# A.D.M COLLEGE FOR WOMEN (AUTONOMOUS),

**(Accredited With 'A' Grade By NAAC 3rd Cycle)**

*(Affiliated to Bharathidasan University, Tiruchirappalli)*

# NAGAPATTINAM-611 001

**PG DEPARTMENT OF COMPUTER SCIENCE**



# SYLLABUS

# B.Sc., COMPUTER SCIENCE

# (2021-2024 Batch)

# A.D.M. COLLEGE FOR WOMEN (AUTONOMOUS), NAGAPATTINAM
## UG Programme - B.Sc Computer Science
### (For the candidates admitted from 2019 – 2020 onwards)
### Bloom's Taxonomy Based Assessment Pattern

**Cognitive Level**

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

**Part I, II and III**

**Theory (External + Internal = 75 + 25 = 100 marks)**

| External/Internal | | | | | |
|---|---|---|---|---|---|
| **Cognitive Level** | **Section** | **Marks** | **Hrs.** | **Total** | **Passing Mark** |
| K1-K3 | A (Answer all) | $10 \times 2 = 20$ | | | |
| K3-K6 | B (Either or pattern) | $5 \times 5 = 25$ | 3 | 75 | 30 |
| K3-K6 | C (Answer 3 out of 5) | $3 \times 10 = 30$ | | | |
| **PRACTICAL** **(External + Internal = 60 + 40 = 100 marks)** | | | 3 | 60 | 24 |
| K1-K6 | Answer all Questions | $2 \times 25 = 50$ Record $= 10$ | | | |

## PG DEPARTMENT OF COMPUTER SCIENCE
## B.Sc. COMPUTER SCIENCE COURSE
## STRUCTURE UNDER CBCS(2021-2024 Batch)

## OBE ELEMENTS

**Programme Educational Objectives (PEO):**

| | |
|---|---|
| PEO 1: | To impart Cognitive in advanced concepts and applications in different fields of computer Science. |
| PEO 2: | To prepare students to enter into professional courses. |
| PEO 3: | To educate students to occupy important positions in Software's, MNC's and Industries. |
| PEO 4: | To equip students with skills to excel in their future careers. |
| PEO 5: | To enable students to take up challenging jobs. |

**Programme Outcomes (PO):**
On completion of the course the learner will be able

| | |
|---|---|
| PO 1: | Under Graduate students are to Apply algorithmic, mathematical and scientific reasoning to a variety of computational problems |
| PO 2: | Undergraduate students to analyze impacts of computing on individuals organization and society. |
| PO 3: | Undergraduate students are recognition of the need for and ability to engage in continuing professional development. |
| PO 4: | Undergraduate students are to be exposed to technical, analytical and creative. |
| PO 5: | The Under Graduate students are recognize the social and ethical responsibilities of a professional working in the various disciplines |

**Programme Specific Outcomes (PSO):**
On completion of the course the learner will be able

| | |
|---|---|
| PSO 1: | To acquire Cognitive with fundamentals of computer science to solve complex problems related to the field of Computer science |
| PSO 2: | Ability to identify, formulate and analyze complex problems related to computer science and reaching a substantiated conclusions using mathematicsand its applications |
| PSO 3: | Ability to understand professional & ethical responsibility in the field of Computer Science. |
| PSO 4: | Understand the impact of the Computer professionals in societal and environmental contexts. |
| PSO 5: | Capability to use appropriate software for analysis of data and relevant information from various sources for easy access and evaluation in variety of learning situation. |

## B.Sc., Computer Science

## 2021 – 2024 Batch

## STRUCTURE OF THE PROGRAMME

| Part | Title of the part | No. of Courses | Hours | Credit |
|------|-------------------|----------------|-------|--------|
| I | LC- Language Course | 4 | 24 | 12 |
| II | ELC – English Language Course | 4 | 24 | 12 |
| III | CC- Core Course | 15 | 75 | 63 |
| | AC –Allied Course | 6 | 27 | 18 |
| | MBE - Major Based Elective | 3 | 15 | 15 |
| IV | NME - Non- Major Elective | 2 | 4 | 4 |
| | SBE - Skill Based Elective | 3 | 6 | 6 |
| | SSD – Soft Skill Development | 1 | 2 | 2 |
| V | ES - Environmental Studies | 1 | 2 | 2 |
| | VE - Value Education | 1 | 2 | 2 |
| | EA - Extension Activities | - | - | 1 |
| | GS - Gender Studies | 1 | 1 | 1 |
| | **Total** | **41** | **180** | **140** |

**Note:**

1. Activities undertaken apart from the working

2. Other than working  will be scheduled on Saturdays with special time table

* Extra Credit Courses:

| Year | Semester | Courses |
|------|----------|---------|
| I | I & II | **Extra Credit Course**<br>Paper I : Computer Literacy – I<br>Paper II : Computer Literacy - II |

**Passing Minimum**

A candidate shall be declared to have passed in each course if she secures not less than 40% marks out of 75 marks (i.e., 30 marks) in the End Semester Examination (SE) and 40% out of 25 marks (i.e., 10 marks) in the Continuous Internal Assessment.(CIA).

## B.Sc., Computer Science 2021- 2024 Batch
## SCHEME OF THE PROGRAMME

| Sem. | Part | Course Code | Course | Ins. Hrs | Credit | Exam | Marks | | Total Marks |
|------|------|-------------|--------|----------|--------|------|------|------|-------------|
| | | | | | | | CIA | SE | |
| **I** | I | LCTA | LC- Language Course Tamil -I/Arabic-I/French-I/Hindi-I | 6 | 3 | 3 | 25 | 75 | 100 |
| | II | LCEA | ELC – English Language Course English-I | 6 | 3 | 3 | 25 | 75 | 100 |
| | III | XUA | CC- Core Course I C Programming | 5 | 4 | 3 | 25 | 75 | 100 |
| | | XUBY | CC- Core Course II Programming in C Lab | 3 | 3 | 3 | 40 | 60 | 100 |
| | | XUCY | CC- Core Course III Office Automation Lab | 2 | 2 | 3 | 40 | 60 | 100 |
| | | MUAP1 | AC –Allied Course I Mathematics I | 6 | 3 | 3 | 25 | 75 | 100 |
| | IV | VE | Value Education | 2 | 2 | 3 | 25 | 75 | 100 |
| | | | **Total** | **30** | **20** | * | * | * | **700** |
| **II** | I | LCTB | LC- Language Course Tamil II/Arabic-II/French-II/Hindi-II | 6 | 3 | 3 | 25 | 75 | 100 |
| | II | LCEB | ELC – English Language Course English-II | 6 | 3 | 3 | 25 | 75 | 100 |
| | III | XUD | CC - Core Course IV ObjectOriented Programming using C++ with Data Structures | 4 | 4 | 3 | 25 | 75 | 100 |
| | | XUEY | CC- Core Course V Data Structures Using C++ Lab | 4 | 3 | 3 | 40 | 60 | 100 |
| | | MUAP2 | AC -Allied Course II Mathematics II | 4 | 3 | 3 | 25 | 75 | 100 |
| | | MUAP3 | AC -Allied Course II Mathematics III | 4 | 3 | 3 | 25 | 75 | 100 |
| | IV | ES | Environmental Studies | 2 | 2 | 3 | 25 | 75 | 100 |
| | | | **Total** | **30** | **20** | * | * | * | **700** |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **III** | I | LCTC | LC- Language Course Tamil III /Arabic-III /French-III / Hindi-III | 6 | 3 | 3 | 25 | 75 | 100 |
| | II | LCEC | ELC - English Language Course- English-III | 6 | 3 | 3 | 25 | 75 | 100 |
| | III | XUF | CC - Core Course VI Database Systems | 5 | 5 | 3 | 25 | 75 | 100 |
| | | XUGY | CC - Core Course VII Database Systems Lab | 4 | 3 | 3 | 40 | 60 | 100 |
| | | PUAP1 | AC -Allied Course I Applied Physics –I | 5 | 3 | 3 | 25 | 75 | 100 |
| | | PUAP2Y | AC-Allied Course II Applied Physics –II Lab | 2 | - | - | - | - | - |
| | IV | XUE1Y | NME -Non Major Elective I 1.Web Designing Lab 2.DTP Lab | 2 | 2 | 3 | 40 | 60 | 100 |
| | | | **Total** | **30** | **19** | ***** | ***** | ***** | **600** |
| **IV** | I | LCTD | LC- Language Course - TamilIV/Arabic-IV/French-IV/ Hindi-IV | 6 | 3 | 3 | 25 | 75 | 100 |
| | II | LCED | ELC – English Language Course English-IV | 6 | 3 | 3 | 25 | 75 | 100 |
| | III | XUH | CC - Core Course VIII Java Programming | 5 | 3 | 3 | 25 | 75 | 100 |
| | | XUIY | CC - Core Course IX Java Programming Lab | 3 | 2 | 3 | 40 | 60 | 100 |
| | | PUAP2 Y | AC - Allied Course II Applied Physics II Lab | 2 | 3 | 3 | 40 | 60 | 100 |
| | | PUAP3 | AC - Allied Course III Applied Physics III | 4 | 3 | 3 | 25 | 75 | 100 |
| | IV | XUE2Y | NME - Non Major Elective II 1.Animation Lab 2.HTML and CSS Lab | 2 | 2 | 3 | 40 | 60 | 100 |
| | V | XUS1 | SBE – Skill- Based Elective I- 1.R-Programming Lab 2.Software Design Tools Lab | 2 | 2 | 3 | 40 | 60 | 100 |
| | III | | Internship/Field work (30 ) | - | 2 | - | - | - | Grade |
| | | | **Total** | **30** | **23** | ***** | ***** | ***** | **800** |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **V** | III | XUJ | CC - Core Course X – Web Technology | 6 | 5 | 3 | 25 | 75 | 100 |
| | | XUK | CC- Core Course XI- Operating System | 6 | 6 | 3 | 25 | 75 | 100 |
| | | XUL | CC - Core Course XII- Computer Networks | 6 | 6 | 3 | 25 | 75 | 100 |
| | | XUE3 | MBE –Major Based Elective I<br>1.Web Graphics<br>2.Big Data and Analytics<br>3.Mobile Communication | 6 | 6 | 3 | 25 | 75 | 100 |
| | IV | XUS2 | SBE –Skill Based Course II<br>1.Web Technology and Bioinformatics Lab<br>2.Software Testing Tools | 2 | 2 | 3 | 40 | 60 | 100 |
| | | XUS3 | SBE – Skill Based Elective III<br>1.Multimedia Lab<br>2.Internet with ASP Lab | 2 | 2 | 3 | 40 | 60 | 100 |
| | | SSD | Soft Skills Development | 2 | 2 | 3 | 25 | 75 | 100 |
| | | | **Total** | **30** | **29** | ***** | ***** | ***** | **700** |
| **VI** | III | XUM | CC- Core Course XIII –Micro Computer Architecture | 6 | 6 | 3 | 25 | 75 | 100 |
| | | XUNY | CC- Core Course XIV – Python and Bioinformatics Lab | 6 | 5 | 3 | 40 | 60 | 100 |
| | | XUOP | CC - Core Course XV -Project | 6 | 5 | 3 | 40 | 60 | 100 |
| | | XUE4 | MBE – Major Based Elective II<br>1.Python Programming<br>2.Computer Graphics<br>3.Artificial Intelligence | 6 | 6 | 3 | 25 | 75 | 100 |
| | | XUE5Y | MBE – Major Based Elective III<br>1.Microprocessor Lab<br>2.Data Visualization tool Lab<br>3.UI/UX Design and Animation Lab using Open source Tools | 5 | 5 | 3 | 40 | 60 | 100 |
| | V | | EA - Extension Activities | - | 1 | - | - | - | Grade |
| | | GS | GS - Gender Studies | 1 | 1 | 3 | 25 | 75 | 100 |
| | | | **Total** | **30** | **29** | | | | **600** |
| | | | **Grand Total** | **180** | **140** | | | | **4100** |

