**VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN**
**(Autonomous)**
**Elayampalayam, Tiruchengode – 637205.**

**M.TECH. INFORMATION TECHNOLOGY**
**REGULATIONS – 2015**
**CHOICE BASED CREDIT SYSTEM**

## PROGRAMME EDUCATIONAL OBJECTIVES (PEOs) :

I. To prepare students to excel in research and to succeed in Information Technology profession through global, rigorous post graduate education.
II. To provide students with a solid foundation in computing, communication and information technologies that is required to become a successful IT professional or a researcher in the field of computer science and information technology.
III. To train students with good computing and communication knowledge so as to comprehend, analyze, design, and create novel software products and communication protocols for the real life problems.
IV. To inculcate students in professional and ethical attitude, effective communication skills, teamwork skills, multidisciplinary approach, and an ability to relate information technology issues to broader social context.
V. To provide student with an academic environment aware of excellence, leadership, written ethical codes and guidelines, and the life-long learning needed for a successful professional career.

## PROGRAMME OUTCOMES (POs):

On successful completion of the programme,

1. Graduates will demonstrate knowledge of information technology, computer science and communication engineering.
2. Graduates will demonstrate an ability to identify, formulate and solve computing and communication problems.
3. Graduate will demonstrate an ability to design effective and useful software and carry out research in the fields of computing and communication.
4. Graduates will demonstrate an ability to implement a system, component or process as per needs and specifications.
5. Graduates will demonstrate an ability to implement the projects that require knowledge from related fields like electronics and communication.
6. Graduate will demonstrate skills to use modern computing paradigms and computing platforms to develop products and projects that are useful to the society.
7. Graduates will demonstrate knowledge of professional and ethical responsibilities.
8. Graduate will be able to communicate effectively in both verbal and written form.
9. Graduate will show the understanding of impact of information technology solutions on the society and also will be aware of contemporary issues.
10. Graduate will develop confidence for self education and ability for life-long learning.
11. An ability to apply engineering and management knowledge and techniques to estimate time and resources needed to complete a computer engineering project
12. Knowledge of contemporary issues in the social sciences and the humanities using computational tools

**MAPPING OF PROGRAMME EDUCATIONAL OBJECTIVES WITH PROGRAMME OUTCOMES**

**A broad relation between the programme objective and the outcomes is given in the following table**

| Programme Educational Objectives | Programme Outcomes | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| I | √ | | √ | | | | | | | √ | √ | √ |
| II | √ | √ | √ | √ | √ | | | | | √ | | √ |
| III | | | √ | √ | √ | | √ | | | | | |
| IV | | | | | | | √ | √ | √ | | √ | |
| V | | | | √ | √ | | | | √ | √ | √ | √ |

| | SEM | COURSE NAME | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YEAR 1 | SEM 1 | Applied Probability & Statistics | √ | √ | √ | | √ | | | √ | | | √ | |
| | | Advanced Computer Architecture | √ | √ | √ | | √ | | | | √ | | √ | |
| | | Advanced Data Structures & Algorithms | √ | √ | √ | √ | √ | | | | | | √ | |
| | | Multimedia Communication & Networks | √ | √ | √ | √ | √ | | √ | | | | | |
| | | Advanced Database Technology | √ | | √ | √ | √ | | | | | | | |
| | | Professional Elective – I | | | | | | | | | | | | |
| | | Advanced Data Structures Lab | √ | √ | √ | √ | √ | | | | | | | |
| | SEM 2 | Advanced Operating Systems | √ | | √ | √ | √ | | | | | | √ | √ |
| | | Object Oriented Analysis & Design | √ | | √ | √ | √ | √ | | | | | √ | |
| | | Research Methodology & Data Analysis | √ | √ | √ | | | √ | | | | | | √ |
| | | Professional Elective – II | | | | | | | | | | | | |
| | | Professional Elective – III | | | | | | | | | | | | |
| | | Open Elective-I | | | | | | | | | | | | |
| | | Software Development Lab | √ | √ | √ | √ | √ | √ | | | | | √ | |
| | | Technical Seminar | | √ | | | √ | √ | | √ | | √ | √ | √ |
| YEAR 2 | SEM 3 | Professional Elective-IV | | | | | | | | | | | | |
| | | Professional Elective-V | | | | | | | | | | | | |
| | | Open Elective-II | | | | | | | | | | | | |
| | | Project Phase-I | | √ | √ | √ | √ | | | √ | √ | √ | √ | √ |
| | SEM 4 | Project Phase-II | | √ | √ | √ | √ | | | √ | √ | √ | √ | √ |

| | | | | | |
|---|---|---|---|---|---|
| | **VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN**<br>(Autonomous Institution Affiliated to Anna University, Chennai)<br>Elayampalayam, Tiruchengode – 637 205 | | | | |
| Programme | **M.Tech.** | Programme Code | **204** | Regulation | **2015** |
| Department | **INFORMATION TECHNOLOGY** | | | Semester | **I** |

**CURRICULUM**

(Applicable to the students admitted from the academic year 2015-2016 onwards)

| Code | Course Name | Category | Periods / Week | | | Credit | Maximum Marks | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | L | T | P | C | CA | ESE | Total |
| **THEORY** | | | | | | | | | |
| P15MA101 | Applied Probability & Statistics | FC | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| P15IT101 | Advanced Computer Architecture* | PC | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| P15IT102 | Advanced Data Structures & Algorithms | PC | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| P15IT103 | Multimedia Communication & Networks | PC | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| P15IT104 | Advanced Database Technology* | PC | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| | Professional Elective – I | PE | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| **PRACTICAL** | | | | | | | | | |
| P15IT105 | Advanced Data Structures Lab | PC | 0 | 0 | 4 | 2 | 50 | 50 | 100 |
| | | | | | **Total Credits** | **20** | **350** | **350** | **700** |

FC – Foundation Course, PC – Professional Course, PE – Professional Elective, CA - Continuous Assessment, ESE - End Semester Examination

*Common Syllabus for M.E. CSE

**VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN**
(Autonomous Institution Affiliated to Anna University, Chennai)
Elayampalayam, Tiruchengode – 637 205

| Programme | **M.Tech.** | Programme Code | **204** | Regulation | **2015** |
|---|---|---|---|---|---|
| Department | **INFORMATION TECHNOLOGY** | | | Semester | **II** |

**CURRICULUM**
(Applicable to the students admitted from the academic year 2015-2016 onwards)

| Code | Course Name | Category | Periods / Week | | | Credit | Maximum Marks | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | L | T | P | C | CA | ESE | Total |
| **THEORY** | | | | | | | | | |
| P15IT206 | Advanced Operating Systems | PC | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| P15IT207 | Object Oriented Analysis & Design | PC | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| P15IT208 | Research Methodology & Data Analysis* | PC | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| | Professional Elective – II | PE | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| | Professional Elective – III | PE | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| | Open Elective-I | OE | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| **PRACTICAL** | | | | | | | | | |
| P15IT209 | Software Development Lab | PC | 0 | 0 | 4 | 2 | 50 | 50 | 100 |
| P15IT210 | Technical Seminar | EEC | 0 | 0 | 2 | 1 | 50 | 50 | 100 |
| | | | | | **Total Credits** | **21** | **400** | **400** | **800** |

PC – Professional Course, PE – Professional Elective, OE – Open Elective, EEC – Enhanced Employability Course,
CA - Continuous Assessment, ESE - End Semester Examination

*Common Syllabus for M.E. CSE, M.E. AE, M.E. PSE and M.E. VLSI

| | | | | | |
|---|---|---|---|---|---|
| | **VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN**<br>(Autonomous Institution Affiliated to Anna University, Chennai)<br>Elayampalayam, Tiruchengode – 637 205 | | | | |
| Programme | **M.Tech.** | Programme Code | **204** | Regulation | **2015** |
| Department | **INFORMATION TECHNOLOGY** | | | Semester | **III** |

**CURRICULUM**

(Applicable to the students admitted from the academic year 2015-2016onwards)

| Code | Course Title | Category | Periods / Week | | | Credit | Maximum Marks | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | L | T | P | C | CA | ESE | Total |
| **THEORY** | | | | | | | | | |
| | Professional Elective – IV | PE | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| | Professional Elective – V | PE | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| | Open Elective – II | OE | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| **PRACTICAL** | | | | | | | | | |
| P15IT311 | Project Phase – I | EEC | 0 | 0 | 12 | 6 | 50 | 50 | 100 |
| | | | | | **Total Credits** | **15** | **200** | **200** | **400** |

PE – Professional Elective, OE – Open Elective, EEC – Enhanced Employability Course, CA - Continuous Assessment, ESE - End Semester Examination

| | | | | | |
|---|---|---|---|---|---|
| | **VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN**<br>(Autonomous Institution Affiliated to Anna University, Chennai)<br>Elayampalayam, Tiruchengode – 637 205 | | | | |
| Programme | **M.Tech.** | Programme Code | **204** | Regulation | **2015** |
| Department | **INFORMATION TECHNOLOGY** | | | Semester | **IV** |

**CURRICULUM**

(Applicable to the students admitted from the academic year 2015-2016 onwards)

| Code | Course Name | Category | Periods / Week | | | Credit | Maximum Marks | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | L | T | P | C | CA | ESE | Total |
| **PRACTICAL** | | | | | | | | | |
| P15IT412 | Project Phase – II | EEC | 0 | 0 | 24 | 12 | 50 | 50 | 100 |
| | | | **Total Credits** | | | **12** | **50** | **50** | **100** |

EEC – Enhanced Employability Course, CA - Continuous Assessment, ESE - End Semester Examination

Cumulative Course Credits : 68

| | | | | | |
|---|---|---|---|---|---|
| | **VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN**<br>(Autonomous Institution Affiliated to Anna University, Chennai)<br>Elayampalayam, Tiruchengode – 637 205 | | | | |
| Programme | **M.Tech.** | Programme Code | **204** | Regulation | **2015** |
| Department | **INFORMATION TECHNOLOGY** | | | Semester | **ELECTIVE** |

**CURRICULUM**

(Applicable to the students admitted from the academic year 2015-2016onwards)

**LIST OF PROFESSIONAL ELECTIVE**

| Code | Course Name | Periods / Week | | | Credit | Maximum Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | C | CA | ESE | Total |
| **THEORY** | | | | | | | | |
| P15ITE01 | Digital Image Processing | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| P15ITE02 | Data Warehousing and Data Mining | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| P15ITE03 | Green Computing | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| P15ITE04 | 3G and 4G Wireless Networks | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| P15ITE05 | Compiler Design | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| P15ITE06 | Software Testing and Quality Assurance | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| P15ITE07 | Information Retrieval | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| P15ITE08 | Bio Informatics Computing | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| P15ITE09 | High Speed Networks | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| P15ITE10 | Open Source Systems | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| P15ITE11 | Grid Computing | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| P15ITE12 | Ad-hoc & Sensor Networks | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| P15ITE13 | Soft Computing | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| P15ITE14 | Knowledge Engineering | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| P15ITE15 | Big Data Analytics | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| P15ITE16 | Information Security | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| P15ITE17 | Cyber Forensics | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| P15ITE18 | Principles of Programming Languages | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| P15ITE19 | Computer Graphics and Multimedia | 3 | 0 | 0 | 3 | 50 | 50 | 100 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| P15ITE20 | Operations Research | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| P15ITE21 | Software Metrics and Reliability | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| P15ITE22 | E-Learning | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| P15ITE23 | Building Internet of Things | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| P15ITE24 | Human Computer Interaction | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| P15ITE25 | Supply Chain Management | 3 | 0 | 0 | 3 | 50 | 50 | 100 |

**FOUNDATION COURSE (FC)**

| SL.No. | COURSE CODE | COURSE TITLE | CATEGORY | CONTACT PERIODS | L | T | P | C |
|---|---|---|---|---|---|---|---|---|
| 1. | P15MA101 | Applied Probability & Statistics | FC | 3 | 3 | 0 | 0 | 3 |

**PROFESSIONAL CORE (PC)**

| SL.No. | COURSE CODE | COURSE TITLE | CATEGORY | CONTACT PERIODS | L | T | P | C |
|---|---|---|---|---|---|---|---|---|
| 1. | P15IT101 | Advanced Computer Architecture | PC | 3 | 3 | 0 | 0 | 3 |
| 2. | P15IT102 | Advanced Data Structures & Algorithms | PC | 3 | 3 | 0 | 0 | 3 |
| 3. | P15IT103 | Multimedia Communication & Networks | PC | 3 | 3 | 0 | 0 | 3 |
| 4. | P15IT104 | Advanced Database Technology | PC | 3 | 3 | 0 | 0 | 3 |
| 5. | P15IT105 | Advanced Data Structures Lab | PC | 3 | 0 | 0 | 4 | 2 |
| 6. | P15IT206 | Advanced Operating Systems | PC | 3 | 3 | 0 | 0 | 3 |
| 7. | P15IT207 | Object Oriented Analysis & Design | PC | 3 | 3 | 0 | 0 | 3 |
| 8. | P15IT208 | Research Methodology & Data Analysis* | PC | 3 | 3 | 0 | 0 | 3 |

## PROFESSIONAL ELECTIVES (PE)

| SL.No. | COURSE CODE | COURSE TITLE | CATEGORY | CONTACT PERIODS | L | T | P | C |
|---|---|---|---|---|---|---|---|---|
| 1. | P15ITE01 | Digital Image Processing | PE | 3 | 3 | 0 | 0 | 3 |
| 2. | P15ITE02 | Data Warehousing and Data Mining | PE | 3 | 3 | 0 | 0 | 3 |
| 3. | P15ITE03 | Green Computing | PE | 3 | 3 | 0 | 0 | 3 |
| 4. | P15ITE04 | 3G and 4G Wireless Networks | PE | 3 | 3 | 0 | 0 | 3 |
| 5. | P15ITE05 | Compiler Design | PE | 3 | 3 | 0 | 0 | 3 |
| 6. | P15ITE06 | Software Testing and Quality Assurance | PE | 3 | 3 | 0 | 0 | 3 |
| 7. | P15ITE07 | Information Retrieval | PE | 3 | 3 | 0 | 0 | 3 |
| 8. | P15ITE08 | Bio Informatics Computing | PE | 3 | 3 | 0 | 0 | 3 |
| 9. | P15ITE09 | High Speed Networks | PE | 3 | 3 | 0 | 0 | 3 |
| 10. | P15ITE10 | Open Source Systems | PE | 3 | 3 | 0 | 0 | 3 |
| 11. | P15ITE11 | Grid Computing | PE | 3 | 3 | 0 | 0 | 3 |
| 12. | P15ITE12 | Ad-hoc & Sensor Networks | PE | 3 | 3 | 0 | 0 | 3 |
| 13. | P15ITE13 | Soft Computing | PE | 3 | 3 | 0 | 0 | 3 |
| 14. | P15ITE14 | Knowledge Engineering | PE | 3 | 3 | 0 | 0 | 3 |
| 15. | P15ITE15 | Big Data Analytics | PE | 3 | 3 | 0 | 0 | 3 |
| 16. | P15ITE16 | Information Security | PE | 3 | 3 | 0 | 0 | 3 |
| 17. | P15ITE17 | Cyber Forensics | PE | 3 | 3 | 0 | 0 | 3 |
| 18. | P15ITE18 | Principles of Programming Languages | PE | 3 | 3 | 0 | 0 | 3 |
| 19. | P15ITE19 | Computer Graphics and Multimedia | PE | 3 | 3 | 0 | 0 | 3 |
| 20. | P15ITE20 | Operations Research | PE | 3 | 3 | 0 | 0 | 3 |
| 21. | P15ITE21 | Software Metrics and Reliability | PE | 3 | 3 | 0 | 0 | 3 |
| 22. | P15ITE22 | E-Learning | PE | 3 | 3 | 0 | 0 | 3 |
| 23. | P15ITE23 | Building Internet of Things | PE | 3 | 3 | 0 | 0 | 3 |
| 24. | P15ITE24 | Human Computer Interaction | PE | 3 | 3 | 0 | 0 | 3 |
| 25. | P15ITE25 | Supply Chain Management | PE | 3 | 3 | 0 | 0 | 3 |

