



# A.D.M College For Women (Autonomous)

Nationally Accredited with 'A' Grade by NAAC (Cycle-III)

Nagapattinam -611 001  
TamilNadu.



## B.Sc., COMPUTER SCIENCE

■ **Employability**

■ **Entrepreneurship**

■ **Skill Development**

Name of the Programme	Semester	Course Code	Title of the Course	SD	EN	EM
B.Sc Computer Science	I	XUA	C Programming	✓		
	I	XUBY	Programming in C Lab			✓
	I	XUCY	Office Automation Lab	✓	✓	✓
	II	XUD	Object Oriented Programming using C++ with Data Structures	✓		
	II	XUEY	Data Structures Using C++ Lab			✓
	III	XUF	Database Systems	✓		
	III	XUGY	Database Systems Lab		✓	
	III	XUE1Y	Web Designing Lab	✓	✓	✓
	III	XUE1Y	DTP Lab	✓	✓	✓
	IV	XUH	Java Programming	✓		
	IV	XUIY	Java Programming Lab			✓
	IV	XUE2Y	Animation Lab	✓	✓	✓
	IV	XUE2Y	HTML and CSS Lab		✓	✓
	IV	XUS1	R-Programming Lab		✓	✓
	IV	XUS1	Software Design Tools Lab	✓	✓	✓
	V	XUJ	Web Technology	✓		
	V	XUK	Operating System	✓		
	V	XUL	Computer Networks	✓		

V	XUE3	Web Graphics	✓		
V	XUE3	Big Data and Analytics			✓
V	XUE3	Mobile Communication		✓	
V	XUS2	Web Technology and Bioinformatics Lab			✓
V	XUS2	Software Testing Tools	✓	✓	✓
V	XUS3	Multimedia Lab	✓	✓	✓
V	XUS3	Internet with ASP Lab			✓
VI	XUM	Micro Computer Architecture	✓		
VI	XUNY	Python and Bioinformatics Lab	✓	✓	✓
VI	XUOP	Project	✓	✓	
VI	XUE4	Python Programming	✓		
VI	XUE4	Computer Graphics	✓		
VI	XUE4	Artificial Intelligence	✓	✓	
VI	XUE5Y	Microprocessor Lab			✓
VI	XUE5Y	Data Visualization tool Lab	✓		
VI	XUE5Y	UI/UX Design and Animation Lab using Open source Tools	✓		

### Skill Development (SD)

<b>Semester-I / Core Course-I(CC)</b>	<b>C Programming</b>	<b>Course Code: XUA</b>
<b>Instruction Hours: 5</b>	<b>Credits: 4</b>	<b>Exam Hours: 3</b>
<b>Internal Marks:25</b>	<b>External Marks:75</b>	<b>Total Marks: 100</b>

<b>Cognitive Level</b>	K1-Acquire / Remember K2-Understanding K3-Apply K4-Analyze K5-Evaluate K6-Create	
<b>Course Objectives</b>	<ul style="list-style-type: none"> <li>• To obtain knowledge about the structure of the programming language C</li> <li>• To develop the program writing and logical thinking skill.</li> <li>• To impart the knowledge about pointers which is the backbone of effective memory handling</li> <li>• To study the advantages of user defined data type which provides flexibility for application development</li> <li>• To teach the basics of Preprocessors available with C compiler</li> </ul>	
<b>UNIT</b>	<b>CONTENT</b>	<b>HOURS</b>
UNIT I	<b>FUNDAMENTALS OF PROGRAMMING:</b> Computer Basics- Algorithms – Simple Model of a Computer – Characteristics of Computers- Problem Solving Using Computers – Flow Chart – The Working of a Computer. Introduction To C Language: Identifiers, Keywords, Constants, Variables and data types, Access Modifiers, Data Type Conversions- Operators- Conditional Controls – Loop.	12 Hours
UNIT II	<b>ARRAYS:</b> One Dimensional Array - Two Dimensional Array – Character Arrays and Strings. <b>FUNCTION:</b> Introduction - Elements of User Defined Function - Definition of Functions - Return Values and their Types – Function Calls - Function Declaration - Category of Function - Nesting of Function - Recursion - Passing Arrays to Function - Passing Strings to Function – The Scope, Visibility and Lifetime of Variables - Library functions.	15 Hours
UNIT III	<b>STRUCTURES AND UNIONS:</b> Defining Structure - Declaring Structure Variable - Accessing Structure Members Structure Initialization - Arrays of Structure - Arrays within Structures - Structures within Structures - Structures and Function - Union.	15 Hours

UNIT IV	POINTERS : Pointers - Declaration of Pointers - Accessing Variables through Pointers - Chain of Pointers - Pointer Expressions- Pointer Increments - Pointers with Arrays, Strings- Array of Pointers - Pointers with Functions - Pointers with Structures.	15 Hours
UNIT V	FILE MANAGEMENT IN C : Defining and Opening a File - Closing a File - Input / Output Operations on Files – Error Handling During I/O Operations - Random Access to Files - Command Line Arguments - Dynamic Memory Allocation.	15 Hours
UNIT VI	Contemporary Issues: Problem Solving through C Programming - Edureka	3 Hours

**Text Books:**

1. V. Rajaraman, “Fundamentals of Computer “,Asoke k.Ghosh Publications, PHI Course Limited, 6th Ed.,New Delhi,2011. UNIT I(A)
2. E. Balagurusamy, “Programming in C”, Tata McGraw Hill, 8th Ed., New Delhi, 2016. UNIT I (B) to UNIT V.

**Reference Books:**

- 1.Byron S. Gottfried, “Programming with C”, Tata McGraw Hill, 3rd Ed., New Delhi, 2010.
- 2.Yashvant Kanetkar, “Working with C”, BPB Publication, 2nd revised edition, New Delhi, 2008.

**Web-Resources:**

1. <https://www.w3schools.in/c-tutorial/> <https://nptel.ac.in/courses/106104128/>

**Course Outcomes:**

On completion of the Course, learner should be able to,

- Understand the basic terminology of algorithm, flowchart and gain awareness used in computer programming.
- Design programs involving the various concepts like decision structures, loops, functions of C language.
- Demonstrate the single, multi-dimensional arrays, String functions and user defined functions.
- Compare the structure and union of C and apply it to construct array of structures and structurefunction.
- Understand the dynamics of memory by the use of pointers and pointers with functions.

**Mapping of COs with POs & PSOs:**

<b>CO/PO</b>	<b>PO</b>					<b>PSO</b>				
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

**S - Strongly Correlated**

**M - Moderately Correlated**

**W-Weakly Correlated**

**N – No Correlation**

<b>Semester-I / Core Course-III(CC)</b>	<b>Office Automation Lab</b>	<b>Course Code: XUCY</b>
<b>Instruction Hours: 2</b>	<b>Credits: 2</b>	<b>Exam Hours: 3</b>
<b>Internal Marks :40</b>	<b>External Marks:60</b>	<b>Total Marks: 100</b>

### Knowledge Level

K1-Acquire / Remember	K2-Understanding	K3-Apply	K4-Analyze	K5-Evaluate	K6-Create
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### Course Objectives:

1. Office tools course would enable the students in crafting professional word documents, excel spread sheets, power point presentations using the Microsoft suite of office tools.
2. Give students an in-depth understanding of why computers are essential components in business, education and society.
3. Provide foundational or “computer literacy” curriculum that prepares students for life-long learning of computer concepts and skills.
4. To acquire knowledge on editor, spread sheet and presentation software.
5. To train them to work on the comment based activities in MS-office system

### MS-WORD

1. Text Manipulation – Change the font size and type, Aligning and Justification of text, Underlining the text, indenting the text
  - a) Prepare a Bio-data
  - b) Prepare a letter
2. Using Bullets and Numbering in Paragraphs, Footer and Header, Finding and Replacing Text and Checking Spelling
  - a) Prepare any document
  - b) Prepare any document in newspaper format
3. Tables and Manipulations – Creation, Insertion and Deletion (Rows and Columns) and Usage of Auto Format
  - a) Create a Mark sheet and find total mark, average and result
  - b) Create a calendar and Auto Format it.
4. Picture Insertion and Alignment - Prepare a handout
5. Using Mail Merge
  - a) Prepare a business letter
  - b) Prepare an invitation

## MS-EXCEL

1. Usage of Formulae and Built-in Functions.
2. Editing Cells and Using Commands and Functions
3. Moving and Copying, Inserting and Deleting Rows and Columns
4. Paybill Preparation

## MS-POWERPOINT

1. Preparation and Manipulation of Slides

### Course Outcomes:

On completion of the Course, learner should be able to

- To perform documentation activities
- To execute accounting operations
- To enhance presentation skills
- To work on Document Management Systems
- Format Text, Paragraphs, and sections, and
- To Create and manage documents

