**COURSE OUTCOMES**

**ARASU ENGINEERING COLLEGE-KUMBAKONAM**

**DEARTMENT OF COMUTER SCIENCE AND ENGINEERING**

**SEMESTER - I**

**Course Name: C101 (MA7155/ Applied Probability and Statistics)**

At the end of the course, the student should be able to:

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| --- | --- |
| **C101.1** | Apply the concept of random variable to find moments& moment generating functions of distributions |
| **C101.2** | Find marginal, conditional distribution, statistical average for the standard probability function. |
| **C101.3** | Find the M.L.E and use the principle of least squares for curve fitting andregression lines. |
| **C101.4** | Identify small, large samples and apply testing of hypothesis. |
| **C101.5** | Analyze the multivariate methods for normal density and principal components from standardized variables |

**CO-PO-PSO CORRELATION LEVEL MATRIX:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| **CO** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** |
| **C101.1** | 3 | 3 | 2 | 2 | - | - | - | - | - | - | - | 1 | - | - |
| **C101.2** | 3 | 3 | 2 | 2 | - | - | - | - | - | - | - | 1 | - | - |
| **C101.3** | 3 | 3 | 2 | 3 | - | - | - | - | - |  - | - | 1 | - | -- |
| **C101.4** | 3 | 3 | 2 | 3 | - | - | - | - | - | - | - | 1 | - | - |
| **C101.5** | 3 | 3 | 2 | 3 | 1 | 1 | - | - | - | - | - | 1 | 1 | - |
| **C101** | 3 | 3 | 2 | 3 | 1 | 1 | - | - | - | - | - | 1 | 1 | - |

**Course Name: C102 (CP7101/ Design and Management of Computer Networks)**

At the end of the course, the student should be able to:

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| **C102.1** | Understand the process of designing a computer network |
| **C102.2** | Understand the addressing strategies for managing the networks. |
| **C102.3** | Understand the functions of flow analysis . |
| **C102.4** | Understand the routing strategies for managing the networks. |
| **C102.5** | To learn the process of optimizing a network. |

**CO-PO-PSO CORRELATION LEVEL MATRIX:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CO** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** |
| **C102.1** | 3 | 3 | 3 | 3 | 3 | - | - | - | - | - | 1 | 2 | 3 | 3 |
| **C102.2** | 3 | 3 | 3 | 3 | 3 | - | - | - | - | - | 1 | 2 | 3 | 3 |
| **C102.3** | 3 | 3 | 3 | 3 | 3 | - | - | - | - | - | 1 | 2 | 3 | 3 |
| **C102.4** | 3 | 3 | 3 | 3 | 3 | - | - | - | - | - | 1 | 3 | 3 | 3 |
| **C102.5** | 3 | 3 | 3 | 3 | 3 | - | - | - | - | - | 1 | 2 | 3 | 3 |
| **C102** | 3 | 3 | 3 | 3 | 3 | - | - | - | - | - | 1 | 2 | 3 | 3 |

**Course Name: C103 (CP7102/ Advanced data structure and Algorithms)**

At the end of the course, the student should be able to:

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| --- | --- |
| **C103.1** | Understand the principles of iterative and recursive algorithms. |
| **C103.2** | Design and implement optimization algorithms in specific application |
| **C103.3** | Design implement dynamic programming algorithms. |
| **C103.4** | Understand the concept of shared and concurrent objects |
| **C103.5** | Implement and apply concurrent linked lists, stacks, and queues |

**CO-PO-PSO CORRELATION LEVEL MATRIX:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| **CO** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** |
| **C103.1** | 3 | 3 | 3 | 3 | - | - | - | 1 | 1 | 1 | 1 | 3 | 3 | 3 |
| **C103.2** | 3 | 3 | 3 | 3 | - | - | - | 1 | 1 | 1 | 1 | 3 | 3 | 3 |
| **C103.3** | 3 | 3 | 3 | 3 | 1 | 1 | 1 | - | - | 1 | 1 | 3 | 3 | 3 |
| **C103.4** | 3 | 3 | 3 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 3 | 3 |
| **C103.5** | 3 | 3 | 3 | 3 | 1 | 1 | 1 | - | - | 1 | 1 | 3 | 3 | 3 |
| **C103** | 3 | 3 | 3 | 3 | 1 | 1 | - | - | - | 1 | 1 | 3 | 3 | 3 |

**Course Name: C104 (CP7103/ Multicore Architecture)**

At the end of the course, the student should be able to:

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| --- | --- |
| **C104.1** | Identify the limitations of ILP and the need for multicore architectures |
| **C104.2** | Discuss the issues related to Vector Processing, GPU and software pipelining |
| **C104.3** | Ability to discuss issues on multiprocessors, cache coherence and interconnection networks |
| **C104.4** | Ability to discuss the architecture and workloads for warehouse scale computers |
| **C104.5** | Discuss the architecture of embedded processors and multiprocessors |

**CO-PO-PSO CORRELATION LEVEL MATRIX:**

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| **CO** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** |
| **C104.1** | 3 | 1 | 3 | 2 | - | - | - | - | - | - | - | 2 | 2 | 3 |
| **C104.2** | 3 | 3 | 3 | 2 | - | - | - | - | - | - | - | 2 | 1 | 2 |
| **C104.3** | 2 | 3 | 3 | 2 | - | - | - | - | - | - | - | 2 | 3 | 3 |
| **C104.4** | 2 | 2 | 3 | 3 | 2 | - | - | - | - | - | - | 2 | 2 | 2 |
| **C104.5** | 2 | 2 | 3 | 3 | 2 | - | - | - | - | - | - | 2 | 3 | 3 |
| **C104** | 2 | 2 | 3 | 2 | 2 | - | - | - | - | - | - | 2 | 2 | 3 |

**Course Name: C105E (CP7004/ Image Processing and Analysis)**

At the end of the course, the student should be able to:

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| **C105E.1** | Understand the basics of digital images and their spatial domain processing |
| **C105E.2** | Understand the various frequency domain transformations and filters |
| **C105E.3** | Apply different segmentation techniques to digital images |
| **C105E.4** | Understand the various Corner and interest point detection methods and morphological operators |
| **C105E.5** | Understand the components of color images and different image compression technique |

