

Technology & Visual Arts

ARTIFICIAL INTELLIGENCE ROBOTICS AND AUTOMATION

AIDI1012 – 01 _ Classroom: BA_K 224

Fridays - 11am – 14pm

AIDI1012 – 02 _ Classroom: BA_K 320

Fridays - 15pm – 18pm

(Winter 2023)

Course Presentation: GC Flex

[GC Flex](#) gives students choice and flexibility. Using technology-enabled, purpose-designed learning spaces, professors deliver lectures and labs in the classroom and simultaneously online.

Course Description:

Artificial Intelligence (AI) systems can be used to enable robotic devices to better interact with their physical environment, as well as enhance the autonomy and efficiency of automation systems. Students apply AI concepts to robotic devices to solve real-world challenges and integrate AI technologies with traditional automation systems such as heating, ventilation and air conditioning (HVAC) and progressive assembly systems to create intelligent automation solutions.

Resources:

<https://gc.blackboard.com>

Instructor:

Alireza Ghaffari, Ph.D.

alireza.ghaffari@georgiancollege.ca

Office Hours:

Fridays 09:00 am – 11:00 am (GMT-5), either Online or in person with appointment.

Appointments should be requested by email.

Building – Room: K - 224 & K - 320

Evaluation:

Assignments **40%**

Quiz **20%**

Project (s) **40%**

Schedule of Activities:

WEEK	Date	Module	TOPIC	ASSESSMENT*/Quiz	Project**
1	01/13	Module-1 Introduction to Edge AI	Course Overview AI-Introduction	Assignment – 1 (10%) Module-1-Lab-image-video Module-1-Lab-parallel-programming Module-1-Lab-pred-classification-ml Module-1-Lab-pycuda-mandelbrot	<div>Jetson Nano Project (See the instruction in course BB)</div> <div>The basic/minimum level (50-65 out of 100), either Road following or Object Following</div> <div>The average level (66-80 out of 100), Combination of Road/object following and collision avoidance</div> <div>The most advanced level (>80 - 100), Running two or more Jabot to follow road, object and avoiding collision</div>
2	01/20		AI-Hardware	Module-1-Quiz (5%) Cont. Assignment –1	
3	01/27		Introduction to Jetson Nano	Cont. Assignment –1	
4	02/03	Module-1&2 Vision Deep Neural Networks	Edge-IoT-Big Data	Assignment –2 (10%) Module-2-Lab-hello-ai-world Module-1-Lab-intro-rapids-cudf Module-21-Lab-acc-workloads-rapids	
5	02/10		parallel programming (New added - Refactoring)	Module-2-Quiz (5%) Cont. Assignment –2	
6	02/17	Module -2&3 Diversity, Ethics, and Security	ML Fundamentals (New added - Introduction to ANN)	Assignment –3 (10%) Module-3-Lab-image-redaction Module-3-Lab-video-redaction	
7	02/24		Image Classification (New added - Activation- Function and Perceptron, & Advanced NN)	Module-3-Quiz (5%) Cont. Assignment –3	
Reading Week- No Class					
8	03/10	Module-4 Autonomous Robotics	Agent Architectures	Cont. Assignment –3	
9	03/17		Teaching Machines to Act	Assignment –4 (10%) Module-4-Lab-jetbot-autonomous-nav Module-4-Lab-jetbot-autonomous-nav-ros- gazebo	
10	03/24		Introduction to ROS2	Module-4-Quiz (5%) Cont. Assignment –4	
11	03/31		Robot Navigation	Cont. Assignment –4	
12 13 14	04/07 04/14 04/21	Complete and submit Jetson Nano project (40%)			

The sequence and content of this syllabus may change due to unanticipated opportunities or challenges, or to accommodate the learning styles of the students.

Due to extenuating circumstances and to accommodate the need for this program to be offered remotely, there may be some modifications to the evaluation/assessment. This has been approved by the Dean of Technology & Visual Arts (TVA), as directed by the Vice President, Academic.

** In general, Assignments must be submitted before starting the next the assignment. The exact date of submission for each individual assignment will be noted in each instruction. Assignments must be submitted in format of **PowerPoint with maximum 5 slides**.*

*** Projects must be submitted by end of the day on **December 21st, 2022 @ 11:30 pm**. You can find full instruction for the final project in **BB** within **next two weeks after starting the course**.*