### Mapping of COs with POs & PSOs:

CO/PO	PO					PSO				
	1	2	3	4	5	1	2	3	4	5
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

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**N – No Correlation**

<b>Semester-II/ Core Course-IV(CC)</b>	<b>Object Oriented Programming Using C++with Data Structures</b>	<b>Course Code: XUD</b>
<b>Instruction Hours: 4</b>	<b>Credits: 4</b>	<b>Exam Hours: 3</b>
<b>Internal Marks :25</b>	<b>External Marks:75</b>	<b>Total Marks: 100</b>

<b>Cognitive Level</b>	K1-Acquire / Remember K2-Understanding K3-Apply K4-Analyze K5-Evaluate K6-Create	
<b>Course Objectives</b>	<ul style="list-style-type: none"> <li>• To give the concepts of object oriented programming and to impart the programming skills inC++.</li> <li>• Describe the procedural and object oriented paradigm with concepts of streams, classes, functions, data and objects.</li> <li>• Understand dynamic memory management techniques</li> <li>• Classify inheritance with the understanding of early and late binding, usage of exceptionhandling, generic programming.</li> <li>• Demonstrate the use of various OOPS concepts with the help of programs</li> </ul>	
<b>UNIT</b>	<b>CONTENT</b>	<b>HOURS</b>
UNIT I	DATA ABSTRACTION & OVERLOADING : Overview of C++ – Structures – Class Scope and Accessing Class Members – Reference Variables – Initialization – Constructors – Destructors – Member Functions and Classes – Friend Function – Dynamic Memory Allocation – Static Class Members – Container Classes and Integrator – Proxy Classes – Overloading: Function overloading and Operator Overloading.	10 Hours
UNIT II	INHERITANCE & POLYMORPHISM: Base Classes and Derived Classes – Protected Members – Casting Class pointers and Member Functions – Overriding – Public, Protected and Private Inheritance – Constructors and Destructors in derived Classes – Implicit Derived –	12 Hours



	Class Object To Base – Class Object Conversion – Composition Vs. Inheritance – Virtual functions – This Pointer – Abstract Base Classes and Concrete Classes – Virtual Destructors – Dynamic Binding.	
UNIT III	LINEAR DATA STRUCTURES: Abstract Data Types (ADTs) – List ADT – array-based implementation – linked list implementation – singly linked lists –Polynomial Manipulation - Stack ADT – Queue ADT - Evaluating arithmetic expressions.	12 Hours
UNIT IV	NON-LINEAR DATA STRUCTURES: Trees – Binary Trees – Binary tree representation and traversals – Application of trees: Set representation and Union-Find operations – Graph and its representations – Graph Traversals – Representation of Graphs – Breadth-first search – Depth- first search - Connected components.	12 Hours
UNIT V	<b>SORTING and SEARCHING: Sorting algorithms: Insertion sort - Quick sort - Merge sort - Searching: Linear search –Binary Search.</b>	12 Hours
UNIT VI	Contemporary Issues: Expert lectures, online seminars - webinars	2 Hours

### **Text Books:**

- 1.E. Balagurusamy, “Object Oriented Programming with C++”, TMG, 8<sup>th</sup> Ed., New Delhi, 2017.
- 2.Seymour Lipschutz, “Data Structures”, Tata McGraw Hill Publishing Company Limited, Revised 5<sup>th</sup> edition, New Delhi, 2014. UNITS: III, IV & V.

### **Reference Books:**

- 1.Robert Lafore, “Object Oriented Programming in Microsoft C++”, Galgotia Publications,4<sup>th</sup>edition, New Delhi, 2000.
- 2.Bjarne Stroustrup, “The C++ Programming Language”, Addison- Wesley, 4th edition., 2013

### **Web-Resources:**

- 1.<https://www.w3schools.com/cpp/> <http://nptelvideos.com/video.php?id=2187&c=28>

**Course Outcomes:**

On completion of the Course, learner should be able to

- Learn the basic concepts in Object-Oriented programming.
- Develop programming skills by applying Object-Oriented programming.
- Discuss the function overloading and Member Functions.
- Understand the concepts of Constructors and Inheritance.
- An Ability to incorporate Exception Handling in Object-Oriented programs and analyze File Input/output Streams.

**Mapping of COs with POs & PSOs:**

CO/PO	PO					PSO				
	1	2	3	4	5	1	2	3	4	5
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

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**N – No Correlation**

<b>Semester-III / Core Course-VI(CC)</b>	<b>Database Systems</b>	<b>Course Code: XUF</b>
<b>Instruction Hours: 5</b>	<b>Credits: 5</b>	<b>Exam Hours: 3</b>
<b>Internal Marks :25</b>	<b>External Marks:75</b>	<b>Total Marks: 100</b>

Cognitive Level	K1-Acquire / Remember K2-Understanding K3-Apply K4-Analyze K5-Evaluate K6-Create	
<b>Course Objectives</b>	<ul style="list-style-type: none"> <li>• Distinguish between data and information and Knowledge</li> <li>• Distinguish between file processing system and DBMS</li> <li>• Describe DBMS its advantages and disadvantages</li> <li>• Describe Database users including data base administrator</li> <li>• Describe data models, Schemas and instances.</li> <li>• Describe DBMS Architecture &amp; Data Independence</li> </ul>	
<b>UNIT</b>	<b>CONTENT</b>	<b>HOURS</b>
UNIT I	<b>Introduction:</b> Database System Applications –Database Languages – Transaction Management – Database Architecture – Database users and Administrators - <b>Relational Model:</b> Structure of Relational Databases – Database Design – ER Model – The Entity- relationship Model – Constraints – Entity Relationship Diagrams	12 Hours
UNIT II	Relational Algebra Operations – Relational Languages: The Tuple Relational Calculus – The Domain Relational Calculus – SQL: Background – Data Definition – Basic Structure of SQL Queries– Set Operations – Aggregate Functions – Null Values – Nested Sub-Queries – Views – Modification of the Database.	15 Hours
UNIT III	Data Normalization: Pitfalls in Relational Database Design – Decomposition – Functional Dependencies – Normalization – First Normal Form – Second Normal Form – Third Normal Form – Boyce-Codd Normal Form – Fourth Normal Form – Fifth Normal Form –	15 Hours

	Denormalization – Database Security: Data Security Requirements – Protecting the Data within the Database – Granting and Revoking Privileges – Data Encryption.	
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 – SQ L in PL/SQL – Data Manipulation – Transaction Control statements.	15 Hours
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.	15 Hours
UNIT VI	Contemporary Issues : Expert lectures, online seminars - webinars	3 Hours

**Text Book:**

1. “Database System Concepts”, Abraham Silberschatz, Henry F.Korth, .Sudarshan, TMH6th Edition (Units - I, II, )
2. “Fundamentals of Database Management Systems”, Alexis Leon, Mathews Leon, VijayNicole Imprints Private Limited. (Unit – III)
3. “Database Systems Using Oracle” Nilesh Shah, 2nd edition, PHI.UNIT-IV: Chapters 1& 11 UNIT-V: Chapters 12, 13 & 14)

**Reference Books:**

Text Book of RDBMS (Relational Database Management System)- By Mrs Vidya H. Bankar, Mrs DeepaShree K, Mehendale, Mrs Sujatha P. Patel

**Web Resource:**

1. <http://www.svecw.edu.in/Docs%5CITIIBTechIISemLecDBMS.pdf>

2. [http://www.kciti.edu/wp-content/uploads/2017/07/dbms\\_tutorial.pdf](http://www.kciti.edu/wp-content/uploads/2017/07/dbms_tutorial.pdf)

**Course Outcomes:**

On completion of the Course, learner should be able to

- Emphasize the need, role, importance and uses of databases in application development
- Design E-R modeling for a given situation and provide the foundation for development of relational database structure.
- Identify the advantages of the database approach over the file based data storage system.
- Distinguish between different models of file organizing, storing and using of data and understand the relational model and relational algebra operations.
- Normalize the relational tables applying normalization rules and apply PL/SQL procedural interfaces statement on relational tables as per requirements.

