# VIVEKANANDHA

## COLLEGE OF ARTS AND SCIENCES FOR WOMEN

**ELAYAMPALAYAM, TIRUCHENGODE (Tk.), NAMAKKAL (Dt.).**

**(Affiliated to Periyar University, Approved by AICTE & Re-Accredited with 'A' by NAAC) by NAAC)**
**Recognized under section 2(f) & 12(b) of UGC Act. 1956**

AUTONOMOUS

## DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS

**B.Sc. COMPUTER TECHNOLOGY**

**SYLLABUS & REGULATIONS**

**FOR CANDIDATES ADMITTED FROM 2017-18 ONWARDS UNDER AUTONOMOUS - CBCS PATTERN**

**VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN**

**VIVEKANANDHA EDUCATIONAL INSTITUTIONS**

**Angammal Educational Trust**

**Elayampalayam, Tiruchengode (Tk.), Namakkal (Dt.)**

**[AUTONOMOUS]**

**B.Sc., (COMPUTER TECHNOLOGY)**

(Candidates admitted from 2017-2018 onwards)

**REGULATIONS**

**I. SCOPE OF THE PROGRAMME**

Bachelor of Computer Technology can be considered to be one of the most prominent UG level programs in our country. This programme mainly deals with the development of computer applications for the purpose of updating computer programming languages. B.Sc. [CT] also aims at creating strong knowledge of theoretical Computer Technology subjects who can be employed in software development and testing units of industries. The course has a time period of 3 years with 6 semesters.

**II. SALIENT FEATURES**

- Regular conduct of guest lectures and seminars
- Campus recruitment
- Provides facilities such as Internet Access and In-House Library
- Provides Career Guidance for Post Graduate Courses like M.Sc, and the Certifications in programming languages
- Conduct of Personality Development Program
- Visiting Experts from Industries

**III. OBJECTIVES OF THE COURSE**

The Course Objective of the B.Sc. Computer Technology program is to provide advanced and in-depth knowledge of Computer Technology and its applications to enable students pursue a professional career in Information and Communication Technology in related industry, business and research. The course designed to impact professional knowledge and practical skills to the students.

**IV. ELIGIBILITY FOR ADMISSION**

A Candidates seeking admission to the first year Degree course (**B.Sc. COMPUTER TECHNOLOGY)** shall be required to have passed Higher Secondary Examination with Mathematics or Business Mathematics or Computer science or Statistics (Academic Stream or Vocational Stream) as one of the subject under Higher Secondary Board of Examination, conducted by the Government of Tamilnadu or an examination accepted as equivalent thereto by the syndicate, subject to such conditions as may be prescribed thereto are permitted to appear and

qualify for the **B.Sc. Computer Technology** Degree Examination of Periyar University after a course of study of three academic years.

**V.DURATION OF THE PROGRAMME**

- The course shall extend over a period of three academic years consisting of six semesters. Each academic year will be divided into two semesters. The First semester will consist of the period from July to November and the Second semester from December to April.
- The subjects of the study shall be in accordance with the syllabus prescribed from time to time by the Board of Studies of Vivekanandha College of Arts and Sciences for Women with the approval of Periyar University.

**VI. CONTINUOUS INTERNAL ASSESSMENT (CIA)**

The performance of the students will be assessed continuously and the Internal Assessment Marks for Theory papers

1. Average of two Tests - 10 Marks
2. Seminar - 5 Marks
3. Assignment - 5 Marks
4. Attendance - 5 Marks

Total = 25 Marks

Internal Assessment Marks for Practical

1. Attendance - 10 Marks
2. Observation - 10 Marks
3. Test - 20 Marks

Total = 40 Marks

**PASSING MINIMUM (Theory)**

**EXTERNAL**

In the University Examinations, the passing minimum shall be 40 % out of 75 Marks. (30 Marks)

**INTERNAL**

In the Internal Examinations, the passing minimum shall be 40 % out of 25 Marks. (10 Marks)

**PASSING MINIMUM (Practical / Mini project)**

**EXTERNAL**

In the University Examinations, the passing minimum shall be 40 % out of 60 Marks. (24 Marks)

Distribution of Marks

| | |
|---|---|
| Problem Understanding | : 05 Marks |
| Program writing | : 10 Marks |
| Debugging | : 04 Marks |
| For Correct Results | : 05 Marks |

**INTERNAL**

In the Internal Examinations, the passing minimum shall be 40 % out of 40 Marks (16 Marks).

**VII. ELIGIBILITY FOR EXAMINATION**

A candidate will be permitted to appear for the University Examination only on earning 75 % of attendance and only when her conduct has been satisfactory. It shall be opened to grant exemption to a candidate for valid reasons subject to conditions prescribed.

Distribution of marks for attendance

| PERCENTAGE | MARKS | |
|---|---|---|
| | THEORY | PRACTICAL |
| 75-80 | 1 | 2 |
| 81-85 | 2 | 4 |
| 86-90 | 3 | 6 |
| 91-95 | 4 | 8 |
| 96-100 | 5 | 10 |

**VIII. CLASSIFICATION OF SUCCESSFUL CANDIDATES**

Successful candidates passing the examination of Core Courses (main and allied subjects) and securing marks

a) 75 % and above shall be declared to have passed the examination in first class with Distinction provided they pass all the examinations prescribed for the course at first appearance itself.
b) 60% and above but below 75 % shall be declared to have passed the examinations in first class without Distinction.
c) 50% and above but below 60% shall be declared to have passed the examinations in second class.

d) All the remaining successful candidates shall be declared to have passed the examinations in third class.

e) Candidates who pass all the examinations prescribed for the course at the first appearance itself and within a period of three consecutive academic years from the year of admission only will be eligible for University rank.

## IX. ELIGIBILITY FOR AWARD OF THE DEGREE

A candidate shall be eligible for the award of the degree only if she has undergone the above degree for a period of not less than three academic years comprising of six semesters and passed the examinations prescribed and fulfilled such conditions have been prescribed therefore.

## X. PROCEDURE IN THE EVENT OF FAILURE

If a candidate fails in a particular subject, she may reappear for the semester examination in the concerned subject in subsequent semesters and shall pass the examination.

## XI. COMMENCEMENT OF THE REGULATIONS

The regulations shall take effect from the academic year 2017-18 (i.e.,) for the students who are to be admitted to the first year of the course during the academic year 2017-18 and thereafter.

