develop programs for queue data structure and its operations.	**K1,K2,K3**
CO5	Apply numerical methods to find solution of algebraic equations using different methods and different conditions and numerical solution of system of algebraic equations.	**K1,K2,K3**

    K1-Knowledge   **K2-Understand**   **K3-Apply**

Mapping of CO with PO

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

1-Low   **2-Medium**   **3-Strong**

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	2	3	3
CO2	3	2	3	2	3
CO3	3	1	2	3	3
CO4	3	2	2	2	3
CO5	3	1	3	2	3

1-Low   **2-Medium**   **3-Strong**

Syllabus

List of Practical for Programming in Data Structures:

1. Write an interactive program to implement the following operations on stack using arrays
   a. PUSH b. POP
2. Write an interactive program to perform insertion and deletion operations in Linear Queue using arrays.
3. Write an interactive program to perform insertion and deletion operations in Circular Queue using arrays.
4. Write an interactive program to insert a node in a linked list at the front, delete a node from the rear and display.

List of Practical for Programming in Algorithms:

1. Program to search an element by binary search using divide and conquer
2. Program to find the minimum cost spanning tree using Kruskal's Algorithm.
3. Program to find the minimum cost spanning tree using Prim's Algorithm.
4. Program to generate n random numbers and sort them using Quick Sort method.

5. Program to implement Merge Sort Algorithm.
6. Implement 0/1 Knapsack problem.

List of Practical for Programming in Numerical Methods:

1. Program to solve the given equation by using Bisection method.
2. Program to solve the given equation by using Newton Raphson method.
3. Program to solve the given differential equation by using Rungekutta method.
4. Program to implement Lagrange interpolation method.
5. Program to integrate the given function by using Trapezoidal method.
6. Program to integrate the given function by using Simpson rule.

Text Books

Seymour Lipschut, **Data Structures,** Tata McGraw Hill.

Richard Neapolitan Kumarss Naimipour, **Foundations of Algorithms using C++ Pseudocode,** Third Edition, Narosa Publications, 2004.

S. Arumugam and A.Thangapandi, **Numerical Analysis,** ISSAC.

Course Designer
Mr. S. Peer Mohaideen Mudalali
Associate Professor of Computer Science.

Course Code	Course Title	Category	Total Hours	Credits
20UCSA41	**Numerical Methods**	**Allied – IV**	**60**	**4**

Nature of Course		Course Relevance	
Knowledge Oriented	✓	Local	
Skill Oriented	✓	Regional	
Employability Oriented		National	
Entrepreneurship Oriented		Global	✓

Preamble

This course provides an introduction to the basic concepts and techniques of numerical solution of algebraic equation, system of algebraic equation, numerical solution of differentiation, integration and applications to computer to science and to develop the mathematical skills of the students in the areas of numerical methods.

Course Outcomes (CO)

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

No.	Course Outcome	Knowledge Level
CO1	Select appropriate method for finding numerical solutions of algebraic and transcendental equations.	**K1,K2,K3**
CO2	Find approximate solutions to simultaneous equation	**K1**
CO3	Solve mathematical problems such as interpolation	**K1,K2,K3**
CO4	Enable the students to solve Numerical differentiation and Numerical Integration	**K1,K2,K3**
CO5	Enable the students to solve differential equation and partial differential equations numerically	**K1,K2,K3**

K1-Knowledge **K2-Understand** **K3-Apply**

Mapping of CO with PO

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

1-Low **2-Medium** **3-Strong**

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	3	3	3
CO2	3	1	3	1	3
CO3	2	1	3	3	2
CO4	2	1	2	3	3
CO5	3	1	3	2	3

1-Low   **2-Medium**   **3-Strong**

Syllabus

UNIT I   12 Hours

Algebraic and Transcendental Equations: Iteration Method – Aitken's method- Bisection method – Regula Falsi method – Newton Raphson method.

UNIT II   12 Hours

Simultaneous equations: Gauss elimination method – Gauss Jordan method–Gauss Jacobi iteration method - Gauss seidel iteration methods.

UNIT III   12 Hours

Interpolation: Newton's interpolation formulae – central difference interpolation formulae – Lagrange's interpolation formulae – Inverse interpolation.

UNIT IV   12 Hours

Numerical differentiation: Newton's forward and Backward difference formulae – Maxima and Minima of the interpolating polynomial - Numerical Integration: Trapezoidal rule – Simpson's rule.

UNIT V   12 Hours

Numerical solution of differential equations – Taylor's series method - Euler's method – RungeKutta method.

Text Books

S. Arumugam and A.Thangapandi, *Numerical Analysis,* ISSAC.

Reference Books

T. Veerarajan & T. Ramachandran, *Numerical Methods, Second Edition,* Tata McGraw Hill, 2006.

P. Thangaraj, *Computer – oriented Numerical Methods,* Prentice Hall of India, Pvt. Ltd, New Delhi, 2008.

Pedagogy

Chalk and Talk Lecture, Seminar, Group discussion, LMS & PPT

Teaching aids

Black Board, LCD Projector

Course Contents and Lecture Schedule

Module No.	Topic	No. of Lectures	Content Delivery Methods
UNIT - I			
1.1	Algebraic and Transcendental Equations	2	Discussion
1.2	Iteration Method	2	Chalk & Talk
1.3	Aitken's Method	2	Chalk & Talk
1.4	Bisection method	2	Chalk & Talk
1.5	Regula Falsi method	2	Chalk & Talk
1.6	Newton Raphson method.	2	Chalk & Talk
UNIT - II			
2.1	Gauss elimination method	3	Lecture
2.2	Gauss Jordan method	3	Chalk & Talk
2.3	Gauss Jacobi iteration method	3	Chalk & Talk
2.4	Gauss seidel iteration methods.	3	Chalk & Talk
UNIT - III			
3.1	Newton's interpolation formulae	3	Chalk & Talk
3.2	Central difference interpolation formulae	3	Chalk & Talk
3.3	Lagrange's interpolation formulae	3	Chalk & Talk
3.4	Inverse interpolation.	3	Chalk & Talk
UNIT - IV			
4.1	Newton's forward difference	2	Chalk & Talk
4.2	Backward difference	2	Chalk & Talk
4.3	Maxima of the interpolating polynomial	2	Chalk & Talk
4.4	Minima of the interpolating polynomial	2	Chalk & Talk
4.5	Trapezoidal role	2	Chalk & Talk
4.6	Simpson's rule	2	Chalk & Talk

UNIT - V			
5.1	Taylor's series method	4	Chalk & Talk
5.2	Euler's method	4	Chalk & Talk
5.3	RungeKutta method.	4	Chalk & Talk
	Total	**60**	

Course Designer
Dr. S. Seyad Ali Fathima
Assistant Professor of Mathematics.

Course Code	Course Title	Category	Total Hours	Credits
20UCSS4P	**Linux Shell Programming Lab**	**SBS - II**	**30**	**2**

Nature of Course			Course Relevance	
Knowledge Oriented	✓		Local	
Skill Oriented	✓		Regional	
Employability Oriented	✓		National	
Entrepreneurship Oriented	✓		Global	✓

Preamble

In this course basics of shell programming are dealt. Shell programs to understand the operating environment of Linux are practiced. An exposure to system calls types of process and inter process communication issues are dealt with practical exercises.

Syllabus

   List of Practicals:

   1. Find the sum of the digits of a given number
   2. Find the reverse of a number
   3. Perform basic arithmetic operations using case
   4. Display multiplication table
   5. Check whether a number is prime or not using while
   6. Convert lowercase to uppercase using tr statement
   7. Check for an adam number
   8. Check pattern matching using grep
   9. Find the number of users who have logged in
   10. Check for palindrome
   11. Find age of a person using set date
   12. Write a menu driven program to display today's date, Processes of the System, users of the   system, list files of the system
   13. Write a Shell Script to read 10 names from a file and sort in
        a. Ascending order   b. Descending order
   14. Get mark details of a student and display total and grade
   15. Prepare electricity bill
   16. To set the attributes of a given file
   17. To check the given file is a directory or not
   18. To create and append a file
   19. To compare two files
   20. To perform string manipulation

Text Books

    Mike McGrath ***Linux in easy steps*** dreamtech.

Course Designer
Mr. S. Sirajudeen
Associate Professor of Computer Science.

Course Code	Course Title	Category	Total Hours	Credits
20UCSC51	Cloud Computing	Core - IX	60	4

Nature of Course			Course Relevance	
Knowledge Oriented	✓		Local	
Skill Oriented	✓		Regional	
Employability Oriented	✓		National	
Entrepreneurship Oriented			Global	✓

Preamble

Cloud computing is an emerging computing paradigm where various users access the resources and services offered by service providers. Use of cloud computing at this course encompasses the production services and it can offer benefits in the cost, performance, and delivery of IT services.

Course Outcomes (CO)

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

No.	Course Outcome	Knowledge Level
CO1	Identify the fundamental concepts of Cloud Computing.	K1,K2,K3
CO2	Make use of the various types of virtualization and its importance.	K1,K2,K3
CO3	Use the various cloud infrastructures and application.	K1,K2,K3
CO4	Identify the methods used for secure cloud access and application development.	K1,K2,K3
CO5	Determine the various cloud platforms to provide cloud based services for complex applications.	K1,K2,K3

K1-Knowledge **K2-Understand** **K3-Apply**

Mapping of CO with PO

	PO1	PO2	PO3	PO4	PO5
CO1	3	2	3	2	3
CO2	3	2	3	2	3
CO3	3	2	3	3	3
CO4	3	2	3	3	3
CO5	3	3	2	3	3

1-Low **2-Medium** **3-Strong**

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	1	3	3
CO2	3	3	1	3	3
CO3	3	3	2	3	3
CO4	3	3	2	3	3
CO5	3	3	2	3	3

1-Low   **2-Medium**   **3-Strong**

Syllabus

UNIT I   12 Hours

Introduction: The vision of cloud computing - Defining a cloud - The cloud computing reference model - Characteristics and benefits - Historical developments (Evolution of Cloud Computing) – **Principles of Parallel and Distributed Computing** - Era of Computing - Parallel vs Distributed Computing.

UNIT II   12 Hours

Virtualization: Characteristics of Virtualized Environments - Taxonomy of Virtualization Techniques - Virtualization and Cloud Computing - Pros and cons of virtualization - Technology Examples.

UNIT III   12 Hours

Cloud Computing Architecture: The cloud reference model - Types of clouds - Open challenges.