**Mapping of COs with POs & PSOs:**

CO/PO	PO					PSO				
	1	2	3	4	5	1	2	3	4	5
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	M	S	S	S	S	S
CO3	S	M	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	M
CO5	S	S	S	S	M	S	S	S	S	S

**S - Strongly Correlated**

**M - Moderately Correlated**

**W-Weakly Correlated**

**N – No Correlation**

<b>Semester-III/Non Major Elective INME)</b>	<b>Web Designing Lab</b>	<b>Course Code:XUE1Y</b>
<b>Instruction Hours: 2</b>	<b>Credits: 2</b>	<b>Exam Hours: 3</b>
<b>Internal Marks :40</b>	<b>External Marks:60</b>	<b>Total Marks: 100</b>

### Knowledge Level

K1-Acquire / Remember	K2-Understanding	K3-Apply	K4-Analyze	K5-Evaluate	K6-Create
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### Course Objectives:

- To understand the importance of the web as an effective medium of communication.
- To develop basic skills in analyzing the usability of a web site.
- To develop hands on experience using open source technologies such as HTML, CSS, JavaScript, PHP and MySQL.
- To implement static, dynamic and interactive web pages and web applications.
- To be able to analyze the available open source technologies and select the appropriate one based on need.

### List of Practicals

1. Design a Bio-Data Form.

2. Create a Web Page With Four Frame (Picture, Table, List, Hyperlink).

3. Write a Program to show all Character Entities.

4. To Create a Web Page in HTML to Show the Block Level Elements and Text Level Elements.

5. Create your own page with your favourite hobbies.

6. A Web Page in HTML to show books in inventory in different tables using Row Span and Column Span.

7. Create a Web Page in HTML to show Admission form.

8. A Web Page in HTML to show your resume using appropriate Formatting Elements.

9. A Web Page in HTML to show all the Text, Color, Background and Font Elements.

10. Write a Program to Create a Nested List.

**Course Outcomes:**

On completion of the Course, learner should be able to

- Develop skills in analyzing the usability of a web site.
- Understand how to plan and conduct user research related to web usability.
- Design, develop and host a user friendly website.
- Know the usage of APIs.
- Layout management in line with current trend.

**Mapping of COs with POs & PSOs:**

CO/PO	PO					PSO				
	1	2	3	4	5	1	2	3	4	5
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

**S - Strongly Correlated**

**M - Moderately Correlated**

**W-Weakly Correlated**

**N – No Correlation**

Semester-III/Non Major Elective INME)	DTP Lab	Course Code: XUE1Y
Instruction Hours: 2	Credits: 2	Exam Hours: 3
Internal Marks :40	External Marks:60	Total Marks: 100

### Knowledge Level

K1-Acquire / Remember	K2-Understanding	K3-Apply	K4-Analyze	K5-Evaluate	K6-Create
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### Course Objectives:

- Demonstrate knowledge of terminology related to desktop publishing, graphics and animation, and multimedia.
- Identify and use hardware components (input and output devices) used in desktop publishing, graphics/animation and multimedia.
- Analyze the impact of desktop publishing, graphics/animation and multimedia on society.
- Model respect for intellectual property when manipulating, morphing, and editing video, graphics, sound, and text.
- Identify and use appropriate software and documentation for an identified audience to create projects in desktop publishing, graphics/animation and multimedia.

### PAGEMAKER

**Adobe PageMaker :** Components of PageMaker , Toolbox , Palettes , Working with text.

**Constructing a Publication:** Creating a new Page , Save publication , Preferences **Edit**

**Text:** Edit Story , Master Page , Measurement , Ruler & guideline , Page numbers **Layout**

**menu:** Sorting page , Deleting Page

**Text formatting:** Type Menu , Control Palette , Expert Tracking , Indents And Tab

**Element Menu:** Fill , Fill and Stroke , Create a Frame , Arrange , Wrap text Group Object , Image Control , Using Photoshop Effect , Change the Shape Of Polygon/ Rectangle

**Utilities Manu:** Checking Spelling & Grammar , Change Case , Index Entry



## **CORELDRAW**

**Introduction to Corel draw:** Toolbars, Components of Corel draw

**Edit Menu:** Introduction to Corel draw, Duplicate, Clone

**View menu:** Full screen Preview, Grid and ruler setup

**Layout Menu:** Insert page, Delete page, Switching page Orientation, Page setup

**Arrange Menu:** Introduction, Transformation, Order, Behind, Group, Shaping  
**Effects Menu:** Adjust, Transform, Artistic Media, Contour, Extrude

**Bitmap Menu:** Convert to bitmap, Mode, 3D Effect

**Art Strokes:** Charcoal, Pastels, Pen & ink, Scrap oared, Sketchpad, Watercolor, Blur, Smooth, Color transform, Halftone

**Art Stocks:** Edge Detect, Find edge

**Creative:** Crafts, Glass black Sample glass

**Distort:** Blocks, swirl

**Notice:** Add Notice

**Text menu:** Edit text, Fit text to path Tools & windows

## **PHOTOSHOP**

**Introduction to Photoshop:** About work area, Toolbox overview

**File menu:** What is new in file?

**Edit menu:** What is s new in file Transform & Patten

**Image menu:** Mode, Rotate image

**Layer menu:** New layer, Layer styles, New fill layer, Add layer mask

**Select menu:** Inverse, Feather, Modify, Grow

**Filter menu:** Extract, Artistic, Blur, Brush stroke, Distort, Pixel ate, Render, Sharpen, Sketch

**Course Outcomes:**

On completion of the Course, learner should be able to

- Introduction to Page Maker
- Print Design Basics
- Design Principles & Color Harmony
- Layout Design
- Photoshop

**Mapping of COs with POs & PSOs:**

CO/PO	PO					PSO				
	1	2	3	4	5	1	2	3	4	5
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

**S - Strongly Correlated**

**M - Moderately Correlated**

**W-Weakly Correlated**

**N – No Correlation**

<b>Semester-IV/ Core Course VIII(CC)</b>	<b>Java Programming</b>	<b>Course Code: XUH</b>
<b>Instruction Hours: 5</b>	<b>Credits: 3</b>	<b>Exam Hours: 3</b>
<b>Internal Marks :25</b>	<b>External Marks:75</b>	<b>Total Marks: 100</b>

<b>Cognitive Level</b>	K1-Acquire / Remember K2-Understanding K3-Apply K4-Analyze K5-Evaluate K6-Create	
<b>Course Objectives</b>	<ul style="list-style-type: none"> <li>• Programming in the Java programming language,</li> <li>• Knowledge of object-oriented paradigm in the Java programming language,</li> <li>• The use of Java in a variety of technologies and on different platforms.</li> <li>• To Learn Why Java is useful for the design of desktop and web applications.</li> <li>• To learn how to implement object oriented designs with Java.</li> <li>• To identify Java language components and how they work together in applications.</li> </ul>	
<b>UNIT</b>	<b>CONTENT</b>	<b>HOURS</b>
UNIT I	JAVA Evolution: History - Features - Java differs from C and C++ -Java and Internet - Java and WWW - Web Browsers. Overview of Java Language: Introduction - Simple Java program - Structure- Java tokens- Statements - Java virtual Machine.	12 Hours
UNIT II	Constants -Variables- Data types - Operators and expressions -Decision making and Branching: Simple If Statement, the IF...Else statement, The Else... If ladder, The Switch Statement, The? : Operator, Decision making and looping: The While statement, the do Statement - The for Statement - Jumps in loops - labeled loops - Classes, Objects and Methods.	15 Hours
UNIT III	Arrays, Strings and Vectors – Interfaces- Multiple Inheritance – Packages: Putting classes together Multi Threaded Programming.	15 Hours
UNIT IV	Managing Errors and Exceptions – Applet Programming – Graphics programming: The Graphics class-Lines and rectangles-Circles and ellipses-Drawing arcs-Drawing polygons- Line graphs-Using Control loops in applets-Drawing Bar charts.	15 Hours

UNIT V	Files: Introduction – concept of streams – Stream classes – Using stream – I/O classes – File class – I/O Exceptions – creation of files – Reading / Writing characters/ Bytes – Handling primitive data types – Random Access Files.	15 Hours
UNIT VI	Contemporary Issues : Expert lectures, online seminars - webinars	3Hours

**Text Book:**

1. E. Balaguruswamy, Programming with JAVA -A Primer, McGraw Hill Professional, 6<sup>th</sup> edition, 2015.

**Reference Books:**

1. Herbert Schildt, Java: The Complete Reference, McGraw Hill Professional, 7<sup>th</sup> edition, 2017.
2. Robert Sedgewick & Kevin Wayne, Introduction to Programming in Java, Addison Wesley, 2017.