## EVALUATION OF EXTERNAL EXAMINATIONS (EE)

## QUESTION PAPER PATTERN – Theory

Time Duration: 3 Hours Max. Marks: 75

PART- A: 20x1 = 20

Answer all the Questions

Two Questions from each unit

PART- B: 5x5 = 25

Answer all the Questions

One Question from each unit (either or type)

PART- C: 3x10 = 30

Answer Any Three Questions

One Question from each unit (3 Out of 5)

The Passing minimum shall be 40% out of 75 marks (30 marks)

## QUESTION PAPER PATTERN – Practical

Time duration: 3 Hours Max. Marks: 60

1. One compulsory question from the given list of objectives : 30 Marks
2. One Either/OR type question from the given list of objectives : 30 Marks

The Passing minimum shall be 40% out of 60 marks (24 marks)

**DEPARTMENT OF COMPUTER APPLICATIONS**
**B.Sc. COMPUTER TECHNOLOGY**
**COURSE PATTERN AND SCHEME OF EXAMINATIONS UNDER CBCS**
**for the Candidates admitted from the year 2017-2018**

| Sem | Course Code | Part | Courses | Hour | Credit | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Int. Marks | Ext. Marks | Total Marks |
| I | 17U1LT01 | I | Tamil-I | 4 | 3 | 25 | 75 | 100 |
| | 17U1LE01 | II | English I | 4 | 3 | 25 | 75 | 100 |
| | 17U1CTC01 | IV | Core – I Digital Computer Fundamentals & C Programming | 5 | 5 | 25 | 75 | 100 |
| | 17U1CTCP01 | IV | Core Lab I – Problem Solving and C Programming Lab | 5 | 3 | 40 | 60 | 100 |
| | 17U1MAA03 | III | Allied-I Numerical Methods | 4 | 4 | 25 | 75 | 100 |
| | 17U1CTC02 | IV | Core-II - Basics of Hardware | 4 | 3 | 25 | 75 | 100 |
| | 17U1VE01 | | Value Education | 2 | 2 | 25 | 75 | 100 |
| | | | **Library** | **1** | **-** | **-** | **-** | **-** |
| | | | **Sports** | **1** | **-** | **-** | **-** | **-** |
| | **TOTAL** | | | **30** | **23** | **190** | **510** | **700** |
| II | 17U2LT02 | I | Tamil-II | 4 | 3 | 25 | 75 | 100 |
| | 17U2LE02 | II | English-II | 4 | 3 | 25 | 75 | 100 |
| | 17U2CTC03 | IV | Core III – Data Structures &Algorithms | 4 | 3 | 25 | 75 | 100 |
| | 17U2CTCP02 | IV | Core Lab II – Data Structures Lab | 4 | 3 | 40 | 60 | 100 |
| | 17U2CTC04 | IV | Core IV –Programming in C++ | 4 | 3 | 40 | 60 | 100 |
| | 17U2MAA06 | III | Allied- II Discrete Mathematics | 4 | 4 | 25 | 75 | 100 |
| | 17U2ES01 | | Environmental Studies | 4 | 4 | 25 | 75 | 100 |
| | | | **Library** | **1** | **-** | **-** | **-** | **-** |
| | | | **Sports** | **1** | **-** | **-** | **-** | **-** |
| | **TOTAL** | | | **30** | **23** | **205** | **495** | **700** |
| III | 17U3CTC05 | IV | Core V- Microprocessor and Computer Architecture | 4 | 3 | 25 | 75 | 100 |
| | 17U3CTC06 | IV | Core VI- Java Programming | 4 | 3 | 25 | 75 | 100 |
| | 17U3CTC07 | IV | Core VII- Relational Database Management Systems | 5 | 5 | 25 | 75 | 100 |
| | 17U3CTCP03 | IV | Core Lab III - RDBMS Lab | 5 | 3 | 40 | 60 | 100 |
| | 14U3MAA14 | III | Allied- III Resource Management Techniques-I | 4 | 4 | 25 | 75 | 100 |
| | 17U3CTCP04 | IV | Core Lab IV – Java Programming Lab | 4 | 3 | 40 | 60 | 100 |
| | 17U3CTS01 | VII | SBEC-I – Office Package | 2 | 2 | 25 | 75 | 100 |
| | | | **Library** | **1** | **-** | **-** | **-** | **-** |
| | | | **Sports** | **1** | **-** | **-** | **-** | **-** |
| | **TOTAL** | | | **30** | **23** | **205** | **495** | **700** |
| IV | 17U4CTC08 | IV | Core VIII-Computer Networks | 4 | 3 | 25 | 75 | 100 |
| | 17U4CTC09 | IV | Core IX- Operating Systems | 4 | 3 | 25 | 75 | 100 |
| | 17U4CTC10 | IV | Core-X- Dot net Programming | 5 | 5 | 25 | 75 | 100 |
| | 17U4CTCP05 | IV | Core Lab V- Dot net Programming Lab | 5 | 3 | 40 | 60 | 100 |
| | 17U4CMA04 | III | Allied-IV Cost and Management Accounting | 4 | 4 | 25 | 75 | 100 |
| | 17U4CTC11 | IV | Core XI - Multimedia Design and Applications (DTP Package & Corel Draw) | 4 | 3 | 25 | 75 | 100 |
| | 17U4CTS02 | VII | SBEC-II (Basics of Unix and Linux) | 2 | 2 | 25 | 75 | 100 |
| | | | **Library** | **1** | **-** | **-** | **-** | **-** |
| | | | **Sports** | **1** | **-** | **-** | **-** | **-** |
| | **TOTAL** | | | **30** | **23** | **190** | **510** | **700** |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 17U5CTC12 | IV | Core-XII Web Technology | 5 | 5 | 25 | 75 | 100 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| V | 17U5CTC13 | IV | Core-XIII Software Engineering | 5 | 5 | 25 | 75 | 100 |
| | 17U5CTC14 | IV | Core-XIV Data Mining and Data Warehousing | 5 | 3 | 25 | 75 | 100 |
| | 17U5CTE__ | V | Elective –I | 5 | 4 | 25 | 75 | 100 |
| | 17U5CTCP06 | IV | Core Lab VI- Web Technology Lab | 5 | 3 | 40 | 60 | 100 |
| | | VI | NMEC - I | 2 | 2 | 25 | 75 | 100 |
| | 17U5CTS03 | VII | SBEC-III Computer installation and Servicing | 2 | 2 | 25 | 75 | 100 |
| | | | **Library / Sports** | **1** | **-** | **-** | **-** | **-** |
| | **TOTAL** | | | **30** | **24** | **190** | **510** | **700** |
| VI | 17U6CTC15 | IV | Core-XV Computer Graphics & Multimedia | 5 | 5 | 25 | 75 | 100 |
| | 17U6CTC16 | IV | Core – XVI Python Programming | 5 | 5 | 25 | 75 | 100 |
| | 17U6CTE__ | IV | Elective –II | 4 | 3 | 25 | 75 | 100 |
| | 17U6CACPPR01 | IV | PROJECT – I Project Work- (In house -Project) | 5 | 3 | 40 | 60 | 100 |
| | 17U6CTCP07 | IV | Core Lab VII - Python Programming Lab | 5 | 3 | 40 | 60 | 100 |
| | | VI | NMEC-II | 2 | 2 | 25 | 75 | 100 |
| | 17U6CTS04 | VII | SBEC-IV (Internet of Things) | 2 | 2 | 25 | 75 | 100 |
| | 17U6EX01 | | Extension Activities | 1 | 1 | - | - | - |
| | | | Library / Sports | 1 | - | - | - | - |
| | **TOTAL** | | | **30** | **24** | **205** | **495** | **700** |
| **GRAND TOTAL** | | | | **180** | **140** | **1185** | **3015** | **4200** |

