UNIVERSITY OF MICHIGAN
College of Engineering
Curriculum Committee Meeting
Tuesday, December 5, 2023

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

Support Staff: Mercedes Carmona, Betsy Dodge, Matthew Faunce

Call to Order: 1:35 PM

Adjourned: 2:21 PM

Agenda:
1. Approval of 11.21.2023 Meeting Minutes - Page 2 - **APPROVED**
2. HLC Annual Audit Questions 1, 3, & 4 for the CoE Curriculum Committee – Informative Item – Page 5 - **PENDING**
    a. Question 1 - How should departments handle courses that are taught in combination with other institutions? How should departments handle it when the course is taught at UM? Do courses that are a teaching collaborative need to follow CoE Policy for the Assignment of Credit Hours?
        i. The HLC Working Group sent the ROB Department an email requesting clarification and information about the question. No follow up has been given yet, so discussion will continue at the next CoE CC Meeting once a response is given.
    b. Question 3 - Do labs need to be scheduled in a formal CoE Computer Lab space when the work can be done online? - **PENDING**
        i. Combined discussion with Question 4 listed below.
    c. Question 4 - Are the activities associated with the online, self-paced, asynchronous Canvas modules used in ENGR 101 and 110 and other departmental courses acceptable as CoE contact hours? - **PENDING**
        i. ENGR/ADUE Representative – Rachael Schemedlen – reached out to Laura Alford, an instructor of ENGR 101 online modules, who gave examples of the "help videos" created for ENGR 101. This was screenshared by the CoE CC Chair during the meeting and summarized below.
            1. Per Laura, office hours are offered Sunday – Friday each week students, so many hours are offered. Piazza is used for async help and students post a lot. The turnaround time for questions asked on Piazza is generally less than an hour, unless posted late at night or the weekend. Question responses are after 30 minutes to give the other students a chance to answer, but if no one chimes in, then an ENGR staff member will respond. Questions are always endorsed or clarified upon answering. Office hours type help is built into the async instructions, such as walkthrough videos if a student gets stuck as a ENGR staff member goes through the exercise so students can follow along and check to see what went wrong. Feedback is given as well as advice on wrong answers, which is the same responses given if a student came to office hours.
                a. Homework Club on Sundays was run through the ECAS, which is staffed by an ENGR 101 GSI and ECAS SI for students to do their async assignments together while an instructor is on standby to assist any student. These sessions were poorly attended, with a 5 or so students a week out of 700 enrolled for the course overall, so this has been discontinued.
        ii. MECHENG: This information was sent to other colleagues for discussion and feedback. Most agreed that this type of module is helpful for students and can benefit students greatly.
            1. Suggestion of possibly changing the wording to the CoE Contact Hours policy to allow this type of learning to count towards contact hours OR a change to the course so that this can pass the HLC audit.
            2. Overall question of, what type of activity can be included in the academic engagement?

          iii.   If such learning would be allowed for the official credit hours, how would this look or reflect?
1. ISD: Points out issue of constructing a website that is effective. A system/website would need to be created that stays consistent.
2. MECHENG: Need to define the boundary and situation for what type of activity is allowed and be careful when doing so. Just watching the video and not fully participating should not be allowed. Instructor needs to lay down ground rules/guidelines as to how this is allowed. Understandable that emergencies and such occur that this type of learning would be beneficial to use, but this is to not be abused and allowed just for anyone to complete.
3. CLIMATE & SPACE & Instructor of 110: More than creating a video. For example, students are required to perform and participate in 15 video modules and more than just videos are included in that. Before a module begins, a Pre-Survey pops up so that a student documents the learning they have gained prior to completing the module at hand. A Post Survey also occurs at the end of the module for a Reflection, which is a required 200–300-word count response. Students are engaging in both online videos and content. Piazza is also used, and questions are asked to instructors. The learning is more than simply watching a video, as pre and post work is required for each module to be completed.