**Web-Resources:**

1. <https://www.tutorialspoint.com/java/index.htm>
2. <https://www.javatpoint.com/java-tutorial>

**Course Outcomes:**

On Completion of the course the student should be able to

- Use an integrated development environment to write
- Compile and run
- Test simple object oriented java programs.
- Read and make elementary modifications to Java programs that solve real world problems
- Validate input in a Java Program

**Mapping of COs with POs & PSOs:**

<b>CO/PO</b>	<b>PO</b>					<b>PSO</b>				
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

**S - Strongly Correlated**

**M - Moderately Correlated**

**W-Weakly Correlated**

**N – No Correlation**

<b>Semester-IV/ Non Major Elective II(NME)</b>	<b>1.Animation Lab</b>	<b>Course Code:XUE2Y</b>
<b>Instruction Hours: 2</b>	<b>Credits: 2</b>	<b>Exam Hours: 3</b>
<b>Internal Marks :40</b>	<b>External Marks:60</b>	<b>Total Marks: 100</b>

### Knowledge Level

K1-Acquire / Remember	K2-Understanding	K3-Apply	K4-Analyze	K5-Evaluate	K6-Create
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### Course Objectives:

- To Impart Practical Training in Computer Graphics and Animation related problems.
- To implement various graphics drawing algorithms, 2D-3D transformations and clipping techniques.
- Describe and evaluate the eight major classical types of animation
- Identify modern day examples for each classical animation type.
- Emphasis on creating movement and expression utilizing traditional or electronically generated image sequences.

### List of Practicals:

#### Photoshop:

1. (i) Handling different file formats and interchanging them, changing the resolution, color, grayscales and size of the images  
(ii) Using brushes and creating multicolor real life images
2. Cropping, rotating, overlapping, superimposing, pasting photos on a page
3. Creation of a single image from selected portions of many
4. Developing a commercial brochure with background tints
5. Creating an image with multi-layers of images and texts.
6. Applying masks and filtering on images

**Flash:**

Develop an image(s) and do the following.

1. Basic Drawing and Painting
2. Working with Strokes and Fills
3. Creating Custom Colors, Gradients, and Line Styles Transforming and Grouping Objects
4. Creating and Managing Multiple Layers
5. Converting Text into Shapes
6. Animate using motion, shape, Tweening, and actions

**Course Outcomes:**

On completion of the Course, learner should be able to

- Communicate ideas, believable action and emotion effectively by employing principles
- Animation and performance in all aspects of drawing.
- Integrate the concepts, principles and theories involved in the physics of animation in all aspects of drawing.
- Design layouts and backgrounds that incorporate principles of composition, perspective and colour, with speed and accuracy.

**Mapping of COs with POs & PSOs:**

CO/PO	PO					PSO				
	1	2	3	4	5	1	2	3	4	5
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

**S - Strongly Correlated**

**M - Moderately Correlated**

**W-Weakly Correlated**

**N – No Correlation**

<b>Semester-V/ Skill Based Course II</b>	<b>2.Software Testing Tools</b>	<b>Course Code: XUS2</b>
<b>Instruction Hours: 2</b>	<b>Credits: 2</b>	<b>Exam Hours: 3</b>
<b>Internal Marks :40</b>	<b>External Marks:60</b>	<b>Total Marks: 100</b>

### Knowledge Level

K1-Acquire / Remember	K2- Understanding	K3- Apply	K4- Analyze	K5- Evaluate	K6- Create
-----------------------	----------------------	--------------	----------------	-----------------	---------------

### Course Objective:

- To improve understanding of software testing skills- it's purpose, nature, issues and constraints.
- To learn various software testing techniques through case studies.
- To understand the essential characteristics of various automation tools used for testing.
- To gaining confidence in and providing information about the level of quality.
- To make sure that the end result meets the business and user requirements.

### List of Practicals:

1. Write a test case based on controls.
2. Test data in a flat file.
3. Manual test case to verify student grade
4. Write and test a program to select the number of students who have scored more than 60 in any one subject(or all Subjects)
5. Write and test a program to login a specific web page.
6. Write and test a program to get the number of list items in a list / combo box.
7. Test a HTML file.
8. Test a program in MS Excel for Data Driven Wizard.
9. Test the addition of two values in C++ Program.
10. Write a test suite containing minimum 4 test cases.



**Course Outcomes:****On the Completion of the course learner will be able**

- Apply modern software testing processes in relation to software development and Projectmanagement.
- Create test strategies and plans, design test cases
- Prioritize and
- Execute
- Manage incidents and risks within a project.

**Mapping of COs with POs & PSOs:**

CO/PO	PO					PSO				
	1	2	3	4	5	1	2	3	4	5
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

**S - Strongly Correlated**

**M - Moderately Correlated**

**W-Weakly Correlated**

**N – No Correlation**

<b>Semester-V/ Core Course X(CC)</b>	<b>Web Technology</b>	<b>Course Code: XUJ</b>
<b>Instruction Hours: 6</b>	<b>Credits: 5</b>	<b>Exam Hours: 3</b>
<b>Internal Marks :25</b>	<b>External Marks:75</b>	<b>Total Marks: 100</b>

Cognitive Level	K1-Acquire / Remember K2-Understanding K3-Apply K4-Analyze K5-Evaluate K6-Create	
<b>Course Objectives:</b>	<ul style="list-style-type: none"> <li>• Define the knowledge about HTML document with element types, hyperlinks, images, list, tables and forms.</li> <li>• Analyze a web page and identify its elements and attributes. Create web pages using XHTML and Cascading Style Sheets.</li> <li>• Build dynamic web pages using JavaScript (Client side programming).</li> <li>• Create XML documents and Schemas.</li> </ul>	
<b>UNIT</b>	<b>CONTENT</b>	<b>HOURS</b>
UNIT I	Fundamentals of HTML:-Understanding Elements: Root Elements-Metadata Elements- Section Elements-Heading Elements. Describing data types.	15 Hours
UNIT II	HTML5 and its essentials: Exploring New Features of HTML5- Next Generation of Web Development-Structuring an HTML Document-Exploring Editors and Browsers Supported by HTML5-Creating and Saving an HTML Document-Validating an HTML Document-Viewing an HTML Document-Hosting Web Pages.	18 Hours
UNIT III	<b>DHTML: Introduction - Cascading Style sheets - DHTML Document Object Model and collections – Event Handling - Filters and Transitions - Data Binding</b>	18 Hours
UNIT IV	JAVASCRIPT: Introduction- Language Elements - Objects of JavaScript- Other Objects. VBSCRIPT: Introduction- Embedding VBScript Code in an HTML Document-	18 Hours

	Comments- Variables- Operators-Procedures- Conditional Statements- Looping Constructs - Objects and VBScript - Cookies.	
UNIT V	EXTENSIBLE MARK-UP LANGUAGE (XML): Introduction- HTML vs. XML- Syntax of the XML Document- XML Attributes- XML Validation- XML DTD- The Building Blocks of XML Documents-DTD Elements - DTD Attributes- DTD Entities- DTD Validation –XSL - XSL Transformation- XML Namespaces- XML Schema.	18 Hours
UNIT VI	Contemporary Issues : Expert lectures, online seminars – webinars	3 Hours

### Reference Books:

1. Web Technology, Akanksha Rastogi, K.Nath & Co Educational Publishers, 1<sup>st</sup>Edition.
2. Introduction to Web Technology, Anuranjan Misra, Arjun Kumar Singh, Laxmi Publication, 2011.
3. World Wide Web Design with HTML, C.Xavier, TMH Publishers, 2008.

### Web-Resources:

1. [https://mrcet.com/downloads/digital\\_notes/IT/WEB%20TECHNOLOGIES%20\(R15A0520\).pdf](https://mrcet.com/downloads/digital_notes/IT/WEB%20TECHNOLOGIES%20(R15A0520).pdf)
2. <http://yellaswamy.weebly.com/web-technologiesiiibtech-ii-sem.html>

### Course Outcomes:

On completion of the Course, learner should be able to

- Illustrate the web technology concept to create schemas and dynamic web pages.
- Understand the concept of CSS for dynamic presentation effect in HTML and XML documents.
- Describe the mark-up languages for processing, identifying and presenting information in web pages.
- Apply scripting languages in HTML document to add interactive components to web pages
- Define the knowledge about HTML document with element types, hyperlinks, images, list, tables and forms

**Mapping of COs with POs & PSOs:**

<b>CO/PO</b>	<b>PO</b>					<b>PSO</b>				
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

**S - Strongly Correlated**

**M - Moderately Correlated**

**W-Weakly Correlated**

**N – No Correlation**

<b>Semester-IV/ Core Course XI(CC)</b>	<b>Operating System</b>	<b>Course Code: XUK</b>
<b>Instruction Hours: 6</b>	<b>Credits: 6</b>	<b>Exam Hours: 3</b>
<b>Internal Marks :25</b>	<b>External Marks:75</b>	<b>Total Marks: 100</b>

