

COSC420 Intelligent Tutoring Systems – Course Outline

Course supervisor: Tanja Mitrovic

February 2024

Course Aims

This course addresses the use of Artificial Intelligence to create computer-based Intelligent Tutoring Systems (ITSs). Students will learn theoretical and data-driven methods for creating ITSs. ITSs have been demonstrated to enhance student learning significantly in many domains, including, to name a few, mathematics, computer science, medicine, biology and engineering. In addition to discussion and readings about methods and models of problem solving, learning, and tutor design, the course will have a "learning by doing" component.

Learning Outcomes

After successful completion of this course, students will be able to:

- understand key ideas in the area of Artificial Intelligence in Education
- understand the basics of psychology of learning
- critically assess approaches to student modelling in ITSs
- develop constraints and production rules for use in ITSs
- develop small-scale constraint-based tutors
- understand current research topics in the area of Artificial Intelligence in Education

Lectures and Lecturers

Lectures will be given by Prof Tanja Mitrovic (email tanja.mitrovic@canterbury.ac.nz).

Lecture times and locations will be published on the Course Information System (CIS).

Recommended Preparation: COSC367

Assessment

Type	Worth	Due Date
Assignment 1	5%	8.3.2024
Assignment 2	15%	26.4.2024
Assignment 3	25%	28.5.2024
Review and Presentation	15%	TBA
Exam (open book, 2 hours)	40%	TBA

Review of selected papers and presentation (15%): You will be assigned some papers to read, and will need to write a short review (one paragraph) and email it to the lecturer at least one hour before the lecture. Your review may contain questions about the paper, or a

description of the most important point of the paper. You will also participate in class discussion on these papers. You will present one paper to the class.

No assignments will be accepted after the drop dead date (i.e. a week after the assignment is due). The penalty for the late submission of an assignment will be an *absolute* deduction of 15% of the maximum possible mark.

In order to pass a course you must meet two requirements:

- a) The university has adopted a common scale for converting marks to grades. According to this scale, an average mark of 50% is sufficient to pass the course (i.e. to achieve a C-), with an average mark of 55% a C grade is achieved and so forth. We apply this conversion scale to the average marks students achieve over all assessment items.
- b) You must achieve an average mark of at least 45% on invigilated assessment items. Marks are sometimes scaled to achieve consistency between courses from year to year.

Reference Material

Course notes will be available on Learn, as well as some papers.

Important documents

Notices about this course will be posted to the course forum in the Learn system (learn.canterbury.ac.nz). CSSE students will also be made members of a class called "CSSE Notices", where general notices will be posted that apply to all classes (such as information about building access or job opportunities).

There are several important documents available online about departmental regulations, policies and guidelines at the following site. We expect all students to be familiar with these. <http://www.cosc.canterbury.ac.nz/policy/>

Tentative lecture schedule

Week	Topic
1	Psychology of learning, Computers in Education
2	Student Modeling
3	Model/Knowledge tracing
4	Constraint-based Modeling, Think-aloud protocol
5	SQL-Tutor, EER-Tutor
6	Authoring tools, ASPIRE
Semester break	
7	Evaluation of ITSs
8	
9	Third generation tutors (metacognition and affect)
10	Selected topics
11	Selected topics
12	Assignment 3 presentations, Course review