



## Koneru Lakshmaiah Education Foundation

(Category -1, Deemed to be University estd. u/s. 3 of the UGC Act, 1956)

Accredited by NAAC as 'A++' ♦ Approved by AICTE ♦ ISO 21001:2018 Certified  
 Campus: Green Fields, Vaddeswaram - 522 302, Guntur District, Andhra Pradesh, INDIA.  
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Department of Computer Science and Engineering

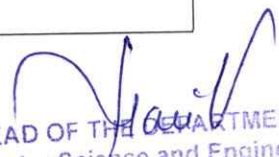
Program: M. Tech - MLC

Academic Year : 2019-2020


| Course Code | Course Title            | CO. No | Description of the course Outcome   |
|-------------|-------------------------|--------|---|
| 18CS5109    | OPTIMIZATION TECHNIQUES | CO1    | Learn efficient computational procedures to solve optimization problems,  |
|             |                         | CO2    | To develop and promote research interest in applying optimization techniques in problems of Engineering and Technology  |
|             |                         | CO3    | Cast engineering minima/maxima problems into optimization framework to solve real world problems.   |
|             |                         | CO4    | Apply and Evaluate knowledge of optimization to formulate and solve engineering problems  |
| 18CS5110    | APPLIED STATISTICS      | CO1    | Identify the suitable probability distribution to the given experimental data and calculation of various characteristics of the respective probability distributions                        |
|             |                         | CO2    | Draw the statistical inference of the given data through various tests of statistical hypothesis, viz., tests for means and proportions (single and two) and design of experiments          |
| 18CS5111    | DATA MINING             | CO1    | Illustration of Warehouse & Mining, ETL, OLAP & OLTP, Data Cube Operations and Data Warehouse architecture  |
|             |                         | CO2    | Demonstration of Data Preprocessing through different methods   |
|             |                         | CO3    | Apply Different Classification Algorithms to Segregate Input data into different class levels and find out Hidden relationship between transactional dataset using Association Rule Mining. |
|             |                         | CO4    | Build different Clustering Models using the predefined dataset.   |
|             |                         | CO5    | Implementation of warehousing and mining algorithms using suitable tools and programming languages  |

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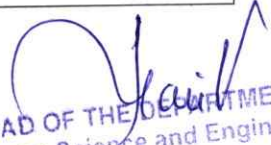
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| 18CS5112 | MATRIX<br>COMPUTATION                    | CO1 | Use sophisticated scientific computing and visualization environments to solve application problems involving matrix computation algorithms and Explain the effects of errors in computation and how such errors affect solutions.                           |
|          |  | CO2 | Analyze numerical algorithms, and understand the relationships between the computational effort and the accuracy of these algorithms.  |
|          |  | CO3 | Interpret the results produced by computer implementations of numerical algorithms.  |
|          |  | CO4 | Apply Rayleigh quotient iterations and Explicit and implicit QR algorithms.  |
|          |  | CO5 | Demonstrate the necessary analytical background for further studies leading to research in Machine Learning  |
| 18CS5113 | EVOLUTIONARY<br>AND NATURAL<br>COMPUTING | CO1 | Demonstrate the natural evolution, basic principles of GA  |
|          |  | CO2 | Apply techniques of genetic algorithms, genetic programming to understand the problems   |
|          |  | CO3 | Identifying different types of genetic algorithms, Improving GA, Types of Genomes and demonstration of basic principles of ACO   |
|          |  | CO4 | Demonstration of different techniques of Ant Colony Optimization, Swarm Intelligence and application to problems, Comparing the different approaches to solve problems. To Explain Artificial Immune Systems, Computational Embryology, and Artificial Life. |
|          |  | CO5 | Execute lab experiments and develop a small project along with his/her team members.   |
| 18CS5114 | DISCRETE<br>MATHEMATICS                  | CO1 | Apply the principle of counting to solve the problems related to discrete event occurrences; Apply propositional logic to solve the problems   |
|          |  | CO2 | Apply the laws of set theory and formulate recurrence relation   |
|          |  | CO3 | Understand the sequence of symbols to represent in terms of finite sequence of characters; Understand graph & tree concepts; apply tree concepts to solve related problems   |
|          |  | CO4 | Apply graphs concepts using algorithms and Optimal transportation problems   |
| 18CS5115 | PATTERN<br>RECOGNITION AND               | CO1 | The student will be able to apply kernel methods, support vector machines for classification and regression problems   |

