

UNIVERSITY OF MICHIGAN
College of Engineering
Curriculum Committee Meeting
Tuesday, October 10, 2023

Attending: Achilleas Anastasopoulos, Jack Baker, Robert Bordley, Yavuz Bozer, Chris Fidkowski, Fei Gao, Saadet Albayrak Guralp, Amir Kamil, Leena Lalwani, Xiaogan Liang, Cameron Louttit, Emmanuelle Marquis, Frank Marsik, Radoslaw Michalowski, Mika Panagou, Anchal Sareen, Ben Spector, Roxanne Walker

Support Staff: Mercedes Carmona, Betsy Dodge, Matthew Faunce

Call to Order: 1:36 PM

Adjourned: 2:46 PM

Agenda:

1. Approval of 9.26.2023 Meeting Minutes (Page 2) – **APPROVED**
2. Re-visit - Non-Attendance Drop Statement Proposal – Action Item (Page 6) - **TABLED**
 - a. After CoE members spoke to their departments regarding this proposal, the following was gathered:
 - i. MECHENG: Main concern was how teamwork and student participation, with certain courses, would be affected if this proposal were to become established. Students need to make a commitment in the beginning of the course and therefore instructors feel there is no need for a policy. There would be no replacement for the student if there were involved on a team or project. Local policy for teamwork and students to make a strong commitment for the course.
 - ii. CEE: Overall, no conclusion was reached and there was little support for a policy to be made. By faculty members having the power to drop a student, there may be an abuse of power that would come with this, and this should be avoided if possible. Department relays comments but also says that this should not stop CoE from establishing a statement if needed.
 - iii. ISD: CoE member states no attendance is taken, but students' participation is measured in assignments, exams, projects, etc. Questions if LSA takes attendance for the policy to implemented and if that's how LSA instructors determine to drop a student or not. Response to this was that no information could be given regarding how LSA uses or enforces their policy based on attendance taken or not.
 - iv. IOE: Lectures are recorded and makes it easier for students who miss lecture to follow up on their own and not get behind in the course. Example given of instructor asking questions in lecture for students that are actively attending and receiving extra credit towards the student's overall grade as a result.
 - v. CLASP: College wide policy would be difficult, and student would have to petition to override if dropped due to non-attendance, creating more work for faculty to complete as a result. Suggestion of EAC being brought in to do a wellness check on the student if there is a consistent absence from the course, gather information from the student if they are given a response, and this is communicated to the instructor before an immediate drop would be taken.
 - vi. NAVARCH: There needs to be an intermittent step taken, like what CLASP has suggested that the EAC is involved and communicates to the instructor as to why the student hasn't been attending the course.
 - vii. NERS: A policy can be drafted and sent to the departments to go over and collect feedback to continue the discussions had regarding this proposal.
 - viii. ECE: Instructors already have milestones throughout a course so that a policy wouldn't need to be in place as this would be harsh and can be achieved by other means. Looking for more feedback from department chairs.

- ix. TCHNCLCM: A group of students to focus on are waitlisted students and how a policy would have an impact. Students not showing up for the first few weeks of classes are hurting waitlisted students who want to take the course and continue their academics. This policy would also affect financial aid students and if these students can be flagged and not to be lost in the process of dropping due to their attendance.
 - 1. International students would also be affected as this would put the student below being a full-time student and cause problems with their Visa.
 - x. ROB: Policy is supported but needs to be executed well. Waitlist example also mentioned as well as EAC or RO to be involved for the student not actively participating in the course and to gather information as to why. This would also help international students take the courses they need while being here for the main terms of the year, Fall and Winter. Example of growing conference and student athletes traveling more as a result would also be in class less, so how would they be affected by this. CoE member suggests to further discuss this to the entire CoE so that everyone can have an opinion or consensus regarding the proposal. Also gives example that their lectures are recorded, and the student completes their work on their own and keeps up with the course, but still not physically attending lecture, so should this student be faulted by this. More clarity is needed and what situations would this policy be applied to. Would each department or course instructor(s) need to establish their own policy for this to be effective?
 - xi. BIOMEDE: Waitlists also brought up as already mentioned by other departments and how larger lectures such as 200 level courses are affected. Counterpoint that reaching out to the student and gathering information is fair, but what is the timeframe for this as if this takes too long, then a waitlisted student could fall farther behind in the course as a result. There needs to be a reasonable time when to reach out to the student after not attending the course.
 - xii. EECS: Agrees with ROB. The department has no attendance required for courses. Reiterates the department used to have an attendance policy in place for students, that was removed due to students viewing this as harmful, negative. The department is not interested in a blanket statement policy to be established.
- b. A point made that if groups for courses are formed immediately and other aspects are not deemed as of importance, then does the policy depend on the course level and what would this policy look like as well as if there is no communication from the student, how do we proceed. Overall, question of how does one measure attendance for a course.
- i. CoE RO states the instructor can do this and that the RO would support, but there needs to be a clear, concise statement that is widely viewed by all that this can happen based on a specific course and what specific actions would be taken. Do we want a generalized statement, to copy LSA's, or for CoE to create our own? What is the best route to go forward?
 - ii. Suggestion that this can also be a statement of attendance for the specific courses that need this to be enforced. Each department can develop their own information to be in this statement.
 - 1. Example that students thought attendance was optional for a course, but there was a message that would be visible and public for students that stated the student would be dropped if there was no participation after a week. This message would appear in Wolverine Access or LSA Course Guide.
 - a. Issue brought up that some students don't get access to the course entirely until after the first week of classes. This is why a statement would be more effective to appear on Wolverine Access.
 - i. Counterpoint that students do not read information given, such as on a Syllabus or Wolverine Access, as there are so many policies in place and reading is getting lengthier, therefore would be overlooked.
 - b. UG Representative states that having statements on the LSA Course Guide and/or Wolverine Access would be helpful. The more redundancy of a statement/policy listed for a course, the better to overall get the messaged across. Agrees that students aren't reading lengthy syllabus, so that another policy/statement would be missed if included.
 - 2. Mentioned if this statement should be put on a CARF, but ultimately deemed that a CARF submitted for just this statement, would not be deemed as the best method.
- c. To end the discussion, a poll was conducted for members with the options listed as, LSA Policy, Modified Policy, or No Policy.
- i. Members voted in favor for the Modified Policy by 81% (13 members) vs No Policy by 19% (3 members).
 - 1. The follow up discussed was that more information is to be gathered and discussed at the next CoE CC meeting on 10.24.2023.

- ii. CoE member suggests that this might be helpful for Rachael, who represents the ENGR and Undergraduate Education Departments as a CoE CC member, to be of assistance as she represents a large portion of students to be effective by this proposal.
 - 1. Xiaogan to follow up with Rachael.
- 3. Re-visit - Review of Professional or Creative Development Courses (PCDC) Degree Audit Rule – Informational Item (Page 7) – **TABLED**
 - a. Updated responses from Fred and Susan:
 - i. Highlighted areas in document speaks as to why PCDC was created and the intent of this.
 - ii. Question from previous meeting if there was a historical agreement with LSA regarding the PCDC Degree Audit Rule, and there is not.
 - iii. Susan supports option 3 for what way to move forward with PCDC Degree Audit Rules.
 - iv. Fred didn't have an option to move forward with and didn't see this as an issue and really is for the courses that didn't fit any other Liberal Arts or Humanities Intellectual Breadths. Can count both courses towards Intellectual Breadth, but more what the designation is to go to for courses.
 - b. Overall feedback from departments as is follow:
 - i. MECHENG - PDCD optional, HU should be the stronger designation.
 - ii. NAVARCH – Agreement in Option 3 listed.
 - c. Due to the time constraint and needing to get to the CARFs on the agenda, there was an agreement that more feedback is to be gathered by departments and continue the discussion at the next CoE CC meeting on 10.24.2023.
- 4. Upcoming ABET Visit
 - a. A CoE member mentioned that some CoE CC members will have to miss the meeting due to time conflicts with the CoE CC meeting and the ABET visit.
 - i. CoE CC Chair suggests finding a replacement member so votes can be taken, and discussions can continue to be had.

PAGE	SUBJECT	COURSE #	ACTION	SUMMARY	EFFECTIVE TERM	MIN. GRADE REQ. FOR ENF. PREPREQ	Is Course on LSA Course Guide?	APPROVED	NOTES & REVISIONS	TABLED
9	CSE	543	MOD	Change in Cross Listing.	WT 2024	NO	NO	APPROVED		
12	EECS	367	MOD	Change in Home Department, Cross Listing, and Course Components Terms Offered.	WT 2024	C	YES	APPROVED		
15	EECS	495	MOD	Change in Course and Abbreviated Titles, Course Description.	WT 2024	C	YES	APPROVED		
18	IOE	474	MOD	Change to Course Credit Type and Course Components.	WT 2024	C-	YES	APPROVED	Suggestion of Course Title to be modified to be more descriptive.	
21	ROB	103	MOD	Change in Course Catalog Number, Course Description, Full-Term Credit Hours, Grading Basis, and Course Components.	WT 2024	NO	NO	CONDITIONAL APPROVAL	List ENGN 100-Sec 850 for Credit Exclusion. Suggested Course Description corrections, “Student develop...” and “...milling, etc.”	
25	ROB	560	NEW		WT 2024	NO	NO	CONDITIONAL APPROVAL	Course Description needs to list course topics.	

PAGE	SUBJECT	COURSE #	ACTION	SUMMARY	EFFECTIVE TERM	MIN. GRADE REQ. FOR ENF. PREPREQ	Is Course on LSA Course Guide?	APPROVED	NOTES & REVISIONS	TABLED
40	ROB	572	NEW		WT 2024	NO	NO	APPROVED	Cross listed with NAVARCH 569.	

EECS CARFs with Subject Changes to ECE or CSE – Bulk Review

PAGE	SUBJECT	COURSE #	ACTION	SUMMARY	EFFECTIVE TERM	MIN. GRADE REQ. FOR ENF. PREPREQ	Is Course on LSA Course Guide?	APPROVED	NOTES & REVISIONS	TABLED
51	EECS	595	MOD		FT 2024	NO	YES	APPROVED	Cross listed with LING 541 and SI 561.	
54	SI	649	MOD		FT 2024	C-	YES	APPROVED	Cross listed with EECS 548.	
57	SI	650	MOD		FT 2024	NO	YES	APPROVED	Cross listed with EECS 549.	
60	SI	652	MOD		FT 2024	NO	YES	APPROVED	Cross listed with EECS 547.	

UNIVERSITY OF MICHIGAN
College of Engineering
Curriculum Committee Meeting
Tuesday, September 26, 2023

Attending: Peter Adriaens, Achilleas Anastasopoulos, Jack Baker, Robert Bordley, Chris Fidkowski, Fei Gao, Saadet Albayrak Guralp, Gail Hohner, Amir Kamil, Leena Lalwani, Megan Langille, Xiaogan Liang, Cameron Louttit, Emmanuelle Marquis, Frank Marsik, Radoslaw Michalowski, Mika Panagou, Eric Rutherford, Anchal Sareen, Ben Spector, Roxanne Walker

Support Staff: Mercedes Carmona, Besty Dodge, Matthew Faunce

Call to Order: 1:35PM

Adjourned: 2:29 PM

Agenda:

1. Approval of 9.12.2023 Meeting Minutes (Page 3) - **APPROVED**
2. M Eng Smart Infrastructure Finance Program Curriculum Modifications – Action Item (Page 7) - **APPROVED**
 - a. The original M Eng Smart Infrastructure Finance program was approved in 2018 and implemented in 2019-2020 and 2020-2021. Ross School of Business then requested, after discussions internally with the Interim Dean and Finance faculty, that the required core courses be removed from the program curriculum due to no longer wanting to participate. Ultimately, the core classes have been altered as well as the electives for the program. These new proposed changes are to be effective for Fall 2024.
 - i. Core Classes
 1. Old/Removed Courses: TO 640, FIN 428
 2. New Courses: CEE 504 or 531, CEE 555 or 501.001, CEE 575 or CEE 533, CEE 553 or IOE 561, CEE 503
 - ii. Electives
 1. Old/Removed Courses: FIN 480, FIN 624, PUBPOL 750 Section 008/009
 2. New Courses:
 - a. Data Science Options: IOE 541, CEE 435
 - b. Finance Options: PUBPOL 744, IOE 453, IOE 455, PUBPOL 715 Section 001
 - b. A member inquired if the courses were already listed for the program. Courses are listed and there are some still being submitted, such as CEE 503, which is on the agenda for review and approval today.
3. Non-Attendance Drop Statement Proposal – Action Item (Page 17) - **TABLED**
 - a. The CoE RO received an inquire whether instructors could administratively drop a student for non-attendance or inactivity from a course.
 - b. CoE does not have a policy that directly relates to this, but LSA does have a policy statement that can be viewed. The URO said theoretically this request could be done, but there needs to be an official vote and agreement on a policy that directly states this in the CoE Bulletin. The CoE RO is reaching out to CoE CC members to further elaborate on this and possibly come to an agreement or not regarding this Non-Attendance Drop for students.
 - c. Currently, CoE instructors can issue a grade of ED, which is equivalent to an unofficial drop meaning the student never participated. ED is calculated into the student's GPA as a failing grade. This is a mechanism that has been used, but ultimately there should be policy in place.
 - d. A member asks if this is a common issue that is affecting students. Students are aware of tuition costs so they would find a way to drop a course if needed. There is no specific data at hand as to how many students are being affected by this. Another member says this is probably for a rare number of students and gives examples of courses (ENGR 100, ME 235) that could be used, as do other members.

- e. The main issue, a member brought up, is group project participation and lack of a student participating ultimately hurting this group's chance of fully having active participation and learning experiences due to the student's non-attendance/inactivity.
- f. The EECS Department had similar language to LSA regarding non-attendance from students within their courses. This language seemed to scare students as they thought this was negative and would be penalized in a way down the road. Ultimately, the language was removed by the department as a result to lessen the burden if a student had to miss the first week or day of classes.
- g. A member asks if this policy would be about attendance or general participation for a course. With a new policy created, this could include all information about participation from a student, but there would need to be an agreement on what attendance or participation means. In this case, this may be a DEI Issue at hand, which would be a bigger issue at hand.
- h. Suggestion of an intermittent step that if a student doesn't participate would be to have the EAC send an email and await the student's response before additional steps are taken to ultimately drop the student. This would help with group projects and participation needed for the duration of the course.
 - i. There would then need to be a predetermined time as to when this step is to be implemented and not wait till the end of the semester.
 - i. There was an agreement that CoE Members are to speak within their departments about this policy and next meeting discuss what they inquired.
 - j. This proposal will be tabled until the next CoE CC meeting on 10.10.2023.
- 4. Review of Professional or Creative Development Courses (PCDC) Degree Audit Rule – Informational Item (Page 18) – **TABLED**
 - a. The CoE RO is reaching out about Degree Audit Rules with Intellectual Breadth (IB) for PCDC and Humanities (HU) Credits and how some courses should be listed and counted for a student's degree audit when a course is listed for both PCDC and HU.
 - i. 16 IB Credits, which include:
 - 1. PCDC credits are optional and are no more than 4 credits.
 - 2. HU credits are at least 3 credits based off the LSA Course Guide, and credit by test cannot be used for this requirement.
 - 3. 300-level LAC are at least 3 credits of LAC 300 level or higher courses. Students may satisfy the HU and 300 level requirements with a single course.
 - b. Example: PUBPOL 200 (4 credits) listed as PCDC and ARCH 215 (4 credits) listed as PCDC and counts to HU. With PUBPOL 200, the student would then have 4 PCDC credits that can be counted toward 16 IB credits. In the student's audit, what then should happen to ARCH 215? A few options were given.
 - i. ARCH 215 should NOT count toward the 3 credits of HU requirement and should NOT count toward 16 IB credits.
 - ii. ARCH 215 should count toward the 3 credits of HU but should NOT count toward the 16 IB credits. The student would then need 3 additional credits to count toward the 16 IB credit total.
 - iii. ARCH 215 should count toward BOTH HU and 16 IB credits even though the 4 credits max had been met with PUBPOL 200. Therefore, the HU designation negates the PCDC designation.
 - 1. This suggestion is the current understanding of IB credits and degree audits. The CoE RO would like to know whether to continue to follow this or follow the rule that says HU courses should not be allowed in PCDC.
 - c. Questions as to what the history is behind 4 credits needed to exist as a PCDC max as well as if HU has a higher priority than PCDC designation. Also, if there are any other requirements missing or an agreement with CoE and LSA regarding the IB credits that can be provided before this is voted upon members. No information given at hand but can be discussed with RO as well as faculty members, Fred Terry and Susan Montgomery.
 - i. Susan was approached regarding this topic. Says there may have been confusion whether a course that was both PCDC and HU and how to determine which slot to fulfill and as a result chose the HU slot. If that wasn't the case, then it was best to have the audit match the bulletin.
 - 1. The preferred method would be to prioritize a HU category course to the HU slot first. Then, the PCDC course could have the HU associated with it.
 - d. There was an agreement that CoE Members are to do more reading and gain information before voting and discuss more at the next meeting.
 - e. This proposal will be tabled until the next CoE CC meeting on 10.10.2023.