## ELECTIVE COURSES

### ELECTIVE – I

| Semester | Course Code | Course Name |
|---|---|---|
| V | 17U5CTE01 | Web Services |
| V | 17U5CTE02 | Soft Computing |
| V | 17U5CTE03 | Big Data Analytics |

### ELECTIVE – II

| Semester | Course Code | Course Name |
|---|---|---|
| VI | 17U6CTE04 | Open Source Technologies |
| VI | 17U6CTE05 | Artificial Intelligence and Expert Systems |
| VI | 17U6CTE06 | Network Security & Cryptography |

| | | | | |
|---|---|---|---|---|
| **Subject Title** | **Web Technology** | **Semester** | **V** | **Hours:75** |
| **Subject Code** | **17U5CTC12** | **Specialization** | **NA** | |
| **Type** | **Core- XII** | **L:T:P:C** | **5:0:0:5** | |
| | | | | |

**Objectives:**

1. It covers the TCP/IP Basics.
2. It includes Basics of Browser, tiers, servlets, web security and XML.

| Unit | Syllabus Contents | Number of Sessions |
|---|---|---|
| I | **User HTML Basics:** An overview of HTML-Creating an HTML Document. Formatting an HTML Document- Fonts & Colors- Lists & Tables. | 15 |
| II | Hyperlinks &Frames- Images- Working with Audio & Video- Forms- Style Sheets | 15 |
| III | PHP syntax & variables : Introduction- Comments-Variables & its scope – Data Types –Output in PHP. PHP Control Structures & Functions : Boolean Expression –Branching- Looping-using functions- Function Documentation – Defining own functions- Funcitons & Variable scope- function scope. | 15 |
| IV | Passing Information with PHP- PHP string Handling- Arrays in PHP- PHP Number Handling. | 15 |
| V | **MySQL Database Integration:** Introduction to Database & MySQL-SQL – **Integrating PHP & MySQL:** Connecting & Creating MySQL Queries- Fetching Data sets- Multiple Conenction- Creating MySQL Database with PHP –Error Checking. | 15 |

## Learning Resources

| | |
|---|---|
| **Text Books** | 1. Steve Suehring,Tim Converce and Joyce Park "PHP & MySQL " wiley Publication,2017.<br>2. NIIT, "HTML & XML –An Introduction " PHI Learning pvt 2012. |
| **Reference Books** | 1. Larry Ullman "PHP 6 and MySQL5" Pearson Publications,2016.<br>2. Faithe Wempen " Microsoft step by step HTML5" O'Reilly Media Inc 2017. |
| **Web Sites / Links** | 1. http://www.tutorials.com<br>2. www.w3schools.com\php |

**Content beyond the syllabus:**

1. Design web pages using HTML.
2. Web Designing software.

| Subject Title | Software Engineering | Semester | V | Hours:75 |
|---|---|---|---|---|
| Subject Code | 17U5CTC13 | Specialization | NA | |
| Type | Core –XIII | L:T:P:C | 5:0:0:5 | |

**Objectives:**

1. Introduce software engineering basics
2. To Learn Cost Estimation, Design notations and Software testing.

| Unit | Syllabus Contents | Number of Sessions |
|---|---|---|
| I | Introduction to Software Engineering: Definitions – Size Factors – Quality and Productivity Factors. Planning a Software Project: Planning the Development Process – Planning an Organizational Structure. | 15 |
| II | Software cost Factors – Software Cost Estimation Techniques –Staffing-Level Estimation – Estimating Software Estimation Costs. | 15 |
| III | Software Requirements Definition: The Software Requirements specification – Formal Specification Techniques. Software Design**:** Fundamental Design Concepts – Modules and Modularization Criteria. | 15 |
| IV | Design Notations – Design Techniques. Implementation Issues: Structured Coding Techniques – Coding Style – Standards and Guidelines – Documentation Guidelines. | 15 |
| V | Verification and Validation Techniques: Quality Assurance – Walkthroughs and Inspections – Unit Testing and Debugging – System Testing. Software Maintenance: Enhancing Maintainability during Development – Managerial Aspects of Software Maintenance – Configuration Management Testing Tools: Overview – Examples. | 15 |

| Learning Resources | |
|---|---|
| **Text Books** | 1. Richard Fairley, "Software Engineering Concepts, TMH 2007.<br>2. Dr.K.V.K.K Prasad "Software Testing Tools, Dream Tech Press, 2010. |
| **Reference Books** | 1. Eve Anderson, Philip Greenspun, Andrew Grumet, "Software Engineering for Internet Applications", PHI 2006.<br>2. Jeff Tian, "Software Quality Engineering" Student edition, 2006, Wiley India. |
| **Web Sites / Links** | 1. www.softwareengineerinsider.com/articles/what-is-software-engineering.html<br>2. https://www.udemy.com/courses/development/software-engineering |

**Content beyond the syllabus:**

1. Software Development Life Cycle
2. Learn about SRS (Software Requirement Specification)
3. Study about importance of testing with software engineering

| Subject Title | Data Mining and Data Warehousing | Semester | V | Hours:75 |
|---|---|---|---|---|
| Subject Code | 17U5CTC14 | Specialization | NA | |
| Type | Core -XIV | L:T:P:C | 5:0:0:3 | |

**Objectives**

1. Understand data mining principles and techniques
2. Introduce DM as a method and acquaint the students with the DM techniques.