UNIT IV   12 Hours

Cloud Platforms in Industry: AWS – Google App Engine – Microsoft Azure

UNIT V   12 Hours

Cloud Applications: Health care – ERP applications.

Text Books

Rajkumar Buyya, Christian Vecchiola and Thamari Selvi, ***Mastering in Cloud Computing***, Tata McGraw Hill Education Private Limited, New Delhi, 2019, 1st Edition.

Reference Books

Arshdeep Bahga & Vijay Madisetti, ***Cloud Computing***, Universities Press (India) Private Limited, Universities Press (India) Private Limited, 2014, 2nd Edition.

George Reese, ***Cloud Application Architectures***, ISBN: 184047142, Shroff/O'Reilly, 2009.

Pedagogy

PDF, Group PDF, Seminar

Teaching aids

Black Board, LCD Projector

Course Contents and Lecture Schedule

Module No.	Topic	No. of Lectures	Content Delivery Methods
UNIT - I			
1.1	**Introduction** - The vision of cloud computing	1	PDF
1.2	Defining a cloud	2	
1.3	The cloud computing reference model	2	
1.4	Characteristics and benefits	2	PDF
1.5	Historical developments (Evolution of Cloud Computing)	2	PDF
1.6	**Principles of Parallel and Distributed Computing** - Era of Computing	1	PDF
1.7	Parallel vs Distributed Computing	2	PDF
UNIT - II			
2.1	**Virtualization** - Characteristics of Virtualized Environments	3	PDF
2.2	Taxonomy of Virtualization Techniques	3	PDF
2.3	Virtualization and Cloud Computing	2	PDF
2.4	Pros and cons of virtualization	2	PDF
2.5	Technology Examples	2	PDF
UNIT - III			
3.1	**Cloud Computing Architecture** - The cloud reference model	4	PDF
3.2	Types of clouds	4	PDF
3.3	Open challenges	4	PDF
UNIT - IV			
4.1	**Cloud Platforms in Industry** – AWS	4	PDF
4.2	Google App Engine	4	PDF
4.3	Microsoft Azure	4	PDF

UNIT - V			
5.1	**Cloud Applications** – Health care –	6	PDF
5.2	ERP applications	6	PDF
	Total	60	

Course Designer
Mr. M. Sulthan Ibrahim
Associate Professor of Computer Science

Course Code	Course Title	Category	Total Hours	Credits
20UCSC52	**Operating Systems**	**Core - X**	**60**	**4**

Nature of Course		Course Relevance	
Knowledge Oriented	✓	Local	
Skill Oriented	✓	Regional	
Employability Oriented		National	
Entrepreneurship Oriented		Global	✓

Preamble

In this course the students learn about the fundamental components of a computer operating system, the policies for scheduling, deadlocks, memory management, synchronization, system calls, and file systems**.**

Course Outcomes (CO)
On the successful completion of the course the students will be able to

No.	Course Outcome	Knowledge Level
CO1	Determine the characteristics of different structures of the Operating Systems (such as microkernel, layered etc.) and identify the core functions of the Operating Systems	**K1,K2,K3**
CO2	Apply the mutual exclusion, software solutions, hardware solutions to the mutual exclusion problem, semaphores and monitors	**K1,K2,K3**
CO3	Explain the deadlock, examples of deadlock, necessary conditions of deadlock, deadlock prevention, deadlock avoidance, deadlock detection and deadlock recovery and able to apply various scheduling algorithms	**K1,K2,K3**
CO4	Determine real memory organization , management and virtual memory management	**K1,K2,K3**
CO5	Use file system , database system and disk performance optimization	**K1,K2,K3**

K1-Knowledge   K2-Understand   K3-Apply

Mapping of CO with PO

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

1-Low   **2-Medium**   **3-Strong**

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	1	2	3	3
CO2	2	1	2	3	3
CO3	3	1	3	3	3
CO4	3	1	3	2	3
CO5	3	1	3	2	3

1-Low   **2-Medium**   **3-Strong**

Syllabus

UNIT I   12 Hours

Introduction: What Operating Systems Do-Computer - System Organization –Computer - System Architecture – Operating - System Structure - **Process Management** - Process Concept - Process Scheduling - Operations on Processes -Interprocess Communication.

UNIT II   12 Hours

Process Scheduling - Basic Concepts - Scheduling Criteria - Scheduling Algorithms. **Deadlocks -** System Model - Deadlock Characterization - Methods for Handling Deadlocks - Deadlock Prevention - Deadlock Avoidance -Deadlock Detection - Recovery from Deadlock.

UNIT III   12 Hours

Memory Management – Background – Swapping - Contiguous Memory Allocation –Segmentation –Paging - Structure of the Page Table**.**

UNIT IV   12 Hours

Virtual Memory – Background - Demand Paging – Copy – on – Write - Page Replacement **– Mass - Storage Structure -** Overview of Mass – Storage – Structure - Disk Structure - Disk Attachment - Disk Scheduling - Disk Management.

UNIT V   12 Hours

File-System: File Concept- Access Methods- Directory and Disk Structure-File-System Mounting- File Sharing- Protection.

Text Books

Abraham Silbers chatz, Peter B Galvin, Gerg Gagne, ***Operating System Concepts***, Ninth Edition, Wiley India Pvt. Ltd. 2019.

Reference Books

Deitel Choffnes, ***Operating Systems***, Third edition, Pearson education, New Delhi, 2008.

D. M. Dhamdhere, ***Operating Systems A Concept Based approach***, Second Edition, Tata McGraw Hill Publishing Company Limited, New Delhi, 2006.

Pedagogy

PDF, PDF, Group PDF

Teaching aids

Black Board, LCD Projector

Course Contents and Lecture Schedule

Module No.	Topic	No. of Lectures	Content Delivery Methods
UNIT - I			
1.1	**Introduction**: What Operating Systems Do	1	PDF
1.2	Computer-System Organization	1	PDF
1.3	Computer- System Architecture	1	PDF
1.4	Operating-System Structure	1	PDF
1.5	**Process Management**: Process Concept	2	PDF
1.6	Process Scheduling	2	PDF
1.7	Operations on Processes	2	PDF
1.8	Inter process Communication	2	PDF
UNIT - II			
2.1	**Process Scheduling:** Basic Concepts	1	PDF
2.2	Scheduling Criteria	1	PDF
2.3	Scheduling Algorithms	1	PDF
2.4	**Deadlocks**: System Model	1	PDF
2.5	Deadlock Characterization	2	PDF
2.6	Methods for Handling Deadlocks	2	PDF
2.7	Deadlock Prevention	1	PDF
2.8	Deadlock Avoidance	1	PDF
2.9	Deadlock Detection	1	PDF

2.10	Recovery from Deadlock	1	PDF
UNIT - III			
3.1	**Memory Management -**Background	2	PDF
3.2	Swapping	2	PDF
3.3	Contiguous Memory Allocation	2	PDF
3.4	Segmentation	2	PDF
3.5	Paging	2	PDF
3.6	Structure of the Page Table	2	PDF
UNIT - IV			
4.1	**Virtual Memory-**Background	1	PDF
4.2	Demand Paging	1	PDF
4.3	Copy-on-Write	2	PDF
4.4	Page Replacement	2	PDF
4.5	**Mass-Storage Structure-**Overview of Mass-Storage-Structure	1	PDF
4.6	Disk Structure	2	PDF
4.7	Disk Attachment	2	PDF
4.8	Disk Scheduling	1	PDF
UNIT - V			
5.1	**File-System-**File Concept	2	PDF
5.2	Access Methods	2	PDF
5.3	Directory and Disk Structure	2	PDF
5.4	File-System Mounting	2	PDF
5.5	File Sharing	2	PDF
5.6	Protection	2	PDF
Total		**60**	

Course Designer
Mr. M. Mohamed Meeran
Associate Professor of Computer Science

Course Code	Course Title	Category	Total Hours	Credits
20UCSC53	**Data Communication and Networking**	**Core - XI**	**60**	**4**

Nature of Course		Course Relevance	
Knowledge Oriented	✓	Local	
Skill Oriented	✓	Regional	
Employability Oriented		National	
Entrepreneurship Oriented		Global	✓

Preamble

Studying the basic terminologies in computer networks, protocols in networking, services and features of protocol stack, network services, security and mechanisms to counter network threats.

Course Outcomes (CO)

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

No.	Course Outcome	Knowledge Level
CO1	Utilize different network models, and Network topologies.	**K1,K2,K3**
CO2	Identify multiplexing techniques and switching techniques.	**K1,K2,K3**
CO3	Make use of Data link Layer Framing, Error control, Sliding Window Protocols like data link layer HDLC and point to point protocol (PPP).	**K1,K2,K3**
CO4	Identify Random Access, Controlled Access and Channelization.	**K1,K2,K3**
CO5	Make use of IEEE Standards, Standard Ethernet, Fast Ethernet, IEEE-802.11, and illustrate Application layer protocols and Wireless Application Protocol.	**K1,K2,K3**

K1-Knowledge　　　　　**K2-Understand**　　　　　**K3-Apply**

Mapping of CO with PO

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

1-Low   **2-Medium**   **3-Strong**

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	2	2	2
CO2	3	2	1	2	3
CO3	3	3	2	3	1
CO4	3	2	3	2	2
CO5	2	2	3	2	3

1-Low   **2-Medium**   **3-Strong**

Syllabus

UNIT I   12 Hours

Introduction: Data Communications-Components- Data Representation-Data Flow- Networks-Distributed processing-Network Criteria-Physical Structures-Network Models-Categories of Networks-The Internet-A Brief History- The Internet Today-Protocols and standards-Protocols-standards-standards Organizations-Internet Standards.

Network Models: Layered Tasks-OSI Model-Layers in the OSI Model-TCP/IP protocol suite.

UNIT II   12 Hours

Transmission Media: Guided Media-Twisted Pair Cable-Coaxial cable-Fiber-optic cable- Unguided Media-Wireless- Radio Waves- Microwaves-Infrared.

Switching: Circuit switched Networks-Datagram Networks-Virtual circuit Networks-Structure of a switch.

UNIT III   12 Hours

Error Detection and Correction: Introduction-Type of Errors-Block coding-Linear Block codes-Cyclic codes-Checksum.

UNIT IV   12 Hours

Data Link Control: Framing-Flow and Error Control-Protocols-Noiseless Channels-Simplest protocol-stop and wait protocol-Noisy channels-stop and wait Automatic Repeat Request-Go Back N Automatic Repeat Request-selective repeat Automatic Repeat Request-Piggybacking-HDLC.

