# computing and Information Systems Department

# Trent University

**COIS 4550H - Artificial Intelligence**

**2019 - Summer**

**Distance Education/Online**

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| **Instructor:** Brian Hircock | **Email:** bhircock@trentu.ca |

**Technical Help**

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| **Technical support:** Learning System Team | **Email:** online@trentu.ca |
| **Local Telephone:** 705-748-1010 | **Toll-free:** 888-739-8885 ext. 1010 |

**Administrative Help**

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| **Academic Administrative Assistant:** Bonnie MacKinnon | **Email:** cois@trentu.ca |
| **Office Location:** OCA 102.6 | **Telephone:** 705-748-1011 ext 7802 |

### Course Description:

This is a general-interest course intended to spur the students’ interest in Artificial Intelligence (AI), which frankly is very easy due to the amazing things that AI researchers are capable of doing now and the promise for the future. We examine more about the why and what can be done, along with available tools, rather than the finer details of how it could be built. So programming ability is not a necessity but there are opportunities for students to write code if they choose.

#### Course Pre-requisites: 10.0 university credits with one of COIS 1020H, 1520H, or 1620H recommended.

### Learning Outcomes:

I have developed the course to address several learning outcomes. By the end of the course a successful student should:

* Become aware of the history of AI and its historical limitations.
* Discover the connections between discoveries in other fields and AI.
* Learn the concepts and limitations of Classical AI.
* Become aware of the concepts and uses for Evolutionary Computing (Genetic algorithms, genetic programming)
* Learn how neural nets work and their applications.
* Become aware of intelligent agents, both hardware and software.
* Learn how AI can be used in games
* Discover how AI impacts out everyday lives now and potentially in the future

### Online Course Structure

In this course students will be presented with material in various ways:

* Posted course notes and other readings
* Short audio clips stressing the key points of each module
* Discussion groups
* Online video clips

### Course Format:

The course consists of 6 modules. There will be 4 assignments and a report. Students are also expected to take part in online discussions as part of the assignments. There will an invigilated final exam.

### Required Course Material: None

#### Reference Texts:

* Engelbrecht, AP. Computational Intelligence: An Introduction (2007)
* Holland, John. *Emergence: From Chaos to Order (1998)*
* Negnevitsky, M. *Artificial Intelligence: A Guide to Intelligent Systems 3rd ed. (2011)*
* Wolfram, Stephen, *A New Kind of Science (2002)*

### Proposed Course Schedule

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| **Module** | **Topic** | **Dates** |
| **1** | **Introduction** | May 8 – 14 |
| **2** | **Background** | May 15 - 21 |
| **3** | **Traditional AI** | May 22 – 28 |
| **4** | **Evolutionary Computer Learning** | May 29 - June 4 |
| **5** | **Intelligent Agents** | June 5 – 11 |
| **6** | **AI Now and in the Future** | June 12 - 15 |

### Course Evaluation:

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| **Assignment** | **Value** | **Due Date – at 11:59pm** |
| **Assignment 1** | **10%** | May 20 |
| **Assignment 2** | **15%** | May 27 |
| **Assignment 3** | **15%** | June 10 |
| **Assignment 4** | **10%** | June 17 |
| **Final exam** | **50%** | TBD - either June 17 or 18 |

### Brief Description of Assignments:

On Assignment 1 you will be asked to write an essay on your perceptions of what AI is and what it is not. You will also comment on what you see for the future.

Assignment 2 will cover the material from Module 1 and 2. Module 1's questions will consist of short to medium answer questions which discuss intelligence and how and if it can be measured. How do we tell if a computer is intelligent? The assignment will introduce students to the problems involved in describing or measuring intelligence. Module 2's questions will consist of a problem set based on the background material. The assignment will involve using various types of Cellular Automata and introduce the students to the concept of finite machines

Assignment 3 will cover Modules 3 and 4. Students will be asked to solve problems and design a game using genetic programming techniques.

On Assignment 4, you will be asked to write a report on a specific AI technique or on a particular application area.

**Final Exam:**

The final exam must be invigilated. You may write the exam at Trent in Peterborough or Oshawa or at George Brown College in Toronto or elsewhere dependent on where you are located. You will be asked early in the term where you want to write the final exam. The final exam will cover all of the modules and may consist of multiple choice, and true/false or short answer questions. It will be 3 hours in duration and will be written during the regularly scheduled exam period in December. You will be permitted to bring a one page ‘study sheet’ to this exam. You may use both sides and put anything that you like on it. The final exam will be scheduled during the regular exam period.