  
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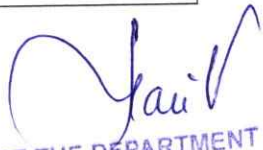
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|          | MACHINE LEARNING                     | CO2 | The students will be able to apply Kernel Ridge Regression; Kernel Density Estimation; Kernel PCA   |
|          |                                      | CO3 | The students will be to apply Kernel Online Learning, Spectral Clustering, Model Based Clustering, Expectation Maximization                                     |
|          |                                      | CO4 | The student will be able to analyze Independent Component Analysis; Hidden Markov Models; Factor Analysis; Introduction to Graphical Models & Sampling Methods. |
|          |                                      | CO5 | The students will be able to apply above techniques for classification, clustering and multiclass classification etc...   |
| 18CS5116 | COMPUTER MODELING & SIMULATION       | CO1 | Understand the basics of simulation and modeling with examples and platforms supporting simulation  |
|          |                                      | CO2 | Analyze discrete event simulation principles, mathematical, Statistical and Queuing Models.   |
|          |                                      | CO3 | Analyze Input Modeling, Verification and Validation of the simulation Models  |
|          |                                      | CO4 | Apply the Simulation on Manufacturing and Material Handling Systems, Computer System and Computer Networks.   |
|          |                                      | CO5 | Develop the basic concepts of Simulation and Modeling using Arena simulation tool   |
| 18CS51E1 | COMPUTER VISION AND IMAGE PROCESSING | CO1 | Understand image representation and modelling   |
|          |                                      | CO2 | Apply image transformation methods  |
|          |                                      | CO3 | Interpret image processing algorithms   |
|          |                                      | CO4 | Apply and analyse transformation, pose consistency and segmentation algorithms  |
| 18CS51E2 | SERVICE ORIENTED ARCHITECTURE        | CO1 | Understand the fundamentals of web services and distributed computing   |
|          |                                      | CO2 | Understand the basic standards and principles of service oriented architectures   |

  
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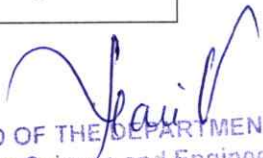
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|          |                            | CO3 | Analyse the integration of SOA technological points with Web Services.   |
|          |                            | CO4 | Implement of SOA in development cycle of Web Services.   |
| 18CS51E3 | DATA ANALYSIS              | CO1 | Understand a meaningful pattern in data and graphically interpret data   |
|          |                            | CO2 | Implement the analytic algorithms  |
|          |                            | CO3 | Handle large scale analytics projects from various domains   |
|          |                            | CO4 | Develop intelligent decision support systems   |
| 18CS51E4 | CLOUD COMPUTING            | CO1 | Articulate the main concepts, key technologies, strengths, limitations of cloud computing and the possible applications for state-of-the-art cloud computing.                  |
|          |                            | CO2 | Identify the architecture and infrastructure of cloud computing, including cloud delivery and deployment models  |
|          |                            | CO3 | Analyse the core issues of cloud computing such as security, privacy, and interoperability.  |
|          |                            | CO4 | Identify problems, analyse, and evaluate various cloud computing solutions.  |
| 18CS51F1 | ARTIFICIAL NEURAL NETWORKS | CO1 | Understand and build basic network representations, topologies and models  |
|          |                            | CO2 | Apply various techniques for training and optimizing neural networks   |
|          |                            | CO3 | Analyze different techniques related to network stochastics  |
|          |                            | CO4 | Analyze different techniques related to learning algorithms for neural networks and develop knowledge on emerging software, tools and technologies related to these algorithms |
| 18CS51F2 | APPLICATION DEVELOPMENT    | CO1 | Identify basic aspects of web-frameworks.  |

  
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|          | FRAMEWORKS         | CO2  | Apply the basic concepts, principles and practices of Web-site development using server-side technologies                                  |
|          |                    | CO3  | Create and manage Blogs, Websites using WordPress  |
|          |                    | CO4  | Create Web Application using Moodle and manage features of Moodle sites  |
| 18CS51F3 | BIG DATA ANALYTICS | CO 1 | Understand the concepts of big data, Initial exploration of analysis of data and Data visualization  |
|          |                    | CO 2 | Understand Initial exploration of data and advanced data analytics by using R  |
|          |                    | CO 3 | Apply advanced algorithms & Statistical modeling for big data using HDFS, HIVE, and PIG.   |
|          |                    | CO 4 | Apply advanced SQL functions for in-database analytics by MADlib, Greenplum along with common deliverables of analytics life cycle project |
| 18CS51F4 | CLOUD SECURITY     | CO1  | Understand the principles of cryptography and Apply various cryptographic algorithms   |
|          |                    | CO2  | Analyze various security issues and system vulnerabilities in virtualization   |
|          |                    | CO3  | Analyze the technologies for virtualization based security enhancements  |
|          |                    | CO4  | Analyze legal and Compliance issues and examine modern security standards  |
| 18CS52G1 | CONTROL THEORY     | CO1  | Understand the fundamentals of the Control system.   |
|          |                    | CO2  | Understand about Type & Order of the system with Time Response Specification.  |
|          |                    | CO3  | Examine different techniques for Time & Frequency Response Analysis  |
|          |                    | CO4  | Design controller as per given specifications using different techniques.  |