          iv.   IOE member brings up, does email count as academic engagement or not? I receive a lot more emails than office hours. Significant portion of student engagement happens in email rather than in person. Is this acceptable or how would this be defined as this is not stated in the policy.
- a. EECS - CSE: Instructor acting under academic matters, is what this should count under.
- b. CLIMATE & SPACE: ENGN 110 Office Hour sessions are a requirement for the course due to size of class. Hold 2 hours of office hours each week. If we are to provide specific evidence for a class, this can be provided, Instructor-student contact hours.
- c. IOE: Do we define this on our own or how do we go about this?
- d. MECHENG: Use Piazza and encourage students to use that as this is more efficient than answering the same question many other students have as well. Piazza allows you to share the response and not feel shame for asking a question and/or show to other students.
- e. IOE: Due to the competitive nature of the course I instruct, I strictly tell students not to ask questions to the entire class, hence why more emails are relevant to me vs other instructors.
- f. MECHENG: This should be academic engagement. Rather in Piazza or email exchange.
- g. IOE: Not every email is an academic interaction, but a good 70-80% emails exchanged are.
- h. ISD: We may have a lot of emails, but this may fluctuate. How do you measure emails as contact hours? Is there a way to do this? What about a private email vs a group email?
- i. MECHENG: Not sure as email is 1 to 1. Lecture, how do we define the contact hour? Mandatory office hour that requests a student to attend. No idea for the email as to how that would translate to a credit hour. Student as an individual can benefit from this. Should count towards a credit hour.

          v.   Feedback will be sent to Rachael and continue departmental discussion to think of a solution. Suggestion of re-wording our current credit policy that could be done early next semester.

3. Next CoE Curriculum Committee Meeting
    a. The 1.2.2024 meeting will be **cancelled** due to the extra holiday week being added for students and staff. Attendance would more than likely be low so, in the best interest of all members, this meeting will be cancelled.
    b. <mark>The 1.16.2024 meeting will be the first meeting for Winter 2024.</mark> This will be in person at the Lurie Engineering Center's GM Conference Room on the 4th floor, same time 1:30PM to 3:00PM.

PAGE	SUBJECT	COURSE #	ACTION	SUMMARY	EFFECTIVE TERM	MIN. GRADE REQ. FOR ENF. PREPREQ	Is Course on LSA Course Guide?	APPROVED	NOTES & REVISIONS	TABLED
7	IOE	366	MOD	Change in Enforced Prerequisite.	FT 2024	C-	YES	APPROVED		
10	IOE	373	MOD	Change in Full Term Credit Hours, Course Credit Type, and Enforced Prerequisites	FT 2024	C-	YES	APPROVED	For Enforced Prerequisites, remove ENGR 104, EECS 100 and CMPTRSC 100 or 183 and add ROB 102 and EECS 180. For Course Credit Type, remove both groups of graduate students.	

UNIVERSITY OF MICHIGAN
College of Engineering
Curriculum Committee Meeting
Tuesday, November 21, 2023

Attending: Achilleas Anastasopoulos, Jack Baker, Robert Bordley, Yavuz Bozer, Roger De Roo, Chris Fidkowski, Fei Gao, Saadet Albayrak Guralp, Amir Kamil, Leena Lalwani, Xiaogan Liang, Cameron Louttit, Emmanuelle Marquis, Radoslaw Michalowski, Yulin Pan, Mika Panagou, Eric Rutherford, Rachael Schmedlen, Ben Spector, Roxanne Walker