**Note:**

1. Activities undertaken apart from the working .
2. Other than working will be scheduled on Saturdays with special time table.

| | | | |
|---|---|---|---|
| Sem I & II | Non Major Course | Paper I: Computer Literacy-I | 2 (Extra Credit) |
| | | Paper II: Computer Literacy- II | 2(Extra Credit) |

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

| Cognitive Level | K1-Acquire / Remember<br>K2-Understanding<br>K3-Apply<br>K4-Analyze<br>K5-Evaluate<br>K6-Create | |
|---|---|---|
| Course Objectives | • To obtain Cognitive about the structure of the programming language C<br><br>• To develop the program writing and logical thinking skill.<br><br>• To impart the Cognitive about pointers which is the backbone of effective memory handling<br><br>• To study the advantages of user defined data type which provides flexibility for application development<br><br>• To teach the basics of Preprocessors available with C compiler | |
| **UNIT** | **CONTENT** | **HOURS** |
| I | FUNDAMENTALS OF PROGRAMMING: 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. | 15 |
| II | ARRAYS: One Dimensional Array - Two Dimensional Array – Character Arrays and Strings. FUNCTION: 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 |
| III | STRUCTURES AND UNIONS: Defining Structure - Declaring Structure Variable - Accessing Structure Members Structure Initialization - Arrays of Structure - Arrays within Structures - Structures within Structures - Structures and Function - Union. | 15 |
| IV | POINTERS : Pointers - Declaration of Pointers - Accessing Variables | 15 |

| | | |
|---|---|---|
| | through Pointers - Chain of Pointers - Pointer Expressions- Pointer Increments - Pointers with Arrays, Strings- Array of Pointers - Pointers with Functions - Pointers with Structures. | |
| 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 |
| VI | Contemporary Issues: Problem Solving through C Programming - Edureka | - |

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

**Course Outcomes:**
  On completion of the Course, learner should be able to,

| |
|---|
| CO1: Understand the basic terminology of algorithm, flowchart and gain awareness used incomputer programming.<br>CO2:Design programs involving the various concepts like decision structures, loops, functions of Clanguage.<br>CO3:Demonstrate the single, multi-dimensional arrays, String functions and user defined functions.<br>CO4:Compare the structure and union of C and apply it to construct array of structures and structurefunction.<br>CO5:Understand the dynamics of memory by the use of pointers and pointers with functions. |

**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-I / Core Course-II(CC) | Programming in C Lab | Course Code: XUBY |
|---|---|---|
| Instruction : 3 | Credits: 3 | Exam : 3 |
| Internal Marks :40 | External Marks:60 | Total Marks: 100 |

**Course Objectives:**

- To develop skills in implementing algorithms through the programming Language C
- To explore the features of C by applying sample problems.
- The students will be able to enhance their analyzing and problem solving skills
- To learn problem solving techniques.
- To teach the student to write programs in C and to solve the problems.

**List of Practical's:**

1. a) Program to find Simple Interest

   b) Program to calculate area of rectangle, square and triangle

   c) Program to find whether the given number is odd or even

2. a) Program to find the roots of a quadratic equation using if … else statement

   b) Program to find the biggest of 3 given numbers using nested if else… statement.

3. a) Program to find sum of individual digits of a given number using while statement.

   b) Program to find the sum of odd numbers between 1 and 100 using do … while statement.

   c) Program to find the sum and average of the given 'n' numbers using for loop

4. a) Program to find the factorial of the given number using recursive function

   b) Program to calculate the binomial coefficient.

5. a) Program to sort the given set of numbers.

   b) Program to perform the addition of two given matrices.

   c) Program to perform the multiplication of two given matrices.

6. a) Program to check whether the given string is palindrome or not.

   b) Program to arrange the given set of names in alphabetical order.

7. a) Program to illustrate the use of pointers in arithmetic operations.

   b) Program to compute the sum of all elements stored in an array using pointers.

   c) Program to swap the two values using pointers

8. Program to prepare mark sheet using array.

**Course Outcomes**

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

CO1: Understanding a functional hierarchical code organization.

CO2: Ability to define and manage data structures based on problem subject domain.

CO3: Ability to work with textual information, characters and strings.

CO4: Ability to work with arrays of complex objects.

CO5: Understanding a concept of object thinking within the framework of functional model.

**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-I / Core Course-III(CC) | Office Automation Lab | Course Code: XUCY |
|---|---|---|
| Instruction : 2 | Credits: 2 | Exam : 3 |
| Internal Marks :40 | External Marks:60 | Total Marks: 100 |

**Course Objectives:**

- 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.

- Give students an in-depth understanding of why computers are essential components in business, education and society.

- Provide foundational or "computer literacy" curriculum that prepares students for life-long learning of computer concepts and skills.

- To acquire Cognitive on editor, spread sheet and presentation software.

- To train them to work on the comment based activities in MS-office system

**List of Practical's:**

**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 andReplacing 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

Preparation and Manipulation of Slides

**Course Outcomes**

On completion of the Course, learner should be able to

| |
|---|
| CO1:To perform documentation activities |
| CO2:To execute accounting operations |
| CO3:To enhance presentation skills |
| CO4:To work on Document Management Systems |
| CO5:Format Text, Paragraphs, and sections, and |
| CO6: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 |

**S - Strongly Correlated**

**M - Moderately Correlated**

**W-Weakly Correlated**

**N – No Correlation**

| Semester-I | Value Education | Course Code: VE |
|---|---|---|
| Instruction : 2 | Credits: 2 | Exam Hours: 3 |
| Internal Marks :25 | External Marks:75 | Total Marks: 100 |

| Cognitive Level | K1-Acquire / Remember<br>K2-Understanding<br>K3-Apply<br>K4-Analyze<br>K5-Evaluate<br>K6-Create | |
|---|---|---|
| Course Objectives | • To develop good moral values in the children.<br><br>• To develop thinking in a better aspect and a democratic way of living.<br><br>• To develop good citizenship and standard of living and behavior of children.<br><br>• To develop tolerance and make a kind person to the children**.**<br><br>• To teach and inculcate the essential qualities to become a good leader | |
| **UNIT** | **CONTENT** | **HOURS** |
| I | Philosophy of Life and Social Values : Human Life on Earth (Kural 629) Purpose of Life (Kural 46) Meaning and Philosophy of Life (Kural 131, 226) Family (Kural 45), Peace in Family (Kural 1025) Society (Kural 446), The Law of Life (Kural 952), Brotherhood (Kural 807) Five responsibilities / duties of Man<br>(a)     to himself<br>(b)     to his family<br>(c)     to his environment<br>(d)     to his society,<br>(e)     to the Universe in his lives (Kural 43, 981). | 6 |
| II | Human Rights and Organisations: Definitions, Nature of Human Rights. Universal Declaration of Human Rights, International covenent on Civil and Political Rights - International covenent of Economic, Social and Cultural Rights. Amnesty International Red Cross. | 6 |
| III | Human Rights : Contemporary Challenges- Child labour - Womens Right - Bonded labour - Problems of refugees - Capital punishment. National and State Human Rights Commissions | 6 |

| IV | Yoga and Health : Definition, Meaning, Scope of Yoga - Aims and objectives of Yoga - Yoga Education with modern context - Different traditions and schools of Yoga - Yoga practices: Asanas, Pranayama and Meditation. | 6 |
|---|---|---|
| V | Role of State Public Service Commission : Constitutional provisions and formation - Powers and Functions - Methods of recruitment - Rules and notification, syllabi for different exams - written and oral - placement. | 6 |

**Reference Book:**

1. Thirukkural with English Translation of Rev. Dr. G.U. Pope, Uma Publication, 156, Serfoji Nagar, Medical College Road, Thanjavur 613 004

2. Leah Levin, Human Rights, NBT, 1998

3. V.R. Krishna Iyer, Dialetics and Dynamics of Human Rights in India, Tagore Law Lectures.

4. Yogic Thearpy - Swami Kuvalayananda and Dr.S.L.Vinekar, Government of India, Ministry

5. of Health, New Delhi.