PAGE	SUBJECT	COURSE #	ACTION	SUMMARY	EFFECTIVE TERM	MIN. GRADE REQ. FOR ENF. PREPREQ	IS COURSE ON LSA COURSE GUIDE?	APPROVED	NOTES & REVISIONS	TABLED
20	CEE	211	MOD	Change to Course Description.	WT 2024	NO	NO	APPROVED		
23	CEE	503	NEW		WT 2024	NO	NO	CONDITIONALLY APPROVED	Course Description needs to have course topics listed out.	
39	CEE	526	MOD	Change to Course Description and Course Components.	WT 2024	NO	NO	APPROVED	Correction of Faculty Name and Signature.	
42	EECS	440	DEL		WT 2024	C	YES	APPROVED		
45	EECS	448	MOD	Change to Advisory Prerequisite.	WT 2024	C	YES	APPROVED		
48	ENGR	255	MOD	Change to Full Term Credit Hours.	WT 2024	NO	YES	APPROVED		
51	ENGR	455	MOD	Change to Full Term Credit Hours and Repeatability.	WT 2024	NO	YES	APPROVED		
54	NAVARCH	332	MOD	Change to Course & Abbreviated Title and Advisory Prerequisite.	WT 2024	NO	NO	CONDITIONALLY APPROVED	Advisory Prerequisites need to be correctly listed (NA, ME to NAVARCH, MECHENG).	
57	NAVARCH	340	MOD	Change to Advisory Prerequisite.	FT 2024	NO	NO	CONDITIONALLY APPROVED.	Advisory Prerequisites need to be correctly listed (NA, ME to NAVARCH, MECHENG).	
60	NAVARCH	420	DEL		WT 2024	NO	NO	CONDITIONALLY APPROVED	Cross listed with CLIMATE 420 and ENSCEN 420. Advisory Prerequisites need to be correctly listed (NA to NAVARCH).	
63	NAVARCH	475	MOD	Change to Advisory & Enforced Prerequisites.	FT 2024	C-	NO	CONDITIONALLY APPROVED	Advisory Prerequisites need to be correctly listed (NA to NAVARCH).	
66	ROB	511	MOD	Change to Course & Abbreviated Title, Course Description, Advisory Prerequisite, Credit Exclusions, Course Components.	WT 2024	NO	NO	CONDITIONALLY APPROVED	Follow up if ROB 511 needs to be listed in Credit Exclusions and Enforced Prerequisite needs to have Graduate Standing.	

Non-Attendance Drop Statement Proposal

The CoE Registrar's Office received an inquiry regarding whether a CoE professor could administratively drop a student from their engineering class section due to inactivity.

After reaching out to the Registrar's Office to inquire about this possibility, the CoE RO learned that Engineering currently does not have a statement that students will be dropped for non-attendance. LSA does currently have a non-attendance statement, which can be reviewed below.

A recent example was a project-based course (ENGR 100) in which students needed to be assigned to teams and waiting until the end of the course and giving the student an ED grade could impact the team projects.

LSA's Policy Statement:

IT IS CRITICAL THAT STUDENTS ATTEND CLASSES FROM THE BEGINNING OF THE TERM. EVEN THOUGH STUDENTS MAY BE REGISTERED OFFICIALLY FOR A COURSE, DEPARTMENTS MAY GIVE AWAY A STUDENT'S PLACE IN A CLASS IF THEY DO NOT ATTEND:

---THE FIRST MEETING OF BIOLOGY, CHEMISTRY, AND PHYSICS LABORATORIES;

---EITHER OF THE FIRST TWO MEETINGS OF ENGLISH COURSES;

---THE FIRST TWO MEETINGS OF HISTORY 496 AND 497;

---EITHER OF THE FIRST TWO MEETINGS OF ANY COURSE OFFERED BY THE DEPARTMENT OF ROMANCE LANGUAGES;

---THE FIRST TWO MEETINGS OF COURSES IN OTHER SUBJECTS.

AT THE SAME TIME, DEPARTMENTS ARE NOT OBLIGATED TO WITHDRAW STUDENTS OFFICIALLY FROM THE COURSE, EVEN THOUGH THE STUDENT HAS BEEN INFORMED THAT HIS/HER PLACE IN A COURSE HAS BEEN TAKEN AWAY. STUDENTS ARE RESPONSIBLE FOR THE ACCURACY OF THEIR SCHEDULES AND MUST BE SURE THAT ALL DROPS ARE PROCESSED THROUGH REGISTRATION SYSTEM DURING THE NORMAL DROP/ADD PERIOD.

The CoE RO is bringing this information forward to the CoE Curriculum Committee to decide on a path forward. A non-exhaustive list of a few identified options are as follows:

1. Adopt the same (or similar) non-attendance statement and procedure as LSA, which would allow the unit's curriculum coordinator permission to approve of and request a non-attendance class drop for a given student by reaching out to the Registrar's Office (wolverineservices@umich.edu).
2. Create a modified non-attendance statement and procedure (details would be determined by the CCC).
3. Do not allow departments or units to administratively drop students from classes on the basis of non-attendance.

Review of Professional or Creative Development Courses (PCDC)

Degree Audit Rules

CoE Bulletin Language:

Intellectual Breadth

It is important that our students learn about modes of thought and areas of human accomplishment beyond the purely technical. This breadth can be designed by students to provide context to their engineering work by learning about human modes of thought, the structure and history of the human societies that they serve as engineers, how humans behave and interact, and how humans express their aspirations in the arts, literature and music. This breadth will help students to understand the impact of engineering solutions in a global, economic, environmental and societal context. This breadth makes our students more flexible, creative and better able to work with diverse groups.

We cannot precisely define all of these possibilities for every student so we strive to create a broad intellectual opportunity for students to pursue their interests both beyond and within engineering. Students are encouraged to use these credits in a coherent way to build a foundation of understanding in both the liberal arts and other disciplines that might contribute to their development of creativity or professional foundation.

The College of Engineering requires all students to complete 16 credits of Intellectual Breadth coursework, and between 9 and 16 credits of General Electives (depending on engineering major). To satisfy the Intellectual Breadth requirement, students must complete the following:

- **16 Intellectual Breadth Credits:** Comprised of Liberal Arts Courses (LACs — defined in the following section of the Bulletin titled, “Definition of Liberal Arts Courses”), including:
 - **Humanities:** At least 3 credits of Humanities classes marked HU in the LSA course guide, credit by test cannot be used to meet this requirement
 - **300-level LAC:** At least 3 credits of LAC must be at the 300 level or higher. Students *may* satisfy the Humanities and 300-level requirements with a single course.
 - **(Optional) PCDC** – no more than 4 credits of PCDC (defined in the following section of the Bulletin titled, “Professional or Creative Development Courses”)

Professional or Creative Development Courses (PCDC)

Professional and creative development courses are optional and offer a student the opportunity to build on non-engineering and non-technical courses to develop their creativity and professional capabilities as engineers. PCDC courses include any course from the following subjects in the indicated units, provided they are not marked BS (Bachelor of Science) or NS (Natural Science) in the LSA course guide:

- Taubman College of Architecture and Urban Planning: Architecture (ARCH), Urban Design (UD), Urban Planning (UP), Urban and Regional Planning (URP—Effective FA 17)
- Stamps School of Art & Design (ARTDES, UARTS)
- Ross School of Business: Accounting (ACC), Business Administration (BA), Business Economics and Public Policy (BE), Entrepreneurial Studies (ES), Business Law & Business Communication (BL&BCOM), Marketing (MKT), Management and Organization (MO), Strategy (STRATEGY)
- School of Music, Theatre & Dance: Music Composition (COMP), Musicology (MUSICOL), Music Theory (THEORY), Theater & Drama (THTREMUS) and MUSPERF 300/PAT 305 (this course is an exception, no other PAT/MUSPERF courses will satisfy PCDC requirement)
- School of Environment and Sustainability (EAS)

- Ford School of Public Policy (PUBPOL)
- School of Public Health: Health Behavior & Health Education (HBEHED), Health Management & Policy (HMP)
- College of Engineering: Center for Entrepreneurship (ENTR) – Effective WN 2018 (ENTR coursework taken FA 2013 and later can be used to satisfy PCDC requirements)

As an example, ARCH 215 has the HU course attribute and is also PCDC. How should this course be treated?

Here is a scenario. Let's say a student has:

- PUBPOL 200. 4 credits, FA22 (PUBPOL is on the PCDC list)
- ARCH 215. 4 credits, FA23 (ARCH is on the PCDC list, and ARCH 215 counts as HU)

Having PUBPOL 200, the student has reached the limit of 4 PCDC credits that can count toward 16 IB credits.

What should happen in the audit when the student takes ARCH 215? There are 3 options:

1. ARCH 215 should not count toward the 3 credits of Humanities requirement, and should not count toward 16 IB credits.
2. ARCH 215 should count toward the 3 credits of Humanities, but should NOT count toward the total 16 IB credits. (The student will need 3 credits of something else to count toward the 16 IB credit total.)
3. ARCH 215 should count toward BOTH 3 credits of Humanities AND toward the 16 IB credits - even though the 4 credits max had been met with PUBPOL 200. (Basically, the HU designation negates the PCDC designation.)

The current understanding of the rule is #3, should we continue this, or follow the old rule that says HU courses should not be allowed in PCDC.

After reaching out to other faculty members, Fred Terry's response, "The PCDC section was to allow space for 16 credit hours for classes that made sense but did not fit the other narrow definitions. There is no need to designate a PCDC on an audit unless the class would otherwise not fit in IB as HU or other LAC class."

Susan Montgomery's response, "PCDC was included to allow a broader range of experience into IB without compromising the overarching requirement of a Liberal Arts experience. HU doesn't need to be allowed for PCDC because as HU it already counts, but some courses might fall under both categories because it fits the description of both (LSA approved it as an HU and it falls into the course categories we count for PCDC). There was no agreement with LSA involved. It's not so much that HU courses should not be allowed in PCDC, but that the HU designation trumps the PCDC designation." She supports option #3.



Course Approval Request Form

Office of the Registrar, University of Michigan

1210 LSA Building
500 S. State Street
Ann Arbor, MI 48109-1382
Phone: 734.763.2113
Fax: 734.936.3148
ro.curriculum@umich.edu
ro.umich.edu

CHECK APPROPRIATE BOXES FOR ALL CHANGES

Action Requested

- New Course
- Modification of Existing Course
- Deletion of Existing Course

Date of Submission: 2023-09-29

Effective Term: Winter 2024

<input checked="" type="checkbox"/>	Course Offered <input checked="" type="checkbox"/> Indefinitely <input type="checkbox"/> One term only	RO USE ONLY Date Received: Date Completed: Completed By:
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CURRENT LISTING

REQUESTED LISTING

<input type="checkbox"/>	Dept (Home): Computer Science and Engineering Subject: CSE Catalog: 543			Dept (Home): Computer Science and Engineering Subject: CSE Catalog: 543		
	<input type="checkbox"/> Course is Cross-Listed with Other Departments			<input checked="" type="checkbox"/> Course is Cross-Listed with Other Departments		
<input checked="" type="checkbox"/>	Department	Subject	Catalog Number	Department	Subject	Catalog Number
				Robotics - ROB -543		
<input type="checkbox"/>	Course Title (full title) Ethics for AI and Robotics			Course Title (full title) Ethics for AI and Robotics		
<input type="checkbox"/>	Abbreviated Title (20 char) Ethics AI & Robotics			Abbreviated Title (20 char) Ethics AI & Robotics		
<input type="checkbox"/>	Course Description (Please limit to 50 words and attach separate sheet if necessary) Ethical issues raised by AI and Robotics. Foundations in philosophical ethics and game theory; trust, cooperation, and the well-being of society; safety and autonomous vehicles; privacy and surveillance; fairness and bias; jobs and economic inequality; regulation of AI.					
<input type="checkbox"/>	Full Term Credit Hours Undergraduate Min: 4 Graduate Min: 4 Undergraduate Max: 4 Graduate Max: 4			Half Term Credit Hours Undergraduate Min: Graduate Min: Undergraduate Max: Graduate Max:		
<input type="checkbox"/>	Course Credit Type Undergraduate Student, Rackham Graduate Student, Non-Rackham Graduate Student					
<input type="checkbox"/>	Repeatability <input type="checkbox"/> Course is Repeatable for Credit Maximum number of repeatable credits:			<input type="checkbox"/> Course is Y graded <input type="checkbox"/> Can be taken more than once in the same term		

Subject: Computer Science and Engineering Catalog: 543

<input type="checkbox"/>	Grading Basis		
	<input checked="" type="checkbox"/> Graded (A – E) <input type="checkbox"/> Credit/No Credit <input type="checkbox"/> Satisfactory/Unsatisfactory <input type="checkbox"/> Pass/Fail <input type="checkbox"/> Business Administration	Add Consent <input type="checkbox"/> Department Consent <input type="checkbox"/> Instructor Consent <input checked="" type="checkbox"/> No Consent	Drop Consent <input type="checkbox"/> Department Consent <input type="checkbox"/> Instructor Consent <input checked="" type="checkbox"/> No Consent
<input type="checkbox"/>	Grading		
	<input type="checkbox"/> Not for Credit <input type="checkbox"/> Not for Degree Credit <input type="checkbox"/> Degree Credit Only		

CURRENT LISTING**REQUESTED LISTING**

<input type="checkbox"/>	Advisory Prerequisite (254 char) Coursework in artificial intelligence or robotics	Advisory Prerequisite (254 char) Coursework in artificial intelligence or robotics
<input type="checkbox"/>	Enforced Prerequisite (254 char) Graduate standing Minimum grade requirement:	Enforced Prerequisite (254 char) Graduate standing Minimum grade requirement:
<input type="checkbox"/>	Credit Exclusions	Credit Exclusions
<input type="checkbox"/>	Course Components <input checked="" type="checkbox"/> Lecture <input type="checkbox"/> Seminar <input type="checkbox"/> Recitation <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Discussion <input type="checkbox"/> Independent Study	Graded Component <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
		Terms Typically Offered <input checked="" type="checkbox"/> Fall <input checked="" type="checkbox"/> Winter <input type="checkbox"/> Spring <input type="checkbox"/> Summer <input type="checkbox"/> Spring/Summer
Cognizant Faculty Member Name: Benjamin Kuipers		Cognizant Faculty Member Title:

SIGNATURES ARE REQUIRED FROM ALL DEPARTMENTS INVOLVED (Please Print AND Sign Name)

Contact Person: Punam Vyas

Email: vyas@umich.edu

Phone: 647-1754

CoE Curriculum

Committee Representative:



Print: Amir Kamil

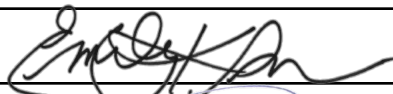
Date: 9/29/23

CoE Curriculum Committee Chair:

Print:

Date:

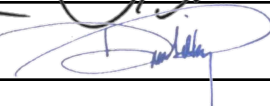
Home Department Chair:



Print: Emily Mower Provost

Date: 10/6/23

Cross-Listed Department Chair:



Print: Dawn Tilbury

Date: 10/10/23

Cross-Listed Department Chair:

Print:

Date:

Cross-Listed Department Chair:

Print:

Date:

DEPARTMENTAL/COLLEGE USE ONLY

Current:**Requested:**Course Description

Ethical issues raised by AI and Robotics. Foundations in philosophical ethics and game theory; trust, cooperation, and the well-being of society; safety and autonomous vehicles; privacy and surveillance; fairness and bias; jobs and economic inequality; regulation of AI.

Class Length

Full term

Contact hours (lecture):

3

Contact hours (recitation)

1

Contact hours (lab)Course Description

Ethical issues raised by AI and Robotics. Foundations in philosophical ethics and game theory; trust, cooperation, and the well-being of society; safety and autonomous vehicles; privacy and surveillance; fairness and bias; jobs and economic inequality; regulation of AI.

Class Length

Full term

Contact hours (lecture):

3

Contact hours (recitation)

1

Contact hours (lab)**Additional Info:**Submitted by:

Home dept

Describe how this course fits with the degree requirements:

Satisfies the 500-level and technical elective requirements for CSE MS degree, and the depth requirement for CSE PhD degree.

Special resources of facilities required for this course:Supporting statement:

Ethics for AI and Robotics has been offered every Winter semester under the Robotics and Computer Science and Engineering Departments since Winter 2020, when it was originally a two-credit course (ROB 599 and EECS 498/598). This course is planned to be taught again in the Winter 2024 semester as CSE 543. The material and intellectual tools provided by this course is of great concern and of interest to students from a variety of backgrounds who are interested not only in how to design and build robots, but in how to ensure that they play an ethical role in human society.

This is an entry-level graduate course with new material including lectures by the instructor and six (or so) guest lecturers, substantial discussion sections, and literature reviews and term papers.



