DEEP LEARNING II

School of Comp. Technology

Course Code: AASD4014	**Co-Requisites:** Please see Course Related Information	**Pre-Requisites:** Please see Course Related Information
Applicable Program(s): T431 - Applied A.I. Solutions Development	**Core/Elective:** Core	
Prepared by:	Moe Fadaee, Professor	
Approved by:	Chair Computer Technology, Chair, School of Comp. Technology	
Approval Date:	Friday, February 25, 2022	
Approved for Academic Year:	2021-2022	
Contact Hours:	48.00	
Credit Hours:	3.00	

Course Description

This course will dive into the advanced concepts of Deep Learning. The focus of this course will be on the development of Deep Learning models for image and video processing. Students will gain hands-on experience with popular tools, techniques, and libraries such as OpenCV, Keras, and Tensorflow, as well as the advanced applications of multi-layered Deep Neural Networks.

Essential Employability Skills

This course contributes to your program by helping you achieve the following Essential Employability Skills:

EES 1   COMMUNICATION: Communicate clearly, concisely and correctly in the written, spoken and visual form that fulfills the purpose and meets the needs of the audience. (P, E,)

EES 2   COMMUNICATION: Respond to written, spoken or visual messages in a manner that ensures effective communication. (P, E,)

EES 3   NUMERACY: Execute mathematical operations accurately. (P, E,)

EES 4   CRITICAL THINKING & PROBLEM SOLVING: Apply a systematic approach to solve problems. (T, P, E,)

EES 5   CRITICAL THINKING & PROBLEM SOLVING: Use a variety of thinking skills to anticipate and solve problems. (T, P, E,)

EES 6   INFORMATION MANAGEMENT: Analyze, evaluate and apply relevant information from a variety of sources. (T, P, E,)

EES 7	INFORMATION MANAGEMENT: Locate, select, organize and document information using appropriate technology and information systems. (T, P, E,)
EES 8	INTERPERSONAL: Show respect for diverse opinions, values, belief systems and contributions of others. (P, E,)
EES 9	INTERPERSONAL: Interact with others in groups or teams in ways that contribute to effective working relationships and the achievement of goals. (T, P, E,)
EES 10	PERSONAL: Manage the use of time and other resources to complete projects. (T, P, E,)
EES 11	PERSONAL: Take responsibility for one's own actions, decisions and consequences. (P, E,)

Note: "T" means elements of the skill are taught; "P" means elements of the skill are practiced; "E" means elements of the skill are evaluated; "C" means the skill culminates.

Course Learning Outcomes

When you have earned credit for this course, you will have demonstrated the ability to:

CLO 1	AASD 4014 CLO1 - Train, evaluate, and optimise advanced Neural Networks for Computer Vision
CLO 2	AASD 4014 CLO2 - Build advanced image processing algorithms using Convolutional Neural Networks.
CLO 3	AASD 4014 CLO3 - Apply image analysis techniques for Object detection, Object Segmentation, Object Classification, Image captioning, Image Understanding
CLO 4	AASD 4014 CLO4 - Apply video analysis techniques for Object Tracking, Object Localization, and Augmented Reality.
CLO 5	AASD 4014 CLO5 - Build advanced Deep Learning Computer Vision models using OpenCV, Keras and Tensorflow
CLO 6	AASD 4014 CLO6 - Implement Generative Adversarial Networks

Delivery Methods/Learning Activities

The instructional methods of this course are comprised of a combination of lectures, demonstrations, hands-on exercises and take-home assignments.

Learning Resources

Required: N/A
Recommended: N/A

Course Related Information

Prerequisites: AASD 4012

Corequisites: None

TESTING POLICY:

- Students must complete tests and the final exam on the assigned day. If unable to complete the test/exam as scheduled, students are required to notify the professor at least three days prior to the date, so alternative arrangements can be made. Failure to comply with this policy may result in a zero grade.
- Lab tests must be completed based on given instructions and must be completed during the lab hours. There will be no partial marks awarded for any of the lab tests if they are not complete.
- There will be no makeup quiz and lab exercises, for medical or other reasons. If you anticipate missing more than 2 quizzes or lab exercises for serious, major reasons, see your professor beforehand.

