

ARULMIGU PALANIANDAVAR ARTS COLLEGE FOR WOMEN**(AUTONOMOUS)****Re-accredited with B⁺⁺ by NAAC in 3rd cycle****(Run by Hindu Religious and Charitable Board under the Aegis of
Arulmigu Dhandayuthapani Swamy Thirukovil, Palani)****(Affiliated to Mother Teresa Women's University, Kodaikanal)
Chinnakalayamputhur(PO), Palani 624 615.****Curriculum Framework and Syllabus for Outcome Based Education in****Bachelor of Science****(Computer Science)****(PROGRAMME CODE: UGCSS)****Degree Programme for the students admitted from the Academic year****2019-2020 Onwards****PG DEPARTMENT OF COMPUTER SCIENCE**

INSTITUTIONAL VISION AND MISSION

VISION

- Enlightenment and Empowerment of Rural Women

MISSION

- To imbibe research activity and collaborative programs with our local communities.
- High quality teaching, providing learning environment with practical exposure.
- Encouragement of a questioning spirit and self-reliance.
- Strong and support education for the students employability

DEPARTMENT VISION AND MISSION

VISION

- Employing women in the field of Information Technology.
- Molding rural women into Future Leaders.

MISSION

- Training students in latest trends in IT Field.
- Motivating students to organize IT related competitions.
- Conducting special lectures for the students to advance the state of the art in computer science and IT Field.
- Training students to do projects in recent technologies.

B.SC COMPUTER SCIENCE

REGULATIONS

1. Preamble

B.Sc Computer Science is a broad and flexible degree programme introduced in 1998 as self supporting department with the curriculum specifically designed to reflect the depth and breadth of computer science. To encourage young rural women students to adopt higher education, M.Sc Computer Science programme is added in the department in 2005. Expert members from Academia and Industry provide inputs in introducing specialized courses in the curriculum to suit industry needs. To further enhance the quality of the programme, the department adheres Outcome Based Education (OBE) 2019-2020 onwards.

2. Eligibility for Admission

- Candidate should have passed the Higher Secondary Examination conducted by the board of syndicate as equivalent there to with Mathematics.

3. Duration of the course

- The students will undergo the prescribed course of study for a period of not less than three academic years (Six semesters).

4. Medium of Instruction:

- English

5. General Framework :

- Course Study : Part I,II,III,IV,V subjects.

6. Eligibility of the degree:

- Candidates will be eligible, if they complete the course with the required credits and pass in the prescribed examinations.
- The candidate requires 75% of attendance to attend the end semester examination.
- Two internal tests will be conducted and the average of two tests will be considered for the internal mark consolidation.
- To get Graduation , the students should gain minimum 140 credits.

7. Evaluation

Pattern of Evaluation

	Int.	Ext.	Total
Theory	25	75	100
Practical	40	60	100
Project	40	60	100

Internal Assessment Components

Theory(25 Marks)

Test	-	15
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Assignment	-	5
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Seminar	-	5
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25

8. Content Delivery Methods

1. Lecture method
2. Group Discussion
3. ICT

9. Passing Rules

- 75% of marks are allotted for external evaluation and 25% of the marks are allotted for internal evaluation in each of the theory subjects
- 60% of marks are allotted for external evaluation and 40% of the marks are allotted for internal evaluation in each of the practical subjects.
- For each courses there will be Continuous Internal Assessment (CIA) and Final Semester Examination.
- For each paper, passing minimum is 40% in both internal and external

10. Pattern of the Question Paper(External)**BLOOM'S TAXONOMY BASED ASSESSMENT PATTERN**

K1-Knowledge; **K2**- Comprehend; **K3**- Applications; **K4**-Analysis; **K5**- Synthesis; **K6**-Evaluation

1. PART I,II,III**External Question Pattern : Theory – 75 Marks (3 Hours)**

Knowledge Level	Section	Marks	Course Outcomes	Description	Total
K1	A (Answer All) Two Questions from each unit	10*1=10	CO1&CO2	One word/ Short Answers	75
K2 & K3	B (Either or Choice) One Questions from each unit	5x 5 = 25	CO2 & CO3	Descriptive / Detailed	
K3&K4	C (Answer 5 out of 8)	5*8 = 40	CO3,CO4 &CO5	Descriptive / Detailed	

Internal Question Pattern (30 Marks – 2 Hours Test)

Knowledge Level	Section	Marks
K1	A (Answer All)	6*1=6
K2,K3	B (Answer 2 out of 4)	2x 4 = 8
K4,K5	C (Answer 2 out of 4)	2*8 = 16

PART IV(SBC & NME) – External (75 Marks – 3 Hours)

Knowledge Level	Section	Marks	Description	Total
K1,K2	A(Answer 5 out of 8)	5*3=15	Short Answers	75
K2	B(Answer 5 out of 8)	5*6=30	Descriptive	
K4	C(Answer 3 out of 5)	3*10=30	Detailed	

INTERNAL QUESTION PATTERN**(For SBC & NME Papers)****Time : 1 Hours****Maximum : 15 Marks****SECTION A****Answer any TWO out of THREE questions****(2*2=4)****SECTION B****Answer any TWO out of THREE questions****(1*4=4)****SECTION C****Answer any TWO out of THREE questions****(1*7=7)**

APAC(W), Palani

B.Sc Computer Science 2019-2020 onwards

**ARULMIGU PALANIANDAVAR ARTS COLLEGE FOR WOMEN, PALANI
(AUTONOMOUS)**

Re-accredited with B⁺⁺ by NAAC in 3rd cycle
(Affiliated to Mother Teresa Women's University, Kodaikanal)

Curriculum Framework and Syllabus for Outcome Based Education in

**Bachelor of Science
(Computer Science)**

(For the students admitted from the Academic year 2019-2020)

BOARD OF STUDIES MEETING HELD ON 26.04.2019

UNIVERSITY NOMINEE:

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Contact No.: +91 9442094960

M.P. Indragandhi
26/4/2019

SUBJECT EXPERTS:

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26/4/19

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Elamparithi M
26/4/19

C. S. Srinivasan

H.O.D

P. S. Srinivasan
Dean

A. R. Srinivasan

PRINCIPAL

**SEMESTER-WISE DISTRIBUTION OF COURSES WITH
SCHEME OF VALUATION
UNDER CBCS PATTERN
OUTCOME BASED EDUCATION (OBE)**

Part	Sub.Code	Title of Paper	Hours	Marks			Credits	Exam (H)
				INT	EXT	TOT		
	Semester I							
PART I	MUGT1	Tamil	6	25	75	100	3	3
PART II	MUGE1	English	6	25	75	100	3	3
PART III	MUCSC1	Core I– Fundamentals of Digital Computers	5	25	75	100	5	3
	MUCSL1	Core II: Practical -I – Web designing & Multimedia	5	40	60	100	3	3
	MUCSA1	Allied I –Mathematics I	5	25	75	100	5	3
PART IV	MUCSOA1	Skill Based Course-I -Lab	2	40	60	100	2	3
	MUVE	Value Education – Yoga	1	25	75	100	2	3
		TOTAL	30			700	23	
	Semester II							
PART I	MUGT2	Tamil	6	25	75	100	3	3
PART II	MUGE2	English	6	25	75	100	3	3
PART III	MUCSC2	Core III : Programming in ‘C’	6	25	75	100	5	3
	MUCSL2	Core IV: Practical -II Programming in ‘C’	5	40	60	100	3	3
	MUCSA2	Allied II – Mathematics II	5	25	75	100	5	3
PART IV	MUCSNA2	Skill Based Course –II	2	25	75	100	2	3
		TOTAL	30			600	21	
	Semester III							
PART III	MUCSC3	Core V – Object oriented programming with C++	5	25	75	100	4	3
	MUCSC4	Core VI – Computer Organization	6	25	75	100	4	3
	MUCSC5	Core VII – Data Structures	5	25	75	100	4	3
	MUCSL3	Core VIII : Practical –III C++ with data structures	5	40	60	100	3	3
	MUCSA3	Allied III – Mathematics III	5	25	75	100	5	3
PART IV	MUCSHR3	Skill Based Course – III	2	25	75	100	2	3
	MUCSN1	Non Major Elective – I	2	25	75	100	2	3
		TOTAL	30			700	24	
	Semester IV							
PART III	MUCSC6	Core IX –Java Programming	6	25	75	100	5	3
	MUCSC7	Core X – Operating System	5	25	75	100	5	3

	MUCSL4	Core XI: Practical -IV : Web Programming	6	40	60	100	3	3
	MUCSL5	Core XII : Practical –V : Java Programming	6	40	60	100	3	3
	MUCSAL6	Allied IV – Mathematics IV R-Programming Lab	5	40	60	100	5	3
PART IV	MUCSOS4	Skill Based Course – IV :	2	25	75	100	2	3
PART V	MUEXA4	Extension Activities	-	-	-	100	1	
		TOTAL	30			700	24	
	<i>Internship Training(15 days)</i>							
	Semester V							
PART III	MUCSC8	Core XIII – Relational Database Management system	6	25	75	100	5	3
	MUCSL7	Core XIV :Practical -VI: .NET Programming	5	40	60	100	3	3
	MUCSL8	Core XV: Practical –VII : Relational Database Management System	5	40	60	100	3	3
	MUCSE1	Elective - I	6	25	75	100	5	3
	MUCSE2	Elective - II	6	25	75	100	5	3
	MUCSIT	Internship Training	-	-	100	100	1	3
PART IV	MUCSAC5	Skill Based Course – V	2	25	75	100	2	3
		TOTAL	30			700	24	
	Semester VI							
PART III	MUCSC9	Core XVI – Computer Networks	6	25	75	100	5	3
	MUCSC10	Core XVII – Software Engineering	5	25	75	100	4	3
	MUCSPR	Core XVIII – Project Work	7	40	60	100	4	3
	MUCSE3	Elective - III	6	25	75	100	5	3
PART IV	MUCSSS6	Skill Based Course – VI (Oral Practical)	2	25	75	100	2	3
	MUES6	Environmental Studies	2	25	75	100	2	3
	MUCSN2	Non Major Elective – II	2	25	75	100	2	3
		Total	30			700	24	

Extra Credit Papers:

S.No	Subject	Subject Code	Semester	Marks	Credits
1.	IoT(Internet Of Things)	UGEIT	I	100	2
2.	Tally	UGET	III	100	2
3.	MOOC Online Course	UGEMOC	V	100	2

LIST OF SKILL BASED COURSES

- | | | |
|-----------------|---|---------------------------------|
| 1. Semester I | - | Office Automation |
| 2. Semester II | - | Numerical Aptitude |
| 3. Semester III | - | Human Rights |
| 4. Semester IV | - | Open Source Software |
| 5. Semester V | - | Advanced Computing Technologies |
| 6. Semester VI | - | Soft-skills |

LIST OF ALLIED PAPERS

- | | | |
|-----------------|----------|--|
| 1. Semester I | Allied 1 | - Mathematics I - Discrete Mathematics |
| 2. Semester II | Allied 2 | - Mathematics II – Statistics |
| 3. Semester III | Allied 3 | - Mathematics III - Computer Based Optimization Techniques |
| 4. Semester IV | Allied 4 | - Mathematics IV- R-Programming Lab |

LIST OF ELECTIVE PAPERS**SEMESTER V:****Elective I :**

1. Computer graphics & Multimedia (or)
2. Cloud Computing(or)
3. PC Maintenance and trouble shooting

Elective II :

1. Information Security (or)
2. Big Data Analysis (or)
3. Principles of compiler design

SEMESTER VI:**Elective III :**

1. Digital Image Processing (or)
2. Business Intelligence (or)
3. Mobile Computing

LIST OF NME PAPERS

- | | |
|-----------------|---------------------------------------|
| 1. Semester III | : Computer Application for Automation |
| 2. Semester VI | : Computer for Digital Era |

CORE PAPERS**❖ Theory Papers**

1. CORE I - Fundamentals of Digital Computers
2. Core III : Programming in 'C'
3. Core V – Object oriented programming with C++
4. Core VI – Computer Organization
5. Core VII – Data Structures

6. **Core IX –JAVA**
7. **Core X – Operating System**
8. **Core XIII – Relational Database Management system**
9. **Core XVI – Computer Networks**
10. **Core XVII – Software Engineering**
- ❖ **Practical papers**
 1. **Core II : Practical -I-Web designing and Multimedia**
 2. **Core IV: Practical -II– Programming in ‘C’**
 3. **Core VIII : Practical –III: C++ with data structures**
 4. **Core XI: Practical - IV : Web Programming**
 5. **Core XII : Practical V: Java Programming**
 6. **Core XIV: Practical –VI: .NET Programming**
 7. **Core XV : Practical –VII: Relational Database Management System**
- ❖ **Project**
 1. **Core XVIII : Project Work**
- ❖ **Internship Training**

Students will undergo internship training in the fourth semester holidays from first week of May to second week of June for a period of 4 weeks in a related organization approved by the staff co-ordinator / HOD. It will be evaluated during V semester for 100 marks.

DISTRIBUTION OF CORE, ALLIED, ELECTIVE, NME AND SBC

PART I	Curriculum Structure	No. Of Courses	Credits
I	Languages	02	06
II	English	02	06
III	Core Papers	18 (10 Theory + 7 Lab + 1 Project)	71
	Allied Courses	04	20
	Core Elective	03	15
	Internship Training	01	01
IV	Non-Major Elective	02	04
	Value Based Course	02	04
	Skill Based Course	06	12
V	Extension Activities	01	01
Total		41	140

TOTAL MARKS : 4100

OUTCOME BASED EDUCATION

“Outcome-Based Education” (OBE) is considered as a student-centered instruction model that focuses on measuring student performance through outcomes. Outcomes include knowledge, skills and attitudes. In the OBE model, the required knowledge and skill sets for a particular degree is predetermined and the students are evaluated for all the required parameters (Outcomes) during the course of the program.

Part – I : Languages: Part – 1 comprises of category namely Tamil

Part – II : English: Part – 2 comprises of the category namely English

Part – III :Core Courses: A set of *major papers* that include Theory, Practical, Allied, Core Electives, Project and Internship in the major field of study selected by the student. Core courses are mandatory in nature.

Part – IV : Non - Major Electives (NME): A set of non – major elective courses are offered as choices of the students, outside of their major discipline. The courses other than the core and allied shall be opted by the students as Non – Major Elective.

Value Based Courses (VBC): Courses of cross-cutting issues relevant to the current pressing concerns both nationally and internationally such as environment and human values .

Skill Based Courses (SBC): The courses offered as skill - based courses under Part IV of the programme is aimed at imparting Advanced Skill of the programme. This comprises of six courses from 1st to 6th semesters.

Part – V: Extension Activities: Students shall be actively participated in the extension activities .

PROGRAM EDUCATIONAL OBJECTIVES

After few years from the completion of B.Sc programme, the students will be able to

- PEO1** Graduates are trained to be employed in private and public sectors of IT industries by having the necessary core concepts of computer science
- PEO2** Graduates are given practice in career and entrepreneurial skill development domains to become efficient women entrepreneur.
- PEO3** Given practice to work in teams to accomplish a common computational goal.
- PEO4** Actively involved in social and professional service at local, national, and global levels

PROGRAMME OUTCOMES

Upon successful completion of the programme, the student will able to

- PO1** Ability to apply knowledge of computing and mathematics to solve problems.
- PO2** Able to survive in today's interconnected world with the knowledge earned through critical thinking and fundamental core concepts.
- PO3** Become women entrepreneur such as web designer, database developer , programmer and multimedia designer.
- PO4** Providing hands-on –training in state- of- the art technologies to design and implement software applications for social ,economic, health , safety and ethical issues.
- PO5** Have sufficient knowledge in hardware and software to meet the current industry requirements.