6. SOUND HEALTH THROUGH YOGA - Dr.K.Chandrasekaran, Prem Kalyan Publications,

7. Sedaptti, 1999.

**Course Outcomes:**

Learner will understand the importance of value based living.

CO1:Students will gain deeper understanding about the purpose of their life.

CO2:Students will understand and start applying the essential steps to become good leaders.

CO3:Students will emerge as responsible citizens with clear conviction

to practice values andethics in life.

CO4:Students will become value based professionals.

CO5:Students will contribute in building a healthy nation

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

| Cognitive Level | K1-Acquire / Remember<br>K2-Understanding<br>K3-Apply<br>K4-Analyze<br>K5-Evaluate<br>K6-Create |
|---|---|
| Course Objectives | • To give the concepts of object oriented programming and to impart the programming skills inC++.<br>• Describe the procedural and object oriented paradigm with concepts of streams, classes, functions, data and objects.<br>• Understand dynamic memory management techniques<br>• Classify inheritance with the understanding of early and late binding, usage of exceptionhandling, generic programming.<br>• Demonstrate the use of various OOPS concepts with the help of programs |

| UNIT | CONTENT | HOURS |
|---|---|---|
| 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. | 12 |
| 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 – Class Object To Base – Class Object Conversion – Composition Vs. Inheritance – Virtual functions – This Pointer – Abstract Base Classes and Concrete Classes – Virtual Destructors – Dynamic Binding. | 12 |
| 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 |
| IV | NON-LINEAR DATA STRUCTURES: Trees – Binary Trees – Binary tree representation and traversals – Application of trees: Set representation and | 12 |

| | Union-Find operations – Graph and its representations – Graph Traversals – Representation of Graphs – Breadth-first search – Depth- first search - Connected components. | |
| --- | --- | --- |
| V | SORTING and SEARCHING: Sorting algorithms: Insertion sort - Quick sort - Merge sort - Searching: Linear search –Binary Search. | 12 |
| VI | Contemporary Issues: Expert lectures, online seminars - webinars | - |

**Text Books:**

1. E. Balagurusamy, "Object Oriented Programming with C++", TMG, 8th Ed., New Delhi, 2017.

2. Seymour Lipschutz, "Data Structures", Tata McGraw Hill Publishing CompanyLimited, Revised 5th edition, New Delhi, 2014. UNITS: III, IV & V.

**Reference Books:**

1. Robert Lafore, "Object Oriented Programming in Microsoft C++", Galgotia Publications,4thedition, New Delhi, 2000.

2. Bjarne Stroustrup, "The C++ Programming Language", Addison- Wesley, 4th edition., 2013

**Web-Resources:**

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

CO1:Learn the basic concepts in Object-Oriented programming.

CO2:Develop programming skills by applying Object-Oriented programming.

CO3:Discuss the function overloading and Member Functions.

CO4:Understand the concepts of Constructors and Inheritance.

CO5: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 |

**S - Strongly Correlated**

**M - Moderately Correlated**

**W-Weakly Correlated**

**N – No Correlation**

| Semester-II / Core Course-V(CC) | Data Structures Using C++ Lab | Course Code: XUEY |
|---|---|---|
| Instruction : 4 | Credits: 3 | Exam : 3 |
| Internal Marks :40 | External Marks:60 | Total Marks: 100 |

**Course Objectives:**

- To understand the procedural and object oriented paradigm with concepts of streams,classes, functions, data and objects.

- Understand how to produce object-oriented software using C++

- To familiarize the students with language environment.

- To implement various concepts related to language.

- Be able to understand the difference between object oriented programming and procedural oriented language and data types in C++.

**List of Practical's:**

1. a) Program to find factorial of a given number.

   b) Program to convert dollars to rupees.

2. Program to illustrate the call by value and call by reference

3. a) Program to find the largest of three numbers using inline function.

   b) Program to find mean of 'N' numbers using friend function.

4. Program to find volume of cube, cylinder and rectangular box using function overloading.

5. Matrix Addition and Multiplication operations

6. To find an element using Sequential and binary search.

7. Perform the following types of Sorting:

   i.     Bubble sort

   ii.    Insertion sort

   iii.   Selection sort

8. To PUSH and POP an element from STACK

9. To Insert and Delete an element from QUEUE.

10. To insert and delete a node in a linked list.

**Course Outcomes:**

On completion of the Course, learner should be able to

CO1:After the completion of this course, the students will be able to develop applications.
CO2:Describe the procedural and object oriented paradigm with concepts of streams, classes,functions, data and objects.
CO3:Understand dynamic memory management techniques using pointers, constructors,destructors, etc

**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-II | Environmental Studies | Course Code: ES |
|---|---|---|
| Instruction : 2 | Credits: 2 | Exam : 3 |
| Internal Marks :25 | External Marks:75 | Total Marks: 100 |

| Cognitive Level | K1-Acquire / Remember<br>K2-Understanding<br>K3-Apply<br>K4-Analyze<br>K5-Evaluate<br>K6-Create |
|---|---|
| Course Objectives | • To develop a world population that is aware of and concerned about the environment andits associated problems<br>• To develop the Cognitive<br>• To ensure the Skills and attitudes<br>• To develop motivations<br>• Develop commitment to work individually and collectively towards solutions of currentproblems and prevention . |

| UNIT | CONTENT | HOURS |
|---|---|---|
| I | The Multidisciplinary nature of environmental studies Definition, scope and importance. Need for public awareness. | 8 |
| II | Natural Resources: Renewable and non-renewable resources: Natural resources and associated problems. a) Forest resources: use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people. b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams benefits and problems. c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. e) Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Case studies. f) Land resources: Land as a resources, land degradation, man induced Landslides, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles. | 8 |
| III | Ecosystems Concept of an ecosystem. Structure and function of an ecosystem. Producers, consumers and decomposers Energy flow in | 6 |

| | | | |
|---|---|---|---|
| | the ecosystem Ecological succession. Food chains, food webs and ecological pyramids Introduction, types, characteristic features, structure and function of the following ecosystem:- <br> a.      Forest ecosystem <br> b.      Grassland ecosystem <br> c.      Desert ecosystem <br> d.      Aquatic ecosystems, (ponds, streams, lakes, rivers, oceans, estuaries) | | |
| IV | Biodiversity and its conservation Introduction – Definition : Genetic, species and ecosystem diversity Bio geographical classification of India Value of biodiversity : consumptive use, productive use, social, ethical, aesthetic and option values Biodiversity at global, National and local levels India as a mega-diversity nation Hot-spots of biodiversity Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts. Endangered and endemic species of India Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity. | 8 | |
| V | Environmental Pollution Definition Causes, effects and control measures of: a. Air Pollution <br> b. Water Pollution c. Soil Pollution d. Marine Pollution e. Noise pollution f. Thermal Pollution <br> g. Nuclear hazards Solid waste Management: Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution Pollution case studies Disaster management: floods, earthquake, cyclone and landslides. Ill-Effects of Fireworks: Firework and Celebrations, Health Hazards, Types of Fire, Firework and Safety | 8 | |
| VI | Social Issues and the Environment From Unsustainable to Sustainable development. Urban problems related to energy. Water conservation, rain water harvesting, watershed management. Resettlement and rehabilitation of people; its problems and concerns. Case studies Environmental ethics: Issues and possible solutions. Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies. Wasteland reclamation. Consumerism and waste products. Environment Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and Control of Pollution) Act. Wildlife Protection Act. Forest Conservation Act. Issues involved in enforcement of environmental legislation Public awareness. | 7 | |
| VII | Human Population and the Environment Population growth, variation among nations. Population explosion – Family Welfare Programmes Environment and human health Human Rights - Value Education HIV/ AIDS - Women and Child Welfare Role of Information Technology in Environment and human health .Case studies. | 8 | |
| VIII | Field Work Visit to a local area to document environmental assets-river / forest/ grassland/ hill/ mountain | - | |

**Reference Books:**

**1.**Agarwal, K.C. 2001 Environmental Biology, Nidi Public Ltd Bikaner.

2.Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt ltd, Ahamedabad – 380013, India, E-mail: mapin@icenet.net(R)

3.  Brunner R.C. 1989, Hazardous Waste Incineration, McGraw Hill Inc 480 p

4.  Clark R.S. Marine Pollution, Clanderson Press Oxford (TB)

5.  Cunningham, W.P.Cooper, T.H.Gorhani E & Hepworth, M.T. 2001.

6.  De A.K. Environmental Chemistry, Wiley Eastern Ltd

7.  Down to Earth, Centre for Science and Environment (R)

8.  Gleick, H.P. 1993. Water in crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute Oxford University, Press 473p.

9. Hawkins, R.E. Encyclopedia of India Natural History, Bombay Natural History Society,   Bombay (R)

10.  Heywood, V.H & Watson, R.T. 1995. Global Biodiversity Assessment. Cambridge University   Press 1140 p.

11.  Jadhav, H & Bhosale, V.M. 1995. Environmental Protection and Laws Himalaya Pub.House,   Delhi 284 p.

12.  Mckinney, M.L. & Schoch R.M. 1996. Environmental Science systems & Solutions, Web enhanced    edition 639 p.

13.  Mhaskar A.K. Matter Hazardous, Techno-Science Publications (TB)

14.  Miller T.G. Jr. Environmental Science, Wadsworth Publishing Co. (TB)

15.  Odum, E.P. 1971 Fundamentals of Ecology. W.B. Saunders Co. USA. 574 p

16.  Rao MN & Datta, A.K. 1987 Waste Water treatment, Oxford & IBH Publication Co. Pvt Ltd 345

17.  Sharma B.K. 2001 Environmental chemistry Goel Publ House, Meerut.

18.  Survey of the Environment, The Hindu (M ).

19.  Townsend C. Harper, J and Michael Begon, Essentials of Ecology, Blackwell science(TB)

20.  Trivedi R.K. Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards,  Vol. I and II, Enviro Media (R).

21. Trivedi R.K. and P.K. Goel, Introduction to air pollution, Techno-Science Publications (TB).

**Web-Resources:**

**Course Outcomes:**

On completion of the Course, learner should be able to

CO1: Understand key concepts from economic, political, and social analysis as they pertain tothe design and evaluation of environmental policies and institutions.