Course Approval Request Form

Office of the Registrar, University of Michigan

1210 LSA Building

500 S. State Street

Ann Arbor, MI 48109-1382

Phone: 734.763.2113

Fax: 734.936.3148

ro.curriculum@umich.edu

ro.umich.edu

CHECK APPROPRIATE BOXES FOR ALL CHANGES

Action Requested

- New Course
 Modification of Existing Course
 Deletion of Existing Course

Date of Submission: 2023-09-14

Effective Term: Winter 2024

<input checked="" type="checkbox"/>	Course Offered <input checked="" type="checkbox"/> Indefinitely <input type="checkbox"/> One term only	RO USE ONLY Date Received: Date Completed: Completed By:
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CURRENT LISTING

REQUESTED LISTING

<input checked="" type="checkbox"/>	Dept (Home): Elec Engin & Computer Sci Subject: EECS Catalog: 367	Dept (Home): Robotics Subject: ROB Catalog: 380												
<input type="checkbox"/>	<input type="checkbox"/> Course is Cross-Listed with Other Departments	<input checked="" type="checkbox"/> Course is Cross-Listed with Other Departments												
<input checked="" type="checkbox"/>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">Department</th> <th style="width: 25%;">Subject</th> <th style="width: 50%;">Catalog Number</th> </tr> </thead> <tbody> <tr> <td colspan="3" style="text-align: center;">Elec Engin & Computer Sci - EECS - 367</td> </tr> </tbody> </table>	Department	Subject	Catalog Number	Elec Engin & Computer Sci - EECS - 367			<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">Department</th> <th style="width: 25%;">Subject</th> <th style="width: 50%;">Catalog Number</th> </tr> </thead> <tbody> <tr> <td colspan="3" style="text-align: center;">Elec Engin & Computer Sci - EECS - 367</td> </tr> </tbody> </table>	Department	Subject	Catalog Number	Elec Engin & Computer Sci - EECS - 367		
Department	Subject	Catalog Number												
Elec Engin & Computer Sci - EECS - 367														
Department	Subject	Catalog Number												
Elec Engin & Computer Sci - EECS - 367														
<input type="checkbox"/>	Course Title (full title) Introduction to Autonomous Robotics	Course Title (full title) Introduction to Autonomous Robotics												
<input type="checkbox"/>	Abbreviated Title (20 char) Intro Autos Robotics	Abbreviated Title (20 char) Intro Autos Robotics												
<input type="checkbox"/>	Course Description (Please limit to 50 words and attach separate sheet if necessary) A computational introduction to the modeling and control of autonomous robots and mobile manipulators. Programming projects and lectures cover 3D coordinate systems, axis-angle rotation, forward and inverse kinematics, physical simulation and numerical integration, motion control, path planning, high-dimensional motion planning, and robot software systems. Emphasizes portable programming of general robots.													
<input type="checkbox"/>	Full Term Credit Hours Undergraduate Min: 4 Graduate Min: Undergraduate Max: 4 Graduate Max:	Half Term Credit Hours Undergraduate Min: Graduate Min: Undergraduate Max: Graduate Max:												
<input type="checkbox"/>	Course Credit Type Undergraduate Student													
<input type="checkbox"/>	Repeatability <input type="checkbox"/> Course is Repeatable for Credit <input type="checkbox"/> Course is Y graded Maximum number of repeatable credits: <input type="checkbox"/> Can be taken more than once in the same term													

Subject: Elec Engin & Computer Sci Catalog: 367

<input type="checkbox"/>	Grading Basis		
	<input checked="" type="checkbox"/> Graded (A – E) <input type="checkbox"/> Credit/No Credit <input type="checkbox"/> Satisfactory/Unsatisfactory <input type="checkbox"/> Pass/Fail <input type="checkbox"/> Business Administration	Add Consent <input type="checkbox"/> Department Consent <input type="checkbox"/> Instructor Consent <input checked="" type="checkbox"/> No Consent	Drop Consent <input type="checkbox"/> Department Consent <input type="checkbox"/> Instructor Consent <input checked="" type="checkbox"/> No Consent
<input type="checkbox"/>	Grading		
	<input type="checkbox"/> Not for Credit <input type="checkbox"/> Not for Degree Credit <input type="checkbox"/> Degree Credit Only		

	CURRENT LISTING	REQUESTED LISTING
<input type="checkbox"/>	Advisory Prerequisite (254 char)	Advisory Prerequisite (254 char)
<input type="checkbox"/>	Enforced Prerequisite (254 char) EECS 281 and (MATH 214 or 217 or 296 or 417 or 419 or ROB 101); (C or better; no OP/F). Enrollment in one minor elective allowed for Computer Science Minors. Minimum grade requirement: C	Enforced Prerequisite (254 char) EECS 281 and (MATH 214 or 217 or 296 or 417 or 419 or ROB 101); (C or better; no OP/F). Enrollment in one minor elective allowed for Computer Science Minors. Minimum grade requirement: C
<input type="checkbox"/>	Credit Exclusions	Credit Exclusions
<input checked="" type="checkbox"/>	Course Components <input checked="" type="checkbox"/> Lecture <input type="checkbox"/> Seminar <input type="checkbox"/> Recitation <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Discussion <input type="checkbox"/> Independent Study	Graded Component <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
		Terms Typically Offered <input checked="" type="checkbox"/> Fall <input checked="" type="checkbox"/> Winter <input type="checkbox"/> Spring <input type="checkbox"/> Summer <input type="checkbox"/> Spring/Summer
Cognizant Faculty Member Name: Chad Jenkins		Cognizant Faculty Member Title:

SIGNATURES ARE REQUIRED FROM ALL DEPARTMENTS INVOLVED (Please Print AND Sign Name)

Contact Person: Punam Vyas

Email: vyas@umich.edu

Phone: 647-1754

CoE Curriculum

Committee Representative:



Print: Amir Kamil

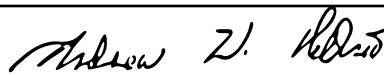
Date: 9/14/23

CoE Curriculum Committee Chair:

Print:

Date:

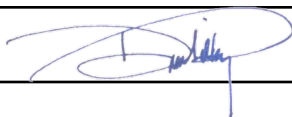
Home Department Chair:



Print: Andrew DeOrio

Date: 09/14/2023

Cross-Listed Department Chair:



Print: Dawn Tilbury

Date: 09/28/2023

Cross-Listed Department Chair:

Print:

Date:

Cross-Listed Department Chair:

Print:

Date:

DEPARTMENTAL/COLLEGE USE ONLY

Current:**Requested:**Course Description

A computational introduction to the modeling and control of autonomous robots and mobile manipulators. Programming projects and lectures cover 3D coordinate systems, axis-angle rotation, forward and inverse kinematics, physical simulation and numerical integration, motion control, path planning, high-dimensional motion planning, and robot software systems. Emphasizes portable programming of general robots.

Course Description

A computational introduction to the modeling and control of autonomous robots and mobile manipulators. Programming projects and lectures cover 3D coordinate systems, axis-angle rotation, forward and inverse kinematics, physical simulation and numerical integration, motion control, path planning, high-dimensional motion planning, and robot software systems. Emphasizes portable programming of general robots.

Class Length

Full term

Class Length

Full term

Contact hours (lecture):

3

Contact hours (lecture):

3

Contact hours (recitation)Contact hours (recitation)Contact hours (lab)

2

Contact hours (lab)

2

Additional Info:Submitted by:

Home dept

Describe how this course fits with the degree requirements:Special resources of facilities required for this course:Supporting statement:

The Robotics department has been teaching this course and would like to make it available to both EECS and Robotics students. As such, we are adding ROB 380 as a cross listing and designating Robotics as the new home department. We are also adding Winter to the list of terms typically offered.



Course Approval Request Form

Office of the Registrar, University of Michigan

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ro.curriculum@umich.edu
ro.umich.edu

CHECK APPROPRIATE BOXES FOR ALL CHANGES

Action Requested

- New Course
 Modification of Existing Course
 Deletion of Existing Course

Date of Submission: 2023-09-29

Effective Term: Winter 2024

<input checked="" type="checkbox"/>	Course Offered <input checked="" type="checkbox"/> Indefinitely <input type="checkbox"/> One term only	RO USE ONLY Date Received: Date Completed: Completed By:
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CURRENT LISTING

REQUESTED LISTING

<input type="checkbox"/>	Dept (Home): Elec Engin & Computer Sci Subject: EECS Catalog: 495	Dept (Home): Elec Engin & Computer Sci Subject: EECS Catalog: 495												
<input type="checkbox"/>	<input type="checkbox"/> Course is Cross-Listed with Other Departments	<input type="checkbox"/> Course is Cross-Listed with Other Departments												
<input type="checkbox"/>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">Department</th> <th style="width: 25%;">Subject</th> <th style="width: 50%;">Catalog Number</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	Department	Subject	Catalog Number				<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">Department</th> <th style="width: 25%;">Subject</th> <th style="width: 50%;">Catalog Number</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	Department	Subject	Catalog Number			
Department	Subject	Catalog Number												
Department	Subject	Catalog Number												
<input checked="" type="checkbox"/>	Course Title (full title) Software Development for Accessibility	Course Title (full title) Accessible Computing												
<input checked="" type="checkbox"/>	Abbreviated Title (20 char) Software for Access	Abbreviated Title (20 char) Accessible Computing												
<input checked="" type="checkbox"/>	Course Description (Please limit to 50 words and attach separate sheet if necessary) Team-based development of technology systems focused on disability, accessibility, or chronic illness. Students work closely with people with disabilities to develop technologies addressing a specific need. Covers design methods and problem-solving strategies; human factors; human-machine interfaces; community perspectives; social and ethical aspects; and accessible technology for disability or chronic illness.													
<input type="checkbox"/>	Full Term Credit Hours Undergraduate Min: 4 Graduate Min: 4 Undergraduate Max: 4 Graduate Max: 4	Half Term Credit Hours Undergraduate Min: Graduate Min: Undergraduate Max: Graduate Max:												
<input type="checkbox"/>	Course Credit Type Undergraduate Student, Rackham Graduate Student, Non-Rackham Graduate Student													
<input type="checkbox"/>	Repeatability <input type="checkbox"/> Course is Repeatable for Credit <input type="checkbox"/> Course is Y graded Maximum number of repeatable credits: <input type="checkbox"/> Can be taken more than once in the same term													

Subject: Elec Engin & Computer Sci Catalog: 495

<input type="checkbox"/>	Grading Basis <input checked="" type="checkbox"/> Graded (A – E) <input type="checkbox"/> Credit/No Credit <input type="checkbox"/> Satisfactory/Unsatisfactory <input type="checkbox"/> Pass/Fail <input type="checkbox"/> Business Administration Grading <input type="checkbox"/> Not for Credit <input type="checkbox"/> Not for Degree Credit <input type="checkbox"/> Degree Credit Only	Add Consent <input type="checkbox"/> Department Consent <input type="checkbox"/> Instructor Consent <input checked="" type="checkbox"/> No Consent	Drop Consent <input type="checkbox"/> Department Consent <input type="checkbox"/> Instructor Consent <input checked="" type="checkbox"/> No Consent
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	CURRENT LISTING	REQUESTED LISTING
<input type="checkbox"/>	Advisory Prerequisite (254 char)	Advisory Prerequisite (254 char)
<input type="checkbox"/>	Enforced Prerequisite (254 char) EECS 281; (C or better, No OP/F) Minimum grade requirement: C	Enforced Prerequisite (254 char) EECS 281; (C or better, No OP/F) Minimum grade requirement: C
<input type="checkbox"/>	Credit Exclusions	Credit Exclusions
<input type="checkbox"/>	Course Components <input checked="" type="checkbox"/> Lecture <input type="checkbox"/> Seminar <input type="checkbox"/> Recitation <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Discussion <input type="checkbox"/> Independent Study	Graded Component <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
		Terms Typically Offered <input checked="" type="checkbox"/> Fall <input checked="" type="checkbox"/> Winter <input type="checkbox"/> Spring <input type="checkbox"/> Summer <input type="checkbox"/> Spring/Summer
Cognizant Faculty Member Name: Dave Chesney		Cognizant Faculty Member Title:

SIGNATURES ARE REQUIRED FROM ALL DEPARTMENTS INVOLVED (Please Print AND Sign Name)

Contact Person: Punam Vyas Email: vyas@umich.edu Phone: 647-1754

CoE Curriculum Committee Representative:  Print: Amir Kamil Date: 9/22/23

CoE Curriculum Committee Chair: _____ Print: _____ Date: _____

Home Department Chair:  Print: Andrew DeOrio Date: 9/22/23

Cross-Listed Department Chair: _____ Print: _____ Date: _____

Cross-Listed Department Chair: _____ Print: _____ Date: _____

Cross-Listed Department Chair: _____ Print: _____ Date: _____

DEPARTMENTAL/COLLEGE USE ONLY

Current:**Requested:**Course Description

Emphasizes team-based development of large, complex, software systems using established software development methodology. Systems will incorporate state-of-the-art technology dealing with disability, illness, and accessibility. Real world projects, usually in partnership with hospitals or for specific disabled clients.

Course Description

Team-based development of technology systems focused on disability, accessibility, or chronic illness. Students work closely with people with disabilities to develop technologies addressing a specific need. Covers design methods and problem-solving strategies; human factors; human-machine interfaces; community perspectives; social and ethical aspects; and accessible technology for disability or chronic illness.

Class Length

Full term

Class Length

Full term

Contact hours (lecture):

3

Contact hours (lecture):

3

Contact hours (recitation)

1

Contact hours (recitation)

1

Contact hours (lab)Contact hours (lab)**Additional Info:**Submitted by:

Cross-listed dept

Describe how this course fits with the degree requirements:Special resources of facilities required for this course:Supporting statement:

EECS 495 as it is actually taught has become broader in scope than originally envisioned to include not just software but also hardware. The revised title and description addresses that by emphasizing "development of technology systems focused on disability".



Course Approval Request Form

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ro.curriculum@umich.edu

ro.umich.edu

CHECK APPROPRIATE BOXES FOR ALL CHANGES

Action Requested

- New Course
 Modification of Existing Course
 Deletion of Existing Course

Date of Submission: 2023-09-23

Effective Term: Winter 2024

<input checked="" type="checkbox"/>	Course Offered <input checked="" type="checkbox"/> Indefinitely <input type="checkbox"/> One term only	RO USE ONLY Date Received: Date Completed: Completed By:
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CURRENT LISTING

REQUESTED LISTING


<input type="checkbox"/>	Dept (Home): Industrial & Operations Engin Subject: IOE Catalog: 474	Dept (Home): Industrial & Operations Engin Subject: IOE Catalog: 474												
<input type="checkbox"/>	<input type="checkbox"/> Course is Cross-Listed with Other Departments	<input type="checkbox"/> Course is Cross-Listed with Other Departments												
<input type="checkbox"/>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">Department</th> <th style="width: 25%;">Subject</th> <th style="width: 50%;">Catalog Number</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	Department	Subject	Catalog Number				<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">Department</th> <th style="width: 25%;">Subject</th> <th style="width: 50%;">Catalog Number</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	Department	Subject	Catalog Number			
Department	Subject	Catalog Number												
Department	Subject	Catalog Number												
<input type="checkbox"/>	Course Title (full title) SIMULATION	Course Title (full title) SIMULATION												
<input type="checkbox"/>	Abbreviated Title (20 char) SIMULATION	Abbreviated Title (20 char) SIMULATION												
<input type="checkbox"/>	Course Description (Please limit to 50 words and attach separate sheet if necessary) Simulation of complex discrete-event systems with applications in industrial and service organizations. Course topics include modeling and programming simulations in one or more high-level computer packages such as ProModel or GSPP/H; input distribution modeling; analysis of simulation output data. The course will obtain a team simulation project.													
<input type="checkbox"/>	Full Term Credit Hours Undergraduate Min: 4 Graduate Min: 4 Undergraduate Max: 4 Graduate Max: 4	Half Term Credit Hours Undergraduate Min: Graduate Min: Undergraduate Max: Graduate Max:												
<input checked="" type="checkbox"/>	Course Credit Type Undergraduate Student, Rackham Graduate Student, Non- Rackham Graduate Student													
<input type="checkbox"/>	Repeatability <input type="checkbox"/> Course is Repeatable for Credit <input type="checkbox"/> Course is Y graded Maximum number of repeatable credits: <input type="checkbox"/> Can be taken more than once in the same term													

Subject: Industrial & Operations Engin	Catalog: 474
<input type="checkbox"/>	<p>Grading Basis</p> <p><input checked="" type="checkbox"/> Graded (A – E)</p> <p><input type="checkbox"/> Credit/No Credit</p> <p><input type="checkbox"/> Satisfactory/Unsatisfactory</p> <p><input type="checkbox"/> Pass/Fail</p> <p><input type="checkbox"/> Business Administration</p> <p>Grading</p> <p><input type="checkbox"/> Not for Credit</p> <p><input type="checkbox"/> Not for Degree Credit</p> <p><input type="checkbox"/> Degree Credit Only</p>
	<p>Add Consent</p> <p><input type="checkbox"/> Department Consent</p> <p><input type="checkbox"/> Instructor Consent</p> <p><input checked="" type="checkbox"/> No Consent</p>
	<p>Drop Consent</p> <p><input type="checkbox"/> Department Consent</p> <p><input type="checkbox"/> Instructor Consent</p> <p><input checked="" type="checkbox"/> No Consent</p>

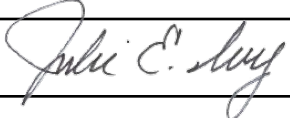
	CURRENT LISTING	REQUESTED LISTING
<input type="checkbox"/>	Advisory Prerequisite (254 char) IOE 373	Advisory Prerequisite (254 char) IOE 373
<input type="checkbox"/>	Enforced Prerequisite (254 char) IOE 316 and IOE 366, preceded or accompanied by IOE 373; C- or better OR Graduate Standing, Minimum Grade Requirement: C-	Enforced Prerequisite (254 char) IOE 316 and IOE 366, preceded or accompanied by IOE 373; C- or better OR Graduate Standing, Minimum Grade Requirement: C-
<input type="checkbox"/>	Credit Exclusions	Credit Exclusions
<input checked="" type="checkbox"/>	<p>Course Components</p> <p><input checked="" type="checkbox"/> Lecture</p> <p><input type="checkbox"/> Seminar</p> <p><input type="checkbox"/> Recitation</p> <p><input checked="" type="checkbox"/> Lab</p> <p><input type="checkbox"/> Discussion</p> <p><input type="checkbox"/> Independent Study</p>	<p>Graded Component</p> <p><input checked="" type="checkbox"/></p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p>
		<p>Terms Typically Offered</p> <p><input checked="" type="checkbox"/> Fall</p> <p><input checked="" type="checkbox"/> Winter</p> <p><input type="checkbox"/> Spring</p> <p><input type="checkbox"/> Summer</p> <p><input type="checkbox"/> Spring/Summer</p>
Cognizant Faculty Member Name: Luis Garcia-Guzman Cognizant Faculty Member Title:		

SIGNATURES ARE REQUIRED FROM ALL DEPARTMENTS INVOLVED (Please Print AND Sign Name)

Contact Person: Leonora Lucaj Email: lucajl@umich.edu Phone: 734-764-3297

CoE Curriculum Committee Representative: Yavuz Bozer  Print: Yavuz Bozer Date: 10/05/23

CoE Curriculum Committee Chair: Print: Date:

Home Department Chair: Julie Ivy  Print: Julie Simmons Ivy Date: 10/04/23

Cross-Listed Department Chair: Print: Date:

Cross-Listed Department Chair: Print: Date:

Cross-Listed Department Chair: Print: Date:

DEPARTMENTAL/COLLEGE USE ONLY

Current:**Requested:**Course Description

Simulation of complex discrete-event systems with applications in industrial and service organizations. Course topics include modeling and programming simulations in one or more high-level computer packages such as ProModel or GSPP/H; input distribution modeling; analysis of simulation output data. The course will obtain a team simulation project.