PROGRAMME SPECIFIC OUTCOMES

Graduate with a B.Sc. in Computer Science will have the ability to

- PSO1** Able to work in the areas of programming, database, multimedia, web designing, networking and to acquire knowledge in various domain based electives.
- PSO2** Accomplish the ability to design and develop computer applications for real world problems
- PSO3** Able to create platforms to become an entrepreneur and a relish for higher studies such as M.C.A.,M.Sc.,etc.,

MAPPING INSTITUTION MISSION WITH PROGRAMME EDUCATIONAL OBJECTIVES

Mapping				
	IO1	IO2	IO3	IO4
PEO1		*		*
PEO2	*	*		*
PEO3			*	
PEO4	*			*

CORE PAPER I
MUCSC1- FUNDAMENTALS OF DIGITAL COMPUTERS

Hours: 5**Credits : 5****Semester: I****Preamble**

This course facilitates the students to acquire knowledge on Digital Computers and also it enables the students to understand the working principles of computer.

Course Outcomes

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

CO	Course Outcome	Cognitive Level
CO1.	Gain knowledge of input and output devices, Number systems, simplification techniques, combinational and sequential circuits.	Knowledge (Level K1)
CO2.	Understand the fundamental concepts and techniques used in digital electronics.	Knowledge (Level K1) Comprehension (Level K2)
CO3.	Apply the concepts of Boolean Algebra, Logic gates, Logic variables and Truth tables to simplify equations.	Application (Level K3)
CO4.	Comprehend the combinational logic in terms of Adder, Subtractor and Multiplexer circuits.	Comprehend (Level K3)
CO5.	Analyze combinational logic in terms of Adder, Subtractor and Multiplexer circuits.	Analysis (Level K4)

COURSE CONTENT**Unit - I:**

Introduction to Computers: Introduction- Characteristics of Computers- Classification of Computers- Uses of Computers- Generations of Computers. **Anatomy of a Digital Computer:** Introduction- Parts of a Computer. **Input Devices: Introduction-** Keyboard- Mouse- OCR- OMR- MICR. **Output Devices:** Monitor: CRT Monitor- Flat Panel Monitor –Printer: Daisy Wheel Printer- Dot Matrix Printer – Inkjet Printer.

Number Systems: Introduction – conversion – Floating point representation of Numbers – Binary Arithmetic Operations - 1's & 2's Complement – 9's & 10's complement.

Unit - II:

Codes: Weighted Binary Codes – Non-weighted Codes – Error detecting codes –Error Correcting codes – Alpha numeric codes.

Boolean algebra and Minimization Techniques: Introduction – Boolean Logic Operations – Basic Laws of Boolean Algebra – Demorgan's Theorems– Sum of Products and Product of Sums – Karnaugh Map.

Unit - III:

Logic Gates: Introduction – Positive and Negative Logic Designation – Logic Gates.

Arithmetic: Half Adder – Full Adder –Half Subtractor- Full Subtractor.

Unit - IV:

Combinational Circuits: Multiplexer: Basic Four – Input Multiplexer – 8 to 1 Multiplexer – 16 to 1 Multiplexer.

De-Multiplexer: 1 to 4 De-Multiplexer – 1 to 8 De-Multiplexer – 1 to 16 De- Multiplexer.

Unit - V:

Flip – Flops: Introduction - S-R Flip -Flops - D Flip -Flops - J-K Flip -Flops - T Flip – Flops.

TEXT BOOK

- Alexis Leon, Mathew Leon, *Fundamentals of Information Technology*, II Edition(Unit-I)
- S.Salivahan and S.Arivazhagan ,*Digital Circuits and Design* , Third Edition, Vikas Publishing House Pvt. Ltd. New Delhi, 2007(Unit 1 to 5)

REFERENCE BOOK

- Anil K.Maini, *Digital Electronics Principles, Devices, Applications* , Wiley Publications, 2007

Mapping					
COs & POs	PO1	PO2	PO3	PO4	PO5
CO1	H	M	M	M	H
CO2	H	H	M	M	H
CO3	H	H	M	M	H
CO4	M	H	M	M	H
CO5	H	M	H	H	H

*H-High;

M-Medium;

L-Low;

CORE PAPER II
MUCSL1 - PRACTICAL I - WEB DESIGNING AND MULTIMEDIA

Hours: 5**Credits : 3****Semester: I****Preamble**

This course helps the students to learn HTML, Photoshop and Macromedia Flash .It provide the knowledge and skills for creating websites.

Course Outcomes

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

CO	Course Outcome	Cognitive Level
CO1.	To know the basic concepts of Photoshop.	Knowledge (Level K1)
CO2.	Design visiting cards, invitations, greeting cards using Photoshop.	Applications (Level K3)
CO3.	Implement various concepts using Photoshop.	Comprehension(Level K2)
CO4.	Create animation using Macromedia flash.	Synthesis(Level K5)
CO5.	Create website by using HTML tags.	Synthesis(Level K5)

PROGRAM LIST**Web Designing**

1. Design a webpage using basic HTML tags
2. Create a webpage using formatting tags
3. Develop a webpage using list tags
4. Create a webpage using physical and logical tags
5. Prepare class timetable using table tags.
6. Link the web pages internally and externally using anchor tag.
7. Split the web page using frame tag
8. Design a web page by applying various attributes of form tag.
9. Create a website for your college
10. Design a web page for your Department

Multimedia

1. Scenery Creation.
2. Greeting Card Design.
3. Visiting Card Design.

4. Motion Twining.
5. Shape Twining.
6. Animation Using Mask Layer.
7. Animation Using Guide Layer.
8. Transforming Object Using Buttons.
9. Screen Creation.
10. Greeting Card Design and Star Blinking

Mapping					
COs & POs	PO1	PO2	PO3	PO4	PO5
CO1	M	H	H	H	M
CO2	M	H	H	H	H
CO3	M	H	H	H	H
CO4	H	M	H	M	H
CO5	H	H	H	H	H

***H-High;**

M-Medium;

L-Low;

ALLIED PAPER I
MU CSA1 - MATHEMATICS I - DISCRETE MATHEMATICS

Hours: 5**Credits: 5****Semester: I****Preamble**

This course helps the students to obtain the knowledge on Matrices, Polynomial equations, set theory, Relations and Graph Theory.

Course Outcomes

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

CO	Course Outcome	Cognitive Level
CO1.	Recall the basic concepts of Mathematics.	Knowledge (Level K1)
CO2.	Impart different kinds of Matrices, Equations, Sets, Relations and Graphs.	Knowledge (Level K1)
CO3.	Comprehend different kinds of Matrices, Equations, Sets, Relations and Graphs.	Comprehension (Level K2)
CO4.	Solve the equations to find the roots.	Comprehension (Level K2) Application (Level K3)
CO5.	Analyze the real world problems using Graph Theory.	Analysis (Level K4)

COURSE CONTENT**Unit - I:**

Matrices Definition - Types of Matrices- Addition of Matrices-Subtraction of Matrices – Product of Matrices-Transpose of a matrix - Inverse of a matrix –Reciprocal Matrix – Rank of a Matrix.

Unit - II:

Theory of Equations: Nature of roots –Relation between the coefficients and the roots of an algebraic equation-Transformation of equations-Horner's Method-Newton's Method.

Unit - III:

Set Theory: Introduction-Basic concepts and Notations-Ordered pairs and Cartesian product-set operations.

Unit - IV:

Relations: Introductions –Definition-Types of Relations-Some operations on relations –Composition of Relations –Properties of Relations-Equivalence classes-Partition of a set –Matrix representation of a relation.

Unit - V:

Graph Theory: Introduction- Definitions-Degree of a Vertex-Some special simple graphs-Matrix representation of graphs-Paths , Cycles and connectivity.

TEXT BOOKS

- S.Narayanan ,R.Hanumantha Rao and T.K .Manickavasagam Pillay ,*Ancillary Mathematics – Volume I* Reprint 2015.(UNIT I,II)
- T.Veerarajan ,*Discrete Mathematics*, Reprint 2015 (**Rest of Units**).

Mapping					
COs & POs	PO1	PO2	PO3	PO4	PO5
CO1	H	H	H	H	H
CO2	H	H	M	H	H
CO3	H	H	H	H	M
CO4	H	H	H	H	H
CO5	H	H	H	H	H

H-High;*M-Medium;****L-Low;**

SKILL BASED COURSE -I
MUCSOA1 - OFFICE AUTOMATION

Hours: 2**Credits : 2****Semester: I****Preamble**

This course imparts the skills on application of MS-Office Packages and it provide hands-on use of Microsoft Office applications like Word, Excel, Access and PowerPoint.

Course Outcomes

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

CO	Course Outcome	Cognitive Level
CO1.	Understand the dynamics of an office environment.	Comprehension (Level K2)
CO2.	Use various Office Automation Tools like MS Word, MS Excel & MS PowerPoint.	Comprehension (Level K2)
CO3.	Design various Office Automation Tools like MS Word, MS Excel & MS PowerPoint.	Application (Level K3)
CO4.	The ability to apply application software in an office environment.	Application (Level K3)
CO5.	The ability to implement applications in an office environment.	Comprehension(Level K2)

PROGRAM LIST

1. **Format the document using**
 - i. Bulleted & Numbered List
 - ii. Adding Headers and Footers
 - iii. Find and Replace the word.
2. **Create a Business Letter using Mail Merge concept.**
3. **Create a document News Paper format in MS- word.**
4. **Create a worksheet to**
 - i. Find, delete and add records,
 - ii. Formatting columns, row height, merging, splitting columns.
 - iii. Sort the contents in ascending and descending order

- 5 Create the worksheet in MS-EXCEL to store the following information:**
Reg. no, Name, Mark1 , Mark2, Mark3 , Total Average
- Using formula and function find the total, average, maximum, minimum total marks
 - Create the bar chart for average mark with proper title for axes, legend and gridlines.
- 6 Create, display and interact with data using Pivot Tables and Pivot Charts of excel feature.**
- 7 Create 3 slides for a Seminar Lecture on introduction to computer and do the following**
- Numbering the Slides
 - Moving the Frames and Inserting Clipart
 - Inserting New Slide
 - Deleting Slide
 - Copying a Slide.
- 8 Create 5 Slide presentation of your own and do the following**
- Inserting Pictures
 - Copying picture form previous slide
 - Copying text from previous slide

Mapping					
COs & POs	PO1	PO2	PO3	PO4	PO5
CO1	M	H	H	H	H
CO2	H	H	H	H	H
CO3	H	H	H	H	H
CO4	H	M	H	M	H
CO5	H	M	H	H	H

*H-High;

M-Medium;

L-Low;

CORE PAPER III
MUCSC2 - PROGRAMMING IN 'C'

Hours: 6**Credits : 5****Semester: II****Preamble**

This course helps the students to learn C Programming language and develop programming skills in writing simple programs.

Course Outcomes

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

CO	Course Outcome	Cognitive Level
CO1.	Recall and understand the fundamentals of C programming. To acquire the programming logic, use of program instruction, syntax and programming structure.	Knowledge (Level K1)
CO2.	To acquire the programming logic, use of program instruction, syntax and programming structure.	Comprehension (Level K2)
CO3.	Understand the concepts of decision making, branching and looping.	Knowledge (Level K1) Comprehension(Level K2)
CO4.	Implement different operations on arrays and functions to solve the problem.	Application (Level K3)
CO5.	Execute file operations to preserve data in physical disk.	Application(Level K3)

COURSE CONTENT**Unit - I:**

History of C – Basic Structure of C Programs – Character Set –C Tokens – Keywords and Identifiers – Constants and Variables – Data Types – Storage Class - Operators and Expressions.

Unit - II:

Managing Input and Output Operations - Decision Making and Branching: IF statement –Simple IF Statement-The IF....ELSE Statements - Nesting of IF.....ELSE Statements – The Switch Statement – The? : Operator - The GOTO Statement – **Decision Making and Looping** – The WHILE Statement – The DO Statement – The FOR Statement-Jumps in LOOPS.

Unit - III:

Arrays: One-dimensional Arrays – Two-dimensional Arrays – Multi-dimensional Arrays – Character Arrays and Strings.

User - defined Function – Elements of user defined functions – definition of functions –function calls – Functions declaration – category of functions - Nesting of functions – Passing arrays to functions – Scope, visibility and life time of variables.

Unit - IV:

Structures: Defining a Structure – Declaring Structure variables – Accessing structure members – structure initialization – copying and comparing Structure Variables- Arrays of structure – Arrays within structure – Structure within structure.

Union: introduction- size of structure – Bit fields.

Pointers: Accessing the address of a variable – declaration – initialization – accessing a variable through its pointer – pointer expression – pointers & characters string – Array of pointers – Pointers as functions arguments – pointers and Structures.

Unit - V:

File Management : Introduction – Defining and Opening a File – Closing a File – Input / Output Operations on Files - Error Handling During I/O Operation – Random Access to Files – Command Line Arguments.

TEXT BOOK

- E.Balagurusamy ,*Programming in ANSI 'C'*, Fouth Edition, Tata McGraw – Hill Publishing Company, 2009.

REFERENCE BOOK

- Yashwanth Kanetkar , “*Let us C*” , BPB Publication

Mapping					
COs & POs	PO1	PO2	PO3	PO4	PO5
CO1	H	H	H	H	H
CO2	H	H	H	H	H
CO3	H	H	H	H	H
CO4	H	H	H	H	H
CO5	H	H	M	H	M

*H-High;

M-Medium;

L-Low;

CORE PAPER IV**MUCSL2 - PRACTICAL II - PROGRAMMING IN 'C'****Hours: 5****Credits : 3****Semester : II****Preamble**

This course provide exposure to problem-solving through programming and train the students to the basic concepts of the C-Programming Languages

Course Outcomes

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

CO	Course Outcome	Cognitive Level
CO1.	Read and understand the execution of programs written in C language.	Knowledge (Level K1)
CO2.	Trace the execution of programs written in C language.	Comprehension (Level K2)
CO3.	Implement various concepts in C.	Application(Level K3)
CO4.	Implement programs with pointers and arrays, perform pointer arithmetic and use the pre-processor.	Application(Level K3)
CO5.	Write the C code for a given algorithm.	Analysis(Level K4) Synthesis (Level K5)

PROGRAM LIST

1. To find the Sum of individual Digits.
2. To reverse a given Digit.
3. Prime Number Series.
4. Armstrong Number Series.
5. Matrix Manipulation and Transpose of a Matrix.
6. Palindrome using String.
7. String Concatenation, Comparison and Length.
8. Count number of words, character and lines in a sentence.
9. Standard deviation ,Mean
10. Fibonacci using Recursion.
11. Swapping of numbers using Pointers.

12. To prepare student Mark List using Structures.

13. To prepare Electricity Bill using Files.

Mapping					
COs & POs	PO1	PO2	PO3	PO4	PO5
CO1	H	H	H	H	H
CO2	H	H	H	H	H
CO3	H	H	H	H	H
CO4	H	M	H	M	H
CO5	H	H	M	H	H

***H-High;**

M-Medium;

L-Low;

ALLIED PAPER II**MUCSA2 - MATHEMATICS II - STATISTICS****Hours: 5****Credits : 5****Semester : II****Preamble**

This course facilitate the students to impart knowledge on various statistical methods like central tendency, dispersion, correlation and regression, probability and sampling theory.