CO2: Appreciate concepts and methods from ecological and physical sciences and theirapplication in environmental problem solving.

CO3: Appreciate the ethical, cross-cultural, and historical context of environmental issues andthe links between human and natural systems.

CO4: Reflect critically about their roles and identities as citizens, consumers and environmentalactors in a complex, interconnected world.

CO5: Understand the transnational character of environmental problems and ways of addressing them, including interactions across local to global scales.

**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 / Core Course-VI(CC) | Database Systems | Course Code: XUF |
|---|---|---|
| Instruction : 5 | Credits: 5 | Exam : 3 |
| Internal Marks :25 | External Marks:75 | Total Marks: 100 |

| Cognitive Level | K1-Acquire / Remember<br>K2-Understanding<br>K3-Apply<br>K4-Analyze<br>K5-Evaluate<br>K6-Create |
|---|---|
| Course Objectives | • Distinguish between data and information and Cognitive<br><br>• Distinguish between file processing system and DBMS<br><br>• Describe DBMS its advantages and disadvantages<br><br>• Describe Database users including data base administrator<br><br>• Describe data models, Schemas and instances.<br><br>• Describe DBMS Architecture & Data Independence |

| UNIT | CONTENT | HOURS |
|---|---|---|
| I | **Introduction:** Database System Applications –Database Languages – Transaction Management – Database Architecture – Database users and Administrators - **Relational Model:** Structure of Relational Databases – Database Design – ER Model – The Entity- relationship Model – Constraints – Entity Relationship Diagrams | 15 |
| 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 |
| 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 – Denormalization – Database Security: Data Security Requirements – Protecting the Data within the Database – Granting and Revoking Privileges – Data Encryption. | 15 |

| | | | |
|---|---|---|---|
| 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 |
| 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 |
| VI | Contemporary Issues : Expert lectures, online seminars - webinars | - |

**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 Systerms)- By Mrs Vidya H. Bankar, Mrs DeepaShree K, Mehendale, Mrs Sujatha P. Patel

**Web Resource:**

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

http://www.kciti.edu/wp-content/uploads/2017/07/dbms_tutorial.pdf

CO1:Emphasize the need, role, importance and uses of databases in application development

CO2: Design E-R modeling for a given situation and provide the foundation for development of relational database structure.

CO3: Identify the advantages of the database approach over the file based data storage system.

CO4: Distinguish between different models of file organizing, storing and using of data and understand the relational model and relational algebra operations.

CO5: Normalize the relational tables applying normalization rules and apply PL/SQL procedural interfaces statement on relational tables as per requirements.

**Course Outcomes:**

On completion of the Course, learner should be able to

**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**

| Semester-III / Core Course-VII(CC) | Database Systems Lab | Course Code: XUGY |
|---|---|---|
| Instruction : 4 | Credits: 3 | Exam : 3 |
| Internal Marks :40 | External Marks:60 | Total Marks: 100 |

**Course Objectives:**

- To acquire skills in SQL statements with various constructs

- To acquire skills in PL/SQL Programming

- To practice with stored Objects, functions, procedures, trigger.

- Design different views of tables for different users and to apply embedded and nestedqueries.

- Design and implement a database for a given problem according to well known designprinciples that balance data retrieval performance with data consistency.

**List of Practical's:**

1. Creating, modifying and dropping Tables.

2. Inserting, modifying and deleting rows.

3. Working with Decode and case.

4. Creating tables with Adding , Dropping ,disabling /enabling constraints.

5. Retrieving rows with Character functions.

6. Retrieving rows with Number and Date functions.

7. Retrieving rows with Group functions and HAVING.

8. Retrieving rows with Sub Queries.

9. PL/SQL programs with control structures.

10. PL/SQL programs with Cursors.

11. PL/SQL programs with Exception Handling.

12. PL/SQL programs with Triggers.

**Course Outcomes:**

On completion of the Course, learner should be able to

CO1: Design and implement a database schema for a given problem-domain

CO2: Normalize a database

CO3: Declare and enforce integrity constraints on a database using a state-of-the-artRDBMS

CO4: Programming PL/SQL including stored procedures, stored functions, cursors, packages.

CO5: Effectively designs basic and advanced SQL queries to retrieve data from the database.

**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) | Web Designing Lab | Course Code: XUE1Y |
|---|---|---|
| Instruction : 2 | Credits: 2 | Exam : 3 |
| Internal Marks :40 | External Marks:60 | Total Marks: 100 |

**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 appropriateone based on need.

**List of Practical's**
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 LevelElements.
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 andColumn 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

> CO1:Develop skills in analyzing the usability of a web site.
>
> CO2:Understand how to plan and conduct user research related to web usability.
>
> CO3:Design, develop and host a user friendly website.
>
> CO4:Know the usage of APIs.
>
> CO5:Layout management in line with current trend.

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

**Course Objectives:**

- Demonstrate Cognitive 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.

**List of Practical's**:

**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

| CO1: Introduction to Page Maker |
| --- |
| CO2: Print Design Basics |
| CO3:Design Principles & Color Harmony |
| CO4: Layout Design |
| CO5:Photoshop |

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

| Cognitive Level | K1-Acquire / Remember<br>K2-Understanding<br>K3-Apply<br>K4-Analyze<br>K5-Evaluate<br>K6-Create |
|---|---|
| Course Objectives | • Programming in the Java programming language,<br><br>• Cognitive of object-oriented paradigm in the Java programming language,<br><br>• The use of Java in a variety of technologies and on different platforms.<br><br>• To Learn Why Java is useful for the design of desktop and web applications.<br><br>• To learn how to implement object oriented designs with Java.<br><br>• To identify Java language components and how they work together in applications. |

| UNIT | CONTENT | HOURS |
|---|---|---|
| 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. | 15 |
| 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 |
| III | Arrays, Strings and Vectors – Interfaces- Multiple Inheritance – Packages: Putting classes together Multi Threaded Programming. | 15 |
| 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 |
| V | Files: Introduction – concept of streams – Stream classes – Using | 15 |

| | stream – I/O classes – File class – I/O Exceptions – creation of files – Reading / Writing characters/ Bytes – Handling primitive data types – Random Access Files. | |
|---|---|---|
| VI | Contemporary Issues : Expert lectures, online seminars - webinars | - |

**Text Book**

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

**Reference Books**

1. Herbert Schildt, Java: The CompleteReference, McGraw Hill Professional,7<sup>th</sup> edition,2017.

2. Robert Sedgewick&Kevin Wayne, Introduction to Programmingin Java, Addison Wesley, 2017.

**Web-Resources:**

https://www.tutorialspoint.com/java/index.html
https://www.javatpoint.com/java-tutorial

**Course Outcomes:**

On Completion of the course the student should be able to

CO1: Use an integrated development environment to write

CO2: Compile and run

CO3: Test simple object oriented java programs.

CO4: Read and make elementary modifications to Java programs that solve real worldproblems

CO5: Validate input in a Java Program

**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-IV/ Core Course IX(CC) | Java Programming Lab | Course Code: XUIY |
|---|---|---|
| Instruction : 3 | Credits: 2 | Exam : 3 |
| Internal Marks :40 | External Marks:60 | Total Marks: 100 |

**Course Objective:**

- Understand fundamentals of programming such as variables, conditional and iterative execution, API's etc.
- Understand fundamentals of object oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.
- Have the ability to write computer programs to solve specific problems.
- Be able to use the Java SDK environment to create, debug and run Java programs.
- To implement front end and back end of an application

**List of Practical's:**

1. Exercises using classes and objects
2. Exercises using Control Statements
3. Exercises using different Inheritance
4. Exercises using Mouse Events
5. Exercises for implementing the font class method
6. Exercises to implement Exception Handling
7. Exercises using Interfaces
8. Exercises to illustrate the Thread Priority
9. Retrieve nucleotide sequences and perform pair wise and multiple sequence alignmentusing BLAST tool and analyze the output.
10. Retrieve nucleotide sequences and perform multiple sequence alignment usingCLUSTALW tool and generate phylogenetic tree.
11. Retrieve two nucleotide sequences to align and generate PAM & BLOSUM scoringmatrix.
12. Convert gene sequence into its corresponding amino acid sequence using TranslateTool
13. Convert RNA gene sequence into its corresponding amino acid sequence using RNAprediction Tool

**Course Outcomes:**

On completion of the Course, learner should be able to

CO1: Implement Object Oriented programming concept using basic syntax's of control Structures, strings and function for developing skills of logic building activity.

CO2: Identify classes, objects, members of a class and the relationships among them neededfor a finding the solution to specific problem

CO3: Demonstrates how to achieve reusability using inheritance, interfaces and packages anddescribes faster application development can be achieved.

CO4: Demonstrate understanding and use of different exception handling mechanisms

CO5: Concept of multi-threading for robust faster and efficient application development.

**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-IV/ Skill Based Course I | R-Programming Lab | Course Code:XUS1 |
|---|---|---|
| Instruction : 2 | Credits: 2 | Exam : 3 |
| Internal Marks :40 | External Marks:60 | Total Marks: 100 |

**Course Objective:**

- Master the use of the R and R Studio interactive environment.

- Expand R by installing R packages.

- Explore and understand how to use the R documentation.

- Read Structured Data into R from various sources.

- Understand the different data types in R.

- Understand the different data structures in R.

**List of Practical's:**

1. R Program for Vector operations.

2. Create a R- list.

3. Implement matrices addition, subtraction and Multiplication.

4. Create a Data frame.

5. Create a factor object.

6. Import data, copy data from CSV file to R.

7. Create a R program for Mean median and mode.

8. Draw Bar charts and Pie charts in R.

9. Make visual representations of data for plotting functions in R.

10. Create a R program for Regression Model.

**Course Outcomes:**

On completion of the Lab, learner should be able to

CO1: Download and install R and R Studio.