Class Length

Full term

Contact hours (lecture):

4

Contact hours (recitation)Contact hours (lab)Course Description

Simulation of complex discrete-event systems with applications in industrial and service organizations. Course topics include modeling and programming simulations in one or more high-level computer packages such as ProModel or GSPP/H; input distribution modeling; analysis of simulation output data. The course will obtain a team simulation project.

Class Length

Full term

Contact hours (lecture):

3

Contact hours (recitation)Contact hours (lab)

2

Additional Info:Submitted by:

Home dept

Describe how this course fits with the degree requirements:

This course is part of the required 33 credits of the IOE core requirements.

Special resources of facilities required for this course:Supporting statement:

In all previous CARFs, IOE 474 did not have a lab component listed. We needed to officially add the lab component. We need to add 2 contact hours for the lab to comply with the CoE Credit Policy that 1 credit hour for a lab is 2 contact hours. Additionally, the cognizant faculty would like to allow Non-Rackham Graduate Students to take this course since we allow that for most other IOE courses.



Course Approval Request Form

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CHECK APPROPRIATE BOXES FOR ALL CHANGES

Action Requested

- New Course
 Modification of Existing Course
 Deletion of Existing Course

Date of Submission: 2023-09-25

Effective Term: Winter 2024

<input checked="" type="checkbox"/>	Course Offered <input checked="" type="checkbox"/> Indefinitely <input type="checkbox"/> One term only	RO USE ONLY Date Received: Date Completed: Completed By:
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CURRENT LISTING

REQUESTED LISTING

<input checked="" type="checkbox"/>	Dept (Home): Robotics			Dept (Home): Robotics		
	Subject: ROB			Subject: ROB		
	Catalog: 103			Catalog: 203		
	<input type="checkbox"/> Course is Cross-Listed with Other Departments			<input type="checkbox"/> Course is Cross-Listed with Other Departments		
<input type="checkbox"/>	Department	Subject	Catalog Number	Department	Subject	Catalog Number
<input type="checkbox"/>	Course Title (full title) Robotic Mechanisms			Course Title (full title) Robotic Mechanisms		
<input type="checkbox"/>	Abbreviated Title (20 char) Robotic Mechanisms			Abbreviated Title (20 char) Robotic Mechanisms		
<input checked="" type="checkbox"/>	Course Description (Please limit to 50 words and attach separate sheet if necessary) Hands-on design, build, and operations of robotic systems. Students will develop maker-shop skills (3D printing, laser cutting, mill, etc.), gain experience in embedded programming and controls, system design and integration.					
<input checked="" type="checkbox"/>	Full Term Credit Hours			Half Term Credit Hours		
	Undergraduate Min: 2		Graduate Min:	Undergraduate Min:		Graduate Min:
	Undergraduate Max: 2		Graduate Max:	Undergraduate Max:		Graduate Max:
	Course Credit Type Undergraduate Student					
<input type="checkbox"/>	Repeatability					
	<input type="checkbox"/> Course is Repeatable for Credit			<input type="checkbox"/> Course is Y graded		
	Maximum number of repeatable credits:			<input type="checkbox"/> Can be taken more than once in the same term		

Subject: Robotics Catalog: 103				
<input checked="" type="checkbox"/>	<table style="width: 100%; border: none;"> <tr> <td style="width: 33%; vertical-align: top;"> Grading Basis <input checked="" type="checkbox"/> Graded (A – E) <input type="checkbox"/> Credit/No Credit <input type="checkbox"/> Satisfactory/Unsatisfactory <input type="checkbox"/> Pass/Fail <input type="checkbox"/> Business Administration Grading <input type="checkbox"/> Not for Credit <input type="checkbox"/> Not for Degree Credit <input type="checkbox"/> Degree Credit Only </td> <td style="width: 33%; vertical-align: top;"> Add Consent <input type="checkbox"/> Department Consent <input checked="" type="checkbox"/> Instructor Consent <input type="checkbox"/> No Consent </td> <td style="width: 33%; vertical-align: top;"> Drop Consent <input type="checkbox"/> Department Consent <input checked="" type="checkbox"/> Instructor Consent <input type="checkbox"/> No Consent </td> </tr> </table>	Grading Basis <input checked="" type="checkbox"/> Graded (A – E) <input type="checkbox"/> Credit/No Credit <input type="checkbox"/> Satisfactory/Unsatisfactory <input type="checkbox"/> Pass/Fail <input type="checkbox"/> Business Administration Grading <input type="checkbox"/> Not for Credit <input type="checkbox"/> Not for Degree Credit <input type="checkbox"/> Degree Credit Only	Add Consent <input type="checkbox"/> Department Consent <input checked="" type="checkbox"/> Instructor Consent <input type="checkbox"/> No Consent	Drop Consent <input type="checkbox"/> Department Consent <input checked="" type="checkbox"/> Instructor Consent <input type="checkbox"/> No Consent
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	CURRENT LISTING	REQUESTED LISTING			
<input type="checkbox"/>	Advisory Prerequisite (254 char) ROB 101	Advisory Prerequisite (254 char) ROB 101			
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<input type="checkbox"/>	Credit Exclusions	Credit Exclusions			
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Cognizant Faculty Member Name: Derrick Yeo Cognizant Faculty Member Title: Lecturer					

SIGNATURES ARE REQUIRED FROM ALL DEPARTMENTS INVOLVED (Please Print AND Sign Name)

Contact Person: Kayla Dombrowski Email: kakelle@umich.edu Phone:

CoE Curriculum Committee Representative:  Print: Dimitra Panagou Date: 9/26/2023

CoE Curriculum Committee Chair: Print: Date:

Home Department Chair:  Print: Dawn Tilbury Date: 9/29/2023

Cross-Listed Department Chair: Print: Date:

Cross-Listed Department Chair: Print: Date:

Cross-Listed Department Chair: Print: Date:

DEPARTMENTAL/COLLEGE USE ONLY

Current:**Requested:**Course Description

Hands-on design, build, and operations of robotic systems. Students, in teams, will build a mobile manipulation robot that can be teleoperated. Students will develop maker-shop skills (3D printing, laser cutting, mill, etc.), programming (C++) and controls, system design and integration, and technical writing. Culmination in friendly competition and final report.

Class Length

Full term

Contact hours (lecture):

1

Contact hours (recitation)Contact hours (lab)

6

Course Description

Hands-on design, build, and operations of robotic systems. Students will develop maker-shop skills (3D printing, laser cutting, mill, etc.), gain experience in embedded programming and controls, system design and integration.

Class Length

Full term

Contact hours (lecture):Contact hours (recitation)Contact hours (lab)

4

Additional Info:Submitted by:

Home dept

Describe how this course fits with the degree requirements:

ROB 203 is the lab-only offering of Engineering 100-850 (Robotics Mechanisms) which is part of the Full Spectrum Robotics Introduction, a modular set of courses that are revolutionizing engineering students' first exposure to mathematics, programming, and system design, by fully contextualizing these concepts within the sense-reason-act paradigm of modern robotics. Along with ROB 101 (Computational Linear Algebra) and ROB 102 (Introduction to AI and Programming, E100-850 has enabled students to get right to designing and prototyping functional robotics projects. The unifying thread across these courses is the "sense-reason-act" paradigm and its application to autonomous navigation for mobile robots. Each course has addressed different aspects of "sense-reason-act" to provide the mathematical foundations to handle perception from robot sensors, computational foundations to perform path planning over graphs, and mechanical foundations to construct and control a mobile robot. At the end of their first year, students can the complete process to build their own autonomously navigating robot that serves as a scaffold for deeper understanding through their pathway in the second and third years of the Robotics Major. ROB 203 offers the technical content from Engineering 100-850 without design and communication material, and is intended for ROB students who completed their ENGR 100 requirement in a different section.

Special resources of facilities required for this course:

FRB Maker Space + access to CAEN Lab

Supporting statement:

Michigan Robotics has envisioned an undergraduate (UG) curriculum that produces students with scholarly excellence and values of equal opportunity who are prepared to thrive in the Robotics and AI workforce. In pursuit of this vision, we have re-imagined the first-year experience of engineering students, especially in regards to how mathematics and

computing are taught. Our Full Spectrum Robotics Introduction and Robotics Pathways Curriculum has connected the “why” of modern robotics to the processes behind “how” one does it, mathematically, computationally, and engineering-wise.

Towards this aim, we are particularly motivated to provide a more engaging undergraduate pathway for students inspired by FIRST Robotics in their K-12 experience. Such students are often eager to engage in Robotics during their undergraduate program. However, in the current offerings, such students must wait until their third or fourth year to take the next step in Robotics, AI, Controls, and Automation. We believe a solid and engaging first year experience in Robotics can better bridge this divide and lead into sustained engagement across the undergraduate Robotics experience.

We designed Engineering 100-850 to do two things: putting shop back into the undergraduate curriculum while tying it to the design, build, and test of a mobile robotic platform. Here, shop means laser cutters, 3D printers, CAD, and other contemporary CAM equipment. Our previous offerings of Engineering 100-850 and Robotics 103 have provided a hands-on, purpose-driven experience that we believe has inspired students who may have otherwise been casualties of the leaky pipeline, as well as re-engaged a number of students who had already leaked out and we now propose offering a modified version of it as a 200-level technical elective for ROB majors who were not able to enroll in Engineering 100-850 due to capacity or scheduling constraints.



Course Approval Request Form
Office of the Registrar, University of Michigan

1210 LSA Building
500 S. State Street
Ann Arbor, MI 48109-1382
Phone: 734.763.2113
Fax: 734.936.3148
ro.curriculum@umich.edu
ro.umich.edu

CHECK APPROPRIATE BOXES FOR ALL CHANGES

Action Requested

- New Course
- Modification of Existing Course
- Deletion of Existing Course

Date of Submission: 2023-09-22
Effective Term: Winter 2024

<input checked="" type="checkbox"/>	Course Offered <input checked="" type="checkbox"/> Indefinitely <input type="checkbox"/> One term only	RO USE ONLY Date Received: Date Completed: Completed By:
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CURRENT LISTING

REQUESTED LISTING

<input checked="" type="checkbox"/>	Dept (Home): Subject: Catalog:	Dept (Home): Robotics Subject: ROB Catalog: 560												
<input type="checkbox"/>	<input type="checkbox"/> Course is Cross-Listed with Other Departments	<input type="checkbox"/> Course is Cross-Listed with Other Departments												
<input type="checkbox"/>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">Department</th> <th style="width: 25%;">Subject</th> <th style="width: 50%;">Catalog Number</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	Department	Subject	Catalog Number				<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">Department</th> <th style="width: 25%;">Subject</th> <th style="width: 50%;">Catalog Number</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	Department	Subject	Catalog Number			
Department	Subject	Catalog Number												
Department	Subject	Catalog Number												
<input checked="" type="checkbox"/>	Course Title (full title)	Course Title (full title) BioInspired Robotic Design												
<input checked="" type="checkbox"/>	Abbreviated Title (20 char)	Abbreviated Title (20 char) Bio Insp Rob												
<input checked="" type="checkbox"/>	Course Description (Please limit to 50 words and attach separate sheet if necessary) The bioinspired design process examines original scientific research to extract general principles that can be applied to robotics. Students will build functional prototypes and learn about the bioinspired design process through case studies that highlight health, the environment, and safety.													
<input checked="" type="checkbox"/>	Full Term Credit Hours Undergraduate Min: 4 Graduate Min: 4 Undergraduate Max: 4 Graduate Max: 4	Half Term Credit Hours Undergraduate Min: Graduate Min: Undergraduate Max: Graduate Max:												
<input checked="" type="checkbox"/>	Course Credit Type Undergraduate Student, Rackham Graduate Student, Non-Rackham Graduate Student													
<input type="checkbox"/>	Repeatability <input type="checkbox"/> Course is Repeatable for Credit Maximum number of repeatable credits:	<input type="checkbox"/> Course is Y graded <input type="checkbox"/> Can be taken more than once in the same term												

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	CURRENT LISTING	REQUESTED LISTING
<input checked="" type="checkbox"/>	Advisory Prerequisite (254 char)	Advisory Prerequisite (254 char) ROB 550
	Enforced Prerequisite (254 char) Minimum grade requirement:	Enforced Prerequisite (254 char) Minimum grade requirement:
<input type="checkbox"/>	Credit Exclusions	Credit Exclusions
<input checked="" type="checkbox"/>	Course Components <input checked="" type="checkbox"/> Lecture <input type="checkbox"/> Seminar <input type="checkbox"/> Recitation <input checked="" type="checkbox"/> Lab <input checked="" type="checkbox"/> Discussion <input type="checkbox"/> Independent Study	Graded Component <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
	Terms Typically Offered <input type="checkbox"/> Fall <input checked="" type="checkbox"/> Winter <input type="checkbox"/> Spring <input type="checkbox"/> Summer <input type="checkbox"/> Spring/Summer	
Cognizant Faculty Member Name: Talia Moore		
Cognizant Faculty Member Title: Assistant Professor		

SIGNATURES ARE REQUIRED FROM ALL DEPARTMENTS INVOLVED (Please Print AND Sign Name)

Contact Person: Kayla Dombrowski Email: kakelle@umich.edu Phone:

CoE Curriculum Committee Representative:  Print: Dimitra Panagou Date: 9/25/2023

CoE Curriculum Committee Chair: _____ Print: _____ Date: _____

Home Department Chair:  Print: Dawn Tilbury Date: 9/29/2023

Cross-Listed Department Chair: _____ Print: _____ Date: _____

Cross-Listed Department Chair: _____ Print: _____ Date: _____

Cross-Listed Department Chair: _____ Print: _____ Date: _____

DEPARTMENTAL/COLLEGE USE ONLY

Current:**Requested:**Course DescriptionCourse Description

The bioinspired design process examines original scientific research to extract general principles that can be applied to robotics. Students will build functional prototypes and learn about the bioinspired design process through case studies that highlight health, the environment, and safety.

Class LengthClass Length

Full term

Contact hours (lecture):Contact hours (lecture):

2

Contact hours (recitation)Contact hours (recitation)

1

Contact hours (lab)Contact hours (lab)

2

Additional Info:Submitted by:

Home dept

Describe how this course fits with the degree requirements:

This will be an elective course that fulfills the acting requirement for the Robotics MS and PhD programs.

Special resources of facilities required for this course:

Availability of a lab space with open areas where both hard and soft robots can be tested. We need access to a makerspace with laser cutters, 3D printers, heat press, saws, drills, etc. We also need a basic electronics workstation.

Supporting statement:

Currently, the graduate robotics curriculum lacks courses that explicitly address the design of robotic systems.

The objective of Bio-Inspired Robotics is to define a biologically informed analogical design strategy that can be systematically applied to robotic systems. Students will learn both hard and soft skills to support interdisciplinary collaboration and research. The project-based laboratory element will provide students with opportunities to design, build, and test their designs in the real world.

Students will learn how to search for and understand relevant research in biological primary scientific literature (i.e. peer-reviewed journal articles). From these original scientific discoveries, students will then identify a mechanistic biological principle that can be abstracted and applied to engineering design. Students will systematically assess the strength of the analogy between the biological inspiration and the novel design.

There will be three types of lectures in this class. First the "Design" lectures lay out the bio-inspired design process. This includes how to find biological sources of inspiration, how to abstract the biological principle, how to appropriately reduce the complexity of the mechanism, how and why to scale the mechanism for the design, and how to consider and

overcome the constraints of biological systems. The “Case Study” lectures will describe topics in bio-inspired design through case studies of diverse researchers in the field. These examples demonstrate a diversity of ways in which interdisciplinary teams of researchers work together to translate research from science into robotics. These lectures will be used to demonstrate successful ways in which teams of diverse people with complementary skill sets can work together. These will also be used to demonstrate how bio-inspired design can advance health, environmental, infrastructure, and artistic goals. Case study lectures are organized by topics such as actuators, terrestrial locomotion, sensing, swimming, flying, and materials. The “Deep Dive” lectures will follow the interdisciplinary work of one research group as they went from original biological discovery, through hypothesis testing, prototype design, and application. These lectures will provide students with a clearer understanding of what it is like to work in an academic research laboratory environment.

The laboratory activities enable the students to apply the design strategies from the lectures as they work in interdisciplinary teams. These labs may change from year to year, but will involve legged robotics, soft robotics, control, and an open-ended design project of the students’ choice. In the lab presentations, students will explicitly learn tips for successful interdisciplinary teamwork. Assignments will be in the style of peer-reviewed research and will include elements related to collaborative goal-setting, assigning roles based on individual strengths, and aiming for equitable contribution.

