

CAP 378
ARTIFICIAL INTELIGENCE

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Course Outcome

CO1 :: define the approaches and the types of artificial intelligence used for problem solving

CO2 :: understand knowledge representation, heuristic search algorithms, and different methods of game playing

CO3 :: apply analytical concepts to deal with uncertainty and fuzzification

CO4 :: discuss the use of different AI language and tools and apply basic principles of AI in solutions that require inference, knowledge representation and logical reasoning.



Text Books and References

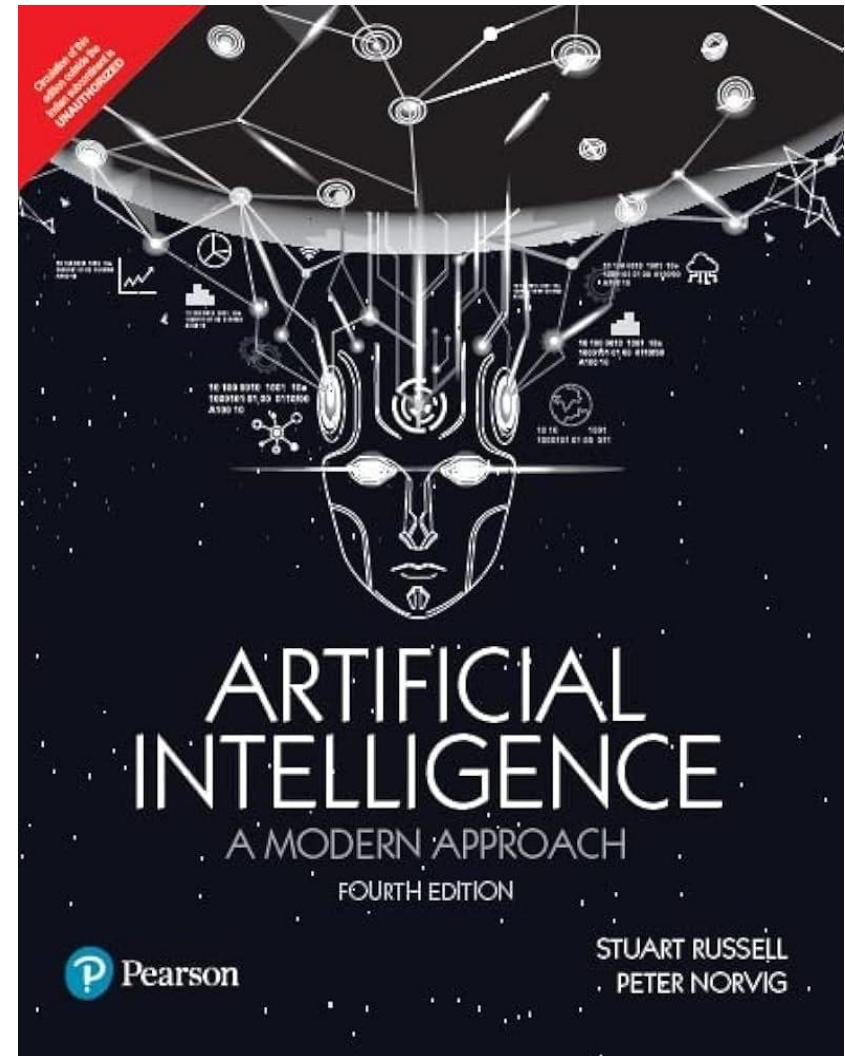
- **TEXT BOOK:**
Artificial Intelligence, A Modern Approach
by Stuart Russel, Peter Norvig
- **REFERENCES:**
Artificial Intelligence by Rich, Knight
- Journals articles as Compulsary reading
(specific articles, complete reference)
<https://courses.cs.vt.edu/~csonline/AI/Lessons/>