**CO-PO-PSO CORRELATION LEVEL MATRIX:**

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| **CO** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** |
| **C105E.1** | 3 | 3 | 3 | 2 | 3 | - | - | - | - | - | 1 | 2 | 3 | 3 |
| **C105E.2** | 3 | 2 | 3 | 3 | 3 | - | - | - | - | - | 1 | 2 | 3 | 3 |
| **C105E.3** | 3 | 3 | 3 | 3 | 2 | - | - | - | - | - | 1 | 2 | 3 | 3 |
| **C105E.4** | 3 | 3 | 2 | 3 | 2 | - | - | - | - | - | 1 | 2 | 3 | 3 |
| **C105E.5** | 3 | 3 | 3 | 3 | 3 | - | - | - | - | - | 1 | 2 | 3 | 3 |
| **C105E** | 3 | 3 | 3 | 3 | 3 | - | - | - | - | - | 1 | 2 | 3 | 3 |

**Course Name: C106B (NE-7002/ Mobile and Pervasive computing)**

At the end of the course, the student should be able to:

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| --- | --- |
| **C106B.1** | Interpret the fundamental of basics of Mobile Computing and Pervasive Computing |
| **C106B.2** | Construct the role of Cellular Networks in Mobile and Pervasive Networks |
| **C106B.3** | Apply the knowledge in concept of sensor and mesh networks |
| **C106B.4** | Demonstrate the tools with context aware and wearable Computing |
| **C106B.5** | Demonstrate the Application and Manage the Memory |

**CO-PO-PSO CORRELATION LEVEL MATRIX:**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CO** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** |
| **C106B.1** | 2 | 2 | 2 | 2 | 3 | - | - | - | - | - | 1 | 2 | 2 | 2 |
| **C106B.2** | 2 | 3 | 2 | 2 | 3 | - | - | - | - | - | 1 | 2 | 3 | 3 |
| **C106B.3** | 3 | 3 | 2 | 3 | 3 | - | - | - | - | - | 2 | 3 | 3 | 3 |
| **C106B.4** | 3 | 3 | 2 | 3 | 3 | - | - | - | - | - | 2 | 3 | 3 | 3 |
| **C106B.5** | 3 | 3 | 2 | 3 | 3 | - | - | - | - | - | 3 | 3 | 3 | 3 |
| **C106B** | 3 | 3 | 2 | 3 | 3 | - | - | - | - | - | 2 | 3 | 3 | 3 |

**Course Name: C107 (CP7211/ Advanced Data structures Lab )**

At the end of the course, the student should be able to:

|  |  |
| --- | --- |
| **C107.1** | Design and apply iterative and recursive algorithms |
| **C107.2** | Design and implement optimization algorithms for specific applications |
| **C107.3** | Design and implement randomized algorithms. |
| **C107.4** | Design appropriate shared objects and concurrent objects for applications |
| **C107.5** | Implement and apply concurrent linked lists, stacks, and queues |

**CO-PO-PSO CORRELATION LEVEL MATRIX:**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CO** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** |
| **C107.1** | 2 | 2 | 2 | 2 | 2 | - | - | - | - | - | 2 | 2 | 2 | 2 |
| **C107.2** | 3 | 3 | 3 | 3 | 3 | - | - | - | - | - | 2 | 3 | 3 | 3 |
| **C107.3** | 3 | 3 | 3 | 3 | 3 | - | - | - | - | - | 2 | 3 | 3 | 3 |
| **C107.4** | 3 | 3 | 3 | 3 | 3 | - | - | - | - | - | 2 | 3 | 3 | 3 |
| **C107.5** | 3 | 3 | 3 | 3 | 3 | 1 | 1 | 1 | 3 | 3 | 2 | 3 | 3 | 3 |
| **C107** | 3 | 3 | 3 | 3 | 3 | 1 | 1 | 1 | 3 | 3 | 2 | 3 | 3 | 3 |

**Course Name: C108 (CP7122/ Case Study-Network Design )**

At the end of the course, the student should be able to:

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| **C108.1** | Analyzed the performance of various configurations and protocols in LAN |
| **C108.2** | Understanding the concept of RIP and OSPF |
| **C108.3** | Demonstrated the concept of Network Security and Networks Traffic Flow. |
| **C108.4** | Understand the configuration of Firewall. |
| **C108.5** | Understand the integration of EIGRP (Enhanced Interior Gateway Routing protocol) into existing networks. |

**CO-PO-PSO CORRELATION LEVEL MATRIX:**

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| **CO** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** |
| **C108.1** | 2 | 2 | 2 | 2 | 2 | - | - | - | - | - | 1 | 2 | 3 | 3 |
| **C108.2** | 2 | 2 | 2 | 3 | 3 | - | - | - | - | - | 1 | 3 | 3 | 3 |
| **C108.3** | 3 | 3 | 3 | 3 | 3 | - | - | - | - | - | 1 | 3 | 3 | 3 |
| **C108.4** | 3 | 3 | 3 | 3 | 3 | - | - | - | - | - | 1 | 3 | 3 | 3 |
| **C108.5** | 3 | 3 | 3 | 3 | 3 | - | - | - | - | - | 1 | 3 | 3 | 3 |
| **C108** | 3 | 3 | 3 | 3 | 3 | - | - | - | - | - | 1 | 3 | 3 | 3 |

**Year/Semester: I/II**

**Course Name: C109 (CP7201/ Theoretical Foundation of Computer Science)**

At the end of the course, the student should be able to:

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| **C109.1** | Interpret the fundamentals of set theory. |
| **C109.2** | Solve the different logic programming for the given statements. |
| **C109.3** | Compare the different reduction methods in lambda calculus. |
| **C109.4** | Illustrate the methods of tree and graph structures for problem solving |
| **C109.5** | Construct a FA for the given language set. |

**CO-PO-PSO CORRELATION LEVEL MATRIX:**

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| **CO** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** |
| **C109.1** | 3 | 3 | 3 | 3 | - | - | - | - | - | - | - | 2 | 2 | 2 |
| **C109.2** | 3 | 3 | 3 | 3 | - | - | - | - | - | - | - | 3 | 2 | 2 |
| **C109.3** | 3 | 3 | 3 | 3 | - | - | - | - | - | - | - | 3 | 2 | 2 |
| **C109.4** | 3 | 3 | 3 | 3 | - | - | - | - | - | - | - | 3 | 2 | 2 |
| **C109.5** | 3 | 3 | 3 | 3 | - | - | - | - | - | - | - | 3 | 3 | 3 |
| **C109** | 3 | 3 | 3 | 3 | - | - | - | - | - | - | - | 3 | 2 | 2 |

**Course Name: C110 (CP7202/ Advanced databases )**

At the end of the course, the student should be able to:

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| **C110.1** | Outline database system architectures and explain parallel and distributed databases. |
| **C110.2** | Compare object and object relational databases and experiment with OQL |
| **C110.3** | Explain active, temporal and spatial databases |
| **C110.4** | Outline mobile, multimedia databases and explain mining techniques |
| **C110.5** | Experiment with XML and summarize web database and cloud storage basics |

