
Steven E Butt
Mon 11/26/2018 11:44 AM

To: Raja G Aravamuthan <raja.aravamuthan@wmich.edu>; Said M Abubakr <said.abubakr@wmich.edu>
Cc: Holly Blanks <holly.blanks@wmich.edu>

2 attachments (57 KB)
IEE4190-3 Syllabus Fall 2018.docx; IEE 4190 3 CR WMU Essential Studies Assessment.docx

Please verify your data for New Curriculum Course Request for department: IEM; college: A.
Go to the following URL to complete your worklist items: https://bwip1.cc.wmich.edu:7102/wfaprod

Date of request: 26-NOV-2018

Request ID: A-2018-IEM-124

College: A

Department: IEM

Initiator name: Larry Mallak

Initiator email: Larry.mallak@wmich.edu

Proposed effective term: 202040

Does course need General Education approval?: Y

Will course be used in teacher education?: N

If 5000 level course, prerequisites apply to: U

Proposed course data:
WES Change Course IEE 4190
Specific Course Change type selected: WMU Essential Studies - Level 3: Connections

1. Existing course prefix and number:
IEE 4190

2. Level 3: Connections:
Indicate which course category the course should be placed in:
Local and National Perspectives

3. Indicate which ONE additional required student learning outcome the course will assess:
https://outlook.office.com/owa/?realm=WMICH.EDU&exsvurl=1&ll=cc=1033&modurl=0&path=/mail/inbox
Work both independently and in collaboration with others to achieve goals

4. AND, Indicate which ONE additional required student learning outcome the course will assess:
   Demonstrate effective and appropriate written communication abilities

5. How are you going to address this in your course?
   Ethical, critical, & informed thought: Engineering and Professional Ethics paper begins with reviewing engineering code of ethics and a class discussion on professional and team ethics. Students must then submit papers which incorporate possible ethical concerns in the area of the team's senior capstone project including disciplines of design, production, quality, human resources, and supply chain.

   Collaboration: All students work in teams to analyze an issue, provide possible solutions or develop a product or process, and ultimately recommend the best option. Teams must collaborate on interactions internally as well as with advisor(s), sponsor(s), and instructor(s). Students must identify and execute approaches to best achieve the project goal and present them both presentation and report format.

   Written communication: Students develop multiple written documents throughout the semester, including weekly progress reports, project objective statement, project summary poster, and portions of a final technical report.

A. Please choose Yes or No to indicate if this class is a Teacher Education class:
   No

B. Please choose the applicable class level:
   Undergraduate

C. Please respond Yes if this is a current general education course and/or a course being submitted for the new WMU Essential Studies program. Please respond No if it is neither.
   Yes

D. Explain briefly and clearly the proposed improvement.
   Initial WMU Essential Studies review and approval.

E. Rationale. Give your reason(s) for the proposed improvement. (If your proposal includes prerequisites, justify those, too.).
   Initial WMU Essential Studies review and approval.

F. List the student learning outcomes for the proposed course or the revised or proposed major, minor, or concentration. These are the outcomes that the department will use for future assessments of the course or program.
   1. Apply ethical, critical, and informed thought within and across disciplines (WES student outcome)
   2. Work both independently and in collaboration with others to achieve goals (WES student outcome)
   3. Demonstrate effective and appropriate written communication (WES student outcome)
   4. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
   5. An ability to communicate effectively with a range of audiences
   6. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
   7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies

G. Describe how this curriculum change is a response to student learning assessment outcomes that are part of a departmental or college assessment plan or informal assessment activities.
   Initial WMU Essential Studies review and approval.

H. Effect on other colleges, departments or programs. If consultation with others is required, attach evidence of consultation
and support. If objections have been raised, document the resolution. Demonstrate that the program you propose is not a duplication of an existing one.
Initial WMU Essential Studies review and approval.

I. Effect on your department's programs. Show how the proposed change fits with other departmental offerings.
Initial WMU Essential Studies review and approval.

J. Effects on enrolled students: are program conflicts avoided? Will your proposal make it easier or harder for students to meet graduation requirements? Can students complete the program in a reasonable time? Show that you have considered scheduling needs and demands on students' time. If a required course will be offered during summer only, provide a rationale.
Initial WMU Essential Studies review and approval.