Text Book: Artificial Intelligence A Modern Approach

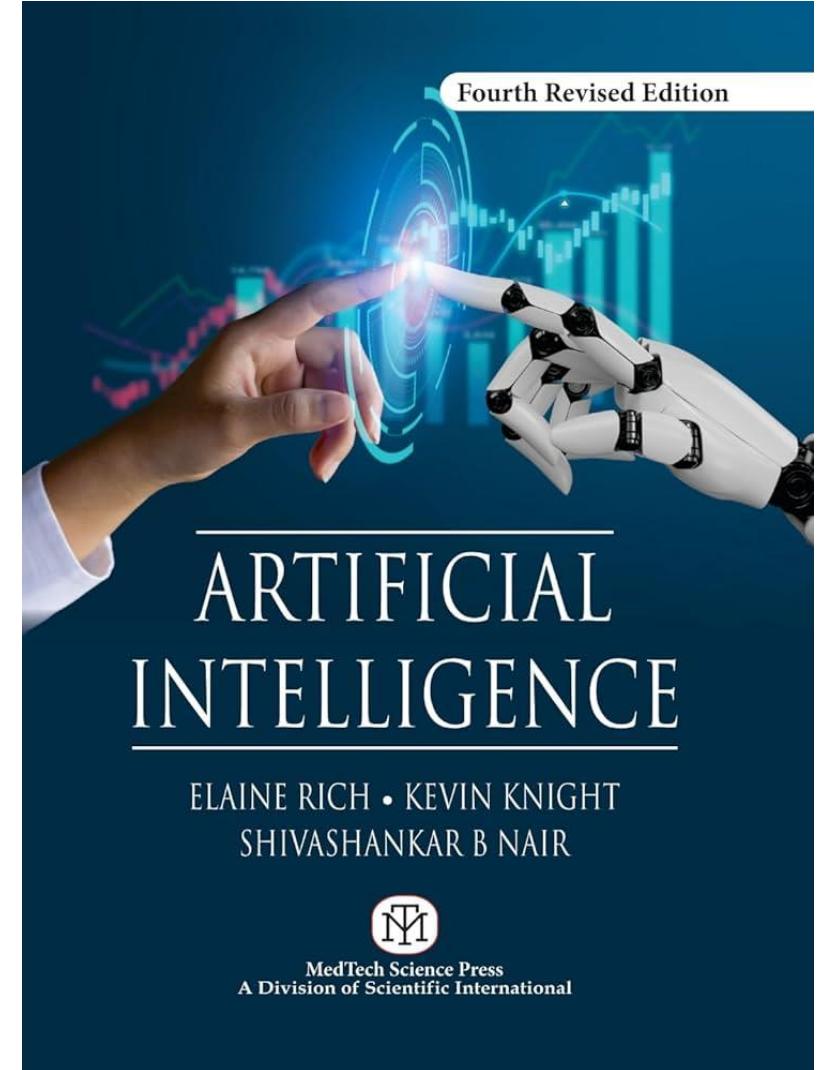
Author: Stuart Russel, Peter Norvig

Download: <https://dpvipraco.../2023/01/Russell-S.-Norvig-P.-Artificial-intelligence-a-modern-approach-2edPH2003T1112s.pdf>



Reference Book: Artificial Intelligence

Author: Rich, Knight



Relevant Websites

S. No	Web Address	Salient Features
1	https://www.cs.utexas.edu/~novak/cs381kcontents.html	Searching techniques
2	http://lecturesppt.blogspot.com/2010/03/artificial-intelligence-pdf.html	Planning, Uncertainty and Learning
3	https://www.elementsofai.com/	Introduction to Artificial Intelligence
4	https://www.coursera.org/learn/machine-learning	Machine learning introduction
5	http://www.stats.ox.ac.uk/~ripley/Expert/Expert.pdf	Expert system notes

Relevant Websites

S. No	Web Address	Salient Features
6	https://www.cl.cam.ac.uk/teaching/2002/NatLangProc/nlp1-4.pdf	NLP introduction
7	https://www.geeksforgeeks.org/fuzzy-logic-introduction/	Fuzzy Logic
8	https://www.edureka.co/blog/what-is-machine-learning/	Machine Learning
9	https://www.tutorialspoint.com/artificial_intelligence/artificial_intelligence_natural_lan	Natural Language Processing

