

COURSE NAME: GDD502 Artificial Intelligence

Credit Value: 4
Total Course Hours: 56
Prerequisite Course(s): None
Corequisite Course(s): None

COURSE DESCRIPTION

Artificial intelligence is an important component in creating immersive games that react and learn from the player. In this class, students will learn how to create and implement AI in their games, including algorithms that track and follow player movement, move in patrol patterns, and call in reinforcements.

LAND ACKNOWLEDGEMENT

Canadore College resides on the traditional territory of the Anishinaabeg and within lands protected by the Robinson Huron Treaty of 1850. This land is occupied by the people of Nipissing First Nation, Treaty #10 in the Robinson Huron Treaty of 1850 since time immemorial.

PLAR INFORMATION

This course is not eligible for Prior Learning Assessment and Recognition.

COURSE LEARNING OUTCOMES

Upon completion of this course, the student will have reliably demonstrated the ability to:

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| <p>1.0 Evaluate the basics of AI theory.</p> <ul style="list-style-type: none">1.1 Describe the basics of pathfinding.1.2 Discuss how decision trees aid in AI decision making.1.3 Discuss machine learning, deep learning, and other future means of implementing AI systems.1.4 Describe the AI sense / think / act cycle that drives game interactions.1.5 Discuss ways in which AI benefits from decision making that puts the user experience first, and adherence to realism second. <p>2.0 Set up pathfinding in game engines.</p> <ul style="list-style-type: none">2.1 Discuss navigation meshes, what they are, their purpose, and how to create them.2.2 Discuss the difference between static and dynamic navigation meshes.2.3 Demonstrate ability to set up waypoints for AI.2.4 Describe the A* pathfinding algorithm.2.5 Describe traditional pathfinding limitations.2.6 Demonstrate ability to link individual navmesh sections to create a more robust navigation solution. | <p>3.0 Demonstrate Analyze the AI state / decision tree process.</p> <ul style="list-style-type: none">3.1 Analyze the difference between hard coded conditional statements and more standard AI solutions.3.2 Explain how to set behavioural states.3.3 Demonstrate ability to implement world sensing systems for NPCs, such as vision cones, ray casting.3.4 Demonstrate ability to use AI inputs to process state of world.3.5 Demonstrate ability to use result of processing to choose appropriate state for AI.3.6 Demonstrate ability to reset AI back to default state. <p>4.0 Illustrate how to move an NPC through the world.</p> <ul style="list-style-type: none">4.1 Demonstrate ability to feed NPC processing into locomotion, turning, etc.4.2 Demonstrate ability to assign NPC targets.4.3 Demonstrate ability to move NPC towards targets using navmeshes.4.4 Demonstrate ability to move NPCs between linked navmeshes. |
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5.0 Compare and contrast individual, tactical, and strategic AI.

- 5.1 Describe of the concept of individual AI.
- 5.2 Appraise tactical AI, how it allows groups of AI units to make decisions together.
- 5.3 Analyze how strategic AI can drive higher level decision making and strategizing that

trickles down to all AI.

- 5.4 Discuss appropriate use cases for each type of AI.
- 5.5 Discuss ways in which to blend one or more of these AI types together for a more robust AI solution.

GENERAL EDUCATION

This is not a General Education course.

ESSENTIAL EMPLOYABILITY SKILLS OUTCOMES

This course contributes to the following Ministry of Colleges and Universities approved essential employability skills (EES) outcomes:

- 3. Execute mathematical operations accurately
- 4. Apply a systematic approach to solve problems
- 5. Use a variety of thinking skills to anticipate and solve problems
- 6. Locate, select, organize, and document information using appropriate technology and information systems.
- 7. Analyse, evaluate, and apply relevant information from a variety of sources.

EXTERNAL COURSE ACCREDITATIONS AND CONDITIONS

There are no external accreditations or conditions identified for this course.