CO2: Navigate and optimize the R integrated development environment (IDE) R Studio.

CO3: Install and load add-in packages and import external data into R for data processing

and statistical analysis.

CO4: Learn the main R data structures – vector and data frame.

CO5: Compute basic summary statistics.

| Semester-IV/ Skill Based Course I | 2.Software Design Tool Lab | Course Code:XUS1 |
|---|---|---|
| Instruction : 2 | Credits: 2 | Exam : 3 |
| Internal Marks :40 | External Marks:60 | Total Marks: 100 |

**Course Objective:**
- Analysis tools (e.g., debuggers, profilers, automated bug-finders, style-checkers, programdifferencing tools, program investigation tools)
- Construction tools (e.g., compilation managers and build scripts)
- Tool support for collaboration (e.g., version control systems and problem report databases)
- Design tools (e.g. UML- based modeling tool)
- GNU/Linux operating system environment, command-line utilities, bash shell scripting

**List of Practical's:**
1. Write the complete problem statement
2. Write the software requirement specification document
3. Draw the entity relationship diagram
4. Draw the data flow diagrams at level 0 and level 1
5. Draw use case diagram
6. Draw activity diagram of all use cases
7. Draw state chart diagram of all use cases
8. Draw sequence diagram of all use cases
9. Draw collaboration diagram of all use cases
10. Assign objects in sequence diagram to classes and make class diagram

**Course Outcomes:**
Students will be able to decompose the given project in various phases of a life cycle.

CO1: Students will be able to choose appropriate process model depending on the userrequirements.
CO2: Understand the Automation testing approach.
CO3: Students will be able perform various life cycle activities like Analysis, Design,Implementation, Testing and Maintenance.
CO4: Students will be able to know various processes used in all the phases of the product.
CO5: Students can apply the Cognitive, techniques, and skills in the development of asoftware product.

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

**Course Objectives:**

- To Impart Practical Training in Computer Graphics and Animation related problems.

- To implement various graphics drawing algorithms, 2D-3D transformations and clippingtechniques.

- 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 electronicallygenerated image sequences.

**List of Practical's**

**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 GroupingObjects

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

CO1:Communicate ideas, believable action and emotion effectively by employing principles

CO2: Animation and performance in all aspects of drawing.

CO3: Integrate the concepts, principles and theories involved in the physics of animation inall aspects of drawing.

CO4: Design layouts and backgrounds that incorporate principles of composition, perspective andcolour, with speed and accuracy.

| Semester-IV/ Non Major Elective II (NME) | 2. HTML and CSS Lab | Course Code: XUE2Y |
|---|---|---|
| Instruction : 2 | Credits: 2 | Exam : 3 |
| Internal Marks :40 | External Marks:60 | Total Marks: 100 |

**Course Objectives:**

- Basic principle

- Strategies

- Methodologies of web application development.

- Designed to develop dynamic web page using scripting languages with CSS

- HTML.

**List of Practical's:**

**HTML**

1. Usage of New Semantic Elements

2. Create Page Structure and Navigation

3. Create Form Input and Validation.

4. Create Image onto Canvas.

   **CSS**
5. Selectors and Colors

6. Text and Drop Shadows

7. Transition- Rotating Box

8. Linear Gradient and Radial gradient.

9. 2D and 3D Animations

10. SVG, Drag and Drop.\

**Course outcomes:**

On completion of the Course, learner should be able to

CO1: Define the Cognitive about HTML document with element types, hyperlinks, images, list,tables and forms.
CO2: Understand the concept of CSS for dynamic presentation effect in HTML and XMLdocuments.
CO3: Describe the mark-up languages for processing, identifying and presenting information inweb pages.
CO4: Apply scripting languages in HTML document to add interactive components to web pages.
CO5: Illustrate the web technology concept to create schemas and dynamic web pages.

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

| Cognitive Level | K1-Acquire / Remember<br>K2-Understanding<br>K3-Apply<br>K4-Analyze<br>K5-Evaluate<br>K6-Create | |
|---|---|---|
| Course Objectives | • Define the Cognitive about HTML document with element types, hyperlinks, images, list, tables and forms.<br><br>• Analyze a web page and identify its elements and attributes.<br><br>• Create web pages using XHTML and Cascading Style Sheets.<br><br>• Build dynamic web pages using JavaScript (Client side programming).<br><br>• Create XML documents and Schemas. | |
| **UNIT** | **CONTENT** | **HOURS** |
| I | Fundamentals of HTML:-Understanding Elements: Root Elements-Metadata Elements- Section Elements-Heading Elements. Describing data types. | 18 |
| 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 |
| III | DHTML: Introduction - Cascading Style sheets - DHTML Document Object Model and collections – Event Handling - Filters and Transitions - Data Binding. | 18 |
| IV | JAVASCRIPT: Introduction- Language Elements - Objects of JavaScript- Other Objects. VBSCRIPT: Introduction- Embedding VBScript Code in an HTML Document- Comments- Variables-Operators-Procedures- Conditional Statements- Looping Constructs - Objects and VBScript - Cookies. | 18 |
| V | EXTENSIBLE MARK-UP LANGUAGE (XML): Introduction- HTML | 18 |

| | | 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. | |
|---|---|---|---|
| VI | Contemporary Issues : Expert lectures, online seminars – webinars | - |

**Reference Books:**

1. Web Technology, Akanksha Rastogi, K.Nath & Co Educational Publishers, 1<sup>st</sup> edition.

2. Intoduction toWeb Technology, Anuranjan Misra,Arjun Kumar Singh, Laxmi Publication,2011.

3. World Wide Web Design withHTML, C.Xavier, TMH Publishers, 2008.

**Web-Resources:**

https://mrcet.com/downloads/digital_notes/IT/WEB%20TECHNOLOGIES%20(R15A0520). pdf

http://yellaswamy.weebly.com/web-technologiesiiibtech-ii-sem.html

**Course Outcomes:**

On completion of the Course, learner should be able to

| |
|---|
| CO1: Illustrate the web technology concept to create schemas and dynamic web pages. CO2: Understand the concept of CSS for dynamic presentation effect in HTML and XMLdocuments. CO3: Describe the mark-up languages for processing, identifying and presenting information inweb pages. CO4: Apply scripting languages in HTML document to add interactive components to web pages CO5: Define the Cognitive about HTML document with element types, hyperlinks, images, list,tables and forms |

**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-IV/ Core Course XI(CC) | Operating Systems | Course Code: XUK |
|---|---|---|
| Instruction : 6 | Credits: 6 | Exam : 3 |
| Internal Marks :25 | External Marks:75 | Total Marks: 100 |

| Cognitive Level | K1-Acquire / Remember<br>K2-Understanding<br>K3-Apply<br>K4-Analyze<br>K5-Evaluate<br>K6-Create | |
|---|---|---|
| Course Objectives | • To gain the basic Cognitive about the operating systems and its various schemes and services.<br>• To make students able to learn different types of operating systems<br>• To learn the concept of file systems and CPU scheduling algorithms used in operating system.<br>• To provide students Cognitive of memory management and deadlock handling algorithms<br>• 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. | |
| UNIT | CONTENT | HOURS |
| 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. | 18 |
| 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 |
| 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 – | 18 |

| | | |
|---|---|---|
| | Pipelining – Vector Processing - Array processor –Dataflow computers-Multiprocessing-Fault tolerance. | |
| IV | UNIX - Getting started - Gaining Confidence: The Unix File System – Creating File- Indulging File Play. Listing Files & Directories – Directory Related Commands. | 18 |
| 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 |
| VI | Contemporary Issues : Expert lectures, online seminars - webinars | - |

**Text Book**

1. Dietal.H.M, An introduction to operating system, Welsey publication,3rd edition , 2005.
2. Yashavant P. Kanetkar, UNIX Shell Programming, BPB Publication,4th 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 2nd Edition, 2011.

3. 3.DborahS.Ray, Eric.J.Ray, Unix and Linux, Pearchpit press, 4th edition, 2009.

4.4.Randal K. Michael, Mastering Unix shell scripting, Wiley India, 2nd Edition, 2009.

**Web-Resources:**

http://www.svecw.edu.in/Docs%5CCSEOSLNotes2013.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,

| |
|---|
| CO1: Recognize the basic concepts of operating system. |
| CO2: Understand the process and thread concepts. |
| CO3: Distinguish the concepts of deadlocks and storage management in operating systemconcepts. |
| CO4: Apply various file system implementation and optimization techniques using files. |
| CO5: 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**

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

| Cognitive Level | K1-Acquire / Remember K2-Understanding K3-Apply K4-Analyze K5-Evaluate K6-Create | |
|---|---|---|
| Course Objectives | • Resource sharing <br> • High Reliability <br> • Improve performance <br> • Communication <br> • Transmission Medium | |
| UNIT | CONTENT | HOURS |
| 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. | 18 |
| II | 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. | 18 |
| 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 |
| 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 |
| V | Application Layer: Name space- domain name space- distribution | 18 |

| | | of name space- DNS in the internet- resolution- remote logging-telnet- electronic mail- file transfer-cryptography Introduction-symmetric-key cryptography- asymmetric-key cryptography. | |
|---|---|---|---|
| VI | Contemporary Issues: Expert lectures, online seminars - webinars | | - |

**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:**

https://www.mrecacademics.com/DepartmentStudyMaterials/20201223Computer%20Networks.pdf https://www.smartzworld.com/notes/computer-network-notes-pdf-cn/

**Course Outcomes:**

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

CO1: Provide an overview of the concepts and fundamentals of data communication and computer networks.

CO2: Understand the terminology and concepts of the OSI reference model and the TCP-IP reference model.

CO3: Describe the significance of protocols used in data communications and networking.

CO4: Illustrate the importance of network security and application of cryptographic methods in establishing security.