## ENHANCED EMPLOYABILITY COURSES (EEC)

| SL.No. | COURSE CODE | COURSE TITLE | CATEGORY | CONTACT PERIODS | L | T | P | C |
|---|---|---|---|---|---|---|---|---|
| 1. | P15IT210 | Technical Seminar | EEC | 2 | 0 | 0 | 2 | 1 |
| 2. | P15IT311 | Project Phase – I | EEC | 12 | 0 | 0 | 12 | 6 |
| 3. | P15IT412 | Project Phase – II | EEC | 24 | 0 | 0 | 24 | 12 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN**<br>(Autonomous Institution, Affiliated to Anna University ,Chennai)<br>Elayampalayam, Tiruchengode – 637 205 | | | | | | | |
| Programme | **M.Tech.** | Programme code | **204** | | Regulation | | **2015** | |
| Department | **INFORMATION TECHNOLOGY** | | | | Semester | | **I** | |
| Course code | Course Name | Periods Per Week | | | Credit | Maximum Marks | | |
| | | L | T | P | C | CA | ESE | Total |
| **P15MA101** | **Applied Probability & Statistics** | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| **Course Objective** | The main objective of this course is to:<br>• Introduce the basic concepts of one dimensional and two dimensional Random Variables.<br>• Provide information about Estimation theory, Correlation, Regression and Testing of hypothesis.<br>• Enable the students to use the concepts of multivariate normal distribution and principle components analysis. | | | | | | | |
| **Unit – I** | **ONE DIMENSIONAL RANDOM VARIABLES** | | | | Periods | **12** | | |
| Random Variables-Probability Function-Moments-Moment Generation Function & their Properties-Binomial-Poisson-Geometric, Uniform & Exponential Distribution | | | | | | | | |
| **Unit – II** | **TWO DIMENSIONAL RANDOM VARIABLES** | | | | Periods | **12** | | |
| Joint Distributions-Marginal and Conditional distributions-Functions of two dimensional random variables-Regression curve-Correlation | | | | | | | | |
| **Unit - III** | **ESTIMATION THEORY** | | | | Periods | **12** | | |
| Un biased Estimators-Methods of Moments-Maximum Likelihood Estimation-Curve Fitting by Principle of Least Squares-Regression lines. | | | | | | | | |
| **Unit - IV** | **TESTING OF HYPOTHESIS** | | | | Periods | **12** | | |
| Sampling distributions-Type I and II errors-tests based on Normal.t.chi-square and F distributions for testing of mean, variance and proportions-Tests for Independence of Attributes and Goodness of fit | | | | | | | | |
| **Unit - V** | **MULTIVARIATE ANALYSIS** | | | | Periods | **12** | | |
| Random Vectors and matrices-Mean vectors and Covariance matrices-Multivariate Normal density and its properties-Principal components Population Principal Components- Principal Components from Standardized variables | | | | | | | | |
| | | | | | **Total Periods** | **60** | | |
| **REFERENCES:** | | | | | | | | |
| 1. | Jay L.Devore.”Probability and Statistics for Engineering and the Sciences”, Thomson and Duxbury,2002 | | | | | | | |
| 2. | Richard Johnson.”Miller & Freund, Probability and Statistics for Engineers”, Prentice-Hall, Seventh Edition, 2007 | | | | | | | |
| 3. | Richard.A.Johnson and Dean W.Wichern, “Applied Multivariate Statistical Analysis”, Pearson Education. Asia. 5th Edition, 2002. | | | | | | | |
| 4. | Gupta S.C and Kapoor V.K, “Fundamentals of Mathematical Statistics”, Sultan & sons 2001. | | | | | | | |
| 5. | Dallas E Johnson, “Applied Multivariate Methods for Data Analysis”, Thomson and Duxbury Press,1998 | | | | | | | |
| **Course Outcome** | Students who complete this course successfully are expected to:<br>• Understand and apply the basic concepts of probability theory and statistics to Engineering problems.<br>• Analyze problems and apply relevant statistical techniques to arrive at a solution. | | | | | | | |

**VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN**
(Autonomous Institution, Affiliated to Anna University ,Chennai)
Elayampalayam, Tiruchengode – 637 205

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Programme | **M.Tech.** | Programme code | **204** | Regulation | **2015** | | | |
| Department | **INFORMATION TECHNOLOGY** | | | Semester | **I** | | | |

| Course code | Course Name | Periods Per Week | | | Credit | Maximum Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | C | CA | ESE | Total |
| **P15IT101** | **Advanced Computer Architecture** | 3 | 0 | 0 | 3 | 50 | 50 | 100 |

**Course Objective**

The main objective of this course is to:

- Introduce the evolution of computer architecture.
- the state-of-the-art in computer architecture.
- Understand the design challenges in building a system.

| **Unit - I** | **FUNDAMENTALS OF COMPUTER DESIGN** | Periods | **9** |
|---|---|---|---|

Introduction-Measuring, reporting and summarizing performance-Quantitative principles of computer design-Instruction Set Principles-Introduction-Classifying ISA-Types and size of operands-Pipelining-Introduction-Hazards-Implementation-Multicycle operations.

| **Unit - II** | **INSTRUCTION LEVEL PARALLELISM** | Periods | **9** |
|---|---|---|---|

Instruction Level Parallelism-Concepts, Challenges-Basic Compiler Techniques for exposing ILP-Reducing branch cost with prediction-Overcoming data hazards with dynamic scheduling-Examples and algorithms-Hardware based speculation.

| **Unit - III** | **INSTRUCTION LEVEL PARALLELISM WITH HARDWARE AND SOFTWARE APPROACHES** | Periods | **9** |
|---|---|---|---|

Exploiting ILP with multiple Issues and static scheduling, dynamic scheduling-Advanced technique for instruction delivery and speculation-Limitations of ILP-Hardware Vs Software Speculation-Multithreading using ILP-Exploit thread level parallelism.

| **Unit - IV** | **MULTIPROCESSORS AND THREAD LEVEL PARALLELISM** | Periods | **9** |
|---|---|---|---|

Introduction-Symmetric Shared Memory- Architecture, Performance-Distributed Shared memory-Directory based coherence-Synchronization-Basic-Models of memory consistency-Sun T1 Multiprocessor.

| **Unit - V** | **MEMORY HIERARCHY AND STORAGE DEVICES** | Periods | **9** |
|---|---|---|---|

Introduction-Optimization of cache performance-Memory technology and optimizations-Protection-Virtual Memory and Machine-Storage Systems-Introduction-Advanced topics in disk storage-I/O performance, reliability, measures and benchmarks.

| | | |
|---|---|---|
| | **Total Periods** | **45** |

**REFERENCES:**


| | |
|---|---|
| 1. | John L. Hennessey and David A. Patterson, "Computer Architecture – A quantitative approach", Morgan Kaufmann / Elsevier, Fifth edition, 2012. |


**FURTHER READINGS:**


| | |
|---|---|
| 1. | William Stallings, " Computer Organization and Architecture – Designing for Performance", Seventh Edition, Pearson Education, 2006. |
| 2. | Richard Y. Kain, "Advanced Computer Architecture a Systems Design Approach", PHI, 2011. |


**Course Outcome**

Students who complete this course successfully are expected to:

- Design sub-systems to meet specific performance requirements.
- Analyze the requirements of large systems to select and build the right infrastructure.
- Compare and evaluate the performance of various computer architectures.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN**<br>(Autonomous Institution, Affiliated to Anna University ,Chennai)<br>Elayampalayam, Tiruchengode – 637 205 | | | | | | | |
| Programme | **M.Tech.** | Programme code | **204** | | Regulation | **2015** | | |
| Department | **INFORMATION TECHNOLOGY** | | | | Semester | **I** | | |
| Course code | Course Name | Periods Per Week | | | Credit | Maximum Marks | | |
| | | L | T | P | C | CA | ESE | Total |
| **P15IT102** | **Advanced Data Structures and Algorithms** | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| **Course Objective** | The main objective of this course is to:<br>• Understand the usage of algorithms in computing.<br>• Learn and use hierarchical data structures and its operations<br>• Learn the usage of graphs and its applications.<br>• Design data structures and algorithms that is appropriate for problems. | | | | | | | |
| **Unit - I** | **COMPLEXITY ANALYSIS AND ELEMENTARY DATA STRUCTURES** | | | | Periods | **9** | | |
| Algorithm Specification-Performance Analysis-Randomized Algorithm-Stacks –Queues-Trees | | | | | | | | |
| **Unit - II** | **ADVANCED HEAP STRUCTURES** | | | | Periods | **9** | | |
| Min Max Heaps-Binomial Heaps- Fibonacci Heaps-Symmetric Min Max Heaps-Interval Heaps-Pairing Heaps | | | | | | | | |
| **Unit - III** | **TREES** | | | | Periods | **9** | | |
| Binary Search Trees-AVL Trees-Red-Black Trees-Selection Trees-Forests-Threaded Binary Tree-Splay Tree-B Tree-B+ Trees. | | | | | | | | |
| **Unit - IV** | **GREEDY AND DIVIDE AND CONQUER** | | | | Periods | **9** | | |
| Quick Sort-Strassen's Matrix Multiplication- Convex Hull-Tree Vertex Splitting-Job Sequencing with Deadlines-Optimal Storage on Tapes. | | | | | | | | |
| **Unit - V** | **DYNAMIC PROGRAMMING AND BACK TRACKING** | | | | Periods | **9** | | |
| Multistage Graphs- 0/1 Knapsack using dynamic programming-Flow shop scheduling-8 Queen problem-Graph Coloring- Knapsack using Backtracking. | | | | | | | | |
| | | | | | **Total Periods** | **45** | | |
| **REFERENCES:** | | | | | | | | |
| 1. | Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran, "Computer Algorithms/ C++", Second Edition, Universities Press.2008 | | | | | | | |
| 2. | Ellis Horowitz, Sartaj Sahni, Dinesh Mehta," Fundamentals of Data Structures in C++", Second Edition, Universities Press, 2008. | | | | | | | |
| **FURTHER READINGS:** | | | | | | | | |
| 1. | G. Brassard and P. Bratley," Algorithmics: Theory and Practice", Prentice –Hall,1988. | | | | | | | |
| 2. | Thomas H. Cormen, Charles E Leiserson, Ronald L Rivest, Clifford Stein, " Introduction to Algorithms", Second Edition, PHI.2001 | | | | | | | |
| **Course Outcome** | Students who complete this course successfully are expected to:<br>• Design data structures and algorithms to solve computing problems.<br>• Design algorithms using graph structure and various string matching algorithms to solve real-life problems.<br>• Apply suitable design strategy for problem solving. | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN**<br>(Autonomous Institution, Affiliated to Anna University ,Chennai)<br>Elayampalayam, Tiruchengode – 637 205 | | | | | | | |
| Programme | **M.Tech.** | Programme code | **204** | | Regulation | | | **2015** |
| Department | **INFORMATION TECHNOLOGY** | | | | Semester | | | **I** |
| Course code | Course Name | Periods Per Week | | | Credit | Maximum Marks | | |
| | | L | T | P | C | CA | ESE | Total |
| **P15IT103** | **Multimedia Communication & Networks** | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| **Course Objective** | The main objective of this course is to:<br>• Understand the multimedia communication models<br>• Analyze the guaranteed service model<br>• Study the multimedia transport in wireless networks<br>• Explore real-time multimedia network applications | | | | | | | |
| **Unit - I** | **IP NETWORKS** | | | | | Periods | | **9** |
| Open Data Network Model – Narrow Waist Model of the Internet - Success and Limitations of the Internet – Suggested Improvements for IP and TCP – Significance of UDP in modern Communication – Network level Solutions – End to End Solutions – Best Effort service model – Scheduling and Dropping policies for Best Effort Service model | | | | | | | | |
| **Unit - II** | **ADVANCED ROUTING** | | | | | Periods | | **9** |
| Intra AS routing – Inter AS routing – Router Architecture – Switch Fabric – Active Queue Management – Head of Line blocking – Transition from IPv4 to IPv6 – Multicasting – Abstraction of Multicast groups – Group Management – IGMP – Group Shared Multicast Tree – Source based Multicast Tree – Multicast routing in Internet – DVMRP and MOSPF – PIM – Sparse mode and Dense mode | | | | | | | | |
| **Unit - III** | **GUARANTEED SERVICE MODEL** | | | | | Periods | | **9** |
| Best Effort service model – Scheduling and Dropping policies – Network Performance Parameters – Quality of Service and metrics – WFQ and its variants – Random Early Detection – QoS aware Routing – Admission Control – Resource Reservation – RSVP - Traffic Shaping Algorithms – Caching – Laissez Faire Approach - Possible Architectures – An Overview of QoS Architectures | | | | | | | | |
| **Unit - IV** | **MULTIMEDIA COMMUNICATION** | | | | | Periods | | **9** |
| Stream characteristics for Continuous media – Temporal Relationship – Object Stream Interactions, Media Levity, Media Synchronization – Models for Temporal Specifications – Streaming of Audio and Video – Jitter – Fixed playout and Adaptive playout – Recovering from packet loss – RTSP — Multimedia Communication Standards – RTP/RTCP – SIP and H.263 | | | | | | | | |
| **Unit - V** | **WIRELESS MULTIMEDIA COMMUNICATION** | | | | | Periods | | **9** |
| End to End QoS provisioning in Wireless Multimedia Networks – Adaptive Framework – MAC layer QoS enhancements in Wireless Networks – A Hybrid MAC protocol for 10 Multimedia Traffic – Call Admission Control in Wireless Multimedia Networks – A Global QoS Management for Wireless Networks | | | | | | | | |
| | | | | | | **Total Periods** | | **45** |
| **REFERENCES:** | | | | | | | | |
| 1. | Jean Warland and Pravin Vareya, “High Performance Networks”, Morgan Kauffman Publishers, 2002 | | | | | | | |

| FURTHER READINGS: | |
|---|---|
| 1. | Mahbub Hassan and Raj Jain, "High Performance TCP/IP Networking", Pearson Education, 2004. |
| 2. | William Stallings, "High Speed Networks: Performance and Quality of Service", 2 nd Edition, Pearson Education, 2002. |
| 3. | Kurose and Ross, "Computer Networks : A top down Approach", Pearson Education, 2002 |
| 4. | Aura Ganz, Zvi Ganz and Kitti Wongthawaravat, "Multimedia Wireless Networks: Technologies, Standards and QoS", Prentice Hall, 2003. |
| **Course Outcome** | Students who complete this course successfully are expected to:<br>• Deploy the appropriate Multimedia Communication models<br>• Apply QoS to multimedia network applications with efficient routing techniques<br>• Develop the real-time multimedia network applications |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN**<br>(Autonomous Institution, Affiliated to Anna University ,Chennai)<br>Elayampalayam, Tiruchengode – 637 205 | | | | | | | |
| Programme | **M.Tech.** | Programme code | **204** | | Regulation | **2015** | | |
| Department | **INFORMATION TECHNOLOGY** | | | | Semester | **I** | | |
| Course code | Course Name | Periods Per Week | | | Credit | Maximum Marks | | |
| | | L | T | P | C | CA | ESE | Total |
| **P15IT104** | **Advanced Database Technology** | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| **Course Objective** | The main objective of this course is to:<br>• Learn the modeling and design of databases.<br>• Acquire knowledge on parallel and distributed databases and its applications.<br>• Study the usage and applications of Object Oriented and Intelligent databases.<br>• Understand the usage of Mobile Databases.<br>• Learn emerging databases such as XML, Cloud and Big Data.<br>• Acquire inquisitive attitude towards research topics in databases. | | | | | | | |
| **Unit - I** | **INTRODUCTION** | | | | | Periods | | **9** |
| Data models, structure of relational databases, component of management system – DDL, DML, database languages, SQL standard, database users and administrators | | | | | | | | |
| **Unit - II** | **RELATIONAL DBMS** | | | | | Periods | | **9** |
| Design issues - basic normal forms and additional normal forms, Transforming E-R diagram to relations, Integrity constraints, Query processing and optimization. | | | | | | | | |
| **Unit - III** | **TRANSACTION PROCESSING** | | | | | Periods | | **9** |
| Transaction concept, concurrent execution, isolation, testing for serializability, Concurrency control, lock based - time-stamp based - validation based protocols, multi-version schemes, deadlock handling. | | | | | | | | |
| **Unit - IV** | **DATABASE ADMINISTRATION** | | | | | Periods | | **9** |
| Functions of DBA, Data volume and usage analysis, security and authorization, recovery and atomicity, buffer management, backup systems. | | | | | | | | |
| **Unit - V** | **ADVANCED DATABASES** | | | | | Periods | | **9** |
| Object oriented, parallel, distributed, web databases | | | | | | | | |
| | | | | | | **Total Periods** | | **45** |
| **REFERENCES:** | | | | | | | | |
| 1. | Abraham Silberschatz, Hanry F Korth, Sudarshan S, "Database Systems Concepts", McGraw Hill, 2007. | | | | | | | |
| **FURTHER READINGS:** | | | | | | | | |
| 1. | Raghu Ramakrishnan, "Database Management Systems", McGraw Hill , 2003. | | | | | | | |
| 2. | Michael Kifer, Arthur Bernstein, Philip M Lewis, Prabin K Panigrahi, "Database Systems – An application oriented approach",Pearson Education, 2008. | | | | | | | |
| 3. | Jeffrey D Ullman, " A First Course in Database Systems", Pearson Education, 2007 | | | | | | | |
| 4. | Date C J, "An Introduction to Database Systems", Pearson Education, 2003. | | | | | | | |
| **Course Outcome** | Students who complete this course successfully are expected to:<br>• Develop in-depth understanding of relational databases and skills to optimize database performance in practice.<br>• Discuss and critique on each type of databases.<br>• Design faster algorithms in solving practical database problems.<br>• Implement intelligent databases and various data models. | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN**<br>(Autonomous Institution ,Affiliated to Anna University,Chennai)<br>Elayampalayam, Tiruchengode – 637 205 | | | | | | | |
| Programme | **M.Tech.** | Programme code | **204** | | Regulation | **2015** | | |
| Department | **INFORMATION TECHNOLOGY** | | | | Semester | **I** | | |
| Course code | Course Name | Periods Per Week | | | Credit | Maximum Marks | | |
| | | L | T | P | C | CA | ESE | Total |
| **P15IT105** | **Advanced Data Structures Lab** | 0 | 0 | 4 | 2 | 50 | 50 | 100 |

| | |
|---|---|
| **Course Objective** | The main objective of this course is to:<br>• Acquire the knowledge of using advanced tree structures.<br>• Learn the usage of heap structures.<br>• Understand the usage of graph structures and spanning trees. |