K. Student or external market demand. What is your anticipated student audience? What evidence of student or market demand or need exists? What is the estimated enrollment? What other factors make your proposal beneficial to students?
Initial WMU Essential Studies review and approval.

L. Effects on resources. Explain how your proposal would affect department and University resources, including faculty, equipment, space, technology, and library holdings. Tell how you will staff additions to the program. If more advising will be needed, how will you provide for it? How often will course(s) be offered? What will be the initial one-time costs and the ongoing base-funding costs for the proposed program? (Attach additional pages, as necessary.)
One section offered each Spring semester with a capacity of 30 students. Not offered online.

M. With the change from General Education to WMU Essential Studies, this question is no longer used.

For courses requesting approval as a WMU Essential Studies course, a syllabus identifying the student learning outcomes and an action plan for assessing the student learning outcomes must be attached in the Banner Workflow system.

Attached.

N. (Undergraduate proposals only) Describe, in detail, how this curriculum change affects transfer articulation for Michigan community colleges. For course changes, include detail on necessary changes to transfer articulation from Michigan community college courses. For new majors or minors, describe transfer guidelines to be developed with Michigan community colleges. For revisions to majors or minors, describe necessary revisions to Michigan community college guidelines. Department chairs should seek assistance from college advising directors or from the admissions office in completing this section.
Initial WMU Essential Studies review and approval.

O. Current catalog copy:
IEE 4190 - IE Senior Design
This course is the capstone industrial engineering course, taken in two separate semesters. The first semester for one credit and the second semester for three credits. The course will require application of several IE design principles to a project. The projects are chosen by students or assigned by faculty. All students are required to present their projects at the Senior Engineering Design Conference hosted by the College of Engineering and Applied Sciences.

Prerequisites & Corequisites: Prerequisite: department approval

Credits: 1 - 4 hours

Notes: May be repeated for credit.

P. Proposed catalog copy:
IEE 4190 - IEE Senior Design
This course is the capstone industrial engineering course, taken in two separate semesters. The first semester for one credit and the second semester for three credits. The course will require application of several IE design principles to a project. The projects are chosen by students or assigned by faculty. All students are required to present their projects at the Senior
Engineering Design Conference hosted by the College of Engineering and Applied Sciences. This course meets the student learning outcomes in the WMU Essential Studies Level 3: Connections, Local and National Perspectives course category when taken as a 3-credit hour course in the second semester of the senior design sequence.

Prerequisites & Corequisites: Prerequisite: department approval

Credits: 1 - 4 hours

Notes: May be repeated for credit.

Department Curriculum Chair approver: Larry Mallak

Department Curriculum Chair comment:

Date: 26-NOV-2018

Department approver: Steven Butt

Chair comment:

Date: 26-NOV-2018
IEE 4190 (3 Cr. Hr.); IEE Senior Design
Course Syllabus – Fall 2019; Tuesday 2:30 – 5:30 pm; Room D206
Revised: 14-Nov-18

2017-2018 Catalog Data: This course is the capstone industrial engineering course taken in two separate semesters, the first semester for one credit, and the second semester for three credits. This course will require application of several IE design principles to a project. The projects are chosen by students or assigned by faculty. All students are required to present their projects at the Senior Design Conference hosted by the College of Engineering and Applied Sciences.

This course meets the student learning outcomes in the WMU Essential Studies Level 3: Connections, Local and National Perspectives course category when taken as a 3-credit hour course in the second semester of the senior design sequence. (3 credits)

**WES Student Learning Outcomes**

1. Apply ethical, critical, and informed thought within and across disciplines
2. Work both independently and in collaboration with others to achieve goals
3. Demonstrate effective and appropriate written communication

Prerequisite Courses: IEE 4010, 4160 (can be concurrent). Students MUST register in this course in two consecutive semesters. They can only register for the first one credit-hour of the course one year prior to their scheduled graduation dates, and only after all the required prerequisites have been met. Students must register for the next 3 credit hour course, immediately following the semester at which they registered for the first course. Summer sessions are not counted toward this requirement.