Course Outcomes

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

CO	Course Outcome	Cognitive Level
CO1.	Revise the formula of different Means, Median, Mode, Deviations, Correlation, Regression, Probability, Chi square test, Degree of Freedom, etc.	Knowledge (Level K1)
CO2.	Describe the formula of different Means, Median, Mode, Deviations, Correlation, Regression, Probability, Chi square test, Degree of Freedom, etc.	Comprehension (Level K2)
CO3.	Understand the concepts Central tendency, Dispersion, Correlation and regression, Probability and Sampling theory.	Comprehension (Level K2)
CO4.	Solve the problems by using formulas.	Comprehension(Level K2) Application(Level K3)
CO5.	Apply the suitable techniques of statistics to solve real time problems.	Application(Level K3)

(80 % Problems + 20 % Theory)

COURSE CONTENT**Unit - I:**

Measures of central tendency: Mean: Arithmetic Mean, Weighted Arithmetic Mean, Combined Arithmetic Mean, Geometric Mean, Harmonic Mean, Median and mode – Relation between mean, median and mode

Unit - II:

Dispersion: Range - Mean deviation - Standard deviation - Coefficient of Variation – Quartile Deviation

Unit - III:

Correlation: Karl Pearson's Coefficient of Correlation – Rank correlation. **Regression:** Regression Equations - Difference between correlation & Regression.

Unit - IV:

Probability: Permutation and Combination- Important terms in probability- Measurement of Probability: Classical Approach- Relative Frequency theory of probability – Personalistic view of probability – Axiomatic Approach of probability. Theorems of probability: Addition – Multiplication – Odds.

Unit - V:

Sampling Theory and Test of Significance: Introduction – Estimation theory – Testing of hypothesis – Testing if significance for large samples and small samples. **Chi Square Test:** Introduction – χ^2 test, Degrees of freedom, Test of goodness of fit, Test of Independence.

TEXT BOOK

- Pillai R. S. N. Bagavathi V, *Statistical Methods*, Sultan Chand and Sons & Company Ltd. New Delhi(2005).

REFERENCE BOOK

- S.P.Gupta S.Chand & sons “*Statistical Methods*”.

Mapping					
COs & POs	PO1	PO2	PO3	PO4	PO5
CO1	H	H	H	H	H
CO2	H	H	H	H	H
CO3	H	H	H	H	H
CO4	H	M	H	M	H
CO5	H	H	M	H	H

*H-High;

M-Medium;

L-Low;

SKILL BASED COURSE - II
MUCSNA2 - NUMERICAL APTITUDE

Hours: 2**Credits : 2****Semester : II****Preamble**

This course helps the students to improve their employability skills.

Course Outcomes

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

CO	Course Outcome	Cognitive Level
CO1.	Recollect and describe the basic concepts of logical reasoning.	Knowledge (Level K1) Comprehension (Level K2)
CO2.	Discuss problem solving and reasoning ability.	Comprehension (Level K2)
CO3.	Demonstrate various principles involved in solving mathematical problems and thereby reducing the time taken for performing job functions.	Application(Level K3)
CO4.	Apply various principles involved in solving mathematical problems and thereby reducing the time taken for performing job functions.	Application(Level K3)
CO5.	Critically evaluate various real life situations by resorting to analysis of key issues and factors.	Analysis (Level K4)

COURSE CONTENT

Unit - I:

Operations on Numbers – H.C.F & L.C.M of Numbers (Solved Examples).

Unit - II:

Problems on Numbers- Problems on Ages — Problems on Trains(Solved Examples)

Unit - III:

Percentage – Profit & Loss – Ratio & Proposition(Solved Examples).

Unit - IV:

Time & Work –Time & Distance(Solved Examples)

Unit - V:

Simple Interest-Compound Interest-Permutations & Combinations

TEXT BOOK

- R.S.Aggarwal ,*Quantitative Aptitude for Competitive Examination*, Revised Edition

Mapping					
COs & POs	PO1	PO2	PO3	PO4	PO5
CO1	H	H	M	H	H
CO2	H	H	M	H	H
CO3	H	H	M	H	H
CO4	H	H	M	H	H
CO5	H	H	H	H	H

***H-High;**

M-Medium;

L-Low;

CORE PAPER V**MUCSC3 - OBJECT ORIENTED PROGRAMMING WITH C++****Hours: 5****Credits : 4****Semester: III****Preamble**

This course discuss OOPS concepts, it deals with I/O facilities, control structures and help the students to develop programming skills in writing simple programs.

Course Outcomes

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

CO	Course Outcome	Cognitive Level
CO1.	Get an idea about object oriented paradigm with concepts of streams, classes, functions, data and objects and also recollect the concepts of files.	Knowledge (Level K1)
CO2.	Classify difference between object oriented programming and procedural oriented language and data types in C++.	Knowledge (Level K1) Comprehension (Level K2)
CO3.	Apply dynamic memory management techniques using pointers, constructors, destructors, etc.,	Knowledge (Level K1) Application (Level K3)
CO4.	Validate the use of various OOPs concepts with the help of programs.	Analysis (Level K4) synthesis(Level K5)
CO5.	Acquire the concept of polymorphism and apply inheritance with the understanding of early and late binding.	Application (Level K3) Analysis (Level K4)

COURSE CONTENT**Unit - I:**

Principles of OOP: OOP Paradigm – Basic Concepts of OOP – Benefits of OOP – Object Oriented Languages – Applications of OOP.

Token, Expressions and Control Structures: Introduction – Tokens - Keywords, -Identifiers and Constants – Data Types – Variables – Operators – Manipulators - Expressions - Control Structures in C++.

Unit - II:

Functions in C++: Introduction - Main Function – Function Prototyping – Call by Reference –Return by Reference - Inline Functions - Function Overloading – Friend and Virtual Functions.

Unit - III:

Classes and Objects - Constructors and Destructors - Operator Overloading and Type Conversions.

Unit - IV:

Inheritance: Introduction - Single Inheritance – Multilevel Inheritance –Multiple Inheritance- Hierarchical Inheritance – Hybrid Inheritance – Virtual Base Classes – Abstract Classes.

Pointers , Virtual Functions and Polymorphism - Managing Console I/O Operations

Unit - V:

Working with Files – Classes for File Stream Operations – Opening and Closing a File –Detecting end-of-file – File Pointers – Updating a File – Error handling During File Operations – Command Line Arguments.

TEXT BOOK

- E.Balagurusamy, *Object Oriented Programming with C++, Fourth Edition*,Tata McGraw – Hill, New Delhi 2009.

REFERENCE BOOK

- “C++: The Complete Reference”, *Herbert schildt, Fourth Edition*, McGraw – Hill Publications 2003.

Mapping					
COs & POs	PO1	PO2	PO3	PO4	PO5
CO1	H	H	H	H	H
CO2	H	H	H	H	M
CO3	H	H	H	H	H
CO4	H	H	H	H	M
CO5	H	H	H	H	M

*H-High;

M-Medium;

L-Low;

CORE PAPER VI
MUCSC4 - COMPUTER ORGANIZATION

Hours: 6**Credits : 4****Semester: III****Preamble**

This course concerns about basic structure of hardware and software ,and helps to know input output organization and memory subsystem.

Course Outcomes

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

CO	Course Outcome	Cognitive Level
CO1.	Recollect the basic structure of Computer and get the idea about instructions, input-output organization, Memory system, Processing and Pipelining.	Knowledge (Level K1)
CO2.	Understand the basic structure of Computer and get the idea about instructions, input-output organization, Memory system, Processing and Pipelining.	Comprehension (Level K2)
CO3.	Classify various digital components.	Comprehension (Level K2)
CO4.	Describe arithmetic and logic operations of processing unit.	Comprehension (Level K2) Application (Level K3)
CO5.	Analyze various types of computers, instructions, memory system and working principles of pipelining.	Application (Level K3) Analysis (Level K4)

COURSE CONTENT**Unit – I:**

Basic Structure of Computers: Computer Types - Functional Units - Basic Operational Concepts - Bus Structures – Software – Performance – Processor Clock – Basic Performance Equation.

Memory Location and Address: Byte Addressability – Big Endian and Little Endian Assignments – Word Alignment.

Unit - II:

Instructions and Instruction Sequencing: Assembly Language Notation – Basic Instructions Type – Addressing Modes.

Input-Output Organization: Accessing I/O devices - Interrupts – Interrupts Hardware - Enabling and Disabling Interrupts - Handling Multiple Devices – Exceptions - Direct Memory Access.

Unit - III:

Memory System: Basic Concepts – Semi Conductor RAM Memories - Static Memories- Asynchronous DRAMs – Read - Only Memories. **Cache Memories:** Introduction - Mapping Functions- Replacement Algorithm. **Virtual Memories:** Address Translation.

Unit - IV:

The Processing Unit: Fundamentals Concepts: Register Transfers – Performing. Arithmetic or Logic Operations - Fetching a word from Memory-Storing a word into the Memory.

Unit - V:

Pipelining: Basic Concepts - Role of Cache Memories – Pipeline Performance – Data Hazards – Operand Forwarding - Instruction Hazards.

TEXT BOOK

- V.Carl Hamacher, Zvonko G. Vranesic, Safwat G. Zaky, *Computer Organization 5th Edition*, McGraw Hill Publication, 2002.

REFERENCE BOOK

- Morris Mano *Computer System Architecture*, Prentice Hall of India, 2001

Mapping					
COs & POs	PO1	PO2	PO3	PO4	PO5
CO1	M	H	M	H	H
CO2	M	H	M	H	H
CO3	H	H	H	H	H
CO4	M	H	M	H	H
CO5	H	H	H	H	H

***H-High;**

M-Medium;

L-Low;

CORE PAPER VII

MUCSC5 - DATA STRUCTURES

Hours: 5**Credits :4****Semester: III****Preamble**

This course gives knowledge on data,files ,Arrays ,Records and Pointers. It helps to understand Stack, Queue, Linked list and Trees.

Course Outcomes

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

CO	Course Outcome	Cognitive Level
CO1.	Recognize fundamental concepts of Data structures, space complexity and time complexity.	Knowledge (Level K1)
CO2.	Understand linear data structures such as stacks, queues, linked list and non linear data structures such as trees and Graphs.	Knowledge (Level K1) Comprehension (Level K2)
CO3.	Apply appropriate data structure for a given application.	Application (Level K3)
CO4.	Implement different searching and sorting techniques.	Application (Level K3)
CO5.	Analyze efficient algorithms by acquiring knowledge about time and space complexities of the algorithms.	Analysis (Level K4) Synthesis(Level K5)

COURSE CONTENT**Unit - I:**

Introduction and Overview: Introduction – Basic Terminology; Elementary Data organization – Data Structures-Data Structure Operations. Algorithms: Complexity - Time-space Tradeoff.

Unit - II:

Arrays, Records and Pointers: Introduction – Linear Arrays – Representation of Linear Arrays in Memory – Representation of Linear Arrays in Memory – Traversing Linear Arrays – Inserting and deleting .Sorting :Bubble Sort – Searching : Linear Search – Binary Search.

Unit - III:

Linked Lists: Introduction - Linked Lists – Representation of Linked List in Memory – Traversing a Linked Lists – searching a Linked List. Memory allocation: Garbage Collection – Insertion into a Linked List –Deletion from a Linked List – Header Linked List –Two way Lists.

Unit - IV:

Stacks, Queues: Stacks – Array Representation of Stacks – Linked Representation of Stacks - Arithmetic expressions: Polish Notation – Queues – Linked Representation of Queues.

Unit - V:

TREES: Introduction – Binary Trees – Representing Binary Trees in Memory – Traversing Binary Trees – Traversal Algorithms using Stacks – Header Nodes: Threads – Binary Search Trees – Searching and Inserting in Binary Search Trees – Deleting in a Binary Search Tree.

TEXT BOOK

- Seymour Lipschutz *Data Structures Revised First Edition* – McGraw Hill Education Private Limited, 2006.

REFERENCE BOOK

- Ellis Horowitz, Sartaj Sahni *Fundamentals of Data Structures* – Galgotia Publications, 1998.

Mapping					
COs & POs	PO1	PO2	PO3	PO4	PO5
CO1	H	H	H	H	H
CO2	H	H	H	H	H
CO3	H	H	H	H	H
CO4	H	H	H	H	M
CO5	H	H	H	H	M

*H-High;

M-Medium;

L-Low;

CORE PAPER VIII**MUCSL3 - PRACTICAL III - C++ WITH DATA STRUCTURES****Hours: 5****Credits : 3****Semester: III****Preamble**

This course provide understanding of classes, objects, constructors, destructors, and control structures. This course impart knowledge about data structures including linked list, stacks & queues and binary trees

Course Outcomes

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

CO	Course Outcome	Cognitive Level
CO1.	Understand Object oriented features and C++ concepts.	Comprehension (Level K2)
CO2.	Apply Object oriented features and C++ concepts.	Application (Level K3)
CO3.	Practice to solve the real world problems.	Application (Level K3)
CO4.	Apply to solve the real world problems.	Application (Level K3)
CO5.	Experiment various data structure concepts using C++.	Analysis (Level K4)

PROGRAM LIST

1. Print the Student Name, Register Number, Marks, Total and Average using Array Of Objects.
2. Sum of the given numbers using Function Overloading
 - o Two Integer Values
 - o Three Integer Values
 - o Two double Values
3. Banking Operations using Constructors.
4. Sum of the two values using '+' operator overloading using
 - o Two integer values
 - b. Two floating values
5. Find the Arithmetic operations using Inline function.
6. Write a C++ program to apply single inheritance and assume the fields by your own.
7. Write a C++ program to apply multiple inheritances and assume the fields by your own.
8. Write a C++ program to apply the 'this' pointer to greatest age among them.
9. Write a C++ program to apply run time polymorphism to display the book details.

10. Create a sequential file with fields with student name, register number C++ Mark, Maths mark, Science mark and write another program to access the file and calculate total mark, average and result.
11. Stack Operations
12. Queue Operations
13. Binary Search
14. Sorting

Mapping					
COs & POs	PO1	PO2	PO3	PO4	PO5
CO1	H	H	H	H	H
CO2	H	H	H	H	H
CO3	H	H	H	H	H
CO4	H	M	H	M	H
CO5	H	H	M	H	H

***H-High;**

M-Medium;

L-Low;

ALLIED PAPER III**MU CSA3 - MATHEMATICS III -COMPUTER BASED OPTIMIZATION TECHNIQUES****Hours: 5****Credits : 5****Semester: III****Preamble**

This course give basic ideas about operation Research and solve the LPPs using various methods of operation Research.

Course Outcomes

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

CO	Course Outcome	Cognitive Level
CO1.	Recall the concept of Operation Research.	Comprehension (Level K2)
CO2.	Describe the concept of Operation Research.	Comprehension (Level K2)
CO3.	Apply transportation and assignment problem to allocate resources.	Application (Level K3)
CO4.	Acquire the knowledge about game theory.	Analysis (Level K4)
CO5.	Validate network scheduling by PERT and CPM.	Synthesis (Level K5)

(80% Problem Solving – Solved Problems Only,20% Theory)

COURSE CONTENT**Unit - I:**

Operation Research: Introduction – Origin and development – Nature and features – Modeling – Advantages and Limitations of Models – Applications of Operation Research.