Support Staff: Stacie Benison, Betsy Dodge, Matthew Faunce

Call to Order: 1:35pm

Adjourned: 2:47pm

Agenda:
1. Approval of 10.24.2023 Meeting Minutes - Page 2 - **APPROVED**
2. URO ROB CARFs Discrepancies and Requests– Informative Item – Page 4
   a. Situation summary: A student was unable to register for ROB 450 when they had seemingly met the prerequisites. The enforced prerequisites on the course were, "Junior standing and [TCHNCLCM 350; (C or better)] and [ONE of ROB 310, 311, 320, 330 or 340; (C or better)]." When the Robotics Department had included "junior standing", they were under the impression that this meant at least junior standing but after speaking with the URO, they discovered that this is what is restricting senior students from enrolling. Michael Shearon assisted Robotics in updating the enforced prerequisite to read "Junior or senior standing and [TCHNCLCM 350; (C or better)] and [ONE of ROB 310, 311, 320, 330 or 340; (C or better)]" so that seniors could register for the Winter 2024 term. A Modification CARF with these edits was submitted and sent to the RO Curriculum Office on 11.20.2023.
   b. For future reference, when a department requests a credit exclusion between courses, the department needs to be aware that for the credit exclusion to work properly, a CARF updating the credit exclusion for each course included must be submitted.
   c. You cannot have a credit exclusion based on one section of a course. This can be added to the Enforced Prerequisite section instead, for example: *No credit in ENGR 100, topic "Robotics Mechanisms (topic ID 29)"*
3. HLC Annual Audit Questions for the CoE Curriculum Committee – Informative Item – Xiaogan to Present - Page 8
   a. Question 1 (How should departments handle courses that are taught in combination with other institutions? How should departments handle it when the course is taught at UM? Do courses that are a teaching collaborative need to follow CoE Policy for the Assignment of Credit Hours?) - **PENDING**
      i. CCC Chair Xiaogan Liang discussed that the course design should fit the requirements of both institutions.
      ii. ROB representative had mentioned that Chad Jenkins has been leading the effort on the UM side, he can offer more information on the syllabus, course materials associated with this course and the agreement between the two universities. CCC Chair Xiaogan Liang will send an email to Chad Jenkins requesting clarification.
      iii. A question was asked if the course is offered residentially, and it was answered that for UM students, this will be offered online, and lectures are conducted synchronously at Florida A&M University.
      iv. CSE representative noted that the course is currently scheduled Tuesday & Thursday 9:30am-10:45am for 3 credits and asked for clarification that the discrepancy in contact hours was 10 minutes per week. Given that courses at UM are scheduled to the end of the hour but release students 10 minutes early, the discrepancy appears to be 5 minutes in lecture time.

      v.   A few CCC members agreed that the department should schedule the class at the UM campus until the end of the hour (in the case of the current class, that would be until 11am, or a total timeframe of 9:30-11am with the understanding that students will be let out 15 minutes early, knowing this is comparable to UM.

b.   Question 2 (When was the lab policy established?) - **RESOLVED**

      i.   The current CoE Policy for the Assignment of Credit Hours was approved October 13, 2020. There was no further response from CCC members with knowledge of earlier dates of the Credit Hour Policy, but it was understood that Labs met for 2 contact hours for each credit.

c.   Question 3 (Do labs need to be scheduled in a formal CoE Computer Lab space when the work can be done online?) – **PENDING**

      i.   Combined discussion below under question 4.

d.   Question 4 (Are the activities associated with the online, self-paced, asynchronous Canvas modules used in ENGR 101 and 110 and other departmental courses acceptable as CoE contact hours?) – **PENDING**

      i.   Questions posed regarding a shift to more virtual instruction:

          1.   What does it mean to have a tutorial with interactive tutorial without further participation from a faculty member?

          2.   What happens when there is a course with minimal faculty interaction?

          3.   Will students see this as a deterrent to attending the University of Michigan if they can receive similar instruction through online methods or videos?

      ii.   ECE representative commented on the interactive aspect of lab courses, with an example of a course taught with a regular lab, but during COVID students were allowed to build their circuits at home. They questioned what is the difference between a lab versus a homework assignment? Are students required to come to the lab so that they can show their work, have faculty supervision, and have faculty retain an active role in the learning process? Concern was expressed regarding software labs in which the work is being done all at home regarding whether this could be considered a lab.

      iii.   CCC Chair Xiaogan Liang mentioned using Piazza for providing answers to student inquiries and mentioned that the nature of the course can determine what components may be most desired to count as contact hours. He noted that for some courses, if a student does not attend the lab, they won't have access to the necessary tools. But for software courses in which students can work from any location, providing student feedback through a platform such as Piazza or other platforms that allow faculty to respond in the moment can be sufficient for providing faculty interaction to students.

      iv.   CSE representative added that the current definition of contact hours does not capture most interactions between instructors and students and what instructors and students themselves think is effective. The CSE representative mentioned having a 16-minute average response time for EECS 280 for Piazza, and that 1400 of these responses were their own. Office hours have been effective for many students taking CSE courses as this is noted as one of their primary methods for interacting with faculty. When attendance at lectures has been made optional, students have been attending class less and have instead been focusing their time on attending office hours. From the point of view of staffing hours, staff find it is more effective for faculty and staff to spend more time on Piazza office hours than being in the room with students. It would be nice for the policy to account for the "on the ground reality" of how faculty members spend their time interacting with students.