UNIT V   12 Hours

Wired Lans: Ethernet- IEEE standards-Standard Ethernet-changes in the standard-Fast Ethernet-Gigabit Ethernet-Wireless Lans: IEEE 802.11-Bluetooth.

Text Books

Behrous A. Forouzan, ***Data Communications and Networking***, Tata McGraw-Hill Edition, New Delhi, 4th Edition 2007.

Reference Books

Brijendra Singh, ***Data Communications andComputer Networks***, Prentice- Hall of India Pvt. Ltd, New Delhi, 2007, Second Edition.

A. Tananbaum, ***Computer Networks***, Pearson Education Asia, New York,200,5th Edition.

Pedagogy

PDF, Group PDF, Seminar

Teaching aids

Black Board, LCD Projector

Course Contents and Lecture Schedule

Module No.	Topic	No. of Lectures	Content Delivery Methods
UNIT - I			
1.1	**Introduction**: Data Communications-Components	1	PDF
1.2	Data Representation	1	PDF
1.3	Data Flow	1	PDF
1.4	Networks-Distributed processing-Network Criteria-Physical Structures	2	PDF
1.5	Network Models-Categories of Networks	2	PDF
1.6	The Internet-A Brief History- The Internet Today	1	PDF

1.7	Protocols and standards-Protocols-standards-standards Organizations-Internet Standards	1	PDF
1.8	**Network Models**: Layered Tasks-OSI Model-Layers in the OSI Model	2	PDF
1.9	TCP/IP protocol suite.	1	PDF
UNIT - II			
2.1	**Transmission Media**: Guided Media Twisted Pair Cable-Coaxial cable-Fiber-optic cable	4	PDF
2.2	Unguided Media-Wireless- Radio Waves-Microwaves-Infrared.	4	PDF
2.3	**Switching**: Circuit switched Networks-Datagram Networks-Virtual circuit Networks- Structure of a switch.	4	PDF
UNIT - III			
3.1	**Error Detection and Correction**: Introduction-Type of Errors	2	PDF
3.2	Block coding	3	PDF
3.3	Linear Block codes	3	PDF
3.4	Cyclic codes	2	PDF
3.5	Checksum	2	PDF
UNIT - IV			
4.1	**Data Link Control**: Framing-Flow and Error Control	2	PDF
4.2	Protocols-Noiseless Channels-Simplest protocol-stop and wait protocol	2	PDF
4.3	Noisy channels-stop and wait Automatic Repeat Request	2	PDF
4.4	Go Back N Automatic Repeat Request	2	PDF
4.5	selective repeat Automatic Repeat Request-Piggybacking	2	PDF
4.6	HDLC	2	PDF

UNIT - V			
5.1	**Wired Lans**: Ethernet- IEEE standards	1	PDF
5.2	Standard Ethernet	2	PDF
5.3	changes in the standard	1	PDF
5.4	Fast Ethernet	1	PDF
5.5	Gigabit Ethernet	2	PDF
5.6	Wireless Lans: IEEE 802.11	3	PDF
5.7	Bluetooth	2	PDF
	Total	**60**	

Course Designer
Mr. M. Mohamed Meeran
Associate Professor of Computer Science

Course Code	Course Title	Category	Total Hours	Credits
20UCSE51	Multimedia Technology	Elective - I	60	3

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

Course Relevance	
Local	
Regional	
National	
Global	✓

Preamble

This course provides adequate knowledge in multimedia applications and usage of tools used in multimedia environment.

Course Outcomes (CO)

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

No.	Course Outcome	Knowledge Level
CO1	Learn the basics and Fundamentals of Multimedia.	K1,K2,K3
CO2	Introduce Multimedia components and Tools.	K1,K2,K3
CO3	Understand how Multimedia can be incorporated Expected Course Outcome.	K1,K2,K3
CO4	Understand multimedia components using various tools and techniques.	K1,K2,K3
CO5	Know different types of media format and their properties.	K1,K2,K3

K1-Knowledge   **K2-Understand**   **K3-Apply**

Mapping of CO with PO

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

1-Low   **2-Medium**   **3-Strong**

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	1	3	3
CO2	3	3	1	3	3
CO3	3	3	2	3	3
CO4	3	3	2	3	3
CO5	3	3	2	3	3

1-Low   **2-Medium**   **3-Strong**

Syllabus

UNIT I   12 Hours

Multimedia-an overview: Introduction, Multimedia presentation and production, characteristics of a multimedia presentation, Multiple Media, Utilities of multisensory perception, Hardware and software requirements, Uses of multimedia, steps for creating multimedia presentation.

UNIT II   12 Hours

Visual display Systems: Introduction, Cathode Ray Tube (CRT), Video Adapter Card, Video Adapter cable, Liquid Crystal Display (LCD), Plasma Display Panel (PDP).   Text: Introduction, Types of Text, Unicode Standard, Font, Insertion of Text, Text compression, File Formats.

UNIT III   12 Hours

Image: Introduction, Image Types, Seeing color, color models, Basic steps for Image Processing, Scanner, Digital Camera, Interface Standards, Image Processing software, File formats, Image output on monitor, Image output on printer.

UNIT IV   12 Hours

Audio: Introduction, Fundamentals Characteristics of sound, Elements of Audio systems, Microphone, Amplifier, Loudspeaker, Audio mixer, Audio and multimedia, Audio Processing software.

UNIT V   12 Hours

Animation: Introduction, Uses of animation, Key frames and Tweening, Types of animation, Computer Assisted Animation, Creating movements, Principles of animation, Some Techniques of Animation, Animation on the web,3D Animation, Special Effects, Animation software.

Text Books

Ranjan Parekh, ***Principles of Multimedia***, Tata McGraw Hill Education Private Limited, New Delhi, Twelfth Reprint 2011.

Reference Books

Prabhat K. Andleigh and Kiran Thakrar, *Multimedia System Design*, Pearson Education India, India, 2015.

Pedagogy

PDF, PDF, Group PDF

Teaching aids

Black Board, LCD Projector

Course Contents and Lecture Schedule

Module No.	Topic	No. of Lectures	Content Delivery Methods
	UNIT - I		
1.1	Multimedia-an overview: Introduction	2	PDF
1.2	Multimedia presentation and production, characteristics of a multimedia presentation	3	PDF
1.3	Multiple Media, Utilities of multisensory perception	2	PDF
1.4	Hardware and software requirements, Uses of multimedia	3	PDF
1.5	steps for creating multimedia presentation	2	PDF
	UNIT - II		
2.1	Introduction, Cathode Ray Tube (CRT)	2	PDF
2.2	Visual display Systems, Video Adapter Card	2	PDF
2.3	Video Adapter cable, Liquid Crystal Display (LCD), Plasma Display Panel (PDP)	2	PDF
2.4	Introduction, Types of Text	2	PDF
2.5	Unicode Standard, Font	2	PDF
2.6	Insertion of Text, Text compression, File Formats	2	PDF
	UNIT - III		
3.1	Introduction, Types of Text, Unicode Standard, Font, Insertion of Text, Text compression, Text, File Formats	3	PDF

3.2	Image Types, Seeing color, color models, Basic steps for Image Processing	3	PDF
3.3	Scanner, Digital Camera, Interface Standards, Image Processing software	3	PDF
3.4	File formats, Image output on monitor, Image output on printer	3	PDF
UNIT - IV			
4.1	Introduction, Fundamentals Characteristics of sound	3	PDF
4.2	Elements of Audio systems, Microphone	3	PDF
4.3	Amplifier, Loudspeaker, Audio mixer	3	PDF
4.4	Audio and multimedia, Audio Processing software	3	PDF
UNIT - V			
5.1	Introduction, Uses of animation, Key frames and Tweening	3	PDF
5.2	Types of animation, Computer Assisted Animation, Creating movements	3	PDF
5.3	Principles of animation, Some Techniques ofAnimation, Animation on the web	3	PDF
5.4	3D Animation, Special Effects, Animation software	3	PDF
Total		60	

Course Designer
Mr. S. Peer Mohaideen Mudalali
Associate Professor of Computer Science

Course Code	Course Title	Category	Total Hours	Credits
20UCSE52	Microprocessors & Applications	Elective - I	60	3

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

Course Relevance	
Local	
Regional	
National	
Global	✓

Preamble

In this course students learn about Microprocessors and their applications involved in the current scenario, Concentrate on various modes of operation in 8086 and Focus on the concepts on the system design and interfacing in 8086, Emphasis on the advanced processors such as 80286, 80386, 80486 and their internal architectures.

Course Outcomes (CO)

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

No.	Course Outcome	Knowledge Level
CO1	Use the architecture, and identify capabilities & limitations of the 8086 microprocessor	K1,K2,K3
CO2	Estimate how 8086 fits in with modern computers	K1,K2,K3
CO3	Build interfaces for computer control	K1,K2,K3
CO4	Make use of architecture of 80286, 80386, 80486	K1,K2,K3
CO5	Collect the concepts of Pentium Processors	K1,K2,K3

  K1-Knowledge   **K2-Understand**   **K3-Apply**

Mapping of CO with PO

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

  1-Low   **2-Medium**   **3-Strong**

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	2	3	3
CO2	3	1	2	3	3
CO3	3	2	3	1	3
CO4	3	1	3	2	2
CO5	3	1	3	2	3

1-Low   **2-Medium**   **3-Strong**

Syllabus

UNIT I   12 Hours

Evolution of Microprocessors - 8086 architecture – Addressing modes - Instruction set and assembler directives – Assembly language programming – Interrupts and interrupt service routines.

UNIT II   12 Hours

8086 signals description –Basic configurations - System bus timing – System design using 8086 – Minimum mode /Maximum modes 8086 system and timings.

UNIT III   12 Hours

Memory Interfacing and I/O interfacing - Parallel communication interface –Serial communication interface –Timer – Keyboard /display controller – Interrupt controller –DMA controller –Programming and applications.

UNIT IV   12 Hours

Intel 80286 – Internal Architecture – Register Organization – Internal Block Diagram – Modes of operation – Real Address Mode – Protected Virtual Address mode – Architectural features and Register Organization of i386, i486.

UNIT V   12 Hours

Introduction to Pentium Microprocessor – Special Pentium Registers – Pentium Memory Management –Introduction to Pentium II Microprocessor –Pentium II Software Changes –The Pentium III–Pentium IV.

Text Books

A. K. Ray & K. M. Bhurchandi, *Advanced Microprocessors and peripherals Architectures, Programming and Interfacing*, Tata McGraw Hill, Noida, Uttar Pradesh, 2009, 2nd Edition, 11th reprint.