ASSIGNMENT POLICY:

- All assignments must be submitted on the due date based on an instruction given by the professor. Late assignment, will be penalized 20% per day to maximum of 5 days, weekend included unless the student has notified the professor (via e-mail, phone or in person) ahead of the due date that he/she has a valid reason for late submission.
- Students are responsible for making sure their marks are up to date on the blackboard. No mark will change after two weeks from the time marks were posted on Blackboard.

George Brown Related Information

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ACKNOWLEDGEMENT OF THE TRADITIONAL LAND

We would like to acknowledge that George Brown College is located on the traditional territory of the Mississaugas of the Credit First Nation and the land of other Indigenous Peoples who have lived here over time.

PROGRAM LEARNING OUTCOMES

College programs are designed to deliver program learning outcomes that relate to the unique content of a particular area of study. To review the specific program learning outcomes for your program, please go to your program page on the George Brown College website at https://www.georgebrown.ca/

IMPORTANT PROGRAM INFORMATION

Students are advised to consult program coordinators regarding specific requirements for successfully completing their program, including adding/dropping courses and other issues that might disrupt their course of study.

RETENTION OF COURSE OUTLINES

Students are expected to retain their course outlines to support learning in the course and for future use in applications for transfer of credit to other educational institutions.

COLLEGE POLICIES

It is essential that students review all college policies, including Academic Policies available at https://www.georgebrown.ca/policies.

DIGITAL LEARNING REQUIREMENTS

Students are required to have access to a computer and to the internet. There may also be additional technology-related requirements to participate in a course that are not included in the course materials fee, such as headphones, webcams, specialized software, etc. Details on these requirements can be found in the course outline for each course.

The Library Learning Commons (LLC) has a limited number of devices including laptops and portable WIFI devices to support students; however, the LLC cannot guarantee access to a device for all students.

ACCESSIBLE LEARNING SERVICES FOR STUDENTS

Accessible Learning Services facilitates academic support and services for George Brown College students with physical, sensory, learning, medical or mental health disabilities. Delivered in collaboration with academic departments and other service areas, these services are available to students in all programs at all campuses.

George Brown College is committed to upholding a student's right to individualized and timely accommodation that promotes dignity, independence, autonomy, equity, and inclusion for the student. In addition to our current supports, we are working to eliminate barriers by increasing access to alternate formats, planning accessible buildings and classrooms, enhancing employee training, and adopting inclusive practices in placement and on campus.

Only those involved in a student's accommodation plan shall be alerted to their registration with Accessible Learning Services, and a student's registration with Accessible Learning Services will not be identified on the student's official college transcript and/or graduation documentation. For more information, please visit the Accessible Learning Services website at http://www.georgebrown.ca/accessible-learning-services/ or call 416-415-5000 ext. 2622 or email letstalk@georgebrown.ca

EQUITY STATEMENT

George Brown College values the diversity of our students, employees, and community partners, and is committed to providing a learning environment where all people are safe and respected. Comments, behaviours, or interactions that are inconsistent with our values may be a violation of the following college policies: Sexual Assault and Sexual Violence, Human Rights Discrimination and Harassment, and the Prevention of Workplace Violence and Harassment. These types of actions or comments are not acceptable and will not be tolerated. The commitment and cooperation of all students and employees is required to maintain a welcoming environment in which to learn and work.

Support and information are available through a Human Rights Advisor at diversity@georgebrown.ca or the Sexual Violence Response Advisor at svra@georgebrown.ca

For information on the relevant policies visit https://www.georgebrown.ca/diversity/

TEXT-MATCHING DETECTION SOFTWARE

Text-matching detection software assists faculty and students in preventing and detecting plagiarism. Faculty may use such software to check the originality of the academic work students submit in a course by comparing submitted assignments to those contained in publicly accessible internet sites, and academic journals, as well as databases of

submitted papers and other sources. Faculty may not submit any student work that contains personally identifiable information through a text matching/anti-plagiarism tool or require students to do so.

