

University of Alberta**PSYCO 457 “Embodied Cognitive Science”****Section: X02****Fall Term 2019****Instructor: Professor Michael R.W. Dawson****Office:** BSB P-108 (Biological Computation Project Lab)**Phone:** 780-492-5175**E-mail:** mdawson@ualberta.ca**Web Page:** http://www.bcp.psych.ualberta.ca/~mike/Pearl_Street/INTD554/**Office Hours:** See web page (URL given above) for hours, contact information, etc. for the instructor**Lecture Time & Room:** **Tuesdays, 6:30-9:30 pm, BSB P-116**

Course Description: Introduction to theory and practice of embodied cognitive science, focusing on phenomena that emerge from agent-environment interactions, including how even simple agents can produce apparently complex behavior. [Faculty of Science]

Course Prerequisites: STAT 141 or 151, PSYCO 354 and one other 300-level psychology course.

Course Objectives and Expected Learning Outcomes: The goal of this course is to provide students with a solid working knowledge of cognitive science from a meta-theoretical perspective. The meta-theoretical theme for the course this year is “synthetic psychology and embodied cognitive science”. Exploring this theme will involve contrasting different approaches to understanding cognition: the analytic tradition versus the synthetic tradition. The primary goal of the course is to introduce the methodology of what is known as “embodied cognitive science”, and to examine how this methodology can be applied to psychology. In embodied cognitive science, builds cognitive agents that interact with a complex environment. One issue that I would like to have percolating throughout the course is the extent to which this embodied approach can be shaped into a discipline that I will call “synthetic psychology”. Another important objective of the course is to provide students with a certain amount of computer literacy, as well as some expertise in building and programming Lego robots. All students will be participating in a robot construction project that will result in new information about cognitive science being provided to others in the form of a web page. No prior experience with working with robots, web pages etc is expected.

Required Textbooks:

Dawson, M.R.W., Dupuis, B., & Wilson, M. (2010) *From Bricks To Brains: The Embodied Cognitive Science of LEGO Robots*. Edmonton, AB: Athabasca University Press.

Shapiro, L. (2011). *Embodied Cognition*. New York: Routledge

Recommended or Optional Learning Resources:

Additional readings and some supplementary readings will be provided on the course website for the lectures for which they are appropriate. In the table below they are indicated by the phrase “See website for this week’s reading”.

Lecture Schedule & Assigned Readings:

DATE	TOPIC	READING	ACTIVITY	ASSIGNMENT
Sep. 3	Fast, Cheap, And Out Of Control	No Reading	Introductory Discussion	None Due
Sep. 10	Mind Control – Internal or External?	Dawson, Dupuis & Wilson Chapter 1	Discussion of <i>Fast, Cheap, and Out of Control</i>	None Due
Sep. 17	Classical Music and the Classical Mind	Shapiro Chapter 1 Dawson, Dupuis & Wilson Chapter 2	TBA	Paper Stage 1 Due
Sep. 24	Situated Cognition and Bricolage	Shapiro Chapter 2 Dawson, Dupuis & Wilson Chapter 3	TBA	Media Review #1 Due
Oct. 1	LEGO Design	Shapiro Chapter 3 Dawson, Dupuis & Wilson Chapter 4	Build Vehicle 2	None Due
Oct. 8	Thoughtless Walkers	Shapiro Chapter 4 Dawson, Dupuis & Wilson Chapter 5	Program and Explore Vehicle 2	Paper Stage 2 Due
Oct. 15	Machina speculatrix	Shapiro Chapter 5 Dawson, Dupuis & Wilson Chapter 6	Build AntiSLAM	None Due
Oct. 22	The Subsumption Architecture	Shapiro Chapter 6 Dawson, Dupuis & Wilson Chapter 7	Program and Explore AntiSLAM	Media Review #2 Due
Oct. 29	Embodiment, Stigmergy, and Swarm Intelligence	Shapiro Chapter 7 Dawson, Dupuis & Wilson Chapter 8	More AntiSLAM Exploration	Paper Stage 3 Due
Nov. 5	Totems, Toys – or Tools?	Dawson, Dupuis & Wilson Chapter 9	Group Robot Project	None Due
Nov. 19	Humanoid Situation	See website for this week's reading	Group Robot Project	None Due
Nov. 26	Social Robotics	See website for this week's reading	Group Robot Project	Media Review #3 Due
Dec. 3	Discussion of Paper Topics and Robot Projects	No Reading	Discussions and Presentations	Paper Stage 4 due Robot Project Due

Representative Evaluative Material: Past or representative material for evaluating performance in the course will be available from the course website.