Barry B. Brey, *The Intel Microprocessors, 8086/8088, 80186/80188, 80286, 80386, 80486 , Pentium, Pentium Pro Processor, Pentium II, Pentium III, Pentium IV, Architecture, Programming & Interfacing*, Pearson Education / PHI, New Delhi, 2009, 8th Edition.

Reference Books

Douglas Hall, ***Microprocessors and Its Interfacing,*** New Delhi,2006, Revised 2ⁿᵈ edition

Badri Ram, **Advanced *Microprocessor and Interfacing***, NewDelhi, 2008, Fifteenth Reprint.

Pedagogy

Chalk & Talk & E-Resources & PDF

Teaching aids

Black Board, LCD Projector

Course Contents and Lecture Schedule

Module No.	Topic	No. of Lectures	Content Delivery Methods
	UNIT - I		
1.1	Evolution of Microprocessors	2	PDF
1.2	8086 architecture	2	PDF
1.3	Addressing modes	2	PDF
1.4	Instruction set and assembler directives	2	PDF
1.5	Assembly language programming	2	PDF
1.6	Interrupts and interrupt service routines	2	PDF
	UNIT - II		
2.1	8086 signals description	2	PDF
2.2	Basic configurations	2	PDF
2.3	System bus timing	2	PDF
2.4	System design using 8086	3	PDF
2.5	Minimum mode /Maximum modes 8086 system and timings.	3	PDF
	UNIT - III		
3.1	Memory Interfacing and I/O interfacing	2	PDF
3.2	Parallel communication interface	2	PDF
3.3	Serial communication interface	2	PDF
3.4	Timer – Keyboard /display controller	3	PDF
3.5	Interrupt controller ,DMA controller – Programming and applications	3	PDF

	UNIT - IV		
4.1	Intel 80286	2	PDF
4.2	Internal Architecture	1	PDF
4.3	Register Organization	2	PDF
4.4	Internal Block Diagram	2	PDF
4.5	Modes of operation – Real Address Mode	2	PDF
4.6	Protected Virtual Address mode, Architectural features and Register Organization of i386, i486.	3	PDF
	UNIT - V		
5.1	Introduction to Pentium Microprocessor	2	PDF
5.2	Special Pentium Registers	2	PDF
5.3	Pentium Memory Management	2	PDF
5.4	Introduction to Pentium II Microprocessor	2	PDF
5.5	Pentium II Software Changes	2	PDF
5.6	The Pentium III –Pentium	2	PDF
	Total	**60**	

Course Designer
Mr. M. Mohamed Meeran
Associate Professor of Computer Science

Course Code	Course Title	Category	Total Hours	Credits
20UCSE53	Data Mining	Elective - I	60	3

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

Course Relevance	
Local	
Regional	
National	
Global	✓

Preamble

To understand the basic concept of data mining process, association rule mining, classification, cluster analysis and web data mining.

Course Outcomes (CO)

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

No.	Course Outcome	Knowledge Level
CO1	Identify the basic concepts and techniques of Data Mining.	K1,K2,K3
CO2	Determine the association rule mining and its related Algorithms.	K1,K2,K3
CO3	Make use of Decision tree, Naïve Bayes method and criteria for classification methods.	K1,K2,K3
CO4	Experiment with cluster analysis methods, Partitional methods, Hierarchical methods and Density-based methods.	K1,K2,K3
CO5	Develop skills of Web Data Mining, Web usage mining, Web structure mining and Web mining software.	K1,K2,K3

K1-Knowledge   K2-Understand   K3-Apply

Mapping of CO with PO

	PO1	PO2	PO3	PO4	PO5
CO1	3	2	3	3	2
CO2	3	2	3	3	2
CO3	3	2	3	3	2
CO4	3	2	3	3	2
CO5	3	2	3	3	2

1-Low   2-Medium   3-Strong

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	3	3	2
CO2	3	2	3	3	2
CO3	3	2	3	3	2
CO4	3	2	3	3	2
CO5	3	2	3	3	2

1-Low   **2-Medium**   **3-Strong**

Syllabus

UNIT I   12 Hours

Introduction – What is data mining? – Why data mining now? – The data mining process – Data mining applications – Data mining techniques – Some data mining case studies – The future of data mining – Guidelines for successful data mining – #Data mining software#.

UNIT II   12 Hours

Association Rules Mining – Basics – The task and a Naïve Algorithm – The Apriori Algorithm – Improving the efficiency of the Apriori Algorithm – Apriori-Tid – Direct hashing and pruning – Dynamic item set counting – Mining frequent patterns without candidate generation – Performance evaluation of algorithms – Software for association rule mining.

UNIT III   12 Hours

Classification – Decision tree – Building a decision tree – The tree induction algorithm – Split algorithm based on information theory – Split algorithm based on the Gini index – Over fitting and pruning – Decision tree rules – Naïve Bayes Method – Estimating predictive accuracy of classification methods – Improving accuracy of classification methods – Other evaluation criteria for classification methods – Classification software.

UNIT IV   12 Hours

Cluster analysis – What is cluster analysis? – Desired features of cluster analysis – Types of data – Computing distance – Types of cluster analysis methods – Partitional methods – Hierarchical methods – Density-based methods – #Dealing with large databases# – Quality and validity of cluster analysis methods – Cluster analysis software.

UNIT V   12 Hours

Web Data Mining – Web terminology and characteristics – Locality and hierarchy in the Web – Web content mining – Web usage mining – Web structure mining – Web mining software.

Text Books

G.K. Gupta, *Introduction to Data Mining with Case Studies*, PHI, 2008, Second Printing.

Reference Books

Arun K. Pujari, *Data Mining Techniques*, Universities Press, Hydrabad, 2006, Ninth Impression.

Pedagogy

PDF, Group PDF, Seminar

Teaching aids

Black Board, LCD Projector

Course Contents and Lecture Schedule

Module No.	Topic	No. of Lectures	Content Delivery Methods
UNIT - I			
1.1	Introduction – What is data mining? – Why data mining now? – The data mining process – Data mining applications.	4	PDF
1.2	Data mining techniques – Some data mining case studies.	4	PDF
1.3	The future of data mining – Guidelines for successful data mining – #Data mining software#.	4	PDF
UNIT - II			
2.1	Association Rules Mining – Basics – The task and a Naïve Algorithm – The Apriori Algorithm.	3	PDF
2.2	Improving the efficiency of the Apriori Algorithm – Apriori- Tid – Direct hashing and pruning.	3	PDF
2.3	Dynamic item set counting – Mining frequent patterns without candidate generation.	3	PDF
2.4	Performance evaluation of algorithms – Software for association rule mining.	3	PDF

UNIT - III			
3.1	Classification – Decision tree – Building a decision tree – The tree induction algorithm	3	PDF
3.2	Split algorithm based on information theory – Split algorithm based on the Gini index.	3	PDF
3.3	Overfitting and pruning – Decision tree rules – Naïve Bayes Method.	2	PDF
3.4	Estimating predictive accuracy of classification methods – Improving accuracy of classification methods.	2	PDF
3.5	Other evaluation criteria for classification methods – Classification software.	2	PDF
UNIT - IV			
4.1	Cluster analysis – What is cluster analysis? – Desired features of cluster analysis	2	PDF
4.2	Types of data – Computing distance – Types of cluster analysis methods.	3	PDF
4.3	Partitional methods – Hierarchical methods – Density-based methods – #Dealing with large databases	3	PDF
4.4	Quality and validity of cluster analysis methods	2	PDF
4.5	Cluster analysis software	2	PDF
UNIT - V			
5.1	Web Data Mining – Web terminology and characteristics	4	PDF
5.2	Locality and hierarchy in the Web – Web content mining	4	PDF
5.3	Web usage mining – Web structure mining – Web mining software	4	PDF
Total		**60**	

Course Designer
Mr. M. Mohamed Meeran
Associate Professor of Computer Science

Course Code	Course Title	Category	Total Hours	Credits
20UCSC5P	**Python Programming Lab**	**Core - XII**	**60**	**4**

Nature of Course		Course Relevance	
Knowledge Oriented	✔	Local	
Skill Oriented	✔	Regional	
Employability Oriented	✔	National	
Entrepreneurship Oriented	✔	Global	✔

Preamble

On successful completion of this course the students are able to develop programs using Python.

Course Outcomes (CO)

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

No.	Course Outcome	Knowledge Level
CO1	Develop Python Programs and test, debug.	**K1,K2,K3**
CO2	Apply Conditionals and Loops for Python Programs	**K1,K2,K3**
CO3	Apply functions and represent compound data using Lists, Tuples and Dictionaries	**K1,K2,K3**
CO4	Read and write data from & to files in Python and develop Application using Python.	**K1,K2,K3**
CO5	Appling the concepts of file handling, exception handling and database connectivity.	**K1,K2,K3**

K1-Knowledge   **K2-Understand**   **K3-Apply**

Mapping of CO with PO

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

1-Low   **2-Medium**   **3-Strong**

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	1	2	3	3
CO2	2	1	2	3	3
CO3	3	1	3	3	3
CO4	3	1	3	2	3
CO5	3	1	3	2	3

1-Low   2-Medium   3-Strong

Syllabus

List of Practicals:

1) a) Write a python program to print a number is positive/negative using if- else.

   b) Write a python program to find largest number among three numbers.

2) Write a python program to print prime numbers between the given two numbers.

3) Write a python Program to read a number and display corresponding day using if_else if

4) Write a program to create a menu with the following options
   1. To perform addition
   2. To perform subtraction
   3. To perform multiplication
   4. To perform division. Accepts users input and perform the operation accordingly. Use functions with arguments.

5) Write a python program to check whether the given string is palindrome or not. Write a python program to count alphabets in a given string.

6) Write a python program to find factorial of a given number using Functions.

7) Write a Python function that takes two lists and returns true if they are Equal otherwise false.

8) Write a program to double a given number and add two numbers using lambda ()

9) Write a program for filter () to filter only even numbers from a given list.

10) Write a program for map () function to double all the items in the list?

11) Write a program to find sum of the numbers for the elements of the list by Using reduces ()?