Credit/Contact Hours: This course is taught in two semesters. In the first semester, students are expected to register for one (1) credit hour of IEE 4190, and in the second semester, they are expected to register for three (3) credit hours. This course is a required course in the IEE Program and is scheduled for 1+3 lab and class discussion.

Course Coordinator and Instructor: Dana L. Hammond, Faculty Specialist, E-221 Floyd Hall
Phone: 276-3370; E-mail: Dana.Hammond@wmich.edu

Office Hours: Tuesday: 9:00am – 10:00am
                    Thursday: 9:00am – 10:00am

Textbook: Notes which will be e-mailed to students in class and/or provided via E-Learning.

Attendance Policy: Same as the university's policy

Students are responsible for making themselves aware of and understanding the University policies and procedures that pertain to Academic Honesty. These policies include cheating, fabrication, falsification and forgery, multiple submission, plagiarism, complicity and computer misuse. The academic policies addressing Student Rights and Responsibilities can be found in:
- Undergraduate Catalog at: [http://catalog.wmich.edu/content.php?catoid=24&navoid=974](http://catalog.wmich.edu/content.php?catoid=24&navoid=974)
- Graduate Catalog at: [http://catalog.wmich.edu/content.php?catoid=25&navoid=1030](http://catalog.wmich.edu/content.php?catoid=25&navoid=1030)

If there is reason to believe you have been involved in academic dishonesty, you will be referred to the Office of Student Conduct. You will be given the opportunity to review the charge(s) and if you believe you are not responsible, you will have the opportunity for a hearing. You should consult with your instructor if you are uncertain about an issue of academic honesty prior to the submission of an assignment or test.

Students and instructors are responsible for making themselves aware of and abiding by the “Western Michigan University Sexual and Gender-Based Harassment and Violence, Intimate Partner Violence, and Stalking Policy and Procedures” related to prohibited sexual misconduct under Title IX, the Clery Act and the Violence Against Women Act (VAWA) and Campus Safe. Under this policy, responsible employees (including instructors) are required to report claims of sexual misconduct to the Title IX Coordinator or designee (located in the Office of Institutional Equity). Responsible employees are not confidential resources. For a complete list of resources and more information about the policy see [www.wmich.edu/sexualmisconduct](http://www.wmich.edu/sexualmisconduct).

In addition, students are encouraged to access the Code of Conduct, as well as resources and general academic policies on such issues as diversity, religious observance, and student disabilities:
- Office of Student Conduct [www.wmich.edu/conduct](http://www.wmich.edu/conduct)
Computer Usage: Software used in prerequisite courses can be employed to solve design problems.

Teams: The design projects take place in teams of 2 to 4 students. The members of the team will be selected by the instructor based on the overall academic performance of the members, with an input from the students and other IEE faculty. The same team of students is expected to work on their project in both semesters, unless the faculty member notices unsatisfactory performance.

IEE 4190 Second Semester (3 Cr. Hrs.); IEE Senior Design

Evaluation for the IEE 4190 - 3 credit hours: Your final grade will be based on the following:

- Progress Reports and Presentations (3) 60% (3 X 20)
- Final Presentation 20%
- Final Written Report 20%

Grading Scale:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>93 - 100</td>
</tr>
<tr>
<td>BA</td>
<td>88 - 92</td>
</tr>
<tr>
<td>B</td>
<td>83 - 87</td>
</tr>
<tr>
<td>CB</td>
<td>78 - 82</td>
</tr>
<tr>
<td>C</td>
<td>73 - 77</td>
</tr>
<tr>
<td>DC</td>
<td>68 - 72</td>
</tr>
<tr>
<td>D</td>
<td>60 - 67</td>
</tr>
<tr>
<td>E</td>
<td>Below 60</td>
</tr>
</tbody>
</table>

Course Learning Objectives: By the end of the semester the student should be able:

1. To apply IEE design skills to solve the complex design problem identified in the first IEE 4190 class.
2. To identify, discuss, and analyze ethical challenges within various industries relating to project topics.
3. To work on an engineering team.
4. To prepare a professional engineering written and oral report.