**CO-PO-PSO CORRELATION LEVEL MATRIX:**

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| **CO** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** |
| **C110.1** | 3 | 3 | 3 | 2 | 2 | - | - | - | - | - | 2 | 2 | 3 | 3 |
| **C110.2** | 3 | 3 | 3 | 2 | 2 | - | - | - | - | - | 2 | 3 | 3 | 3 |
| **C110.3** | 3 | 3 | 3 | 2 | 2 | - | - | - | - | - | 1 | 3 | 3 | 3 |
| **C110.4** | 3 | 3 | 3 | 2 | 2 | - | - | - | - | - | 2 | 3 | 3 | 3 |
| **C110.5** | 3 | 3 | 3 | 2 | 3 | - | - | - | - | - | 2 | 3 | 3 | 3 |
| **C110** | 3 | 3 | 3 | 2 | 2 | - | - | - | - | - | 2 | 3 | 3 | 3 |

**Course Name: C111 (CP7203/ Principles of programming Language )**

At the end of the course, the student should be able to:

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| **C111.1** | Summarize syntax and semantics of a programming language |
| **C111.2** | Outline design issues of data types, statements and expressions |
| **C111.3** | Experiment with design issues for subprograms |
| **C111.4** | Identify design issues for various object oriented concepts |
| **C111.5** | Interpret different multi paradigm languages |

**CO-PO-PSO CORRELATION LEVEL MATRIX:**

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| **CO** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** |
| **C111.1** | 3 | 3 | 3 | 3 | 3 | - | - | - | - | - | 1 | 2 | 2 | 2 |
| **C111.2** | 3 | 3 | 3 | 3 | 3 | - | - | - | - | - | 1 | 2 | 2 | 2 |
| **C111.3** | 3 | 3 | 3 | 3 | 3 | - | - | - | - | - | 1 | 2 | 3 | 3 |
| **C111.4** | 3 | 3 | 3 | 3 | 3 | - | - | - | - | - | 1 | 2 | 3 | 3 |
| **C111.5** | 3 | 3 | 3 | 3 | 3 | - | - | - | - | - | 1 | 3 | 3 | 3 |
| **C111** | 3 | 3 | 3 | 3 | 3 | - | - | - | - | - | 1 | 2 | 3 | 3 |

**Course Name: C112 (CP7204/ Advanced Operating System)**

At the end of the course, the student should be able to:

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| **C112.1** | Discuss the various synchronization, scheduling and memory management |
| **C112.2** |  Demonstrate the Mutual exclusion, Deadlock detection and agreement protocols of distributed systems |
| **C112.3** | Discuss the various resource management techniques for distributed systems |
| **C112.4** | Identify the different features of real time and mobile operating Systems |
| **C112.5** | Modify existing open source kernels in terms of functionality or features used |

**CO-PO-PSO CORRELATION LEVEL MATRIX:**

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| **CO** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** |
| **C112.1** | 3 | 3 | 3 | 3 | 3 | 1 | - | - | - | - | - | 3 | 3 | 3 |
| **C112.2** | 3 | 3 | 3 | 3 | 3 | 1 | - | - | - | - | - | 3 | 3 | 3 |
| **C112.3** | 3 | 3 | 3 | 3 | 3 | 1 | - | - | - | - | 1 | 3 | 3 | 3 |
| **C112.4** | 3 | 3 | 3 | 3 | 3 | 1 | - | - | - | - | 1 | 3 | 3 | 3 |
| **C112.5** | 3 | 3 | 3 | 3 | 3 | 1 | - | - | - | - | 1 | 3 | 3 | 3 |
| **112** | 3 | 3 | 3 | 3 | 3 | 1 | - | - | - | - | 1 | 3 | 3 | 3 |

**Course Name: C113D (NE7202/ Network and Information Security )**

At the end of the course, the student should be able to:

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| **C113D.1** | Understand the fundamentals of Cryptography |
| **C113D.2** | Apply the knowledge of various algorithms to provide confidentiality, integrity and authenticity |
| **C113D.3** | Implementation of various key distribution and management schemes |
| **C113D.4** | Examine encryption techniques to secure data in transit across data networks |
| **C113D.5** | Design security applications in the field of Information technology |

**CO-PO-PSO CORRELATION LEVEL MATRIX:**

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| **CO** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** |
| **C113D.1** | 3 | 3 | 3 | 3 | 2 | 2 | - | - | - | - | - | 2 | 2 | 2 |
| **C113D.2** | 3 | 3 | 3 | 3 | 2 | 2 | - | - | - | - | - | 2 | 3 | 3 |
| **C113D.3** | 3 | 3 | 3 | 3 | 3 | 3 | - | - | - | - | - | 3 | 3 | 3 |
| **C113D.4** | 3 | 3 | 3 | 3 | 3 | 3 | - | 2 | - | - | 1 | 3 | 3 | 3 |
| **C113D.5** | 3 | 3 | 3 | 3 | 3 | 3 | - | 2 | - | - | 1 | 3 | 3 | 3 |
| **C113D** | 3 | 3 | 3 | 3 | 3 | 3 | - | 2 | - | - | 1 | 3 | 3 | 3 |

**Course Name: C114C (IF7202/Cloud Computing )**

At the end of the course, the student should be able to:

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| **C114C.1** | Discuss the broad perceptive of cloud architecture and Model |
| **C114C.2** |  Understand the concept of Virtualization |
| **C114C.3** |  Apply different cloud programming model as per need. |
| **C114C.4** | Understand the design of cloud Services. |
| **C114C.5** | Design the trusted cloud Computing system |

**CO-PO-PSO CORRELATION LEVEL MATRIX:**

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| **CO** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** |
| **C114C.1** | 3 | 3 | 3 | 3 | 3 | 2 | - | - | - | - | 1 | 2 | 2 | 2 |
| **C114C.2** | 3 | 3 | 3 | 3 | 3 | 3 | - | - | - | - | 2 | 3 | 2 | 3 |
| **C114C.3** | 3 | 3 | 3 | 3 | 3 | 3 | - | - | - | - | 2 | 3 | 3 | 3 |
| **C114C.4** | 3 | 3 | 3 | 3 | 3 | 3 | 1 | 2 | 1 | - | 2 | 3 | 3 | 3 |
| **C114C.5** | 3 | 3 | 3 | 3 | 3 | 2 | 1 | 2 | 1 | - | 2 | 3 | 3 | 3 |
| **C114C** | 3 | 3 | 3 | 3 | 3 | 3 | 1 | 2 | 1 | - | 2 | 3 | 3 | 3 |