**SUGGESTED LIST OF EXPERIMENTS:**

1. Implementation of Min Heap Structures
2. Implementation of Deaps.
3. Implementation of Leftist Heap
4. Implementation of AVL Tree
5. Implementation of B-Tree
6. Implementation of Tries
7. Implementation of Quick Sort
8. Implementation of Convex hull
9. Implementation of 0/1 Knapsack using Dynamic Programming
10. Implementation of Graph coloring using backtracking

**TOTAL PERIODS : 45**

| | |
|---|---|
| **Course Outcome** | Students who complete this course successfully are expected to:<br>• Design and implement basic and advanced data structures extensively.<br>• Design algorithms using graph structures<br>• Design and develop efficient algorithms with minimum complexity using design techniques. |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN**<br>(Autonomous Institution, Affiliated to Anna University ,Chennai)<br>Elayampalayam, Tiruchengode – 637 205 | | | | | | | |
| Programme | **M.Tech.** | Programme code | **204** | | Regulation | | **2015** | |
| Department | **INFORMATION TECHNOLOGY** | | | | Semester | | **II** | |
| Course code | Course Name | Periods Per Week | | | Credit | Maximum Marks | | |
| | | L | T | P | C | CA | ESE | Total |
| **P15IT206** | **Advanced Operating Systems** | 3 | 0 | 0 | 3 | 50 | 50 | 100 |

**Course Objective**

The main objective of this course is to:

- Learn the fundamentals of Operating system.
- Gain knowledge on Distributed operating system concepts that includes architecture, Mutual exclusion algorithms, Deadlock detection algorithms and agreement protocols.
- Gain insight on to the distributed resource management components viz. the algorithms for implementation of distributed shared memory, recovery and commit protocols.
- Know the components and management aspects of Real time, Mobile operating systems.

| **Unit – I** | **INTRODUCTION** | Periods | **9** |
|---|---|---|---|

Overview - Functions of an Operating System – Design Approaches – Types of Advanced Operating System - Synchronization Mechanisms – Concept of a Process, Concurrent Processes – The Critical Section Problem, Other Synchronization Problems – Language Mechanisms for Synchronization – Axiomatic Verification of Parallel Programs - Process Deadlocks - Preliminaries – Models of Deadlocks, Resources, System State – Necessary and Sufficient conditions for a Deadlock – Systems with Single-Unit Requests, Consumable Resources, Reusable Resources.

| **Unit – II** | **DISTRIBUTED OPERATING SYSTEMS** | Periods | **9** |
|---|---|---|---|

Introduction – Issues – Communication Primitives – Inherent Limitations - Lamport's Logical Clock; Vector Clock; Causal Ordering; Global State; Cuts; Termination Detection. Distributed Mutual Exclusion – Non-Token Based Algorithms – Lamport's Algorithm - Token-Based Algorithms – Suzuki-Kasami's Broadcast Algorithm – Distributed Deadlock Detection – Issues – Centralized Deadlock-Detection Algorithms - Distributed Deadlock-Detection Algorithms. Agreement Protocols – Classification - Solutions –Applications.

| **Unit – III** | **DISTRIBUTED RESOURCE MANAGEMENT** | Periods | **9** |
|---|---|---|---|

Distributed File systems – Architecture – Mechanisms – Design Issues – Distributed Shared Memory – Architecture – Algorithm – Protocols - Design Issues. Distributed Scheduling – Issues – Components – Algorithms.

| **Unit - IV** | **FAILURE RECOVERY AND FAULT TOLERANCE** | Periods | **9** |
|---|---|---|---|

Basic Concepts-Classification of Failures – Basic Approaches to Recovery; Recovery in Concurrent System; Synchronous and Asynchronous Check pointing and Recovery; Check pointing in Distributed Database Systems; Fault Tolerance; Issues - Two-phase and Non- blocking Commit Protocols; Voting Protocols; Dynamic Voting Protocols;

| **Unit - V** | **MULTIPROCESSOR AND DATABASE OPERATING SYSTEMS** | Periods | **9** |
|---|---|---|---|

Structures – Design Issues – Threads – Process Synchronization – Processor Scheduling – Memory Management – Reliability / Fault Tolerance; Database Operating Systems – Introduction – Concurrency Control – Distributed Database Systems – Concurrency Control Algorithms.

| | | |
|---|---|---|
| | **Total Periods** | **45** |

| REFERENCES: | |
|---|---|
| 1. | Mukesh Singhal and N. G. Shivaratri, "Advanced Concepts in Operating Systems", McGraw-Hill, 2000 |
| **FURTHER READINGS:** | |
| 1. | Abraham Silberschatz, Peter B. Galvin, G. Gagne, "Operating System Concepts", Sixth Edition, Addison Wesley Publishing Co., 2003. |
| 2. | Andrew S. Tanenbaum, "Modern Operating Systems", Second Edition, Addison Wesley, 2001. |
| **Course Outcome** | Students who complete this course successfully are expected to:<br>• Analyze process management & memory management of Operating system.<br>• Demonstrate the Mutual exclusion, Deadlock detection and agreement protocols of Distributed operating system. |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN**<br>(Autonomous Institution, Affiliated to Anna University ,Chennai)<br>Elayampalayam, Tiruchengode – 637 205 | | | | | | | |
| Programme | **M.Tech.** | Programme code | **204** | | Regulation | **2015** | | |
| Department | **INFORMATION TECHNOLOGY** | | | | Semester | **II** | | |
| Course code | Course Name | Periods Per Week | | | Credit | Maximum Marks | | |
| | | L | T | P | C | CA | ESE | Total |
| **P15IT207** | **Object Oriented Analysis & Design** | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| **Course Objective** | The main objective of this course is to:<br>• Understand the basics of objects & various methodologies of object oriented system development<br>• Understand how to convert requirement to design & map the design to code | | | | | | | |
| **Unit – I** | **INTRODUCTION** | | | | Periods | **10** | | |
| Introduction to System Concepts - Managing Complex Software — Properties – Object Oriented Systems Development – Object Basics – Systems Development Life Cycle - Rumbaugh Methodology - Booch Methodology - Jacobson Methodology – Unified Process. | | | | | | | | |
| **Unit – II** | **UNIFIED APPROACH** | | | | Periods | **8** | | |
| Unified Approach – Unified Modeling Language – Static behavior diagrams – Dynamic behavior diagrams – Object Constraint Language | | | | | | | | |
| **Unit – III** | **REQUIREMENTS & DESIGN** | | | | Periods | **9** | | |
| Inception – Evolutionary Requirements – Domain Models – Operation Contracts - Requirements to Design – Design Axioms – Logical Architecture - Designing Objects with Responsibilities – Object Design – Designing for Visibility. | | | | | | | | |
| **Unit – IV** | **PATTERNS** | | | | Periods | **9** | | |
| Patterns – Analysis and Design patterns – GoF Patterns - Mapping designs to code – Test Driven development and refactoring – UML Tools and UML as blueprint. | | | | | | | | |
| **Unit – V** | **APPLICATIONS** | | | | Periods | **9** | | |
| More Patterns – Applying design patterns – Architectural Analysis – Logical Architecture Refinement – Package Design – Persistence framework with patterns | | | | | | | | |
| | | | | | **Total Periods** | **45** | | |
| **REFERENCES:** | | | | | | | | |
| 1. | Craig Larman. “Applying UML and Patterns – An introduction to Object-Oriented Analysis and Design and Iterative Development”, Third Edition, Pearson Education, 2005. | | | | | | | |
| 2. | Fowler, Martin. UML Distilled. Third Edition, Pearson Education. 2004. | | | | | | | |
| **FURTHER READINGS:** | | | | | | | | |
| 1. | Michael Blaha and James Rumbaugh, “Object-oriented modeling and designwith UML”, Prentice-Hall of India, 2005. | | | | | | | |
| 2. | Booch, Grady. Object Oriented Analysis and Design. Second Edition, Pearson Education 2000. | | | | | | | |
| 3. | Ali Bahrami, “Object Oriented Systems Development”, Tata McGrawHill, 1999. | | | | | | | |
| **Course Outcome** | Students who complete this course successfully are expected to:<br>• Understand Object Oriented Software Development Process<br>• Gain exposure to Object Oriented Methodologies & UML Diagrams<br>• Apply Object Oriented Analysis Processes for projects | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN**<br>(Autonomous Institution Affiliated to Anna University ,Chennai)<br>Elayampalayam, Tiruchengode – 637 205 | | | | | | | |
| Programme | **M.Tech.** | Programme code | **204** | | Regulation | **2015** | | |
| Department | **INFORMATION TECHNOLOGY** | | | | Semester | **II** | | |
| Course code | Course Name | Periods Per Week | | | Credit | Maximum Marks | | |
| | | L | T | P | C | CA | ESE | Total |
| **P15IT208** | **Research Methodology & Data Analysis** | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| **Course Objective** | The main objective of this course is to:<br>• Understand the importance of Research<br>• Acquire knowledge in Data Collection and Analysis of Data<br>• Effectively write reports | | | | | | | |
| **Unit - I** | **INTRODUCTION TO RESEARCH** | | | | | Periods | **7** | |
| Nature, scope, and design of social research; Review of literature: qualitative (literary), quantitative (meta-analysis) | | | | | | | | |
| **Unit - II** | **HYPOTHESIS** | | | | | Periods | **9** | |
| Hypothesis: sources, types and characteristics; Sample survey: sample and census survey, probability, non-probability and mixed sampling; | | | | | | | | |
| **Unit - III** | **DATA COLLECTION** | | | | | Periods | **11** | |
| Methods of data collection: historical method, case study, observation, ethnographic methods, interview, questionnaire, focus group discussion, participatory rural appraisal, experimental method, pre-testing, and pilot survey; Scaling techniques different scales, item analysis, reliability, validity; Method of secondary data collection: sources, sample criteria, characteristics; | | | | | | | | |
| **Unit - IV** | **DATA ANALYSIS** | | | | | Periods | **9** | |
| Data analysis: descriptive statistics, mean difference test, analysis of variance and experimental design; Bivariate and multivariate correlation and regression; Factor analysis, Cluster analysis, Discriminant analysis, Structural equation modelling, non-parametric statistics, Content analysis | | | | | | | | |
| **Unit - V** | **REPORT WRITING** | | | | | Periods | **9** | |
| Report writing: review, qualitative, and empirical article writing. | | | | | | | | |
| | | | | | | **Total Periods** | **45** | |
| **REFERENCES:** | | | | | | | | |
| 1. | C.M.Chaudhary, Research Methodology, RBSA Publishers, Jaipur, India 2009. | | | | | | | |
| 2. | R.Paneerselvam, Research Methodology, PHI Learning Pvt Ltd.,New Delhi 2009. | | | | | | | |
| **Course Outcome** | Students who complete this course successfully are expected to:<br>• Formulate researchable questions<br>• Define a research strategy and design a research project to answer a research question<br>• Discuss the practice and principles of qualitative and quantitative social research | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN** (Autonomous Institution, Affiliated to Anna University ,Chennai)<br>Elayampalayam, Tiruchengode – 637 205 | | | | | | | |
| Programme | **M.Tech.** | Programme code | **204** | | Regulation | **2015** | | |
| Department | **INFORMATION TECHNOLOGY** | | | | Semester | **II** | | |
| Course code | Course Name | Periods Per Week | | | Credit | Maximum Marks | | |
| | | L | T | P | C | CA | ESE | Total |
| **P15IT209** | **Software Development Lab** | 0 | 0 | 4 | 2 | 50 | 50 | 100 |

| | |
|---|---|
| **Course Objective** | The main objective of this course is to:<br>• Comprehend software development process and formal specifications<br>• Know advanced software development techniques and its application in real world context<br>• Understand how to manage complex projects<br>• Use advanced software testing techniques<br>• Understand process improvement and re engineering |

**SUGGESTED LIST OF EXPERIMENTS:**

Analysis, Design and Implementation of Software system involving an application domain.

Sample systems are:

1. Core Banking
2. Health Care System
3. e-learning.
4. e-Commerce.
5. Enterprise Resource Planning Modules
6. Management Information System

**Total Periods : 45**

| | |
|---|---|
| **Course Outcome** | Students who complete this course successfully are expected to:<br>• Apply general principles of software development in the development of complex software and software- intensive systems.<br>• Discuss methods and techniques for advanced software development and also to be able to use these in various development situations.<br>• Apply testing techniques for object oriented software and web-based systems . |

**VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN**
(Autonomous Institution Affiliated to Anna University, Chennai)
Elayampalayam, Tiruchengode – 637 205

| Programme | **M.Tech.** | Programme Code | **204** | Regulation | **2015** |
|---|---|---|---|---|---|
| Department | **INFORMATION TECHNOLOGY** | | | Semester | **II** |

| Course Code | Course Name | Periods Per Week | | | Credit | Maximum Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | C | CA | ESE | Total |
| **P15IT210** | **Technical seminar** | 0 | 0 | 2 | 1 | 50 | 50 | 100 |

**Objective**

The main objective of the course is to:

- Encourage the students to study advanced engineering developments
- Prepare the students to present technical reports.
- Encourage the students to use various teaching aids such as over head projectors, power point presentation and demonstrative models.

**METHOD OF EVALUATION :**

- During the seminar session each student is expected to prepare and present a topic on engineering/ technology, for duration of about 8 to 10 minutes.
- In a session of three periods per week, 15 students are expected to present the seminar. Each student is expected to present at least twice during the semester and the student is evaluated based on that.
- At the end of the semester, she can submit a report on her topic of seminar and marks are given based on the report.
- A Faculty guide is to be allotted and he / she will guide and monitor the progress of the student and maintain attendance also.
- Evaluation is 100% internal.

**Total Periods : 15**

**Course Outcome**

Students who complete this course successfully are expected to:

- Review, prepare and present technological developments
- Face the placement interviews easily.

**VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN**
(Autonomous Institution, Affiliated to Anna University ,Chennai)
Elayampalayam, Tiruchengode – 637 205

| Programme | **M.Tech.** | Programme code | **204** | Regulation | **2015** |
|---|---|---|---|---|---|
| Department | **INFORMATION TECHNOLOGY** | | | Semester | **I** |

| Course code | Course Name | Periods Per Week | | | Credit | Maximum Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | C | CA | ESE | Total |
| **P15ITE01** | **Digital Image Processing** | 3 | 0 | 0 | 3 | 50 | 50 | 100 |

**Course Objective**

The main objective of this course is to:

- Understand the basic concepts and algorithms of digital processing
- Identify the image processing environments like Matlab and its equivalent open source Image processing environments.
- Categorize the broad range of image processing techniques and issues and their applications.
- Apply image processing techniques to real world applications.

| **Unit – I** | **DIGITAL IMAGE FUNDAMENTALS & TRANSFORMS** | Periods | **9** |
|---|---|---|---|

Elements of digital image processing system-Image sensing and acquisition- Image sampling and quantization – Basic relationship between pixels. - Need for image transforms- Discrete Fourier transform- Discrete Cosine transform-Walsh transform- Hadamard transform- Hotelling transform- Haar transform-Radon transform.

| **Unit – II** | **IMAGE ENHANCEMENT** | Periods | **9** |
|---|---|---|---|

Spatial domain methods- Frequency domain methods- Histogram modification techniques- Neighborhood averaging-median filtering- Lowpass filtering- averaging of multiple images- image sharpening by differentiation- high pass filtering

| **Unit – III** | **IMAGE FILTERING & RESTORATION** | Periods | **9** |
|---|---|---|---|

Image observation models- restoration in the presence of noise only- spatial filtering: mean filters, order statistics filters, adaptive filters- Inverse filtering- Wiener filtering – Constrained least squares filtering- blind deconvolution.

| **Unit – IV** | **IMAGE CODING** | Periods | **9** |
|---|---|---|---|

Quantization: scalar Quantization and vector Quantization-code word assignment: uniform length and variable length codeword assignment – differential pulse code modulation, two channel coders, pyramid coding; hybrid transform coding – wavelet coding.

| **Unit – V** | **IMAGE SEGMENTATION & REPRESENTATION** | Periods | **9** |
|---|---|---|---|

Edge detection: Gradient operators - edge linking and boundary detection: Global processing via Hough transform, Graph theoretic techniques -Thresholding: Global thresholding, adaptive threshold-Representation: Chain codes, Polygonal approximations, Signatures, boundary segments, skeletons - Boundary descriptors: Shape numbers, Fourier descriptors, Statistical moments - Regional descriptors: Texture - Relational descriptors.

| | **Total Periods** | **45** |
|---|---|---|

**REFERENCES:**


| | |
|---|---|
| 1. | Rafael C.Gonzalez and Richard E.Woods, “Digital Image Processing”, Third Edition, Pearson Education, 2008, New Delhi. |
| 2. | S.Sridhar, “Digital Image Processing”, Oxford University Press, 2011, New Delhi |


**FURTHER READINGS:**


| | |
|---|---|
| 1. | Alasdair McAndrew, “Introduction to Digital Image Processing with Matlab”, Cengage Learning 2011, India. |
| 2. | Anil J Jain, “Fundamentals of Digital Image Processing”, PHI, 2011. |
| 3. | Kenneth R Castleman, ”Digital Image Processing”, Prentice Hall International,Inc., 2001 |
| 4. | William K Pratt, “Digital Image Processing”, John Wiley & Sons, 2003. |


**Course Outcome**

Students who complete this course successfully are expected to:

- Implement basic image processing algorithms using MATLAB tools
- Design an application that incorporate different concepts of Image processing
- Apply and explore new techniques in the areas of image enhancement, restoration.

**VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN**
(Autonomous Institution, Affiliated to Anna University ,Chennai)
Elayampalayam, Tiruchengode – 637 205

| Programme | **M.Tech.** | Programme code | **204** | Regulation | **2015** |
|---|---|---|---|---|---|
| Department | **INFORMATION TECHNOLOGY** | | | Semester | **I** |

| Course code | Course Name | Periods Per Week | | | Credit | Maximum Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | C | CA | ESE | Total |
| **P15ITE02** | **Data Warehousing and Data Mining** | 3 | 0 | 0 | 3 | 50 | 50 | 100 |

**Course Objectives**

The main objective of this course is to:

- Understand data mining principles and techniques.
- Examine Data warehousing Architecture and Implementation.
- Understand the overview of developing areas – Web mining, Text mining and ethical aspects of Data mining.
- Identify Business applications and Trends of Data mining.

| **Unit – I** | **DATA WAREHOUSE** | Periods | **9** |
|---|---|---|---|

Data Warehousing - Operational Database Systems vs. Data Warehouses - Multidimensional Data Model - Schemas for Multidimensional Databases – OLAP Operations – Data Warehouse Architecture – Indexing – OLAP queries & Tools.

| **Unit – II** | **DATA MINING & DATA PREPROCESSING** | Periods | **9** |
|---|---|---|---|

Introduction to KDD process – Knowledge Discovery from Databases - Need for Data Preprocessing – Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization and Concept Hierarchy Generation.

| **Unit – III** | **ASSOCIATION RULE MINING** | Periods | **9** |
|---|---|---|---|

Introduction - Data Mining Functionalities - Association Rule Mining - Mining Frequent Itemsets with and without Candidate Generation - Mining Various Kinds of Association Rules - Constraint- Based Association Mining.

| **Unit – IV** | **CLASSIFICATION & PREDICTION** | Periods | **9** |
|---|---|---|---|

Classification vs. Prediction – Data preparation for Classification and Prediction – Classification by Decision Tree Introduction – Bayesian Classification – Rule Based Classification – Classification by Back Propagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods – Prediction – Accuracy and Error Measures – Evaluating the Accuracy of a Classifier or Predictor – Ensemble Methods – Model Section.

| **Unit – V** | **CLUSTERING** | Periods | **9** |
|---|---|---|---|

Cluster Analysis: - Types of Data in Cluster Analysis – A Categorization of Major Clustering Methods – Partitioning Methods – Hierarchical methods – Density-Based Methods – Grid-Based Methods – Model-Based Clustering Methods – Clustering High- Dimensional Data – Constraint- Based Cluster Analysis – Outlier Analysis.

| | **Total Periods** | **45** |
|---|---|---|

| REFERENCES: | |
|---|---|
| 1. | Jiawei Han and Micheline Kamber, "Data Mining Concepts and Techniques",Second Edition, Elsevier, Reprinted 2011. |
| 2. | K.P. Soman, Shyam Diwakar and V. Ajay, "Insight into Data mining Theory and Practice", Easter Economy Edition, Prentice Hall of India, 2006. |
| 3. | G. K. Gupta, "Introduction to Data Mining with Case Studies", Easter Economy Edition, Prentice Hall of India, 2006. |
| **Course Outcome** | Students who complete this course successfully are expected to:<br>• Evolve Multidimensional Intelligent model from typical system.<br>• Discover the knowledge imbibed in the high dimensional system.<br>• Evaluate various mining techniques on complex data objects. |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN**<br>(Autonomous Institution, Affiliated to Anna University ,Chennai)<br>Elayampalayam, Tiruchengode – 637 205 | | | | | | | |
| Programme | **M.Tech.** | Programme code | **204** | | Regulation | **2015** | | |
| Department | **INFORMATION TECHNOLOGY** | | | | Semester | **I** | | |
| Course code | Course Name | Periods Per Week | | | Credit | Maximum Marks | | |
| | | L | T | P | C | CA | ESE | Total |
| **P15ITE03** | **Green Computing** | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| **Course Objectives** | The main objective of this course is to:<br>• Understand the concept of green computing.<br>• Identify energy efficient computing.<br>• Understand the power management in computing devices<br>• Analyze the consumption of power in data centers | | | | | | | |
| **Unit – I** | **INTRODUCTION** | | | | Periods | **9** | | |
| Energy- efficient – power efficient and thermal aware computing and communication - Newton's cooling model and basic thermodynamics and sustainability. | | | | | | | | |
| **Unit – II** | **POWER MANAGEMENT** | | | | Periods | **9** | | |
| Operating system Directed power management – Power management history and motivation – key power management concepts – power management scenarios – ACPI desktop motherboard design | | | | | | | | |
| **Unit – III** | **DEVELOPMENT OF EFFICIENT POWER MANAGEMENT SYSTEM** | | | | Periods | **9** | | |
| Dual mode desktop power delivery – system BIOS – Designing mobile systems – Communication with peripheral devices – Drivers – Developing robust power managed applications | | | | | | | | |
| **Unit – IV** | **ENERGY EFFICIENT DATA CENTER** | | | | Periods | **9** | | |
| Data center power consumption – Power metrics – Energy efficient data center tuning – energy efficient server management – Industry vision and recommendations | | | | | | | | |
| **Unit – V** | **CASE STUDIES AND APPLICATION** | | | | Periods | **9** | | |
| Google green datacenter - IBM green technology - Microsoft – Case Studies – Applying Green IT Strategies and Applications to a Home – Hospital - Packaging Industry and Telecom Sector. | | | | | | | | |
| | | | | | **Total Periods** | **45** | | |
| **REFERENCES:** | | | | | | | | |
| 1. | Jerzy Kolinski, Ram Chary, Andrew Henroid, and Barry Press, "Building the Power-Efficient PC<br>A Developer's Guide to ACPI Power Management", Intel Press August 2001. | | | | | | | |
| 2. | Lauri Minas, Brad Ellison, "Energy Efficiency for Information Technology: How to Reduce Power Consumption in Servers and Data Centers", Intel Press, 2009. | | | | | | | |
| 3. | Bhuvan Unhelkar, "Green IT Strategies and Applications-Using Environmental Intelligence", CRC Press, June 2011. | | | | | | | |
| 4. | Wu Chun Feng, "Green Computing: Large-Scale Energy Efficiency", CRC Press INC, 2013. | | | | | | | |
| **Course Outcome** | Students who complete this course successfully are expected to:<br>• Understand to minimize Energy consumption.<br>• Analyze to Reduce Paper and other consumables used.<br>• Minimize equipment disposal requirement. | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN**<br>(Autonomous Institution, Affiliated to Anna University ,Chennai)<br>Elayampalayam, Tiruchengode – 637 205 | | | | | | | |
| Programme | **M.Tech.** | Programme code | **204** | | Regulation | **2015** | | |
| Department | **INFORMATION TECHNOLOGY** | | | | Semester | **I** | | |
| Course code | Course Name | Periods Per Week | | | Credit | Maximum Marks | | |
| | | L | T | P | C | CA | ESE | Total |
| **P15ITE07** | **Information Retrieval** | 3 | 0 | 0 | 3 | 50 | 50 | 100 |

| | |
|---|---|
| **Course Objectives** | The main objective of this course is to:<br>• Understand the basics of Information Retrieval with pertinence to modeling, Query operations and indexing.<br>• Discover the machine learning techniques for text classification and clustering.<br>• Understand the various applications of Information Retrieval giving emphasis to Multimedia IR, Web Search.<br>• Understand the concepts of digital libraries. |

| **Unit – I** | **INTRODUCTION** | Periods | **9** |
|---|---|---|---|
| Introduction - Goals and History of IR - The Impact of the Web on IR - The Role of Artificial Intelligence (AI) in IR - Basic IR Models - Boolean and Vector-Space Retrieval Models – Ranked Retrieval - Text-Similarity Metrics - TF-IDF (Term Frequency/Inverse Document Frequency) Weighting - Cosine Similarity. | | | |
| **Unit – II** | **PREPROCESSING** | Periods | **9** |
| Basic Tokenizing Indexing and Implementation of Vector-Space Retrieval - Simple Tokenizing - Stop-Word Removal and Stemming - Inverted Indices - Efficient Processing with Sparse Vectors - Query Operations and Languages - Relevance Feedback - Query Expansion - Query Languages. | | | |
| **Unit – III** | **METRICS** | Periods | **9** |
| Experimental Evaluation of IR - Performance Metrics – Recall - Precision and F Measure - Evaluations on Benchmark Text Collections - Text Representation - Word Statistics - Zipf's Law - Porter Stemmer – Morphology - Index Term Selection - Using Thesauri - Metadata and Markup Languages - Web Search - Search Engines – Spidering – Metacrawlers - Directed Spidering – Link Analysis Shopping Agents. | | | |
| **Unit – IV** | **CATEGORIZATION AND CLUSTERING** | Periods | **9** |
| Text Categorization and Clustering - Categorization Algorithms - Naive Bayes - Decision Trees and Nearest Neighbor - Clustering Algorithms - Agglomerative Clustering - K-Means – Expectation Maximization (EM) - Applications to Information Filtering – Organization and Relevance Feedback. | | | |
| **Unit – V** | **Extraction and Integration** | Periods | **9** |
| Recommender Systems - Collaborative Filtering and Content-Based Recommendation of Documents and Products Information Extraction and Integration - Extracting Data from Text – XML - Semantic Web - Collecting and Integrating Specialized Information on the Web. | | | |
| | | **Total Periods** | **45** |

**REFERENCES:**


| | |
|---|---|
| 1. | Christopher D. Manning, Prabhakar Raghavan and Hinrich Schütze, “Introduction to Information Retrieval”, Cambridge University Press, 2008 |
| 2. | Ricci, F, Rokach, L. Shapira, B.Kantor, “Recommender Systems Handbook”, First Edition, 2011. |
| 3. | Brusilovsky, Peter, “The Adaptive Web: Methods and Strategies of Web Personalization”, Springer, 2007 |


| | |
|---|---|
| **Course Outcome** | Students who complete this course successfully are expected to:<br>• Build an Information Retrieval system using the available tools.<br>• Identify and design the various components of an Information Retrieval system.<br>• Apply machine learning techniques to text classification and clustering which is used for efficient Information Retrieval.<br>• Analyze the Web content structure. |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN**<br>(Autonomous Institution, Affiliated to Anna University ,Chennai)<br>Elayampalayam, Tiruchengode – 637 205 | | | | | | | |
| Programme | **M.Tech.** | Programme code | **204** | | Regulation | **2015** | | |
| Department | **INFORMATION TECHNOLOGY** | | | | Semester | **I** | | |
| Course code | Course Name | Periods Per Week | | | Credit | Maximum Marks | | |
| | | L | T | P | C | CA | ESE | Total |
| **P15ITE05** | **Compiler Design** | 3 | 0 | 0 | 3 | 50 | 50 | 100 |

| | |
|---|---|
| **Course Objectives** | The main objective of this course is to:<br>• Learn the fundamentals of a translator<br>• Study about intermediate code generation<br>• Understand memory handling<br>• Explore code optimization techniques |

| | | | |
|---|---|---|---|
| **Unit – I** | **INTRODUCTION** | Periods | **9** |
| Language Processors - The Structure of a Compiler – The Evolution of Programming Languages- The Science of Building a Compiler – Applications of Compiler Technology Programming Language Basics - The Lexical Analyzer Generator -Parser Generator - Overview of Basic Blocks and Flow Graphs - Optimization of Basic Blocks - Principle Sources of Optimization. | | | |
| **Unit – II** | **INSTRUCTION-LEVEL PARALLELISM** | Periods | **9** |
| Processor Architectures – Code-Scheduling Constraints – Basic-Block Scheduling –Global Code Scheduling – Software Pipelining. | | | |
| **Unit – III** | **OPTIMIZING FOR PARALLELISM AND LOCALITY – THEORY** | Periods | **9** |
| Basic Concepts – Matrix-Multiply: An Example - Iteration Spaces - Affine Array Indexes – Data Reuse Array data dependence Analysis. | | | |
| **Unit – IV** | **OPTIMIZING FOR PARALLELISM AND LOCALITY-APPLICATION** | Periods | **9** |
| Finding Synchronization - Free Parallelism – Synchronization Between Parallel Loops – Pipelining – Locality Optimizations – Other Uses of Affine Transforms. | | | |
| **Unit – V** | **INTERPROCEDURAL ANALYSIS** | Periods | **9** |
| Basic Concepts – Need for Interprocedural Analysis – A Logical Representation of Data Flow – A Simple Pointer-Analysis Algorithm – Context Insensitive Interprocedural Analysis - Context- Sensitive Pointer-Analysis - Datalog Implementation by Binary Decision Diagrams. | | | |
| | | **Total Periods** | **45** |

**REFERENCES:**


| | |
|---|---|
| 1. | Alfred V. Aho, Monica S.Lam, Ravi Sethi, Jeffrey D.Ullman, “Compilers:Principles, Techniques and Tools”, Second Edition, Pearson Education,2008. |
| 2. | Keith Cooper and Linda Torczon, " Engineering a Compiler", Second Edition, Morgan Kaufmann Publishers, 2012. |
| 3. | Steven S. Muchnick, “Advanced Compiler Design and Implementation”, Morgan Kaufmann Publishers - Elsevier Science, India, Indian Reprint 2003. |


| | |
|---|---|
| Course Outcome | Students who complete this course successfully are expected to:<br>• Explain the fundamentals of a translator<br>• Implement intermediate code generation<br>• Devise memory handling techniques<br>• Design code optimization techniques |

**VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN**
(Autonomous Institution, Affiliated to Anna University ,Chennai)
Elayampalayam, Tiruchengode – 637 205

| Programme | **M.Tech.** | Programme code | **204** | Regulation | **2015** |
|---|---|---|---|---|---|
| Department | **INFORMATION TECHNOLOGY** | | | Semester | **II** |

| Course code | Course Name | Periods Per Week | | | Credit | Maximum Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | C | CA | ESE | Total |
| **P15ITE06** | **Software Testing and Quality Assurance** | 3 | 0 | 0 | 3 | 50 | 50 | 100 |

**Course Objective**

The main objective of this course is to:

- Give a clear picture on quality management, documentation and controlling for software quality
- Provide knowledge on standards, models and tools used for quality management
- How to perform measurement and assessment of software quality
- Introduce the basics and necessity of Software testing
- Introduce various testing techniques along with software production
- Introduce the concepts of Software bugs and its impact

| **Unit – I** | **FUNDAMENTALS OF SOFTWARE QUALITY ASSURANCE** | Periods | **9** |
|---|---|---|---|

Ethical Basis for Software Quality – Total Quality Management Principles – Software Processes and Methodologies.

| **Unit – II** | **QUALITY STANDARDS** | Periods | **9** |
|---|---|---|---|

Quality Standards - Practices and Conventions – Software Configuration Management – Reviews and Audits –Enterprise Resource Planning Software.

| **Unit – III** | **QUALITY METRIC SYSTEM** | Periods | **9** |
|---|---|---|---|

Measurement Theory – Software Quality Metrics – Designing Software Measurement Programs – Complexity Metrics and Models – Organizational Learning – Improving Quality with Methodologies – Structured/Information Engineering.

| **Unit – IV** | **SOFTWARE TESTING - INTRODUCTION** | Periods | **9** |
|---|---|---|---|

Testing as an Engineering Activity - Role of Process in Software Quality – Testing as a Process – Basic Definitions, Software Testing Principles – The Tester's Role in a Software Development Organization – Origins of Defects – Defect Classes – The Defect Repository and Test Design – Defect Examples – Developer/Tester Support for Developing a Defect Repository.

| **Unit – V** | **TESTING ISSUES** | Periods | **9** |
|---|---|---|---|

Introduction to Testing Design Strategies – The Smarter Tester –Test Case Design Strategies – Using Black Box Approach to Test Case Design – Random Testing – Equivalence Class Partitioning – Boundary Value Analysis – Other Black-box Test Design Approaches – Black-box testing and COTS – Using White-Box Approach to Test design – Test Adequacy Criteria – Coverage and Control Flow Graphs – Covering Code Logic – Paths – White-box Based Test Design – Additional White Box Test Design Approaches – Evaluating Test Adequacy Criteria.