Grade Evaluation:

Scaffolded Final Paper Project:	50%
Media Reviews (3 worth 10% each):	30%
Robot Exploration Project:	20%

How I Assign Your Letter Grade:

Letter Grade For Course	Final Mark (In Percent) To Obtain That Letter Grade
A+	89 – 100
A	85 – 88.9
A-	80 – 84.9
B+	77 – 79.9
B	71 – 76.9
B-	66 – 70.9
C+	61 – 65.9
C	57 – 60.9
C-	52 – 56.9
D+	50 – 51.9
D	48 – 49.9
F	0 – 47.9

Grades are unofficial until approved by the Department and/or Faculty offering the course.

Missed Term Assignments:

A student who cannot complete a term assignment due to incapacitating illness, severe domestic affliction or other compelling reasons can apply for an extension of time to complete an assignment. This is to be done by consulting with the instructor. Deferral of term work is a privilege and not a right; there is no guarantee that a deferral will be granted. Misrepresentation of Facts to gain a deferral is a serious breach of the *Code of Student Behaviour*.

DESCRIPTION OF COURSE EVALUATION COMPONENTS**Scaffolded Final Paper Project:**

Students are required to write a 15 to 20 page paper, with the topic of the paper being selected by the student in consultation with the instructor. In general, the paper should attempt to relate some topic of interest to the student with the themes developed in the course. For instance, a review paper that explored how robots are being used to study a topic of interest to the student is an example of the kind of paper appropriate for the course. Similarly a paper about the embodied cognitive science of a topic of interest to the student is another example.. **This paper project is scaffolded, so that it is developed in four stages, and each stage is handed in for grading.** The course homepage provides a detailed description of each stage, how it will be graded, and its contribution to the total value of 60%. **The due dates for each stage are provided in the table on page 2 of this document!** A detailed description of each stage is provided in a separate document available on the course website.

This paper is of major importance for the course, and one of my main objectives is to provide students with a positive writing experience, and to provide some guidance and structure for this writing project. *To accomplish this, I am using a paper sequencing or paper scaffolding method for this assignment.*

With this approach, students will accomplish four different structured writing tasks, all of which are designed to produce a solid term paper when they are accomplished. Each of these tasks can be viewed as a stage in writing the paper. A brief description of each stage is in the table below; a separate document on the course website describes each of the four stages in more detail, and provides the rubrics that I will use to mark each stage. The course syllabus indicates when each stage of this sequenced project is due. The four stages together define a paper project worth 50% of the total grade for the course; the worth of each individual stage is provided in the table below as well.

Stage	Content	Worth of Total Course Grade	Highest Possible Raw Score
1	Title, Topic, Three References	5%	5
2	Annotated Bibliography	10%	50

3	Introductory Paragraphs, Outline, Reference List	10%	70
4	Final Term Paper	25%	70
		50% Total	

Robot Project

Students will work in small groups (2-4 students) to construct, program, and document the behavior of a robot constructed from LEGO Dacta materials available from the instructor. The basics of robot construction will be covered in the course. Usually students take one of the two robot chassis that we cover in the course, and modify its construction and/or its programming. Documentation usually involves photographing modified chassis, and video recording of robot behavior. This kind of documentation is frequently put on the course web page.

In addition to this documentation, student groups will compile a short paper (typically 5 pages long) that describes the robot project – that is, provides an account of the purpose of the project, the robot's construction, the program used to control the robot's behavior, observations of the behavior, and a discussion of the implications. The group will turn in one report, and all members of the group will receive the same grade. The robot project is graded according to the criteria that are available on the course website.

Media Reviews

One of the exercises used in this course to encourage students to reflect upon course themes, and to develop their writing, is to have students write short reviews (5 pages) of popular media. The purpose of the review is to consider the work of art in the context of course themes. In other words, each short paper will review one (or more) works of popular media, and the review will tie the work into the course. Three such reviews will be conducted in the term; the due dates are listed above. Each review will be worth 10% of your final grade.

There are four categories of popular media available for review: non-fiction books, novels, movies, and music. The hope is that students will sample from a variety of different media types. Rather than listing the available media, students are encouraged to visit the 'black shelf' in my lab in order to examine what is available for review. Criteria for marking media reviews are provided on the course website.

Missed Term Assignments:

For an excused absence where the cause is religious belief, a student must contact the instructor(s) within two weeks of the start of Fall or Winter classes to request accommodation for the term (including the final exam, where relevant). Instructors may request adequate documentation to substantiate the student request.