| Unit | Syllabus Contents | Number of Sessions |
|---|---|---|

| | | |
|---|---|---|
| **I** | Introduction: What motivated data mining?-Why is it important?-What is data mining?-Data mining-On what kind of data?-Data mining Functionalities-Classification of Data mining-Data mining task primitives-Integration of a Data mining System with a Database or Data Warehouse System-Major issues in Data mining | **15** |
| **II** | Data Preprocessing: Why Preprocess the Data?-Descriptive Data Summarization-Data Cleaning-Data Integration and Transformation-Data Reduction-Data Discretization and Concept Hierarchy Generation | **15** |
| **III** | Mining Frequent patterns, Associations and Correlations: Mining various kinds of association Rules-Classification and Prediction: What is Classification? What is Prediction? Issues regarding classification and Prediction-Bayesian Classification-Classification by Back propagation-Prediction | **15** |
| **IV** | Types of Data in cluster Analysis-Categorization of major Clustering methods Hierarchical methods-Density-based Methods-Spatial Data mining-Text mining-Data Mining Applications-Social Impacts of data mining-Trends in data mining | **15** |
| **V** | Data Warehouse and OLAP Technology: What is Data Warehouse? A Multidimensional Data Model-Data Warehouse Architecture-Data Warehouse Implementation | **15** |

| **Learning Resources** | |
|---|---|
| **Text Books** | 1. Jiawei Han and Micheline Kamber,"DATA MINING Concepts and Techniques", Morgan Kaufmann Publishers,Second Edition,2006. |
| **Reference Books** | 1. Soman K. P, Shyam Diwakar, V. Ajay, Data Mining, Printice Hall, 2008.<br>2. Arun K.Pujari, "Data Mining Techniques", Universities Press (India) Limited, 2001.<br>3. Pang-Ning Tan, Michael Steinbach, Vipin Kumar, Introduction to Data Mining, Pearson, 2008. |
| **Web Sites / Links** | 1. https://en.wikipedia.org/wiki/Data_mining<br>2. www.hinduwebsite.com/webresources/data_warehousing.asp |

**Content beyond the syllabus:**

1. Write down the drawbacks of the earlier existing decision support systems.
2. Justify that data warehouse is a blend of many technologies.
3. Justify that data warehouse is an environment not a product.

| **Subject Title** | **Web Technology Lab** | **Semester** | **V** | **Hours:60** |
|---|---|---|---|---|
| **Subject Code** | **17U5CTCP06** | **Specialization** | **NA** | |
| **Type** | **Core Lab - VI** | **L:T:P:C** | **0:0:5:3** | |
| | | | | |

**Objectives**

1. Plan different types of HTML Tags and usage.
2. Differentiate different types of Cascading Style Sheets in HTML.
3. Infer PHP Programs.
4. Critiquing the different types of String Handling Function in PHP.

**List of Programs**

**HTML Programs**

1. Design a web page for your College using basic HTML tags.
2. Create a Web page with the following using HTML
   a) To embed an image map in a web page
   b) To fix the hot spots
   c) Show all the related information when the hot spots are clicked.
3. Create a Web page with all types of cascading style sheets. Use all types of Cascading.

**PHP Programs**

4. Create a php webpage and print "hello world".
5. Create a php program to find odd or even number from given number
6. Write a php program to find maximum of three numbers.
7. Write a PHP program to swap two numbers.
8. Write a PHP Program to do various String Handling Functions in PHP.
9. Write a PHP program that demonstrate **form element**(input elements).
10. Write a PHP program that demonstrate passing variable using URL.
11. Write a PHP program to create a table in MySQL.
12. Write a PHP program to insert record into a table using MySQL.
13. Write a PHP program to drop table using MySQL.
14. Write a program to update table.
15. Create a student Registration in PHP and Save and Display the student Records.

| **Subject Title** | **Computer Installation and Servicing** | **Semester** | **V** | **Hours:30** |
|---|---|---|---|---|
| **Subject Code** | **17U5CTS03** | **Specialization** | **NA** | |
| **Type** | **SBEC:III** | **L:T:P:C** | **2:0:0:2** | |

**Objectives**

1. Aims to equip participants with basic knowledge and skills about computer hardware and software maintenance and troubleshooting of common problems.

| **Unit** | **Syllabus Contents** | **Number of Sessions** |
|---|---|---|
| **I** | The Visible PC: How the PC Works –input – processing – output – storage. | **06** |

| | | |
|---|---|---|
| | The Complete PC: External Connections – Devices and their connections – Inside the system unit: Case – CPU – Ram – Motherboard – Power supply – Hard drive – Optical Drives. | |
| **II** | Learning CPU: Memory and RAM – Address Bus – Modern CPU's - Intel Pentium early processors – Intel Pentium 4 – Intel core – AMD athelon – AMD Duron – Intel Celeron – Intel Pentium Dual Core – Intel Core i7. Types of RAM's: SDRAM – RDDRAM –DDRSDRAM - DDR2 – DDR3 – RAM Variations. | **06** |
| **III** | Learning Motherboard: CMOS – BIOS – POST - Expansion Slots – Motherboard Components – Hardware Technologies: Platter Based – Solid Based Drives – Parallel and Serial ATA's – SCSI – RAID. Removable Media: Flash Memory – USB – Flash Cards - Optical Devices – CD – DVD- Blue-ray Media's. | **06** |
| **IV** | Installing & Upgrading Windows: Hardware Requirements – type of installation - Backup & Restoring Data – Partition the Hard Drive and file System – Installing XP Professional – Post Installation Tasks – Boot Process – Partitioning Files. | **06** |
| **V** | Learning Local Area Networking: Topologies – Network organization – Configuring TCP/IP – Wireless Networking Components - Wireless Networking Standards – Connecting to the Internet. Computer Security: Security Concepts – Malicious Software – Virus Prevention and Recovery. | **06** |

## Learning Resources

| | |
|---|---|
| **Text Books** | 1. Mike Meyers, "Introduction to PC Hardware and Troubleshooting", Tata McGraw-Hill, New Delhi, 2003. |
| **Reference Books** | 1. Craig Zacker & John Rourke, "The complete reference:PC hardware", Tata McGraw-Hill, New Delhi, 2001.<br>2. B.Govindarajulu, "IBM PC and Clones hardware trouble shooting and maintenance", Tata McGraw-Hill, New Delhi, 2002.<br>3. Stephen J.Bigelow, "Trouble Shooting, maintaining and Repairing PCs",Tata McGraw-Hill, New Delhi, 2001. |
| **Web Sites / Links** | 1. www.itap.purdue.edu/facilities/instructionallabs/resources/instructions.htm<br>2. http://www.ibm.com/support/knowledgecenter/SS3RA7_17.1.0/modeler_in |

| | |
|---|---|
| | stall_concurrentlic_admin_ddita/common/installation/common_admin_local.dita |

**Content beyond the syllabus:**

1. Study about PC trouble shooting
2. Software up gradation
3. Learn the concepts of repairing and servicing PC

| Subject Title | Computer Graphics and Multimedia | Semester | VI | Hours:75 |
|---|---|---|---|---|
| Subject Code | 17U6CTC15 | Specialization | NA | |
| Type | Core -XV | L:T:P:C | 5: 0 : 0 :5 | |