Audio Visual Aids (AV)

S. No	Web Address	Salient Features
1	https://www.coursera.org/learn/introduction-to-ai	MOOCS
2	https://nptel.ac.in/courses/106106126/	NPTEL

Virtual Labs (VL)

S. No	Web Address	Salient Features
1	https://www.swi-prolog.org/	Prolog

Syllabus / Course Outline



UNIT I:
Introduction And
Problem Solving



UNIT II: Heuristic
Search And Game
Playing



UNIT III:
Knowledge
Representation



UNIT IV:
Uncertainty And
Planning In AI



UNIT V:Fuzzy
Logic



**UNIT
VI:**Foundations Of
Machine Learning

UNIT I

- Introduction To Artificial Intelligence,
- Types Of Intelligence,
- General Vs Narrow AI,
- Strong Vs Weak AI,
- Difference Between Human And Machine Intelligence,
- Applications Of AI,
- Approaches Of Artificial Intelligence,
- Intelligent Agent,
- Types Of Agent Programs,
- Formulating Problems -
 - Water Jug Problem,
 - 8 Puzzle Problem,
 - Missionaries And Cannibals Problem

UNIT II

- Introduction To Heuristic And Blind Search,
- Heuristic Search Strategies -
 - Best First Search,
 - A* Algorithm,
 - Iterative Deepening A*(IDA),
 - Small Memory A*(SMA),
- Heuristic Techniques:
 - Generate And Test,
 - Hill Climbing,
 - State Space Search,
 - Constraint Satisfaction Problem,
- Introduction To Game Playing,
- Applications Of Game Playing,
- Minimax Algorithm And Alphabeta Pruning,
- Perfect Decision Game And Imperfect Decision Game

UNIT III

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- Types Of Knowledge In AI,
 - Issues In Knowledge Representation,
 - Logic Representation,
 - Propositional Logic,
 - Predicate Logic,
 - Forward Chaining And Backward Chaining

UNIT IV

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- Introduction To Uncertainty And Probability,
 - Prior Probability And Posterior Probability,
 - Bayes Rule,
 - Belief Network,
 - Introduction To Perception And Planning In AI,
 - Representation Of Planning,
 - Blocks-world Planning Problem,
 - Components Of Planning System

UNIT V

- Fuzzy Logic,
- Advantage Of Fuzzy Logic Based Systems,
- Introduction To Fuzzy Sets,
- Fuzzy Logic,
- Block Diagram a Fuzzy Logic Based System
 - Fuzzification Modules,
 - Inference Engine,
 - Knowledge Base and Defuzzification Module of a Fuzzy System
- Illustration of the Working of a Fuzzy Logic Based System with an Example,
- Applications Areas: Expert Systems, Finance, Business, Management, Software Engineering, Medicine And Industry

UNIT VI

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- Introduction To Learning,
 - Various Forms Of Learning,
 - Need Of Machine Learning,
 - Types Of Machine Learning,
 - Limits Of Machine Learning,
 - Introduction To Neural Network,
 - Artificial Neural Network And Expert System,
 - How Neurons Activate,
 - Components Of Expert System,
 - Characteristics Of Expert Systems,
 - Benefits Of Expert System,
 - Natural Language Processing,
 - Components Of NLP,
 - Difficulties In NLU,
 - Phases Of NLP

Grading policy

- Attendance – 5%
- CA - (o2)– 25%
- Mid Term – 20%
- End Term Test – 50%

- CA Category : A0202 (Total 2 / Best of 2)

GitHub Classroom

- All assignments and study materials will be available in the GitHub repository.
- To access the repository, you must have a GitHub account.
- An invitation will be sent to the email linked to your GitHub account.
- Simply accept the invitation to gain access to:
 - All lecture materials
 - All lab materials