| | **Total Periods** | **45** |
|---|---|---|

| | |
|---|---|
| **REFERENCES:** | |
| 1. | Glenford J.Myers, Tom Badgett, Corey Sandler, "The Art of Software Testing",3rd edition, John Wiley & Sons publication, 2012. |
| **FURTHER READINGS:** | |
| 2. | Edward Kit, "Software Testing in the Real World – Improving the Process", Pearson Education, 2004. |
| 3. | William E.Perry , "Effective methods for Software Testing", Second Edition, Wiley, 2000. |
| **Course Outcome** | Students who complete this course successfully are expected to:<br>• Learned how to document, control and manage software quality with the aid of tools and standards.<br>• The process of measurement and assessment would be practiced to ensure Software Quality<br>• Perform automated testing using test tools<br>• Document the testing procedures |

**VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN**
(Autonomous Institution, Affiliated to Anna University ,Chennai)
Elayampalayam, Tiruchengode – 637 205

| Programme | **M.Tech.** | Programme code | **204** | Regulation | **2015** |
|---|---|---|---|---|---|
| Department | **INFORMATION TECHNOLOGY** | | | Semester | **II** |

| Course code | Course Name | Periods Per Week | | | Credit | Maximum Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | C | CA | ESE | Total |
| **P15ITE04** | **3G and 4G Wireless Networks** | 3 | 0 | 0 | 3 | 50 | 50 | 100 |

**Course Objective**

The main objective of this course is to:

- Learn various generations of wireless and cellular networks.
- Study about fundamentals of 3G Services, its protocols and applications.
- Study about evolution of 4G Networks, its architecture and applications.
- Study about Wi MAX networks, protocol stack and standards.
- Understand about the emerging trends of smart phones and evolution of latest standards like DLNA, NFC and femtocells

| **Unit – I** | **INTRODUCTION** | Periods | **9** |
|---|---|---|---|

Introduction: History of Mobile Cellular Systems - First Generation - Second Generation - Generation 2.5 - Overview of 3G & 4G. 3GPP and 3GPP2 standards

| **Unit – II** | **3G NETWORKS** | Periods | **9** |
|---|---|---|---|

Evolution from GSM, 3G Services and Applications - UMTS network structure - Core network - UMTS Radio access - HSPA – HSUPA- HSDPA- CDMA 1X - EVDO Rev -0, Rev-A, Rev-B, Rev-C Architecture- Protocol stack.

| **Unit – III** | **4G LTE NETWORKS** | Periods | **9** |
|---|---|---|---|

LTE: Introduction, Radio interface architecture - Physical layer, Access procedures – System Architecture Evolution (SAE) - Communication protocols – Interfaces.

| **Unit – IV** | **WIMAX NETWORKS** | Periods | **9** |
|---|---|---|---|

Introduction – IEEE 802.16 – Frame Format – Protocols - OFDM – MIMO - IEEE 802.20- Applications.

| **Unit – V** | **DLNA & NFC REVOLUTION** | Periods | **9** |
|---|---|---|---|

Introduction and Evolution - Applications of DLNA and NFC - DLNA Architecture and Protocol stack - Smart phone and NFC – Mobile Commerce and NFC – NFC tags –Security Issues.

| | **Total Periods** | **45** |
|---|---|---|

**REFERENCES:**


| | |
|---|---|
| 1. | Juha Korhonen, “Introduction to 3G Mobile Communication”, Artech House, 2003 |
| 2. | Erik Dahlman, Stefan Parkvall, Johan Skold and Per Beming , “3G Evolution HSPA and LTE for Mobile Broadband”, Academic Press, 2008 |
| 3. | Flavio Muratore, “UMTS Mobile Communication for the Future”, John Wiley & Sons , 2001 |
| 4. | Harri Holma and Antti Toskala, “HSDPA/HSUPA for UMTS”, Johan Wiley & Sons, 2006. |
| 5. | Martin Sauter, “ 3G & 4G & Beyond: Bringing Networks, Devices and the Web together”, second edition, Wiley, 2013. |


**Course Outcome**

Students who complete this course successfully are expected to:

- To appreciate the evolution of cellular networks.
- To deploy 3G Services.
- Explore the developments in 4G Networks.
- To implement Wi MAX networks, protocol stack and standards.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN**<br>(Autonomous Institution, Affiliated to Anna University ,Chennai)<br>Elayampalayam, Tiruchengode – 637 205 | | | | | | | |
| Programme | **M.Tech.** | Programme code | **204** | | Regulation | | **2015** | |
| Department | **INFORMATION TECHNOLOGY** | | | | Semester | | **II** | |
| Course code | Course Name | Periods Per Week | | | Credit | Maximum Marks | | |
| | | L | T | P | C | CA | ESE | Total |
| **P15ITE08** | **Bio Informatics Computing** | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| **Course Objective** | The main objective of this course is to:<br>• Learn bio-informatics algorithms<br>• Understand pattern matching<br>• To demonstrate drugs discovery components and system biology | | | | | | | |
| **Unit – I** | **INTRODUCTORY CONCEPTS** | | | | Periods | | **9** | |
| The Central Dogma – The Killer Application – Parallel Universes – Watson's Definition – Top Down Versus Bottom up – Information Flow – Convergence – Databases – Data Management – Data Life Cycle – Database Technology – Interfaces – Implementation – Networks – Geographical Scope – Communication Models – Transmissions Technology – Protocols – Bandwidth – Topology – Hardware – Contents – Security – Ownership – Implementation – Management. | | | | | | | | |
| **Unit – II** | **SEARCH ENGINES AND DATA VISUALIZATION** | | | | Periods | | **9** | |
| The search process – Search Engine Technology – Searching and Information Theory – Computational methods – Search Engines and Knowledge Management – Data Visualization – sequence visualization – structure visualization – user Interface – Animation Versus simulation – General Purpose Technologies. | | | | | | | | |
| **Unit – III** | **STATISTICS AND DATA MINING** | | | | Periods | | **9** | |
| Statistical concepts – Microarrays – Imperfect Data – Randomness – Variability – Approximation – Interface Noise – Assumptions – Sampling and Distributions – Hypothesis Testing – Quantifying Randomness – Data Analysis – Tool selection statistics of Alignment – Clustering and Classification – Data Mining – Methods – Selection and Sampling – Preprocessing and Cleaning – Transformation and Reduction – Data Mining Methods – Evaluation – Visualization – Designing new queries – Pattern Recognition and Discovery – Machine Learning – Text Mining – Tools. | | | | | | | | |
| **Unit – IV** | **PATTERN MATCHING** | | | | Periods | | **9** | |
| Pair-wise sequence alignment – Local versus global alignment – Multiple sequence alignment – Computational methods – Dot Matrix analysis – Substitution matrices – Dynamic Programming – Word methods – Bayesian methods – Multiple sequence alignment – Dynamic Programming – Progressive strategies – Iterative strategies – Tools – Nucleotide Pattern Matching – Polypeptide pattern matching – Utilities – Sequence Databases. | | | | | | | | |
| **Unit – V** | **MODELING AND SIMULATION** | | | | Periods | | **9** | |
| Drug Discovery – components – process – Perspectives – Numeric considerations – Algorithms – Hardware – Issues – Protein structure – AbInitio Methods – Heuristic methods – Systems Biology – Tools – Collaboration and Communications – standards - Issues – Security – Intellectual property. | | | | | | | | |
| | | | | | **Total Periods** | | **45** | |
| **REFERENCES:** | | | | | | | | |
| 1. | Bryan Bergeron, "Bio Informatics Computing", Second Edition, Pearson Education,2003. | | | | | | | |
| **FURTHER READINGS:** | | | | | | | | |
| 1. | T.K.Attwood and D.J. Perry Smith, "Introduction to Bio Informatics, Longman Essen, 1999. | | | | | | | |
| **Course Outcome** | Students who complete this course successfully are expected to:<br>• To design and implement bio-informatics algorithms<br>• Can explain the basics of bio informatics and computational biology.<br>• Can use bioinformatics search tools on the internet for mining data, pair wise. | | | | | | | |

**VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN**
(Autonomous Institution, Affiliated to Anna University ,Chennai)
Elayampalayam, Tiruchengode – 637 205

| Programme | **M.Tech.** | Programme code | **204** | Regulation | **2015** |
|---|---|---|---|---|---|
| Department | **INFORMATION TECHNOLOGY** | | | Semester | **II** |

| Course code | Course Name | Periods Per Week | | | Credit | Maximum Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | C | CA | ESE | Total |
| **P15ITE09** | **High Speed Networks** | 3 | 0 | 0 | 3 | 50 | 50 | 100 |

**Course Objective**

The main objective of this course is to:

- Get an introduction about ATM and Frame relay.
- Provide an up-to-date survey of developments in High Speed Networks.
- Know techniques involved to support real-time traffic and congestion control.
- Understand different levels of quality of service (QoS) to different applications.

| **Unit - I** | **HIGH SPEED NETWORKS** | Periods | **9** |
|---|---|---|---|

Frame Relay Networks – Asynchronous transfer mode – ATM Protocol Architecture, ATM logical Connection, ATM Cell – ATM Service Categories – AAL. High Speed LAN's: Fast Ethernet, Gigabit Ethernet, Fibre Channel – Wireless LAN's.

| **Unit - II** | **CONGESTION AND TRAFFIC MANAGEMENT** | Periods | **9** |
|---|---|---|---|

Queuing Analysis- Queuing Models – Single Server Queues – Effects of Congestion – Congestion Control – Traffic Management – Congestion Control in Packet Switching Networks – Frame Relay Congestion Control.

| **Unit - III** | **TCP AND ATM CONGESTION CONTROL** | Periods | **9** |
|---|---|---|---|

TCP Flow control – TCP Congestion Control – Retransmission – Timer Management – Exponential RTO backoff – KARN's Algorithm – Window management – Performance of TCP over ATM. Traffic and Congestion control in ATM – Requirements – Attributes – Traffic Management Frame work, Traffic Control – ABR traffic Management – ABR rate control, RM cell formats, ABR Capacity allocations – GFR traffic management.

| **Unit - IV** | **INTEGRATED AND DIFFERENTIATED SERVICES** | Periods | **9** |
|---|---|---|---|

Integrated Services Architecture – Approach, Components, Services- Queuing Discipline, FQ, PS, BRFQ, GPS, WFQ – Random Early Detection, Differentiated Services.

| **Unit – V** | **PROTOCOLS FOR QOS SUPPORT** | Periods | **9** |
|---|---|---|---|

RSVP – Goals & Characteristics, Data Flow, RSVP operations, Protocol Mechanisms – Multiprotocol Label Switching – Operations, Label Stacking, Protocol details – RTP – Protocol Architecture, Data Transfer Protocol, RTCP.

| | **Total Periods** | **45** |
|---|---|---|

**REFERENCES:**


1. William Stallings, "High Speed Networks and Internet", Second Edition, Pearson Education, 2002.


**FURTHER READINGS:**


1. Warland & Pravin Varaiya, "High Performance Communication Networks", Second Edition,Jean Harcourt Asia Pvt. Ltd., 2001.
2. Irvan Pepelnjk, Jim Guichard and Jeff Apcar, "MPLS and VPN architecture", Cisco Press, Volume 1 and 2, 2003.


**Course Outcome**

Students who complete this course successfully are expected to:

- Can be describe and interpret the basics of high speed networking technologies.
- Can apply the concept learnt in this course to optimize and troubleshoot high-speed network.

**VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN**
(Autonomous Institution, Affiliated to Anna University ,Chennai)
Elayampalayam, Tiruchengode – 637 205

| Programme | **M.Tech.** | Programme code | **204** | Regulation | **2015** |
|---|---|---|---|---|---|
| Department | **INFORMATION TECHNOLOGY** | | | Semester | **II** |

| Course code | Course Name | Periods Per Week | | | Credit | Maximum Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | C | CA | ESE | Total |
| **P15ITE10** | **Open Source Systems** | 3 | 0 | 0 | 3 | 50 | 50 | 100 |

**Course Objective**

The main objective of this course is to:

- Introduce open technologies
- Develop applications using python
- Provide an exposure to open hardware

| Unit - I | **INTRODUCTION** | Periods | **9** |
|---|---|---|---|

Open source system definition - Merits and demerits of open source software vs. closed source or proprietary software and freeware – software licensing and intellectual property rights.

| Unit - II | **OPEN SOURCE OPERATING SYSTEMS** | Periods | **9** |
|---|---|---|---|

OpenSolaris, OpenDarwin, MINIX, Haiku, Linux – General overview – Kernel types - architectures – Supported file systems - networking technologies - Security features.

| Unit - III | **OPEN SOURCE DATABASES** | Periods | **9** |
|---|---|---|---|

MySQL, PostgreSQL, MaxDB, Firebird, Ingres – general properties - SQL standard compliance – supported platforms - programming interfaces.

| Unit - IV | **OPEN SOURCE PROGRAMMING LANGUAGES** | Periods | **9** |
|---|---|---|---|

Perl, PHP, Python, Ruby – General features - Syntax and Style - Execution Environment - Programming in web environment – File handling and data storage.

| Unit - V | **OPEN SOURCE TOOLS & TECHNOLOGIES** | Periods | **9** |
|---|---|---|---|

Apache Web server, Mozilla Firefox, Wikipedia, Eclipse software development platform.

**Total Periods** **45**

**REFERENCES:**


1. Chris DiBona, Mark Stone, Danese Cooper, “Open Sources 2.0, The Continuing Evolution”, O'Reilly Media, Inc., 2008.


**FURTHER READINGS:**


1. Greg Kroab Hartman, “Linux Kernel in A Nutshell”, Shroff Publishers and Distributors, 2007.
2. Tim Converse, Joyce Park, Clark Morgan, “PHP 5 and MYSQL Bible”, Wiley Dream Tech, 2005.
3. Wesley J Chun, “Core Phython Programming”, Second edition, Pearson Education Asia, 2007.
4. James Lee, Brent Ware, “Open Source Development with LAMP: Using Linux, Apache, MySQL, Perl and PHP”, Addison - Wesley Professional, 2008.


**Course Outcome**

Students who complete this course successfully are expected to:

- Explain the internal structure of linux
- Write desktop and web applications using python
- Design for extendibility and code reuse
- Develop applications for open source hardware