**Objectives:**

1. To explore different software components and their application.

| Unit | Syllabus Contents | Number of Sessions |
|---|---|---|
| I | Basic − Line − Curve and ellipse drawing algorithms − Examples – Applications - Attributes − Two- Dimensional geometric transformations − Two-Dimensional clipping and viewing – Input techniques. | 15 |
| II | Three-Dimensional object representations − Three-Dimensional geometric and modeling transformations − Three-Dimensional viewing − Hidden surface elimination − Color models – Virtual reality - Animation. | 15 |
| III | Multimedia basics − Multimedia applications − Multimedia system architecture − Evolving technologies for multimedia − Defining objects for multimedia systems − Multimedia data interface standards − Multimedia databases. | 15 |
| IV | Compression and decompression − Data and file format standards − Multimedia I/O technologies − Digital voice and audio − Video image and animation − Full motion video − Storage and retrieval technologies. | 15 |
| V | Multimedia authoring and user interface − Hypermedia messaging − Mobile messaging − Hypermedia message component − Creating hypermedia message − Integrated multimedia message standards − Integrated document management − Distributed multimedia systems. | 15 |

## Learning Resources

| | |
|---|---|
| **Text Books** | 1. Donald Hearn and M. Pauline Baker, "Computer Graphics C Version", Pearson Education, 2003.<br>2. Andleigh, P. K and Kiran Thakrar, "Multimedia Systems and Design", PHI, 2003. |
| **Reference Books** | 1. Judith Jeffcoate, "Multimedia in practice: Technology and Applications", PHI, 1998.<br>2. Foley, Vandam, Feiner and Huges, "Computer Graphics: Principles and Practice", 2nd. |
| **Web Site / Links** | 1. https://www.tutorialspoint.com/computer_graphics/.<br>2. ttps://lecturenotes.in/subject/59/computer-graphics. |

**Content beyond Syllabus:**

1. To understand about Multimedia tools.
2. To understand about new technologies in Multimedia.

| Subject Title | Python Programming | Semester | VI | Hours:75 |
|---|---|---|---|---|
| Subject Code | 17U6CTC16 | Specialization | NA | |
| Type | Core -XVI | L:T:P:C | 5: 0 : 0 :5 | |

**Objectives:**

- To learn a dynamic, interpreted (Byte code-Compiled) and high level programming language.

| Unit | Syllabus Contents | Number of Sessions |
|---|---|---|
| I | Python: Introduction – Python interpreter and interactive mode – Values & Types – Variable – Expressions and Statements – Assigning Values in Python, Variable Declaration, Multiple Assignment – Operators – Types of Operators, Operator Precedence – Modules and Functions: Modules, Function Definition and Use, Defining a Function, Calling Function, Uses of Function, Advantages of Functions - Flow of Execution. | 15 |
| II | Conditionals: Booleans Values and Operators – Operators – Operator Precedence – Decision Making – if, if… Else, If…Elif… Else & Nested statements – Iteration – Fruitful Functions – Scope of Variable – Global and Local Variable in Function, Nonlocal Variable – Composition – Recursion - Parameters and Arguments: Functions with No Arguments, Functions with Arguments, Functions with Return Value. | 15 |
| III | Strings: String Slices – String are Immutable – String Functions and Methods – String Module – Lists as Array. Lists: Accessing Elements in Lists Using Subscript Operator, List Operations, List Slices, List Methods, List Loop, Mutability, Aliasing, Cloning Lists, List Parameters, Deleting List Elements, Python Functions for List Operations, List Comprehension. | 15 |
| IV | Tuples: Advantages of Tuple Over List, Accessing Values, Updating Tuples, Delete Tuple Elements, Tuple Assignment, Tuple Methods, Other Tuple Operations, Tuples As Return Values, Built-in Functions with Tuple, Variable Length Arguments Tuples – Dictionaries: Built-in Dictionary Functions and Methods, Access update and Add Elements, Delete and Remove Elements, Sorting, Iterating through, Reverse Lookup, Inverting a Dictionary, Memorization(Memos) | 15 |
| V | Files: Reading and Writing, Format Operator, Command Line Arguments – Errors and Exceptions: Errors, Exceptions. Modules: Writing Modules, Locating Modules. Packages: Steps to create a Python Package. | 15 |

| Learning Resources | |
|---|---|
| **Text Books** | 1. Dr. S. Suresh kumar, "Problem Solving and Python Programming" Charulatha Publications, 2018. |
| **Reference Books** | 1. Python Essential Reference (4th Edition): David Beazley<br>2. Beginning Python: From Novice to Professional Beginning **(Beginning From Novice to Professional) by Magnus Lie Hetland second edition**<br>3. Core Python Programming (2nd Edition): Wesley J Chun. |
| **Web Site / Links** | 1. https://www.tutorialspoint.com/computer_graphics/.<br>2. ttps://lecturenotes.in/subject/59/computer-graphics. |

**Content beyond Syllabus:**

3. To understand about Multimedia tools.
4. To understand about new technologies in Multimedia.

| Subject Title | Project work (In-house mini project) | Semester | V | Hours:30 |
|---|---|---|---|---|
| Subject Code | 17U6CACPPR01 | Specialization | NA | |
| Type | Core Project - 1 | L:T:P:C | 0:0:5:3 | |

**Objectives**

1. **To understand the problem in clear and concise mode**
2. **To know how to connect the statement with the problem**
3. **Usage of features of programming language in project.**
4. **Design the whole project**

## PROJECT WORK PATTERN

1 **FIRST REVIEW:** **(20 Marks)**

1. Project Title
2. Project Platform (Language / Package Selected )
3. Confirmation Letter (from Company / Industry)
4. Details of Internal Guide with Designation & Qualification (in the company / Industry)
5. Presentation

**SECOND REVIEW:** **(20 Marks)**

1. Work Observation
2. Modules in Project (Design Screens Sample)
3. DFD / ERD / System Flow Diagram ( Whichever Applicable)
4. Estimated Time of Completion
5. Completed Work in the form of Percentage Analysis
6. PowerPoint Presentation.

**FINAL REVIEW:** **(60 Marks)**

1. Documentation
2. Screens Shots
3. DFD / ERD / System Flow Diagram ( Whichever Applicable)
4. Final Project Report ( with executable format including complete source code)

**The Passing minimum shall be 40% out of 60 marks (24 Marks)**

| Subject Title | Python Programming Lab | Semester | VI | Hours:60 |
|---|---|---|---|---|
| Subject Code | 17U6CTCP07 | Specialization | NA | |
| Type | Core Lab - VII | L:T:P:C | 0:0:5:3 | |

**Objectives**

To enable the students to gaining knowledge on Python Programming through practice

**List of Programs**

1. To compute the GCD of Two Numbers.
2. Find square root of a Number.
3. To find the exponentiation of a given positive Number.
4. To perform linear search from the list of Elements.
5. List the first N prime Numbers.
6. Find the Maximum of a list of Numbers.
7. Implementation Insertion Sort.
8. Remove all the duplicate elements in a list.
9. Implement a program that take command line Arguments.
10. Implement a python program find the most frequent words in a text read from a file.

| Subject Title | Internet of Things | Semester | VI | Hours:60 |
|---|---|---|---|---|
| Subject Code | 17U6CTS04 | Specialization | NA | |
| Type | SBEC:IV | L:T:P:C | 2:0:0:2 | |