**Course Name: C115 (CP7211/Advance Database Lab )**

At the end of the course, the student should be able to:

|  |  |
| --- | --- |
| **C115.1** | Apply distributed database, Parallel database technique to solve a scenario |
| **C115.2** | Apply OQL to retrieve results |
| **C115.3** | Experiment with weka tool |
| **C115.4** | Make use of active and deductive database to solve a scenario |
| **C115.5** | Construct XML schema for given database |

**CO-PO-PSO CORRELATION LEVEL MATRIX:**

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| **CO** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** |
| **C115.1** | 2 | 2 | 2 | 2 | 3 | 2 | - | - | - | - | 2 | 2 | 2 | 2 |
| **C115.2** | 3 | 3 | 3 | 2 | 3 | 1 | - | - | - | - | 2 | 3 | 3 | 3 |
| **C115.3** | 3 | 3 | 3 | 2 | 3 | 2 | - | - | - | - | 2 | 3 | 3 | 3 |
| **C115.4** | 3 | 3 | 3 | 2 | 3 | 1 | - | - | 2 | - | 2 | 3 | 3 | 3 |
| **C115.5** | 3 | 3 | 3 | 2 | 3 | 2 | - | - | 2 | - | 2 | 3 | 3 | 3 |
| **C115** | 3 | 3 | 3 | 2 | 3 | 2 | - | - | 2 | - | 2 | 3 | 3 | 3 |

**Course Name: C116 (CP7212/Case Study- Operating System Design)**

At the end of the course, the student should be able to:

|  |  |
| --- | --- |
| **C116.1** | Understand the issues in designing and implementing modern operating systems |
| **C116.2** | Understand team formation, team issues, and allocating roles and responsibilities |
| **C116.3** | Demonstrate individual competence in building medium size operating system components |
| **C116.4** | Demonstrate ethical and professional attributes of a computer engineer |
| **C116.5** | Prepare suitable plan with clear statements of deliverables, and track the same. |

**CO-PO-PSO CORRELATION LEVEL MATRIX:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CO** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** |
| **C116.1** | 2 | 2 | 2 | 2 | 2 | 1 | - | - | 3 | - | 2 | 2 | 2 | 2 |
| **C116.2** | 3 | 3 | 3 | 3 | 3 | 2 | - | - | 3 | - | 2 | 2 | 2 | 2 |
| **C116.3** | 3 | 3 | 3 | 3 | 3 | 2 | - | - | 3 | - | 2 | 2 | 3 | 3 |
| **C116.4** | 3 | 3 | 3 | 3 | 3 | 2 | 2 | - | 3 | - | 2 | 2 | 3 | 3 |
| **C116.5** | 3 | 3 | 3 | 3 | 3 | 2 | 2 | - | 3 | - | 3 | 2 | 3 | 3 |
| **C116** | 3 | 3 | 3 | 3 | 3 | 2 | 2 | - | 3 | - | 2 | 2 | 3 | 3 |

**SEMSTER-III**

**Course Name: C201 (CP7301/Software Process and Project Management)**

At the end of the course, the student should be able to:

|  |  |
| --- | --- |
| **C201.1** | Understand overall SDLC and adopt suitable processes |
| **C201.2** |  Elicit functional and quality requirements |
| **C201.3** | Perform trade-off among conflicting requirements |
| **C201.4** | Understand and apply configuration and quality management techniques |
| **C201.5** | Evaluate, manage, and design processes |

**CO-PO-PSO CORRELATION LEVEL MATRIX:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CO** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** |
| **C201.1** | 3 | 3 | 2 | 3 | 2 | - | - | - | 2 | - | 2 | 2 | 2 | 2 |
| **C201.2** | 3 | 2 | 1 | 3 | 2 | - | - | - | 2 | - | 3 | 3 | 2 | 2 |
| **C201.3** | 3 | 2 | 2 | 3 | 3 | - | - | - | 2 | - | 3 | 3 | 3 | 3 |
| **C201.4** | 3 | 1 | 2 | 3 | 3 | - | - | - | 2 | - | 3 | 3 | 3 | 3 |
| **C201.5** | 3 | 3 | 1 | 3 | 3 | - | 2 | - | 2 | - | 3 | 3 | 3 | 3 |
| **C201** | 3 | 2 | 2 | 3 | 3 | - | 2 | - | 2 | - | 3 | 3 | 3 | 3 |

**Course Name: C202B (CP7019- Managing Big Data)**

At the end of the course, the student should be able to:

|  |  |
| --- | --- |
| **C202B.1** | Describe big data and use cases from selected business domains |
| **C202B.2** |  Explain NoSQL big data management |
| **C202B.3** |  Explain the Install, configure, and run Hadoop and HDFS |
| **C202B.4** | Perform map-reduce analytics using Hadoop |
| **C202B.5** |  Use Hadoop related tools such as HBase, Cassandra, Pig, and Hive for big data analytics |

**CO-PO-PSO CORRELATION LEVEL MATRIX:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CO** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** |
| **C202B.1** | 3 | 3 | 3 | 2 | 3 | 3 | 1 | - | - | - | 2 | 2 | 2 | 3 |
| **C202B.2** | 3 | 3 | 3 | 1 | 3 | 3 | 1 | - | - | - | 2 | 3 | 2 | 2 |
| **C202B.3** | 3 | 2 | 3 | 1 | 3 | 3 | 1 | - | - | - | 2 | 3 | 3 | 3 |
| **C202B.4** | 3 | 3 | 3 | 2 | 3 | 3 | 1 | - | - | - | 2 | 3 | 3 | 3 |
| **C202B.5** | 3 | 3 | 3 | 2 | 3 | 2 | 1 | 1 | 1 | 1 | 2 | 3 | 3 | 3 |
| **C202B** | 3  | 3  | 3  | 2  | 3  | 3  | 1  | 1  | 1  | 1  | 2 | 3 | 3 | 3 |

**Course Name: C203F (CP7026/ Software Quality Assurance)**

At the end of the course, the student should be able to:

|  |  |
| --- | --- |
| **C203F.1** | Describe different approaches to testing software applications |
| **C203F.2** | Analyze specifications and identify appropriate test generation strategies |
| **C203F.3** | Develop an appropriate test design for a given test object |
| **C203F.4** | Execute the test design |
| **C203F.5** | Evaluate the testing effort based on adequate measures |