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN**<br>(Autonomous Institution, Affiliated to Anna University ,Chennai)<br>Elayampalayam, Tiruchengode – 637 205 | | | | | | | |
| Programme | **M.Tech.** | Programme code | **204** | | Regulation | | **2015** | |
| Department | **INFORMATION TECHNOLOGY** | | | | Semester | | **II** | |
| Course code | Course Name | Periods Per Week | | | Credit | Maximum Marks | | |
| | | L | T | P | C | CA | ESE | Total |
| **P15ITE11** | **Grid Computing** | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| **Course Objective** | The main objective of this course is to:<br>• Understand Grid Architecture.<br>• Understand different types of grids.<br>• Know Grid standards.<br>• Acquire the knowledge of Grid computing in various areas. | | | | | | | |
| **Unit – I** | **INTRODUCTION** | | | | | Periods | | **9** |
| High Performance Computing, Cluster Computing, Meta-computing, Peer-to-Peer Computing, Internet Computing, Grid Computing – Types of grids - The Grid: Past, Present, Future - A New Infrastructure for 21st Century Science, Grid Applications | | | | | | | | |
| **Unit – II** | **GRID COMPUTING TECHNOLOGY** | | | | | Periods | | **9** |
| The Evolution of the Grid - Desktop Grids - Cluster Grids – HPC Grids – Computational and Data Grids. | | | | | | | | |
| **Unit – III** | **THE ANATOMY OF THE GRID** | | | | | Periods | | **9** |
| Virtual organizations, Grid architecture and its Relationship to other distributed technologies – autonomic computing – service on demand – SOA and the Grid – semantic grids - Service virtualization – Infrastructure and applications. | | | | | | | | |
| **Unit – IV** | **THE OPEN GRID SERVICES ARCHITECTURE & INFRASTRUCTURE** | | | | | Periods | | **9** |
| Evolution to OGSA, Physiology of the Grid: OGSA Infrastructure - OGSA Basic Services, Creating and Managing Grid Services, Managing Grid Environments - Grid-Enabling software applications, Grid-Enabling network services, Grid Security, Grid Resource Management and Scheduling - High-level Introduction to OGSI, Technical details of OGSI specification. | | | | | | | | |
| **Unit – V** | **APPLICATION- CASE STUDY** | | | | | Periods | | **9** |
| Globus Toolkit – Architecture, Programming model, Sample Implementation, High Level Services – Study of a cloud computing infrastructure. | | | | | | | | |
| | | | | | | **Total Periods** | | **45** |
| **REFERENCES:** | | | | | | | | |
| 1 | Ahmar Abbas, “Grid Computing Practical Guide to Technology and Applications”, Firewall Media, New Delhi, 2008. | | | | | | | |
| **FURTHER READINGS:** | | | | | | | | |
| 1 | Ian Foster, Carl Kesselman, “The Grid : Blueprint for a New Computing Infrastructure”, Morgan Kaufman, New Delhi, 2006. | | | | | | | |
| 2 | Fran Berman, Geoffrey Fox, Anthony Hey J G, “Grid Computing Making the Global Infrastructure a Reality”, Wiley, USA, 2003 | | | | | | | |
| 3 | Joshy Joseph, Craig Fallenstein, “Grid Computing”, Pearson Education, New Delhi, 2004. | | | | | | | |
| 4 | Prabhu C S R, “Grid and Cluster Computing”, PHI Pvt Ltd, New Delhi, 2008. | | | | | | | |
| 5 | Janakiraman, “Grid Computing-Models, A Research Monograph”, Tata Mc Graw Hill, 2005. | | | | | | | |
| **Course Outcome** | Students who complete this course successfully are expected to:<br>• Create Grid Middleware architecture.<br>• Explain the services offered by grid and to utilize grid for various applications. | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN**<br>(Autonomous Institution, Affiliated to Anna University ,Chennai)<br>Elayampalayam, Tiruchengode – 637 205 | | | | | | | |
| Programme | **M.Tech.** | Programme code | **204** | | Regulation | **2015** | | |
| Department | **INFORMATION TECHNOLOGY** | | | | Semester | **II** | | |
| Course code | Course Name | Periods Per Week | | | Credit | Maximum Marks | | |
| | | L | T | P | C | CA | ESE | Total |
| **P15ITE12** | **Ad-Hoc & Sensor Networks** | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| **Course Objective** | The main objective of this course is to:<br>• Learn about the issues in the design of ad hoc and wireless sensor networks<br>• Understand the working of protocols in different layers of ad hoc and sensor networks<br>• Expose the students to different aspects in ad hoc and sensor networks<br>• Understand various standards and applications in ad hoc and sensor networks | | | | | | | |
| **Unit - I** | **AD-HOC MAC** | | | | | Periods | | **9** |
| Introduction – Issues in Ad-Hoc Wireless Networks. MAC Protocols – Issues, Classifications of MAC protocols, Multi channel MAC & Power control MAC protocol. | | | | | | | | |
| **Unit - II** | **AD-HOC NETWORK ROUTING & TCP** | | | | | Periods | | **9** |
| Issues – Classifications of routing protocols – Hierarchical and Power aware. Multicast routing – Classifications, Tree based, Mesh based. Ad Hoc Transport Layer Issues. TCP Over Ad Hoc – Feedback based, TCP with explicit link, TCP-BuS, Ad Hoc TCP, and Split TCP. | | | | | | | | |
| **Unit - III** | **WSN –MAC** | | | | | Periods | | **9** |
| Introduction – Sensor Network Architecture, Data dissemination, Gathering. MAC Protocols – self-organizing, Hybrid TDMA/FDMA and CSMA based MAC. | | | | | | | | |
| **Unit - IV** | **WSN ROUTING, LOCALIZATION & QOS** | | | | | Periods | | **9** |
| Issues in WSN routing – OLSR, AODV. Localization – Indoor and Sensor Network Localization. QoS in WSN. | | | | | | | | |
| **Unit - V** | **MESH NETWORKS** | | | | | Periods | | **9** |
| Necessity for Mesh Networks – MAC enhancements – IEEE 802.11s Architecture –Opportunistic routing – Self configuration and Auto configuration – Capacity Models – Fairness – Heterogeneous Mesh Networks – Vehicular Mesh Networks. | | | | | | | | |
| | | | | | | **Total Periods** | | **45** |
| **REFERENCES:** | | | | | | | | |
| 1. | C.Siva Ram Murthy and B.Smanoj, " Ad Hoc Wireless Networks – Architectures and Protocols", Pearson Education, 2004. | | | | | | | |
| **FURTHER READINGS:** | | | | | | | | |
| 1. | WaltenegusDargie,Christian Poellabauer, "Fundamentals of Wireless SensorNetworks", John Wiley & Sons, 2010. | | | | | | | |
| 2. | C.K.Toh, "Ad Hoc Mobile Wireless Networks", Pearson Education, 2002. | | | | | | | |
| 3. | Thomas Krag and Sebastin Buettrich, "Wireless Mesh Networking", O'Reilly Publishers, 2007 | | | | | | | |
| **Course Outcome** | Students who complete this course successfully are expected to:<br>• Identify different issues in wireless ad hoc and sensor networks<br>• Analyze the protocols developed for ad hoc and sensor networks<br>• Identify and discuss the standards , applications of ad hoc and sensor networks | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN**<br>(Autonomous Institution, Affiliated to Anna University ,Chennai)<br>Elayampalayam, Tiruchengode – 637 205 | | | | | | | |
| Programme | **M.Tech.** | Programme code | **204** | | Regulation | **2015** | | |
| Department | **Information Technology** | | | | Semester | **II** | | |
| Course code | Course Name | Periods Per Week | | | Credit | Maximum Marks | | |
| | | L | T | P | C | CA | ESE | Total |
| **P15ITE13** | **Soft Computing** | 3 | 0 | 0 | 3 | 50 | 50 | 100 |

| | | | |
|---|---|---|---|
| **Course Objective** | The main objective of this course is to:<br>• Understand the concept and applications of fuzzy logic, neural networks, genetic algorithms and hybrid systems. | | |
| **Unit - I** | **INTRODUCTION TO SOFT COMPUTING AND NEURAL NETWORKS** | Periods | **9** |
| Evolution of Computing - Soft Computing Constituents – From Conventional AI to Computational Intelligence - Machine Learning Basics | | | |
| **Unit - II** | **GENETIC ALGORITHMS** | Periods | **9** |
| Introduction to Genetic Algorithms (GA) – Applications of GA in Machine Learning - Machine Learning Approach to Knowledge Acquisition. | | | |
| **Unit - III** | **NEURAL NETWORKS** | Periods | **9** |
| Machine Learning Using Neural Network, Adaptive Networks – Feed forward Networks – Supervised Learning Neural Networks – Radial Basis Function Networks - Reinforcement Learning – Unsupervised Learning Neural Networks – Adaptive Resonance architectures – Advances in Neural networks. | | | |
| **Unit - IV** | **FUZZY LOGIC** | Periods | **9** |
| Fuzzy Sets – Operations on Fuzzy Sets – Fuzzy Relations – Membership Functions- Fuzzy Rules and Fuzzy Reasoning – Fuzzy Inference Systems – Fuzzy Expert Systems – Fuzzy Decision Making. | | | |
| **Unit - V** | **NEURO-FUZZY MODELING** | Periods | **9** |
| Adaptive Neuro-Fuzzy Inference Systems – Coactive Neuro-Fuzzy Modeling – Classification and Regression Trees – Data Clustering Algorithms – Rulebase Structure Identification – Neuro-Fuzzy Control – Case studies. | | | |
| | | **Total Periods** | **45** |

**REFERENCES:**


| | |
|---|---|
| 1. | Jyh-Shing Roger Jang, Chuen-Tsai Sun, Eiji Mizutani, "Neuro-Fuzzy and Soft Computing", Prentice-Hall of India, 2003. |
| 2. | George J. Klir and Bo Yuan, "Fuzzy Sets and Fuzzy Logic-Theory and Applications", Prentice Hall, 1995. |


**FURTHER READINGS:**


| | |
|---|---|
| 1. | James A. Freeman and David M. Skapura, "Neural Networks Algorithms, Applications, and Programming Techniques", Pearson Edition., 2003. |
| 2. | Mitchell Melanie, "An Introduction to Genetic Algorithm", Prentice Hall, 1998. |
| 3. | David E. Goldberg, "Genetic Algorithms in Search, Optimization and Machine Learning", Addison Wesley, 1997. |
| 4. | S. N. Sivanandam, S. Sumathi and S. N. Deepa, "Introduction to Fuzzy Logic using MATLAB", Springer, 2007. |
| 5. | S.N.Sivanandam · S.N.Deepa, " Introduction to Genetic Algorithms", Springer, 2007. |
| 6. | Jacek M. Zurada, "Introduction to Artificial Neural Systems", PWS Publishers, 1992. |


| | |
|---|---|
| **Course Outcome** | Students who complete this course successfully are expected to:<br>• Implement the concept and applications of fuzzy logic, neural networks, genetic algorithms and hybrid systems. |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN**<br>(Autonomous Institution, Affiliated to Anna University ,Chennai)<br>Elayampalayam, Tiruchengode – 637 205 | | | | | | | |
| Programme | **M.Tech.** | Programme code | **204** | | Regulation | **2015** | | |
| Department | **INFORMATION TECHNOLOGY** | | | | Semester | **II** | | |
| Course code | Course Name | Periods Per Week | | | Credit | Maximum Marks | | |
| | | L | T | P | C | CA | ESE | Total |
| **P15ITE14** | **Knowledge Engineering** | 3 | 0 | 0 | 3 | 50 | 50 | 100 |

| | | | |
|---|---|---|---|
| **Course Objectives** | The main objective of this course is to:<br>• Understand knowledge representation and reasoning techniques.<br>• Understand the application of knowledge representation and reasoning in actions and planning. | | |
| **Unit – I** | **INTRODUCTION AND PROPOSITION LOGIC** | Periods | **9** |
| The Need for Formal Languages for Representing (Machine-Understandable) Knowledge - Reasoning Services and Logic-Based Reasoning - High Level Architecture of KR&R Systems - Propositional Logic - Syntax and Semantics of Propositional Logic – Reasoning in Proposition Logic - Limitations. | | | |
| **Unit – II** | **FIRST ORDER PREDICATE LOGIC AND DERIVATIVES** | Periods | **9** |
| Syntax and Semantics of First Order Logic - Knowledge Engineering using First Order Logic - Reasoning in First Order Logic - Normal Forms - Herbrand Interpretations and Herbrand's Theorem - Undecidability of the Satisfiability and Validity Problems -Resolution in First Order Logic - Description Logics as Fragments of First Order Logic -Syntax and Semantics – Reasoning with Description Logics. | | | |
| **Unit – III** | **MODAL AND NON MONOTONIC LOGICS** | Periods | **9** |
| Temporal Logic – Syntax and Semantics – KR using Temporal Logic – Epistemic Logic – Syntax and Semantics – KR using Epistemic Logic – Non Monotonic Logic- Uncertainty – Fuzzy logic. | | | |
| **Unit – IV** | **OBJECT ORIENTED REPRESENTATION** | Periods | **9** |
| Semantic Networks- Object Oriented Representations – Frame Formalism – Structured Descriptions – Meaning and Entailment - Taxonomies and Classification – Inheritance – Conceptual Dependency- Scripts – Expert Systems. | | | |
| **Unit – V** | **ACTIONS AND PLANNING** | Periods | **9** |
| Actions – Situational Calculus – Frame Problem – Representing Complex Actions – Planning – STRIPS/ ADL – Planning as Reasoning – Hierarchical and Conditional Planning. | | | |
| | | **Total Periods** | **45** |

**REFERENCES:**


| | |
|---|---|
| 1. | Ronald Brachman, Hector Levesque, "Knowledge Representation and Reasoning", The Morgan Kaufmann Series in Artificial Intelligence, 2004. |
| 2. | Elaine Rich, S.Nair, "Artificial intelligence", Third edition, Tata McGraw-Hill Education, 2010 |
| 3. | Johan van Benthem, Hans van Ditmarsch, Jan van Eijck and Jan Jaspars, Logic in Action, A new introduction to Logic, Available in http://www.logicinaction.org/, 2014. |
| 4. | Arthur B. Markman, "Knowledge Representation", Lawrence Erlbaum Associates, 1998. |
| 5. | S.C. Mehrotra, Ratnadeep R. Deshmukh, Sachin N. Deshmukh, Ramesh R. Manza, "Knowledge Engineering" , Alpha Science, 2011. |


| | |
|---|---|
| **Course Outcome** | Students who complete this course successfully are expected to:<br>• Implement knowledge representation and reasoning techniques.<br>• Apply knowledge engineering for the development of intelligent applications |

**VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN**
(Autonomous Institution, Affiliated to Anna University ,Chennai)
Elayampalayam, Tiruchengode – 637 205

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Programme | **M.Tech.** | Programme code | **204** | Regulation | **2015** | | | |
| Department | **INFORMATION TECHNOLOGY** | | | Semester | **II** | | | |
| Course code | Course Name | Periods Per Week | | | Credit | Maximum Marks | | |
| | | L | T | P | C | CA | ESE | Total |
| **P15ITE15** | **Big Data Analytics** | 3 | 0 | 0 | 3 | 50 | 50 | 100 |

**Course Objectives**

The main objective of this course is to:

- Understand big data analytics as the next wave for businesses looking for competitive advantage
- Understand the financial value of big data analytics and to explore tools and practices for working with big data
- Understand how big data analytics can leverage into a key component
- Learn about stream computing
- Know about the research that requires the integration of large amounts of data

| **Unit – I** | **INTRODUCTION TO BIG DATA** | Periods | **8** |
|---|---|---|---|

Introduction to BigData Platform – Challenges of Conventional Systems - Intelligent data analysis – Nature of Data - Analytic Processes and Tools - Analysis vs Reporting - Modern Data Analytic Tools - Statistical Concepts: Sampling Distributions - Re-Sampling - Statistical Inference - Prediction Error.

| **Unit – II** | **DATA ANALYSIS** | Periods | **11** |
|---|---|---|---|

Regression Modeling - Multivariate Analysis – Bayesian Methods – Bayesian Paradigm – Bayesian Modeling - Inference and Bayesian Networks - Support Vector and Kernel Methods - Analysis of Time Series: Linear Systems Analysis - Nonlinear Dynamics - Rule Induction - Fuzzy Logic: Extracting Fuzzy Models from Data - Fuzzy Decision Trees

| **Unit – III** | **SEARCH METHODS AND VISUALIZATION** | Periods | **9** |
|---|---|---|---|

Search by simulated Annealing – Stochastic, Adaptive search by Evaluation – Evaluation Strategies – Genetic Algorithm – Genetic Programming – Visualization – Classification of Visual Data Analysis Techniques – Data Types – Visualization Techniques – Interaction techniques – Specific Visual data analysis Techniques.

| **Unit – IV** | **MINING DATA STREAMS** | Periods | **8** |
|---|---|---|---|

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

| **Unit – V** | **FRAMEWORKS** | Periods | **9** |
|---|---|---|---|

Map Reduce – Hadoop, Hive, MapR – Sharding – NoSQL Databases - S3 - Hadoop Distributed File Systems – Case Study.

| | | |
|---|---|---|
| | **Total Periods** | **45** |

| REFERENCES: | |
|---|---|
| 1. | Michael Berthold, David J. Hand, “Intelligent Data Analysis”, Springer, 2007. |
| 2. | Anand Rajaraman and Jeffrey David Ullman, “Mining of Massive Datasets”, Cambridge University Press, 2012. |
| 3. | Bill Franks, “Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics”, John Wiley & sons, 2012. |
| 4. | Glenn J. Myatt, “Making Sense of Data”, John Wiley & Sons, 2007 |
| 5. | Pete Warden, “Big Data Glossary”, O’Reilly, 2011. |
| 6. | Jiawei Han, Micheline Kamber “Data Mining Concepts and Techniques”, Second Edition, Elsevier, Reprinted 2008. |
| 7. | Da Ruan, Guoquing Chen, Etienne E.Kerre, Geert Wets, Intelligent Data Mining, Springer,2007 |
| 8. | Paul Zikopoulos ,Dirk deRoos , Krishnan Parasuraman , Thomas Deutsch , James Giles, David Corrigan , “Harness the Power of Big Data The IBM Big Data Platform”, Tata McGraw Hill Publications, 2012 |
| 9. | Michael Minelli, Michele Chambers, Ambiga Dhiraj ,” Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses”,Wiley Publications,2013 |
| 10. | Zikopoulos, Paul, Chris Eaton, “Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data”, Tata McGraw Hill Publications, 2011 |
| **Course Outcome** | Students who complete this course successfully are expected to:<br>• Use Hadoop, Map Reduce Framework<br>• Suggest areas to apply big data to increase business outcome<br>• Contextually integrate and correlate large amounts of information automatically to gain faster insights |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN**<br>(Autonomous Institution, Affiliated to Anna University ,Chennai)<br>Elayampalayam, Tiruchengode – 637 205 | | | | | | | |
| Programme | **M.Tech.** | Programme code | **204** | | Regulation | **2015** | | |
| Department | **INFORMATION TECHNOLOGY** | | | | Semester | **III** | | |
| Course code | Course Name | Periods Per Week | | | Credit | Maximum Marks | | |
| | | L | T | P | C | CA | ESE | Total |
| **P15ITE16** | **Information Security** | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| **Course Objective** | The main objective of this course is to:<br>• Understand the principles of encryption algorithms, conventional and public key cryptography.<br>• Understand the basics of Information Security<br>• Know the legal, ethical and professional issues in Information Security<br>• Know the technological aspects of Information Security | | | | | | | |
| **Unit – I** | **INTRODUCTION** | | | | Periods | **9** | | |
| An Overview of Computer Security, Access Control Matrix, Policy-Security policies, Confidentiality policies, Integrity policies and Hybrid policies. | | | | | | | | |
| **Unit – II** | **CRYPTOSYSTEMS** | | | | Periods | **9** | | |
| Cryptography- Key management – Session and Interchange keys, Key exchange and generation, Cryptographic Key Infrastructure, Storing and Revoking Keys, Digital Signatures, Cipher Techniques | | | | | | | | |
| **Unit – III** | **ACCESS CONTROL** | | | | Periods | **9** | | |
| Systems: Design Principles, Representing Identity, Access Control Mechanisms, Information Flow and Confinement Problem. | | | | | | | | |
| **Unit – IV** | **INTRUSION DETECTION** | | | | Periods | **9** | | |
| Malicious Logic, Vulnerability Analysis, Auditing and Intrusion Detection | | | | | | | | |
| **Unit – V** | **SECURITY ANALYSIS** | | | | Periods | **9** | | |
| Network Security, System Security, User Security and Program Security | | | | | | | | |
| | | | | | **Total Periods** | **45** | | |
| **REFERENCES:** | | | | | | | | |
| 1. | Matt Bishop ,“Computer Security art and science ”, Second Edition, Pearson Education, 2002 | | | | | | | |
| **FURTHER READINGS:** | | | | | | | | |
| 1. | Mark Merkow James Breithaupt“ Information Security : Principles and Practices” First Edition, Pearson Education, 2007. | | | | | | | |
| 2. | Whitman, “Principles of Information Security”, Second Edition, Pearson Education, 2008 | | | | | | | |
| 3. | William Stallings, “Cryptography and Network Security – Principles and Practices”, Pearson Education, Sixth Edition, 2013. | | | | | | | |
| 4. | “Security in Computing ”,Charles P.Pfleeger and Shari Lawrence Pfleeger, Third Edition, 2003. | | | | | | | |
| **Course Outcome** | Students who complete this course successfully are expected to:<br>• Can understand, analyze and work on activities of fraud prevention, monitoring, investigation, reporting.<br>• Can differentiate among the models, architectures, challenges and global legal constraints of secure electronic commerce technologies used to ensure transmission, processing and storage of sensitive information. | | | | | | | |

**VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN**
(Autonomous Institution, Affiliated to Anna University ,Chennai)
Elayampalayam, Tiruchengode – 637 205

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Programme | **M.Tech.** | Programme code | **204** | Regulation | **2015** | | | |
| Department | **INFORMATION TECHNOLOGY** | | | Semester | **III** | | | |
| Course code | Course Name | Periods Per Week | | | Credit | Maximum Marks | | |
| | | L | T | P | C | CA | ESE | Total |
| **P15ITE17** | **Cyber Forensics** | 3 | 0 | 0 | 3 | 50 | 50 | 100 |

**Course Objective**

The main objective of this course is to:

- Study the fundamentals of computer forensics.
- Have an overview of techniques for Data Recovery and Evidence Collection.
- Study various threats associated with security and information warfare.
- Study the tools and tactics associated with cyber forensics

| **Unit – I** | **INTRODUCTION** | Periods | **7** |
|---|---|---|---|

Computer Forensics Fundamentals – Types of Computer Forensics Technology – Types of Vendor and Computer Forensics Services.

| **Unit – II** | **COMPUTER FORENSICS EVIDENCE AND CAPTURE** | Periods | **8** |
|---|---|---|---|

Data Recovery – Evidence Collection and Data Seizure –Duplication and Preservation of Digital Evidence – Computer Image Verification and Authentication.

| **Unit – III** | **COMPUTER FORENSIC ANALYSIS** | Periods | **10** |
|---|---|---|---|

Discover of Electronic Evidence – Identification of Data – Reconstructing Past Events Fighting against Macro Threats – Information Warfare Arsenal – Tactics of the Military–Tactics of Terrorist and Rogues – Tactics of Private Companies.

| **Unit – IV** | **INFORMATION WARFARE** | Periods | **10** |
|---|---|---|---|

Arsenal – Surveillance Tools- Hackers and Theft of Components- Contemporary Computer Crime Identity Theft and Identity Fraud-Organized Crime & Terrorism Avenues Prosecution and Government Efforts- Applying the First Amendment to Computer Related Crime-The Fourth Amendment and Other Legal Issues.

| **Unit – V** | **COMPUTER FORENSIC CASES** | Periods | **10** |
|---|---|---|---|

Developing Forensic Capabilities- Searching and Seizing Computer Related Evidence-Processing Evidence and Report Preparation - Future Issues.

| | | |
|---|---|---|
| | **Total Periods** | **45** |

**REFERENCES:**


| | |
|---|---|
| 1. | John R. Vacca, "Computer Forensics: Computer Crime Scene Investigation, Volume1, Cengage Learning, 2005 |
| 2. | Marjie T Britz , "Computer Forensics and Cyber Crime: An Introduction, 3/E,Pearson Education, 2013. |
| 3. | Marie-Helen Maras, "Computer Forensics: Cybercriminals, Laws, and Evidence", Jones & Bartlett Publishers, 2011. |
| 4. | Chad Steel, "Windows Forensics", Wiley India, 2006.Majid Yar, "Cybercrime and Society", Sage Publications, 2006.Robert M Slade, "Software Forensics", Tata Mc Graw Hill, 2004. |


**Course Outcome**

Students who complete this course successfully are expected to:

- Apply the concepts of computer forensics.
- Handle threats associated with security and information warfare.
- Design tools and tactics associated with cyber forensics.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN**<br>(Autonomous Institution, Affiliated to Anna University ,Chennai)<br>Elayampalayam, Tiruchengode – 637 205 | | | | | | | |
| Programme | **M.Tech.** | Programme code | **204** | | Regulation | **2015** | | |
| Department | **INFORMATION TECHNOLOGY** | | | | Semester | **III** | | |
| Course code | Course Name | Periods Per Week | | | Credit | Maximum Marks | | |
| | | L | T | P | C | CA | ESE | Total |
| **P15ITE18** | **Principles of Programming Languages** | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| **Course Objectives** | The main objective of this course is to:<br>• Understand and describe syntax and semantics of programming languages<br>• Understand data, data types, and basic statements<br>• Understand call-return architecture and ways of implementing them<br>• Understand object-orientation, concurrency, and event handling in programming languages<br>• Develop programs in non-procedural programming paradigms | | | | | | | |
| **Unit – I** | **SYNTAX AND SEMANTICS** | | | | Periods | **9** | | |
| Evolution of programming languages – describing syntax – context-free grammars – attribute grammars – describing semantics – lexical analysis – parsing – recursive-decent – bottom-up parsing | | | | | | | | |
| **Unit – II** | **DATA, DATA TYPES, AND BASIC STATEMENTS** | | | | Periods | **9** | | |
| Names – variables – binding – type checking – scope – scope rules – lifetime and garbage collection – primitive data types – strings – array types – associative arrays – record types – union types – pointers and references – Arithmetic expressions – overloaded operators – type conversions – relational and boolean expressions – assignment statements – mixed-mode assignments – control structures – selection – iterations – branching – guarded statements | | | | | | | | |
| **Unit – III** | **SUBPROGRAMS AND IMPLEMENTATIONS** | | | | Periods | **9** | | |
| Subprograms – design issues – local referencing – parameter passing – overloaded methods – generic methods – design issues for functions – semantics of call and return – implementing simple subprograms – stack and dynamic local variables – nested subprograms – blocks – dynamic scoping | | | | | | | | |
| **Unit – IV** | **OBJECT-ORIENTATION, CONCURRENCY, AND EVENT HANDLING** | | | | Periods | **9** | | |
| Object-orientation – design issues for OOP languages – implementation of object-oriented constructs – concurrency – semaphores – monitors – message passing – threads – statement level concurrency – exception handling – even handling | | | | | | | | |
| **Unit – V** | **FUNCTIONAL AND LOGIC PROGRAMMING LANGUAGES** | | | | Periods | **9** | | |
| Introduction to lambda calculus – fundamentals of functional programming languages – Programming with Scheme – Programming with ML – Introduction to logic and logic programming – Programming with Prolog – multi-paradigm languages | | | | | | | | |
| | | | | | **Total Periods** | **45** | | |

| REFERENCES: | |
|---|---|
| 1. | Robert W. Sebesta, “Concepts of Programming Languages”, Tenth Edition, Addison Wesley, 2012. |
| 2. | Michael L. Scott, “Programming Language Pragmatics”, Third Edition, Morgan Kaufmann, 2009. |
| 3. | R. Kent Dybvig, “The Scheme programming language”, Fourth Edition, MIT Press, 2009. |
| 4. | Jeffrey D. Ullman, “Elements of ML programming”, Second Edition, Prentice Hall, 1998. |
| 5. | Richard A. O'Keefe, “The craft of Prolog”, MIT Press, 2009 |
| **Course Outcome** | Students who complete this course successfully are expected to:<br>• Manipulate and generate lambda-terms, extending a system such as Church numerals; check and assign types to lambda terms.<br>• Solve simple recursive equations by determining the limit of the Kleene fixpoint construction.<br>• Design and extend operational and denotational definitions for basic programming language constructs.<br>• Prove properties of programs by various formal means, including structural and fixpoint induction.<br>• Demonstrate correspondences between grammars, languages and automata. |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN**<br>(Autonomous Institution, Affiliated to Anna University ,Chennai)<br>Elayampalayam, Tiruchengode – 637 205 | | | | | | | |
| Programme | **M.Tech.** | Programme code | **204** | | Regulation | **2015** | | |
| Department | **INFORMATION TECHNOLOGY** | | | | Semester | **III** | | |
| Course code | Course Name | Periods Per Week | | | Credit | Maximum Marks | | |
| | | L | T | P | C | CA | ESE | Total |
| **P15ITE19** | **Computer Graphics and Multimedia** | 3 | 0 | 0 | 3 | 50 | 50 | 100 |

| | |
|---|---|
| **Course Objectives** | The main objective of this course is to:<br>• Understand the basics of geometry processing.<br>• Understand the fundamentals of pipelined rasterization rendering of meshed objects and curved surfaces.<br>• Understand and work with advanced rendering methods such as radiosity.<br>• Design programs for advancped animation methods and<br>• Become proficient at graphics programming using OpenGL |

| | | | |
|---|---|---|---|
| **Unit – I** | **INTRODUCTION TO GRAPHICS** | Periods | **9** |
| Introduction - Design and Drawing - Pictures Storage and Display - Basic Graphics Pipeline, Bitmap and Vector- Based Graphics - Attributes of output primitives – Line, Circle and Ellipse drawing algorithms and Other Conics. | | | |
| **Unit – II** | **TRANSFORMATION AND PROJECTION** | Periods | **9** |
| Two dimensional Geometric Transformation – Camera View Port – Viewing Pipeline –Viewing Transformation - Parallel and Perspective Viewing and Projections - Three Dimensional Object Representation –Visualization of Data Sets – Visible Surface Identification - Three-Dimensional Transformations - Two- Dimensional Clipping - Polygon Clipping - Clipping In Three Dimensions - Text Clipping. | | | |
| **Unit – III** | **CURVE AND SURFACE DESIGN AND COLOUR MODELS** | Periods | **9** |
| Parametric Curve Design - Spline Curve Representation - Bezier Curves - B-Spline Curves and Surface Design - Constructive Solid Geometry - Color Models – RGB – YIQ – CMY - HSV – Animations – General Computer Animation, Raster - Key Frame - Graphics Programming using OPENGL – Basic Graphics Primitives – Drawing Three Dimensional Objects - Drawing Three Dimensional Scenes. | | | |
| **Unit – IV** | **MULTIMEDIA AUTHORING AND DATA REPRESENTATIONS** | Periods | **9** |
| Introduction to Multimedia – Multimedia Authoring Tools – Graphics and Image Data Representations – Basics of Digital Video – Types of Video Signals – Analog and Digital Video – Digitization of Sound – Quantization and Transmission of Audio - MIDI. | | | |
| **Unit – V** | **MULTIMEDIA DATA COMPRESSION** | Periods | **9** |
| Lossless and Lossy Compression Algorithms – Image Compression Standards – Basic Audio and Video Compression Techniques – MPEG Audio and Video Coding – Computer and Multimedia Networks – Content Based Retrieval. | | | |
| | | **Total Periods** | **45** |

**REFERENCES:**


| | |
|---|---|
| 1. | Donald Hearn, Pauline Baker, "Computer Graphics – C Version", Second Edition, Pearson Education,2004. |
| 2. | James D. Foley, Andries Van Dam, Steven K. Feiner, John F. Hughes, "Computer Graphics-Principles and Practice", Second Edition in C, Pearson Education, 2007. |
| 3. | Donald D. Hearn, M. Pauline Baker, Warren Carithers, "Computer Graphics with Open GL", 4th Edition, Prentice Hall, 2011. |
| 4. | Ze-Nian Li and Mark S. Drew, "Fundamentals of Multimedia", Prentice Hall, 2004. |


| | |
|---|---|
| **Course Outcome** | Students who complete this course successfully are expected to:<br>• Analyze the fundamentals of 2D and 3D computer graphics.<br>• Discuss the basic algorithms commonly used in 3D computer graphics.<br>• Describe advanced computer graphics techniques and applications. . |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN**<br>(Autonomous Institution, Affiliated to Anna University ,Chennai)<br>Elayampalayam, Tiruchengode – 637 205 | | | | | | | |
| Programme | **M.Tech.** | Programme code | **204** | | Regulation | **2015** | | |
| Department | **INFORMATION TECHNOLOGY** | | | | Semester | **III** | | |
| Course code | Course Name | Periods Per Week | | | Credit | Maximum Marks | | |
| | | L | T | P | C | CA | ESE | Total |
| **P15ITE20** | **Operations Research** | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| **Course Objectives** | The main objective of this course is to:<br>• Understand the basic concepts of a few deterministic optimization techniques, queuing theory, simulation and apply them to various engineering problems. | | | | | | | |
| **Unit – I** | **QUEUING MODELS** | | | | Periods | **9** | | |
| Markovian Queues - Steady state analysis of Single and Multi-server Models - Little's Formula - Finite and Infinite Capacity Models - Machine Interference Model - Self-Service Queue. | | | | | | | | |
| **Unit – II** | **LINEAR PROGRAMMING** | | | | Periods | **9** | | |
| Formulation - Graphical Solution - Simplex Method - Two-Phase Method - Transportation and Assignment Models. | | | | | | | | |
| **Unit – III** | **NON-LINEAR PROGRAMMING** | | | | Periods | **9** | | |
| Constrained Problems - Equality Constraints - Lagrangean Method - Inequality Constraints - Karush – Kuhn - Tucker (KKT) Conditions - Quadratic Programming. | | | | | | | | |
| **Unit – IV** | **DYNAMIC PROGRAMMING** | | | | Periods | **9** | | |
| Dynamic Programming - Principle of Optimality - Forward and Backward Recursion – Applications of Dynamic Programming - Problem of Dimensionality. | | | | | | | | |
| **Unit – V** | **SIMULATION MODELING** | | | | Periods | **9** | | |
| Monte Carlo Simulation - Types of Simulation - Elements of Discrete Event Simulation - Generation of Random Numbers - Applications to Queuing systems. | | | | | | | | |
| | | | | | **Total Periods** | **45** | | |
| **REFERENCES:** | | | | | | | | |
| 1. | Taha H.A, "Operations Research: An Introduction", Pearson Education, New Delhi, Ninth Edition, 2010. | | | | | | | |
| 2. | Gupta P.K. and Hira, D.S., "Operations Research", S.Chand & Company Ltd., Revised Edition, 2012. | | | | | | | |
| 3. | Ravindran A., Don T. Phillips and James J. Solberg, "Operations Research", Wiley-India Edition, Second Edition, 2006. | | | | | | | |
| 4. | Sharma J. K., "Operations Research", Macmillan Publishers India Ltd., Third Edition, 2009. | | | | | | | |
| **Course Outcome** | Students who complete this course successfully are expected to:<br>• Have a clear perception of the power of mathematical programming tools and acquire skills to analyze queuing models.<br>• Demonstrate the application of the operations research techniques to problems drawn from industry, management and other engineering fields. | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN**<br>(Autonomous Institution, Affiliated to Anna University ,Chennai)<br>Elayampalayam, Tiruchengode – 637 205 | | | | | | | |
| Programme | **M.Tech.** | Programme code | **204** | | Regulation | **2015** | | |
| Department | **INFORMATION TECHNOLOGY** | | | | Semester | **III** | | |
| Course code | Course Name | Periods Per Week | | | Credit | Maximum Marks | | |
| | | L | T | P | C | CA | ESE | Total |
| **P15ITE21** | **Software Metrics and Reliability** | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| **Course Objectives** | The main objective of this course is to:<br>• Gain basic knowledge about metrics, measurement theory and related Terminologies<br>• Learn measure the quality level of internal and external attributes of the software product<br>• To introduce the basics of software reliability and to illustrate how to perform planning, executing and testing for software reliability<br>• Explore various metrics and models of software reliability<br>• To compare various models of software reliability based on its application | | | | | | | |
| **Unit – I** | **FUNDAMENTALS OF MEASUREMENTS** | | | | Periods | **9** | | |
| Measurements in Software Engineering – Scope of Software Metrics – Fundamentals of Measurements Theory – Goal Based Framework – Software Measurement Validation. | | | | | | | | |
| **Unit – II** | **METRICS AND MODELS** | | | | Periods | **9** | | |
| Measurement of Internal Product Attributes – Size and Structure – External Product Attributes - Measurement of Quality– Reliability Model – Exponential Distribution and Reliability Growth Model – Availability Metrics. | | | | | | | | |
| **Unit – III** | **INTRODUCTION TO SOFTWARE RELIABILITY** | | | | Periods | **9** | | |
| Basic Concepts – Failure and Faults – Environment – Availability –Modeling –uses. | | | | | | | | |
| **Unit – IV** | **SOFTWARE RELIABILITY MODELING** | | | | Periods | **9** | | |
| Concepts – General Model Characteristic – Historical Development of models – Model Classification scheme – Markovian models – General concepts – General Poisson Type Models – Binomial Type Models – Poisson Type models – Fault reduction factor for Poisson Type models. | | | | | | | | |
| **Unit – V** | **COMPARISON OF SOFTWARE RELIABILITY MODELS** | | | | Periods | **9** | | |
| Comparison Criteria – Failure Data – Comparison of Predictive Validity of Model Groups – Recommended Models – Comparison of Time Domains – Calendar Time Modeling – Limiting Resource Concept – Resource Usage model – Resource Utilization – Calendar Time Estimation and confidence Intervals. | | | | | | | | |
| | | | | | **Total Periods** | **45** | | |

