NORTHWESTERN POLYTECHNIC

SCIENCE DEPARTMENT

COURSE OUTLINE – Fall 2025

CS 3220: Introduction to Artificial Intelligence 3 (3-0-3)

90 Hours for 15 Weeks

Northwestern Polytechnic acknowledges that our campuses are located on Treaty 8 territory, the ancestral and present-day home to many diverse First Nations, Metis, and Inuit people. We are grateful to work, live and learn on the traditional territory of Duncan's First Nation, Horse Lake First Nation and Sturgeon Lake Cree Nation, who are the original caretakers of this land.

We acknowledge the history of this land and we are thankful for the opportunity to walk together in friendship, where we will encourage and promote positive change for present and future generations.

INSTRUCTOR: Dr. Hanna Yehoshyna
OFFICE: C-302
OFFICE HOURS: appointment by email
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CALENDAR DESCRIPTION:

This course gives an introduction to artificial intelligence (AI). The course covers supervised classification based on e.g., artificial neural networks - deep learning, as well as unsupervised learning - clustering, regression, optimizing and reinforcement learning, as well as design of experiments and evaluation. Students will learn how this knowledge is used in areas such as: building smart robots, computer vision and other applications.

PREREQUISITE(S)/COREQUISITE:

- CS2010 - Practical Programming Methodology (3)
- MA1200 - Linear Algebra I (3)
- ST1510 - Introduction to Applied Statistics I (3)

REQUIRED TEXT/RESOURCE MATERIALS:

The text for this course is:

- *Artificial Intelligence: A Modern Approach, 4th edition. Stuart Russell, Peter Norvig, Pearson, 2021, ISBN 978-0134610993*

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DELIVERY MODE(S):

In Person. This course is delivered in person at the Grande Prairie campus.

This course includes 3-hours of lecture per week and a 3-hour lab per week

Lecture:	A2	G112	Mon. 13:00-14:20 Wed. 13:00-14:20
Labs:	L1	G112	Fri. 08:30-11:20

LEARNING OUTCOMES:

On the successful completion of this course, students will be able to

- understand end explain goals and principles of AI, its relationship to other fields, and the problem domains it is suitable for;
- understand end explain core concepts in AI, such as intelligent agents, heuristic and adversarial search, game playing, knowledge representation and reasoning, making decisions;
- identify and describe the characteristics, and formulate an efficient problem space for a given problem using initial and goal states, and operators;
- identify and apply basic models and algorithms used in artificial intelligence for a given problem;
- apply, design and implement different AI techniques and AI-based solution to solve real-world problems;
- work effectively in teams on AI projects.

TRANSFERABILITY:

Please consult the Alberta Transfer Guide for more information. You may check to ensure the transferability of this course at the Alberta Transfer Guide main page http://www.transferalberta.alberta.ca.

** Grade of D or D+ may not be acceptable for transfer to other post-secondary institutions. **Students are cautioned that it is their responsibility to contact the receiving institutions to ensure transferability.**

EVALUATIONS:

Your final grade will be determined in the following manner:

Assignments	*30%*
Quizzes	*10%*
Midterm Exam	*25%*
Final Exam	*35%*

Course Evaluation Practices:

- all assignments must be completed as individual efforts unless the Instructor states otherwise;
- quizzes and tests must be written as scheduled by the Instructor;
- a student must average at least 50% on the tests combined in order to receive credit for this course;
- a student must average at least 50% on the assignments in order to receive credit for this course.

GRADING CRITERIA

Please note that most universities will not accept your course for transfer credit **IF** your grade is **less than C-**.

Alpha Grade	4-point Equivalent	Percentage Guidelines	Alpha Grade	4-point Equivalent	Percentage Guidelines
A+	4.0	95-100	C+	2.3	67-69
A	4.0	85-94	C	2.0	63-66
A-	3.7	80-84	C-	1.7	60-62
B+	3.3	77-79	D+	1.3	55-59
B	3.0	73-76	D	1.0	50-54
B-	2.7	70-72	F	0.0	00-49

COURSE SCHEDULE/TENTATIVE TIMELINE:

Weeks	Topics
1	Introduction to AI
2	Intelligent agents and environments. Problem-solving agents and basic search
3	Uninformed search strategies
4	Informed (heuristic) search strategies
5	Informed (heuristic) search strategies (cont.)
6	Constraint satisfaction problems
7	Adversarial search and games
8	Local agents

Weeks	Topics
9	Logical Agents
10	**Midterm I**
11	First-Order Logic
12	Knowledge representation
13	Uncertain knowledge, reasoning and making decisions
14	Intro to Machine Learning
15	**Final Exam**

STUDENT RESPONSIBILITIES:

- Students are responsible for all material taught, discussed, assigned or presented by the Instructor. It is the student's responsibility to obtain any missed material covered during classes.
- Students take the two examinations at the date and time announced by the Instructor and/or Student Services. If the midterm is missed due to illness the weight will be put on the final. If the final is missed due to illness it will be deferred.
- Documented illness is the only valid excuse for missing an exam. An original medical note will be required in both cases. A grade of 0 may be assigned for any missed exam.
- Students must be prepared for class with the proper books and assignments, and having read and/or completed all assigned material.
- Students are supposed to complete assignments on or before the due the time and date announced by the Instructor
- Students are not permitted to work together on assignments or exams (unless otherwise instructed by the Instructor).

STATEMENT ON ACADEMIC MISCONDUCT:

Academic Misconduct will not be tolerated. For a more precise definition of academic misconduct and its consequences, refer to the Student Rights and Responsibilities policy available at https://www.nwpolytech.ca/about/administration/policies/index.html.

**Note: all Academic and Administrative policies are available on the same page.