BioInspiration WN 2022 ROB/MECHENG 599

[Jump to Today](#)  [Edit](#)

Please note that the content here may change to accommodate the unpredictability of this semester

Instructors:

Lecture: Prof. Talia Y. Moore

Online office hours on [gather.town](#).  [_](https://gather.town/invite?token=ZdN8RAHc%20) Password: BioDesign. Wed: 5pm-6pm

Lab: Pouyan Firouzabadi, GSI

Online office hours on [gather.town](#)  [_](https://gather.town/app/yhbQPPwuxb3VDNVX/Office) Password: BioDesign Mon: 1pm-2pm

Course Communication:

- Only email your instructors for health- or emergency-related matters.
- All assignments will be posted and submitted via Canvas
- We will be using **Piazza** for class discussion. The system is highly catered to getting you help quickly and efficiently from classmates, the TA, and instructors. **Rather than emailing the teaching staff**, we encourage you to post your questions on Piazza. Sign up link:
- You can send private messages to instructors on Piazza. Please do this instead of emailing professors directly for all non-health emergency related matters.

[Schedule of Lecture Topics](#)

[_](https://docs.google.com/spreadsheets/d/1DRUJz4NLqVjXDx-gm7oszl0XYtBCVsEO9xa8pVIRxaQ/edit?usp=sharing)

Course Format: In Person (as long as it is safe)

Lectures: TuTh 1:30PM - 2:30PM in 1050 FMCRB (Robotics)

Labs: Tu 2:30PM - 3:30PM in 1150 FMCRB (Robotics)

Closed toed shoes and long pants required in lab. You must register for BOTH lecture and lab.

You will have access to the lab space outside of your designated lab time.

COVID 19 Considerations:

COVID-19 vaccinations are required for all University of Michigan students, faculty and staff across all three campuses, including Michigan Medicine. This includes those working or learning remotely.

Masks required. Anyone without a mask will be offered a mask. Anyone wearing a mask improperly (not over both nose and chin), will be asked to adjust their mask. If anyone refuses to wear a mask properly during the class, they will be asked to leave. If the instructors feel uncomfortable being in the lecture hall with an improperly masked individual, the class will be dismissed and lecture will resume on Zoom.

For students, **classroom spaces should not be used for eating/drinking**. Students may eat at other locations within buildings adhering to distancing requirements according to their vaccination status.

IF YOU FEEL SICK, if you have been traveling, or if you suspect you have been exposed to someone who has COVID 19, **PLEASE DO NOT COME TO CLASS**. Please see these [university resources](https://campusblueprint.umich.edu/prevention-testing-care/testing/covid19-testing/?utm_source=Engin%20Update%20Fall%202021&utm_campaign=dde963167e-EMAIL_CAMPAIGN_2018_12_13_02_33_COPY_01&utm_medium=email&utm_term=0_77986d5a13-dde963167e-278510084). [↗](https://campusblueprint.umich.edu/prevention-testing-care/testing/covid19-testing/?utm_source=Engin%20Update%20Fall%202021&utm_campaign=dde963167e-EMAIL_CAMPAIGN_2018_12_13_02_33_COPY_01&utm_medium=email&utm_term=0_77986d5a13-dde963167e-278510084)
(https://campusblueprint.umich.edu/prevention-testing-care/testing/covid19-testing/?utm_source=Engin%20Update%20Fall%202021&utm_campaign=dde963167e-EMAIL_CAMPAIGN_2018_12_13_02_33_COPY_01&utm_medium=email&utm_term=0_77986d5a13-dde963167e-278510084) We can accommodate remote learning in these ways:

- All lectures will be recorded and posted to this Canvas site. Lecture participation for remote interactions will be measured using the Perusall tool.
- If we must switch to remote labs, lab supplies will be delivered to your home and must be returned upon completion of the lab activity. You will still be expected to work collaboratively with your teammates.
- Labs will be equipped with computing stations to facilitate Zoom-based teamwork.

If you get sick, please contact us as soon as possible so that we can adjust our expectations for your assignments. This will occur on a case-by-case basis.

If the county or the university initiates a stay-at-home order, we are prepared to switch to an online-only format.

In the event of an exposure, all participants will be notified so that we can all get tested. The identity of those who test positive will not be shared.

Grading:

All assignments are a blend of technical and technical communication content. Rubrics will be posted for each assignment.

- 5% Class Participation and surveys
- 20% Midterm (in-class multiple choice)
- 10% Discovery Decompositions

- 5% Discovery Decomposition presentation
- 10% Team Legged Robot Project
- 10% Team Soft Robot Project
- 10% Team Gecko Project
- 30% Team Final Design Project (5 min team video)
- Extra points for subreddit!
- Extra points for Prosthetic Hand Project!

Our absolute scale is 100-90 A; 90-80 B; 80-70 C; 70-60 D; <60 F.

All assignments are due on Mondays at midnight, except for the final project.

Late Assignments and Emergencies:

If you find yourself facing an unforeseen emergency, please contact us as soon as possible to let us know. Only a documented illness or some other unforeseeable emergency will allow us to grant you a due date for a design assignment that is later than what is posted on this syllabus or in a Canvas Announcement. Anticipated events (such as a scheduled vaccination or homework for another class) do not qualify as acceptable reasons for turning in your assignment late, as you can and should plan ahead and turn your assignment in early.

If your assignment is late, please still submit as soon as possible. You will lose a point for each day late. Assignments will be available for late submission up to 7 days after the original due date.

Academic accommodations:

Please contact the Office of Services for Students with Disabilities at least 2 weeks before the midterm so that we can make accommodations.

Surveys:

You will be asked to participate in a series of surveys and self-reports to help improve the course. Surveys relating to the design projects will be included in the project grade. Surveys relating to the course overall will be anonymous and will be included in the participation grade.

Policies:

Diversity, Equity, and Inclusion:

We consider this classroom to be a place where you will be treated with respect, and we welcome individuals of all ages, backgrounds, beliefs, ethnicities, genders, gender identities, gender expressions, national origins, religious affiliations, sexual orientations, ability – and other visible and nonvisible differences. All members of this class are expected to contribute to a respectful, welcoming and inclusive environment for every other member of the class. We are dedicated to helping each of you achieve all

that you can in this class. We may, either in lecture or smaller interactions, accidentally use language³² that creates offense or discomfort. Should we do this, please contact us and help us understand and avoid making the same mistake again.

Honor code:

We expect students to act in accordance with the University of Michigan Engineering Honor code, available in the sidebar.

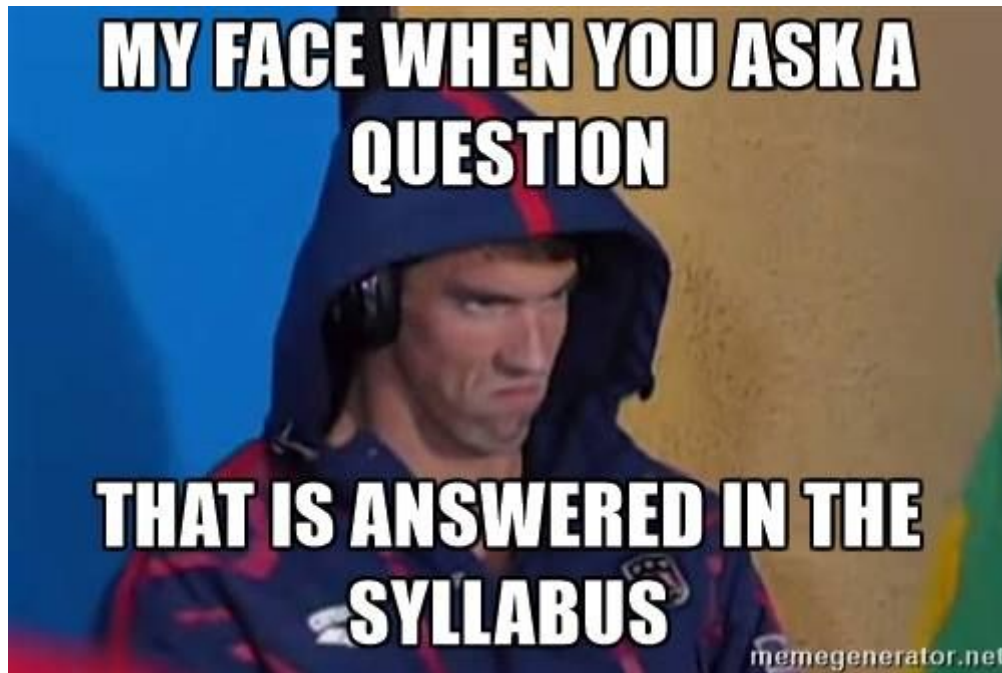
Copyright:

Lectures are comprised of copyrighted intellectual material, and the sharing of that material without express permission is a violation of copyright and personal privacy. Additionally, the discussion of sensitive issues in this class requires that students feel safe to express their opinions without fear of future reprisal or exposure. Students caught sharing course materials will be asked to leave the class. In addition, it is a violation of copyright to sell notes, assignments or exams to on-line companies.

If you want a letter of rec:

Requirements: You must come to office hours at least 3 times throughout the course and have an A grade in the course.



Please contact Prof. Moore no more than 3 weeks after the end of the course to request a letter. Meeting the above requirements does not guarantee that Prof. Moore will be able to write a strong letter. This will be determined on a case-by-case basis.



Course Summary:

Date	Details	Due
Mon Jan 10, 2022	 Anonymous Pre-Survey (https://umich.instructure.com/courses/509429/assignments/1601170)	due by 11:59pm
	 Building Teams Survey (https://umich.instructure.com/courses/509429/assignments/1601171)	due by 11:59pm
Mon Jan 24, 2022	 Discovery Decomposition (https://umich.instructure.com/courses/509429/assignments/1601190)	due by 11:59pm
Tue Jan 25, 2022	 Workshop Training Course (https://umich.instructure.com/courses/509429/assignments/1607817)	due by 11:59pm
Mon Jan 31, 2022	 Prosthetic Hand Lab (https://umich.instructure.com/courses/509429/assignments/1601186)	due by 11:59pm
Wed Feb 9, 2022	 Custom Spine Design (https://umich.instructure.com/courses/509429/assignments/1668477)	due by 11:59pm
Thu Feb 10, 2022	 BioInspiration Midterm Exam (https://umich.instructure.com/courses/509429/assignments/1601166)	due by 3pm
Mon Feb 14, 2022	 Project: Gecko-Inspired Adhesive Design Part 1: Report (https://umich.instructure.com/courses/509429/assignments/1601180)	due by 11:59pm
	 Project: Gecko-Inspired Adhesive Design Part 2: Team Contribution Survey (https://umich.instructure.com/courses/509429/assignments/1601181)	due by 11:59pm
Mon Mar 7, 2022	 Project: Kamigami Robot Design Part 1: Report (https://umich.instructure.com/courses/509429/assignments/1601182)	due by 11:59pm
	 Project: Kamigami Robot Design Part 2: Team Contribution Survey (https://umich.instructure.com/courses/509429/assignments/1601183)	due by 11:59pm
Mon Mar 14, 2022	 Final Project Part 1: Team Selection and Collaborative Plan (https://umich.instructure.com/courses/509429/assignments/1601174)	due by 11:59pm

Date	Details	Due
Mon Mar 21, 2022	 Project: Soft Robot/Artificial Muscle Design Part 1: Report (https://umich.instructure.com/courses/509429/assignments/1601184)	due by 11:59pm
Mon Mar 21, 2022	 Project: Soft Robot/Artificial Muscle Design Part 2: Team Contribution Survey (https://umich.instructure.com/courses/509429/assignments/1601185)	due by 11:59pm
Mon Mar 28, 2022	 Final Project Part 2: Discovery Decomposition Presentation (https://umich.instructure.com/courses/509429/assignments/1601175)	due by 11:59pm
Tue Mar 29, 2022	 Final Project Part 2b: Submit design and order parts (https://umich.instructure.com/courses/509429/assignments/1686549)	due by 11:59pm
Mon Apr 4, 2022	 Final Project Part 3: Analogy Check and Collaborative Plan Update (https://umich.instructure.com/courses/509429/assignments/1601176)	due by 11:59pm
Thu Apr 7, 2022	 Lecture Participation (https://umich.instructure.com/courses/509429/assignments/1601179)	due by 11:59pm
Thu Apr 7, 2022	 r/BioInspiration Extra Credit (https://umich.instructure.com/courses/509429/assignments/1601187)	due by 11:59pm
Mon Apr 18, 2022	 Final Design Project Part 5: Team Contribution Survey (https://umich.instructure.com/courses/509429/assignments/1601173)	due by 11:59pm
Tue Apr 19, 2022	 Final Project Part 4: Video (https://umich.instructure.com/courses/509429/assignments/1601177)	due by 11:59pm
Tue Apr 19, 2022	 Anonymous Design Project Feedback Survey (https://umich.instructure.com/courses/509429/assignments/1601167)	due by 11:59pm
Tue Apr 19, 2022	 Anonymous Lecture Feedback Survey (https://umich.instructure.com/courses/509429/assignments/1601168)	due by 11:59pm

Date	Details	Due
	 Anonymous Post-Survey (https://umich.instructure.com/courses/509429/assignments/1601169)	due by 11:59pm
	 Extra Credit: Supplementary Media Upload (https://umich.instructure.com/courses/509429/assignments/1601172)	due by 11:59pm

University of Michigan
 Winter 2020 Instructor Report Without Comments
 ROB 599-003: Special Topics ROB
 Talia Moore

7 out of 9 students responded to this evaluation.

Responses to University-wide questions about the course:

	SA	A	N	D	SD	N/A	Your Median	Univ-wide Median	School/College Median
This course advanced my understanding of the subject matter. (Q1631)	4	1	0	0	0	1	4.9	4.5	4.7
My interest in the subject has increased because of this course. (Q1632)	6	0	0	0	0	1	5.0	4.2	4.5
I knew what was expected of me in this course.(Q1633)	4	1	1	0	0	1	4.8	4.5	4.5
Overall, this was an excellent course.(Q1)	4	2	0	0	0	1	4.8	4.3	4.5
I had a strong desire to take this course.(Q4)	4	2	0	0	0	1	4.8	4.1	4.6
As compared with other courses of equal credit, the workload for this course was (SA=Much Lighter, A=Lighter, N=Typical, D=Heavier, SD=Much Heavier).	0	2	3	1	0	1	3.2	3.0	3.0
How did the unexpected change to remote course format affect your learning experience in this course this term? (SA=Very Positively Affected, A=Somewhat Positively Affected, N=No Effect, D=Somewhat Negatively Affected, SD=Very Negatively Affected)	0	0	3	3	0	1	2.5	2.4	2.4

Responses to University-wide questions about the instructor:

	SA	A	N	D	SD	N/A	Your Median	Univ-wide Median	School/College Median
Overall, Talia Moore was an excellent teacher.(Q2)	5	1	0	0	0	1	4.9	4.6	4.7
Talia Moore seemed well prepared for class meetings.(Q230)	6	0	0	0	0	1	5.0	4.8	4.8
Talia Moore explained material clearly.(Q199)	5	0	0	0	0	1	5.0	4.7	4.7
Talia Moore treated students with respect.(Q217)	6	0	0	0	0	1	5.0	4.8	4.9

The medians are calculated from Winter 2020 data. University-wide medians are based on all UM classes in which an item was used. The school/college medians in this report are based on classes that are graduate level with enrollment of 1 to 15 in College of Engineering.

University of Michigan
 Winter 2021 Instructor Report Without Comments
 ROB 599 002 - MECHENG 599 004 - MECHENG 599 884 - ROB
 599 882
 Talia Moore

7 out of 20 students responded to this evaluation.

Responses to University-wide questions about the course:

	SA	A	N	D	SD	N/A	Your Median	Univ-wide Median	School/College Median
This course advanced my understanding of the subject matter. (Q1631)	5	2	0	0	0	0	4.8	4.6	4.6
My interest in the subject has increased because of this course. (Q1632)	5	2	0	0	0	0	4.8	4.3	4.5
I knew what was expected of me in this course.(Q1633)	3	3	0	0	0	0	4.5	4.6	4.5
Overall, this was an excellent course.(Q1)	5	2	0	0	0	0	4.8	4.4	4.5
I had a strong desire to take this course.(Q4)	6	1	0	0	0	0	4.9	4.1	4.5
As compared with other courses of equal credit, the workload for this course was (SA=Much Lighter, A=Lighter, N=Typical, D=Heavier, SD=Much Heavier). (Q891)	2	0	3	2	0	0	3.0	2.9	2.9
How did you participate in this course? (SA=Attended most synchronously, A=Attended most asynchronously, N=Attended most in person, D=Attended some in person and some online) (Q1854)	6	0	1	0	0	0	4.9	4.8	4.7

Responses to University-wide questions about the instructor:

	SA	A	N	D	SD	N/A	Your Median	Univ-wide Median	School/College Median
Overall, Talia Moore was an excellent teacher.(Q2)	7	0	0	0	0	0	5.0	4.7	4.7
Talia Moore seemed well prepared for class meetings.(Q230)	7	0	0	0	0	0	5.0	4.8	4.8
Talia Moore explained material clearly.(Q199)	7	0	0	0	0	0	5.0	4.7	4.7
Talia Moore treated students with respect.(Q217)	7	0	0	0	0	0	5.0	4.9	4.9

Responses to questions about the course:

	SA	A	N	D	SD	N/A	Your Median	University-Wide Median
The lab instructions are clear and complete. (Q1765)	5	2	0	0	0	0	4.8	4.4
The provided lab materials (templates, tutorials, etc.) are clear and helpful. (Q1766)	5	2	0	0	0	0	4.8	4.4
Overall, my experience with my assigned group members has been excellent. (Q1767)	5	1	1	0	0	0	4.8	4.6
The amount of assistance given outside scheduled lab time has been sufficient. (Q1768)	7	0	0	0	0	0	5.0	4.7

University of Michigan
 Winter 2022 Instructor Report Without Comments
 MECHENG 599 008 - ROB 599 002
 Talia Moore

8 out of 19 students responded to this evaluation.