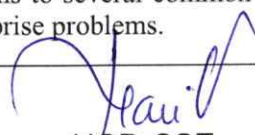
  
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| 18CS52G2 | WEB SEMANTICS                 | CO1  | Understand the Cloud Computing Techniques and Virtualization on cloud platforms  |
|          |                               | CO2  | Understand the semantic web Vision and technologies  |
|          |                               | CO3  | Understand about ontology  |
|          |                               | CO4  | Analyse about Data Web and apply linked open data Cloud  |
| 18CS52G3 | MAP REDUCE<br>DESIGN PATTERNS | CO 1 | Illustrate how Test Driven Development and Refactoring work in software design and maintenance.                                  |
|          |                               | CO 2 | Understanding Structural and Creational Patterns for effective design of a system  |
|          |                               | CO 3 | Utilization of behavioural design pattern and Anti-patterns for system design  |
|          |                               | CO 4 | Understanding the design patterns in an object oriented language along with clean coding principles to a real world application. |
| 18CS52G4 | DATA CENTRE<br>VIRTUALIZATION | CO1  | Configure and manage virtual network and storage such as vCenter server  |
|          |                               | CO2  | Deploy, manage and migrate virtual machines.   |
|          |                               | CO3  | Describe the architecture of a Data Center environment with RAID and Intelligent Storage Systems.                                |
|          |                               | CO4  | Configure replication of data and configure security through best practices  |
| 18CS52H1 | REINFORCEMENT<br>LEARNING     | CO1  | Understand the key features of reinforcement learning that distinguishes it from AI and non-interactive machine learning.        |
|          |                               | CO2  | Apply reinforcement algorithms for real time applications.   |
|          |                               | CO3  | Describe (list and define) multiple criteria for analysing RL algorithms and evaluate algorithms                                 |

  
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|          |                                | CO4 | Describe the exploration vs exploitation challenge and compare and contrast at least two approaches for addressing this challenge   |
| 18CS52H2 | MULTI AGENT SYSTEMS            | CO1 | Understand the notion of an agent, how agents are distinct from other software paradigms (eg objects) and understand the characteristics of applications that lend themselves to an agent-oriented solution             |
|          |                                | CO2 | Understand the key issues associated with constructing agents capable of intelligent autonomous action, and the main approaches taken to developing such agents   |
|          |                                | CO3 | Understand the key issues in designing societies of agents that can effectively cooperate in order to solve problems, including an understanding of the key types of multi-agent interactions possible in such systems  |
|          |                                | CO4 | Understand the main application areas of agent-based solutions, and be able to develop a meaningful agent-based system using a contemporary agent development platform  |
| 18CS52H3 | NETWORK SECURITY               | CO1 | Develop Concept of Security needed in Communication of data through computers and networks along with Various Possible Attacks  |
|          |                                | CO2 | Understand Various Encryption mechanisms for secure transmission of data and management of key required for encryption  |
|          |                                | CO3 | Understand authentication requirements and study various authentication mechanisms  |
|          |                                | CO4 | Understand network security concepts and study different Web security mechanisms.   |
| 18CS52H4 | CLOUD APPLICATION ARCHITECTURE | CO1 | identify and explain the function of core cloud computing technologies and services, such as virtualization, computing instances, virtual private clouds, storage, database, and identity and authentication management |
|          |                                | CO2 | build cloud computing solutions for several common application patterns, including web-tier applications and high availability solutions for computing, database, storage, and network systems.                         |
|          |                                | CO3 | Describe the tradeoffs of block versus object storage, the storage lifecycle, and how to select storage technologies that meet application requirements.  |
|          |                                | CO4 | Formulate cloud solutions to several common types of application and enterprise problems.   |

M. Kavitha  
Academic Professor I/C

  
HOD-CSE

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