Unit - II:

Linear Programming Problem: Mathematical Formulation - Graphical Solution Method: Exceptional Cases – Canonical and Standard forms of LPP. Simplex methods (Excluding Non standard LPPs)optimal solutions.

Unit - III:

Transportation problem : Introduction – LP Formulation of the Transportation Problem- Solution of a TP – Finding an I.B.F.S – Test for Optimality - Degeneracy in TP – MODI Method .

Assignment Problem: Mathematical Formulation of the problem – Solution methods of AP – Special cases in AP – Travelling Salesman Problem.

Unit - IV:

Game Theory –Maximin and Minimax principles –Mixed strategy – Dominance property-Graphical method – Simplex method..

Unit - V:

Network Scheduling by PERT / CPM : Introduction – Network – Logical Sequencing – Rules of Network Construction – Critical Path Analysis – Probability considerations in PERT – Distinction between PERT and CPM.

TEXT BOOK

- Kanti Swarup P.K Gupta, Manmohan sultan chand & sons, “*Operations Research*”, Newdelhi

REFERENCE BOOK

- P.K. Gupta & D.S. Hira, chand & sons, *Introduction to operations research* , Newdelhi
- Ganapathy, *Resource management techniques*

Mapping					
COs & POs	PO1	PO2	PO3	PO4	PO5
CO1	H	M	M	H	M
CO2	H	H	H	H	M
CO3	H	H	M	H	M
CO4	H	H	H	H	M
CO5	H	H	H	H	H

***H-High;**

M-Medium;

L-Low;

SKILL BASED COURSE III
MUCSHR3 - HUMAN RIGHTS

Hours:2**Credits :2****Semester: III****Preamble**

This paper provides an introduction to basic human rights philosophy, principles and also an overview of current issues.

Course Outcome

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

CO	Course Outcome	Cognitive Level
CO1.	Know the basic rights and freedoms, regardless of their political, economical and cultural systems.	Knowledge (Level K1)
CO2.	Understand the importance and historical growth of the Human Rights.	Knowledge (Level K1)
CO3.	Describe historical growth of the Human Rights.	Comprehension (Level K2)
CO4.	Demonstrate the awareness of international context of human rights.	Comprehension (Level K2) Application (Level K3)
CO5.	Categorize the modern issues regarding child and women.	Analysis (Level K4)

COURSE CONTENT

Unit - I:

Definition of Human Rights - Nature, Content, Legitimacy and Priority - Theories on Human Rights - Historical Development of Human Rights.

Unit - II:

International Human Rights - Prescription and Enforcement upto World War II - Human Rights and the U.N.O. - Universal Declaration of Human Rights - International Covenant on Civil and Political Rights - International Covenant on Economic, Social and Cultural Rights and Optional Protocol.

Unit - III:

Human Rights Declarations - U.N. Human Rights Declarations - U.N. Human Commissioner.

Unit - IV:

Amnesty International - Human Rights and Helsinki Process - Regional Developments -European Human Rights System - African Human Rights System - International Human Rights in Domestic courts.

Unit - V:

Contemporary Issues on Human Rights: Children's Rights – Women's Rights –Dalit's Rights – Bonded Labour and Wages – Refugees – Capital Punishment. Fundamental Rights in the Indian Constitution – Directive Principles of State Policy –Fundamental Duties – National Human Rights Commission.

TEXT BOOK

- *International Bill of Human Rights*, Amnesty International Publication, 1988.

Mapping					
COs & POs	PO1	PO2	PO3	PO4	PO5
CO1	H	H	M	H	H
CO2	H	H	H	H	M
CO3	M	H	H	H	H
CO4	H	H	H	H	M
CO5	H	H	H	H	M

***H-High;**

M-Medium;

L-Low;

NON MAJOR ELECTIVE I**MUCSN1 - COMPUTER APPLICATION FOR AUTOMATION****Hours:2****Credits :2****Semester: III****Preamble**

This course helps the students to learn about MS-OFFICE, and provide hands-on use of Microsoft Office applications like Word, Excel, Access and PowerPoint.

Course Outcomes

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

CO	Course Outcome	Cognitive Level
CO1.	Design various Office Automation Tools like MS Word, MS Excel & MS PowerPoint.	Application (Level K3)
CO2.	Use various Office Automation Tools like MS Word, MS Excel & MS PowerPoint.	Application (Level K3)
CO3.	Understand the dynamics of an office environment.	Comprehension (Level K2)
CO4.	Apply application software in an office environment.	Application (Level K3)
CO5.	The ability to implement applications in an office environment.	Comprehension (Level K2)

COURSE CONTENT**Unit - I: WINDOWS**

Introduction – Elements of window – Various types of icons - run through on window – Windows basic – Program Manager – The file manager – Control panel.

Unit - II: MS-WORD

MS Word: Creating and Editing Documents –Menus, Commands, Toolbars and Icons—Formatting document – Creating Tables – Mail Merger.

Unit - III: MS-EXCEL

MS Excel: Spreadsheet Overview – Menus, Toolbars, Icons-Creating worksheets – Editing and Formatting – excel Formulas and Functions – Creating a Chart Data Forms, Sort, and Filter.

Unit - IV: MS-POWERPOINT

MS Power Point – Introduction – Menus – Toolbars – Text and Formats – Animation, Art and Sound – Making the presentation template

Unit - V: MS-ACCESS

MS Access: Database overview – Creating a database – Modifying table and Creating Form – Query – Creating reports – Mailing Labels

TEXT BOOK

- Sanjay Saxena , *MS Office 2000* for every one

Mapping					
COs & POs	PO1	PO2	PO3	PO4	PO5
CO1	H	H	H	H	H
CO2	H	H	H	H	H
CO3	H	H	H	H	H
CO4	H	H	H	H	M
CO5	H	H	H	H	M

***H-High;**

M-Medium;

L-Low;

CORE PAPER IX**MUCSC6 - JAVA PROGRAMMING****Hours: 6****Credits : 5****Semester: IV****Preamble**

This course helps the students to inculcate knowledge on Concepts of Java Programming and to create wide range of Applications and Applets using Java.

Course Outcomes

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

CO	Course Outcome	Cognitive Level
CO1.	Recollect the OOPs concepts such as Class, Inheritance, Encapsulation and Polymorphism.	Knowledge (Level K1) Comprehension (Level K2)
CO2.	Understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.	Knowledge (Level K1) Comprehension (Level K2)
CO3.	Implement programs using more advanced futures such as Interface, Packages and Multithreading.	Application (Level K3)
CO4.	Analyze differences between application program and applets, applet lifecycle and graphics programming.	Analysis(Level K4)
CO5.	Validate Java Programs using Stream Classes and files.	Synthesis(Level K5)

COURSE CONTENT**Unit - I:**

Fundamentals of Object Oriented Programming: Introduction – Object Oriented Paradigm – Basic concepts of OOP – Benefits of OOP – Applications of OOP. Java Evolution.

Over View of Java Language: Introduction-Simple Java Program – Java Program Structure - Java Tokens - Java Statements - Implementing a Java Program - Java Virtual Machine - Command Line Arguments - Constants, Variables and Data Types.

Unit - II:

Classes, Objects and Methods: Introduction-Defining a Class- Static Members-Overriding Methods-Final Variables and Methods-Final Classes- Finalizer Methods-Abstract Methods and Classes –Visibility Control.

Interfaces: Introduction-Defining Interfaces-Extending Interfaces - Implementing Interfaces-Accessing Interface Variables.

Unit - III:

Packages: Java API Packages-Using System Packages-Creating Packages-Accessing a Package-Using a Package-Adding a Class to Package-Hiding Classes.

Multithreading Programming: Creating Threads - Extending the Thread Class-Stopping and Blocking a Thread - Life Cycle of a Thread-Thread Exceptions-Thread Priority-Synchronization-Implementing the ‘Runnable’ Interface - Managing Error and Exceptions.

Unit - IV:

Applet Programming: Introduction-Preparing to Write Applets-Applet Life Cycle-Designing a web page-Passing Parameters to Applets. Event Handling.

Graphics Programming: The Graphics Class-Lines and Rectangles-Circle and Ellipses-Drawing Arcs-Drawing Polygons-Line Graphs-Using Control Loops in Applets.

Unit - V:

Managing Input/Output Files in Java: Introduction - Concept of Streams - Stream Classes - Byte Stream Classes - Character Stream Classes - Input/Output Exceptions - Creation of Files - Reading/Writing Characters - Reading/Writing Bytes - Random Access Files.

TEXT BOOK

- E.Balagurusamy, *Programming with JAVA 6th Edition*. Tata McGraw – Hill, New Delhi 2010.

REFERENCE BOOK

- Herbert Schildt, *“Java 2: The Complete Reference”*, Fifth Edition, Tata McGraw – Hill 2002.

Mapping					
COs & POs	PO1	PO2	PO3	PO4	PO5
CO1	H	H	H	H	M
CO2	H	H	H	H	M
CO3	H	H	H	H	M
CO4	H	H	H	H	M
CO5	H	H	H	H	H

*H-High;

M-Medium;

L-Low;

CORE PAPER X
MUCSC7 - OPERATING SYSTEM

Hours: 5**Credits : 5****Semester: IV****Preamble**

This course teaches the Fundamental Aspect of Operating System and give sufficient knowledge on various system Resources.

Course Outcomes

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

CO	Course Outcome	Cognitive Level
CO1.	Recollect the concept of fundamental aspect of operating system.	Knowledge (Level K1)
CO2.	Describe the concept of fundamental aspect of operating system.	Knowledge (Level K1)
CO3.	Understand the concept of scheduling algorithms, Deadlock, process management and memory management.	Knowledge (Level K1) Comprehension (Level K2)
CO4.	Sketch the Threats, Memory management and production policies.	Application (Level K3)
CO5.	Acquire the knowledge about file management.	Analysis(Level K4)

COURSE CONTENT

Unit - I:

Introduction: What is an Operating System – Mainframe Systems – Distributed Systems **Processes:** Process Concept – Process Scheduling – Interprocess Communication.

Unit - II:

Threads: Overview – Multithreading Models. **CPU Scheduling:** Basic Concepts – Scheduling Criteria – Scheduling Algorithms.

Unit - III:

Process Synchronization: Background – The Critical Section Problem – Synchronization Hardware – Semaphores.

Deadlock: System Model – Deadlock Characterization – Methods For Handling Deadlocks – Deadlock Prevention – Deadlock avoidance – Deadlock detection – Recovery from deadlock

Unit - IV:

Memory Management: Swapping – Contiguous Memory allocation – Paging – Segmentation – Segmentation with Paging – Virtual Memory: Demand Paging

Unit - V:

Security: User Authentication – Cryptography

File System Interface: File Concept – File Access Methods – Directory Structure.

TEXT BOOK

- Silberschatz , Galvin, Gagne , *Operating Systems Concepts*, Sixth Edition, John Wiley & Sons, Inc.

REFERENCE BOOK

- Milan Milenkovic , *Operating Systems (Concepts and Design)*, Second Edition, Tata McGraw –Hill

Mapping					
COs & POs	PO1	PO2	PO3	PO4	PO5
CO1	H	H	H	M	H
CO2	H	H	H	M	H
CO3	H	M	H	M	H
CO4	H	H	H	M	H
CO5	H	H	H	H	M

***H-High;**

M-Medium;

L-Low;

CORE PAPER XI**MUCSL4 - PRACTICAL IV-WEB PROGRAMMING****Hours:6****Credits : 3****Semester: IV****Preamble**

This course helps the students to learn and to create dynamic web page using JSP,PHP and Java script.

Course Outcomes

On successful completion of the course, the student will able to

CO	Course Outcome	Cognitive Level
CO1.	Discuss the core concepts of web programming such as Java script, JSP, PHP.	Comprehension (Level K2)
CO2.	Understand the core concepts of web programming such as Java script, JSP, PHP.	Comprehension (Level K2)
CO3.	Design interactive web pages using Java script.	Application (Level K3)
CO4.	Apply interactive web pages using Java script.	Application (Level K3)
CO5.	Validate server side scripting using JSP and PHP.	Synthesis(Level K5)

PROGRAM LIST

1. Design a web page using CSS
2. Prepare a resume using forms
3. Website Design for a Department (or) College (or) Company etc.
4. Java Script for a Mathematical Calculator
5. Java Script – Number Puzzle
6. Java script-Games using Random number generation
7. Validation of name, mobile number, date of birth, email id using Java Script
8. Online Quiz using JSP
9. Perform Arithmetic operations using JSP

10. Generate Fibonacci series using PHP
11. PHP program to check whether the given number is prime or not
12. Online ticket booking using PHP

Mapping					
COs & POs	PO1	PO2	PO3	PO4	PO5
CO1	M	H	H	H	H
CO2	H	H	H	H	M
CO3	H	H	H	H	M
CO4	H	M	H	M	H
CO5	H	H	H	H	H

***H-High;**

M-Medium;

L-Low;

CORE PAPER XII**MUCSL5 - PRACTICAL -V : JAVA PROGRAMMING****Hours:6****Credits : 3****Semester : IV****Preamble**

This course helps the students to inculcate knowledge on Concepts of Java Programming and to create wide range of Applications and Applets using Java.

Course Outcomes

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

CO	Course Outcome	Cognitive Level
CO1.	Sketch the Oops concepts and gain the knowledge of Java and Applet.	Application (Level K3)
CO2.	Apply the Oops concepts and gain the knowledge of Java and Applet.	Application (Level K3)
CO3.	Describe the core java concepts.	Analysis (Level K4)
CO4.	Implement core java concepts.	Analysis (Level K4)
CO5.	Create simple stand alone application using Core Java and remote applications using Applet.	Synthesis(Level K5)

COURSE CONTENT**PROGRAMMING LIST**

1. To perform addition of complex numbers using class and objects.
2. To perform multiplication of matrices using class and objects.
3. To perform volume calculation using method overloading.
4. Using command line arguments, test if the given string is palindrome or not.
5. Using multilevel inheritance process student marks.
6. Implement multiple inheritance for payroll processing.
7. Package illustration.
8. To illustrate built-in exceptions (any four).
9. To create multiple threads
 - o Using Thread class
 - o Using Runnable interface
10. String manipulation using string methods.

11. Applet – Graphical methods

Mapping					
COs & POs	PO1	PO2	PO3	PO4	PO5
CO1	H	H	H	H	M
CO2	H	H	H	H	M
CO3	H	H	H	H	H
CO4	H	M	H	M	M
CO5	H	H	H	H	H

*H-High;

M-Medium;

L-Low;

ALLIED PAPER IV**MUCSAL6 - MATHEMATICS IV: R-PROGRAMMING LAB****Hours: 5****Credits : 5****Semester: IV****Preamble**

This course facilitates the students to acquire knowledge on basic concepts of R – Programming to create wide range of applications.