Responses to University-wide questions about the course:

	SA	A	N	D	SD	N/A	Your Median	Univ-wide Median	School/College Median
This course advanced my understanding of the subject matter. (Q1631)	8	0	0	0	0	0	5.0	4.6	4.7
My interest in the subject has increased because of this course. (Q1632)	8	0	0	0	0	0	5.0	4.2	4.6
I knew what was expected of me in this course.(Q1633)	8	0	0	0	0	0	5.0	4.6	4.5
I had a strong desire to take this course.(Q4)	8	0	0	0	0	0	5.0	4.1	4.5
As compared with other courses of equal credit, the workload for this course was (SA=Much Lighter, A=Lighter, N=Typical, D=Heavier, SD=Much Heavier). (Q891)	2	0	5	1	0	0	3.1	3.0	3.0

Responses to University-wide questions about the instructor:

	SA	A	N	D	SD	N/A	Your Median	Univ-wide Median	School/College Median
Talia Moore seemed well prepared for class meetings.(Q230)	8	0	0	0	0	0	5.0	4.8	4.8
Talia Moore explained material clearly.(Q199)	8	0	0	0	0	0	5.0	4.7	4.7
Talia Moore treated students with respect.(Q217)	8	0	0	0	0	0	5.0	4.8	4.9

Responses to questions about the course:

	SA	A	N	D	SD	N/A	Your Median
Overall, this was an excellent course. (Q1)	8	0	0	0	0	0	5.0

Responses to questions about the instructor:

	SA	A	N	D	SD	N/A	Your Median
Overall, Talia Moore was an excellent teacher. (Q2)	8	0	0	0	0	0	5.0

The medians are calculated from Winter 2022 data. University-wide medians are based on all UM classes in which an item was used. The school/college medians in this report are based on classes that are graduate level with enrollment of 16 to 74 in College of Engineering.

Term	Course	Section	Mode	Cmp	Units	Crse ID	Class Nbr	Home	Instructor	Room (Cap)	C/E/W	C/E/W Tot	RRC	% Filled	Avg Grd	Meeting Pattern
WN 2023	ROB 599	Bioinspiration	In Person	LEC	3	47946	25214	AWAY	Moore,Talia Yuki (PI)	1620 BEYSTER (52)	15/9/-	30/20/-	40	38.50%	4.000 (9)	01:30 PM - 02:30 PM Tu/Th
WN 2023	ROB 599	Bioinspiration	In Person	LAB	0	47946	25642	AWAY	Moore,Talia Yuki (PI)	TBA	15/9/-	30/20/-	40	N/A	--	02:30 PM - 03:30 PM Tu
WN 2022	ROB 599	Bioinspiration	In Person	LEC	3	47946	27382	AWAY	Moore,Talia Yuki (PI) Firouzabadi,Pouyan (GSI)	1050 FMCRB (56)	15/9/-	30/19/-	30	33.90%	4.000 (9)	01:30 PM - 02:30 PM Tu/Th
WN 2022	ROB 599	Bioinspiration	In Person	LAB	0	47946	28006	AWAY	Moore,Talia Yuki (PI)	TBA	15/9/-	30/19/-	30	N/A	--	02:30 PM - 03:30 PM Tu
WN 2021	ROB 599	Bioinspiration	Mix-COV	LEC	3	47946	28811	HOME	Moore,Talia Yuki (PI) Fu,Xun (GSI)	1060 FMCRB (128)	15/5/-	38/19/-	40	14.80%	4.000 (5)	02:30 PM - 03:30 PM Tu/Th
WN 2021	ROB 599	Bioinspiration	Mix-COV	LAB	0	47946	29435	HOME	Moore,Talia Yuki (PI) Fu,Xun (GSI)	2020 FMCRB (32)	7/2/-	20/12/-	20	37.50%	--	03:30 PM - 04:30 PM Tu
WN 2021	ROB 599	Bioinspiration	Mix-COV	LAB	0	47946	34793	HOME	Moore,Talia Yuki (PI) Fu,Xun (GSI)	2020 FMCRB (32)	8/3/-	20/7/-	20	21.90%	--	03:30 PM - 04:30 PM Th
WN 2021	ROB 599	Bioinspiration	Dis-COV	LEC	3	47946	35746	AWAY	Moore,Talia Yuki (PI) Fu,Xun (GSI)	1060 FMCRB (128)	5/2/-	38/19/-	40	14.80%	4.000 (1)	02:30 PM - 03:30 PM Tu/Th
WN 2021	ROB 599	Bioinspiration	Dis-COV	LAB	0	47946	35238	AWAY	Moore,Talia Yuki (PI) Fu,Xun (GSI)	2020 FMCRB (32)	3/2/-	20/12/-	20	37.50%	--	03:30 PM - 04:30 PM Tu
WN 2021	ROB 599	Bioinspiration	Dis-COV	LAB	0	47946	35239	AWAY	Moore,Talia Yuki (PI) Fu,Xun (GSI)	2020 FMCRB (32)	2/-	20/7/-	20	21.90%	--	03:30 PM - 04:30 PM Th
WN 2020	ROB 599	Bioinspiraton	In Person	LEC	3	47946	28853	HOME	Moore,Talia Yuki (PI)	422 CSRB (30)	24/9/-	24/9/-	24	30.00%	4.000 (6)	01:30 PM - 02:30 PM Tu/Th
WN 2020	ROB 599	Bioinspiraton	In Person	LAB	0	47946	30031	HOME	Moore,Talia Yuki (PI)	422 CSRB (30)	24/9/-	24/9/-	24	30.00%	--	02:30 PM - 04:30 PM Tu



Course Approval Request Form

Office of the Registrar, University of Michigan

1210 LSA Building

500 S. State Street

Ann Arbor, MI 48109-1382

Phone: 734.763.2113

Fax: 734.936.3148

ro.curriculum@umich.edu

ro.umich.edu

CHECK APPROPRIATE BOXES FOR ALL CHANGES

Action Requested

- New Course
 Modification of Existing Course
 Deletion of Existing Course

Date of Submission: 2023-10-02

Effective Term: Winter 2024

<input checked="" type="checkbox"/>	Course Offered <input checked="" type="checkbox"/> Indefinitely <input type="checkbox"/> One term only	RO USE ONLY Date Received: Date Completed: Completed By:
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CURRENT LISTING

REQUESTED LISTING

<input checked="" type="checkbox"/>	Dept (Home): Subject: Catalog:	Dept (Home): Robotics Subject: ROB Catalog: 572												
<input type="checkbox"/>	Course is Cross-Listed with Other Departments	<input checked="" type="checkbox"/>	Course is Cross-Listed with Other Departments											
<input checked="" type="checkbox"/>	<table border="1" style="width: 100%;"> <thead> <tr> <th style="width: 25%;">Department</th> <th style="width: 25%;">Subject</th> <th style="width: 50%;">Catalog Number</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td>Naval Architecture & Marine Engineering - NAVARCH - 569</td> </tr> </tbody> </table>	Department	Subject	Catalog Number			Naval Architecture & Marine Engineering - NAVARCH - 569	<table border="1" style="width: 100%;"> <thead> <tr> <th style="width: 25%;">Department</th> <th style="width: 25%;">Subject</th> <th style="width: 50%;">Catalog Number</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td>Naval Architecture & Marine Engineering - NAVARCH - 569</td> </tr> </tbody> </table>	Department	Subject	Catalog Number			Naval Architecture & Marine Engineering - NAVARCH - 569
Department	Subject	Catalog Number												
		Naval Architecture & Marine Engineering - NAVARCH - 569												
Department	Subject	Catalog Number												
		Naval Architecture & Marine Engineering - NAVARCH - 569												
<input checked="" type="checkbox"/>	Course Title (full title)	<input checked="" type="checkbox"/>	Course Title (full title) Marine Robotics											
<input checked="" type="checkbox"/>	Abbreviated Title (20 char)	<input checked="" type="checkbox"/>	Abbreviated Title (20 char) Marine Rob											
<input checked="" type="checkbox"/>	Course Description (Please limit to 50 words and attach separate sheet if necessary) Overview of marine robotic systems, including autonomous surface vehicles, remotely operated vehicles, and autonomous underwater vehicles. Topics include vehicle design, kinematic and dynamic modeling, control, sensing, and navigation. Examples draw from real robotic missions across a range of applications from inspection of critical subsea infrastructure to exploration of ocean worlds.													
<input checked="" type="checkbox"/>	Full Term Credit Hours Undergraduate Min: 3 Graduate Min: 3 Undergraduate Max: 3 Graduate Max: 3	<input checked="" type="checkbox"/>	Half Term Credit Hours Undergraduate Min: Graduate Min: Undergraduate Max: Graduate Max:											
<input checked="" type="checkbox"/>	Course Credit Type Undergraduate Student, Rackham Graduate Student, Non-Rackham Graduate Student													
<input type="checkbox"/>	Repeatability <input type="checkbox"/> Course is Repeatable for Credit <input type="checkbox"/> Course is Y graded Maximum number of repeatable credits: <input type="checkbox"/> Can be taken more than once in the same term													

Subject: Catalog:	
<input checked="" type="checkbox"/>	Grading Basis <input checked="" type="checkbox"/> Graded (A – E) <input type="checkbox"/> Credit/No Credit <input type="checkbox"/> Satisfactory/Unsatisfactory <input type="checkbox"/> Pass/Fail <input type="checkbox"/> Business Administration Grading <input type="checkbox"/> Not for Credit <input type="checkbox"/> Not for Degree Credit <input type="checkbox"/> Degree Credit Only
	Add Consent <input type="checkbox"/> Department Consent <input type="checkbox"/> Instructor Consent <input checked="" type="checkbox"/> No Consent
	Drop Consent <input type="checkbox"/> Department Consent <input type="checkbox"/> Instructor Consent <input checked="" type="checkbox"/> No Consent

CURRENT LISTING		REQUESTED LISTING
<input checked="" type="checkbox"/>	Advisory Prerequisite (254 char)	Advisory Prerequisite (254 char) Computational Linear Algebra (ROB 101) or Linear Algebra (MATH 214, MATH 217, MATH 417, or MATH 419) or graduate standing; proficiency in MATLAB
<input type="checkbox"/>	Enforced Prerequisite (254 char)	Enforced Prerequisite (254 char)
	Minimum grade requirement:	Minimum grade requirement:
<input type="checkbox"/>	Credit Exclusions	Credit Exclusions
<input checked="" type="checkbox"/>	Course Components <input checked="" type="checkbox"/> Lecture <input type="checkbox"/> Seminar <input type="checkbox"/> Recitation <input type="checkbox"/> Lab <input type="checkbox"/> Discussion <input type="checkbox"/> Independent Study	Graded Component <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
		Terms Typically Offered <input type="checkbox"/> Fall <input checked="" type="checkbox"/> Winter <input type="checkbox"/> Spring <input type="checkbox"/> Summer <input type="checkbox"/> Spring/Summer
Cognizant Faculty Member Name: Katie Skinner		Cognizant Faculty Member Title:

SIGNATURES ARE REQUIRED FROM ALL DEPARTMENTS INVOLVED (Please Print AND Sign Name)

Contact Person:

Email:

Phone:

CoE Curriculum

Committee Representative:



Print: Dimitra Panagou

Date: 9/26/2023

CoE Curriculum Committee Chair:

Print:

Date:

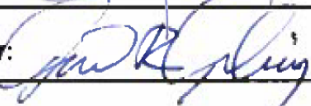
Home Department Chair:



Print: Dawn Tilbury

Date: 9/29/2023

Cross-Listed Department Chair:



Print: David Dowling

Date: 9/26/23

Cross-Listed Department

Print:

Date:

Cross-Listed Department Chair:

Print:

Date:

DEPARTMENTAL/COLLEGE USE ONLY

Current:**Requested:**Course DescriptionCourse Description

Overview of marine robotic systems, including autonomous surface vehicles, remotely operated vehicles, and autonomous underwater vehicles. Topics include vehicle design, kinematic and dynamic modeling, control, sensing, and navigation. Examples draw from real robotic missions across a range of applications from inspection of critical subsea infrastructure to exploration of ocean worlds.

Class LengthClass Length

Full term

Contact hours (lecture):Contact hours (lecture):

3

Contact hours (recitation)Contact hours (recitation)Contact hours (lab)Contact hours (lab)**Additional Info:**Submitted by:

Home dept

Describe how this course fits with the degree requirements:

The objective of ROB 572 is to expose students to theory and practice of marine robotics. Topics will include challenges and considerations for underwater vehicle design, mathematical modeling of kinematics and dynamics of an autonomous underwater vehicle, PID control for an AUV, underwater sensing, and autonomous navigation. This course will reinforce core concepts taught throughout the ROB 300-level courses for robot design, mathematical modeling of kinematics and dynamics, and algorithm development for localization and mapping to present these topics in a specialized manner through the lens of marine systems.

Students will also benefit from MATLAB programming assignments to implement an AUV simulator. This experience will enable students to transfer theory learned in lectures to real implementation. Building and interacting with the simulator will also improve students' intuition for AUV dynamics to learn how components of the dynamic model of an AUV affect the motion of the vehicle. MATLAB is used across many fields of engineering today and thus is a critical skill for students to practice throughout their coursework.

Lectures and assignments will be supplemented with a semester-long open-ended project. This project will enable students to do a deep-dive into a specific topic of their choice to explore state-of-the-art in marine robotics and to practice design and algorithm development for specific applications in marine robotics. This project will also allow students to improve their skills across team building, project management, and project presentations.

Special resources of facilities required for this course:

Availability of a CAEN Lab.

Supporting statement:

ROB 572 will synthesize core concepts throughout the Robotics curriculum to integrate topics across the 300-level and 400-level courses in robot design, perception, navigation, dynamics and controls. This will be fundamental to bridging the gap between theory learned in the classroom and integration of concepts for real world applications. ROB 572 will be a specialized course offering that builds on strengths across UM's College of Engineering in Robotics and Naval Architecture and Engineering. This will provide unique opportunities for our students to consider career pathways in marine robotics.

University of Michigan

NA599 – Marine Robotics

Winter 2022

- Description:** This course will provide an overview of marine robotic systems, including autonomous surface vehicles (ASVs), remotely operated vehicles (ROVs), and autonomous underwater vehicles (AUVs). Topics include vehicle design, kinematic and dynamic modeling, basic control, path planning, sensing, and navigation. Examples will draw from real robotic missions across a wide range of applications from inspection of critical subsea infrastructure to exploration of ocean worlds.
- Instructor:** Prof. Katie Skinner
3244 Ford Robotics Building
kskin@umich.edu
- Lecture:** Tu/Th 9:00-10:30AM – NAME 138
- Office Hours:** Tu 1:00-2:00PM – Virtual
- Prerequisites:** Recommended coursework in linear algebra and differential equations or graduate standing; recommended programming experience with MATLAB.
- Readings:** There is no required textbook for the course. Supplementary readings and resources will be posted on the course Canvas site. The “Handbook of Marine Craft Hydrodynamics and Motion Control” (Fossen) is also recommended as a reference textbook for the course.
- Learning Outcomes:** By the end of this course you should be able to:
- Describe the various types and classes of underwater robots and discuss trade-offs in vehicle design for specific applications.
 - Describe an underwater robot through mathematical modeling.
 - Apply basic low-level control structures on AUVs.
 - Solve basic motion planning problems for AUVs.
 - Select appropriate sensors for a given task, calibrate sensors, and process sensor data for marine applications.
 - Gain familiarity with state estimation algorithms for marine robots.
 - Develop a mission plan for field tests of an underwater vehicle.

Activities:

You will be graded on the following activities:

- Assignments (4 assignments each 15%): There will be 4 independent assignments that will reinforce key concepts from lectures. Some assignments will have a programming component requiring MATLAB. Assignments will all be submitted on Canvas and due at 11:59PM on the due date. There is no penalty off if submitted less than 48 hours (2 days) late; 50% will be taken off each day after that. You may discuss assignments with your classmates at the conceptual level but must complete write-ups and code on your own.
- Final project (30%): The final project will be completed throughout the semester. This will be a group project with groups of 3-4 students. You will be graded on a project proposal (5%), project progress report (5%), a final report (10%) and a final in-class presentation (10%). Project late policy: 50% off if one day late; zero credit if more than one day late.
- Participation (10%): There will be several opportunities to gain class participation points throughout the semester including attendance and participation in class, class presentations, Piazza participation, course surveys and evaluations, peer evaluations, and project presentation evaluations. Midterm participation grades will be released as preliminary feedback.

Grading:

Assignments	60%
Final Project	30%
Participation	10%

Attendance:

Lectures will be held on Tuesdays. You may attend lecture either in-person or virtually. You are expected to attend *most* (> 50%) lectures synchronously to receive full participation. Lectures will be recorded.

Discussions will be held on Thursdays. You are expected to regularly attend discussions to receive full participation. You are encouraged to attend discussions in-person, when possible. If you cannot attend a discussion in-person, please plan to attend and participate in the discussion synchronously over Zoom. If you cannot attend a discussion synchronously either virtually or in-person, you can make up the absence by completing a paper reflection/review.