**CO-PO-PSO CORRELATION LEVEL MATRIX:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CO** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** |
| **C203F.1** | 3 | 3 | 3 | 3 | 3 | - | 1 | - | - | - | 2 | 2 | 1 | 2 |
| **C203F.2** | 3 | 3 | 3 | 3 | 3 | - | 1 | - | - | - | 2 | 2 | 2 | 2 |
| **C203F.3** | 3 | 3 | 3 | 3 | 3 | 1 | 1 | - | - | - | 3 | 2 | 2 | 3 |
| **C203F.4** | 3 | 3 | 3 | 3 | 3 | 1 | 1 | 2 | 2 | - | 3 | 2 | 2 | 2 |
| **C203F.5** | 3 | 3 | 3 | 3 | 3 | 1 | 1 | 2 | 2 | - | 3 | 2 | 2 | 2 |
| **C203F** | 3  | 3  | 3  | 3  | 3  | 1  | 3  | 2  | 2 | - | 3 | 2  | 2 | 2 |

**Course Name: C204C (CP7029- Information Storage Management)**

At the end of the course, the student should be able to:

|  |  |
| --- | --- |
| **C204C.1** | Explain the various storage technologies to suit for required application. |
| **C204C.2** | Apply security measures to safeguard storage & farm. |
| **C204C.3** | understand the different networked storage options for different application environments |
| **C204C.4** | Understand the availability and monitoring data centers |
| **C204C.5** | Evaluate the various virtualization techniques |

**CO-PO-PSO CORRELATION LEVEL MATRIX:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CO** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** |
| **C204C.1** | 3 | 3 | 3 | 3 | 3 | - | - | - | - | - | 2 | 2 | 2 | 3 |
| **C204C.2** | 3 | 3 | 2 | 3 | 2 | - | - | - | - | - | 2 | 3 | 3 | 3 |
| **C204C.3** | 2 | 2 | 3 | 3 | 3 | - | - | - | - | - | 2 | 3 | 3 | 3 |
| **C204C.4** | 3 | 3 | 3 | 3 | 3 | - | - | - | - | - | 2 | 3 | 3 | 3 |
| **C204C.5** | 3 | 3 | 3 | 2 | 3 | 1 | - | - | - | - | 2 | 3 | 3 | 3 |
| **C204C** | 3 | 3 | 3 | 3 | 3 | 1 | - | - | - | - | 2 | 3 | 3 | 3 |

**Course Name: C205 (CP7311/Project Work Phase -I)**

At the end of the course, the student should be able to:

|  |  |
| --- | --- |
| **C205.1** | Identify the problem by applying acquired knowledge. |
| **C205.2** | Analyze and categorize executable project modules after considering risks. |
| **C205.3** | Choose efficient tools for designing project modules. |
| **C205.4** | Combine all the modules through effective team work after efficient testing. |
| **C205.5** | Elaborate the completed task and compile the project report. |

**CO-PO-PSO CORRELATION LEVEL MATRIX:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CO** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** |
| **C205.1** | 3 | 3 | 3 | 3 | 3 | - | 1 | 1 | 3 | 3 | 3 | 3 | 3 | 3 |
| **C205.2** | 3 | 3 | 2 | 3 | 3 | 2 | 1 | 1 | 3 | 3 | 3 | 3 | 3 | 3 |
| **C205.3** | 3 | 3 | 3 | 3 | 3 | 2 | 1 | 1 | 3 | - | 3 | 3 | 3 | 3 |
| **C205.4** | 3 | 3 | 3 | 3 | 3 | 2 | 1 | 1 | 3 | - | 3 | 3 | 3 | 3 |
| **C205.5** | 3 | 3 | 3 | 3 | 3 | 2 | 1 | 1 | 3 | - | 3 | 3 | 3 | 3 |
| **C205** | 3 | 3 | 3 | 3 | 3 | 2 | 1  | 1 | 3  | 3  | 3 | 3 | 3 | 3 |

**Course Name: C206 (CP7411/Project Work Phase - II)**

At the end of the course, the student should be able to:

|  |  |
| --- | --- |
| **C206.1** | Identify the problem by applying acquired knowledge. |
| **C206.2** | Analyze and categorize executable project modules after considering risks. |
| **C206.3** | Choose efficient tools for designing project modules. |
| **C206.4** | Combine all the modules through effective team work after efficient testing. |
| **C206.5** | Elaborate the completed task and compile the project report. |

**CO-PO-PSO CORRELATION LEVEL MATRIX:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CO** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** |
| **C206.1** | 3 | 3 | 3 | 3 | 3 | - | 1 | 1 | 3 | 3 | 3 | 3 | 3 | 3 |
| **C206.2** | 3 | 3 | 2 | 3 | 3 | 2 | 1 | 1 | 3 | 3 | 3 | 3 | 3 | 3 |
| **C206.3** | 3 | 3 | 3 | 3 | 3 | 2 | 1 | 1 | 3 | - | 3 | 3 | 3 | 3 |
| **C206.4** | 3 | 3 | 3 | 3 | 3 | 2 | 1 | 1 | 3 | - | 3 | 3 | 3 | 3 |
| **C206.5** | 3 | 3 | 3 | 3 | 3 | 2 | 1 | 1 | 3 | - | 3 | 3 | 3 | 3 |
| **C206** | 3 | 3 | 3 | 3 | 3 | 2 | 1  | 1 | 3  | 3  | 3 | 3 | 3 | 3 |

**ELECTIVES**

**Course Name: C106A (CP7005 /Randomized Algorithms)**

At the end of the course, the student should be able to:

|  |  |
| --- | --- |
| **C106A.1** | Identify the need for randomized algorithms |
| **C106A.2** | Discuss the classification of randomized algorithms |
| **C106A.3** | Present the various paradigms for designing randomized algorithms |
| **C106A.4** | Discuss the different probabilistic methods used for designing randomized algorithms |
| **C106A.5** | Apply the techniques studied to design algorithms for different applications like matrix multiplication, hashing, linear programming |

**CO-PO-PSO CORRELATION LEVEL MATRIX:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CO** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** |
| **C106A.1** | 3 | 3 | 3 | 3 | 2 | - | - | - | 2 | - | 1 | 2 | 3 | 3 |
| **C106A.2** | 3 | 3 | 3 | 3 | 2 | - | - | - | 2 | - | 1 | 2 | 2 | 2 |
| **C106A.3** | 3 | 3 | 3 | - | 2 | - | - | - | 1 | - | 2 | 3 | 3 | 3 |
| **C106A.4** | 3 | 3 | 3 | - | 2 | - | - | - | 2 | - | 2 | 3 | 3 | 3 |
| **C106A.5** | 3 | 3 | 3 | 3 | - | - | - | - | 2 | - | 2 | 3 | 2 | 3 |
| **C106A** | 3 | 3 | 3 | 3 | 2 | - | - | - | 2 | - | 2 | 3 | 3 | 3 |