          1.   A question was raised regarding how the college can redefine the contact hours policy to consider reasonable interaction through real-time interaction of faculty with students in office hours.

      v.   ENGR/ADUE representative Rachael Schemedlen noted that both ENGR 101 and 110 came to their current structure by going through the Foundational Course Initiative process to determine how best to deliver course content. In ENGR 101, students really like the way the online modules work and feel it is an effective way to learn.

          1.   The CCC should consider defining what course activities can be defined as "faculty-led engagement."

          2.   The CCC should provide guidance on what is considered "interactive computer-assisted instruction" and what's the difference between "interactive tutorial without any further participation" and "interactive tutorial".

      vi.   IOE representative commented on seeing two faculty interaction paths, one being learning something new in a team setting, in which a physical lab plays a bigger role, and assisting students with their questions about course content, in which students typically receiving assistance through office hours.

      vii. CCC members had a discussion surrounding whether student questions answered by faculty, on any platform, would be considered contact hours, such as on platforms like email or Piazza.

          1. IOE representative raised that the Michigan Medicine Patient portal displays a message that lets customers know that their message exchanges with physicians may result in medical charges.

          2. It was noted that complications may arise in how to define faculty engagement through message responses to students in a tangible way.

      viii. A question was raised regarding when students work on the software associated with ENGR 101. Are students able to have a question answered in real time? ENGR/ADUE representative Rachael Schemdlen mentioned that Prairie Learn is the platform used to deliver this course content, which combines Canvas and Slack. Rachael will confirm whether the platform has this functionality for faculty to respond to questions in real-time.

      ix. A question was raised regarding how an "instructor" is defined for contact hours, whether this is defined primarily as the professor or if a GSI or student teaching assistants would count.

      x. It was determined by CCC Chair Xiaogan Liang that departments should go to back to their departmental constituents to collect further feedback, and this topic will return to a future CCC meeting as well as the review of the current Credit Hour Policy.

    e. ACTION ITEM: Departments should review questions 1, 3, and 4 with key departmental constituents for feedback and these items will return to a future CCC meeting for a review of responses and a vote on any necessary policy changes or decisions.

4. Updates for the CoE Curriculum Committee on the HLC Annual Audit Process – Action Item – Xiaogan to Present – Page 10

    a. Update – feedback has now been received on both the MATSCIE and UARTS spreadsheets.

5. Proposal to Update CoE Minor Policy – Double Counting Policy Discrepancy – Action Item – Betsy to Present - Page 12 – **UPDATE APPROVED**

    a. A question was asked whether the number of courses counted between minors is checked, and the answer is yes, departments should be checking this information.

    b. A question was raised, "Why are there differences between LSA and CoE's minor policies?"

      i. A comment was made by CSE representative regarding students who see minors as "coupon collecting", or students taking advantage of double counting rules to earn additional minors. Alternatively, students who have fulfilled the course requirements needed for a minor should earn the certificate for the minor.

    c. A comment was made by CCC Chair Xiaogan Liang regarding looking into whether CoE should propose to schedule a joint meeting between LSA and CoE to discuss their differing minors policies.

    d. There was a unanimous vote and the policy update to the updated language was approved. The CoE RO will make the associated update to the policy.