COURSE EVALUATION

Tests and Quizzes - 40%
 Assignments - 40%
 Labs / Studies - 20%

PROGRAM SPECIFIC GRADING

As per College Grading System

GRADING SYSTEM

A+:	90-100%	B+:	77-79%	C+:	65-69%	D:	50-54%	S - Satisfactory
A:	85-89%	B:	73-76%	C:	60-64%	F:	0-49%	I - Incomplete
A-:	80-84%	B-:	70-72%	D+:	55-59%			F- Repeat Course, included in GPA
								FS- Failure Supplemental

FR- Repeat course,
excluded from GPA

*For a complete chart of grades and descriptions, please see the Grading Policy.

LEARNING RESOURCES

No textbooks have been identified for this course.

Other Resources:

Dr. Davide Aversa - Unity Artificial Intelligence Programming: Add powerful, believable, and fun AI entities in your game with the power of Unity 2018!, 4th Edition ASIN: B07L3CT7ZZ

Resources listed on the course outline support the achievement of learning outcomes, and may be used throughout the course to varying degrees depending on the instructor's teaching methodology and the nature of the resource.

Technology requirements - <https://www.canadorecollege.ca/BYOD>

The Harris Learning Library's staff can help you find resources to support your learning - www.eclibrary.ca

LEARNING ACTIVITIES

In Class instruction/discussion

Instructor demonstration

Individual hands-on practice

In-class assignments

DELIVERY MODE

This course may be delivered, in whole or in part, in a number of modalities, including in class, online, hybrid, in a synchronous or asynchronous manner or a combination thereof, as per accreditation and/or regulatory standards where appropriate.

RECORDING GUIDELINES

This class may be recorded by faculty of the College. Faculty will inform students when recording of the class commences and ceases. 'Recorded' means that the audio-visual and chat portions of the class will be recorded and then be stored on the College or vendor provider server. They will be made available to students, but only for the express and sole use of those registered in this course. If you have any questions or concerns about this recording, please contact your instructor or the College's privacy officer at privacy.officer@canadorecollege.ca. Full recording guidelines can be found at: <https://cdn.agilitycms.com/canadore-college/academic-centre-of->

excellence/Canadore%20Recording%20Guidelines.pdf

ACADEMIC POLICIES

Canadore College is committed to the highest standards of academic integrity, and expects students to adhere to these standards as part of the learning process in all environments. The College's Academic Integrity policy seeks to ensure that all students understand their rights and responsibilities in upholding academic integrity and that students receive an accurate and fair assessment of their work. Please review the Academic Integrity policy (A-18) and other academic policies found on our website:

<https://www.canadorecollege.ca/about/policies>.

COLLEGE POLICIES

- Protecting human rights in support of a respectful college community

For college policies please see: <http://www.canadorecollege.ca/about-us/college-policies>.

STUDENT SUCCESS SERVICES - Your Success Matters!

Student Success Services provides student-focused services to facilitate students' success in their studies. Staff provide support by reducing and/or removing educational-related barriers through individualized accommodations and supports to students with disabilities.

Please visit our webpage to learn more: <https://www.canadorecollege.ca/support/student-success-services> or look for our events on social media.

To connect with Student Success Services email studentsuccessnow@canadorecollege.ca or call 705.474.7600 ext 5205.

FIRST PEOPLES' CENTRE:

A culturally safe environment offering CONFIDENTIAL student focused services, drop in or make an appointment to access:

- One on one counselling
- Elder in residence program
- Peer tutoring
- Peer mentorship
- Lunch & learn workshops on study skills, self-care, life skills
- Learning Resource Centre

Drop by our offices at C254 College Drive, E101 Commerce Court or call 705 474 7600 Ext. 5961 College Drive /

5647 Commerce Court.

<https://www.canadorecollege.ca/experience/indigenous-student-experience>

WAIVER OF RESPONSIBILITY

Every attempt is made to ensure the accuracy of this information as of the date of publication. The college reserves the right to modify, change, add, or delete content.

HISTORICAL COURSE OUTLINES

Students use course outlines to support their learning. Students are responsible for retaining course outlines for future use in applications for transfer of credit to other educational institutions.