CO5: 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**

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

| Cognitive Level | K1-Acquire / Remember<br>K2-Understanding<br>K3-Apply<br>K4-Analyze<br>K5-Evaluate<br>K6-Create | |
|---|---|---|
| Course Objectives | • Graphics should help to guide the viewers' focus<br><br>• Important content on the page.<br><br>• Using visually strong graphic elements on a page.<br><br>• Useful in directing viewers' attention<br><br>• Providing structure for the page. | |
| UNIT | CONTENT | HOURS |
| I | Introduction to multimedia -GIMP: Environment - layers and work path -Image editing - channels, masks and actions - filters - rollovers and animations. | 18 |
| II | Synfig: introduction - drawing and colouring tools. | 18 |
| III | Synfig (contd) : drawing and colouring tools | 18 |
| IV | Synfig: animation - tweening - interactive elements. | 18 |
| V | Inkscape: interface - working with shapes - layers - blend, path and mask. | 18 |

**Text Book**

1. Fazreil Amreen, "Instant GIMP Starter", Packet Publishing Limited, ISBN10: n 1782160345, ISBN-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**

http://personal.ee.surrey.ac.uk/Personal/J.Collomosse/pubs/cm20219.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:**

After learning this course, the learner will be able to

CO1: Appreciate the concepts of multimedia.

CO2: Work with animations, tweening and interactive elements.

CO3: Design shapes in multimedia.

CO4: Adopt skills to make multimedia applications.

CO5: Produce a presentation using multimedia tools.

**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**

| Semester-V/ Major Based Elective Course I (MBE) | 2. Big Data and Analytics | Course Code: XUE3 |
|---|---|---|
| Instruction : 6 | Credits: 6 | Exam : 3 |
| Internal Marks :25 | External Marks:75 | Total Marks: 100 |

| Cognitive Level | K1-Acquire / Remember<br>K2-Understanding<br>K3-Apply<br>K4-Analyze<br>K5-Evaluate<br>K6-Create | |
|---|---|---|
| Course Objectives | • Introduction to big data analytics<br>• Hadoop architecture.<br>• It introduces the Map Reduce programming model.<br>• It provides insight on NoSQL databases<br>• Querying model used in Big Data. | |
| UNIT | CONTENT | HOURS |
| I | Overview of Big Data: Defining Big Data - Big Data Types – Big Data Analytics – Industry Examples of Big Data - Big Data and Data Risk – Big Data Technologies – Benefits of Big Data. | 18 |
| II | Basics of Hadoop: Big Data and Hadoop – Hadoop Architecture – Main Components of Hadoop Framework – Analysing Big Data with Hadoop – Benefits of Distributed Applications – Hadoop Distributed File System – Advantages of Hadoop – Ten Big Hadoop Platforms | 18 |
| III | MapReduce: Introduction to MapReduce –Working of MapReduce – Map operations – MapReduce User Interfaces | 18 |
| IV | NoSQL Databases: NoSQL Data Management – Types of NoSQL Databases – Query Model for Big Data – Benefits of NoSQL – MongoDB – Advantages of MongoDB over RDBMS – Replication in MongoDB. | 18 |
| V | HBase, CASSANDRA and JAQL: Introduction to HBase – Row-oriented and Column-oriented Data Stores – HDFS Vs HBase – Hbase Architecture – HBase Data Model – Introduction to Cassandra –Features of Cassandra . Introduction to JAQL – JSON – Components of JAQL. | 18 |

**Text Book**

Author : V.K., Title of Book :Jain Big Data and Hadoop Khanna Book Publishing, 2017Publication

**Reference Books**

1. Author:Frank J Ohlhorst,"Big Data Analytics: Turning Big   Data   into   Big Money"Wiley and SASBusiness Series,2012
2. Author: Anand Rajaraman,Jeffrey David Ullman Mining of Massive Datasets Cambridge University Press,2012.
3. Author: Paul Zikopoulos, Chris Eaton, Paul Zikopoulos,"Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data" Tata McGraw Hill 2011, publications.

**Web-Resources:**

https://www.iare.ac.in/sites/default/files/NEW%20LECHURE%20NOTES.pdf

https://mrcet.com/downloads/digital_notes/CSE/IV%20Year/(R17A0528%20)%20Big %20Data%20Anal ytics%20Digital%20notes.pdf

**Course Outcomes:**

On completion of the Course, learner should be able to

| |
|---|
| CO1: Define the big data, types of data and understand the need of big data analytics. |
| CO2: Describe the Hadoop architecture and File system. |
| CO3: Apply the Map Reduce Programming model for real-world problems. |
| CO4: Distinguish No SQL databases from RDBMS. |
| CO5: Demonstrate the working of row and column oriented data stores. |

**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**

| Semester-V/ Major Based Elective Course I (MBE) | 3.Mobile Communication | Course Code: XUE3 |
|---|---|---|
| Instruction : 6 | Credits: 6 | Exam : 3 |
| Internal Marks :25 | External Marks:75 | Total Marks: 100 |

| Cognitive Level | K1-Acquire / Remember K2-Understanding K3-Apply K4-Analyze K5-Evaluate K6-Create | |
|---|---|---|
| Course Objectives | • Understand the basic concepts of mobile computing <br><br> • Understand Wireless LAN, Bluetooth and WiFi Technologies <br><br> • Be familiar with the network protocol stack <br><br> • Learn the basics of mobile telecommunication system <br><br> • Be exposed to Ad-Hoc networks | |
| UNIT | CONTENT | HOURS |
| I | For complete syllabus and results, class timetable and more pls download iStudy. Its a light weight, easy to use, no images, no pdfs platform to make students life easier. | 18 |
| II | Mobile Telecommunication System GSM – Architecture – Protocols – Connection Establishment – Frequency Allocation – Routing - Mobility Management – Security -GPRS- UMTS- Architecture. | 18 |
| III | Wireless Networks -Wireless LANs and PANs – IEEE 802.11 Standard – Architecture – Services – Blue Tooth- Wi-Fi –WiMAX. | 18 |
| IV | For complete syllabus and results, class timetable and more pls download iStudy. Its a light weight, easy to use, no images, no pdfs platform to make students life easier. | 18 |
| V | Mobile Transport and Application Layer Mobile TCP- WAP – Architecture – WDP – WTLS – WTP -WSP – WAE – WTA Architecture – WML. | 18 |

**Text Book**

1. Jochen Schiller, Mobile Communications, PHI, Second Edition, 2003.

2. Prasant Kumar Pattnaik, Rajib Mall, Fundamentals of Mobile Computing, PHI LearningPvt.Ltd, New Delhi – 2012

**Reference Books**

1. Dharma Prakash Agarval, Qing and An Zeng, "Introduction to Wireless and Mobile systems",Thomson Asia Pvt Ltd, 2005.

2. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, Principles of MobileComputing, Springer, 2003.

**Web-Resources:**

https://www.slideshare.net/inocentshujaahmad/lecture-notes-on-mobile-communication

https://bu.edu.eg/portal/uploads/Engineering,%20Shoubra/Electrical%20Engineering/2461/crs- 12001/E-716-A_lec01.pdf

**Course Outcomes:**

At the end of the course, the learner should be able to

CO1: Explain the basics of mobile telecommunication system

CO2: Illustrate the generations of telecommunication systems in wireless network

CO3: Understand the architecture of Wireless LAN technologies

CO4: Determine the functionality of network layer and Identify a routing protocol for a given Adhoc networks

CO5: Explain the functionality of Transport and Application 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**

| Semester-V/ Skill Based Course II | 1.Web Technology and Bioinformatics Lab | Course Code:XUS2 |
|---|---|---|
| Instruction : 2 | Credits: 2 | Exam : 3 |
| Internal Marks :40 | External Marks:60 | Total Marks: 100 |

**Course Objectives:**

- To develop tools that aid in the analysis of such data.

- To interpret the results accurately and meaningfully.

- Bioinformatics is designed for students interested in molecular biology and genetics, information technologies and computer science.

- Bio informaticists are involved in the analysis of the human genome, identification of targetsfor drug discovery, development of new algorithms and analysis methods, the study of structural and functional relationships, and molecular evolution.

**List of Practical's:**

1. Exercises using Formatting Tags.

2. Exercises to implement table tags.

3. Exercises using List Tags.

4. Exercises to implement Frames and Frame sets

5. Exercises using Cascading Style Sheets.

6. Exercises to implement image, background color and text.

7. Exercises using Radio buttons, Check boxes and List boxes.

8. Exercises to implement ADD, DELETE and UPDATE records in the table using ADO.NET.

9. Retrieve the structures of the compounds from PubChem: Xylitol, Saccharine, Aspartame

10. Perform the PHI-BLAST and PSI-BLAST for the protein sequence Q1A232.

11. Write the top 4 E scores values and the Sequence ID until convergence.

12. Perform Pair wise alignments for the proteins Insulin from the organism's homosapiens andMusmusculus. Calculate the Percent Similarity and Identity using BLOSUM 62 and PAM 250 Compare the results.

13. Perform the protein –ligand docking using ARGUSLAB for the given receptor and ligand(select the compounds from the databases) and compare the dock score.

14. Find the super secondary structure for any protein database.

**Course Outcomes:**

A student completing a major in Bioinformatics shall be able to apply,

CO1:Cognitive and awareness of the basic principles and concepts of biology, computer science and mathematics

CO2: Existing software effectively to extract information from large databases and to use this information in computer modeling

CO3: Problem-solving skills, including the ability to develop new algorithms and analysis methods

CO4: An understanding of the intersection of life and information sciences, the core of shared concepts and language.

CO5: Skills the ability to speak the language of structure-function relationships, information theory, gene expression, and database queries.

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

**Course Objectives:**

- 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 Practical's:**

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 inany 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 completion of the Course, learners should be able to

CO1: Apply modern software testing processes in relation to software development and CO2: Project management.
CO3: Create test strategies and plans, design test cases
CO4: Prioritize and Execute
CO5: Manage incidents and risks within a project.

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

**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 Cognitive 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 &amp; audio.

**List of Practical's:**

**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 / 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.aptana.com/aptana/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

CO1: To learn and understand technical aspect of Multimedia System

CO2: Design and implement an animation for various themes.

CO3: Prepare multimedia advertisement.

CO4: Develop various Multimedia Systems applicable in real time.

