

INDIAN INSTITUTE OF TECHNOLOGY TIRUPATI
PROFORMA FOR NEW COURSE

1.	Title of the Course	Artificial Intelligence and Machine Learning
2.	Course Number	CS5206
3.	Status of the Course	Core
4.	Structure of Credits	3-0-0-3
5.	Offered To	PG
6.	New Course/Modification to	New
7.	To be Offered by	Department of Computer Science Engineering
8.	To take effect from	January 2019
9.	Prerequisite	CoT for UG
10.	Whether approved by the Department	Yes
11.	Course Objective: To impart theoretical understanding of - AI formalism and problem formulation and state of the art machine learning algorithms and parameter configurations. To provide hands on experience using standard platforms, libraries and data sets from numerical, textual and multimedia sources. To impart overall understanding of the current trends and research future research directions.	
12.	Course Content: Artificial Intelligence concepts including – State space representation and search; Knowledge representation and reasoning; Formal logic and unification algorithms; Planning algorithms, Constraint satisfaction; Case based reasoning; Frequent Pattern Mining. Optimization algorithms including discrete and continuous formulations and matrix factorization algorithms. Machine Learning concepts including – Supervised learning algorithms; ML accuracy metrics, Cross validation and Bias-variance trade off; Missing data and balancing; Model re-training and maintenance; Bayesian learning approaches. Graphical models and unsupervised learning algorithms including – EM, HMM, LDA and clustering. Deep learning concepts including – Introduction to auto-encoders, CNN and RNN mechanisms, Vector encoding of text and multimedia data and applications. Current trends and future directions – including active learning and reinforcement learning algorithms.	
13.	Text book(s): 1. Stuart J. Russell, Peter Norvig, <i>Artificial Intelligence: A Modern Approach</i> , Pearson, (2015). 2. Christopher Bishop, <i>Pattern Recognition and Machine Learning</i> , Springer, (2006).	
14.	Reference(s): 1. Richard O. Duda, Peter E. Hart and David G. Stork, <i>Pattern Classification</i> , Wiley, (2002). 2. Deepak Khemani, <i>A First Course in Artificial Intelligence</i> , McGrawHill, (2015). 3. Charu C. Aggarwal, Jaiwei Han, <i>Frequent Pattern Mining</i> , Springer, (2014). 4. Tom M. Mitchell, <i>Machine Learning</i> , McGrawHill, (1997).	