Performance Criteria (Learning Outcomes)

Course Objective 1:

- Devise methodologies to collect appropriate data to define the posed design problem.
- Propose possible design alternatives.
- Formulate and construct an appropriate design for the defined problem.
- Validate the proposed design through appropriate methodologies.
- Summarize findings.
- Construct means to convey the design to the user.

Course Objective 2:

- Read about and contribute to class discussion on engineering and professional ethics.
- Complete a written assignment on engineering ethics that relate to the specific industry of your capstone project.
- Apply ethical, critical and informed thought in within and across disciplines.

Course Objective 3:

- Projects will take place in teams of 3 to 4 students.
- Students will schedule all meetings with team members, industry sponsor, and faculty advisor(s).
- Students must log meeting minutes and provide weekly progress reports.
- Conflict resolution techniques will be discussed.
- Work both independently and in collaboration with others to achieve goals.

Course Objective 4:

- A written report will be submitted to the department, faculty advisor(s) and industry sponsor.
- Three preliminary project presentations will be given during the semester to the IEE faculty.
- A final oral team presentation at the Senior Design Conference hosted by the CEAS will be given.
- Demonstrate effective and appropriate written communication.

Relationship of Course Objectives to Performance Criteria and Student Learning Outcomes:
<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Objectives</th>
<th>Performance Criteria</th>
<th>ABET-EAC Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st IEE 4190 &amp; 2nd IEE 4190</td>
<td>To apply IEE design skills to identify a complex design problem encountered in professional practice.</td>
<td>Define problems, compare alternative options, and design solutions. Use appropriate engineering science and mathematical tools for decision making.</td>
<td>1*: An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.</td>
</tr>
<tr>
<td>1st IEE 4190 &amp; 2nd IEE 4190</td>
<td>To work on an engineering team.</td>
<td>Presents information in writing that is well-organized, addresses objectives, and meets required standard of grammar and language rules.</td>
<td>3*: An ability to communicate effectively with a range of audiences.</td>
</tr>
<tr>
<td>1st IEE 4190 &amp; 2nd IEE 4190</td>
<td>To prepare a professional engineering written and oral proposal.</td>
<td>Presents information in oral format that is well-organized, useful, and effectively delivered.</td>
<td>3*: An ability to communicate effectively with a range of audiences.</td>
</tr>
<tr>
<td>1st IEE 4190 &amp; 2nd IEE 4190</td>
<td>Work in teams to gather data</td>
<td>Researches and gathers information for team project.</td>
<td>5*: An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives</td>
</tr>
<tr>
<td>1st IEE 4190 &amp; 2nd IEE 4190</td>
<td>To participate in professional meetings.</td>
<td>Attends and participates in professional activities.</td>
<td>7*: An ability to acquire and apply new knowledge as needed, using appropriate learning strategies</td>
</tr>
</tbody>
</table>

**Topics, Schedule, and Assignments**: Please refer to the schedule below. Class participation is required on dates that class topics are listed. Teams are expected to use all other class periods to work on course project. Teams must meet regularly with the faculty and industrial sponsors; please communicate meetings times and dates with the course instructor. Progress Reports and PowerPoint Presentations are due as noted below. Assignments should submitted via the E-Learning dropbox, unless indicated otherwise. Assignment content outlined below.