Course Outcome

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

CO	Course Outcome	Cognitive Level
CO1.	Import and summarize data-sets in R.	Knowledge (Level K1)
CO2.	Review and manipulate and summarize data-sets in R.	Comprehension (Level K2)
CO3.	Identify online resources for R and import new function packages into the R workspace.	Comprehension(Level K2)
CO4.	Demonstrate use of basic functions.	Application (Level K3)
CO5.	Create and edit visualizations with R.	Analysis (Level K4) Synthesis(Level K5)

PROGRAM LIST

1. To create a list containing Strings, numbers, vectors and a logical values
2. To add 10 to each elements of the first vector in a given list
3. To merge given two list into one list
4. To convert a given list into vector
5. To convert a given data frame to a list by rows
6. To count number of objects in a given list
7. To assign NULL to a given list elements
8. To convert given matrix to a list
9. To find all the elements in the given list that are not in the another list
10. To create a list named S containing sequence of 15 Capital letters starting form 'E'

Mapping					
COs & POs	PO1	PO2	PO3	PO4	PO5
CO1	H	H	H	H	M
CO2	H	H	H	H	M
CO3	H	H	H	H	M
CO4	H	H	H	H	M
CO5	H	H	H	H	H

H-High;*M-Medium;****L-Low;**

SKILL BASED COURSE - IV
MUCSOS4 - OPEN SOURCE SOFTWARE

Hours: 2**Credits : 2****Semester: IV****Preamble**

This course helps the students to acquire knowledge on open source software and to create interactive web platform applications.

Course Outcomes

On successful completion of the course, the student will able to

CO	Course Outcome	Cognitive Level
CO1.	Recall the concepts of Open Source, Linux, Java Script and PHP.	Knowledge (Level K1)
CO2.	Describe the concepts of Open Source, Linux, Java Script and PHP.	Comprehension (Level K2)
CO3.	Demonstrate the basics of Open Source Software.	Application (Level K3)
CO4.	Examine and design various applications using Open Source Software.	Analysis(Level K4) Synthesis(Level K5)
CO5.	Examine and design various applications using Open Source Software.	Analysis(Level K4) Synthesis(Level K5)

COURSE CONTENT

Unit - I:

OPEN SOURCE: Introduction - Open Source – Open Source vs. Commercial Software.

Unit – II:

LINUX: What is Linux? - Free Software – Where I can use Linux? Linux Kernel – Linux Distributions. Linux Essential Commands – File system Concept – Standard Files –The Linux Security Model – Vi Editor – Partitions Creation .

Unit - III:

Shell Introduction – String Processing – Investigation and Managing Processes – Network Clients – Installing Application.

Unit - IV:

JavaScript: Introduction – Language elements – Objectives of JavaScript – Other objects – arrays.

Unit - V:

PHP: PHP Introduction – General Syntactic Characteristics – PHP Scripting – Commenting your code – Primitives, Operations and Expressions – PHP Variables – Operations and Expressions Control Statement – Array – Functions – Basic Form Processing – File and Folder Access – Cookies – Sessions.

TEXT BOOK

- James Lee and Brent Ware , “*Open Source Web Development with LAMP using Linux, Apache, MySQL, Perl and PHP*”, Dorling Kindersley(India) Pvt. Ltd, 2008
- N.P.Gopalan , J.Akilandeswari , “*Web Technology: A Developer’s Perspective*” Prentice Hall of India learning, 2007

REFERENCE BOOK

- Eric Resebrook, Eric Filson , “*Setting Up LAMP: Getting Linux, Apache, MySQL, and PHP and Working Together*”, Published by John Wiley and Sons, 2004.
- J. Jaworski, T. A. Powell, *Mastering Javascript*, BPB Publications, 1999 , *Complete Reference HTML (Third Edition)*,TMH, 2002

Mapping					
COs & POs	PO1	PO2	PO3	PO4	PO5
CO1	H	H	H	M	H
CO2	H	H	H	M	H
CO3	H	H	H	M	H
CO4	H	M	H	M	H
CO5	H	H	H	H	H

***H-High;**

M-Medium;

L-Low;

CORE PAPER XIII**MUCSC8 - RELATIONAL DATABASE MANAGEMENT SYSTEM****Hours: 6****Credits : 5****Semester : V****Preamble**

This course facilitate the students to know the Core concepts of RDBMS and helps the students to create and connect the multiple tables and to have knowledge on Normalization Techniques.

Course Outcomes

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

CO	Course Outcome	Cognitive Level
CO1.	Remember and understand the basic concepts and applications of database system.	Knowledge (Level K1) Comprehension (Level K2)
CO2.	Get the idea about various data models which describes the structure of database.	Comprehension (Level K2)
CO3.	Design principles using ER models and Normalization approach.	Comprehension (Level K2) Application (Level K3)
CO4.	Apply principles using ER models and Normalization approach.	Application (Level K3)
CO5.	Interpret SQL interface of a RDBMS package to create, secure, maintain and query a database and PL/SQL programming using Triggers and Cursors.	Analysis (Level K4)

COURSE CONTENT**Unit - I:**

Introduction: Database System Applications – Purpose of Database Systems – View of Data – Database Languages – Transaction Management – Database users and Administrators – Overall System Structure.

Unit - II:

Relational Model: Entity – Relationship Model: Basic Concepts – Design Issues – Mapping cardinalities – Keys – E – R Diagrams – Weak entity sets – Extended E – R feature

Unit - III:

Data Normalization: Pitfalls in Relational Database Design- Entity – Decomposition – Functional Dependencies – Normalization – First Normal Form – Second Normal Form – Third Normal Form – Boyce – Codd Normal Form – Fourth Normal Form – Fifth Normal Form – Denormalization

Unit - IV:

PL/SQL: A Programming Language: History – Fundamentals – Block Structure – Comments – Data Types – Other Data Types – Declaration – Assignment operation – Bind variables – Substitution Variables – Printing – Arithmetic Operators.

Control Structures and Embedded SQL: Control Structures – Nested Blocks – SQL in PL/SQL – Data Manipulation – Transaction Control statements.

Unit - V:

PL/SQL Cursors and Exceptions: Cursors – Implicit & Explicit Cursors and Attributes – Cursor FOR loops – SELECT...FOR UPDATE – WHERE CURRENT OF clause – Cursor with Parameters – Cursor Variables – Exceptions – Types of Exceptions (Predefined Oracle Server Exceptions, User Defined Exceptions).

PL/SQL Composite Data Types: Records – Tables – Varrays . **Named Blocks:** Triggers

TEXT BOOKS

- Abraham Silberschatz, Henry F.Korth, S.Sudarshan , *Database System Concepts*, TMH 5th Edition
(UNIT s – I, II,III- Chapter – 7(7.1,7.2,7.3)
- Alexis Leon, Mathews Leon , Lieon Vikas , *Database Management Systems*, (UNIT – III – Chapter - 11)
- Nilesh Shah , *Database Systems Using Oracle*, 2nd edition, PHI.
(UNIT – IV: Chapters 10 & 11 UNIT – V: Chapters 12, 13 & 14)

REFERENCE BOOK

- Gerald V. Post , *Database Management Systems*, 3rd Edition, TMH.

Mapping					
COs & POs	PO1	PO2	PO3	PO4	PO5
CO1	H	H	H	M	M
CO2	H	H	H	H	H
CO3	H	H	H	H	H
CO4	H	H	H	H	M
CO5	H	H	H	H	H

H-High;*M-Medium;****L-Low;**

CORE PAPER XIV**MUCSL7 - PRACTICAL VI - .NET PROGRAMMING****Hours: 5****Credits: 3****Semester: V****Preamble**

This course helps the students to acquire the knowledge on .NET framework and to develop web based and application based software.

Course Outcomes

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

CO	Course Outcome	Cognitive Level
CO1.	Understand the database connectivity with application programming.	Analysis (Level K4)
CO2.	Demonstrate the database connectivity with application programming.	Analysis (Level K4)
CO3.	Design and execute different kinds of tasks in real time application.	Analysis (Level K4)
CO4.	Apply different kinds of tasks in real time application.	Analysis (Level K4)
CO5.	Validate the results for the given input data.	Synthesis (Level K5)

PROGRAM LIST

1. Write a program to find a grade of students.
2. Write a program to find factorial of given number using functions.
3. Write a program to arrange names in alphabetical order.
4. Write a program to display the user information.(personal details)
5. Calculator.
6. Notepad
7. Employee Details.
8. Hospital Management system.
9. Sales Transaction System.
10. News Paper Vendor Details.

Mapping					
COs & POs	PO1	PO2	PO3	PO4	PO5
CO1	H	H	H	H	H
CO2	H	H	H	H	H
CO3	M	M	H	H	H
CO4	H	M	H	M	H
CO5	H	H	H	H	H

H-High;*M-Medium;****L-Low;**

CORE PAPER XV**MUCSL8 - PRACTICAL VII- RELATIONAL DATABASE MANAGEMENT SYSTEM****Hours: 5****Credits : 3****Semester: V****Preamble**

This course facilitate the students to know the Core concepts of RDBMS and helps the students to create and connect the multiple tables and to have knowledge on Normalization Techniques.

Course Outcomes

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

CO	Course Outcome	Cognitive Level
CO1.	Apply constraints in tables.	Analysis (Level K4)
CO2.	Figure out the need and use of database in application development.	Application (Level K3)
CO3.	Apply the uses of database in application development.	Application (Level K3)
CO4.	Describe the concepts of triggers and cursors.	Synthesis(Level K5)
CO5.	Evaluate the concepts of triggers and cursors.	Synthesis(Level K5)

PROGRAM LIST

- DDL, DML, DCL Commands
- Logical, Comparison, Conjunctive & Arithmetic Operators.
- Retrieving rows with Characters functions:**
 - CONCAT (Concatenation)
 - REPLACE
 - SUBSTR (Substring)
 - LENGTH
- Retrieving rows with Aggregate functions:**
 - GROUP BY
 - HAVING
- Retrieving rows with date functions & number function:**
 - SYSDATE
 - ABS, FLOOR, CEIL, ROUND, POWER
- JOINS:**
 - Union, Intersection & Union all

- Simple Join
- Self-Join
- Outer Join

7. CONSTRAINTS:

- Domain Integrity (Not Null, Check)
- Entity Integrity (Unique & Primary Key)
- Referential Integrity (Foreign Key)

8. VIEW: PL/SQL

- 9. PL/SQL Programs with Control Structures
- 10. PL/SQL Programs with Exception Handling
- 11. PL/SQL Programs with Cursors
- 12. Creating & Calling Procedures

Mapping					
COs & POs	PO1	PO2	PO3	PO4	PO5
CO1	H	H	H	H	M
CO2	H	H	H	H	M
CO3	H	H	H	H	M
CO4	H	M	H	M	H
CO5	H	H	H	H	H

H-High;*M-Medium;****L-Low;**

ELECTIVE 1.1
COMPUTER GRAPHICS AND MULTIMEDIA

Hours:6**Credits :5****Semester: V****Preamble**

This course provides the students with the knowledge on concepts of Multimedia and various basic Graphical Techniques.

Course Outcomes

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

CO	Course Outcome	Cognitive Level
CO1.	Recollect the basic concept of Graphical techniques.	Knowledge (Level K1)
CO2.	Describe about the basic concept of Graphical techniques.	Knowledge (Level K1)
CO3.	Get the idea about transformations.	Comprehension (Level K2)
CO4.	Implement various Clipping algorithms.	Application (Level K3)
CO5.	Demonstrate Omni various data types of Multimedia.	Analysis(Level K4)

COURSE CONTENT

Unit - I:

Output Primitives: Points and Lines – Line - Drawing Algorithms – Loading the frame Buffer – Line function – Circle- Generating Algorithms. **Attributes of Output Primitives:** Line Attributes – Curve Attributes – Color and Grayscale Levels – Area-Fill Attributes – Character Attributes.

Unit – II:

Geometric Transformations: Basic Transformations – Matrix Representations and Homogeneous Coordinates – Composite Transformations – Other Transformations.

Unit - III:

Two Dimensional Viewing: The Viewing Pipeline – Viewing Co-ordinate Reference Frame – Window-to-Viewport Co-ordinate Transformation – 2D Viewing Functions – **Clipping Operations:** Point Clipping – Line Clipping: Cohen- Sutherland Line Clipping, Liang – Barsky Line Clipping – Curve Clipping – Text Clipping.

Unit - IV:

Text: Types of Text – Unicode Standard – Font – Insertion of Text – Text Compression – File Formats.

Image: Image Types – Seeing Color – Color Models.

Unit - V:

Audio : Introduction – Acoustics – Nature of Sound Waves – Fundamental characteristics of Sound – Microphone – Amplifier – Loudspeaker – Audio Mixer – Digital Audio.

Video: Analog Video Camera – Transmission of Video Signals – Video Signal Formats – Television Broadcasting Standards – PC Video - Video Editing – Video Editing Software.

TEXT BOOKS

- Donald Hearn, M.Pauline Baker, *Computer Graphics* 2nd Edition
- Rajan Parekh , *Principles of Multimedia* 2007, TMH

REFERENCE BOOK

- Foley, VanDam, Feiner, and hughes , *Computer graphics: principles and practice* 3rd edition

Mapping					
COs & POs	PO1	PO2	PO3	PO4	PO5
CO1	H	H	H	H	M
CO2	H	H	H	H	M
CO3	H	H	H	H	M
CO4	H	H	H	H	H
CO5	H	H	H	H	H

***H-High;**

M-Medium;

L-Low;

ELECTIVE 1.2

CLOUD COMPUTING

Hours:6**Credits :5****Semester: V****Preamble**

This course enables the students to learn and understand the fundamental concepts of Cloud and its services, and helps the students to understand the service oriented architecture in cloud database.

Course Outcomes

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

CO	Course Outcome	Cognitive Level
CO1.	Define cloud computing and get the idea about cloud architecture	Knowledge (Level K1) Comprehension (Level K2)
CO2.	Understand different cloud services	Knowledge (Level K1) Comprehension (Level K2)
CO3.	Interpret Cloud Services ,security, and architecture	Application (LevelK3)
CO4.	Examine cloud mail services	Application (LevelK3) Analysis(Level K4)
CO5.	Validate cloud services by using various cloud service provides such as, Amazon, Google and Microsoft	Synthesis(Level K5)

COURSE CONTENT**Unit - I:**

Introduction – Definition of Cloud – Cloud types – Characteristics of Cloud – Cloud standards – Measuring cloud's value – Early adopters and new applications - Laws of cloudonomics – Cloud obstacles – Cloud adoption – Cloud computing costs – Service level agreements – Licensing model - Cloud architecture: Cloud computing stack – Composability – Infrastructure – Platforms – Virtual appliances – Communication protocol – Applications – Connecting to cloud.

Unit - II:

Cloud Services: IaaS – PaaS – SaaS – IdaaS – CaaS - Abstraction and Virtualization: Virtualization technologies – Load balancing – Hypervisors – Machine imaging – Porting applications – Capacity planning: Baseline and Metrics – Measurements – System metrics – Load testing – Resource ceilings – Servers and Instance types – Network Capacity – Scaling.

Unit - III:

Exploring Platform as a Service (PaaS) : Service model – Development – Sites and tools – Application features - Exploring Cloud Infrastructures: Administrating the clouds – Management responsibilities – Life cycle management - Cloud management products – Cloud management standards – Cloud Security: Securing the Cloud – Securing the Data – Establishing identity and presence.

Unit - IV:

Service oriented architecture – Introduction – SOA communications – Managing and Monitoring SOA – Relating SOA and Cloud - Applications to the cloud : Functionality mapping – Applications attributes – Cloud service attributes – System abstraction – Cloud bursting – Applications and Cloud APIs – Cloud Storage: Measuring digital universe – Provisioning cloud storage – Cloud backup solutions – Cloud storage interoperability.

