	National Institute of Technology Meghalaya An Institute of National Importance	CURRICULUM
Programme	**Bachelor of Technology in Computer Science and Engineering**	Academic Year of Regulation: **2018-19**
Department	**Computer Science and Engineering**	Semester: **VII**

Course Code	Course Name	Pre-Requisite	Credit Structure				Marks Distribution			
			L	T	P	C	INT	MID	END	Total
CS423	**Artificial Intelligence**	**None**	**3**	**0**	**0**	**3**	**50**	**50**	**100**	**200**

Course Objectives	
	This course familiarizes the basic principles, techniques and applications of Artificial Intelligence (AI).
	This course explains the basic principles to solve problems using Artificial Intelligence.
	This course introduces logic based AI technique, planning algorithms, probability based AI technique and some machine learning models for problem solving.

Course Outcomes	
CO1	**Able to analyze concepts and principles of Artificial Intelligence (AI) for their proper selection for applications of AI.**
CO2	**Able to appraise AI techniques based on their strengths and limitations and decide their applicability to human-centered problems.**
CO3	**Able to develop formal representations of problems w. r. t. different algorithms of AI techniques to solve those problems.**
CO4	**Able to solve problems using logic based algorithms and planning algorithms.**
CO5	**Able to solve problems using probability based algorithms.**
CO6	**Able to solve problems using basic supervised and unsupervised machine learning models.**

No.	COs	Mapping with Program Outcomes (POs)												Mapping with PSOs		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	CO1	3	2	1	1	1	0	0	0	0	0	0	1	1	1	1
2	CO2	3	2	1	1	1	0	0	0	0	0	0	1	1	1	1
3	CO3	3	3	3	3	2	0	0	0	1	1	1	0	3	2	0
4	CO4	3	3	3	3	2	0	0	0	1	1	1	0	3	2	0
5	CO5	3	3	3	3	2	0	0	0	1	1	1	0	3	2	0
6	CO6	3	3	3	3	2	0	0	0	1	1	1	0	3	2	0

SYLLABUS

No.	Content	Hours	COs
I	**Overview; Types of AI; Turing test; Intelligent agents; Knowledge representation; AI technique** **Solving Problems by Searching: AND/OR Graphs; Uninformed search - Depth First Search, Breadth First Search, DFID; Heuristic search - Generate and Test, Hill Climbing, stochastic heuristic search :- Simulated Annealing, Best First Search, Beam Search, A*, Problem reduction search, AO*** **Constraint satisfaction problems - constraint satisfaction search; Means-ends analysis** **Stochastic search methods - Particle Swarm Optimization** **Game Playing - Minimax algorithm, Alpha-beta pruning**	**20**	**CO1, CO2, CO3**
II	**Building a knowledge base: Propositional logic, first order predicate logic (FOPL); Inference in first order predicate logic; Resolution - refutation proofs strategies in FOPL; Theorem Proving in First Order Logic** **Planning; goal stack planning; partial order planning**	**06**	**CO4**
III	**Uncertain knowledge and reasoning; Knowledge representation using probabilities; Bayesian Networks**	**03**	**CO5**
IV	**Overview of different forms of learning: unsupervised, supervised, semi-supervised; K-means clustering algorithm; Decision Trees; Naive Bayes' Classifier; Artificial Neural Networks**	**05**	**CO6**
V	**Introduction to Expert Systems**	**02**	**CO1, CO2, CO3, CO6**
	Total Hours	**36**	

Essential Readings

1. S. Russell and P. Norvig, "Artificial Intelligence: A Modern Approach," Pearson, 4th edition, 2020.
2. E. Rich, K. Knight and S. B. Nair, "Artificial Intelligence," McGraw Hill Education, 3rd edition, 2017.
3. C. Bishop,"Pattern Recognition and Machine Learning," Springer, 1st ed. 2006. Corr. 2nd printing 2011 edition.

Supplementary Readings

1. D. W. Patterson, "Introduction to artificial intelligence and expert systems," Pearson Education India, 1st edition, 2015.
2. I. Bratko, "Prolog Programming for Artificial Intelligence," Addison Wesley, 4th edition, 2011.
3. S. O. Haykin, "Neural Networks and Learning Machines," Pearson Education India, 3rd edition, 2016.
4. D. Jurafsky and J. H. Martin, "Speech and Language Processing," Pearson Education India, 2nd edition, 2013.