<b>Cognitive Level</b>	K1-Acquire / Remember K2-Understanding K3-Apply K4-Analyze K5-Evaluate K6-Create	
<b>Course Objectives</b>	<ul style="list-style-type: none"> <li>• To gain the basic knowledge about the operating systems and its various schemes and services.</li> <li>• To make students able to learn different types of operating systems along with concept of file systems and CPU scheduling algorithms used in operating system.</li> <li>• To provide students knowledge of memory management and deadlock handling algorithms</li> <li>• At the end of the course, students will be able to implement various algorithms required for management, scheduling, allocation and communication used in operating system.</li> </ul>	
<b>UNIT</b>	<b>CONTENT</b>	<b>HOURS</b>
UNIT I	Introduction: What is an operating system?-Early history –Process concepts: Introduction- Definition of process-process states – process state transitions – The Process Control Block – Operations on processes – Suspend and Resume - Interrupt processing – Semaphore – Deadlock & Indefinite postponement.	15 Hours
UNIT II	Real Storage –Virtual Storage Organization: Introduction – Evolution of storage Organization – Virtual Storage – Virtual Storage Management: Introduction - Virtual storage management strategies- Page replacement strategies - Working sets-Demand paging –Page size.	18 Hours

UNIT III	Job & Processor Scheduling: Introduction – Scheduling Levels - Pre-emptive vs. non pre-emptive scheduling-priorities-deadline scheduling-FIFO-RR-Quantum Size-SJF-SRT-HRN. Distributed computing: Classification of sequential & parallel Architecture – Pipelining – Vector Processing - Array processor –Dataflow computers-Multiprocessing-Fault tolerance.	18 Hours
UNIT IV	UNIX - Getting started - Gaining Confidence: The Unix File System – Creating File- Indulging File Play. Listing Files & Directories – Directory Related Commands.	18 Hours
UNIT V	Shell Programming- The First Step: When to Use Shell Scripts – The First Shell Script- Interactive Shell Scripts - Shell Variables - Shell Keywords - Another Way of Assigning Values to Variables - Tips & Traps - Unchanging Variables-Wiping Out Variables - Positional parameters – Passing Command Line Arguments – Setting Values of Position Parameters – Displaying Date in Desired Format – Using Shift on Positional Parameters – Arithmetic in Shell Script – The Carriage Return – The Tab & The Backspace – Positioning The Cursor – Beep – Bold & Beautiful – The output Command – Control Instructions in Shell.	18 Hours
UNIT VI	Contemporary Issues : Expert lectures, online seminars - webinars	3 Hours

**Text Book:**

1. Dietal.H.M, An introduction to operating system, Welsey publication, 3<sup>rd</sup> edition , 2005.
2. Yashavant P. Kanetkar, UNIX Shell Programming, BPB Publication, 4<sup>th</sup> edition, 2012.

**Reference Books:**

1. Abraham Silberschatz, Peter Baer Galvin Gagne, Operating system Principles, Wiley Publishers, 7th edition, 2008.
2. Archer J harries, Operating System, Tata McGraw Hill 2<sup>nd</sup> Edition, 2011.
3. DborahS.Ray, Eric.J.Ray, Unix and Linux, Pearchpit press, 4<sup>th</sup> edition, 2009
4. .Randal K. Michael, Mastering Unix shell scripting, Wiley India, 2nd Edition, 2009.

**Web-Resources:**

1. <http://www.svecw.edu.in/Docs%5CCSEOSLNotes2013.pdf>
2. [https://mrcet.com/downloads/digital\\_notes/CSE/II%20Year/OPERATING%20SYSTEMS%20%20NOTES%20R18.pdf](https://mrcet.com/downloads/digital_notes/CSE/II%20Year/OPERATING%20SYSTEMS%20%20NOTES%20R18.pdf)

**Course Outcomes:**

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

- Recognize the basic concepts of operating system.
- Understand the process and thread concepts.
- Distinguish the concepts of deadlocks and storage management in operating system concepts.
- Apply various file system implementation and optimization techniques using files.
- Illustrate the virtual machine and distributed system in various fields.

**Mapping of COs with POs & PSOs:**

CO/PO	PO					PSO				
	1	2	3	4	5	1	2	3	4	5
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	M	S	S	S	S	S
CO3	S	M	S	S	S	S	S	S	S	M
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	M	S	M	S	S	S

**S - Strongly Correlated**

**M - Moderately Correlated**

**W-Weakly Correlated**

**N – No Correlation**

<b>Semester-IV/ Core Course XII(CC)</b>	<b>Computer Networks</b>	<b>Course Code: XUL</b>
<b>Instruction Hours: 6</b>	<b>Credits: 6</b>	<b>Exam Hours: 3</b>
<b>Internal Marks :25</b>	<b>External Marks:75</b>	<b>Total Marks: 100</b>

<b>Cognitive Level</b>	K1-Acquire / Remember K2-Understanding K3-Apply K4-Analyze K5-Evaluate K6-Create	
<b>Course Objectives</b>	<ul style="list-style-type: none"> <li>• Resource sharing</li> <li>• High Reliability</li> <li>• Improve performance</li> <li>• Communication</li> <li>• Transmission Medium</li> </ul>	
<b>UNIT</b>	<b>CONTENT</b>	<b>HOURS</b>
UNIT I	Data Communications: Components- data representation- Dataflow Networks: Distributed processing-network criteria -physical structures -network models-categories of networks Interconnection of Networks: Internetwork- Protocols and Standards: protocols-standards - standards organizations- internet standards the OSI model- layers in the OSI model-TCP/IP protocol suite.	15 Hours
UNIT II	<b>Guided Media: Twisted-pair cable-coaxial cable-fiber-optic cable-          unguided media: - wireless: radio waves-microwaves-infrared.          Telephone Network: Major components -Latas - signaling services          provided by telephone networks dial-up modems: Modem standards          digital subscriber line- cable TV networks. Wireless LANS:          Bluetooth- connecting devices.</b>	18 Hours
UNIT III	Data Link Layer: Introduction- block coding-framing- flow and error control- protocols noiseless channels- noisy channels. Network Layer: IPV4 addresses- IPV6 addresses- delivery forwarding- unicast routing protocols- multicast routing protocols.	18 Hours



UNIT IV	Transport Layer: Process-to-Process delivery- user datagram protocol- TCP-congestion control and quality TCP connection-congestion control- two examples- quality of service	18 Hours
UNIT V	Application Layer: Name space- domain name space- distribution of name space- DNS in the internet- resolution- remote logging- telnet- electronic mail- file transfer-cryptography Introduction- symmetric-key cryptography- asymmetric-key cryptography.	18 Hours
UNIT VI	Contemporary Issues: Expert lectures, online seminars - webinars	3 Hours

### Reference Books:

1. Robert Orfali, Dan Harkey, Jerry Edwards,” Client/Server Survival Guide”, John Wiley & sons publications, 3 rd Edition, 2008.
2. Larry L Peterson, Bruce S Davie,” Computer Networks - A systems approach”, Elsevier Press publications, 5 th Edition, 2012.
3. Andrew S Tanenbaum,” Computer Networks”, Pearson education publications, 5 th Edition, 2011.
4. William Stallings,” Data and Computer Communications”, Prentice Hall of India Private Limited, New Delhi, 8 th Edition, 2011.

### Web-Resources:

- 1.<https://www.mrecacademics.com/DepartmentStudyMaterials/20201223Computer%20Networks.pdf>
- 2.<https://www.smartworld.com/notes/computer-network-notes-pdf-cn/>

**Course Outcomes:**

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

- Provide an overview of the concepts and fundamentals of data communication and computer networks.
- Understand the terminology and concepts of the OSI reference model and the TCP/IP reference model.
- Describe the significance of protocols used in data communications and networking.
- Illustrate the importance of network security and application of cryptographic methods in establishing security.
- Interpret the data flow in each layer and services of each layer.