PAGE	SUBJECT	COURSE #	ACTION	SUMMARY	EFFECTIVE TERM	MIN. GRADE REQ. FOR ENF. PREPREQ	Is Course on LSA Course Guide?	APPROVED	NOTES & REVISIONS	TABLED
19	EECS	440	NEW		FT 2024	C	NO	APPROVED		

HLC Annual Audit Questions for the CoE Curriculum Committee

1. **How should departments handle courses that are taught in combination with other institutions? How should departments handle it when the course is taught at UM? "Do courses that are a teaching collaborative need to follow CoE Policy for the Assignment of Credit Hours? Examples: ROB 498 and 599 (Robotics)**

ROB 498.004/ROB 599.010 was offered as part of our distributed teaching collaborative and was a course offered between U-M and FAMU. We aligned our course to the FAMU scheduling as their instructor was teaching the course. They plan to run this in WN 24 ROB 498.015/ROB 599.015

2. **When was the lab policy established? (IOE)**

   The Current CoE Policy for the Assignment of Credit Hours was approved October 13, 2020.

3. **Do labs need to be scheduled in a formal CoE Computer Lab space when the work can be done online? (EECS)**

Atul Prakash: I do think the definition of a lab course and the way contact hours are measured is not ideal for software courses in which the lab work can be done virtually at any time and any place by the students. I don't think it is ideal even for hardware courses in which students are able to use a virtual or portable kit and thus a physical lab is less critical. I would recommend another way to designate a course as a lab in CoE so that the courses can get sufficient SCH credit for supporting the teaching staff. A possible way to think about it is if the students are building real or virtual artifacts with software and hardware that requires technical support.

Question for CCC discussion: Does the CCC agree with the use of virtual technical support? How would that look, would students receive immediate feedback?

4. **Are the activities associated with the online, self-paced, asynchronous Canvas modules used in ENGR 101 and 110 and other departmental courses acceptable as CoE contact hours?** These course use contact hours as follows, per feedback from Rachael Schmedlen

The following feedback to define contact hours was gathered from Christne Gerdes, one of the Office of the Provost's identified curriculum specialists for HLC project, regarding guidance on using online self-paced, asynchronous Canvas modules as contact hours:

[The Office of the Provost Guidance on Defining the Academic Credit Hour](#) states: Faculty and instructors — with oversight and input from faculty-led curriculum committees — should determine the activities that would appropriately be viewed as faculty-led engagement within the context of a course and academic program.

Contact hours are defined as time spent by students engaged with the course instructor. This is academic engagement. Hybrid and online courses require an equivalent amount of instruction and student work as required by in-person courses.

Engagement with the course instructor/academic engagement is defined by federal guidance, and to be considered a contact hour, the activity in question must follow the regulations under letter (a):

(a) Participation in an interactive tutorial, webinar, or other interactive computer-assisted instruction

If it meets the standard of (a), as per CoE Curriculum Committee determination, then it is a contact hour. Letter (b) listed below would not follow the determination for the CoE contact hour:

(b) Logging into an online class or tutorial without any further participation

Course Approval Request Form

Office of the Registrar, University of Michigan

☑ **CHECK APPROPRIATE BOXES FOR ALL CHANGES**

Action Requested
☐ New Course
☑ Modification of Existing Course
☐ Deletion of Existing Course

Date of Submission: 2023-10-26
Effective Term: Fall 2024

☑	Course Offered ☑ Indefinitely ☐ One term only	**RO USE ONLY** Date Received: Date Completed: Completed By:

	CURRENT LISTING	**REQUESTED LISTING**
☐	Dept (Home): Industrial & Operations Engin Subject: IOE Catalog: 366	Dept (Home): Industrial & Operations Engin Subject: IOE Catalog: 366

	☐ Course is Cross-Listed with Other Departments			☐ Course is Cross-Listed with Other Departments		
☐	Department	Subject	Catalog Number	Department	Subject	Catalog Number

☐	Course Title (full title)
	    Introduction to Engineering Data Analytics
		Course Title (full title)
		    Introduction to Engineering Data Analytics

☐	Abbreviated Title (20 char)
	    Intro Eng Data Analy
		Abbreviated Title (20 char)
		    Intro Eng Data Analy

☐	Course Description (Please limit to 80 words and attach separate sheet if necessary) Introduction to data analysis methods and statistical tools, linear regression and correlation, multiple linear regression, stepwise selection, nonlinear regression, logistic regression, analysis of variance, introduction to design of experiments.