**Course Name: C106D (CP7007/ Software Requirements Engineering)**

At the end of the course, the student should be able to:

|  |  |
| --- | --- |
| **C106D.1** | Define a process for requirements engineering |
| **C106D.2** | Validate requirements according to criteria such as feasibility, clarity, preciseness etc. |
| **C106D.3** | Develop and document functional requirements for different types of systems. |
| **C106D.4** | Communicate the requirements to stakeholders |
| **C106D.5** | Detect and resolve feature interactions |

**CO-PO-PSO CORRELATION LEVEL MATRIX:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CO** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** |
| **C106D.1** | 3 | 3 | 3 | 3 | 2 | - | - | - | 2 | 1 | 2 | 3 | 2 | 2 |
| **C106D.2** | 3 | 3 | 3 | 3 | 2 | - | - | - | 2 | 1 | 2 | 3 | 2 | 2 |
| **C106D.3** | 3 | 3 | 3 | 3 | - | - | - | - | 2 | 2 | 2 | 3 | 3 | 3 |
| **C106D.4** | 3 | 3 | 2 | 2 | 2 | - | - | - | - | 2 | 3 | 2 | 3 | 3 |
| **C106D.5** | 3 | 3 | 3 | 3 | 3 | - | - | - | 2 | 2 | 3 | 3 | 3 | 3 |
| **C106D** | 3 | 3 | 3 | 3 | 2 | - | - | - | 2 | 2 | 2 | 3 | 3 | 3 |

**Course Name: C105F (NE7001/Sensing Techniques and Sensors)**

At the end of the course, the student should be able to:

|  |  |
| --- | --- |
| **C105F.1** | Explain sensor characteristics and physics of sensors |
| **C105F.2** | Explain optical components of sensors |
| **C105F.3** | Apply sensor interface electronics• |
| **C105F.4** | Choose and use appropriate light and radiation detectors |
| **C105F.5** | Choose and use appropriate temperature sensors and chemical sensors |

**CO-PO-PSO CORRELATION LEVEL MATRIX:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CO** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** |
| **C105F.1** | 3 | 3 | 3 | 3 | 3 | 1 | - | - | - | - | - | 2 | 2 | 3 |
| **C105F.2** | 3 | 3 | 3 | 3 | 3 | 1 | - | - | - | - | - | 2 | 2 | 2 |
| **C105F.3** | 3 | 3 | 3 | 3 | 3 | - | - | - | - | - | - | 2 | 3 | 3 |
| **C105F.4** | 3 | 3 | 2 | 2 | 2 | - | - | - | - | - | - | 2 | 3 | 3 |
| **C105F.5** | 3 | 3 | 3 | 3 | 1 | - | - | - | - | - | - | 2 | 3 | 3 |
| **C105F** | 3 | 3 | 3 | 3 | 2 | 1 | - | - | - | - | - | 2 | 3 | 3 |

**LIST OF ELECTIVES**

**SEMSTER I-ELECTIVE I**

**Course Name: C105A (SE7103/ Formal Models of Software Systems)**

At the end of the course, the student should be able to:

|  |  |
| --- | --- |
| **C105A.1** | Apply the basic elements of Z |
| **C105A.2** | Develop relational, functional, and logical Z structures |
| **C105A.3** | Develop Z schema as models of software systems |
| **C105A.4** | Perform verifications and conduct proofs using Z models |
| **C105A.5** | Refine Z models towards implementing software systems |

**Course Name: C105B (CP7001/ Performance Evaluation of Computer Systems )**

At the end of the course, the student should be able to:

|  |  |
| --- | --- |
| **C105B.1** | Identify the need for performance evaluation and the metrics used for it |
| **C105B.2** | Discuss open and closed queuing networks |
| **C105B.3** | Define Little’e law and other operational laws |
| **C105B.4** | Apply the operational laws to open and closed systems |
| **C105B.5** | Use discrete-time and continuous-time Markov chains to model real world systems |
| **C105B.6** | Develop analytical techniques for evaluating scheduling policies |

**Course Name: C105C (CP7002/ Probabilistic Reasoning Systems)**

At the end of the course, the student should be able to:

|  |  |
| --- | --- |
| **C105C.1** | Construct Bayesian networks |
| **C105C.2** | Reason with Bayesian networks• |
| **C105C.3** | Reason with Dynamic networks and Hidden Markov Models |
| **C105C.4** | Conduct inferences with Bayesian networks• |
| **C105C.5** | Implement algorithms to learn probabilistic graphical models |
| **C105C.6** | Explain actions and decisions with probabilistic graphical models |

**Course Name: C105D (CP7003/ Data Analysis and Business Intelligence)**

At the end of the course, the student should be able to:

|  |  |
| --- | --- |
| **C105D.1** | Build and apply linear regression models  |
| **C105D.2** | Build and apply logistic regression models |
| **C105D.3** | Perform simulation using regression models |
| **C105D.4** | Build and apply multilevel regression models |
| **C105D.5** | Perform data collection and variance analysis |

**Course Name: C105F (NE7001 / Sensing Techniques and Sensors)**

At the end of the course, the student should be able to:

|  |  |
| --- | --- |
| **C105F.1** | Explain sensor characteristics and physics of sensors |
| **C105F.2** | Explain optical components of sensors |
| **C105F.3** | Apply sensor interface electronics• |
| **C105F.4** | Choose and use appropriate light and radiation detectors |
| **C105F.5** | Choose and use appropriate temperature sensors and chemical sensors |

**SEMSTER II**

**ELECTIVE I**

**Course Name: C106A (CP7005/ Randomized Algorithms)**

At the end of the course, the student should be able to:

|  |  |
| --- | --- |
| **C106A.1** | Identify the need for randomized algorithms |
| **C106A.2** | Discuss the classification of randomized algorithms |
| **C106A.3** | Present the various paradigms for designing randomized algorithms |
| **C106A.4** | Discuss the different probabilistic methods used for designing randomized algorithms |
| **C106A.5** | Apply the techniques studied to design algorithms for different applications like matrix multiplication, hashing, linear programming |

**Course Name: C106C (CP7006 / Parallel Programming Paradigms)**

At the end of the course, the student should be able to:

|  |  |
| --- | --- |
| **C106C.1** | Explain models of parallel programming |
| **C106C.2** | Explain hardware level support for concurrency |
| **C106C.3** | Develop shared-memory parallel programs using Pthreads |
| **C106C.4** | Develop shared-memory parallel programs using Pthreads |
| **C106C.5** | Develop CUDA programs |