CO5: To develop multimedia application and analyze the performance of the same.

| Semester-V/ Skill Based Course III | 2.Internet with ASP Lab | Course Code:  XUS3 |
|---|---|---|
| Instruction : 2 | Credits: 2 | Exam : 3 |
| Internal Marks :40 | External Marks:60 | Total Marks: 100 |

**Course Objectives:**

- Microsoft framework architecture.

- Development of console application.

- Building windows application.

- Developing the website & application.

- Application security.

**List of Practical's:**

1. Write ASP program to retrieve Values from a Dictionary.

2. Write ASP program to send and retrieve E-Mail.

3. Write ASP program to Read the properties of system drive.

4. Write ASP program to display current date and time

5. Write ASP program to return a specified number of characters from a string

6. Write ASP program to display a random numbers

7. Write ASP program to convert uppercase to lowercase string

8. Write ASP program to find the visitors browser type, IP Address and more

9. Write ASP program to round the given numbers.

**Course Outcomes:**

On completion of the Course, learners should be able to

CO1: Understand the Microsoft Web Technologies stack.

CO2: Develop web applications using Model View Control.

CO3: Create MVC Models and write code that implements business logic within Model methods,properties, and events.

CO4: Create Views in an MVC application that displays and edits data and interacts with Modelsand Controllers.

CO5: Boost your hireability through innovative and independent learning.

| Semester-V/ Inter Departmental Course(IDC) | Soft Skill Development | Course Code: SSD |
|---|---|---|
| Instruction : 2 | Credits: 2 | Exam : 3 |
| Internal Marks :25 | External Marks:75 | Total Marks: 100 |

| Cognitive Level | K1-Acquire / Remember<br>K2-Understanding<br>K3-Apply<br>K4-Analyze<br>K5-Evaluate<br>K6-Create | |
|---|---|---|
| Course Objectives | • Focusing on soft skills of team work.<br><br>• Inter-personal relationships.<br><br>• Conflict management<br><br>• Leadership quality.<br><br>• Responsibility. | |
| **UNIT** | **CONTENT** | **HOURS** |
| I | KNOW THYSELF/UNDERSTANDING SELF<br>Introduction to soft skills-Self discovery-Developing positive attitude – Improving perceptions – Forming values. | 6 |
| II | INTERPERSONAL SKILLS / UNDERSTANDING OTHERS<br>Developing interpersonal relationships-Team building–Group dynamics-Networking-Improved work relationship. | 6 |
| III | COMMUNICATION SKILLS / COMMUNICATION WITH OTHERS<br>Art of listening-Art of Reading- Art of Speaking-Art of Writing-Art of Writing E-Mail-E-Mail Etiquette. | 6 |
| IV | CORPORATE SKILLS / WORKING WITH OTHERS<br>Developing Body Language-Practising Etiquette and Memorism – Time Management-Stress Management. | 6 |
| UNIT V | SELLING SELF/JOB HUNTING<br>Writing Resume / CV-Interview Skills-Group Discussion-Mock Interview-Mock GD-Goal Setting- Career Planning. | 6 |

**Text Book:**

1. A Book and Development Of Soft Skill Dr. K. Meena & Dr.V. Ayothi. Soft Skills-

    Dr. K. Alex & Chand Company.

**Reference Books**

1. Developing the leader within you John C. Maxwell

2. Good to Great by Jim Collins.

**Course Outcomes:**

On completion of the Course, learners should be able to

| |
|---|
| CO1: Resilience |
| CO2: Communication. |
| CO3: Emotional maturity. |
| CO4: Confidence and enthusiasm for learning, Citizenship. |
| CO5: Employability skills. |

**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-VI/ Core Course XIII(CC) | Micro Computer Architecture | Course Code: XUM |
|---|---|---|
| Instruction : 6 | Credits: 6 | Exam : 3 |
| Internal Marks :25 | External Marks:75 | Total Marks: 100 |

| Cognitive Level | K1-Acquire / Remember<br>K2-Understanding<br>K3-Apply<br>K4-Analyze<br>K5-Evaluate<br>K6-Create | |
|---|---|---|
| Course Objectives | • Discuss the basic concepts and structure of computers.<br><br>• Understand concepts of register transfer logic and arithmetic operations.<br><br>• Explain different types of addressing modes and memory organization.<br><br>• To understand the structure, function and characteristics of computer systems.<br><br>• To understand the design of the various functional units and components of computers.<br><br>• To identify the elements of modern instructions sets and their impact on processor design. | |
| UNIT | CONTENT | HOURS |
| I | Microprocessor Architecture: Intel 8085 - Instruction Cycle - Timing diagram Instruction Format - Addressing modes - Intel 8085 Instructions. | 18 |
| 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 |
| 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 |
| IV | Peripheral Devices and Their Interfacing-II: 8253- Programmable IntervalTimer, 8259- Priority Interrupt Controller, 8279-Programmable Keyboard/Display Interface, 8251- USART, 8237/8257- Programmable DMA Controller | 18 |
| 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 |

| VI | Expert lectures, online seminars - webinars | - |
|----|----------------------------------------------|---|

**Text Book**

1. B. Ram, "Fundamentals of Microprocessors and Microcomputers",Dhanpat Rai Publications Pvt. Ltd., 3 rd 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,$2^{nd}$ 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 the8085/8080A", Wiley Eastern Ltd, New Delhi, 1989

2. Barry B Brey, "The Intel Microprocessors 8086/8088, 80186, 80286, 80386,80486, Pentium

3. Pentium Pro processors Architecture, Programming and Interfacing", Prentice Hall of India,New Delhi, 2002.

**Web Resource**

https://uomustansiriyah.edu.iq/media/lectures/9/9_2017_10_27!12_38_08_AM.pdf
https://www.just.edu.jo/facultiesanddepartments/facultyofengineering/departments/biomed icalengineering/documents/micro_computer_architecture.pdf

**Course Outcomes:**

On completion of the Course, learners should be able to

CO1: Collected Cognitive on Intel 8085 architecture and its addressing modes.

CO2: Understood and the concepts of 8-bit processors.

CO3: Got the fundamental Cognitive of 16-bit processors.

CO4: Familiarity on interfaces and interrupts of Intel 8085.

CO5: Acquired Cognitive on assembly programming and 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**

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**W-Weakly Correlated**

**N – No Correlation**

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

**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 Practical's:**
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,

CO1: Practice the Python programming language from its scratch

CO2: Syntax and idioms.

CO3: Patterns and styles.

CO4: Illustrate the essentials of the Python library.

CO5: 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**

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

**Course Objectives:**
- To provide basic Cognitive of the real time projects of the IT industry.
- 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

CO1: Able to elicit, analyze and specify software requirements.

CO2: Plan a software engineering process life cycle.

CO3: Realize design practically, using an appropriate software engineering methodology

CO4: Analyze and translate a specification into a design.

CO5: Able to use modern engineering tools for specification, design, implementation, and testing

**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-VI/ Major Based ElectiveCourse II(MBE) | 1.Python Programming | Course Code:-XUE4 |
|---|---|---|
| Instruction : 6 | Credits: 6 | Exam : 3 |
| Internal Marks :25 | External Marks:75 | Total Marks: 100 |

| Cognitive Level | K1-Acquire / Remember<br>K2-Understanding<br>K3-Apply<br>K4-Analyze<br>K5-Evaluate<br>K6-Create | |
|---|---|---|
| Course Objectives | • Acquired the fundamental Cognitive on Python programming.<br><br>• Understood the nuances of this language and hence the learner becomes skillful in python programming.<br><br>• Usage of modules and packages in python.<br><br>• Familiarity with the file concept in python.<br><br>• Skillful experimenting the concepts of OOPS with python language.<br><br>• Capable of solving problems using Python. | |
| UNIT | CONTENT | HOURS |
| 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. | 18 |
| 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 |
| 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 | 18 |

| | methods – File built-inattributes – Standard files – command line arguments. | |
|----|----|----|
| 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 |
| 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 |
| VI | Contemporary Issues: Expert lectures, online seminars - webinars | - |

**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 Resources**

https://mrcet.com/downloads/digital_notes/CSE/III%20Year/PYTHON%20PROGRA
MMING%20NOTES.pdf
https://www.stat.berkeley.edu/~spector/python.pdf

**Course Outcomes:**

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

| |
|----|
| CO1: Describe the basic built-in functions and syntax of Python programming. |
| CO2: Explain the mapping and file concept. |
| CO3: Explain the object oriented programming concept. |
| CO4: Illustrate the concepts of decision making and construct statements. |
| CO5: Illustrate the usage of database and regular expression. |

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

| Cognitive Level | K1-Acquire / Remember<br>K2-Understanding<br>K3-Apply<br>K4-Analyze<br>K5-Evaluate<br>K6-Create | |
|---|---|---|
| Course Objectives | • To impart the basic principles of generating primitives, shapes, package development, interactive graphics, raster graphics, two and three dimensional graphics and their transformations.<br><br>• To provide comprehensive introduction about computer graphics system, design algorithms and two dimensional transformations.<br><br>• To make the students familiar with techniques of clipping, three dimensional graphics and three dimensional transformations.<br><br>• The computer graphics course prepares students for activities involving in design, development and testing of modeling, rendering, shading and animation. | |
| UNIT | CONTENT | HOURS |
| 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. | 18 |
| 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 |

| | | | |
|---|---|---|---|
| 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 |
| IV | 2D VIEWING:Windowing concepts – clipping algorithms- window to viewport transformation- Graphical User interfaces - logical classification of input devices -Interactive Input Methods | 18 |
| V | 3D CONCEPTS:Three dimensional display techniques - Three dimensional representation - Three dimensional Transformations | 18 |
| VI | Contemporary Issues : Expert lectures, online seminars - webinars | - |

**Text Book:**

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

**Reference Books:**

1. Steven Harringhton, "Computer Graphics Programming Approach" , 2nd Edition McGraw Hill.
2. Roy A. Plastock and Gorden Kelley, "Theory and Problems of Computer Graphics", Schaum sOutline Series, McGraw Hill.