☐	Full Term Credit Hours Undergraduate Min: 3 Graduate Min: Undergraduate Max: 3 Graduate Max:	Half Term Credit Hours Undergraduate Min: Graduate Min: Undergraduate Max: Graduate Max:

☐	Course Credit Type Undergraduate Student	

☐	Repeatability ☐ Course is Repeatable for Credit Maximum number of repeatable credits:	☐ Course is Y graded ☐ Can be taken more than once in the same term

	Subject: Industrial & Operations Engin Catalog: 366

☐	**Grading Basis** ☑ Graded (A – E) ☐ Credit/No Credit ☐ Satisfactory/Unsatisfactory **Add Consent** **Drop Consent** ☐ Pass/Fail ☐ Department Consent ☐ Department Consent ☐ Business Administration ☐ Instructor Consent ☐ Instructor Consent **Grading** ☑ No Consent ☑ No Consent ☐ Not for Credit ☐ Not for Degree Credit ☐ Degree Credit Only

	CURRENT LISTING	**REQUESTED LISTING**
☐	Advisory Prerequisite (254 char)	Advisory Prerequisite (254 char)

☑	Enforced Prerequisite (254 char)
	    IOE 265 OR Stats 265 and Math 214 or 216 or 256 or 286 or 316 OR ROB 101, C- or better
	Minimum grade requirement: C-
		Enforced Prerequisite (254 char)
		    IOE 265 OR Stats 250 and Math 214 or 216 or 256 or 286 or 316 OR ROB 101, C- or better
		Minimum grade requirement: C-

☐	Credit Exclusions	Credit Exclusions
☐	**Course Components** **Graded Component** ☑ Lecture ☑ ☐ Seminar ☐ ☐ Recitation ☐ ☐ Lab ☐ ☐ Discussion ☐ ☐ Independent Study ☐	**Terms Typically Offered** ☑ Fall ☑ Winter ☐ Spring ☐ Summer ☐ Spring/Summer

Cognizant Faculty Member Name: Eunshin Byon	Cognizant Faculty Member Title: Associate Professor

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: _[signature]_   Print: Date: 11/17/23

CoE Curriculum Committee Chair: Yavuz Bozer   Print: Date:

Home Department Chair: Julie Ivy   _[signature]_   Print: Date: 11/15/23

Cross-Listed Department Chair: Print: Date:

Cross-Listed Department Chair: Print: Date:

Cross-Listed Department Chair: Print: Date:

DEPARTMENTAL/COLLEGE USE ONLY

Current:	**Requested:**
<u>Course Description</u> Introduction to data analysis methods and statistical tools, linear regression and correlation, multiple linear regression, stepwise selection, nonlinear regression, logistic regression, analysis of variance, introduction to design of experiments.	<u>Course Description</u> Introduction to data analysis methods and statistical tools, linear regression and correlation, multiple linear regression, stepwise selection, nonlinear regression, logistic regression, analysis of variance, introduction to design of experiments.
<u>Class Length</u> Full term	<u>Class Length</u> Full term
<u>Contact hours (lecture):</u> 3	<u>Contact hours (lecture):</u> 3
<u>Contact hours (recitation)</u>	<u>Contact hours (recitation)</u>
<u>Contact hours (lab)</u>	<u>Contact hours (lab)</u>

Additional Info:

<u>Submitted by:</u>
Home dept

<u>Describe how this course fits with the degree requirements:</u>
Degree Requirement

<u>Special resources of facilities required for this course:</u>

<u>Supporting statement:</u>
Stats 265 used to be an acceptable prerequisite, now that class is called Stats 250 so we are adjusting the prereqs.