**Course Name: C106D (CP7007/ Software Requirements Engineering)**

At the end of the course, the student should be able to:

|  |  |
| --- | --- |
| **C106D.1** | Define a process for requirements engineering |
| **C106D.2** | Validate requirements according to criteria such as feasibility, clarity, preciseness etc. |
| **C106D.3** | Develop and document functional requirements for different types of systems. |
| **C106D.4** | Communicate the requirements to stakeholders |
| **C106D.5** | Detect and resolve feature interactions |

**Course Name: C106E (CP7008/ Speech Processing and Synthesis)**

At the end of the course, the student should be able to:

|  |  |
| --- | --- |
| **C106E.1**  | Identify the various temporal, spectral and cepstral features required for identifying speech units – phoneme, syllable and word |
| **C106E.2**  | Determine and apply Mel-frequency cepstral coefficients for processing all types of signals |
| **C106E.3**  | Justify the use of formant and concatenative approaches to speech synthesis |
| **C106E.4**  | Identify the apt approach of speech synthesis depending on the language to be processed |
| **C106E.5**  | Determine the various encoding techniques for representing speech. |

**Course Name: C106F(CP7009/ Machine Learning Techniques)**

At the end of the course, the student should be able to:

|  |  |
| --- | --- |
| **C106F.1** | Explain theory underlying machine learning |
| **C106F.2** | Construct algorithms to learn linear and non-linear models |
| **C106F.3** | Implement data clustering algorithms |
| **C106F.4** | Construct algorithms to learn tree and rule-based models |
| **C106F.5** | Apply reinforcement learning techniques |

**SEMESTER - II**

 **ELECTIVE - III**

**Course Name: C113A (CP7010/Concurrency Models)**

At the end of the course, the student should be able to:

|  |  |
| --- | --- |
| **C113A.1** | Develop concurrency models and FSP |
| **C113A.2** | State safety and liveness properties in FSP |
| **C113A.3** | Explain concurrency architectures |
| **C113A.4** | Assert LTL properties in FSP and check using LTSA tool |
| **C113A.5** | Model and analyze concurrency using Petri nets |

**Course Name: C114B(CP7011/Real Time Systems)**

At the end of the course, the student should be able to:

|  |  |
| --- | --- |
| **C114B.1** | Understand the basics and importance of real-time systems |
| **C114B.2** | Generate a high-level analysis document based on requirements specifications |
| **C114B.3** | Generate a validation plan based on all documentation |
| **C114B.4** | Explain Benching RT Systems |
| **C114B.5** | Understand capabilities of at least one commercial off-the-shelf R-T kernel |

**Course Name: C114C(CP7012/Computer Vision)**

At the end of the course, the student should be able to:

|  |  |
| --- | --- |
| **C114C.1** | Implement fundamental image processing techniques required for computer vision |
| **C114C.2** | Implement boundary tracking techniques |
| **C114C.3** | Apply Hough Transform for line, circle, and ellipse |
| **C114C.4** | Apply 3D vision techniques |
| **C114C.5** | Develop applications using computer vision techniques |

**Course Name: C114E(CP7013 /Design and Analysis of Parallel Algorithms)**

At the end of the course, the student should be able to:

|  |  |
| --- | --- |
| **C114E.1** | Identify the need for parallel algorithms |
| **C114E.2** | Discuss the classification of parallel architectures and identify suitable programming• models |
| **C114E.3** | Perform sorting on Sorting on CRCW, CREW, EREW Models |
| **C114E.4** | Search a sorted as well as random sequence |
| **C114E.5** | Develop and analyze algorithms for different applications like matrix multiplication, shortest path, job sequencing and the knapsack problem. |

**Course Name: C114F(CP7014 /Software Architectures)**

At the end of the course, the student should be able to:

|  |  |
| --- | --- |
| **C114F.1** | Explain key architectural drivers |
| **C114F.2** | Explain the influence of architecture on business and technical activities |
| **C114F.3** | Adopt good practices for documenting the architecture |
| **C114F.4** | Explain how to use formal languages to specify architecture |
| **C114F.5** | Describe the recent trends in software architecture |

**SEMESTER - II**

 **ELECTIVE - IV**

**Course Name: C114A(CP7015/ Model Checking and Program Verification)**

At the end of the course, the student should be able to:

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| --- | --- |
| **C114A.1** | Perform model checking using LTL |
| **C114A.2** | Perform model checking using CTL\* |
| **C114A.3** | Perform model checking using TCTL and PCTL |
| **C114A.4** | Verify deterministic and recursive programs |
| **C114A.5** | Verify parallel, distributed, and non-deterministic programs |

**Course Name: C114B(CP7016/ Embedded Software Development)**

At the end of the course, the student should be able to:

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| --- | --- |
| **C114B.1** | Develop assembly code for processors such as ARM, PIC Microcontroller, TI C55x, TI C64x, etc. |
| **C114B.2** | Choose appropriate hardware platform for a given application |
| **C114B.3** | Perform platform-level performance analysis• |
| **C114B.4** | Perform OS-level performance analysis |
| **C114B.5** | Develop distributed embedded systems and systems with shared-memory concurrency |

**Course Name: C114D(CP7017/ Data Visualization Techniques)**

At the end of the course, the student should be able to:

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| --- | --- |
| **C114D.1** | Explain principles of visual perception |
| **C114D.2** | Apply core skills for visual analysis  |
| **C114D.3** | Apply visualization techniques for va rious data analysis tasks |
| **C114D.4** | Explain principles of visual perception for dashboard design |
| **C114D.5** | Design information dashboard |

**Course Name: C114E(NE7005 / Protocols and Architecture for Wireless Sensor Networks)**

At the end of the course, the student should be able to:

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| --- | --- |
| **C114E.1** | Explain Challenges of Sensor network technology |
| **C114E.2** | Describe the design principles of WSN s |
| **C114E.3** | Compare S-MAC protocol and B-MAC protocol |
| **C114E.4** | Discuss Data Centric and Content based Routing |
| **C114E.5** | Explain Node-level Simulators and State-centric Programming. |

**Course Name: C114F(CP7018 / Language Technologies)**

At the end of the course, the student should be able to:

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| --- | --- |
| **C114F.1** | Identify the different linguistic components of given sentences |
| **C114F.2** | Design a morphological analyser for a language of your choice using finite state automata concepts |
| **C114F.3** | Implement a parser by providing suitable grammar and words |
| **C114F.4** | Discuss algorithms for word sense disambiguation |
| **C114F.5** | Design an application that uses different aspects of language processing |

**SEMESTER - III**

 **ELECTIVE - V**

**Course Name: C202A (NE7012 /Social Network Analysis)**

At the end of the course, the student should be able to:

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| --- | --- |
| **C202A.1** | Work on the internals components of the social network  |
| **C202A.2** | Model and visualize the social network  |
| **C202A.3** | Mine the behaviour of the users in the social network  |
| **C202A.4** | Predict the possible next outcome of the social network |
| **C202A.5** | Apply social network in real time applications  |

**Course Name: C202C (NE7011/ Mobile Application Development)**

At the end of the course, the student should be able to:

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| --- | --- |
| **C202C.1** | Describe the requirements for mobile applications |
| **C202C.2** | Explain the challenges in mobile application design and development |
| **C202C.3** | Develop design for mobile applications for specific requirements |
| **C202C.4** |  Implement the design using Android SDK |
| **C202C.5** |  Deploy mobile applications in Android and iPone marketplace for distribution |

**Course Name: C202D (CP7020/ Bio-Inspired Computing)**

At the end of the course, the student should be able to:

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| --- | --- |
| **C202D.1** | Implement and apply evolutionary algorithms |
| **C202D.2** |  Explain cellular automata and artificial life |
| **C202D.3** |  Implement and apply neural systems |
| **C202D.4** |  Explain developmental and artificial immune systems |
| **C202D.5** | Explain behavioural systems to Implement and apply collective intelligence systems |

 **Course Name: C202E (CP7021/ Medical Image Processing)**

At the end of the course, the student should be able to:

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| --- | --- |
| **C202E .1** | Understand the Medical Image Formation Principles: |
| **C202E .2** | Understand the Medical Image Storage, Archiving and Communication Systems and Formats Picture |
| **C202E .3** | Analyze the Medical Image Visualization Fundamentals |
| **C202E .4** | Model the Medical Image Segmentation and Histogram-based methods |
| **C202E .5** | Analyze information from medical data and applications in order to help diagnosis |

**Course Name: C202F(CP7022/ Software Design)**

At the end of the course, the student should be able to:

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| --- | --- |
| **C202F.1** | Describe different approaches to designing a software application |
| **C202F.2** | Analyze specifications and identify appropriate design strategies. |
| **C202F.3** |  Develop an appropriate design for a given set of requirements |
| **C202F.4** |  Identify applicable design patterns for the solution |
| **C202F.5** | Evaluate a given design against the specifications |

**SEMESTER - III**

 **ELECTIVE - VI**

**Course Name: C203A(CP7023/ Reconfigurable Computing)**

At the end of the course, the student should be able to:

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| --- | --- |
| **C203A.1** | Identify the need for reconfigurable architectures |
| **C203A.2** |  Discuss the architecture of FPGAs |
| **C203A.3** |  Point out the salient features of different reconfigurable architectures |
| **C203A.4** |  Build basic modules using any HDL |
| **C203A.5** |  Develop applications using any HDL and appropriate tools to design and build an SoPC for a particular application |

**Course Name: C203B (IF7013/ Energy Aware Computing**)

At the end of the course, the student should be able to:

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| **C203B.1** | Design Power efficient architecture Hardware and Software. |
| **C203B.2** |  Analyze power and performance trade off between various energy aware storage devices. |
| **C203B.3** |  Implement various energy aware algorithms. |
| **C203B.4** |  Restructure the software and Hardware for Energy aware applications. |
| **C203B.5** | Explore the Energy aware applications |

 **Course Name: C203C (CP7024 /Information Retrieval Techniques**)

At the end of the course, the student should be able to:

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| --- | --- |
| **C203C.1** | Build an Information Retrieval system using the available tools |
| **C203C.2** |  Identify and design the various components of an Information Retrieval system |
| **C203C.3** |  Apply machine learning techniques to text classification and clustering which is used for efficient Information Retrieval |
| **C203C.4** |  Analyze the Web content structure |
| **C203C.5** | Design an efficient search engine |

**Course Name: C203D (CP7025/ Data Mining Techniques**)

At the end of the course, the student should be able to:

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| **C203D.1** | Understand the fundamental of data mining algorithms |
| **C203D.2** | Explain the evaluation of Models and Patterns |
| **C203D.3** | Apply various classifications methods’ and support vector machine |
| **C203D.4** | Apply cluster analysis and partitioning methods |
| **C203D.5** |  Evaluate association rule mining and visualization |

**Course Name: C203E (IF7002 /Bio Informatics**)

At the end of the course, the student should be able to:

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| **C203E.1** | Describe different approaches to testing software applications |
| **C203E.2** |  Analyze specifications and identify appropriate test generation strategies |
| **C203E.3** |  Develop an appropriate test design for a given test object |
| **C203E.4** |  Identify applicable measurements for the verification and validation effort |
| **C203E.5** |  Evaluate the testing effort based on adequate measures |

**SEMESTER - III**

 **ELECTIVE - VII**

**Course Name: C204A (CP7027/ Multi Objective Optimization Techniques s**)

At the end of the course, the student should be able to:

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| **C204A.1** | Learn fundamental principles of Multi objective Optimization (MOP) |
| **C204A.2** |  Survey different Multi objective Optimization algorithms |
| **C204A.3** |  Introduce various design issues of MOP |
| **C204A.4** |  Develop and Evaluate MOP Algorithms |
| **C204A.5** | Design Parallel and hybrid MOP Algorithms |

**Course Name: C204B (CP7028/Enterprise Application Integration**)

At the end of the course, the student should be able to:

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| --- | --- |
| **C204B.1** | Describe different approaches to integration enterprise applications |
| **C204B.2** |  Analyze specifications and identify appropriate integration approaches |
| **C204B.3** |  Develop a suitable integration design for a given problem |
| **C204B.4** |  Identify appropriate integration middleware for a given problem |
| **C204B.5** |  Evaluate the integration approaches against specified requirements |

**Course Name: C204D (CP7030/Robotics**)

At the end of the course, the student should be able to:

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| --- | --- |
| **C204D.1** | Explain robot locomotion |
| **C204D.2** | Apply kinematics models and constraints |
| **C204D.3** |  Implement vision algorithms for robotics |
| **C204D.4** |  Implement robot localization techniques |
| **C204D.5** |  Implement robot mapping techniques |

**Course Name: C204E (CP7031/ Compiler Optimization Techniques**)

At the end of the course, the student should be able to:

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| --- | --- |
| **C204E.1** | Understand the optimization techniques used in compiler design. |
| **C204E.2** | Explain the various computer architectures that support parallelism. |
| **C204E.3** | Explain the theoretical background needed for code optimization. |
| **C204E.4** | Understand the techniques used for identifying parallelism in a sequential program. |
| **C204E.5** | Develop the various optimization algorithms |