A student who cannot write a term examination or complete a term assignment due to incapacitating illness, severe domestic affliction or other compelling reasons can apply for extension time to complete an assignment. In all cases, instructors may request adequate documentation to substantiate the reason for the absence at their discretion.

Deferral of term work is a privilege and not a right; there is no guarantee that a deferral will be granted. Misrepresentation of Facts to gain a deferral is a serious breach of the *Code of Student Behaviour*.

Student Responsibilities:

Policies about course outlines can be found in Section 23.4(2) of the University Calendar. The University of Alberta is committed to the highest standards of academic integrity and honesty. Students are expected to be familiar with these standards regarding academic honesty and to uphold the policies of the University in this respect. Students are particularly urged to familiarize themselves with the provisions of the Code of Student Behavior (online at www.ualberta.ca/secretariat/appeals.htm) and avoid any behavior which could potentially result in suspicions of cheating, plagiarism, misrepresentations of facts and/or participation in an offence. Academic dishonesty is a serious offence and can result in suspension or expulsion from the University.

ACADEMIC INTEGRITY:

"The University of Alberta is committed to the highest standards of academic integrity and honesty. Students are expected to be familiar with these standards regarding academic honesty and to uphold the policies of the University in this respect. Students are particularly urged to familiarize themselves with the provisions of the Code of Student Behaviour (online at <http://www.governance.ualberta.ca/en/CodesofConductandResidenceCommunityStandards/CodeofStudentBehaviour.aspx>) and avoid any behaviour which could potentially result in suspicions of cheating, plagiarism, misrepresentation of facts and/or participation in an offence. Academic dishonesty is a serious offence and can result in suspension or expulsion from the University."

All forms of dishonesty are unacceptable at the University. Any offence will be reported to the Senior Associate Dean of Science who will determine the disciplinary action to be taken. Cheating, plagiarism and misrepresentation of facts are serious offences. Anyone who engages in these practices will receive [at minimum](#) a grade of zero for the exam or paper in question and no opportunity will be given to replace the grade or redistribute the weights. As well, in the Faculty of Science the sanction for **cheating** on any examination will include **a disciplinary failing grade** (no exceptions) and senior students should expect a period of suspension or expulsion from the University of Alberta.

The robot project in this course is typically a group activity requiring the collaboration of two or three students. These projects are typically conducted in consultation with the course instructor or the teaching assistant, and as a result issues involving imbalance of contributions by group members typically do not arise. If concerns do arise, then the course instructor should be notified immediately. More information for students about "Collaborating on Assignments" is available on the Truth in Education website <http://www.uofaweb.ualberta.ca/TIE/>.

CELL PHONES: Cell phones are to be turned off during lectures, labs and seminars. Cell phones are not to be brought to exams.

STUDENTS ELIGIBLE FOR ACCESSIBILITY-RELATED ACCOMMODATIONS (students registered with Student Accessibility Services - SAS): Eligible students have both rights and responsibilities with regard to accessibility-related accommodations. Consequently, scheduling exam accommodations in accordance with SAS deadlines and procedures is essential. Please note adherence to procedures and deadlines is required for U of A to provide accommodations. Contact SAS (www.ssds.ualberta.ca) for further information.

STUDENT SUCCESS CENTRE: Students who require additional help in developing strategies for better time management, study skills or examination skills should contact the Student Success Centre (2-300 Students' Union Building).

RECORDING AND/OR DISTRIBUTION OF COURSE MATERIALS: Audio or video recording, digital or otherwise, of lectures, labs, seminars or any other teaching environment by students is allowed only with the prior written consent of the instructor or as a part of an approved accommodation plan. Student or instructor content, digital or otherwise, created and/or used within the context of the course is to be used solely for personal study, and is not to be used or distributed for any other purpose without prior written consent from the content author(s).

Policy about course outlines can be found in the University Calendar ([http://calendar.ualberta.ca/content.php?catoid=6&navoid=806&hl="syllabus"&returnto=search - Evaluation Procedures and Grading System](http://calendar.ualberta.ca/content.php?catoid=6&navoid=806&hl=)).

Policy about course outlines can be found in section 23.4(2) of the University Calendar.

Disclaimer: Any typographical errors in this Course Outline are subject to change and will be announced in class. The date of the final examination is set by the Registrar and takes precedence over the final examination date reported in this syllabus.

Note: Recording is permitted only with the prior written consent of the professor or if recording is part of an approved accommodation plan.