Fr. Conceicao Rodrigues College of Engineering

Mechanical Department

Subject: Automation and Artificial Intelligence

Lesson Plan

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| Sr. No. | Week | Syllabus | Mode |
| 1 | 9-13 Jan | 1.1 Introduction to Automation Definition and fundamentals of automation, Elements of Automated system, Automation principles and strategies, Levels of automation, types of automation, Advanced automation functions | Whiteboard and PPT  |
| 2 | 16-20 Jan | .1 Design of Pneumatic – Single & Double acting, Flow Control, Combination Valve | Whiteboard and PPT  |
| 3 | 23-27 Jan | Circuits Design of Pneumatic sequencing circuits using Cascade method and Shift register method (up to 2 cylinders) | Whiteboard and PPT  |
| 4 | 30 jan -3 Feb | Circuits Design of Pneumatic sequencing circuits using Cascade method and Shift register method (up to 2 cylinders) | Whiteboard and PPT  |
| 5 | 6-10 feb |  Electro-pneumatic Circuits Design of Electro-Pneumatic Circuits using single solenoid and double solenoid valves; with and without grouping; | Whiteboard and PPT  |
| 6 | 13-17 feb | PLC Discrete Control Systems Design of Pneumatic circuits using PLC Control (ladder programming only) up to 2 cylinders, with applications of Timers and Counters and concept of Flag and latching. | Whiteboard and PPT  |
| 7 | 20-24 feb | 2 Design of Hydraulic Circuits Basic Hydraulic Circuits: Meter in, meter out and Bleed off circuits; Intensifier circuits, Regenerative Circuit, Counter balance valve circuit and sequencing circuits. | Whiteboard and PPT  |
| 8 | 27Feb – 3rd March | Unit Test |  |
| 9 | 6th march-10th March  | Robots and their applications: Introduction to Robots, Types, Classifications, Selection of Robots, Robot Degrees of freedom, Robot configuration, Accuracy and repeatability, Specification of a Robot, Robot feedback controls: Point to point control and Continuous path control, Control system for Robot joint, Adaptive control, Drives and transmission systems, End effectors, Industrial robot applications, Nex-gen robots. | Whiteboard and PPT  |
| 10 | 13th – 17th March | 2 Introduction to Artificial Intelligence Introduction, Historical development, Intelligent Systems, Types of Intelligent Agents, Components of AI, Foundations of AI, Scope of AI, Current trends in AI, Relevance to Mechanical Engineering | Whiteboard and PPT  |
| 11 | 20th -24th march | 5.1 Problem Solving: Tree and Graph Search, Uninformed v/s informed search, uninformed methods: depth first search, breadth first search, Informed search: heuristic search, Best first search, branch and bound | Whiteboard and PPT  |
| 12 | 27th -31st march | 5.2 Machine Learning: Introduction, types of machine learning: supervised, unsupervised, reinforcement learning 5.3 Learning with Decision Trees: Introduction to Decision Trees, Classification and Regression Trees, K means clustering algorithm, K nearest neighbours algorithm, hierarchical clustering, Concept of ensemble methods: bagging, boosting, random forests | Whiteboard and PPT  |
| 13 | 3rd -7th April | 6.1 Learning with regression: Linear regression, Logistic regression 6.2 Artificial Neural Networks Concept of ANN, Basic Models of Artificial Neural Networks Important Terminologies of ANNs McCulloch-Pitts Neuron, NN architecture, perceptron, delta learning rule, backpropagation algorithm, Gradient Descent algorithm, feed forward networks, activation functions 6.3 Introduction to AI Technologies in the realm of Automation Concept of Natural Language Processing, Machine Vision, Deep learning, Expert systems, Genetic Algorithms, Industry 4.0 | Whiteboard and PPT  |
|  | 17th – 20th April |  UNIT TEST |  |