12) Using a numpy module create an array and check the following:
   1. Type of array
   2. Axes of array
   3. Shape of array
   4. Type of elements in array

13) Create a list and perform the following methods
   1) Insert () 2) remove () 3) append () 4) len () 5) pop () 6) clear ()
14) Create a dictionary and apply the following methods
   1) Print the dictionary items 2) access items
   3) use get () 4) change values
15) Use len () Create a tuple and perform the following methods
   1) Add items 2) len () 3) check for item in tuple 4) Access items

Course Designer
Mr. M. Sulthan Ibrahim
Associate Professor of Computer Science

Course Code	Course Title	Category	Total Hours	Credits
20UCSC5Q	**Multimedia Lab**	Core - XIII	60	4

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

Course Relevance	
Local	
Regional	
National	
Global	✓

Preamble

This course provides adequate knowledge in multimedia applications and usage of tools used in multimedia environment.

Course Outcomes (CO)

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

No.	Course Outcome	Knowledge Level
CO1	Learn to identify the basic tools of Flash.	K1,K2,K3
CO2	Learn to identify the basic tools of Photoshop.	K1,K2,K3
CO3	Applying data on Transformation tools.	K1,K2,K3
CO4	Applying data on Animation.	K1,K2,K3
CO5	Applying data on 3D Animation Techniques.	K1,K2,K3

K1-Knowledge   K2-Understand   K3-Apply

Mapping of CO with PO

	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	3	2
CO2	3	3	3	3	2
CO3	3	3	3	3	2
CO4	3	3	3	3	2
CO5	3	3	3	3	2

1-Low   2-Medium   3-Strong

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	3	1	3
CO2	3	1	3	1	3
CO3	3	1	3	1	3
CO4	3	1	3	1	3
CO5	3	1	3	1	3

1-Low   **2-Medium**   **3-Strong**

Syllabus

List of Practical for Multimedia

Adobe Photoshop (Bitmap Tool)

1. Create a Heading Banner with different text pattern.
2. Create a Bathing Soap Model using embossing effect.
3. How to use Photoshop to change a B/W photo into Color Photo.

Adobe Illustrator (Vector Graphics Tool)

1. Design a Business card/Merit certificate
2. Design a digital flex banner for a college day function.

Flash Designing

1. Perform different Transformations like rotation, skewing, flipping, and scaling an object ofyour choice.
2. Design a flash movie which incorporates the use of the following symbols
   a) Graphic symbol b) Button symbol c) Movie clip symbol
3. Create a movie which includes frame-by-frame animation of an object (or) an image of yourchoice.
4. Create a movie which includes an object animation using Motion Tweening. (Ex. A ball bouncing across the screen along the specified path). Also add appropriate sound effects.

Course Designer
Mr. S. Peer Mohaideen Mudalali
Associate Professor of Computer Science

Course Code	Course Title	Category	Total Hours	Credits
20UCSC5R	Internet of Things Lab	Core - XIV	60	4

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

Course Relevance	
Local	
Regional	
National	
Global	✓

Preamble

Students will be explored to the interconnection and integration of the physical world and the cyber space. They are also able to design & develop IOT Devices.

Course Outcomes (CO)

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

No.	Course Outcome	Knowledge Level
CO1	Understand the application areas of IOT.	K1,K2
CO2	Understand the revolution of Internet in Mobile Devices, Cloud & Sensor Networks.	K1,K2
CO3	Understand building blocks of Internet of Things and characteristics.	K1,K2
CO4	Apply the state of the art methodologies in IoT application domains.	K1,K2,K3
CO5	Knowledge about the IoT and associated technologies.	K1,K2,K3

K1-Knowledge　　　　　**K2-Understand**　　　　　**K3-Apply**

Mapping of CO with PO

	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	2	2
CO2	3	3	3	2	2
CO3	3	3	3	2	2
CO4	3	3	3	2	2
CO5	3	3	3	2	2

1-Low　　　　　**2-Medium**　　　　　**3-Strong**

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	2
CO2	3	3	3	3	2
CO3	3	3	3	3	2
CO4	3	3	3	3	2
CO5	3	3	3	3	2

1-Low   **2-Medium**   **3-Strong**

Syllabus

List of Practicals:

S. No.	Contents
1	**USING CISCO PACKET TRACER** 1. Design a simple LAN topology using different network devices and configure static IP addresses for communication. Verify the connection using ping command. 2. Assign IP addresses dynamically to all the devices in the network using DHCP protocol 3. Connect and Configure IoT devices in the LAN network and register theIoT service in the Server. 4. Design a smart home and access the home appliances through smartphone from remote place. 5. Blinking an LED Blink using Arduino (SBC) 6. Interface different sensors and actuator with SBC 7. **Case Study:** Design a Fire Alarm System for a factory/Home
2	**USING TINKERCAD** 1. LED RGB Simulation in Tinkercad 2. Push Button Simulation in Tinkercad 3. Servo Motor Simulation in Tinkercad 4. Buzzer Simulation in Tinkercad
3	**USING REAL DEVICES** 1. LED Blinking using Raspberry PI/Arduino 2. Home Weather display using Raspberry PI 3. Design a robo car to follow the track.

	Simulation:
	1) Cisco Packet Tracer
	2) Tinker cad: https://www.tinkercad.com/
	3) Raspberry PI with Grove PI starter Kit
	4) Arduino with Grove PI starter Kit

Course Designer
Mr. M. Sulthan Ibrahim
Associate Professor of Computer Science

Course Code	Course Title	Category	Total Hours	Credits
20UCSS51	**Quantitative Aptitude**	**SBS - III**	**30**	**2**

Nature of Course	
Knowledge Oriented	✔
Skill Oriented	✔
Employability Oriented	
Entrepreneurship Oriented	

Course Relevance	
Local	
Regional	
National	
Global	✔

Preamble

This course is designed to suit the need of the outgoing students and to acquaint them with frequently asked questions in quantitative aptitude and logical reasoning during various competitive examinations and campus interviews.

Syllabus

UNIT I   6 Hours

HCF & LCM of numbers.

UNIT II   6 Hours

Square roots & Cube roots.

UNIT III   6 Hours

Percentage

UNIT IV   6 Hours

Time & Work

UNIT V   6 Hours

Time & Distance

Text Books

R.S. Aggarwal, *Quantitative Aptitude*, S. Chand & Company Ltd. Reprint 2007.

Reference Books

R.V. Praveen, *Quantitative Aptitude and Reasoning*, PHI Learning, 2013, 2nd Edition.

Pedagogy

Chalk & Talk & E-Resources

Teaching aids

Black Board, LCD Projector

Course Contents and Lecture Schedule

Module No.	Topic	No. of Lectures	Content Delivery Methods
UNIT - I			
1.1	HCF & LCM of numbers.	6	Chalk & Talk
UNIT - II			
2.1	Square roots & Cube roots.	6	PDF
UNIT - III			
3.1	Percentage	6	PPT
UNIT - IV			
4.1	Time & Work	6	PDF
UNIT - V			
5.1	Time & Distance	6	Chalk & Talk
	Total	**30**	

Course Designer
Mr. M. Sulthan Ibrahim
Associate Professor in Computer Science

Course Code	Course Title	Category	Total Hours	Credits
20UCSC61	Computer Graphics	Core - XV	60	4

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

Course Relevance	
Local	
Regional	
National	
Global	✓

Preamble

Acquire Knowledge on two dimensional graphical structures.

Course Outcomes (CO)

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

No.	Course Outcome	Knowledge Level
CO1	Understanding the survey of Computer Graphics and Graphics systems.	K1,K2
CO2	Studying the algorithms for output primitives and applying data on it.	K1,K2,K3
CO3	Studying the attributes of output primitives and applying data on it.	K1,K2,K3
CO4	Studying the core concepts of two dimensional geometric transformation and applying data on it.	K1,K2,K3
CO5	Studying the algorithms for Viewing and Clipping and applying data on it.	K1,K2,K3

K1-Knowledge   K2-Understand   K3-Apply

Mapping of CO with PO

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

1-Low   2-Medium   3-Strong

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	2	1
CO2	3	3	2	2	1
CO3	3	3	2	2	1
CO4	3	3	2	2	1
CO5	3	3	2	2	1

1-Low   **2-Medium**   **3-Strong**

Syllabus

UNIT I   12 Hours

A survey of computer graphics: Computer-Aided Design - Presentation Graphics – Computer Art – Entertainment – Education and Training – Visualization – Image Processing – Graphical User Interfaces. Overview of Graphics Systems: Video Display Devices – Raster Scan Systems – Random Scan Systems – Input Devices – Hard Copy Devices.

UNIT II   12 Hours

Output Primitives: Points and Lines – Line Drawing Algorithms – Circle Generating Algorithms –Filled Area primitives.

UNIT III   12 Hours

Attributes of Output Primitives: Line Attributes – Curve Attributes – Color and Gray Scale Levels – Area Fill Attributes – Character Attributes – Bundled Attributes – Inquiry Functions – Antialiasing.

UNIT IV   12 Hours

Two –Dimensional Geometric Transformations : Basic Transformations – Matrix Representations – Composite Transformations – Other Transformations – Transformations between Coordinate Systems.

UNIT V   12 Hours

Two –Dimensional Viewing : The Viewing Pipeline – Viewing Coordinate Reference Frame – Window –to- Viewport Coordinate Transformation – Two-Dimensional Viewing Functions – Clipping Operations – Point Clipping – Line Clipping – Polygon Clipping – Curve Clipping – Text Clipping – Exterior Clipping.

Text Books

Donald Hearn, M. Pauline Baker, *Computer Graphics*, Prentice Hall of India Pvt. Ltd., New Delhi , 1994, Second Edition.

Reference Books

Malay K. Pakhira, ***Computer Graphics, Multimedia and Animation***, Prentice Hall of India Pvt. Ltd., New Delhi - 2008.

D.P. Mukhrjee, ***Fundamentals of Computer Graphics and Multimedia***, Prentice Hall of India Pvt. Ltd., New Delhi - 1999.