Unit - V:

Exploring cloud mail service – Syndicate services – Instant messaging – Collaboration technologies using social networking – Audio and Video streaming – VoIP applications – Mobile market – Smart phones with the cloud - Mobile Web service : Service types – Service discovery – SMS – Protocols – Synchronization.

TEXT BOOK

- Barrie Sosinsky, *Cloud Computing Bible*, Wiley Publications, 2011 (Unit I to V)

REFERENCE BOOKS

- Rountree, Castrillo, *The Basics of Cloud Computing - Understanding the Fundamentals of Cloud Computing in Theory and Practice*, First Edition, Syngress Publication, 2013
- Michael Miller, *Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online*, Que Publishing, 2008
- Srinivasan. S, *Cloud Computing Basics*, Springer, 2013

Mapping					
COs & POs	PO1	PO2	PO3	PO4	PO5
CO1	H	H	M	M	H
CO2	H	H	M	M	H
CO3	H	H	M	M	H
CO4	H	H	M	M	H
CO5	H	H	M	M	H

*H-High;

M-Medium;

L-Low;

ELECTIVE 1.3**PC MAINTENANCE AND TROUBLE SHOOTING****Hours:6****Credits:5****Semester: V****Preamble**

This course Facilitate the students to know the peripheral of computer and helps to do simple trouble shooting techniques.

Course Outcomes

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

CO	Course Outcome	Cognitive Level
CO1.	Keep in mind the peripherals, processors and configuration of the system	Knowledge (Level K1)
CO2.	Get an idea of installation, working principle and maintenance of secondary storage device	Knowledge (Level K1) Comprehension (Level K2)
CO3.	Deploy the different kinds of equipment for diagnose the problem and trouble shoot it	Application (Level K3)
CO4.	Acquire the knowledge on servicing the switches, cables and connectors.	Application (Level K3) Analysis(Level K4)
CO5.	Assembling a new system with standard hardware components.	Synthesis(Level K5)

COURSE CONTENT**Unit - I:**

The Basic Microcomputer System – Processor subsystem – 8086 processor – clock generator 8284 - Bus subsystem Bus controller 8288 – Latch 74LS373 – Transceiver 74LS245 – Memory subsystems – Decoder 74LS138 – DMA Controller 8237 – I/O subsystem – PPI 8255 – PIC 8259 – PIT 8253 – Tips and Trouble Shootings.

Unit - II:

Inside the IBM PC system unit - * power supply - cabling and connectors - *system board functions – system configuration.

Unit - III:

Peripherals – Memory peripherals - * Floppy disk drive – working principle – Removal and Installation – Cleaning and preventive maintenance – Floppy disk format – Winchester disk - *CRT working principle – IBM PC display adapter – printers – interface standards – Modems and Acoustic couplers – Trouble shooting keyboards.

Unit – IV:

Servicing – Switch Settings – Cables and connectors – Operation – post – preventive maintenance.

Unit - V:

Diagnostics and Trouble shooting – Test equipment – Login problem – oscilloscope.

TEXT BOOK

- Stuart M. Asser. Vincent J. Stigliano, Richard F. Bahrenburg, “*Microcomputer servicing practical system and Trouble Shooting*”, A Bell & Howell Information Company Columbus, 1990.

REFERENCE BOOK

- B. Govindrajalu, IBM PC & CLONES, Tata McGrawhill Publishers, IBM PC & CLONES

Mapping					
COs & POs	PO1	PO2	PO3	PO4	PO5
CO1	H	M	M	M	H
CO2	M	H	H	M	H
CO3	M	H	H	M	H
CO4	M	H	M	H	H
CO5	H	H	H	H	H

*H-High;

M-Medium;

L-Low;

ELECTIVE 2.1
INFORMATION SECURITY

Hours:6**Credits : 5****Semester : V****Preamble**

This Course enables the student to understand various methodology available for securing information and to learn about various Security Models.

Course Outcomes

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

CO	Course Outcome	Cognitive Level
CO1.	Get an idea about information Security basis, Security Investigation, Security Analysis, Security models and Security Physical Design	Knowledge (Level K1)
CO2.	Understand Security Investigation and Security Analysis,	Knowledge (Level K1) Comprehension (Level K2)
CO3.	Analyze Security models.	Application (Level K3) Analysis (Level K4)
CO4.	Figure out the Physical design of the Security	Analysis (Level K4)
CO5.	Evaluate the Security and Analysis process.	Synthesis(Level K5)

COURSE CONTENT

Unit - I:

Information Security Basics: INTRODUCTION -History, What is Information Security?, Critical Characteristics of Information, NSTISSC Security Model, Components of an Information System, Securing the Components, Balancing Security and Access, The SDLC, The Security SDLC

Unit - II:

Security Investigation : SECURITY INVESTIGATION - Need for Security, Business Needs, Threats, Attacks, Legal, Ethical and Professional Issues.

Unit - III:

Security Analysis : SECURITY ANALYSIS-Risk Management: Identifying and Assessing Risk, Assessing and Controlling Risk

Unit - IV:

Security Models: LOGICAL DESIGN-Blueprint for Security, Information Security Policy, Standards and Practices, ISO 17799/BS 7799, NIST Models, VISA International Security Model, Design of Security Architecture, Planning for Continuity

Unit - V:

Security Physical Design : PHYSICAL DESIGN-Security Technology, IDS, Scanning and Analysis Tools, Cryptography, Access Control Devices, Physical Security, Security and Personnel.

TEXT BOOK

- Michael E Whitman and Herbert J Mattord, "*Principles of Information Security*", Vikas Publishing House, New Delhi, 2003

Mapping					
COs & POs	PO1	PO2	PO3	PO4	PO5
CO1	H	H	H	M	H
CO2	H	H	M	M	M
CO3	H	H	M	H	M
CO4	H	H	H	H	M
CO5	H	H	H	H	H

***H-High;**

M-Medium;

L-Low;

ELECTIVE 2.2

BIG DATA ANALYTICS

Hours:6**Credits : 5****Semester : V****Preamble**

This Course helps the students to understand the basic concepts of big data, methodologies for analyzing structured and unstructured data with emphasis on the relationship between the Data Scientist and the business needs.

Course Outcomes

On successful completion of the course, the student will able to

CO	Course Outcome	Cognitive Level
CO1.	Understand the of big concepts of Big data techniques, environment and Hadoop Ecosystem	Knowledge (Level K1) Comprehension (Level K2)
CO2.	Apply statistical data analysis and tools to manage and analyze the bid data	Comprehension (Level K2) Application (Level K3)
CO3.	Analyze Hadoop components and their uses for big data processing	Application (Level K3) Analysis (Level K4)
CO4.	Examine the impact of big data for business decisions and strategy	Analysis (Level K4)
CO5.	Manage large-scale analytics tools to solve some open big data problems	Synthesis(Level K5)

COURSE CONTENT**Unit - I:**

Introduction to Big Data Platform - Challenges of Conventional Systems - Intelligent data analysis - Nature of Data - Analytic Processes and Tools - Analysis Vs reporting - Modern Data Analytic Tools - Statistical Concepts: Sampling Distributions -ReSampling- Statistical Inference – Prediction Error.

Unit - II:

Introduction To Streams Concepts - Stream Data Model and Architecture - Stream Computing - Sampling Data in a Stream - Filtering S reams - Counting Distinct Elements in a Stream - Estimating Moments - Counting Oneness in a Window - Decaying Window - Real time Analytics Platform(RTAP) Applications - Case Studies - Real Time Sentiment Analysis, Stock Market Predictions.

Unit -III:

History of Hadoop- The Hadoop Distributed File System - Components of Hadoop Analyzing the Data with Hadoop- Scaling Out- Hadoop Streaming- Design of HDFSJava interfaces to HDFS Basics- Developing a Map Reduce Application-How Map Reduce Works-Anatomy of a Map Reduce Job run- Failures-Job Scheduling-Shuffle and Sort - Task execution - Map Reduce Types and Formats- Map Reduce Features

Unit - IV:

Setting up a Hadoop Cluster - Cluster specification - Cluster Setup and Installation - Hadoop Configuration-Security in Hadoop - Administering Hadoop - HDFS - Monitoring- Maintenance-Hadoop benchmarks- Hadoop in the cloud

Unit - V:

Applications on Big Data Using Pig and Hive - Data processing operators in Pig - Hive services - HiveQL - Querying Data in Hive - fundamentals of HBase and ZooKeeper - IBM InfoSphereBigInsights and Streams. Visualizations - Visual data analysis techniques, interaction techniques; Systems and applications

TEXT BOOK

- Michael Berthold, David J. Hand, *"Intelligent Data Analysis"*, Springer,2007.
- Tom White *"Hadoop: The Definitive Guide"* Third Edition, O'reilly Media,2012.
- Chris Eaton, Dirk DeRoos, Tom Deutsch, George Lapis, Paul Zikopoulos, *"Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data"*, McGrawHill Publishing,2012
- AnandRajaraman and Jeffrey David Ullman, *"Mining of Massive Datasets"*, Cambridge University Press,2012.
- Bill Franks, *"Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics"*, JohnWiley & sons,2012.

Mapping					
COs & POs	PO1	PO2	PO3	PO4	PO5
CO1	H	H	H	H	H
CO2	H	H	M	M	H
CO3	H	H	M	H	H
CO4	M	H	M	M	H
CO5	H	H	H	H	H

*H-High;

M-Medium;

L-Low;

ELECTIVE 2.3
PRINCIPLES OF COMPILER DESIGN

Hours : 6**Credits : 5****Semester: V****Preamble**

This course offers knowledge about concepts and principles of compiler design. It also provide basic understanding of grammars, language definitions and phases of designing compiler.

Course Outcomes

On successful completion of the course, the student will able to

CO	Course Outcome	Cognitive Level
CO1.	Examine the basic function of compiler and interpreter	Comprehension (Level K2)
CO2.	Understand the core concepts of phases of compiler	Comprehension (Level K2)
CO3.	Apply Context Free Grammar for simplify the expression using different kinds of parsers	Application (Level K3)
CO4.	Interpret the code generation and optimization process	Analysis (Level K4) Synthesis(Level K5)
CO5.	Design a simple code generator.	Analysis (Level K4)

COURSE CONTENT

Unit - I:

Introduction: The structure of a Compiler – Compilers writing tools- The lexical and Syntactic Structure of a language – The role of the lexical analyzer – The design of lexical analyzers – Regular expressions – Finite automata.

Unit - II:

Context-free Grammars – Derivation and parse trees – Capabilities of Context Free Grammars – Parses – Shift Reduce parsing - Operators Precedence Parsing – Top-down parsing – Predictive parsers.

Unit - III:

LR Parsers – The canonical collection of LR (0) Items – Constructing SLR Parsing tables – **Symbol tables:** Data structure for Symbol tables

Unit - IV:

Syntax-Directed Translation: Syntax-Directed Translation schemes –Implementation of Syntax-directed translators – Intermediate code – Postfix notation – Parse trees and syntax trees– Three-address code, quadruples and triples – Translation of assignment statements – Boolean expressions

Unit - V:

Introduction To Code Optimization: The Principal source of optimization – Loop optimization – The DAG Representation of Basic Blocks – **Code Generation:** Problems in code generation – A Simple code generator

TEXT BOOK

- Alfred V. Aho Ravi Sethi Jeffrey D.Ullman , “*Principles of Compiler Design*” , Published by Narosa Publishing House.

REFERENCE BOOK

- Kennet C.Louden, “*Compiler Construction:Principles and Practice*”

Mapping					
COs & POs	PO1	PO2	PO3	PO4	PO5
CO1	H	H	M	M	H
CO2	M	H	M	H	H
CO3	H	H	M	M	M
CO4	H	H	M	H	M
CO5	H	H	H	H	H

*H-High;

M-Medium;

L-Low;

SKILL BASED COURSE V
MUCSAC5 - ADVANCED COMPUTING TECHNOLOGIES

Hours: 2**Credits : 2****Semester : V****Preamble**

This course offers knowledge about the basics of Grid, cloud, green computing ,neural network, basis of Fuzzy logic, fuzzy relations, fuzzy inference system and defuzzification techniques.

Course Outcomes

On successful completion of the course, the student will able to

CO	Course Outcome	Cognitive Level
CO1.	Describe the nature and its applications of Grid, Cloud, Green, Soft computing.	Knowledge (Level K1)
CO2.	Discuss the nature and its applications of Grid, Cloud, Green, Soft computing.	Comprehension (Level K2)
CO3.	Illustrates the basis of fuzzy logic, fuzzy relations and defuzzification techniques.	Application (Level K3)
CO4.	Apply the basis of fuzzy logic, fuzzy relations and defuzzification techniques.	Application (Level K3)
CO5.	Acquire knowledge about architecture of Grid and Cloud Computing	Analysis (Level K4)

COURSE CONTENT

Unit - I: Grid Computing

Concepts and Architecture: Introduction - Parallel and Distributed Computing - Cluster computing
Grid computing - Anatomy and physiology of Grid - Review of web services – OGSA – WSRF

Unit - II: Cloud Computing

Examining the Value Proposition: Defining Cloud Computing - Understanding Cloud Architecture
- Understanding Services and Applications by Type

Unit - III: Green Computing

The Importance of Green IT: The Growing Significance of Green IT and Green Data Centers -All Companies Can Take Basic Steps Toward Green IT. The Basics of Green IT: Important Steps for Green IT - Tools for IT Energy Measurement, Monitoring, and Management.

Unit - IV: Neural Network

Neural Networks : Fundamentals of Neural Networks – Basic Concepts of Neural Networks – Model of an Artificial Neuron – Neural Network Architecture – Characteristics of Neural Network – Learning Methods – Taxonomy of Neural Network Architecture – Back Propagation Network – Architecture of Back Propagation Network – Back Propagation Learning

Unit - V: Fuzzy Logic

Fuzzy Set Theory: Crisp Sets – Fuzzy Sets – Crisp Relations – Fuzzy Relations – Fuzzy Systems: Crisp Logic – Predicate Logic – Fuzzy Logic – Fuzzy Rule Based System –Defuzzification Method - Applications

TEXT BOOK

- Maozhen Li, Mark Baker - John Wiley & Sum , “*The Grid: Core Technologies*” 2005 (UNIT I)
- Barrie Sosinky , “*Cloud Computing Bible*”, Wiley Publishing Inc, 2011(UNIT II)
- John Lamb, “*The Greening of IT: How Companies Can Make a Differencefor the Environment*” (UNIT III)
- S.Rajasekaran and G.A.Vijayalakshmi Pai (2011).*Neural Networks,Fuzzy Logic and Genetic Algorithms Synthesis and Application*, Prentice Hall of India,Pvt. Ltd. (UNIT IV & V)

Mapping					
COs & POs	PO1	PO2	PO3	PO4	PO5
CO1	H	H	M	M	H
CO2	H	H	H	M	M
CO3	H	H	M	M	H
CO4	H	M	H	M	H
CO5	H	H	H	H	H

*H-High;

M-Medium;

L-Low;

CORE PAPER XVI
MUCSC9 - COMPUTER NETWORKS

Hours: 6**Credits: 5****Semester: VI****Preamble**

This Course imparts knowledge on network concepts like layers wireless concepts, transmission and security .It give knowledge on networking technologies like broadband and Bluetooth.