**Web Resource:**

http://www.svecw.edu.in/Docs%5CCSECGLNotes2013.pdf

https://drive.google.com/file/d/1st2YSA6l3KoCGiNxFmSAXHMbCdxEHN9i/view

**Course Outcomes:**

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

CO1: Understand the basics of computer graphics, different graphics systems and applications ofcomputer graphics.
CO2: Discuss various algorithms for scan conversion and filling of basic objects and their comparative analysis.
CO3: Use of geometric transformations on graphics objects and their application in compositeform.
CO4: Extract scene with different clipping methods and its transformation to graphics displaydevice.
CO5: Explore projections and visible surface detection techniques for display of 3D scene on 2Dscreen.

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

| Cognitive Level | K1-Acquire / Remember K2-Understanding K3-Apply K4-Analyze K5-Evaluate K6-Create | |
|---|---|---|
| Course Objectives | • Introduces the basic principle concepts in artificial intelligence like simple representationschemes. <br><br> • Problem solving paradigms. <br><br> • Constraint propagation and search strategies. <br><br> • Covers the areas of application such as Cognitive representation. <br><br> • Natural language processing and expert systems. | |
| UNIT | CONTENT | HOURS |
| 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. | 18 |
| II | Heuristic Search Techniques:Generate and Test – Hill climbing – Best –first search – Problem reduction – Constraint satisfaction – Means –ends analysis. Cognitive representation issues: Representations and mappings – Approaches to Cognitive representation. | 18 |
| III | Using Predicate Logic:Representing simple facts in logic – Representing instance and ISA relationships – computable functions and predicates resolution – natural deduction. Representing Cognitive using rules: Procedural versus declarative Cognitive – Logic programming –Forward versus Backward | 18 |

| | | |
|---|---|---|
| | reasoning – Matching – Control Cognitive. | |
| IV | Game Playing:Overview – The minimax search procedure – Adding alpha – beta cut-offs<br><br>– 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-Non linear planning using constraint posting | 18 |
| V | Expert Systems:Representing & using domain Cognitive – Expert system shells – Cognitive 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 |

**Text Book:**

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

**Reference Books:**

1. Stuart Russell Artifical 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:**

https://www.vssut.ac.in/lecture_notes/lecture1428643004.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

CO1: Learn about the artificial intelligence problem and the characteristics of the problem space.

CO2: Demonstrate the fundamentals of heuristic search techniques and reasoning for problem solving.

CO3: Understand the problem solving using predicates.

CO4: Describe the concepts of expert systems with case studies for various applications.

CO5: Apply the concepts of game playing techniques.

| Semester-VI/ Major Based ElectiveCourse III (MBE) | Microprocessor Lab | Course Code: XUE5Y |
|---|---|---|
| Instruction : 5 | Credits: 5 | Exam : 3 |
| Internal Marks :40 | External Marks:60 | Total Marks: 100 |

**Course Objectives:**
- To familiarize the students with the programming and interfacing of microprocessors andmicro controllers.
- To provide strong foundation for designing real world applications using microprocessorsand micro controllers.
- Assembly language programming will be studied as well as the design of various types ofdigital and analog interfaces
- Understand the architecture of 8085 and 8051.
- To introduce the basic concepts of microprocessor and to develop in students the assembly language programming skills and real time applications of Microprocessor**.**

**List of Practical's:**
1. 8-bit addition, subtraction, multiplication and division
2. Multi byte addition and subtraction
3. Sum of series (8-bit)
4. Data transfer from one part of the memory to another
5. Maximum and minimum values
6. Sorting (Ascending and Descending order)
7. Hexadecimal to decimal and decimal to hexadecimal conversion (simple logic only)

**Course Outcomes:**

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

CO1: Understand and apply the fundamentals of assembly level programming of Mcroprocessors.

CO2: To develop in students the assembly language programming skills.

CO3: Understand 8085 microprocessor kit, Cognitive of 8085 instruction set and ability to utilize it in assembly language programming.

CO4: Understand real mode Memory addressing and ability to interface various devices to the microprocessor.

CO5: Provide practical hands-on experience with microprocessor applications and interfacing techniques.

| Semester-VI/ Major Based ElectiveCourse III (MBE) | Data Visualization Tool Lab | Course Code:XUE5Y |
|---|---|---|
| Instruction : 5 | Credits: 5 | Exam : 3 |
| Internal Marks :40 | External Marks:60 | Total Marks: 100 |

**Course Objectives:**
- Effectiveness of visualization designs and about think about each design decision such as
- Choice of color and
- Choice of visual encoding.
- To introduce to the fundamental problems, concepts, and approaches in the design.
- To analysis of data visualization systems.

**List of Practical's:**

1. Create a bar chart for the given data

2. Create a pie chart for the given data

3. Create a scatter chart for the given data

4. Create a time series chart for the given data

5. Create a bullet chart for the given data

6. Create a area chart for the given data

7. Create a heat map for the given data

8. Create a geo map for the given data

9. Create a filled map for the given data

10. Create a dashboard and format it.

**Course Outcomes:**

On completion of the Lab, learner should be able to

CO1: Design and create data visualizations.

CO2: Conduct exploratory data analysis using visualization.

CO3: Craft visual presentations of data for effective communication.

CO4: Use Cognitive of perception.

CO5: Cognition to evaluate visualization design alternatives.

| Semester-VI/ Major Based Elective Course III (MBE) | UI/UX Design and Animation Lab Using Open Source Tools | Course Code:XUE5Y |
|---|---|---|
| Instruction : 5 | Credits: 5 | Exam : 3 |
| Internal Marks :40 | External Marks:60 | Total Marks: 100 |

**Course Objectives:**

- Demonstrate the techniques of photo editing.

- Apply layer masks, filters and blending modes, share and save your images in variousformats.

- Demonstrate the techniques for resize and crop images.

- Learn various retouching and repairing techniques to correct images.

- Learn the creation of various shapes and working with various files.

- Identify a web sites target audience and create user personals to create anaudience appropriate design for a web site.

**List of Practical's**

**Photoshop:**

1. Using various selection tools
2. Using image adjustment tools to enhance an image
3. Create scenery using Photoshop brushes.
4. Demonstrate the use of layer effects.
5. Create a text with picture inside.
6. Demonstrate the use of ripple effect and lens flare.
7. Create a snapshot inside a photo.
8. Photo retouching.
9. Coloring a BW photo.
10. Create slide mount template.
11. Create Photo mount template.
12. Create photo frame effect.
13. Create photo film effect.
14. Create a 3D Photo effect.

15. Create 2D and 3D logos.

16. Animate text using Image Ready.

17. Create three frames with Lens flare effect and different background colors and animate using Image Ready.

18. Create a Christmas Tree with Blinking Lights.

19. Animate a candle flame using Liquify filter.

**Adobe Illustrator**

1) Working with files.

2) Working in layers.

3) Viewing artwork.

4) Making Selections.

5) Creating Basic Shapes.

6) Working with type.

7) Placing Images.

8) Working with Objects.

9) Drawing graphs.

10) Working with imported artwork.

**Course Outcomes:**

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

CO1: Understand the Usability of Interactive systems.
CO2: Understand Guidelines
CO3: Understand Principles
CO4: Be able to manage the development process
CO5: Interaction styles.

| Semester-VI | Gender Studies | Course Code:  GS |
| --- | --- | --- |
| Instruction : 1 | Credits: 1 | Exam : 3 |
| Internal Marks :25 | External Marks:75 | Total Marks: 100 |

| Cognitive Level | K1-Acquire / Remember<br>K2-Understanding<br>K3-Apply<br>K4-Analyze<br>K5-Evaluate<br>K6-Create | |
| --- | --- | --- |
| Course Objectives | • Understand the concepts of gender.<br><br>• Differentiate women studies from gender studies<br><br>• Analyze the areas of gender discrimination<br><br>• Analyze and evaluate the initiative and policies for women empowerment<br><br>• Remember the women's movements and safe guarding mechanisms | |
| UNIT | CONTENT | HOURS |
| I | Concepts of Gender:<br><br>Sex-Gender-Biological Determination-Patriarchy-Feminism-Gender Discrimination-Gender Division of Labour -Gender stereotyping – Gender Sensitivity-Gender Equity – Equality – Gender Mainstreaming – Empowerment. | 3 |
| II | Women"s Studies Vs Gender Studies:<br><br>UGC"s Guidelines – VII to XI Plans – Gender Studies: Beijing Conference and CEDAW Exclusiveness and Inclusiveness. | 3 |
| III | Areas of Gender Discrimination:<br><br>Family – Sex Ratio – Literacy – Health – Governance – Religion Work Vs Employment – Market – Media – Politics – Law – Domestic Violence – Sexual Harassment – State Politics and Planning. | 3 |
| IV | Women Development and Gender Empowerment:<br><br>Initiatives – International Women"s Decade – International Women"s Year – National Policy for Empowerment of Women – | 3 |

| | | Women Empowerment Year 2001 – Mainstreaming Global Policies. | |
|---|---|---|---|
| V | | Women‟s Movements and Safeguarding Mechanism: In India National / State Commission for Women (NCW) – All Women Police Station – Family Court – Domestic Violence Act – Prevention of Sexual Harassment at Work Place Supreme Court Guidelines – Maternity Benefit Act – PNDT Act – Hindu Succession Act 2005 – Eve Teasing Prevention Act – Self Help Groups – 73rdAmendment for PRIs. | 3 |

**Reference Books**

Manimekalai. N & Suba. S (2011), "Gender Studies", Publication Division, Bharathidasan University, Tiruchirappalli,Jane, P. & Imelda, W. (2004), 50 Key Concepts in Gender Studies.

**Course Outcomes:**
On completion of the Course, the learner will be able to

CO1: Evaluate the concepts of gender discrimination.

CO2: Compare women‟s studies with gender studies.

CO3: Describe the areas of gender discrimination.

CO4:Evaluate the initiative and policies for women empowerment.

CO5:Explain the different women movement.

**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**