Pedagogy

PDF, PDF, Group PDF

Teaching aids

Black Board, LCD Projector

Course Contents and Lecture Schedule

Module No.	Topic	No. of Lectures	Content Delivery Methods
UNIT - I			
1.1	Introduction, Computer Aided Design	1	PDF
1.2	Presentation Graphics – Computer Art	2	PDF
1.3	Entertainment – Education and Training, Visualization	2	PDF
1.4	Image Processing – Graphical User Interfaces	2	PDF
1.5	Video Display Devices	1	PDF
1.6	Random Scan Systems – Raster Scan Systems	2	PDF
1.7	Input Devices - Hard Copy Devices.	2	PDF
UNIT - II			
2.1	Points and Lines	1	PDF
2.2	Line Drawing Algorithms	6	PDF
2.3	Circle Generating Algorithms	4	PDF
2.4	FilledArea primitives	1	PDF
UNIT - III			
3.1	Line Attributes, Curve Attributes	2	PDF
3.2	Color and Gray Scale Levels	2	PDF
3.3	Area Fill Attributes, Character Attributes, Bundled Attributes	4	PDF
3.4	Inquiry Functions	2	PDF
3.5	Antialiasing	2	PDF

	UNIT - IV		
4.1	Basic Transformations	4	PDF
4.2	Matrix Representations	2	PDF
4.3	Composite Transformations	2	PDF
4.4	Other Transformations	2	PDF
4.5	Transformations between Coordinate Systems.	2	PDF
	UNIT - V		
5.1	The Viewing Pipeline	1	PDF
5.2	Viewing Coordinate Reference Frame	1	PDF
5.3	Window –to- Viewport	1	PDF
5.4	Coordinate Transformation	1	PDF
5.5	Two-Dimensional Viewing Functions	1	PDF
5.6	Clipping Operations – Point Clipping	1	PDF
5.7	Line Clipping	2	PDF
5.8	Polygon Clipping	1	PDF
5.9	Curve Clipping	1	PDF
5.10	Text Clipping	1	PDF
5.11	Exterior Clipping	1	PDF
	Total	**60**	

Course Designer
Mr. S. Sirajudeen
Associate Professor of Computer Science

Course Code	Course Title	Category	Total Hours	Credits
20UCSC62	**Software Engineering**	Core - XVI	60	4

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

Course Relevance	
Local	
Regional	
National	
Global	✓

Preamble

Explore the various phases in a software project, fundamental concepts of requirements and analysis to maintenance measures.

Course Outcomes (CO)

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

No.	Course Outcome	Knowledge Level
CO1	Studying and understanding the different categories of the project.	K1,K2,K3
CO2	Identify the appropriate cost estimation technique.	K1,K2,K3
CO3	Studying the collection of Software Requirement Specifications.	K1,K2,K3
CO4	Make use of different design techniques.	K1,K2,K3
CO5	An ability to acquire and apply various testing methods.	K1,K2,K3

K1-Knowledge   **K2-Understand**   **K3-Apply**

Mapping of CO with PO

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

1-Low   **2-Medium**   **3-Strong**

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	2	3	2
CO2	3	2	2	3	2
CO3	3	2	2	3	2
CO4	3	2	2	3	2
CO5	3	2	2	3	2

1-Low   **2-Medium**   **3-Strong**

Syllabus

UNIT I   12 Hours

Introduction to Software Engineering: Size factors – Quality and Productivity Factors – Managerial Issues. Planning a Software Project**:** Defining the Problem – Developing a Solution Strategy – Planning the Development Process – Planning an Organizational Structure – Other Planning Activities.

UNIT II   12 Hours

Software Cost Estimation: Software Cost Factors – Software Cost Estimation Techniques – Staffing Level Estimation – Estimating Software Maintenance Costs.

UNIT III   12 Hours

Software Requirements Definitions: The Software Requirements Specification –State orientated notations – Languages and Processors for software Requirement specifications.

UNIT IV   12 Hours

Software Design: Fundamental Design Concepts – Modules and Modularization Criteria – Functional independence -Design Notations – Design Techniques.

UNIT V   12 Hours

Verification and Validation Techniques: Quality Assurance – Testing Strategies - Unit Testing/Program Testing-Integration Testing – Source Code Metrics- Halstead's Effort Equation – McCabe's Cyclomatic Complexity.

Text Books

Richard Fairley, *Software Engineering Concepts*, Tata McGraw Hill Publishing Company Limited, NewDelhi 1997.

Reference Books

Waman S. Jawadekar, **Software Engineering**, Tata McGraw Hill Publishing Company Limited, NewDelhi 2005.

A.K.R.S. Anusha, **Software Engineering**, Charulatha Publications, Chennai. 2016.

Pedagogy

Chalk & Talk & E-Resources

Teaching aids

Black Board, LCD Projector

Course Contents and Lecture Schedule

Module No.	Topic	No. of Lectures	Content Delivery Methods
UNIT - I			
1.1	Introduction to Software Engineering: Size factors	2	PDF
1.2	Quality and Productivity Factors, Managerial Issues	2	PDF
1.3	Planning a Software Project: Defining the Problem – Developing a Solution Strategy	2	PDF
1.4	Planning the Development Process	2	PDF
1.5	Planning an Organizational Structure	2	PDF
1.6	Other Planning Activities	2	PDF
UNIT - II			
2.1	Software Cost Factors	3	PDF
2.2	Software Cost Estimation Techniques	3	PDF
2.3	Staffing Level Estimation	3	PDF
2.4	Estimating Software Maintenance Costs	3	PDF
UNIT - III			
3.1	The Software Requirements Specification	4	PDF
3.2	State orientated notations	4	PDF
3.3	Languages and Processors for Requirements	4	PDF
UNIT - IV			
4.1	Fundamental Design Concepts	1	PDF
4.2	Modules and Modularization Criteria	1	PDF
4.3	Functional independence	2	PDF
4.4	Design Notations	4	PDF

4.5	Design Techniques.	4	PDF
UNIT - V			
5.1	Quality Assurance	2	PDF
5.2	Testing Strategies	2	PDF
5.3	Unit Testing/Program Testing	2	PDF
5.4	Integration Testing	2	PDF
5.5	Source Code Metrics	1	PDF
5.6	Halstead's Effort Equation -McCabe's Cyclomatic Complexity	3	PDF
	Total	**60**	

Course Designer
Mr. S. Peer Mohaideen Mudalali
Associate Professor of Computer Science

Course Code	Course Title	Category	Total Hours	Credits
20UCSE61	**Web Programming**	**Elective - II**	**60**	**3**

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

Course Relevance		
Local	
Regional	
National	
Global	✓

Preamble

Explain internet principles, HTML frames and forms, Designing web pages with PHP, Presentation with CSS, Java Scripts objects and events, access with databases in web pages.

Course Outcomes (CO)

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

No.	Course Outcome	Knowledge Level
CO1	Studying HTML to develop web page.	**K1,K2,K3**
CO2	Implementing PHP to develop web page.	**K1,K2,K3**
CO3	Modifying web pages using CSS.	**K1,K2,K3**
CO4	Manipulate data in web page with the use of java script.	**K1,K2,K3**
CO5	Use of data base in web page.	**K1,K2,K3**

K1-Knowledge   **K2-Understand**   **K3-Apply**

Mapping of CO with PO

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

1-Low   **2-Medium**   **3-Strong**

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	2	3	2
CO2	3	3	2	3	3
CO3	3	3	2	3	2
CO4	3	3	2	3	3
CO5	3	3	2	3	2

1-Low　　　　　　　　**2-Medium**　　　　　　　　**3-Strong**

Syllabus

UNIT I　　　　　　　　　　　　　　　　　　　　　　　　　　12 Hours

Introduction: MARKUP WITH HTML

Introduction-Document background color and image – Text Structuring – Character Formatting – Lists – Ordered – Unordered – Definition Lists – Links to a web page – Tables – Borders and Rules – Rows and Cells – Formatting with Tables –Form handling-Building Forms-HTML5 Features

UNIT II　　　　　　　　　　　　　　　　　　　　　　　　　12 Hours

PHP INTRODUCTION

Incorporating PHP within HTML-The Structure of PHP -Expressions and Control Flow in PHP-Operators-Conditionals

UNIT III　　　　　　　　　　　　　　　　　　　　　　　　12 Hours

PRESENTATION WITH CSS

Introduction to CSS- Importing a Style Sheet –CSS Rules-Style Types-CSS Selectors -The CSS Cascade – Measurements - Fonts and Typography - Managing Text Styles -CSS Colors - Positioning Elements –Pseudo-classes-The Box Model and Layout -Advanced CSS with CSS3- Attribute Selectors - CSS3 Backgrounds - CSS3 Borders –Text Effects – Transformations.

UNIT IV　　　　　　　　　　　　　　　　　　　　　　　　12 Hours

JAVASCRIPT INTRODUCTION

Exploring JavaScript-Using Comments-Semicolons-Variables-Operators-Variable Typing-Functions - Global Variables Local Variables-The Document Object Model-Expressions and Control Flow in JavaScript-Expressions-Literals and Variables- Operators -The with Statement -Using try ... catch -Conditionals -Looping - JavaScript Arrays –JavaScript and PHP Validation and Error Handling-Validating User Input with JavaScript-Regular Expressions -Redisplaying a Form After PHP Validation.

UNIT V   12 Hours

MYSQL AND AJAX

Accessing MySQL Using PHP- Querying a MySQL Database with PHP -A Practical Example -Practical MySQL - Performing Additional Queries- Preventing SQL Injection -HTML Injection -Using Ajax- Using XML Http Request.

Text Books

Steven M.Schafer, *HTML, XHTML and CSS* , Wiley Publishing, Inc., 2010, Fifth Edition.

Reference Books

Chuck Musciano Bill Kennedy, *HTML & XHTML: The Definitive Guide*, O'Reilly, October 24, 2006, 6th Edition.

Thomas A. Powell, *Web Design: The Complete Reference*, McGraw Hill, June 2000.

Jeffrey C.Jackson, *Web Technologies--A Computer Science Perspective*, Pearson Education, 2006.

Thomas Powell, *HTML & CSS: The Complete Reference*, McGraw Hill, Mar 2010, Fifth Edition.

Lemay Laura ,*Mastering HTML, CSS & Javascript Web Publishing*, BPB Publishers,July 2016.

Jon Duckett , *Beginning Web Programming with HTML, XHTML, and CSS*, Wrox Publications, 2008.