Course Outcomes

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

CO	Course Outcome	Cognitive Level
CO1.	Recall the networking concepts, Transmission media and OSI layers of Network.	Knowledge (Level K1) Comprehension (Level K2)
CO2.	Compare OSI & TCP/IP models.	Knowledge (Level K1) Comprehension (Level K2)
CO3.	Deploy the elementary Data link protocols.	Application (Level K3)
CO4.	Interpret various Routing algorithms.	Application (Level K3) Analysis (Level K4)
CO5.	Review transport service and Transmission control protocol like DNS, E-mail.	Synthesis(Level K5)

COURSE CONTENT**Unit - I:**

Introduction: Uses of Computer Networks – Network Hardware: LAN- MAN – WAN- Wireless Networks –Network Software – Reference Models: OSI – TCP/IP- Comparison of OSI and TCP/IP.

Unit - II:

Physical Layer : Guided Transmission Media: Magnetic Media – Twisted Pair – Coaxial Cable – Fiber Optics – Wireless Transmission : Electromagnetic Spectrum – Radio Transmission – Microwave – Infrared and Millimeter – Lightwave Transmission – Telephone Network: Structure of the Telephone System - Switching - Communication Satellites.

Unit - III:

Data Link Layer: Services Provided to the Network Layer- Framing- Error Control – Flow Control- Error Detection and Correction - Elementary Data Link Protocols: An Unrestricted Simplex Protocol- A

Simplex Stop-and-Wait Protocol- A Simplex Protocol for a Noisy Channel- Sliding Window Protocols: A One-Bit Sliding Window Protocol- A Protocol Using Go Back N- A Protocol Using Selective.

Unit - IV:

Network Layer: Network Layer Design Issues- Routing Algorithms: The Optimality Principle- Shortest Path Routing- Flooding- Distance Vector Routing- Link State Routing- Hierarchical Routing- Routing for mobile Hosts - Broadcast Routing- Multicast Routing.

Unit - V:

Transport Layer: The Transport Service: Services Provided to the Upper Layers-Transport Service Primitives- Elements of Transport Protocols: Addressing- Connection Establishment- Connection Release- Flow Control and Buffering -Multiplexing.

Application Layer: DNS- The Domain Name System: The DNS Name Space- Resource Records- Name Servers- Electronic Mail: Architecture and Services- The User Agent- Message Formats- Message Transfer.

TEXT BOOK

- Andrew S.Tanenbawm PHI , *Computer Network*, III Edition, 1996.

REFERENCE BOOK

- BehrouzA.Forouzan , *Data Communications and Networking*, Four EditionTMH,2006.

Mapping					
COs & POs	PO1	PO2	PO3	PO4	PO5
CO1	H	H	M	H	H
CO2	H	H	M	M	H
CO3	H	H	M	M	H
CO4	H	H	M	M	H
CO5	H	H	M	H	H

*H-High;

M-Medium;

L-Low;

CORE PAPER XVII**MUCSC10 - SOFTWARE ENGINEERING****Hours:5****Credits : 4****Semester : VI****Preamble**

This course facilitate the students to know the concept of computer based system and products and to present the role of software, system analysis, design concepts, testing methods and strategies.

Course Outcome

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

CO	Course Outcome	Cognitive Level
CO1.	Recollect the basic terminologies and requirement for software development.	Knowledge (Level K1)
CO2.	Comprehend the core concepts of life cycle models.	Knowledge (Level K1) Comprehension (Level K2)
CO3.	Figure out the Data flow Diagram.	Application(Level K3)
CO4.	Apply the cost & size estimation Techniques and maintenance cost.	Comprehension (Level K2) Analysis (Level K4)
CO5.	Evaluate the software through various testing methods.	Synthesis (Level K5)

COURSE CONTENT**Unit - I:**

The Evolving Role of Software – Definition of Software Engineering – The Changing Nature of Software – Software Myths – Terminologies – Software Life Cycle Models: Build and Fix Model – Evolutionary Process Models – Selection of a Life Cycle Model.

Unit - II:

Requirements: Analysis and Specifications: Type of Requirements – Feasibility Studies – Requirement Elicitation: interviews, brain storming sessions, FAST – Requirement analysis: Data flow diagram, Data Dictionaries - Requirements Validation

Unit - III:

Project Planning: Size Estimation – The Constructive Cost Model (COCOMO) – The Putnam Resource Allocation Model.

Unit - IV:

Software Design: Design: Conceptual and Technical designs, Objectives of design – Modularity - Function Oriented Design – Software reliability: Basic concepts, software reliability, maturity levels - Software Testing: A Strategic Approach to Software Testing – Testing – Functional Testing – Structural Testing – Levels of Testing – Validation Testing.

Unit - V:

Software Maintenance: Categories of Maintenance – Problems during Maintenance – Maintenance is Manageable – Potential Solutions to maintenance problems – Maintenance process – Estimation of maintenance cost

TEXT BOOK

- K.K.Agarwal , “*Software Engineering*”, Third Edition 2008

REFERENCE BOOK

- Richard e.Fairley , “*Software Engineering Concepts*”, McGrawHill,

Mapping					
COs & POs	PO1	PO2	PO3	PO4	PO5
CO1	H	H	H	M	H
CO2	H	H	H	M	H
CO3	H	H	H	H	H
CO4	H	H	M	M	H
CO5	H	H	H	M	H

*H-High;

M-Medium;

L-Low;

CORE PAPER XVIII
MUCSPR- PROJECT WORK

Hours:7**Credits : 4****Semester: VI****Preamble**

This course motivate the Students to work in emerging/latest technologies, help the students to develop ability, to apply theoretical and practical tools/techniques to solve real life problems related to industry, academic institutions and research laboratories.

Course Outcomes

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

CO	Course Outcome	Cognitive Level
CO1.	Understand the problem.	Comprehension (Level K2)
CO2.	Implement & execute the real time application.	Application(Level K3)
CO3.	Apply& execute the real time application.	Application(Level K3)
CO4.	Analyze various testing methods.	Analysis (Level K4)
CO5.	Verify the expected results in real time applications.	Synthesis (Level K5)

COURSE CONTENT

The project is of 7 hours/week for one (semester VI) semester duration and a student is expected to do planning, analyzing, designing, coding, and implementing the project. The initiation of project should be with the project proposal. The synopsis approval will be given by the project guides.

The project proposal should include the following:

- *Title*
- *Objectives*
- *Details of modules and process logic*
- *Limitations of the project*
- *Tools/Platforms, Languages to be used*
- *Sample Coding and Screenshots*
- *Conclusion*

For the project work, the guide (internal) evaluate the work for 40 marks based on the performance of the candidates during the development of the project and the external examiner will evaluate the project work for 60 marks.

The Project work should be either an individual one or group of not more than two members

Mapping					
COs & POs	PO1	PO2	PO3	PO4	PO5
CO1	M	H	H	H	H
CO2	H	H	H	H	H
CO3	H	H	H	H	M
CO4	H	H	M	H	M
CO5	H	H	H	H	H

***H-High;**

M-Medium;

L-Low;

ELECTIVE 3.1
DIGITAL IMAGE PROCESSING

Hours:6**Credits: 5****Semester: VI****Preamble**

This course helps the students to understand the fundamentals steps in Digital image processing and to inculcate knowledge on image compression and image segmentation.

Course Outcomes

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

CO	Course Outcome	Cognitive Level
CO1.	Recollect the various types of data in Multimedia.	Knowledge (Level K1)
CO2.	Understand the fundamental elements of DIP and representation of an image in multi-dimensional aspects.	Knowledge (Level K1) Comprehension (Level K2)
CO3.	Apply arithmetic and logical operations for image enhancement process.	Application (Level K3)
CO4.	Interpret the knowledge on compression techniques for security of an image.	Analysis (Level K4)
CO5.	Verify various deduction mechanisms in image segmentation.	Synthesis(Level K5)

COURSE CONTENT

Unit - I:

Digital Image Processing: Definition – The Origin of Digital Image Processing – Elements of digital image processing – Steps involved in DIP – Fundamental Steps in DIP – Structure of the Human Eye – Brightness Adaptation and Discrimination – Image Acquisition using a single sensor – Image Acquisition using sensor arrays.

Unit - II:

Basic concepts in image sampling and Quantization – Representing Digital Images – Spatial and Gray level resolution – Zooming and shrinking digital images – Neighbors of a pixel – Adjacency, Connectivity – Regions and Boundaries – Distance Measures, Image Operations on a pixel basis.

Unit - III:

Image Enhancement in Spatial Domain – Gray level transformation – Image Negatives – Log Transformations – Enhancements using arithmetic/logical operations – Image Subtraction – Image Averaging.

Unit - IV:

Image Compression: Coding Redundancy – Inter pixel redundancy – Psycho visual redundancy – Image compression models – The source encoder and decoder – The channel Encoder and Decoder.

Unit - V:

Image Segmentation: Detection of discontinuous – Point detection – Line Detection – Edge Detection – Representation of Images: Chain Codes – Polygonal approximation – Signatures – Boundary segments – Skeletons.

TEXT BOOK

- Rafael C. Gonzalez & Richard. E. Woods Addison , *Digital Image Processing* – Wesley publishing Company Inc.(Third Indian Reprint, 2000).

REFERENCE BOOKS

- Anil K.Jain, "*Fundamentals Digital Image Processing*", Pearson Education.
- B.Chandra and D.Dutta Majundar, "*Digital Image Processing and Analysis*", Prentice Hall of India private Ltd., New Delhi.

Mapping					
COs & POs	PO1	PO2	PO3	PO4	PO5
CO1	H	H	H	M	M
CO2	H	H	H	H	M
CO3	H	H	H	H	M
CO4	H	H	H	H	M
CO5	H	H	H	H	M

*H-High;

M-Medium;

L-Low;

ELECTIVE 3.2

BUSINESS INTELLIGENCE

Hours:6**Credits: 5****Semester: VI****Preamble**

This course provide the students to help in justifying the knowledge management and business Intelligence investments and explains Knowledge Creation and Business Intelligence, Knowledge, Portal Technologies in knowledge management

Course Outcomes

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

CO	Course Outcome	Cognitive Level
CO1.	Recollect Knowledge Management ,KM System Life Cycle, Knowledge creation, Changing Business Environments and Implementing BI	Knowledge (Level K1)
CO2.	Understand the basic concepts of Knowledge Management	Knowledge (Level K1) Comprehension (Level K2)
CO3.	Acquire knowledge on KM System Life Cycle and, Changing Business Environments	Comprehension (Level K2) Application (Level K3)
CO4.	Define development of a model, representation of input data, data mining process, analysis, methodologies, data validation ,data transformation, data reduction.	Analysis (Level K4)
CO5.	Implement relational marketing, sales force management optimization models for logistics planning, efficiency measures, efficient frontier, the CCR Model	Synthesis(Level K5)

COURSE CONTENT

Unit - I:

Introduction: Basics - What is Knowledge Management? - Key Challenges - KM Life Cycle - Understanding Knowledge – Definitions - Cognition and Knowledge Management - Data, Information, and Knowledge - Types of Knowledge - Expert Knowledge

Unit - II:

Knowledge Management System Life Cycle: Knowledge Management System Life Cycle - Challenges in Building KM Systems - Conventional Versus KM System Life Cycle - KM System Life Cycle - System Justification – Role of Rapid Prototyping - Role of Knowledge Developer – User Training.

Unit - III:

Knowledge Creation: Knowledge Creation – Nonaka's Model of Knowledge Creation and Transformation - Knowledge Architecture - Capturing Tacit Knowledge – Evaluating the Expert – Developing a relationship with Expert – Interview as a tool – Brainstorming – Repertory Grid - Nominal-Group Techniques(NGT) – Delphi method – Concept mapping Knowledge Codification – Codification Tools and Procedures - Knowledge Developers Skill Set – Knowledge Transfer - Transfer Methods - Portals Basics - Business Challenge - Knowledge Portal Technologies - Ethical and Legal Issues – Knowledge Owners - Legal Issues.

Unit - IV:

Changing Business Environments: Changing Business Environments and Computerized Decision Support – A Framework for Business Intelligence - Intelligence Creation and Use and BI Governance – Transaction Processing versus Analytic Processing - Successful BI Implementation - Major Tools and Techniques of Business Intelligence.

Unit - V:

Implementing BI: Implementing BI: An Overview - BI and Integration Implementation - Connecting BI Systems to Databases and Other Enterprise Systems - On-Demand BI - Issues of Legality, Privacy, and Ethics -Emerging Topics in BI:An Overview - The Web 2.0 Revolution - Online Social Networking: Basics and Examples - Virtual Worlds - Social Networks and BI: Collaborative Decision Making - RFID and New BI Application Opportunities – Reality Mining.

TEXT BOOKS

- Elias M.Awad, Hassan M.Ghaziri, "*Knowledge Management*", Pearson Education, 2004, (Units I, II and III).
- Efraim Turban, Ramesh Sharda, Dursun Delen and David King, "*Business Intelligence*" 2nd Edition, 2010. (Unit IV – Chapter 1, Unit – V -Chapter 6).

Mapping					
COs & POs	PO1	PO2	PO3	PO4	PO5
CO1	M	H	H	M	M
CO2	M	H	H	H	M
CO3	M	H	H	H	H
CO4	H	M	H	M	H
CO5	H	H	H	H	H

H-High;*M-Medium;****L-Low;**

ELECTIVE 3.3

MOBILE COMPUTING

Hours:6**Credits: 5****Semester: VI****Preamble**

This course helps the students to know about the information access device, and to impart knowledge on Internet protocols and formats and it offer concepts of wireless Technology.

Course Outcomes

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

CO	Course Outcome	Cognitive Level
CO1.	Gain and understand the concepts of communication medium and multiplexing in telephone network	Knowledge (Level K1) Comprehension (Level K2)
CO2.	Comprehend the routing mechanism and frequency allocation in GSM	Comprehension (Level K2)
CO3.	Deploy the GPRS concepts for packet data transfer in mobile by using GPRS	Analysis (Level K4) Synthesis(Level K5)
CO4.	Acquire the knowledge of WAP,CDMA,3G network and spectrum technologies in wireless network.	Comprehension (Level K2) Application (Level K3)
CO5.	Acquire the knowledge on social media integration.	Synthesis(Level K5)

COURSE CONTENT**Unit - I:**

Information Access Devices – Handheld Computers – Palm OS – Based Devices Windows CE – Based Handheld Computers – EPOC Based Handheld Computers – S Notebooks – Phones – Cellular Phones – Data transmission capabilities – Smart Phones Screen Phones.

Unit - II:

Smart Identification – Smart Cards – Smart Labels – Smart Tokens – Embedded Controls – Smart Sensors and Actuators – Smart Appliances and home networking – Automotive computing.

Unit - III:

Internet Protocols and Formats: HTTP – HTML – XML – Xforms – Mobile Internet – WAP 1.1 Architecture – Wireless Application Environment 1.1 – WAP 2.0 Architecture – i-node.

Unit - IV:

Voice: Voice Technology Trends – Voice on the web – Standardization.

Unit - V:

Connectivity – Wireless Wide Area Networks – Short Range Wireless Communication.

TEXT BOOK

- Uwe Hansmann, Lothar Merk, Martin S.Nicklous, Thomas Stober, Springer , *Principles of Mobile Computing* — Second Edition – 2003.

