

Maulana Abul Kalam Azad University of Technology, West Bengal
(Formerly West Bengal University of Technology)
Syllabus for B. Tech in CSE (Artificial Intelligence and Machine Learning)
 (Applicable from the academic session 2020-2021)

8	Genetic Algorithms: Introduction, Representation methods, Selection methods, Operators, Replacement methods, Relevant applications	2	
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Text book and Reference books:

1. Rao, S. S., & Rao, S. S., Engineering optimization: theory and practice. John Wiley & Sons.
2. Hadley, G., Linear programming, Narosa Publishing house.
3. Taha, H. A., Operations research: An introduction. Pearson Education India.
4. Deb, K, Optimization for engineering design: Algorithms and examples. PHI Learning Pvt. Ltd.
5. Kumar, D. N., Multicriterion analysis in engineering and management. PHI Learning Pvt. Ltd.

Course Outcomes:

At the end of the course, students will be able to –

1. Relate key concepts and applications of various optimization techniques
2. Identify the appropriate optimization technique for the given problem
3. Formulate appropriate objective functions and constraints to solve real life optimization problem

Artificial Intelligence Lab

Code: PCCAIML 491

Contacts: 4P

Name of the Course:	Artificial Intelligence & Functional Programming Lab
Course Code: PCC-AIML491	Semester:IV
Duration:6 months	Maximum Marks:100
Teaching Scheme:	
Theory: hrs./week	Continuous Internal Assessment
Tutorial: NIL	External Assesement:60
Practical: 4 hrs./week	Distribution of marks:40
Credit Points:	2
COURSE OBJECTIVES	
1. Gain a historical perspective of AI and its foundations.	
2. Become familiar with basic principles of AI toward problem solving, inference, perception, knowledge representation, and learning.	
3. Investigate applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.	
4. Experience AI development tools such as an ‘AI language’, expert system shell, and/or data mining tool.	
5. Experiment with a machine learning model for simulation and analysis	

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Unit 1

Prolog Representation: Introduction, Logic-Based Representation, Prolog Syntax, Creating, Changing, and Tracing a Prolog Computation, Lists and Recursion in Prolog.
Structured Representation and Inheritance Search: Abstract Data Types and Search, Using cut, Control Search in prolog, Abstract Data Types (ADTs) in Prolog.

Unit 2

1. Write a program to implementation of DFS
2. Write a program to implementation of BFS

Unit 3

1. Write a Program to find the solution for traveling salesman Problem

Unit 4

1. Write a program to implement Simulated Annealing Algorithm
2. Write a program to find the solution for wampus world problem

Unit 5

1. Write a program to implement 8 puzzle problem

Unit 6

1. Write a program to implement Tower of Hanoi problem

Unit 7

1. Write a program to implement A* Algorithm

Unit 8

1. Write a program to implement Hill Climbing Algorithm

Unit 9

1. To Study JESS expert system

Unit 10

1. To Study RVD expert system

Unit 11

1. Write a Program to Perform Fibonacci Series
2. Write a Program to Check Sides of a Triangle

Unit 12

1. Write a Program to Perform Length of List
2. Write a Program to Perform Reverse in List.

Unit 13

1. Write a Prolog program to perform Arithmetic Mean.
2. Write a Program to Check Vowels or Not.

Unit 14

Machine Learning Algorithms in Prolog: Machine Learning: Version Space Search, Explanation Based Learning in Prolog.

Programming in Lisp: S-Expressions, Syntax of LISP, Lists and Recursive Search, Variables, Datatypes, High Order Functions, Logic Programming in LISP, Lisp-Shell.

Unit 15

Semantic Networks, Inheritance and Machine Learning: Sematic Nets, Inheritance, Object Oriented Lisp, Learning ID3 Algorithm, And Implementing ID3 Algorithm.

Java, Representation and Object-Oriented Programming, Problem Spaces and Search, a Logic- Based Reasoning System, an Expert System Shell

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Text books/ reference books:

Course Outcome

- 1) Demonstrate fundamental understanding of the history of artificial intelligence (AI) and its foundations.
- 2) Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.
- 3) Demonstrate awareness and a fundamental understanding of various applications of AI Techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.
- 4) Demonstrate proficiency developing applications in an 'AI language', expert system shell, or data mining tool.
- 5) Demonstrate proficiency in applying scientific method to models of machine learning.

PYTHON II / R Programming
Code: PCCAIML492
Contacts: 4P

Name of the Course:	R Programming	
Course Code:PCCAIML492	Semester: IV	
Duration: 6 months	Maximum Marks: 100	
Teaching Scheme		Examination Scheme
Theory:		Mid Semester exam: 15
Tutorial: NIL		Assignment and Quiz: 10 marks
		Attendance: 5 marks
Practical: 4 hrs./week		End Semester Exam : 70 Marks
Credit Points:	2	
Objective:		
1	identify and use available R packages and associated Open Source software to meet given scientific objectives	
2	design and write efficient programs using R (and similar high-level languages) to perform routine and specialized data manipulation/management and analysis tasks	
3	document analytical workflow using R, markdown languages, and version control	
4	document, share, and collaborate on code development using a suite of Open Source standards and tools	
Pre-Requisite:		
1	Computer Concepts and C Programming,	
2	Database Management Systems	

Practical Syllabus

1. Introduction to mechanism for statistics, data analysis, and machine learning; Introduction of R Programming, How to install and run R, Use of R help files, R Sessions, R Objects – Vectors, Attributes, Matrices, Array, Class, List, Data Frames etc. Operators in R.
2. R Programming Structures, Control Statements, Loops, Repeat and Break, R-Function, R Vector Function, Recursive Function in R.