| REFERENCES: | |
|---|---|
| 1. | John D. Musa, “Software Reliability Engineering”, Tata McGraw Hill, 2005. |
| 2. | Norman E . Fenton, Shari Lawrence Pfleeger, "Software metrics", Second Edition, International Student Edition, 2003. |
| 3. | John D. Musa, Anthony Iannino, Kazuhira Okumoto, “Software Reliability – Measurement, Prediction, Application, Series in Software Engineering and Technology”, McGraw Hill, 1987. |
| 4. | Stephen H. Kan, “Metrics and Models in Software Quality Engineering”, Second Edition, Addison-Wesley Professional,2002 |
| 5. | N.Fenton and B.Little Wood,” Software Reliability and Metrics”, Springer, 1991 |
| 6. | Michael R.Lyu,” Handbook of Software Reliability Engineering”, McGraw-Hill, 1996 |
| 7. | Steven R.Rakitin, “Software Verification and Validation for Practitioners and Managers”, Artech House, Inc. Norwood, MA, USA, 2001 |
| **Course Outcome** | Students who complete this course successfully are expected to:<br>• Identify and apply various software metrics, which determines the quality level of software<br>• Identify and evaluate the quality level of internal and external attributes of the software product<br>• Compare and Pick out the right reliability model for evaluating the software<br>• Evaluate the reliability of any given software product<br>• Design new metrics and reliability models for evaluating the quality level of the software based on the requirement |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN**<br>(Autonomous Institution, Affiliated to Anna University ,Chennai)<br>Elayampalayam, Tiruchengode – 637 205 | | | | | | | |
| Programme | **M.Tech.** | Programme code | **204** | | Regulation | **2015** | | |
| Department | **INFORMATION TECHNOLOGY** | | | | Semester | **III** | | |
| Course code | Course Name | Periods Per Week | | | Credit | Maximum Marks | | |
| | | L | T | P | C | CA | ESE | Total |
| **P15ITE22** | **E-Learning** | 3 | 0 | 0 | 3 | 50 | 50 | 100 |

| | |
|---|---|
| **Course Objectives** | The main objective of this course is to:<br>• Learn the basics of e - learning<br>• Understand the design issues in E - Content creation<br>• Study about interactive E - Learning<br>• Learn managing E - Content |

| | | | |
|---|---|---|---|
| **Unit – I** | **INTRODUCTION** | Periods | **9** |
| Introduction – Learning - the role of Training - the role of E-Learning – New Era - E-Learning Revolution - E-Learning Strategy | | | |
| **Unit – II** | **KNOWLEDGE MANAGEMENT** | Periods | **9** |
| Computer Based Training – Pitfalls - classroom course to the web-case study – knowledge Management – types – benefits - knowledge management pyramid - community and collaboration in knowledge management - knowledge management for professionals – services – building knowledge management solution | | | |
| **Unit – III** | **E-LEARNING ARCHITECTURE** | Periods | **9** |
| Integrating E-Learning and Classroom Learning - building Learning Architecture – Learning Architecture for - sales development - financial consultants - initial call center training, executives - E-Learning Applications | | | |
| **Unit – IV** | **LEARNING MANAGEMENT SYSTEM** | Periods | **9** |
| Building and Managing an E-Learning Infrastructure - Learning portals - Learning Management Systems (LMS) - Building Learning Culture – strategies - E-Learning costs – justification – Quality – demonstration - E-Learning- service – speed evaluation | | | |
| **Unit – V** | **CASE STUDY** | Periods | **9** |
| Reinventing the Training Organization – Training at CISCO System – case study - creating E-learning strategy for self – future of E-learning. | | | |
| | | **Total Periods** | **45** |

**REFERENCES:**


| | |
|---|---|
| 1. | Marc J.Rosenberg, "E-Learning: Strategies for Delivering Knowledge in the Digital Age", McGraw Hill, 2001. |
| 2. | Safeeullah Soomro, "E-Learning Experiences and Future", In Tech Publication, 2010 |
| 3. | Frank Rennie, "E-Learning and Social Networking Handbook – Resources for Higher Education" , Tara Morrison, 2012 |
| 4. | Saul Carliner and Patti Shank, "The E-Learning Handbook: Past Promises, Present Challenges", Pfeiffer Publication, 2008. |
| 5. | Clark, R. C. and Mayer, R. E. (2011) eLearning and the Science of Instruction. 3rd edition. |
| 6. | Crews, T. B., Sheth, S. N., and Horne, T. M. (2014) Understanding the Learning Personalities of Successful Online Students. Educause Review. Jan/Feb 2014. |


| | |
|---|---|
| **Course Outcome** | Students who complete this course successfully are expected to:<br>• Appreciate the basics of e - learning<br>• Create the E - Content<br>• Implement interactive E - Learning<br>• Manage E - Content |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN**<br>(Autonomous Institution, Affiliated to Anna University ,Chennai)<br>Elayampalayam, Tiruchengode – 637 205 | | | | | | | |
| Programme | **M.Tech.** | Programme code | **204** | | Regulation | **2015** | | |
| Department | **INFORMATION TECHNOLOGY** | | | | Semester | **III** | | |
| Course code | Course Name | Periods Per Week | | | Credit | Maximum Marks | | |
| | | L | T | P | C | CA | ESE | Total |
| **P15ITE23** | **Building Internet of Things** | 3 | 0 | 0 | 3 | 50 | 50 | 100 |

| | |
|---|---|
| **Course Objectives** | The main objective of this course is to:<br>• Understand the fundamentals of Internet of Things.<br>• Build a small low cost embedded system using Arduino / Raspberry Pi or equivalent boards.<br>• Apply the concept of Internet of Things in the real world scenario |

| | | | |
|---|---|---|---|
| **Unit – I** | **INTRODUCTION** | Periods | **9** |
| Definition – phases – Foundations – Policy– Challenges and Issues - identification - security - privacy | | | |
| **Unit – II** | **COMPONENTS IN INTERNET OF THINGS** | Periods | **9** |
| Control Units – Sensors – Communication modules – Power Sources – Communication Technologies – RFID – Bluetooth – Zigbee – Wifi – Rflinks – Mobile Internet – Wired Communication | | | |
| **Unit – III** | **PROGRAMMING THE MICROCONTROLLER FOR IOT** | Periods | **9** |
| Basics of Sensors and actuators – examples and working principles of sensors and actuators – Cloud computing and IOT – Arduino/Equivalent Microcontroller platform – Setting up the board - Programming for IOT – Reading from Sensors | | | |
| **Unit – IV** | **COMMUNICATION** | Periods | **9** |
| Connecting microcontroller with mobile devices – communication through Bluetooth and USB – connection with the internet using WIFI / Ethernet | | | |
| **Unit – V** | **APPLICATIONS** | Periods | **9** |
| Set up cloud environment – send data from microcontroller to cloud – Case studies – Open Source e-Health sensor platform – BeClose Elderly monitoring – Other recent projects. | | | |
| | | **Total Periods** | **45** |

**REFERENCES:**


| | |
|---|---|
| 1. | Charalampos Doukas , "Building Internet of Things with the Arduino",Fifth Edition Create space, April 2002 |
| 2. | http://postscapes.com/ |
| 3. | http://www.theinternetofthings.eu/what-is-the-internet-of-things |
| 4 | Arshdeep Bahga, Vijay Madisetti, “Internet of Things – A hands-on approach”, Universities Press, 2015. |
| 5 | Marco Schwartz, “Internet of Things with the Arduino Yun”, Packt Publishing, 2014 |
| 6. | Manoel Carlos Ramon, “Intel® Galileo and Intel® Galileo Gen 2: API Features and Arduino Projects for Linux Programmers”, Apress, 2014. |


| | |
|---|---|
| **Course Outcome** | Students who complete this course successfully are expected to:<br>• Design a portable IoT using Arduino/ equivalent boards and relevant protocols.<br>• Develop web services to access/control IoT devices.<br>• Deploy an IoT application and connect to the cloud.<br>• Analyze applications of IoT in real time scenario |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN**<br>(Autonomous Institution, Affiliated to Anna University ,Chennai)<br>Elayampalayam, Tiruchengode – 637 205 | | | | | | | |
| Programme | **M.Tech.** | Programme code | **204** | | Regulation | **2015** | | |
| Department | **INFORMATION TECHNOLOGY** | | | | Semester | **III** | | |
| Course code | Course Name | Periods Per Week | | | Credit | Maximum Marks | | |
| | | L | T | P | C | CA | ESE | Total |
| **P15ITE24** | **Human Computer Interaction** | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| **Course Objectives** | The main objective of this course is to:<br>• Learn the principles and fundamentals of human computer interaction (HCI).<br>• Analyze HCI theories, as they relate to collaborative or social software.<br>• Establish target users, functional requirements, and interface requirements for a given computer application.<br>• Understand user interface design principles, and apply them to designing an interface.<br>• Learn user interface designs through usability inspection and user models.<br>• Know the applications of multimedia on HCI. | | | | | | | |
| **Unit – I** | **DESIGN PROCESS** | | | | | Periods | | **9** |
| Humans – Information Process – Computer – Information Process – Differences and Similarities – Need for Interaction – Models – Ergonomics – Style – Context – Paradigms – Designing of Interactive Systems – Usability – Paradigm shift – Interaction Design Basics – Design Process – Scenarios – Users Need – Complexity of Design | | | | | | | | |
| **Unit – II** | **DESIGN AND EVALUATION OF INTERACTIVE SYSTEMS** | | | | | Periods | | **9** |
| Software Process – Usability Engineering – Issue based Information Systems – Iterative Design Practices – Design Rules – Maximum Usability – Principles – Standards and Guidelines – Design Patterns – Programming Tools – Windowing Systems – Interaction Tool Kit – User Interface Management System – Evaluation Techniques – Evaluation Design – Evaluating Implementations – Observational Methods. | | | | | | | | |
| **Unit – III** | **MODELS** | | | | | Periods | | **9** |
| Universal Design Principles – Multimodal Systems – User Support – Presentation and Implementation Issues – Types – Requirements – Approaches – Cognitive Model – Hierarchical Model – Linguistic Model – Physical and Device Models – Socio technical Models – Communication and Collaboration Models – Task Models – Task Analysis and Design. | | | | | | | | |
| **Unit – IV** | **EXPERIMENTAL DESIGN AND STATISTICAL ANALYSIS OF HCI** | | | | | Periods | | **9** |
| Basic Design Structure – Single Independent Variable – Multiple Independent Variable – Factorial Design – Split-Plot Design – Random Errors – Experimental Procedure – Statistical Analysis – Tests – Analysis of Variance Test – Regression – Chi-Square Test – Survey – Probabilistic Sampling – Non-Probabilistic Sampling – Developing Survey Questions. | | | | | | | | |
| **Unit – V** | **THEORIES** | | | | | Periods | | **9** |
| Dialogue Notations and Design – Dialogue Need – Dialogue Design Notations – Graphical – Textual - Representing Dialogue – Formal Descriptions – Dialogue Analysis – System Models – Interaction Models – Relationship with Dialogue – Formalisms – Formal Notations – Interstitial Behavior – Virtual Reality – Modeling Rich Interaction – Status Event Analysis – Properties – Rich Contexts – Sensor-based Systems – Groupware – Applications – Ubiquitous Computing – Virtual Reality | | | | | | | | |
| | | | | | | **Total Periods** | | **45** |

| **REFERENCES:** | |
|---|---|
| 1. | Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale, "Human Computer Interaction", Third Edition, Prentice Hall, 2004. |
| 2 | Jonathan Lazar Jinjuan Heidi Feng, Harry Hochheiser, "Research Methods in Human-Computer Interaction", Wiley, 2010 |
| 3. | Ben Shneiderman and Catherine Plaisant, "Designing the User Interface: Strategies for Effective Human-Computer Interaction", Fifth Edition, Addison-Wesley Publishing Co, 2009. |
| **Course Outcome** | Students who complete this course successfully are expected to:<br>• Interpret the contributions of human factors and technical constraints on human–computer interaction.<br>• Evaluate the role of current HCI theories in the design of software.<br>• Apply HCI techniques and methods to the design of software.<br>• Categorize and carefully differentiate various aspects of multimedia interfaces.<br>• Design and develop issues related to HCI for real application. |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN**<br>(Autonomous Institution, Affiliated to Anna University ,Chennai)<br>Elayampalayam, Tiruchengode – 637 205 | | | | | | | |
| Programme | **M.Tech.** | Programme code | **204** | | Regulation | **2015** | | |
| Department | **INFORMATION TECHNOLOGY** | | | | Semester | **III** | | |
| Course code | Course Name | Periods Per Week | | | Credit | Maximum Marks | | |
| | | L | T | P | C | CA | ESE | Total |
| **P15ITE25** | **Supply Chain Management** | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| **Course Objective** | The main objective of this course is to:<br>• Introduce and study logistics/supply chain operations.<br>• Analytically solve problems related to inventory management, facility location, and supply chain optimization.<br>• Utilize computer resources to research and analyze supply chain operations.<br>• Understand the global environment and strategic alliances in modern business and their impact on supply chain management. | | | | | | | |
| **Unit - I** | **FUNDAMENTALS OF SUPPLY CHAIN MANAGEMENT** | | | | Periods | **9** | | |
| Supply chain networks, Integrated supply chain planning, Decision phases in s supply chain, process view of a supply chain, supply chain flows, Overview of supply chain models and modeling systems, Supply chain planning: Strategic, operational and tactical, Understanding supply chain through process mapping and process flow chart. | | | | | | | | |
| **Unit - II** | **SCM STRATEGIES, PERFORMANCE** | | | | Periods | **9** | | |
| Supply chain strategies, achieving strategic fit, value chain, Supply chain drivers and obstacles, Strategic Alliances and Outsourcing, purchasing aspects of supply chain, Supply chain performance measurement: The balanced score card approach, Performance Metrics. Planning demand and supply: Demand forecasting in supply chain, Aggregate planning in supply chain, Predictable variability. | | | | | | | | |
| **Unit - III** | **PLANNING AND MANAGING INVENTORIES** | | | | Periods | **9** | | |
| Introduction to Supply Chain Inventory Management. Inventory theory models: Economic Order Quantity Models, Reorder Point Models and Multiechelon Inventory Systems, Relevant deterministic and stochastic inventory models and Vendor managed inventory models. | | | | | | | | |
| **Unit - IV** | **DISTRIBUTION MANAGEMENT** | | | | Periods | **9** | | |
| Role of transportation in a supply chain - direct shipment, warehousing, cross-docking; push vs. pull systems; transportation decisions (mode selection, fleet size), market channel structure, vehicle routing problem. Facilities decisions in a supply chain. Mathematical foundations of distribution management, Supply chain facility layout and capacity planning, | | | | | | | | |
| **Unit - V** | **STRATEGIC COST MANAGEMENT IN SUPPLY CHAIN** | | | | Periods | **9** | | |
| The financial impacts, Volume leveraging and cross docking, global logistics and material positioning, global supplier development, target pricing, cost management enablers, Measuring service levels in supply chains, Customer Satisfaction/Value/Profitability/Differential Advantage. | | | | | | | | |
| | | | | | **Total Periods** | **45** | | |
| **REFERENCES:** | | | | | | | | |
| 1. | David Simchi-Levi, Philip Kaminsky, and Edith Simchi-Levi ,"Designing and Managing the Supply Chain: Concepts, Strategies, and Case Studies", Second Edition, , McGraw-Hill/Irwin, New York, 2003. | | | | | | | |
| 2. | Sunil Chopra and Peter Meindel. "Supply Chain Management: Strategy, Planning, and Operation", Prentice Hall of India, 2002. | | | | | | | |

| **FURTHER READINGS:** | |
|---|---|
| 1. | Sunil Chopra & Peter Meindl,"Supply Chain Management" , Prentice Hall Publisher, 2001 |
| 2. | Monczka, Robert, Handfield, Robert, Giunipero, Larry, and Patterson, James," Purchasing and Supply Chain Management", Cincinnati, OH: Southwestern Publishing, College Division, 5th edition, 2011. |
| **Course Outcome** | Students who complete this course successfully are expected to:<br>• Understand basic terminology and supply chain operations in the context of today's business environment.<br>• Be able to observe and study business operations and then describe the logistics/supply chain systems in oral and written presentations.<br>• Be able to recommend areas for improvement in logistics and supply chain operations.<br>• Understand effective inventory management policy, demand variability, forecasting and lead time on inventory level and cost.<br>• Understand the importance of strategic supply chain alliances and the impact of centralized versus decentralized networks.<br>• Understand basic international issues in supply chain management. |