**Objectives**

1. To assess the vision and introduction of IoT.
2. To understand the application areas of IOT.

| Unit | Syllabus Contents | Number of Sessions |
|---|---|---|
| I | **Introduction:** Introduction to Internet of Things – Defintion & Characteristics of IoT – Things in IoT – IoT Protocols – Logical Design of IoT: IoT functional Blocks – IoT Communication Models – IoT Communication APIs. | 12 |
| II | IoT Enabling Technologies: Wireless Sensor Networks – Cloud computing – Bigdata Analytics – Communication Protocols – Embedded Systems. Domain Specific IoTs: Home Automation – cities – Retail – Health & Monitoring. | 12 |
| III | Developing IoT: Introduction – IoT Design Methodology – Case Study on IoT System for Weather Monitoring. | 12 |
| IV | IoT and M2M: Introduction – M2M – Difference between IoT and M2M – SDN and NFV for IoT: Software defined Networking – Network Function Virtualization. | 12 |
| V | IoT System Management with NETCONF-YANG: Need for IoT System Management – SNMP – NETCONF – YANG. Tools for IoT: Introduction - Chef – Puppet. | 12 |

## Learning Resources

| | |
|---|---|
| **Text Books** | 1. Arshdeep Bahga, Vijay Madisetti " Internet of Things, A Hands on Approach" Universities Press 2015. |
| **Reference Books** | 1. Oliver Hersent, David Boswarthick, Omar Elloumi. " The Internet of Things – Key applications and Protocols", Wiley, 2012. |
| **Web Sites / Links** | 1. www.theinternet of things.eu<br>2. www.cisco.com/c/en_in/solutions/internet-of-things/overview.html |

**Content beyond Syllabus:**

1. Knowing about the Architectural Overview of IoT
2. To Understand the various IoT Protocols
   ( Datalink, Network, Transport, Session, Service)

| Subject Title | Web Services | Semester | V | Hours:60 |
|---|---|---|---|---|
| Subject Code | 17U5CTE01 | Specialization | NA | |

| Type | Elective - I | L:T:P:C | 5 : 0 : 0 : 4 |
|---|---|---|---|

**Objectives:**

1. To know about the role in implementing Service Oriented Architecture (SOA).

| Unit | Syllabus Contents | Number of Sessions |
|---|---|---|
| I | Introduction: Role of XML-XML and the web- XML Language Basics-SOAP-Web Services-Revolution of XML-Service Oriented Architecture (SOA) | 12 |
| II | XML Technology: XML-Name Space-Structuring with schemas and DTD-Presentation Techniques-Transformation-XML Infrastructure. | 12 |
| III | SOAP: Overview of SOAP-HTTP-XML- RPC-SOAP, Protocol-Message Structure-SOAP with Attachments. | 12 |
| IV | Web Services: Overview-Architecture-Key Technologies-UDDI- WSDC-ebxml-SOAP and web services in E-Commerce. | 12 |
| V | XML Security: Security overview-Canonicalization-XML Security Frame work-XML Encryption-XML Digital Signature. | 12 |

## Learning Resources

| | |
|---|---|
| **Text Books** | 1. Frank P Coyle XML, Web Services and the Data Revolution, Pearson Education,2002. |
| **Reference Books** | 1. Sandeep Chatterjee,James Webber,"Developing Enterprise Web Services".Pearson Education,2004.<br>2. Ramesh Nagappan,Robert Skocylas and Rima PatelSriganesh,"Developing Java Web services", Wiley Publishing,Inc,2004. |
| **Web Sites / Links** | 1. http://www.w3schools.com/webservices/ws_intro.asp.<br>2. http://www.service-architecture.com/articles/web-services/web_services_definition.html. |

**Content beyond Syllabus:**

1. Applications in B2B.
2. To understand about Web Service Tools.

| Subject Title | Soft Computing | Semester | V | Hours:60 |
|---|---|---|---|---|
| Subject Code | 17U5CTE02 | Specialization | NA | |

| Type | Elective - I | L:T:P:C | 5 : 0 : 0 : 4 |
|---|---|---|---|

**Objectives:**

To learn basic neural networks, fuzzy systems, and optimization algorithms concepts and their relations.

| Unit | Syllabus Contents | Number of Sessions |
|---|---|---|
| I | Soft Computing: Introduction of Soft Computing-Soft Computing vs. Hard Computing-various types of Soft Computing techniques-Applications of Soft Computing. Fundamentals of Neural Networks: Basic Concepts of Neural Network-Model of an Artificial Neuron-Neural Network Architectures-Characteristics of Neural Networks-Learning Methods-Early Neural Network Architectures-Some applications domain. | 12 |
| II | Back propagation Networks: Architecture of Back propagation Network-Back propagation Learning –illustrations-Effect of Tuning Parameters of the Back propagation Neural Network-Selection of various parameters in Back propagation Neural Network-Variations of Standard Back propagation algorithms. | 12 |
| III | Supervised Learning Neural Networks: Introduction - Perceptron - Adaline – Multiple Adaptive Linear Neurons – Radial Basis Function Networks. Unsupervised Learning Neural Networks: Introduction – Fixed Weight Competitive Nets – Kohonen Self Organizing Feature Maps – Learning Vector Quantization – Adaptive Resonance Theory Network. | 12 |
| IV | Fuzzy logic: Fuzzy Set Theory: Fuzzy versus Crisp - Fuzzy Sets: Membership Function-Basic Fuzzy set operations-Properties-Fuzzy Relations: Fuzzy Cartesian Product-Operations. Fuzzy Systems: Fuzzy Logic-Fuzzy Rule based system-Defuzzification Methods-Applications. | 12 |
| V | Genetic Algorithm: Introduction – Biological Background – Genetic Algorithm and Search Space – Genetic Algorithm Vs Traditional Algorithm – Basic Terminologies in Genetic Algorithm – Simple Genetic Algorithm – General Genetic Algorithm – Operators – Stopping Condition in Genetic Algorithm Flow – Constraints in Genetic Algorithm – Advantages and Limitations of Genetic Algorithm- Applications of Genetic Algorithm. | 12 |

## Learning Resources

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|---|---|
| **Text Books** | 1. Rajasekaran. S and VijayalakshmiPai, Neural Networks, Fuzzy Logic and |

| | |
|---|---|
| | Genetic Algorithms, PHI, New Delhi-2011 (fifteenth edition) (Unit I,II,IV)<br>2. Sivanandam. S. N and Deepa S. N, Principles of Soft Computing, 2 ND Edition Wiley India, 2012.(Unit III & V) |
| **Reference Books** | 1. Fakhreddine O. Karray, Clarence De Silva, Soft Computing and Intelligent Systems Design, Pearson, 2009.<br>2. Sudarshan K. Valluru and T.Nageswara Rao, Introduction to Neural Network and Genetic Algorithm Theory and Applications,Pashupathi Printers Ltd,New Delhi, 2010.<br>3. KwangH.Lee, First Course on Fuzzy Theory and Applications,Springer International Edition,2009.<br>4. AmirthavalliM,Fuzzy Logic and Neural Network,Scitech Publications Pvt.Ltd,2007 |
| **Web Sites/Links** | 1. www.banasthali.org<br>2. www.soft-computing.de/def.html |