Extensive Reading

- www.codecademy.com
- http://www.w3schools.com/html/
- http://www.w3schools.com/css/
- https://www.khanacademy.org/computing/computer-programming/html-css
- http://tutorialehtml.com/en/
- http://www.alternetwebdesign.com/htmltutorial/lesson1.htm
- http://www.htmlhelp.com/reference/css/

Pedagogy

PDF, PDF, Group PDF

Teaching aids

Black Board, LCD Projector

Course Contents and Lecture Schedule

Module No.	Topic	No. of Lectures	Content Delivery Methods
UNIT - I			
1.1	Introduction-Document background color and image	3	PDF
1.2	Text Structuring –Character Formatting	2	PDF
1.3	Lists – Ordered – Unordered – Definition Lists	2	PDF
1.4	Links to a web page – Tables – Borders and Rules – Rows and Cells – Formatting with Tables	3	PDF
1.5	Form handling-Building Forms-HTML5 Features	2	PDF
UNIT - II			
2.1	Incorporating PHP within HTML	3	PDF
2.2	The Structure of PHP	3	PDF
2.3	Expressions and Control Flow in PHP	3	video
2.4	Operators-Conditionals	3	PDF
UNIT - III			
3.1	Introduction to CSS- Importing a Style Sheet –CSS Rules-Style Types-CSS Selectors	2	PDF
3.2	The CSS Cascade – Measurements - Fonts and Typography -Managing Text Styles	3	PDF
3.3	CSS Colors - Positioning Elements – Pseudo-classes	2	PDF
3.4	The Box Model and Layout -Advanced CSS with CSS3- Attribute Selectors	3	PDF
3.5	CSS3 Backgrounds - CSS3 Borders –Text Effects – Transformations	2	PDF
UNIT - IV			
4.1	Exploring JavaScript-Using Comments-Semicolons-Variables-Operators-Variable Typing	3	PDF

4.2	Functions - Global Variables Local Variables-The Document Object Model-Expressions and Control Flow in JavaScript-Expressions-Literals and Variables- Operators	3	PDF
4.3	with Statement -Using try … catch - Conditionals -Looping - JavaScript Arrays	2	PDF
4.4	JavaScript and PHP Validation and Error Handling-Validating User Input with JavaScript	2	PDF
4.5	Regular Expressions -Redisplaying a Form After PHP Validation	2	PDF
UNIT - V			
5.1	Accessing MySQL Using PHP- Querying a MySQL Database with PHP	3	PDF
5.2	A Practical Example -Practical MySQL	3	PDF
5.3	Performing Additional Queries-Preventing SQL Injection	3	PDF
5.4	HTML Injection -Using Ajax- Using XML Http Request	3	PDF
Total		**60**	

Course Designer
Mr. M. Sulthan Ibrahim
Associate Professor of Computer science

Course Code	Course Title	Category	Total Hours	Credits
20UCSE62	**Mobile Application Development**	**Elective - II**	**60**	**3**

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

Course Relevance	
Local	
Regional	
National	
Global	✓

Preamble

Understand Android programming, Android user interface, displaying pictures and menus and its views, content providers, coding the application, understanding Android Resources and Publishing the App to the Google Play Store.

Course Outcomes (CO)

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

No.	Course Outcome	Knowledge Level
CO1	Identify various Concepts of mobile programming that make it unique from programming for other platforms.	**K1,K2,K3**
CO2	Determine mobile applications on their design pros and cons.	**K1,K2,K3**
CO3	Utilize rapid prototype technique to design and develop sophisticated mobile interface	**K1,K2,K3**
CO4	Make use of mobile applications for the Android operating system that use basic and advanced phone features.	**K1,K2,K3**
CO5	Identify mobile applications to the Android market place for distribution.	**K1,K2,K3**

K1-Knowledge   K2-Understand   K3-Apply

Mapping of CO with PO

	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	2	3
CO2	3	2	3	2	3
CO3	3	2	3	2	3
CO4	3	3	2	3	3
CO5	3	2	3	3	3

1-Low   2-Medium   3-Strong

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	2	2
CO2	3	3	2	3	3
CO3	3	3	2	1	3
CO4	3	3	2	3	3
CO5	3	3	2	3	3

1-Low**2-Medium****3-Strong**

Syllabus

UNIT I12 Hours

Your First Android Project: Starting a new project in Android Studio-Responding to errors-Setting Up an Emulator-Running the Hello Android App.

UNIT II12 Hours

Creating the User Interface: Creating the Silent Mode Toggle Application-Laying out the Application-Adding an image to your Application-Creating a Launcher icon for the Application-Previewing the Application in the Visual Designer.

UNIT III12 Hours

Coding your Application: Understanding Activities and the Activity Lifecycle-Creating your first Activity-Working with the Android Framework Classes-Installing your Application-Material Design-Responding to errors-thinking beyond the Application Boundaries.

UNIT IV12 Hours

Understanding Android Resources: Understanding Resources-Working with Resources-Resource Qualifier Directories. Turning your Application into an App Widget: Working with App Widgets in Android-Working with Intents and Pending Intents-Creating the App Widget-Placing your Widget on the Home Screen.

UNIT V12 Hours

Publishing your App to the Google Play Store: Creating a Distributable File-Creating a Google Play Developer Profile-Pricing your Application-Getting Screen Shots for your Application-Uploading your Application to the Google Play Store-Watching the Number of Installs Soar.

Text Books

Michael Burton, *Android Application Development for Dummies*, John Wiley & Sons Inc New Delhi, 2015, 3rd Edition.

Reference Books

Dave Smith and Jeff Friesen, *Android Recipes: A Problem – Solution Approach*, Rakmo Press Pvt., Ltd, New Delhi, 2011.

S. Sydhani Begum, *Mobile App Development Android programs using Eclipse Indigo*, Xpress Publishing, Kerala.

Pedagogy

PDF, Group PDF, Seminar

Teaching aids

Black Board, LCD Projector

Course Contents and Lecture Schedule

Module No.	Topic	No. of Lectures	Content Delivery Methods
UNIT - I			
1.1	Your First Android Project	2	PDF
1.2	Starting a new project in Android Studio	2	PDF
1.3	Responding to errors	2	PDF
1.4	Setting Up an Emulator	2	PDF
1.5	Running the Hello Android App.	4	PDF
UNIT - II			
2.1	Creating the User Interface	3	PDF
2.2	Creating the Silent Mode Toggle Application-	2	PDF
2.3	Laying out the Application	2	PDF
2.4	Adding an image to your Application	2	PDF
2.5	Creating a Launcher icon for the Application	2	PDF
2.6	Previewing the Application in the Visual Designer	1	PDF
UNIT - III			
3.1	Coding your Application: Understanding Activities and the Activity Lifecycle Classes	2	PDF
3.2	Creating your first Activity	3	PDF
3.3	Working with theAndroid Framework	2	PDF
3.4	Installing your Application-Material Design	3	PDF

3.5	Responding to errors-thinking beyond the Application Boundaries	2	PDF
UNIT - IV			
4.1	Understanding Android Resources: Understanding Resources	1	PDF
4.2	Working with Resources	2	PDF
4.3	Resource Qualifier Directories. Turning your Application into an App Widget	2	PDF
4.4	Working with App Widgets in Android	2	PDF
4.5	Working with Intents and Pending Intents	2	PDF
4.6	Creating the AppWidget	1	PDF
4.7	Placing your Widget on the Home Screen	2	PDF
UNIT - V			
5.1	Publishing your App to the Google Play Store: Creating a Distributable File	2	PDF
5.2	Creating a Google Play Developer Profile	2	PDF
5.3	Pricing your Application	2	PDF
5.4	GettingScreen Shots for your Application	2	PDF
5.5	Uploading your Application to the Google Play Store	2	PDF
5.6	Watching the Number of Installs Soar.	2	PDF
Total		**60**	

Course Designer
Mr. M. Sulthan Ibrahim
Associate Professor of Computer Science

Course Code	Course Title	Category	Total Hours	Credits
20UCSE63	**Business Process Outsourcing**	Elective -II	60	3

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

Course Relevance	
Local	
Regional	
National	
Global	✓

Preamble

At the end of this course, students will be able to acquire the necessary skills to manage various positions in the BPO sector and utilize in-depth knowledge related to BPO Industry and Acquire exposure to Finance, Insurance and Human Resource BPO.

Course Outcomes (CO)

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

No.	Course Outcome	Knowledge Level
CO1	Identify the basics of Business Process Out sourcing, Evolution of BPO and Global trends of BPO.	K1,K2,K3
CO2	Make use of employability opportunities in BPO industry.	K1,K2,K3
CO3	Identify the types of BPO models	K1,K2,K3
CO4	Make use of Financial Services and activities	K1,K2,K3
CO5	Utilize the BPO Domains	K1,K2,K3

    K1-Knowledge   **K2-Understand**   **K3-Apply**

Mapping of CO with PO

	PO1	PO2	PO3	PO4	PO5
CO1	3	2	3	2	3
CO2	3	2	3	2	3
CO3	3	2	3	2	3
CO4	3	2	3	2	3
CO5	3	2	3	2	3

    1-Low   **2-Medium**   **3-Strong**

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	2
CO2	3	3	3	3	2
CO3	3	3	3	3	2
CO4	3	3	3	3	2
CO5	3	3	3	3	2

1-Low   **2-Medium**   **3-Strong**

Syllabus

UNIT I   12 Hours

INTRODUCTION TO BPO**:** Basics of Business Process Outsourcing – History of BPO – Evolution of BPO – Global trends of BPO – Future of BPO.

UNIT II   12 Hours

BPO INDUSTRY: Employment opportunities in BPO industry – Employee structure – Skill set required for BPO – Compensation levels – Future of BPO employee.

UNIT III   12 Hours

MODELS OF BPO**:** BPO - Model and Types of Vendors – Transaction Processing BPO – Elements of back office services – Contact Centre BPO – Types of Call Centres – Components and working of a call centre – Offshoring – Offshore BPO – BPO Companies in India

UNIT IV   12 Hours

PROCESSES IN BPO: Financial Services – Insurance – Human Resource BPO – Activities involved in HR BPO – Career in HR BPO.

UNIT V   12 Hours

BPO DOMAINS**:** Media and Entertainment BPO – Publishing BPO – Social media and BPO – Changing dynamics in Indian BPO Industry**.**

Text Books

Kulkarni and Sarika, ***Business Process Outsourcing***, Jaico Publishing House, New Delhi, Second Edition.

Reference Books

J. Bingham, ***Mastering Data Processing***, Macmillan Publishing House, India, 1983, First Edition.

HD. Clifton, ***System Analysis for Business Data Processing***, Prentice Hall Publications, New Delhi, Third Edition.