**Contacting Your Instructor:**

Email is the preferred way to contact me. Simple short answer questions should be answered within 24 hours – more complex questions may take up to 48 hours.Please include your course number in the subject of your e-mail and use your Trent e-mail account to ensure that your message is not spam-filtered accidentally.

**Technology:**

This is an **online course**. It is the responsibility of you, the student, to ensure that you have the appropriate technology to access the course.

* It is your responsibility to ensure you are able to submit assignments online in the appropriate format (usually .pdf, but see the instructions for each assignment for the accepted formats)
* It is your responsibility to ensure all of your assignments have been submitted properly. Submission areas permit you to verify your documents once they have been submitted.
* Material submitted incorrectly, or in an unreadable format, will receive the standard penalty for lateness until submitted correctly.
* If you are experiencing technological difficulties accessing any of the content in this course, you should contact the Information Technology Service Desk as soon as possible (<http://www.trentu.ca/it/>, phone 705-748-1010, or visit the IT Support Desk in the basement of the Bata Library.

### Policy on Exams and Assignments:

* **Final Exam:** Students should ***not make any commitments*** (e.g. vacation, job-related activities, or other travel plans) during the final examination period. Students are required to be available for all examinations during the periods for which they are scheduled (as published in the course syllabus or university time table).
* **Assignment and Assessment Instructions:** Assignments and Assessments have specific instructions regarding acceptable online submission formats (e.g. .pdf). Failure to follow the instructions outlined in each assignment or assessment may result in a grade of 0 for each incident.
* **Valid Submissions:** Always check that your assignment was submitted correctly by returning to the assignment area and re-opening your submission. Assignments in incorrect formats, or assignments that are left un-submitted in the assignments area past the date due, will not be accepted.
* **Deferral of Final Examinations and Extensions for Assignments:** Extension of due dates for completion of assignments or writing of final examinations may be granted to students on the basis of illness, accident or other extreme and unanticipated legitimate circumstances beyond the student’s control, with supporting documentation.
* **Supporting Documentation:** Supporting documentation will be required and must be submitted before deferrals are approved. For illness or accident, supporting documentation will take the form of:
  + The Trent University Medical Certificate from Health Services (http://www.trentu.ca/healthservices/medical.html)
  + A certificate or letter from the attending physician clearly indicating the start and end dates of the illness and the student’s inability to write an examination, complete an assignment, or participate in group activities or,
  + For other circumstances, students should consult the instructor about acceptable forms of documentation.
* **Independent work: A**ll of the work that you submit for assessment must be your own. Submissions may be scanned by SafeAssign to detect plagiarism.

#### Penalties:

* Assignments and projects are to be submitted by the time and date they are due, which will be stated above in the syllabus for each assignment.
* Due Times are given in either Eastern Standard Time (EST) or Eastern Daylight Time (EDT), appropriate to the time of year. Students in other time zones need to adjust the deadlines to their local time accordingly (e. g. an assignment due at 4:00 pm will be due at 1:00 pm if you are taking the course in Vancouver)
* Any assignment or project submitted after this time and date will be considered late and assigned a penalty of 10% per day.
* Assignments or projects will not be accepted more than 7 days after the due date, and will automatically receive a grade of 0 at that point.

#### Special Circumstances

If there are cases of exceptional circumstances surrounding a student’s inability to complete allocated course work, these should be brought to the attention of the instructor, with the appropriate supporting documents, as soon as possible. Extensions arranged after an assignment is due will normally not be granted. Each situation with regard to extensions or potential penalties will be judged on a case-by-case basis.

### University Policies

### Academic Integrity:

Academic dishonesty, which includes plagiarism and cheating, is an extremely serious academic offence and carries penalties varying from a 0 grade on an assignment to expulsion from the University. Definitions, penalties, and procedures for dealing with plagiarism and cheating are set out in Trent University’s Academic Integrity Policy. You have a responsibility to educate yourself – unfamiliarity with the policy is not an excuse. You are strongly encouraged to visit Trent’s Academic Integrity website to learn more: [www.trentu.ca/academicintegrity](http://www.trentu.ca/academicintegrity).

#### Access to Instruction:

It is Trent University's intent to create an inclusive learning environment. If a student has a disability and/or health consideration and feels that he/she may need accommodations to succeed in this course, the student should contact the Student Accessibility Services Office (SAS), Blackburn Hall Suite 132, 705-748-1281 or email [accessibilityservices@trentu.ca](mailto:accessibilityservices@trentu.ca). For Trent University in Oshawa Student Accessibility Services Office contact 905-435-5102 ext. 5024. Complete text can be found under Access to Instruction in the Academic Calendar.