**Content beyond the syllabus:**

1. Applications using ANN
2. Scope of Soft Computing Techniques
3. Study about "R' Tools

| **Subject Title** | **Big Data Analytics** | **Semester** | **V** | **Hours:60** |
|---|---|---|---|---|
| **Subject Code** | **17U5CTE03** | **Specialization** | **NA** | |
| **Type** | **Elective - I** | **L:T:P:C** | **5:0:0:4** | |
| | | | | |
| **Objectives:**<br>1. To understand the basic concepts of big data, methodologies for analyzing structured and | | | | |

| | | |
|---|---|---|
| | unstructured data and Hadoop. | |
| **Unit** | **Syllabus Contents** | **Number of Sessions** |
| **I** | **Overview of BigData:** What is Big Data? Structuring Big Data – Types od Data - Elements of Big Data – Volume, Velocity, Variety – Veracity - Big Data Analytics – Advantages of Big Data Analytics - Careers in Big Data – Future of Big Data. | **12** |
| **II** | **Technologies for Handling BigData:** Distributed and Parallel Computing for Big Data – Introducing Hadoop – Cloud computing and Big Data: Features of Cloud Computing – Cloud Delivery Models – Cloud Services for Big Data – Cloud Providers in Big Data Market – In-memory Computing Technology for Big Data. | **12** |
| **III** | **Understanding Hadoop Ecosystem:** Hadoop Ecosystem – Hadoop Distributed File System – HDFS Architecture – Concept of Blocks in HDFS Architecture – HDFS Commands – Introducing Hbase – Map Reducing Framework – Role of Hbase in Big Data processing. | **12** |
| **IV** | **Analyzing Data with Pig:** Introducing Pig – Running Pig – Working with operators in Pig – Introducing to No Sql – Types of No Sql Data Models – Flum Architecture – Sqoop – Imporitng Data – What is Mahout – Machine Learning – Mahout Algorithms. | **12** |
| **V** | **Understanding Analytics and Big Data:** Comparing report and analysis – Types of analystics – Points to consider during analysis – Developing an Analytic team – Understanding text analytics – Analytical approaches – History of analytical tools – Introducing popular analytical tools. | **12** |

## Learning Resources

| | |
|---|---|
| **Text Books** | 1. "Big Data Black Book". "DT Editorial services", Dream Tech Press, 2016. |
| **Reference Books** | 1. "Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data" EMC Educational services, Wiley Publications, 2015.<br>2. "Real-Time Big Data Analytics: Emerging Architecture", "Mike Barlow", O'Reilly Publications, 2013. |
| **Web Sites / Links** | 1. http://searchbusinessanalytics.techtarget.com/definition/big-data-analytics<br>2. https://www.sas.com/en_us/insights/analytics/big-data-analytics.html |

**Content beyond Syllabus:**

1. To understand about Hadoop.
2. Knowledge about unstructured data.

| Subject Title | Open Source Technologies | Semester | VI | Hours:60 |
|---|---|---|---|---|
| Subject Code | 17U6CTE04 | Specialization | NA | |
| Type | Elective – II | L:T:P:C | 4 : 0 : 0 : 3 | |

**Objectives:**

1. To enable the students to learn the concepts of open source, XML, PHP and MYSQL.

| Unit | Syllabus Contents | Number of Sessions |
|---|---|---|
| I | Open Source: Definition – Application of Open Source, Advantages and disadvantages of open source –benefits of open source – commercial aspects of open source – open source operating system: introduction of Linux. | 12 |
| II | Introduction: What is XML? – Origin Of the XML Standards - Where XML Can Be Used, And What U Can Use it For. Well-Formed XML: Parsing XML – Attributes - Comments –Empty Elements - XML Declaration - Processing Instructions – Illegal PCDATA Characters - Errors in XML. Validation: Document Type Definitions. | 12 |
| III | Introduction to PHP: Sending data to the Web Browser – Variables & Strings – Programming with PHP & Creating HTML: Handling HTML Form & Operators-Validating Form Data & Arrays – Introduction to MySQL: Creating Database columns – Introduction to SQL: Inserting Records & Select Data. | 12 |
| IV | Advance SQL and MySQL:DB Design-Normal Forms - Performing Transactions - Error Handling and Debugging : Introduction – Displaying PHP Errors – PHP Debugging Techniques – Creating Custom error handlers – Using PHP with MySQL: Introduction – Connecting to MySQL – Security & Updation with PHP . | 12 |
| V | Cookies and Sessions: Making Login Page – Using Sessions – Security Methods:Preventing Spam – Preventing XSS & SQL Injection Attacks – Database Encryption - Perl-Compatible Regular Expression: Introduction – Defining Simple Patterns - Finding Matches & Using Modifiers. | 12 |

| Unit | Syllabus Contents | Number of Sessions |
|---|---|---|
| I | Introduction – Branch Overlapping Aspects of Multimedia Content – Global Structure –Multimedia Literature . Multimedia – Media and Data Streams – Medium | **08** |
| II | Sound/Audio : Basic Sound Concepts – Music –Speech , Images and Graphics : Basic Concepts – Computer Image Processing – Video and Animation : Basic Concepts – Television – Computer Based Animation. | **10** |
| III | Data Compression : Storage Space – Coding Requirements – JPEG – MPEG – DVI,Optical Storage Media , Computer Technology – Multimedia Operating System. | **09** |
| IV | Networking System : Layers , Protocols and Services , Networks , Metropolitan Area Networks , WAN , Multimedia Communication System. | **08** |
| V | User Interfaces, Synchronization , Abstraction for Programming : Abstraction Levels –Libraries – System Software – Toolkit – Higher Programming Languages . Multimedia Application : Introduction – Media Population – Media Compos ion – Media Communication – Trends. | **15** |
| | **Relevant Case Analysis for each units for practical hours** | |

## Learning Resources

| | |
|---|---|
| **Text Books** | 1. David Hunter, Jeff Rafter, Joe Fawcett, Eric Van der Vlist ,Danny Ayers, John Duckett, Andrew Watt, Linda McKinnon "Beginning XML 4th Edition", -Wiley India Pvt. Limited -2008. Unit I- Chapters 1,2,4 Unit II –Chapter 11, 12, 15.<br>2. Lary Ullman , "PHP6 AND MySQL5 For Dynamic Web Sites" -, Pearson Education – 2008.Unit III - Chapter 1, 2, 4,5, Unit IV- Chapters 6,7,8 Unit V, Chapters 11, 12, 13. |
| **Reference Books** | 1. Chris Bates "Web Programming, Building Internet Applications", 3rd Edition, April 2006, WILEY Dreamtech.<br>2. Michael j. Young "Step by Step XML?" Microsoft Press, 2002. |
| **Web Sites/Links** | 1. http://www.computerworld.com/open-source-tools/five-open-source-technologies.html.<br>2. http://searchsoa.techtarget.com/definition/XML.<br>3. https://www.php.net.<br>4. https://www.codecademy.com/tracks/php. |