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

☑ **CHECK APPROPRIATE BOXES FOR ALL CHANGES**

Action Requested
☐ New Course
☑ Modification of Existing Course
☐ Deletion of Existing Course

Date of Submission: 2023-11-06
Effective Term: Fall 2024

☑	Course Offered 　☑ Indefinitely 　☐ One term only	**RO USE ONLY** Date Received: Date Completed: Completed By:

CURRENT LISTING　　　　　　　　　　**REQUESTED LISTING**

	CURRENT LISTING	REQUESTED LISTING
☐	Dept (Home): Industrial & Operations Engin Subject: IOE Catalog: 373	Dept (Home): Industrial & Operations Engin Subject: IOE Catalog: 373

	☐ Course is Cross-Listed with Other Departments			☐ Course is Cross-Listed with Other Departments		
☐	Department	Subject	Catalog Number	Department	Subject	Catalog Number

☐	Course Title (full title) 　DATA ANALYTICS TOOLS AND TECHNIQUES	Course Title (full title) 　DATA ANALYTICS TOOLS AND TECHNIQUES
☐	Abbreviated Title (20 char) 　Data Analyt Tls&Tecn	Abbreviated Title (20 char) 　Data Analyt Tls&Tecn

☐	Course Description (Please limit to 80 words and attach separate sheet if necessary) 　Introduction to the computing tools necessary for data, business, and engineering analytics. Emphasis on data cleansing, manipulation, and preparation for visualization, as well as basic inferential statistical analyses and predictive analytics using Python.

☑	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:

☑	Course Credit Type 　Undergraduate Student, Rackham Graduate Student, Non-Rackham Graduate Student

☐	Repeatability 　☐ Course is Repeatable for Credit Maximum number of repeatable credits:	☐ Course is Y graded ☐ Can be taken more than once in the same term

	Subject: Industrial & Operations Engin	Catalog: 373

	Grading Basis
☐	☑ Graded (A – E) ☐ Credit/No Credit ☐ Satisfactory/Unsatisfactory Add Consent Drop Consent ☐ Pass/Fail ☐ Department Consent ☐ Department Consent ☐ Business Administration ☐ Instructor Consent ☐ Instructor Consent Grading ☑ No Consent ☑ No Consent ☐ Not for Credit ☐ Not for Degree Credit ☐ Degree Credit Only

	CURRENT LISTING	**REQUESTED LISTING**
☐	Advisory Prerequisite (254 char)	Advisory Prerequisite (254 char)

☑	Enforced Prerequisite (254 char)
	     Engr 101; C- or better
	Minimum grade requirement: C-
		Enforced Prerequisite (254 char)
		     Engr 101 or 101x or 104 or 151 or EECS 100 or 183 or CMPTRSC 100 or 183 (C- or better)
		Minimum grade requirement: C-

☐	Credit Exclusions	Credit Exclusions
☐	Course Components Graded Component ☑ Lecture ☑ ☐ Seminar ☐ ☐ Recitation ☐ ☑ Lab ☐ ☐ Discussion ☐ ☐ Independent Study ☐	Terms Typically Offered ☑ Fall ☑ Winter ☐ Spring ☐ Summer ☐ Spring/Summer

Cognizant Faculty Member Name: Luis Garcia-Guzman	Cognizant Faculty Member Title: Lecturer

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   *[signature]*   Print: Date: 11/30/23

CoE Curriculum Committee Chair: Print: Date:

Home Department Chair: Julie Ivy   *[signature]*   Print: Julie Ivy   Date: 11/30/23

Cross-Listed Department Chair: Print: Date:

Cross-Listed Department Chair: Print: Date:

Cross-Listed Department Chair: Print: Date:

DEPARTMENTAL/COLLEGE USE ONLY

Current:	**Requested:**

Current:

Course Description
Introduction to the computing tools necessary for data, business, and engineering analytics. Emphasis on data cleansing, manipulation, and preparation for visualization, as well as basic inferential statistical analyses and predictive analytics using Python.

Class Length
Full term

Contact hours (lecture):
3

Contact hours (recitation)

Contact hours (lab)
2

Requested:

Course Description
Introduction to the computing tools necessary for data, business, and engineering analytics. Emphasis on data cleansing, manipulation, and preparation for visualization, as well as basic inferential statistical analyses and predictive analytics using Python.

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:
Degree Requirement

Special resources of facilities required for this course:

Supporting statement:
For the most recent CARF of IOE 373, the enforced prereqs were not written correctly to include all classes. It only included Engr 101 - so this needs to be adjusted.