<table>
<thead>
<tr>
<th>Week</th>
<th>Class Topics</th>
<th>Assignment(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>W1</td>
<td>No Class</td>
<td></td>
</tr>
<tr>
<td>W2</td>
<td>Syllabus Review, Project Status Update, Engineering Code of Ethics</td>
<td>Informal in class project review and update, Progress Report</td>
</tr>
<tr>
<td>W3</td>
<td></td>
<td>Engineering Ethics Paper</td>
</tr>
<tr>
<td>W4</td>
<td>Problem Description and Title Review</td>
<td>Progress Report, Brochure Problem Description and Title</td>
</tr>
<tr>
<td>W5</td>
<td></td>
<td>Progress Report</td>
</tr>
<tr>
<td>W6</td>
<td>Senior Project Presentation (10 Min)</td>
<td>Progress Report, Presentation PowerPoint</td>
</tr>
<tr>
<td>W7</td>
<td></td>
<td>Progress Report</td>
</tr>
<tr>
<td>W8</td>
<td>Project Checkpoint</td>
<td>Progress Report</td>
</tr>
<tr>
<td>W9</td>
<td></td>
<td>Progress Report</td>
</tr>
<tr>
<td>W10</td>
<td>Senior Project Presentation (15 Min)</td>
<td>Presentation PowerPoint</td>
</tr>
<tr>
<td>W11</td>
<td></td>
<td>Progress Report</td>
</tr>
<tr>
<td>W12</td>
<td></td>
<td>Progress Report</td>
</tr>
<tr>
<td>W14</td>
<td>Dress Rehearsal Presentation (20 min)</td>
<td>Rehearsal Video Links, Rehearsal PowerPoint, Revised Poster</td>
</tr>
<tr>
<td>W15</td>
<td>Senior Design Conference (No Class)</td>
<td>Final PowerPoint and Printed Poster, Final Report</td>
</tr>
<tr>
<td>W16</td>
<td>Finals Week</td>
<td>Exit survey and interview due prior to graduation.</td>
</tr>
</tbody>
</table>

---

1 Performance Criteria: IEE performance criteria may be found at [http://www.wmich.edu/ieeem](http://www.wmich.edu/ieeem)

2 ABET/TAC Outcomes: Outcomes may be found at [http://www.abet.org/](http://www.abet.org/)
*Please note that faculty advisors and industry advisors may request additional reports and information at any time. It is your team’s responsibility to fulfill these requirements in a timely and professional manor.*

**Class Introduction and Syllabus Review (Week 1):** General Organizational Meeting. Reformation of team(s) & informal verbal update on the team’s findings since previous semester.

**Progress Reports (Weekly):** Memo formatting should be used to provide weekly status updates to course instructor and faculty advisors. Content of weekly progress reports will include: summary of progress report content, activities completed in the prior week, planned actions for the coming week (i.e. next steps). An example of a well prepared progress report is located in E-Learning.

**Engineering Ethics Assignment (Weeks 1 – 3):** Begins with reviewing engineering code of ethics and a class discussion on professional and team ethics during week 1. Each student will submit an original, insightful, and professional quality paper which incorporates possible ethical concerns in the area of the team’s senior capstone project. This may include disciplines of design, production, quality, human resources, and supply chain. This assignment and assessment of it fulfills the WMU Essential Studies Level III Connections, Local and National Perspectives course category.

**Brochure Problem Title and Description (Week 3):** Submit a rough draft of the problem title and problem description to be printed in the senior design conference brochure. Follow the guidelines provided in the letter to students preparing senior engineering design projects provided by the course instructor. This will be reviewed with the entire class (1st and 2nd semester students).

**Senior Design Presentation 10 Min (Week 6):** First formal presentation session. Each team will have 10 minutes for their presentation. Report and presentation must include a definition of the design problem; sponsor’s anticipated outcomes, possible approaches to the problem, and a comprehensive review of the needed and collected data. Reminder, please number your slides. IEE faculty will critique the presentation and offer suggestions and constructive criticisms. IEE faculty can cancel a project if it is not felt that the team is making sufficient progress.

**Senior Design Presentation 15 Min (Week 10):** Second General Session to ensure that all teams are making progress. Second team project presentation will be given to the IEE faculty by each team. Each team will have 15 minutes for their presentation. Report and presentation to include a detailed definition of the design problem, current findings, current work in progress, and proposed work for completion of the project. IEE faculty will critique the progress, report, and presentation and will offer suggestions and constructive criticisms. IEE faculty can cancel a project if it is not felt that the team is making sufficient progress.

**Project Report Draft (Week 13):** Submit a hard copy of your final report to your instructor as well as your faculty advisors. Please refer to the E-Learning for specific information regarding the content and format of the report.

**Project Poster Draft (Week 13):** Initial draft of project poster summarizing project problem, activities, findings, conclusions and recommendations. Please review the poster requirements outlined in E-Learning. The entire class (1st and 2nd semester students) is required to participate in the peer evaluations of the poster drafts.