**Content beyond syllabus:**

1. Open Source Operating System (Solaris)
2. Open Source web server
3. Eclipse IDE platform

| | | | | |
|---|---|---|---|---|
| **Subject Title** | **Artificial Intelligence and** | **Semester** | **VI** | **Hours:60** |

| | Expert Systems | | | |
|---|---|---|---|---|
| **Subject Code** | **17U6CTE05** | **Specialization** | **NA** | |
| **Type** | **Elective :II** | **L:T:P:C** | **4:0:0:3** | |

**Objectives:**

1. To provide an overview of topics in the field of Artificial Intelligence.
2. Working Knowledge of designing a expert systems and applying expert system technologies in designing and analyzing engineering systems.

| Unit | Syllabus Contents | Number of Sessions |
|---|---|---|
| **I** | Introduction: Artificial Intelligence Problems- Artificial Intelligence Techniques-Criteria for Success. Problems, Problems Space, Search: State Space Search-Production Systems-Problem Characteristics- Issues in design of search. Heuristic Search Techniques: Generate & Test- Hill climbing- Best First, problem Reduction, Constraint satisfaction, Means End Analysis. | **12** |
| **II** | Knowledge Representation Issues: Representations and Mappings-Approaches to Knowledge representation-Issues in knowledge representations-The Frame Problem. Using Predicate Logic: Representing Simple Facts in Logic-Representing instance and ISA Relationships-Computable Functions and Predicates- Resolution-Natural deduction. | **12** |
| **III** | Representing Knowledge Rules: Procedural vs. Declarative Knowledge-Logic Programming- Forward vs Backward Reasoning- Matching- Control Knowledge-Symbolic Reasoning under Uncertainty: Introduction to Nonmonotonic Reasoning- Logics for Nonmonotonic Reasoning-Implementation Issues Augmenting Problem Solver- Implementation: Depth First Search-Implementation: Breadth First Search | **12** |
| **IV** | Statistical Reasoning: Probability and Bayes Theorem-Certainty Factors and Rule-based Systems- Bayesian Networks- Dempster- Shafer Theory- Fuzzy Logic- Weak slot -Filler Structures: Semantic Nets Frames. Strong Slot Filler Structures: Conceptual Dependency- Scripts | **12** |
| **V** | Game Playing: Overview-The Minimax Search Procedure-Adding Alpha-Beta Cutoffs-Additional Refinements- Expert Systems: Representing and using Domain Knowledge-Expert system Shells- Explanation- Knowledge Acquisition | **12** |

| Learning Resources | |
|---|---|
| **Text Books** | 1. Elaine Rich ,Kevin Knight,Shivashankar B Nair, "Artificial Intelligence", Tata McGraw-Hill Publication, 3rd Edition,2010 |
| **Reference Books** | 1. Donald A.Waterman – A Guide to Expert Systems Tata Mcgraw Hill – second Edition,1991.<br>2. Stuart Russell and Peter Norving ,"Artificial Intelligence – A Modern Approach"Second Edition,2007. |
| **Web Sites / Links** | 1. www. tutorialspoint.com.<br>2. www.myreaders.info.<br>3. www.listpdf.com. |

**Content beyond the Syllabus:**

1. The major advantages of AI over natural languages.
2. The role of the intelligent systems and their potential benefits.

| | Cryptography | | | |
|---|---|---|---|---|
| **Subject Code** | **17U6CTE06** | **Specialization** | **NA** | |
| **Type** | **Elective : II** | **L:T:P:C** | **4:0:0:3** | |

**Objectives**

1. Identify and explain the concepts, policies, and technologies associated with a layered and diversified defense-in-depth strategy.
2. Define the concepts of auditing in a network, including the types of audits and the handling of data.

| Unit | Syllabus Contents | Number of Sessions |
|---|---|---|
| I | **Introduction:** Security Trends-The OSI Security Architecture - Security Attacks - Security Services- Security Mechanisms- Model for Internetwork Security - Internet Standards and the Internet Society. Symmetric Encryption and Message Confidentiality: Symmetric Encryption Principles - Symmetric Block Encryption Algorithms - Stream Ciphers and RC4 - Cipher Block Modes of Operations - Location of Encryption Devices-Key Distribution | 12 |
| II | **Public Key Cryptography and Message Authentication:** Approaches to Message Authentication – Secure Hash Functions and HMAC - Public Key Cryptography Principles - Public Key Cryptography Algorithms - Digital Signatures - **Key Management Authentication Applications:** Kerberos - X.509 Authentication service - Public Key Infrastructures. | 12 |
| III | **Electronic mail Security:** Pretty Good Privacy (PGP) - S/MIME. **IP Security:** IP Security Overview – IP Security Architecture - Authentication Header - Encapsulating Security Payload - Combining security Associations - Key Management. | 12 |
| IV | **Web Security:** Web Security Considerations- Security Sockets Layer (SSL) and Transport Layer Security (TLS) - Secure Electronic Transaction. **Network Management Security:** Basic Concepts of SNMP - SNMPV1 Community facility - SNMPV3. | 12 |
| V | **Intruders:** Intruders – Intrusion Detection – Password Management - Malicious Software: Viruses and Related Threats – Virus Countermeasures – Distributed Denial of Service Attacks. **Firewalls:** Firewall Design Principles – Trusted Systems – Common Criteria for IT Security Evaluation. | 12 |

| Learning Resources | |
|---|---|
| **Text Books** | 1. William Stallings, "Network Security Essentials – Applications and Standards", 3rd Edition, Pearson Education, 2009 Edition.<br>Unit I : Chapter 1 & 2 , Unit II : Chapter 3 & 4, Unit III : Chapter 5 & 6,<br>Unit IV : Chapter 7 & 8, Unit-V (Chapter 9, 10 & 11) |
| **Reference Books** | 1. V.K.Pachghare , "Cryptography and Information Security" , PHI 2010.<br>2. William Stallings, "Cryptography and Network Security", Pearson Education - 2008.<br>3. Behrouz A Forouzan, Sophia Chung Fegan, "Data Communications and Networking", TMH-2006. |
| **Web Sites / Links** | 1. Nptel.in<br>2. Tecnopedia.com |

**Content beyond Syllabus:**

1. To know about Cyber security.
2. To understand about security algorithms.