**Mapping of COs with POs & PSOs:**

CO/PO	PO					PSO				
	1	2	3	4	5	1	2	3	4	5
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	M	S	S	S	S	S
CO4	S	M	S	S	S	S	S	S	M	S
CO5	S	S	S	S	S	S	S	S	S	M

**S - Strongly Correlated**

**M - Moderately Correlated**

**W-Weakly Correlated**

**N – No Correlation**

<b>Semester-V/ Major Based Elective Course I (MBE)</b>	<b>1.Web Graphics</b>	<b>Course Code:XUE3</b>
<b>Instruction Hours: 6</b>	<b>Credits: 6</b>	<b>Exam Hours: 3</b>
<b>Internal Marks :25</b>	<b>External Marks:75</b>	<b>Total Marks: 100</b>

<b>Cognitive Level</b>	K1-Acquire / Remember K2-Understanding K3-Apply K4-Analyze K5-Evaluate K6-Create	
<b>Course Objectives</b>	<ul style="list-style-type: none"> <li>• Graphics should help to guide the viewers' focus</li> <li>• Important content on the page.</li> <li>• Using visually strong graphic elements on a page.</li> <li>• Useful in directing viewers' attention</li> <li>• Providing structure for the page.</li> </ul>	
<b>UNIT</b>	<b>CONTENT</b>	<b>HOURS</b>
UNIT I	Introduction to multimedia -GIMP: Environment - layers and work path -Image editing - channels, masks and actions - filters - rollovers and animations.	15 Hours
UNIT II	Synfig: introduction - drawing and colouring tools.	18 Hours
UNIT III	Synfig (contd) : drawing and colouring tools	18 Hours
UNIT IV	Synfig: animation - tweening - interactive elements.	18 Hours
UNIT V	Inkscape: interface - working with shapes - layers - blend, path and mask.	18 Hours
UNIT VI	Contemporary Issues: Expert lectures, online seminars - webinars	3 Hours

**Text Book:**

1. Fazreil Amreen, “Instant GIMPStarter”, Packet Publishing Limited, ISBN10:n1782160345, I  
13: 978-1782160342
2. <http://wiki.synfig.org/Category:Manual>
3. Bethany Hiitola, Packt Publishing Limited, “Inkscape Starter”, ISBN-13: 978-1849517560

**Reference Books:**

1. Manuals available in websites corresponding to the software

**Web-Resources:**

1. <http://personal.ee.surrey.ac.uk/Personal/J.Collomosse/pubs/cm20219.pdf>
2. [https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-831-user-interface-design-and-implementation-spring-2011/lecture-notes/MIT6\\_831S11\\_lec18.pdf](https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-831-user-interface-design-and-implementation-spring-2011/lecture-notes/MIT6_831S11_lec18.pdf)

**Course Outcomes:****On the Completion of the course learner will be able**

- Appreciate the concepts of multimedia.
- Work with animations, tweening and interactive elements.
- Design shapes in multimedia.
- Adopt skills to make multimedia applications.
- Produce a presentation using multimedia tools.

**Mapping of COs with POs & PSOs:**

<b>CO/PO</b>	<b>PO</b>					<b>PSO</b>				
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

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**M - Moderately Correlated**

**W-Weakly Correlated**

**N – No Correlation**

<b>Semester-V/ Skill Based Course II</b>	<b>2.Software Testing Tools</b>	<b>Course Code: XUS2</b>
<b>Instruction Hours: 2</b>	<b>Credits: 2</b>	<b>Exam Hours: 3</b>
<b>Internal Marks :40</b>	<b>External Marks:60</b>	<b>Total Marks: 100</b>

### Knowledge Level

K1-Acquire / Remember	K2- Understanding	K3- Apply	K4- Analyze	K5- Evaluate	K6-Create
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### Course Objective:

- To improve understanding of software testing skills- it's purpose, nature, issues and constraints.
- To learn various software testing techniques through case studies.
- To understand the essential characteristics of various automation tools used for testing.
- To gaining confidence in and providing information about the level of quality.
- To make sure that the end result meets the business and user requirements.

### List of Practicals:

1. Write a test case based on controls.
2. Test data in a flat file.
3. Manual test case to verify student grade
4. Write and test a program to select the number of students who have scored more than 60  
in any one subject(or all Subjects)
5. Write and test a program to login a specific web page.
6. Write and test a program to get the number of list items in a list / combo box.
7. Test a HTML file.
8. Test a program in MS Excel for Data Driven Wizard.
9. Test the addition of two values in C++ Program.
10. Write a test suite containing minimum 4 test cases.

**Course Outcomes:****On the Completion of the course learner will be able**

- Apply modern software testing processes in relation to software development and Projectmanagement.
- Create test strategies and plans, design test cases
- Prioritize and
- Execute
- Manage incidents and risks within a project.

**Mapping of COs with POs & PSOs:**

CO/PO	PO					PSO				
	1	2	3	4	5	1	2	3	4	5
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

**S - Strongly Correlated****M - Moderately Correlated****W-Weakly Correlated****N – No Correlation**

<b>Semester-V/ Skill Based Course III</b>	<b>1.Multimedia Lab</b>	<b>Course Code:XUS3</b>
<b>Instruction Hours: 2</b>	<b>Credits: 2</b>	<b>Exam Hours: 3</b>
<b>Internal Marks :40</b>	<b>External Marks:60</b>	<b>Total Marks: 100</b>

### Knowledge Level

K1-Acquire / Remember	K2-Understanding	K3-Apply	K4-Analyze	K5Evaluate	K6Create
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### Course Objectives:

- To understand about data compression techniques, image compression techniques like JPEG, video compression techniques like MPEG, and the basic concepts about animation.
- To offer the knowledge of creating and working with digital images .
- To manipulate them and to develop a presentation package using multimedia tools.
- To give an overall view of multimedia tools.
- To understand and differentiate text, image, video & audio.

### List of Practicals:

#### GIMP (Photoshop Equivalent)

1. Cropping images using Lasso Tools
2. Designing Pictures using Paint Tools
3. Designing Text using Text Tools
4. Applying Layer Effects to Images and Texts

#### Synfig ([wiki.synfig.org](http://wiki.synfig.org) / Category: Tutorials) (Flash equivalent)

1. Create an animation for bouncing a ball
2. Create brushed outlines for an image
3. Build a magnifying glass
4. Develop a slide show of photos with transitions



**Aptana (<http://content.aptna.com/aptna/tutorials/> )(Dreamweaver equivalent)**

1. Developing a simple webpage with images and links
2. Develop a webpage displaying the timetable of the Department
3. Design an application form for Student Admission
4. Create your own web blog for college events

**Course Outcomes:**

On completion of the Course, learners should be able to

- To learn and understand technical aspect of Multimedia System
- Design and implement an animation for various themes.
- Prepare multimedia advertisement.
- Develop various Multimedia Systems applicable in real time.
- To develop multimedia application and analyze the performance of the same.

**Mapping of COs with POs & PSOs:**

CO/PO	PO					PSO				
	1	2	3	4	5	1	2	3	4	5
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

**S - Strongly Correlated**

**M - Moderately Correlated**

**W-Weakly Correlated**

**N – No Correlation**

<b>Semester-VI/ Core Course XIII(CC)</b>	<b>Micro Computer Architecture</b>	<b>Course Code: XUM</b>
<b>Instruction Hours: 6</b>	<b>Credits: 6</b>	<b>Exam Hours: 3</b>
<b>Internal Marks :25</b>	<b>External Marks:75</b>	<b>Total Marks: 100</b>

<b>Cognitive Level</b>	K1-Acquire / Remember K2-Understanding K3-Apply K4-Analyze K5-Evaluate K6-Create	
<b>Course Objectives:</b>	The course aims <ul style="list-style-type: none"> <li>• Discuss the basic concepts and structure of computers.</li> <li>• Understand concepts of register transfer logic and arithmetic operations.</li> <li>• Explain different types of addressing modes and memory organization.</li> <li>• To understand the structure, function and characteristics of computer systems.</li> <li>• To understand the design of the various functional units and components of computers.</li> <li>• To identify the elements of modern instructions sets and their impact on processor design.</li> </ul>	
<b>UNIT</b>	<b>CONTENT</b>	<b>HOURS</b>
UNIT I	Microprocessor Architecture: Intel 8085 - Instruction Cycle - Timing diagram Instruction Format - Addressing modes - Intel 8085 Instructions.	16 Hours
UNIT II	Programming using 8085: Simple examples - 8-bit addition and subtraction -16-bit addition - 8-bit decimal subtraction - complements of 8-bit and 16-Bit number - shifting bits - - finding largest of two numbers - finding largest and smallest in an array - sum of series of numbers - 8-bit multiplication and division.	18 Hours
UNIT III	Peripheral Devices and Their Interfacing-I: Address Space Partitioning -Memory and I/O Interfacing - Interrupts of Intel 8085 - Interfacing Devices and I/O Devices/8255-Programmable peripheral Interface.	18 Hours

UNIT IV	Peripheral Devices and Their Interfacing-II: 8253- Programmable Interval Timer, 8259- Priority Interrupt Controller, 8279- Programmable Keyboard/Display Interface, 8251- USART, 8237/8257- Programmable DMA Controller	18 Hours
UNIT V	8086 Architecture and assembly language Programming: Basic 8086 Configuration - minimum mode and maximum mode - CPU Architecture Internal Operation – Machine language Instructions – instruction Execution timing – Assembler instruction format.	18 Hours
UNIT VI	Expert lectures, online seminars - webinars	2 Hours

**Text Book:**

1. B. Ram, “Fundamentals of Microprocessors and Microcomputers”, Dhanpat Rai Publications Pvt. Ltd., 3rd edition, 1998. Unit I : Chapter 3, 4; Unit II: Chapter 6; Unit III : Chapter 7
2. Y.C. Liu and G.A. Gibson, “Microcomputer Systems: The 8086/8088 Family Architecture, Programming and Design”, Prentice Hall of India, New Delhi, 2<sup>nd</sup> edition, 1986. Unit IV: Ch 2; Unit V: Ch 3.1 - 3.9, 4.1.

