**Detailed Syllabus**

**Lecture-wise Breakup**

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| **Subject Code** | 15B11CI514 | **Semester:**  **(specify Odd/Even)** | **Semester** ODD **Session** 2019-2020  **Month from** July 19 **to** Dec 19 |
| **Subject Name** | ARTIFICIAL INTELLIGENCE | | |
| **Credits** | 3-1-0 | **Contact Hours** | 4 |

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| **Faculty (Names)** | **Coordinator(s)** | Ambalika Sarkar/Dr. Parul Agarwal |
| **Teacher(s) (Alphabetically)** | Ambalika Sarkar, Dr. Dhanlakshmi, Dr. Parul Agarwal, Dr. Satish Chandra |

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| **COURSE OUTCOMES** | | **COGNITIVE LEVELS** |
| **CO1** | Design, implement and analyze the problem solving agents using various informed, uninformed search strategies. | Analyzing [Level 4] |
| **CO2** | Analyze and apply algorithms to solve problems requiring evolutionary search strategies, constraint satisfaction and game theory. | Analyzing [Level 4] |
| **CO3** | Apply model of probabilistic reasoning in incomplete and uncertain environment. | Apply [Level 3] |
| **CO4** | Apply fundamental machine learning techniques on given data. | Apply [Level 3] |
| **CO5** | Develop the agents with natural language processing and learning capabilities. | Apply [Level 3] |

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| **Module No.** | **Subtitle of the Module** | **Topics in the module** | **No. of Lectures for the module** |
| **1.** | Introduction | History and foundations of AI | 01 |
| **2.** | Problem solving and intelligent agents | PEAS, Structure of agents, nature of environments, concept of rationality | 03 |
| **3.** | Problem solving-I | Problem solving agents, Uninformed search strategies (BFS, UCS, DFS, DLS, IDS) | 02 |
| **4.** | Problem solving-II | Informed Search and Exploration (GBFS, Heuristic function, A\*, RBFS, Hill climbing, Genetic Algorithms, Simulated Annealing) | 06 |
| **5.** | Problem solving-III | Constraint satisfaction problems (backtracking search), Adversarial Search (optimal decision in games, alpha beta pruning) | 06 |
| **6.** | Uncertainty | Inference using full joint distribution, Probabilistic reasoning, Bayesian rule, Bayesian network, Maximum likelihood estimation | 07 |
| **7.** | Learning | Linear and logistic regression, problem of over-fitting and under-fitting, regularization, decision tree, ensemble learning, K- Nearest Neighbor, K-Means algo, Reinforcement Learning | 10 |
| **8.** | Natural Language Processing | Preprocessing, POS tagging using MLE, Parsing using CYK  Text Summarization Application on NLP | 07 |
| **Total number of Lectures** | | | **42** |

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| **Recommended Reading material:** Author(s), Title, Edition, Publisher, Year of Publication etc. ( Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format) | |
| **1.** | *Artificial Intelligence – A modern approach by Stuart Russell and Peter Norvig, PHI, 2008*. |
| **2.** | [*Artificial Intelligence: foundations of computational agents, Cambridge University Press, 2017*](http://artint.info) |
| **3.** | *Artificial Intelligence Review: An International Science and Engineering Journal, Springer* |
| **4.** | *Minds and Machines: Journal for Artificial Intelligence, Philosophy and Cognitive Science, Springer* |
| **5.** | *IEEE Intelligent Systems* |