Tentative Course Schedule

Date	Topic
0. Basics - History & Definitions	
Th Jan 6	Introduction
1. Underwater Vehicle Design	
Tu Jan 11	Vehicle Components, Environmental Considerations & Design Methodology
Th Jan. 13	Discussion: Lighting Presentations
Tu Jan. 18	Buoyancy, Stability & Ballast
Th Jan. 20	Discussion: Vehicle Design Considerations
2. Mathematical Modeling	
Tu Jan. 25	Kinematics
Th Jan. 27	Discussion: Kinematics
Tu Feb. 1	Dynamics
Th Feb. 3	Discussion: Project Proposals
Tu Feb. 8	Hydrostatics & Hydrodynamics
Th Feb. 10	Discussion: Hydrodynamics
3. Guidance & Control	
Tu Feb. 15	Marine Robot Control Systems
Th Feb. 17	Discussion: Guest Lecture (Tentative)
Tu Feb. 22	Guidance & Planning
Th Feb. 24	Discussion: Guidance & Control
Tu March 1	NO CLASS – Spring Break
Th March 3	NO CLASS – Spring Break
4. Sensing & Navigation	
Tu March 8	Marine Robot Sensors
Th March 10	Discussion: Project Updates
Tu March 15	Underwater Imaging
Th March 17	Discussion: Camera Systems
Tu March 22	Acoustics
Th March 24	Discussion: Acoustics
Tu March 29	Localization & SLAM
Th March 31	Discussion: Localization
5. Operations	
Tu April 5	Field Work
6. Course Wrap-Up & Final Presentations	
Th April 7	NO CLASS – Group Project Meeting
Tu April 12	Final Project Presentations I
Th April 14	Final Project Presentations II
Tu April 19	Future of Marine Robotics

*This schedule is subject to change.

Last Updated – January 5th, 2022

Course Policies

Academic Integrity: All students in the class are presumed to be decent and honorable, and all students in the class are bound by the College of Engineering Honor Code. You may not seek to gain an unfair advantage over your fellow students; you may not consult, look at, or possess the unpublished work of another without their permission; and you must appropriately acknowledge your use of another's work.

Accommodations for Students with Disabilities: If you think you need an accommodation for a disability, please let me know at your earliest convenience so that we can work with the Services for Students with Disabilities (SSD) office to help us determine appropriate academic accommodations (734-763-3000; <http://ssd.umich.edu>). Any information you provide is private and confidential and will be treated as such.

Diversity Statement: All members of this class are expected to contribute to a respectful, welcoming and inclusive environment for every other member of the class. I consider this classroom to be a place where you will be treated with respect, and I welcome individuals of all ages, backgrounds, beliefs, ethnicities, genders, gender identities, gender expressions, national origins, religious affiliations, sexual orientations, ability – and other visible and nonvisible differences.

Student Well-Being: Students may experience stressors that can impact both their academic experience and their personal well-being. These may include academic pressure and challenges associated with relationships, mental health, alcohol or other drugs, identities, finances, etc. If you are experiencing concerns, seeking help is a courageous thing to do for yourself and those who care about you. If the source of your stressors is academic, please contact me so that we can find solutions together. For personal concerns, U-M offers many resources, some of which are listed at Resources for Student Well-being on the Well-being for U-M Students website.

Special Considerations for Winter 2022 Regarding the COVID-19 Pandemic: The University of Michigan has implemented reasonable health and safety protocols, taking into account recommendations by local, state and national public health authorities, in response to the COVID-19 pandemic. As a member of the campus community you are expected to abide by health and safety policies which were developed in accordance with public health guidelines.

Family Educational Rights and Privacy Act (FERPA): Course lectures may be audio/video recorded and made available to other students in this course. As part of your participation in this course, you may be recorded. If you do not wish to be recorded, please contact Prof. Skinner (kskin@umich.edu) the first week of class to discuss alternative arrangements. Students may not record or distribute any class activity without written permission from the instructor, except as necessary as part of approved accommodations for students with disabilities. Any approved recordings may only be used for the student's own private use.

University of Michigan
 Winter 2021 Instructor Report With Comments
 NAVARCH 599-065: Special Topics NAME
 Katherine Skinner

7 out of 11 students responded to this evaluation.

Responses to University-wide questions about the course:

	SA	A	N	D	SD	N/A	Your Median	Univ- wide Median	School/College Median
This course advanced my understanding of the subject matter. (Q1631)	5	2	0	0	0	0	4.8	4.6	4.7
My interest in the subject has increased because of this course. (Q1632)	4	2	1	0	0	0	4.6	4.3	4.5
I knew what was expected of me in this course.(Q1633)	6	1	0	0	0	0	4.9	4.6	4.6
Overall, this was an excellent course.(Q1)	5	1	1	0	0	0	4.8	4.4	4.5
I had a strong desire to take this course.(Q4)	5	2	0	0	0	0	4.8	4.1	4.5
As compared with other courses of equal credit, the workload for this course was (SA=Much Lighter, A=Lighter, N=Typical, D=Heavier, SD=Much Heavier). (Q891)	2	4	1	0	0	0	4.1	2.9	2.9
How did you participate in this course? (SA=Attended most synchronously, A=Attended most asynchronously, N=Attended most in person, D=Attended some in person and some online) (Q1854)	6	1	0	0	0	0	4.9	4.8	4.8

Responses to University-wide questions about the instructor:

	SA	A	N	D	SD	N/A	Your Median	Univ-wide Median	School/College Median
Overall, Katherine Skinner was an excellent teacher.(Q2)	6	1	0	0	0	0	4.9	4.7	4.7
Katherine Skinner seemed well prepared for class meetings.(Q230)	6	1	0	0	0	0	4.9	4.8	4.8
Katherine Skinner explained material clearly.(Q199)	7	0	0	0	0	0	5.0	4.7	4.7
Katherine Skinner treated students with respect.(Q217)	7	0	0	0	0	0	5.0	4.9	4.9

The medians are calculated from Winter 2021 data. University-wide medians are based on all UM classes in which an item was used. The school/college medians in this report are based on classes that are graduate level with enrollment of 1 to 15 in College of Engineering.

University of Michigan
 Winter 2022 Instructor Report With Comments
 NAVARCH 599-065: Special Topics NAME
 Katie Skinner

18 out of 21 students responded to this evaluation.

Responses to University-wide questions about the course:

	SA	A	N	D	SD	N/A	Your Median	Univ-wide Median	School/College Median
This course advanced my understanding of the subject matter. (Q1631)	13	5	0	0	0	0	4.8	4.6	4.7
My interest in the subject has increased because of this course. (Q1632)	12	6	0	0	0	0	4.8	4.2	4.6
I knew what was expected of me in this course.(Q1633)	14	3	0	1	0	0	4.9	4.6	4.5
I had a strong desire to take this course.(Q4)	11	5	2	0	0	0	4.7	4.1	4.5
As compared with other courses of equal credit, the workload for this course was (SA=Much Lighter, A=Lighter, N=Typical, D=Heavier, SD=Much Heavier). (Q891)	4	8	6	0	0	0	3.9	3.0	3.0

Responses to University-wide questions about the instructor:

	SA	A	N	D	SD	N/A	Your Median	Univ-wide Median	School/College Median
Katie Skinner seemed well prepared for class meetings.(Q230)	12	5	1	0	0	0	4.8	4.8	4.8
Katie Skinner explained material clearly.(Q199)	11	5	2	0	0	0	4.7	4.7	4.7
Katie Skinner treated students with respect.(Q217)	17	1	0	0	0	0	5.0	4.8	4.9

Responses to questions about the course:

	SA	A	N	D	SD	N/A	Your Median
Overall, this was an excellent course. (Q1)	13	3	2	0	0	0	4.8
This course increased my desire to learn more about this subject in the future. (Q32)	11	6	1	0	0	0	4.7
Students felt comfortable asking questions. (Q892)	16	2	0	0	0	0	4.9

Responses to questions about the instructor:

	SA	A	N	D	SD	N/A	Your Median
Overall, Katie Skinner was an excellent teacher. (Q2)	14	3	1	0	0	0	4.9
Katie Skinner taught near the class level. (Q212)	14	1	2	1	0	0	4.9
Katie Skinner acknowledged all questions insofar as possible. (Q216)	16	1	1	0	0	0	4.9

The medians are calculated from Winter 2022 data. University-wide medians are based on all UM classes in which an item was used. The school/college medians in this report are based on classes that are graduate level with enrollment of 16 to 74 in College of Engineering.

Term	Course	Section	Mode	Cmp	Units	Crse ID	Class Nbr	Home	Instructor	Room (Cap)	C/E/W	C/E/W Tot	RRC	% Filled	Avg Grd	Meeting Pattern
WN 2022	NAVARCH 599	Marine Robotics	In Person	LEC	3	44610	34440	HOME	Skinner, Katie (PI)	138 NAME (55)	40/22/-	40/22/-	40	40.00%	3.876 (21)	09:00 AM - 10:30 AM Tu/Th
WN 2021	NAVARCH 599	Marine Robotics	Dis-COV	LEC	3	44610	33246	HOME	Skinner, Katie (PI)	REMOTE (999)	30/11/-	30/11/-	30	1.10%	3.838 (8)	01:00 PM - 02:30 PM M/W



Course Approval Request Form
Office of the Registrar, University of Michigan

1210 LSA Building
500 S. State Street
Ann Arbor, MI 48109-1382
Phone: 734.763.2113
Fax: 734.936.3148
ro.curriculum@umich.edu
ro.umich.edu

CHECK APPROPRIATE BOXES FOR ALL CHANGES

Action Requested

- New Course
- Modification of Existing Course
- Deletion of Existing Course

Date of Submission: 2023-06-02
Effective Term: Fall 2024

<input checked="" type="checkbox"/>	Course Offered <input checked="" type="checkbox"/> Indefinitely <input type="checkbox"/> One term only	RO USE ONLY Date Received: Date Completed: Completed By:
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CURRENT LISTING

REQUESTED LISTING

<input checked="" type="checkbox"/>	Dept (Home): Elec Engin & Computer Sci Subject: EECS Catalog: 595	Dept (Home): Computer Science and Engineering Subject: CSE Catalog: 595												
<input type="checkbox"/>	<input checked="" type="checkbox"/> Course is Cross-Listed with Other Departments	<input checked="" type="checkbox"/> Course is Cross-Listed with Other Departments												
<input type="checkbox"/>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">Department</th> <th style="width: 25%;">Subject</th> <th style="width: 50%;">Catalog Number</th> </tr> </thead> <tbody> <tr> <td colspan="3" style="text-align: center;">Linguistics - LING- 541, School of Information - SI -561</td> </tr> </tbody> </table>	Department	Subject	Catalog Number	Linguistics - LING- 541, School of Information - SI -561			<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">Department</th> <th style="width: 25%;">Subject</th> <th style="width: 50%;">Catalog Number</th> </tr> </thead> <tbody> <tr> <td colspan="3" style="text-align: center;">Linguistics - LING- 541, School of Information - SI -561</td> </tr> </tbody> </table>	Department	Subject	Catalog Number	Linguistics - LING- 541, School of Information - SI -561		
Department	Subject	Catalog Number												
Linguistics - LING- 541, School of Information - SI -561														
Department	Subject	Catalog Number												
Linguistics - LING- 541, School of Information - SI -561														
<input type="checkbox"/>	Course Title (full title) Natural Language Processing	Course Title (full title) Natural Language Processing												
<input type="checkbox"/>	Abbreviated Title (20 char) Nat Lang Proc	Abbreviated Title (20 char) Nat Lang Proc												
<input type="checkbox"/>	Course Description (Please limit to 50 words and attach separate sheet if necessary) Linguistic fundamentals of natural language processing (NLP), part of speech tagging, hidden Markov models, syntax and parsing, lexical semantics, compositional semantics, word sense disambiguation, machine translation. Additional topics such as sentiment analysis, text generation, and deep learning for NLP.													
<input type="checkbox"/>	Full Term Credit Hours Undergraduate Min: 3 Graduate Min: 3 Undergraduate Max: 3 Graduate Max: 3	Half Term Credit Hours Undergraduate Min: Graduate Min: Undergraduate Max: Graduate Max:												
<input type="checkbox"/>	Course Credit Type Undergraduate Student, Rackham Graduate Student, Non-Rackham Graduate Student													
<input type="checkbox"/>	Repeatability <input type="checkbox"/> Course is Repeatable for Credit <input type="checkbox"/> Course is Y graded Maximum number of repeatable credits: <input type="checkbox"/> Can be taken more than once in the same term													

Subject: Elec Engin & Computer Sci Catalog: 595

<input type="checkbox"/>	Grading Basis		
	<input checked="" type="checkbox"/> Graded (A – E) <input type="checkbox"/> Credit/No Credit <input type="checkbox"/> Satisfactory/Unsatisfactory <input type="checkbox"/> Pass/Fail <input type="checkbox"/> Business Administration	Add Consent <input type="checkbox"/> Department Consent <input type="checkbox"/> Instructor Consent <input checked="" type="checkbox"/> No Consent	Drop Consent <input type="checkbox"/> Department Consent <input type="checkbox"/> Instructor Consent <input checked="" type="checkbox"/> No Consent
<input type="checkbox"/>	Grading		
	<input type="checkbox"/> Not for Credit <input type="checkbox"/> Not for Degree Credit <input type="checkbox"/> Degree Credit Only		

CURRENT LISTING**REQUESTED LISTING**

<input type="checkbox"/>	Advisory Prerequisite (254 char) Senior standing	Advisory Prerequisite (254 char) Senior standing
<input type="checkbox"/>	Enforced Prerequisite (254 char) Minimum grade requirement:	Enforced Prerequisite (254 char) Minimum grade requirement:
<input type="checkbox"/>	Credit Exclusions	Credit Exclusions
<input type="checkbox"/>	Course Components <input checked="" type="checkbox"/> Lecture <input type="checkbox"/> Seminar <input type="checkbox"/> Recitation <input type="checkbox"/> Lab <input type="checkbox"/> Discussion <input type="checkbox"/> Independent Study	Graded Component <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
		Terms Typically Offered <input type="checkbox"/> Fall <input checked="" type="checkbox"/> Winter <input type="checkbox"/> Spring <input type="checkbox"/> Summer <input type="checkbox"/> Spring/Summer
Cognizant Faculty Member Name: Joyce Chai		Cognizant Faculty Member Title:

SIGNATURES ARE REQUIRED FROM ALL DEPARTMENTS INVOLVED (Please Print AND Sign Name)

Contact Person: Punam Vyas

Email: vyas@umich.edu

Phone: 647-1754

CoE Curriculum

Committee Representative



Print: Amir Kamil

Date: 9/28/23

CoE Curriculum Committee Chair:

Print:

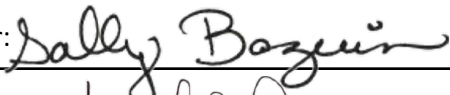
Date:

Home Department Chair:



Print: Emily Mower Provost

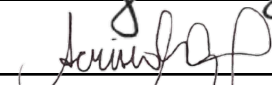
Date: 9/28/23

Cross-Listed Department Chair: 

Print: Sally Bazuin

Date: 9/25/23

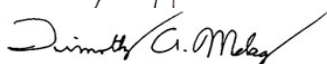
Cross-Listed Department Chair:



Print: Acrisio Pires

Date: 09/28/2023

LSA Curriculum Committee Chair:



Print: Timothy McKay

Date: 10/2/23

DEPARTMENTAL/COLLEGE USE ONLY

Current:**Requested:**Course Description

Linguistic fundamentals of natural language processing (NLP), part of speech tagging, hidden Markov models, syntax and parsing, lexical semantics, compositional semantics, word sense disambiguation, machine translation. Additional topics such as sentiment analysis, text generation, and deep learning for NLP.

Course Description

Linguistic fundamentals of natural language processing (NLP), part of speech tagging, hidden Markov models, syntax and parsing, lexical semantics, compositional semantics, word sense disambiguation, machine translation. Additional topics such as sentiment analysis, text generation, and deep learning for NLP.

Class Length

Full term

Class Length

Full term

Contact hours (lecture):

3

Contact hours (lecture):

3

Contact hours (recitation)Contact hours (recitation)Contact hours (lab)Contact hours (lab)**Additional Info:**Submitted by:

Home dept

Describe how this course fits with the degree requirements:

Tech Elective

Special resources of facilities required for this course:Supporting statement:

The EECS department is moving most 500-level and above courses to separate CSE and ECE subject codes to free up course numbers, and to better reflect which division is the home for each course.