**Reference Books:**

1. Ramesh S. Gaonkar, “Microprocessor Architecture, Programming and Applications with the 8085/8080A”, Wiley Eastern Ltd, New Delhi, 1989
2. Barry B Brey, “The Intel Microprocessors 8086/8088, 80186, 80286, 80386, 80486, Pentium and Pentium Pro processors Architecture, Programming and Interfacing”, Prentice Hall of India, New Delhi, 2002.

**Web Resource:**

1. [https://uomustansiriyah.edu.iq/media/lectures/9/9\\_2017\\_10\\_27!12\\_38\\_08\\_AM.pdf](https://uomustansiriyah.edu.iq/media/lectures/9/9_2017_10_27!12_38_08_AM.pdf)
2. [https://www.just.edu.io/facultiesanddepartments/facultyofengineering/departments/biomedicalengineering/documents/micro\\_computer\\_architecture.pdf](https://www.just.edu.io/facultiesanddepartments/facultyofengineering/departments/biomedicalengineering/documents/micro_computer_architecture.pdf)

**Course Outcomes:**

On the Completion of the course, learner will be

- Collected knowledge on Intel 8085 architecture and its addressing modes.
- Understood and the concepts of 8-bit processors.
- Got the fundamental knowledge of 16-bit processors.
- Familiarity on interfaces and interrupts of Intel 8085.
- Acquired knowledge on assembly programming.
- Known the architecture and functionalities of 8086.

**Mapping of Cos with POs & PSOs:**

CO/PO	PO					PSO				
	1	2	3	4	5	1	2	3	4	5
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	M	S	S	S	S	S	S	S	M
CO4	S	S	S	S	M	S	M	S	S	S
CO5	S	S	M	S	S	S	S	S	S	S

**S - Strongly Correlated**

**M - Moderately Correlated**

**W-Weakly Correlated**

**N – No Correlation**

<b>Semester-VI/ Core Course XIV(CC)</b>	<b>Python and Bioinformatics Lab</b>	<b>Course Code: XUNY</b>
<b>Instruction Hours: 6</b>	<b>Credits: 5</b>	<b>Exam Hours: 3</b>
<b>Internal Marks :40</b>	<b>External Marks:60</b>	<b>Total Marks: 100</b>

### Knowledge Level

K1-Acquire / Remember	K2-Understanding	K3-Apply	K4-Analyze	K5-Evaluate	K6-Create
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### Course Objectives:

- Describe the Strings, List, Tuples and Dictionaries in Python.
- Demonstrate the power of Numbers, Math functions in python
- Develop linked data structures such as linear and binary search.
- Demonstrate the techniques for command line arguments.
- Create elliptical orbits and bouncing ball in Pygame .
- Experiment Python scripting language to develop innovative real time Applications.

### List of Practicals:

1. Compute the GCD of two numbers.
2. Find the square root of a number (Newton's method)
3. Exponentiation (power of a number)
4. Find the maximum of a list of numbers
5. Linear search and Binary search
6. Selection sort, Insertion sort
7. Merge sort
8. First n prime numbers
9. Multiply matrices
10. Programs that take command line arguments (word count)
11. Find the most frequent words in a text read from a file
12. Simulate elliptical orbits in Pygame
13. Simulate bouncing ball using Pygame.

**Course Outcomes:**

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

- Practice the Python programming language from its scratch
- Syntax and idioms.
- Patterns and styles.
- Illustrate the essentials of the Python library.
- Learn how to learn about other parts of the library when you need them.

**Mapping of COs with POs & PSOs:**

CO/PO	PO					PSO				
	1	2	3	4	5	1	2	3	4	5
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

**S - Strongly Correlated**

**M - Moderately Correlated**

**W-Weakly Correlated**

**N – No Correlation**

<b>Semester-VI/ Core Course XV(CC)</b>	<b>Project</b>	<b>Course Code:XUOP</b>
<b>Instruction Hours: 6</b>	<b>Credits: 5</b>	<b>Exam Hours: 3</b>
<b>Internal Marks :40</b>	<b>External Marks:60</b>	<b>Total Marks: 100</b>

### Knowledge Level

K1-Acquire / Remember	K2-Understanding	K3-Apply	K4- Analyze	K5- Evaluate	K6-Create
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### Course Objectives:

- To provide basic knowledge of the real time projects of the IT industry. To develop minireal time software's using any platforms such as C, C++, Java, VB, Dotnet, C#, ASP.net,VB.net, Android, iOS, Linux, Python, etc.
- To Identify Project scope, Objectives and Infrastructure.
- To Develop Activity diagram and Class diagram
- To Develop Sequence diagrams and Collaboration Diagram
- To add interface to class diagram

### Course Outcomes:

On completion of the Course, learners should be able to

- Able to elicit, analyze and specify software requirements.
- Plan a software engineering process life cycle.
- Realize design practically, using an appropriate software engineering methodology
- Analyze and translate a specification into a design.
- Able to use modern engineering tools for specification, design, implementation, and testing

**Mapping of COs with POs & PSOs:**

<b>CO/PO</b>	<b>PO</b>					<b>PSO</b>				
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

**S - Strongly Correlated**

**M - Moderately Correlated**

**W-Weakly Correlated**

**N – No Correlation**



<b>Semester-VI/ Major Based Elective Course II(MBE)</b>	<b>1.Python Programming</b>	<b>Course Code:XUE4</b>
<b>Instruction Hours: 6</b>	<b>Credits: 6</b>	<b>Exam Hours: 3</b>
<b>Internal Marks :25</b>	<b>External Marks:75</b>	<b>Total Marks: 100</b>

Cognitive Level	K1-Acquire / Remember K2-Understanding K3-Apply K4-Analyze K5-Evaluate K6-Create	
<b>Course Objectives:</b>	<b>The Course aims</b> <ul style="list-style-type: none"> <li>• Acquired the fundamental knowledge on Python programming.</li> <li>• Understood the nuances of this language and hence the learner becomes skillful in pythonprogramming.</li> <li>• Usage of modules and packages in python.</li> <li>• Familiarity with the file concept in python.</li> <li>• Skillful experimenting the concepts of OOPS with python language.</li> <li>• Capable of solving problems using Python.</li> </ul>	
<b>UNIT</b>	<b>CONTENT</b>	<b>HOURS</b>
UNIT I	Python –origins – features – variable and assignment - Python basics -statement and syntax- Identifiers – Basic style guidelines – Python objects – Standard types and other built-in types- Internal types – Standard type operators – Standard type built-in functions.	16 Hours
UNIT II	Numbers – Introduction to Numbers – Integers – Double precision floating point numbers - Complex numbers – Operators – Numeric type functions – Sequences: Strings, Lists and Tuples – Sequences – Strings and strings operators – String built-in methods – Lists –List type Built in Methods – Tuples.	18 Hours

UNIT III	Mapping type: Dictionaries – Mapping type operators – Mapping type Built-in and Factory Functions - Mapping type built in methods – Conditionals and loops – if statement – else Statement – elif statement– conditional expression – while statement – for statement – break statement – continue statement – pass statement – Iterators and the iter( ) function - Files and Input/Output – File objects – File built-in functions – File built-in methods – File built- inattributes – Standard files – command line arguments.	18 Hours
UNIT IV	Functions and Functional Programming – Functions – calling functions – creating functions – passing functions – Built-in Functions: apply( ), filter( ), map( ) and reduce( ) - Modules – Modules and Files – Modules built-in functions - classes – class attributes – Instances.	18 Hours
UNIT V	Database Programming – Introduction - Basic Database Operations and SQL - Example of using Database Adapters, Mysql - Regular Expression – Special Symbols and Characters – REs and Python.	18 Hours
UNIT VI	Contemporary Issues: Expert lectures, online seminars - webinars	2 Hours

**Text Book:**

1. Wesley J. Chun, Core Python Programming, Pearson Education Publication, 2<sup>nd</sup> edition,2012

**Reference Books:**

1.Wesley J. Chun, Core Python Application Programming, Pearson Education Publication,2015.  
 2.Eric Matthes, Python crash course, William Pollock, 2016.  
 3.Zed Shaw, Learn Python the hard way, Addition Wesley, 2017.

**Web Resource:**

1.[https://mrcet.com/downloads/digital\\_notes/CSE/III%20Year/PYTHON%20PROGRAMMING%20NOTES.pdf](https://mrcet.com/downloads/digital_notes/CSE/III%20Year/PYTHON%20PROGRAMMING%20NOTES.pdf)  
 2.<https://www.stat.berkeley.edu/~spector/python.pdf>

**Course Outcomes:**

On completion of the Course, learners should be able to,

- Describe the basic built-in functions and syntax of Python programming.
- Explain the mapping and file concept.
- Explain the object oriented programming concept.
- Illustrate the concepts of decision making and construct statements.
- Illustrate the usage of database and regular expression.