Pedagogy

PDF, Group PDF, Seminar

Teaching aids

Black Board, LCD Projector

Course Contents and Lecture Schedule

Module No.	Topic	No. of Lectures	Content Delivery Methods
UNIT - I			
1.1	INTRODUCTION TO BPO: Basics of Business Process Outsourcing	4	PDF
1.2	History of BPO	4	PDF
1.3	Evolution of BPO – Global trends of BPO – Future of BPO.	4	PDF
UNIT - II			
2.1	BPO INDUSTRY: Employment opportunities in BPO industry	4	PDF
2.2	Employee structure – Skill set required for BPO	4	PDF
2.3	Compensation levels – Future of BPO employee	4	PDF
UNIT - III			
3.1	MODELS OF BPO: BPO - Model and Types of Vendors – Transaction Processing BPO	3	PDF
3.2	Elements of back office services – Contact Centre BPO	3	PDF
3.3	Types of Call Centres – Components and working of a call centre	2	PDF
3.4	Offshoring – Offshore BPO – BPO Companies in India	2	PDF
3.5	MODELS OF BPO: BPO - Model and Types of Vendors – Transaction Processing BPO	2	PDF
UNIT - IV			
4.1	PROCESSES IN BPO: Financial Services	4	PDF
4.2	Insurance – Human Resource BPO	4	PDF
4.3	Activities involved in HR BPO – Career in HR BPO.	4	PDF

	UNIT - V		
5.1	BPO DOMAINS: Media and Entertainment BPO	4	PDF
5.2	Publishing BPO – Social media and BPO	4	PDF
5.3	Changing dynamics in Indian BPO Industry	4	PDF
	Total	**60**	

Course Designer
Mr. M. Sulthan Ibrahim
Associate Professor of Computer Science

Course Code	Course Title	Category	Total Hours	Credits
20UCSC6P	Project Work	Core - XVII	120	4

Nature of Course			Course Relevance	
Knowledge Oriented	✓		Local	
Skill Oriented	✓		Regional	
Employability Oriented	✓		National	
Entrepreneurship Oriented	✓		Global	✓

Preamble

The aim of the Project Work is that the student has to understand the real time software development environment. The student should gain a thorough knowledge in the problem/language/software he/she has selected.

Course Outcomes (CO)

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

No.	Course Outcome	Knowledge Level
CO1	Develop a functional application based on the software design	K1,K2,K3
CO2	Apply coding, debugging and testing tools to enhance the quality of the software	K1,K2,K3
CO3	Construct new software system based on the theory and practice gained through this exercise	K1,K2,K3
CO4	Prepare the proper documentation of software projects following the standard guidelines	K1,K2,K3
CO5	Learn technical report and oral presentation skills	K1,K2,K3

K1-Knowledge **K2-Understand** **K3-Apply**

Mapping of CO with PO

	PO1	PO2	PO3	PO4	PO5
CO1	3	2	3	3	3
CO2	3	2	3	3	3
CO3	3	3	3	3	3
CO4	3	2	3	3	3
CO5	3	2	3	3	3

1-Low **2-Medium** **3-Strong**

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	2
CO2	3	3	2	3	2
CO3	3	3	2	3	2
CO4	3	3	3	3	2
CO5	3	3	3	3	2

1-Low **2-Medium** **3-Strong**

Students are asked to follow the instructions given below to complete their Project Work.

01. Head of the Department will allocate guides to each student.

02. One project work will be carried out by two students.

03. The Project work should be carried out by using the available software in the lab.

04. Students have to select a project topic in consultation with their guide. Each student will workunder the overall supervision and guidance of a guide.

05. It is the student's responsibility to ensure continuous contact and interaction with their guide.

06. The guide will evaluate all the components such as knowledge of concepts, intellectual ability, ability to conceive new and useful idea, documentation and expression, originality, punctuality, reliability and self-reliance.

07. The dissertation outline (synopsis) along with the signature of guide must reach HOD on or before the reopen day of even semester.

08. The Synopsis should be written not exceeding 10 lines on A4 size stationary, in typed format.

09. The full dissertation document in neat written format should be submitted to their respective guide as scheduled by the Head of the Department.

10. The formats of the first page of dissertation and certificates are to be obtained from the guide and should be bound along with the dissertation report.

11. Each group must prepare three typed copies of the final dissertation report (Two original reports for each student and one copy of the report is for the department library) to be properly certified by their guide and submit the same as per the schedule.
12. The guide will evaluate the dissertation and conduct the viva-voce examination along with the panel of examiners.

Course Designer
Mr. S. Sirajudeen
Associate Professor of Computer Science

Course Code	Course Title	Category	Total Hours	Credits
20UCSC6Q	**Web Programming Lab**	Core -XVIII	60	4

Nature of Course	
Knowledge Oriented	✔
Skill Oriented	✔
Employability Oriented	✔
Entrepreneurship Oriented	✔

Course Relevance	
Local	
Regional	
National	
Global	✔

Preamble

    On successful completion of this course the students are able to develop website.

Course Outcomes (CO)

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

No.	Course Outcome	Knowledge Level
CO1	Using HTML to develop web pages.	**K1,K2,K3**
CO2	Implementing PHP to develop web pages.	**K1,K2,K3**
CO3	Modifying web pages using CSS.	**K1,K2,K3**
CO4	Manipulate data in web pages with the use of Java script.	**K1,K2,K3**
CO5	Use of data base in web pages.	**K1,K2,K3**

    K1-Knowledge   **K2-Understand**   **K3-Apply**

Mapping of CO with PO

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

    1-Low   **2-Medium**   **3-Strong**

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	2	3	2
CO2	3	3	2	3	3
CO3	3	3	2	3	2
CO4	3	3	2	3	3
CO5	3	3	2	3	2

1-Low   **2-Medium**   **3-Strong**

Syllabus

List of Practicals

1. Write a JavaScript to design a simple calculator to perform the following operations: sum, product, difference and quotient
2. Write a JavaScript that calculates the squares and cubes of the numbers from 0 to 10 and outputs HTML text that displays the resulting values in an HTML table format.
3. Write a JavaScript code that displays text "TEXT-GROWING" with increasing font size in the interval of 100ms in RED COLOR, when the font size reaches 50pt it displays "TEXT-SHRINKING" in BLUE color. Then the font size decreases to 5pt.
4. Develop and demonstrate a HTML5 file that includes JavaScript that uses functions for the following problems:
   a. Parameter: A string
   a. Output: The position in the string of the left-most vowel
   b. Parameter: A number
   c. Output: The number with its digits in the reverse order

5. Design an XML document to store information about a student in an engineering college affiliated to VTU. The information must include USN, Name, and Name of the College, Branch, Year of Joining, and email id. Make up sample data for 3 students. Create a CSS style sheet and use it to display the document.

6. Write a PHP program to keep track of the number of visitors visiting the web page and to display this count of visitors, with proper headings.

7. Write a PHP program to display a digital clock which displays the current time of the server.

8. Write the PHP programs to do the following:
   b. Implement simple calculator operations.
   c. Find the transpose of a matrix.
   d. Multiplication of two matrices.
   e. Addition of two matrices.

9. Write a PHP program that declares variable states with value "HKRH College UPM".

10. Write a PHP program that does the following:

    d. Search for a word in variable states that ends in RH. Store this word in element 0 of a list named states List.

    e. Search for a word in states that begins with U and ends in M. Perform a case insensitive comparison. [Note: Passing re.Ias a second parameter to method compile performs a case-insensitive comparison.] Store this word in element1 of states List.

    f. Search for a word in states that begins with M and ends in s. Store this word in element 2 of the list.

    g. Search for a word in states that ends in a. Store this word in element 3 of the list.

11. Write a PHP program to store and print the student records using mysql database.

Course Designer
Mr. M. Sulthan Ibrahim
Associate Professor of Computer Science

Course Code	Course Title	Category	Total Hours	Credits
20UCSC6R	NET Programming Using C# Lab	Core - XIX	60	4

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

Course Relevance	
Local	
Regional	
National	
Global	✓

Preamble

Cloud computing is an emerging computing paradigm where various users access the resources and services offered by service providers. Use of cloud computing at this course encompasses the production services and it can offer benefits in the cost, performance, and delivery of IT services.

Course Outcomes (CO)

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

No.	Course Outcome	Knowledge Level
CO1	Recognize the fundamental concepts of Cloud Computing.	K1,K2,K3
CO2	Familiar with the various types of virtualization and its importance.	K1,K2,K3
CO3	Explore the various cloud infrastructures and application.	K1,K2,K3
CO4	Analyze the methods used for secure cloud access and application development.	K1,K2,K3
CO5	Analyze the various cloud platforms to provide cloud based services for complex applications.	K1,K2,K3

K1-Knowledge   **K2-Understand**   **K3-Apply**

Mapping of CO with PO

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

1-Low   **2-Medium**   **3-Strong**

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	1	3	3
CO2	3	3	1	3	3
CO3	3	3	2	3	3
CO4	3	3	2	3	3
CO5	3	3	2	3	3

1-Low   **2-Medium**   **3-Strong**

Syllabus
List of Practicals

1. Basic c# programs
2. Classes and objects
3. Inheritance
4. Operator overloading
5. Threading
6. Events and delegates
7. Working with windows forms controls
8. Validating data
9. Creating custom dialog box and Designing an MDI application with menu
10. Retrieving Data from Database & Working with Disconnected Environment

Course Designer
Mr. M. Sulthan Ibrahim
Associate Professor of Computer Science

Course Code	Course Title	Category	Total Hours	Credits
20UCSS61	**Technical Aptitude**	SBS - IV	30	2

Nature of Course	
Knowledge Oriented	✔
Skill Oriented	✔
Employability Oriented	✔
Entrepreneurship Oriented	

Course Relevance	
Local	
Regional	
National	
Global	✔

Preamble

This course is designed to suit the need of the outgoing students and to acquaint them with frequently asked questions in technical aptitude during the recruitment in the software industries and campus interviews.

Syllabus

    UNIT I   6 Hours

        C Programming

    UNIT II   6 Hours

        Data Structures and Algorithms

    UNIT III   6 Hours

        Object Oriented Programming in C++

    UNIT IV   6 Hours

        Operating System

    UNIT V   6 Hours

        Computer Graphics and Multimedia

Text Books

Dr. B. L. Shivakumar, *MCQs IN COMPUER SCIENCE*, Lakshmi Publications Pvt. Ltd. New Delhi.

Reference Books

Timothy Williams, *MCQs IN COMPUER SCIENCE*, McGraw Hill Education (India) Private Limited.

Pedagogy

Chalk & Talk & E-Resources

Teaching aids

Black Board, LCD Projector

Course Contents and Lecture Schedule

Module No.	Topic	No. of Lectures	Content Delivery Methods
UNIT - I			
1.1	C Programming	6	Chalk & Talk
UNIT - II			
2.1	Data Structures and Algorithms	6	PDF
UNIT - III			
3.1	Object Oriented Programming in C++	6	PPT
UNIT - IV			
4.1	Operating System	6	PDF
UNIT - V			
5.1	Computer Graphics and Multimedia	6	Chalk & Talk
	Total	**30**	

Course Designer
Mr. S. Sirajudeen
Associate Professor of Computer Science