Subject: School of Information Catalog: 649

<input type="checkbox"/>	Grading Basis		
	<input checked="" type="checkbox"/> Graded (A – E) <input type="checkbox"/> Credit/No Credit <input type="checkbox"/> Satisfactory/Unsatisfactory <input type="checkbox"/> Pass/Fail <input type="checkbox"/> Business Administration	Add Consent <input type="checkbox"/> Department Consent <input type="checkbox"/> Instructor Consent <input checked="" type="checkbox"/> No Consent	Drop Consent <input type="checkbox"/> Department Consent <input type="checkbox"/> Instructor Consent <input checked="" type="checkbox"/> No Consent
<input type="checkbox"/>	Grading		
	<input type="checkbox"/> Not for Credit <input type="checkbox"/> Not for Degree Credit <input type="checkbox"/> Degree Credit Only		

CURRENT LISTING**REQUESTED LISTING**

<input type="checkbox"/>	Advisory Prerequisite (254 char) SI 582, 618 and 622 are strongly encouraged. EECS 493 or graduate standing and (C or better) or equivalent.	Advisory Prerequisite (254 char) SI 582, 618 and 622 are strongly encouraged. EECS 493 or graduate standing and (C or better) or equivalent.
<input type="checkbox"/>	Enforced Prerequisite (254 char) {[SI 506; (C- or better) or SI 506 Waiver] and [Co-requisite: SI 507; (C- or better) or SI Waiver]} or SI 508; (C- or better); or Graduate Standing Minimum grade requirement: C-	Enforced Prerequisite (254 char) {[SI 506; (C- or better) or SI 506 Waiver] and [Co-requisite: SI 507; (C- or better) or SI Waiver]} or SI 508; (C- or better); or Graduate Standing Minimum grade requirement: C-
<input type="checkbox"/>	Credit Exclusions	Credit Exclusions
<input type="checkbox"/>	Course Components <input checked="" type="checkbox"/> Lecture <input type="checkbox"/> Seminar <input type="checkbox"/> Recitation <input type="checkbox"/> Lab <input type="checkbox"/> Discussion <input type="checkbox"/> Independent Study	Graded Component <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
		Terms Typically Offered <input checked="" type="checkbox"/> Fall <input checked="" type="checkbox"/> Winter <input type="checkbox"/> Spring <input type="checkbox"/> Summer <input type="checkbox"/> Spring/Summer
Cognizant Faculty Member Name: Eytan Adar		Cognizant Faculty Member Title:

SIGNATURES ARE REQUIRED FROM ALL DEPARTMENTS INVOLVED (Please Print AND Sign Name)

Contact Person: Punam Vyas

Email: vyas@umich.edu

Phone: 647-1754

CoE Curriculum

Committee Representative:



Print: Amir Kamil

Date: 6/22/23

CoE Curriculum Committee Chair:

Print:

Date:

Home Department Chair:



Print: Sally Bazuin

Date: 9/25/23

Cross-Listed Department Chair:



Print: Emily Mower Provost

Date: 6/22/23

Cross-Listed Department Chair:

Print:

Date:

Cross-Listed Department Chair:

Print:

Date:

DEPARTMENTAL/COLLEGE USE ONLY

Current:**Requested:**Course Description

Introduction to information visualization. Topics include data and image models, multidimensional and multivariate data, design principles for visualization, hierarchical, network, textual and collaborative visualization, the visualization pipeline, data processing for visualization, visual representations, visualization system interaction design, and impact of perception. Emphasizes construction of systems using graphics application programming interfaces (APIs) and analysis tools.

Class Length

Full term

Contact hours (lecture):

3

Contact hours (recitation)Contact hours (lab)Course Description

Introduction to information visualization. Topics include data and image models, multidimensional and multivariate data, design principles for visualization, hierarchical, network, textual and collaborative visualization, the visualization pipeline, data processing for visualization, visual representations, visualization system interaction design, and impact of perception. Emphasizes construction of systems using graphics application programming interfaces (APIs) and analysis tools.

Class Length

Full term

Contact hours (lecture):

3

Contact hours (recitation)Contact hours (lab)**Additional Info:**Submitted by:

Cross-listed dept

Describe how this course fits with the degree requirements:Special resources of facilities required for this course:Supporting statement:

The EECS department is moving most 500-level and above courses to separate CSE and ECE subject codes to free up course numbers, and to better reflect which division is the home for each course.



Course Approval Request Form
Office of the Registrar, University of Michigan

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CHECK APPROPRIATE BOXES FOR ALL CHANGES

Action Requested

- New Course
- Modification of Existing Course
- Deletion of Existing Course

Date of Submission: 2023-06-23
Effective Term: Fall 2024

<input checked="" type="checkbox"/>	Course Offered <input checked="" type="checkbox"/> Indefinitely <input type="checkbox"/> One term only	RO USE ONLY Date Received: Date Completed: Completed By:
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CURRENT LISTING

REQUESTED LISTING

<input type="checkbox"/>	Dept (Home): School of Information Subject: SI Catalog: 650	Dept (Home): School of Information Subject: SI Catalog: 650												
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Course is Cross-Listed with Other Departments	<input checked="" type="checkbox"/> Course is Cross-Listed with Other Departments												
<input checked="" type="checkbox"/>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">Department</th> <th style="width: 25%;">Subject</th> <th style="width: 50%;">Catalog Number</th> </tr> </thead> <tbody> <tr> <td colspan="3">Elec Comp Sci Eng - EECS - 549</td> </tr> </tbody> </table>	Department	Subject	Catalog Number	Elec Comp Sci Eng - EECS - 549			<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">Department</th> <th style="width: 25%;">Subject</th> <th style="width: 50%;">Catalog Number</th> </tr> </thead> <tbody> <tr> <td colspan="3">Comp Sci Eng - CSE - 549</td> </tr> </tbody> </table>	Department	Subject	Catalog Number	Comp Sci Eng - CSE - 549		
Department	Subject	Catalog Number												
Elec Comp Sci Eng - EECS - 549														
Department	Subject	Catalog Number												
Comp Sci Eng - CSE - 549														
<input type="checkbox"/>	Course Title (full title) Information Retrieval	Course Title (full title) Information Retrieval												
<input type="checkbox"/>	Abbreviated Title (20 char) Informatn Retrieval	Abbreviated Title (20 char) Informatn Retrieval												
<input type="checkbox"/>	Course Description (Please limit to 50 words and attach separate sheet if necessary) Information is everywhere. We encounter it in our everyday lives in the form of E-mail, newspapers, television, the Web, and even in conversations with each other. Information is hidden in a variety of media: text, images, sounds, videos. While casual information consumers can simply enjoy its abundance and appreciate the existence of search engines that can help them find what they want, information professionals are responsible for building the underlying technology that search engines use. Building a search engine involves a lot more than indexing some documents -- information retrieval is the study of the interaction between users and large information environments. It covers concepts such as information need, documents and queries, indexing and searching, retrieval evaluation, multimedia and hypertext search, Web search, as well as bibliographical databases. In this course, students go over some classic concepts of information retrieval and then quickly jump to the current state of the art in the field, where crawlers, spiders, and hard-of-hearing personal butlers roam.													
<input type="checkbox"/>	Full Term Credit Hours Undergraduate Min: Graduate Min: 3 Undergraduate Max: Graduate Max: 3	Half Term Credit Hours Undergraduate Min: Graduate Min: Undergraduate Max: Graduate Max:												
<input type="checkbox"/>	Course Credit Type Rackham Graduate Student													
<input type="checkbox"/>	Repeatability <input type="checkbox"/> Course is Repeatable for Credit <input type="checkbox"/> Course is Y graded Maximum number of repeatable credits: <input type="checkbox"/> Can be taken more than once in the same term													

Subject: School of Information Catalog: 650

<input type="checkbox"/>	Grading Basis		
	<input checked="" type="checkbox"/> Graded (A – E) <input type="checkbox"/> Credit/No Credit <input type="checkbox"/> Satisfactory/Unsatisfactory <input type="checkbox"/> Pass/Fail <input type="checkbox"/> Business Administration	Add Consent <input type="checkbox"/> Department Consent <input type="checkbox"/> Instructor Consent <input checked="" type="checkbox"/> No Consent	Drop Consent <input type="checkbox"/> Department Consent <input type="checkbox"/> Instructor Consent <input checked="" type="checkbox"/> No Consent
<input type="checkbox"/>	Grading		
	<input type="checkbox"/> Not for Credit <input type="checkbox"/> Not for Degree Credit <input type="checkbox"/> Degree Credit Only		

CURRENT LISTING		REQUESTED LISTING
<input type="checkbox"/>	Advisory Prerequisite (254 char)	Advisory Prerequisite (254 char)
<input type="checkbox"/>	Enforced Prerequisite (254 char) SI 507 or Waiver or Graduate Standing Minimum grade requirement:	Enforced Prerequisite (254 char) SI 507 or Waiver or Graduate Standing Minimum grade requirement:
<input type="checkbox"/>	Credit Exclusions	Credit Exclusions
<input type="checkbox"/>	Course Components	Graded Component
	<input checked="" type="checkbox"/> Lecture <input type="checkbox"/> Seminar <input type="checkbox"/> Recitation <input type="checkbox"/> Lab <input type="checkbox"/> Discussion <input type="checkbox"/> Independent Study	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
		Terms Typically Offered
		<input checked="" type="checkbox"/> Fall <input type="checkbox"/> Winter <input type="checkbox"/> Spring <input type="checkbox"/> Summer <input type="checkbox"/> Spring/Summer
Cognizant Faculty Member Name: David Jurgens		Cognizant Faculty Member Title:

SIGNATURES ARE REQUIRED FROM ALL DEPARTMENTS INVOLVED (Please Print AND Sign Name)

Contact Person: Punam Vyas

Email: vyas@umich.edu

Phone: 647-1754

CoE Curriculum

Committee Representative:



Print: Amir Kamil

Date: 6/23/23

CoE Curriculum Committee Chair:

Print:

Date:

Home Department Chair:



Print: Sally Bazuin

Date: 9/25/23

Cross-Listed Department Chair:



Print: Emily Mower Provost

Date: 6/23/23

Cross-Listed Department Chair:

Print:

Date:

Cross-Listed Department Chair:

Print:

Date:

DEPARTMENTAL/COLLEGE USE ONLY

Current:**Requested:**Course Description

Information is everywhere. We encounter it in our everyday lives in the form of E-mail, newspapers, television, the Web, and even in conversations with each other. Information is hidden in a variety of media: text, images, sounds, videos. While casual information consumers can simply enjoy its abundance and appreciate the existence of search engines that can help them find what they want, information professionals are responsible for building the underlying technology that search engines use. Building a search engine involves a lot more than indexing some documents -- information retrieval is the study of the interaction between users and large information environments. It covers concepts such as information need, documents and queries, indexing and searching, retrieval evaluation, multimedia and hypertext search, Web search, as well as bibliographical databases. In this course, students go over some classic concepts of information retrieval and then quickly jump to the current state of the art in the field, where crawlers, spiders, and hard-of-hearing personal butlers roam.

Class Length

Full term

Contact hours (lecture):

3

Contact hours (recitation)Contact hours (lab)Course Description

Information is everywhere. We encounter it in our everyday lives in the form of E-mail, newspapers, television, the Web, and even in conversations with each other. Information is hidden in a variety of media: text, images, sounds, videos. While casual information consumers can simply enjoy its abundance and appreciate the existence of search engines that can help them find what they want, information professionals are responsible for building the underlying technology that search engines use. Building a search engine involves a lot more than indexing some documents -- information retrieval is the study of the interaction between users and large information environments. It covers concepts such as information need, documents and queries, indexing and searching, retrieval evaluation, multimedia and hypertext search, Web search, as well as bibliographical databases. In this course, students go over some classic concepts of information retrieval and then quickly jump to the current state of the art in the field, where crawlers, spiders, and hard-of-hearing personal butlers roam.

Class Length

Full term

Contact hours (lecture):

3

Contact hours (recitation)Contact hours (lab)**Additional Info:**Submitted by:

Cross-listed dept

Describe how this course fits with the degree requirements:Special resources of facilities required for this course:Supporting statement:

The EECS department is moving most 500-level and above courses to separate CSE and ECE subject codes to free up course numbers, and to better reflect which division is the home for each course.



Course Approval Request Form

Office of the Registrar, University of Michigan

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 Phone: 734.763.2113
 Fax: 734.936.3148
 ro.curriculum@umich.edu
 ro.umich.edu

CHECK APPROPRIATE BOXES FOR ALL CHANGES

Action Requested

- New Course
- Modification of Existing Course
- Deletion of Existing Course

Date of Submission: 2023-06-22
 Effective Term: Fall 2024

<input checked="" type="checkbox"/>	Course Offered <input checked="" type="checkbox"/> Indefinitely <input type="checkbox"/> One term only	RO USE ONLY Date Received: Date Completed: Completed By:
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CURRENT LISTING

REQUESTED LISTING

<input type="checkbox"/>	Dept (Home): School of Information Subject: SI Catalog: 652	Dept (Home): School of Information Subject: SI Catalog: 652												
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Course is Cross-Listed with Other Departments	<input checked="" type="checkbox"/> Course is Cross-Listed with Other Departments												
<input checked="" type="checkbox"/>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">Department</th> <th style="width: 25%;">Subject</th> <th style="width: 50%;">Catalog Number</th> </tr> </thead> <tbody> <tr> <td colspan="3">Elec Eng Comp Sci - EECS - 547</td> </tr> </tbody> </table>	Department	Subject	Catalog Number	Elec Eng Comp Sci - EECS - 547			<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">Department</th> <th style="width: 25%;">Subject</th> <th style="width: 50%;">Catalog Number</th> </tr> </thead> <tbody> <tr> <td colspan="3">Comp Sci Eng - CSE - 547</td> </tr> </tbody> </table>	Department	Subject	Catalog Number	Comp Sci Eng - CSE - 547		
Department	Subject	Catalog Number												
Elec Eng Comp Sci - EECS - 547														
Department	Subject	Catalog Number												
Comp Sci Eng - CSE - 547														
<input type="checkbox"/>	Course Title (full title) Incentives and Strategic Behavior in Computational Systems	Course Title (full title) Incentives and Strategic Behavior in Computational Systems												
<input type="checkbox"/>	Abbreviated Title (20 char) Incentive&Strategic	Abbreviated Title (20 char) Incentive&Strategic												
<input type="checkbox"/>	Course Description (Please limit to 50 words and attach separate sheet if necessary) Modeling and analysis of strategic decision environments from combined computational and economic perspectives. Essential elements of game theory, including solution concepts and equilibrium computation. Design and analysis of mechanisms for problems motivated by areas such as electronic commerce, social computing, social choice, and information elicitation.													
<input type="checkbox"/>	Full Term Credit Hours Undergraduate Min: Graduate Min: 3 Undergraduate Max: Graduate Max: 3	Half Term Credit Hours Undergraduate Min: Graduate Min: Undergraduate Max: Graduate Max:												
<input type="checkbox"/>	Course Credit Type Rackham Graduate Student													
<input type="checkbox"/>	Repeatability <input type="checkbox"/> Course is Repeatable for Credit Maximum number of repeatable credits:													
<input type="checkbox"/>	<input type="checkbox"/> Course is Y graded <input type="checkbox"/> Can be taken more than once in the same term													

Subject: School of Information Catalog: 652

<input type="checkbox"/>	Grading Basis	Add Consent	Drop Consent
	<input checked="" type="checkbox"/> Graded (A – E) <input type="checkbox"/> Credit/No Credit <input type="checkbox"/> Satisfactory/Unsatisfactory <input type="checkbox"/> Pass/Fail <input type="checkbox"/> Business Administration <input type="checkbox"/> Not for Credit <input type="checkbox"/> Not for Degree Credit <input type="checkbox"/> Degree Credit Only	<input type="checkbox"/> Department Consent <input type="checkbox"/> Instructor Consent <input checked="" type="checkbox"/> No Consent	<input type="checkbox"/> Department Consent <input type="checkbox"/> Instructor Consent <input checked="" type="checkbox"/> No Consent

CURRENT LISTING**REQUESTED LISTING**

<input type="checkbox"/>	Advisory Prerequisite (254 char)	Advisory Prerequisite (254 char)
<input type="checkbox"/>	Enforced Prerequisite (254 char)	Enforced Prerequisite (254 char)
<input type="checkbox"/>	Minimum grade requirement:	Minimum grade requirement:
<input type="checkbox"/>	Credit Exclusions	Credit Exclusions
<input type="checkbox"/>	Course Components <input checked="" type="checkbox"/> Lecture <input type="checkbox"/> Seminar <input type="checkbox"/> Recitation <input type="checkbox"/> Lab <input type="checkbox"/> Discussion <input type="checkbox"/> Independent Study	Graded Component <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
		Terms Typically Offered <input checked="" type="checkbox"/> Fall <input checked="" type="checkbox"/> Winter <input type="checkbox"/> Spring <input type="checkbox"/> Summer <input type="checkbox"/> Spring/Summer
Cognizant Faculty Member Name: Michael Wellman		Cognizant Faculty Member Title:

SIGNATURES ARE REQUIRED FROM ALL DEPARTMENTS INVOLVED (Please Print AND Sign Name)

Contact Person: Punam Vyas

Email:vyas@umich.edu

Phone:647-1754

CoE Curriculum

Committee Representative:



Print: Amir Kamil

Date:6/22/23

CoE Curriculum Committee Chair:

Print:

Date:

Home Department Chair:



Print: Sally Bazuin

Date: 7/25/23

Cross-Listed Department Chair:



Print: Emily Mower Provost

Date: 6/22/23

Cross-Listed Department Chair:

Print:

Date:

Cross-Listed Department Chair:

Print:

Date:

DEPARTMENTAL/COLLEGE USE ONLY

Current:**Requested:**Course Description

Modeling and analysis of strategic decision environments from combined computational and economic perspectives. Essential elements of game theory, including solution concepts and equilibrium computation. Design and analysis of mechanisms for problems motivated by areas such as electronic commerce, social computing, social choice, and information elicitation.

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Class Length

Full term

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Full term

Contact hours (lecture):

3

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3

Contact hours (recitation)Contact hours (recitation)Contact hours (lab)Contact hours (lab)**Additional Info:**Submitted by:

Cross-listed dept

Describe how this course fits with the degree requirements:Special resources of facilities required for this course:Supporting statement:

The EECS department is moving most 500-level and above courses to separate CSE and ECE subject codes to free up course numbers, and to better reflect which division is the home for each course.