**Dress Rehearsal Presentation (Week 14):** Dress Rehearsal for Senior Design Conference. All teams are expected to videotape a minimum of three rehearsals and submit the tapes prior to the dress rehearsal. This is the final session to ensure that all teams are adequately prepared for the official Senior Engineering Design Conference presentation. Each team will have 20 minutes to present to the IEE faculty. The project should include a detailed definition of the design problem, finalized findings, and a presentation that mimics the final presentation of the project. IEE faculty will critique the progress, report, and presentation and will offer suggestions and constructive criticisms. IEE faculty can cancel a project if it is not felt that the team is making sufficient progress.
Revised Poster (Week 14): Updated poster summarizing project problem, activities, findings, conclusions and recommendations. Please review the poster requirements outlined in E-Learning. Peer evaluation of the poster drafts will be completed by the entire class (1st and 2nd semester students).

Final Presentation and Report for Design Conference (Week 15):
As the second term student in IEE 4190, you are expected to:
1) Provide a final revision of the project poster to be displayed the day of Senior Design Presentation.
2) Submit an electronic version of your final PowerPoint by the same deadline.
3) Submit a hard copy of your final report to the course instructor and your academic advisor(s) by 4:00 pm Wednesday, December 5th (may be turned into the IEE office).
4) Arrange for a formal presentation to your industrial advisor(s). Provide the date, time, and place of presentation to the course instructor.
5) Complete the peer evaluation, exit interview and exit survey and submit to your course instructor by Friday, December 7th at 5pm.
6) Take a deep breath. You did it!!!
### IEE 4190 (3 Credit Hours) WMU Essential Studies Assessment

#### Level III-Connections

<table>
<thead>
<tr>
<th>WMU Essential Studies Student Learning Outcome</th>
<th>Assignments and/or Learning Activities that meet the criteria within the rubric that is aligned with the SLO</th>
<th>When the SLO assessment will take place</th>
</tr>
</thead>
<tbody>
<tr>
<td>☒ Apply ethical, critical, and informed thought within and across disciplines</td>
<td>Engineering and Professional Ethics paper begins with reviewing engineering code of ethics and a class discussion on professional and team ethics. Students must then submit papers which incorporate possible ethical concerns in the area of the team's senior capstone project including disciplines of design, production, quality, human resources, and supply chain.</td>
<td>Content delivery during week 1 and 2 of the semester. Papers are due in week 3 of the semester.</td>
</tr>
</tbody>
</table>

**Choose One Student Learning Outcome From Below**

<table>
<thead>
<tr>
<th>WMU Essential Studies Student Learning Outcome</th>
<th>Assignments and/or Learning Activities that meet the criteria within the rubric that is aligned with the SLO</th>
<th>When the SLO assessment will take place</th>
</tr>
</thead>
<tbody>
<tr>
<td>☒ Work both independently and in collaboration with others to achieve goals</td>
<td>All students work in teams to analyze an issue, provide possible solutions or develop a product or process, and ultimately recommend the best option. Teams must collaborate on interactions internally as well as with advisor(s), sponsor(s), and instructor(s). Students must identify and execute approaches to best achieve the project goal and present them both presentation and report format.</td>
<td>Weekly progress reports throughout the semester provide insight into team dynamics and effectiveness. Team presentations occur during weeks 6, 10 and 14. The final report is due in week 15.</td>
</tr>
</tbody>
</table>

**Additionally, Select One Level I Student Learning Outcome From Below**

<table>
<thead>
<tr>
<th>WMU Essential Studies Student Learning Outcome</th>
<th>Assignments and/or Learning Activities that meet the criteria within the rubric that is aligned with the SLO</th>
<th>When the SLO assessment will take place</th>
</tr>
</thead>
<tbody>
<tr>
<td>☒ Demonstrate effective and appropriate written communication</td>
<td>Students develop multiple written documents throughout the semester, including weekly progress reports, project objective statement, project summary poster, and portions of a final technical report.</td>
<td>Progress Reports – assigned week 1 continue through semester Project Objective Statement – due week 4 Summary Poster – due week 13 Final Report – due week 15</td>
</tr>
</tbody>
</table>