**Mapping of COs with POs & PSOs:**

CO/PO	PO					PSO				
	1	2	3	4	5	1	2	3	4	5
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

**S - Strongly Correlated**

**M - Moderately Correlated**

**W-Weakly Correlated**

**N – No Correlation**

<b>Semester-VI/ Major Based Elective Course II (MBE)</b>	<b>2.Computer Graphics</b>	<b>Course Code:XUE4</b>
<b>Instruction Hours: 6</b>	<b>Credits: 6</b>	<b>Exam Hours: 3</b>
<b>Internal Marks :25</b>	<b>External Marks:75</b>	<b>Total Marks: 100</b>

<b>Cognitive Level</b>	K1-Acquire / Remember K2-Understanding K3-Apply K4-Analyze K5-Evaluate K6-Create	
<b>Course Objectives:</b>	<b>The course aims:</b> <ul style="list-style-type: none"> <li>To impart the basic principles of generating primitives, shapes, package development, interactive graphics, raster graphics, two and three dimensional graphics and their transformations.</li> <li>To provide comprehensive introduction about computer graphics system, design algorithms and two dimensional transformations.</li> <li>To make the students familiar with techniques of clipping, three dimensional graphics and three dimensional transformations.</li> <li>The computer graphics course prepares students for activities involving in design, development and testing of modeling, rendering, shading and animation.</li> </ul>	
<b>UNIT</b>	<b>CONTENT</b>	<b>HOURS</b>
UNIT I	INTRODUCTION: Overview of Graphics Systems - Video Display Devices - Refresh Cathode Ray Tubes - Raster Scan and Random Scan Displays - Raster Scan and Random Scan Display Processor - Colour CRT Monitors – DVST - 3D Viewing Devices - Input Devices - Hard Copy Devices.	16 Hours

UNIT II	OUTPUT PRIMITIVES: Line drawing algorithms - DDA Line drawing algorithm - Bresenham's line drawing algorithm - Circle Drawing algorithms - Bresenham's circle drawing algorithm - Mid point circle drawing Algorithms - Area filling algorithms – Scan line algorithm – boundary fill algorithm – flood fill algorithm - character generation.	18 Hours
UNIT III	ATTRIBUTES OF OUTPUT PRIMITIVES :Line attributes – Curve attributes - Area fill attributes - Character attributes - bundled attributes - Anti aliasing techniques - 2D Transformations – Basic transformation – Composite transformation – other transformation.	18 Hours
UNIT IV	2D VIEWING: Windowing concepts – clipping algorithms- window to viewport transformation - Graphical User interfaces - logical classification of input devices - Interactive Input Methods	18 Hours
UNIT V	3D CONCEPTS: Three dimensional display techniques - Three dimensional representation - Three dimensional Transformations	18 Hours
UNIT VI	Contemporary Issues : Expert lectures, online seminars - webinars	2 Hours

**Text Book:**

1. Donald Hearn and M. Pauline Baker, Computer Graphics , 3rd Edition, Prentice Hall of india.

**Reference Books:**

1. Steven Harrington, “Computer Graphics Programming Approach” , 2nd Edition McGraw Hill.
2. Roy A. Plastock and Gordon Kelley, “Theory and Problems of Computer Graphics”, Schaums Outline Series, McGraw Hill.

**Web Resource:**

1. <http://www.svecw.edu.in/Docs%5CCSECGLNotes2013.pdf>
2. <https://drive.google.com/file/d/1st2YSA6l3KoCGiNxMfSAXHMbCdxEHN9i/view>

**Course Outcomes:**

On completion of this lab course the learner will be able to

- Understand the basics of computer graphics, different graphics systems and applications of computer graphics.
- Discuss various algorithms for scan conversion and filling of basic objects and their comparative analysis.
- Use of geometric transformations on graphics objects and their application in composite form.
- Extract scene with different clipping methods and its transformation to graphics display device.
- Explore projections and visible surface detection techniques for display of 3D scene on 2D screen.

**Mapping of COs with POs & PSOs:**

CO/PO	PO					PSO				
	1	2	3	4	5	1	2	3	4	5
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	M	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	M	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	M	S	S	M	S	S	S	S	S

**S - Strongly Correlated**

**M - Moderately Correlated**

**W-Weakly Correlated**

**N – No Correlation**

<b>Semester-VI/ Major Based Elective Course II (MBE)</b>	<b>3.Artificial Intelligence</b>	<b>Course Code:XUE4</b>
<b>Instruction Hours: 6</b>	<b>Credits: 6</b>	<b>Exam Hours: 3</b>
<b>Internal Marks :25</b>	<b>External Marks:75</b>	<b>Total Marks: 100</b>

<b>Cognitive Level</b>	K1-Acquire / Remember K2-Understanding K3-Apply K4-Analyze K5-Evaluate K6-Create	
<b>Course Objectives:</b>	<b>The course aims:</b> <ul style="list-style-type: none"> <li>• Introduces the basic principle concepts in artificial intelligence like simple representationschemes.</li> <li>• Problem solving paradigms.</li> <li>• Constraint propagation and search strategies.</li> <li>• Covers the areas of application such as knowledge representation.</li> <li>• Natural language processing and expert systems.</li> </ul>	
<b>UNIT</b>	<b>CONTENT</b>	<b>HOURS</b>
UNIT I	Artificial intelligence meaning: The AI problems – The underlying assumption – What is an AI Techniques? – The level of the model. Problems, problem spaces, and search: Defining the system – problem characteristics – production system characteristics.	15 Hours
UNIT II	Heuristic Search Techniques: Generate and Test – Hill climbing – Best –first search – Problem reduction – Constraint satisfaction – Means –ends analysis. Knowledge representation issues: Representations and mappings – Approaches to knowledge representation.	18 Hours

UNIT III	Using Predicate Logic: Representing simple facts in logic – Representing instance and ISA relationships – computable functions and predicates resolution – natural deduction. Representing Knowledge using rules: Procedural versus declarative knowledge – Logic programming –Forward versus Backward reasoning – Matching – Control Knowledge.	18 Hours
UNIT IV	Game Playing: Overview – The minimax search procedure – Adding alpha – beta cut-offs – Additional refinements – Iterative Deepening – References on specific games. Understanding: What understands? What makes understanding hard? Planning- The blocks world- components of a planning system –Good stack planning- Coral Stack planning-Nonlinear planning using constraint posting	18 Hours
UNIT V	Expert Systems: Representing & using domain knowledge – Expert system shells – Knowledge acquisition. Perception and Action: Real-time search – perception- Action – Robot Architectures. Prolog- the Natural languages of Artificial intelligence- introduction- converting English to prolog facts and rules- Goals- prolog terminology-Variables-Control structure-Arithmetic Operators-Matching in prolog- Backtracking.	18 Hours
UNIT VI	Contemporary Issues : Expert lectures, online seminars – webinars	3 Hours

**Text Book:**

1.Elaine rich, Kevin Knight, Shivashankar B Nair, "Artificial Intelligence", Tata McGraw Hill 3rd Edition, 2011.

**Reference Books:**

1. Stuart Russell Artificial Intelligence: A Modern Approach Pearson, 3rd Edition, 2013.
2. Deepak Khemani, "A First Course in Artificial Intelligence", McGraw Hill 2013.
3. Mishra R. B., "Artificial Intelligence", Prentice Hall of India 2010.

**Web Resource:**

1. [https://www.vssut.ac.in/lecture\\_notes/lecture1428643004.pdf](https://www.vssut.ac.in/lecture_notes/lecture1428643004.pdf)
2. [https://www.cet.edu.in/noticefiles/271\\_AI%20Lect%20Notes.pdf](https://www.cet.edu.in/noticefiles/271_AI%20Lect%20Notes.pdf)



**Course Outcomes:**

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

- Learn about the artificial intelligence problem and the characteristics of the problemspace.
- Demonstrate the fundamentals of heuristic search techniques and reasoning for problem solving.
- Understand the problem solving using predicates.
- Describe the concepts of expert systems with case studies for various applications.
- Apply the concepts of game playing techniques.

**Mapping of COs with POs & PSOs:**

CO/PO	PO					PSO				
	1	2	3	4	5	1	2	3	4	5
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	M
CO3	S	M	S	S	S	S	S	S	S	S
CO4	S	S	S	S	M	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

**S - Strongly Correlated**

**M - Moderately Correlated**

**W-Weakly Correlated**

**N – No Correlation**