REFERENCE BOOK

- Gordan L.Stober *Principles of Mobile communication*, 2nd edition, Springer science

Mapping					
COs & POs	PO1	PO2	PO3	PO4	PO5
CO1	M	H	M	M	M
CO2	H	H	M	M	M
CO3	H	H	M	H	H
CO4	H	H	M	H	H
CO5	H	H	H	H	H

***H-High;**

M-Medium;

L-Low;

SKILL BASED COURSE VI**MUCSSS6 - SOFT SKILLS****Hours:2****Credits :2****Semester: VI****Preamble**

This course offers the students to develop the reading, writing, understanding and communication skills for employment.

Course outcomes

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

CO	Course Outcome	Cognitive Level
CO1.	Describe the reading, writing, listening and communication skills.	Knowledge (Level K1)
CO2.	Discuss the reading, writing, listening and communication skills.	Comprehension (Level K2)
CO3.	Dramatize the day today activities with the help of soft skills.	Application (Level K3)
CO4.	Acquiring the necessary employability skills	Application (Level K3)
CO5.	Analyze and improve the skills for employability.	Analysis (Level K4)

COURSE CONTENT**Unit - I:**

- 1.1. Skills in Listening and Writing
- 1.2. Skills in Reading and Understanding

Unit - II:

- 2.1. Skills to Read and Respond to Instructions
- 2.2. Skills of Interpretation and Transcoding Information

Unit - III:

- 3.1. Skills in Seeking and Responding to Information
- 3.2. Skills of Day-to-Day communication

Unit - IV:

- 4.1. Grammatical skills and Spelling rules
- 4.2. Career skills

Unit - V:

- 5.1. Skills of formal and in-formal expressions
- 5.2. Skills of non-verbal communication

TEXT BOOK

- *Soft Skills for Linguistic Communication* by Trinity Publication in Thiruvalluvar University

Mapping					
COs & POs	PO1	PO2	PO3	PO4	PO5
CO1	H	H	H	M	M
CO2	H	H	H	M	M
CO3	H	H	H	M	M
CO4	H	M	H	M	H
CO5	H	H	H	H	H

***H-High;**

M-Medium;

L-Low;

NON MAJOR ELECTIVE -II
MUCSN2 - COMPUTER FOR DIGITAL ERA
(Offered to other department Students)

Hours: 2**Credits : 2****Semester : VI****Preamble**

This course helps the students to know about the Computer Fundamentals, Networks and E-Governances .

Course Outcomes

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

CO	Course Outcome	Cognitive Level
CO1.	Describe about computer and apply the computing technology in their day to day life.	Knowledge (Level K1)
CO2.	Get an idea about computer and apply the computing technology in their day to day life.	Application (Level K3)
CO3.	To Know digital India initiatives to their surroundings.	Application (Level K3)
CO4.	Create awareness regarding digital India initiatives to their surroundings.	Application (Level K3)
CO5.	Apply digital India initiatives to their surroundings.	Application (Level K3)

COURSE CONTENT**Unit - I:**

FUNDAMENTALS OF COMPUTERS : The role of computers in the modern society – Types of Computers and their specifications – Server – Desk Top Computers - Lap Top – Tablet – Smart Phones - Block diagram of Digital Computer –Working Principle of Computer, I/O Devices – Central Processing Unit – Types of Memory - Display – Port – UPS – Setting up and Maintenance of Computer.

Unit - II:

TYPES OF SOFTWARE : Types of Software with examples – System Software – Application Software – Utility Software - Operating System – Basics on Windows – Introduction to Android – Application - Software - Free Open source software – Database and its applications.

Unit - III:

Introduction to computer networks – LAN – WAN – MAN – Wired and wireless network – WiFi Networks - Network Devices – Modem – Switch – Router – Broad Band – Leased Lines Internet – WWW – URL- Browser – e-mail – SMS – MMS - Client Server Computing

Unit - IV:

E GOVERNANCE IN INDIA - E-Governance initiative by the Government – Digital India Platform – Agencies enabling Digital India - Electronic Payment and Receipt – Digital Locker – e-district service – electronic signature service – Digital AIIMS – India BPO Scheme – Integrated Nutrient Management – GIS – Mobile Seva App Store- GARV- Grameen Vidyutikaran.

Unit - V:

E -LEARNING AND MOOC-E – Learning – Digital Library – E- Journals – Introduction to MOOC – Edex – Course era etc -SWAYAM – NPTEL – Cyber Security – Virus – Malware – Network Security - Hacking – Big Data – Data Analytics – Social Networks – Social Media Analytics- Introduction to IT Act.

TEXT BOOK

E- Materials of Manonmaniam Sundaranar University on “*Computer for Digital Era*”,

Mapping					
COs & POs	PO1	PO2	PO3	PO4	PO5
CO1	H	H	H	H	M
CO2	H	H	H	H	H
CO3	M	H	H	M	M
CO4	H	M	H	M	H
CO5	H	H	H	H	H

***H-High;**

M-Medium;

L-Low;

EXTRA CREDIT PAPERS**1.IoT (Internet of Things)****Semester: I****Credits :2****Marks :100****Preamble**

This course helps the students to know Internet of Things

Course Outcomes

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

CO	Course Outcome	Cognitive Level
CO1.	Gain and understand the concepts of Internet of Things	Knowledge(Level K1)
CO2.	Analyze basic protocols in wireless sensor network	Knowledge(Level K1)
CO3.	Understand the application areas of IOT.	Comprehension (Level K2)
CO4.	Implement interfacing of various network & communication aspects	Analysis(Level K4)
CO5.	Evaluate the various state of the art methodologies	Synthesis(Level K5)

COURSE CONTENT**Unit - I: INTRODUCTION TO IOT**

Defining IoT, Characteristics of IoT, Physical design of IoT, Logical design of IoT, Functional blocks of IoT, Communication models & APIs

Unit - II: IOT & M2M

Machine to Machine, Difference between IoT and M2M, Software define Network

Unit - III: NETWORK & COMMUNICATION ASPECTS

Wireless medium access issues, MAC protocol survey, Survey routing protocols, Sensor deployment & Node discovery, Data aggregation & dissemination

Unit - IV: CHALLENGES IN IOT

Design challenges, Development challenges, Security challenges, Other challenges

Unit - V: DOMAIN SPECIFIC APPLICATIONS OF IOT

Home automation, Industry applications, Surveillance applications, Other IoT applications

REFERENCE BOOKS

- Vijay Madisetti, Arshdeep Bahga, “Internet of Things: A Hands – On Approach”
- Waltenegus Dargie, Christian Poellabauer, ”Fundamentals of Wireless Sensor Networks: Theory and Practice”

Mapping					
COs & POs	PO1	PO2	PO3	PO4	PO5
CO1	H	H	M	H	H
CO2	H	H	H	H	H
CO3	M	H	H	M	M
CO4	H	M	H	M	H
CO5	H	H	H	H	H

H-High;*M-Medium;****L-Low;**

EXTRA CREDIT PAPERS**2.TALLY****Semester: III****Credits :2****Marks : 100****Preamble**

This course facilitate the students to inculcate knowledge on creation, alteration, accounting voucher entries in Tally.

Course Outcomes

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

CO	Course Outcome	Cognitive Level
CO1.	Get idea about creation and alteration of company profile	Knowledge (Level K1)
CO2.	Understand and apply various accounting voucher entries	Application (Level K3) Knowledge (Level K1)
CO3.	Acquire the knowledge in bank reconciliation statement preparation and stock summary.	Comprehension (Level K2)
CO4.	Designed to impart knowledge regarding concepts of Financial Accounting.	Application (Level K3)
CO5.	Required skills and can also be employed as Tally data entry operator.	Analysis (Level K4)

COURSE CONTENT**PROGRAM LIST**

1. Company Creation & Accounts master creation
2. Voucher Entry (2 Programs)
3. Day Book preparation
4. Preparation of Trial Balance
5. Preparation of Final Accounts (Profit & Loss A/c & Balance Sheet)
6. Stock Group & Stock item creation
7. Making voucher entries with Inventory details

Mapping					
COs & POs	PO1	PO2	PO3	PO4	PO5
CO1	M	H	H	M	H
CO2	M	M	H	M	H
CO3	M	H	H	M	M
CO4	H	M	H	M	H
CO5	H	H	H	H	H

H-High;*M-Medium;****L-Low;**

EXTRA CREDIT PAPERS**3.MOOC****Semester: V****Credits:2****Marks :100****Preamble**

This course motivate the students to learn online course

Course Outcome

At the end of the course ,the students will able to gain the knowledge in the specific area and get a online certificate

CO	Course Outcome	Cognitive Level
CO1.	Understand and use the web services available in Internet	Knowledge (Level K1) Comprehension (Level K2)
CO2.	Know the web resources in Internet.	Analysis (Level K4)
CO3.	Interpret usage of Online courses.	Synthesis (Level K5)
CO4.	Know the available course content of the new technologies.	Analysis (Level K4)
CO5.	Get an idea of New technologies.	Application(Level K3)

VALUE ADDED COURSE
HARDWARE AND TROUBLE SHOOTING

Programme: UG**Subject :** All Subjects**Course Type:** Value Added Course – I**Contact Hours:** 30**Course:** Hardware and Troubleshooting**CIA:** 100**Course Outcomes:**

CO	Course Outcomes	Cognitive Level
CO1.	Obtaining knowledge of troubleshoot the hardware components of a computer.	Knowledge (Level K1)
CO2.	Comprehending the troubleshooting techniques for storage devices, input and output devices.	Comprehension (Level K2)
CO3.	Applying the troubleshooting techniques for hardware failures.	Application (Level K3)
CO4.	Examining the troubleshooting techniques in Network, Printers and Mother board.	Analysis (Level K4)
CO5.	Assembling a new system with standard hardware component	Synthesis (Level K5)

COURSE CONTENT

Unit - I: Introduction:

Mother boards & its types-ports, slots, connectors, add on cards, power supply units and cabinet types.

Unit - II: Storage Devices.

Primary & Secondary storage medium-magnetic disc, RAM, ROM, PROM, EPROM, Floppy, CD-ROM,CD-R/W, DVD.

Unit - III: Hardware Troubleshooting:

Printers, Floppy drive, Microphone.

Unit - IV: Hardware Troubleshooting:

Scanner, Network, Hardware failure, Testing,CMOS, CDRom, Hard disk drive

Unit - V: Hardware Troubleshooting:

Monitor, Mother Board, Sound Card, Video Card.

TEXT BOOK:

- Stephen J. Bigelow, —Trouble Shooting, maintaining and Repairing PCs, Tata McGraw-Hill, New Delhi, 2001.

REFERENCE BOOKS:

- Craig Zacker & John Rourke, —The Complete Reference: PC Hardware, Tata McGraw-Hill, New Delhi, 2001.
- Mike Meyers, —Introduction to PC Hardware and Trouble Shooting, Tata McGraw-Hill, New Delhi, 2003.
- B. Govindarajulu, —IBM PC and Clones Hardware Trouble Shooting and Maintenance, Tata McGraw-Hill, New Delhi, 2002.

Question Pattern**Section – A:**

Seven questions are to be given. Five questions are to be answered. 5 x 20 = 100 marks

Total marks = 100

Mapping					
COs & POs	PO1	PO2	PO3	PO4	PO5
CO1	H	H	H	M	H
CO2	M	H	H	M	H
CO3	H	H	H	H	H
CO4	H	H	M	H	H
CO5	H	M	H	H	H

***H-High;**

M-Medium;

L-Low;

VALUE ADDED COURSE**APPLICATION DEVELOPMENT IN PROGRAMMING LANGUAGES****Programme:** UG**Subject :** All Subjects**Course Type:** Value Added Course – II**Contact Hours:** 30**Course:** Application Development in Programming Languages**CIA:** 100**Course Outcomes:**

CO	Course Outcomes	Cognitive Level
CO1.	Acquiring the knowledge of Application Development in Programming Languages	Knowledge (Level K1)
CO2.	Understanding the concept of interpreter and Compiler	Comprehension (Level K2)
CO3.	Illustrating categories of programming languages	Application (Level K3)
CO4.	Correlating various programming languages used in popular website	Analysis (Level K4)
CO5.	Developing simple applications in structured and object oriented Programming Languages.	Synthesis (Level K5)

COURSE CONTENT**Unit - I:**

Introduction- Categories of Programming Languages Interpreted Programming Languages: Introduction – Examples- Advantages and disadvantages. Compiled Programming Languages: Introduction – Advantages and Disadvantages – Examples.

Unit - II:

Functional Programming Languages: Introduction – Categories –Examples.Scripting Languages: Introduction- Advantages – Disadvantages- Examples. Markup Languages : Introduction –Examples.

Unit - III :

Application Development in Structured Programming

Unit - IV:

Application Development in Object Oriented Programming

Unit - V:

Programming Languages used in most popular websites: Google.com – Facebook.com-YouTube.com –Yahoo-Amazon.Com – Wikipedia.org- Twitter.com – Linkedin.com.

Web links:

- <https://www.typesnuses.com/types-of-programming-languages-with-differences/>
- [https://en.wikipedia.org/wiki/C_\(programming_language\)](https://en.wikipedia.org/wiki/C_(programming_language))
- https://en.wikipedia.org/wiki/Object-oriented_programming
- https://en.wikipedia.org/wiki/Programming_languages_used_in_most_popular_websites

Question Pattern**Section – A:**

Seven questions are to be given. Five questions are to be answered. 5 x 20 = 100 marks

Total marks = 100

Mapping					
COs & POs	PO1	PO2	PO3	PO4	PO5
CO1	H	M	H	M	H
CO2	H	H	H	H	H
CO3	H	H	H	M	H
CO4	M	M	H	H	H
CO5	H	M	H	M	H

***H-High;**

M-Medium;

L-Low;

VALUE ADDED COURSE
ICT TOOLS AND TECHNOLOGIES LAB

Programme: UG**Subject:** All Subjects**Course Type:** Value Added Course – III**Contact Hours:** 30**Course:** ICT Tools and Technologies Lab**CIA:** 100**Course Outcomes:**

CO	Course Outcomes	Cognitive Level
CO1.	Acquiring knowledge about video making and editing techniques	Knowledge (Level K1)
CO2.	Applying different ICT tools for entrepreneurship development	Application (Level K3)
CO3.	Enhancing the digital skill-set required in workplace	Synthesis (Level K5)
CO4.	Appreciation of Technology in everyday life	Analysis (Level K4)
CO5.	Helps them to adjust to the inevitable future changes	Evaluation (Level K6)

COURSE CONTENT

PROGRAM LIST**Unit - I: ICT in Assessment:**

- Online Quiz Creation
- Survey and Feedback creation

Unit - II: Professional Development through ICT:

- Video making tools
- Video editing
- Video publishing in You tube

Unit - III: Website Creation:

- Web node and blog creation

Unit - IV: Role of ICT in Administration:

- Record Keeping
- Event scheduling
- Budget calculation

Unit - V: Application Software and its educational applications:

- Word Processing using Google doc
- Presentations using Google slides

Websites:

Forms.google.com

Question Pattern**Practical Examination:** 100 marks

Mapping					
COs & POs	PO1	PO2	PO3	PO4	PO5
CO1	H	M	H	M	H
CO2	H	M	H	H	H
CO3	H	H	H	H	H
CO4	H	M	H	M	H
CO5	M	H	H	H	M

H-High;*M-Medium;****L-Low;**

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