Automated text matching software will be made available to all academic staff and students to promote academic integrity and appropriate documentation of sources. Professors may choose to use the college-approved automated text matching detection software in their courses. Students are permitted to submit draft assignments prior to the due date, and to receive the screening report that is also available to professors.

Student Evaluation System

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Below is a list of evaluation methods included in this course along with the course learning outcomes (CLO) and essential employability skills (EES) assessed by each. In some cases, program learning outcomes (PLO) assessed may also be indicated.

Participation (10%)

In class participation in various activities

> Validates Outcomes: CLO 1, CLO 2, CLO 3, CLO 4, CLO 5, CLO 6, EES 1, EES 2, EES 3, EES 4, EES 5, EES 6, EES 7, EES 8, EES 9, EES 10, EES 11

Lab Activity(ies) (30%)

Needs to submit/present the week after @ 5 Marks eachWeekly Hands-on exercises/ Assignments

> Validates Outcomes: CLO 1, CLO 2, CLO 3, CLO 4, CLO 5, CLO 6

Project(s) (30%)

Individual Assignments

> Validates Outcomes: CLO 1, CLO 2, CLO 3, CLO 4, CLO 5, CLO 6

Final Exam (30%)

This is a short answer exam that will evaluate the knowledge of the student

> Validates Outcomes: CLO 1, CLO 2, CLO 3, CLO 4, CLO 5, CLO 6, EES 1, EES 2, EES 3, EES 4, EES 5, EES 6, EES 7, EES 8, EES 9, EES 10, EES 11

Prior Learning Assessment and Recognition

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Prior learning assessment and recognition (PLAR) is a process that gives students the opportunity to obtain academic credit for one or more courses in a certificate, diploma or degree based on demonstrated prior learning acquired through life experiences before enrollment in a program. More information regarding PLAR can be found on the GBC website at: http://www.georgebrown.ca/plar/

• This course is PLAR eligible, please see Program Coordinator/Chair for more information.

Grading System

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The passing grade for this course is 50% / "D"

Final Grade	Percentage	Weight
A+	90-100	4.0
A	86-89	4.0
A-	80-85	3.7
B+	77-79	3.3
B	73-76	3.0
B-	70-72	2.7
C+	67-69	2.3
C	63-66	2.0
C-	60-62	1.7
D+	57-59	1.3
D	50-56	1.0

Refer to the Evaluation System on this outline for information on how marks are distributed. More detailed information on assessments may also be found in your Course Section document.

As per Office of the Registrar Policies:

"A" Range = GPA 4.0-Consistently exceeds (course) requirements; shows evidence of being well-organized; shows original and creative thinking and a superior grasp of subject matter.

"B" Range = GPA 3.0-Shows consistent performance and evidence of being well-organized, shows elements of original and creative thinking; has a strong grasp of subject matter

"C" Range = GPA 2.0-Applies the subject matter appropriately; comprehends the subject matter."

"D" Range = GPA 1.0-The student inconsistently applies and communicates knowledge of the subject matter

"F" Range = GPA 0.0-The student fails to apply and communicate an understanding of the subject matter.

Additional information regarding grading for this course may also be found in the "Course Related Information" section of this course outline.

Legend

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Terms
- ILO: Indigenous Learning Outcome
- Apprenticeship LO: Apprenticeship Learning Outcome
- CLO: Course Learning Outcome
- DPLO: Degree Program Learning Outcome
- EES: Essential Employability Skill
- EOP: Element of Performance

- GELO: General Education Learning Outcome
- LO: Learning Outcome
- APO: Additional Program Outcome
- PLA: Prior Learning Assessment
- PLAR: Prior Learning Assessment and Recognition
- PLO: Program Learning Outcome