Curriculum Course Request WES Change Course ME 2320 - A-2018-ME-122; effective term: 202040

Koorosh Naghshineh
Fri 12/21/2018 12:06 PM
To: Raja G Aravamuthan; Said M Abubakr; Holly Blanks
Cc: Holly Blanks

2 attachments (106 KB)
ME_2320_Syllabus_WES_V2.doc; ME2320 WMU Essential Studies Assessment- Fall 2020 V2.pdf;

Please verify your data for New Curriculum Course Request for department: ME; college: A.
Go to the following URL to complete your worklist items: https://bwfp1.cc.wmich.edu:7102/wfbprod

Date of request: 25-NOV-2018
Request ID: A-2018-ME-122
College: A
Department: ME
Initiator name: kristina.lemmer
Initiator email: kristina.lemmer@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 ME 2320
Specific Course Change type selected: Description
Specific Course Change type selected: WMU Essential Studies - Level 2: Exploration and Discovery

1. Existing course prefix and number:
ME 2320

2. Level 2: Exploration and Discovery
Indicate which course category the course should be placed in:
Science and Technology
Increase foundational knowledge of the sciences (WMU Essential Studies SLO).

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.

This is a required course for Mechanical and Aerospace Engineering majors, and an elective course for many other engineering majors. There are approximately 100 students enrolled in the course every semester.

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.)
Three sections offered in the fall (total capacity of 120 students)
Two sections offered the spring (total capacity of 100 students)
Not offered online
All sections will follow the same assessment plan.

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. Not Applicable

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:
Fundamental laws of classic thermodynamics including ideal and non-ideal processes. Applications are studied in relationship to the traditional thermodynamic cycles and to alternate energy systems such as solar and wind energy.
Syllabus for ME 2320
THERMODYNAMICS I
Fall 2020
3 credits: Required for BS Mechanical Engineering and BS Aerospace Engineering
Updated: 11/15/2018

COURSE DESCRIPTION:
This course features the fundamental laws of classic thermodynamics including the First and
Second Laws of Thermodynamics. Work, heat transfer, and energy are defined. Students learn to
identify properties of pure substances using databases and equations of state. Definitions of ideal
and non-ideal processes allow students to determine inefficiencies in thermodynamic systems,
including power, refrigeration, and heat pump cycles. Applications are studied in relationship to
fixed mass systems, control volumes, and thermodynamic cycles. Comparisons to alternate
energy systems such as solar and wind energy are made. This course meets the student learning
outcomes in the WMU Essential Studies Level 2 – Science and Technology course category.

Pre-Requisites: MATH 1230 or 1710, PHYS 2050, PHYS 2060; with a grade of “C” or better in all
prerequisites. Pre-requisites are in place to ensure student success in the course and
include knowledge of required math and physics skills.

Co-Requisites: None

Textbook:  Thermodynamics, an Engineering Approach, 8th edition by Cengel and Boles
Supplement: Handouts downloaded from course website and given in class
Website:  E-learning website

Instructor: Assoc. Professor Kristina Lemmer
Office: G-229
E-mail: kristina.lemmer@wmich.edu
Phone: (269) 276-3417

Office Hours: Tuesdays/Wednesdays: 1:30 pm – 3:30 pm
Or by appointment
Room G-229

T/A: TBD

Other Help:  STEP Student Success Center – https://www.wmich.edu/step/about/successcenter

COURSE OBJECTIVES: This course is intended to educate students in the core principles of
thermodynamics. Students will focus on problem solving, property identification, and
determination of efficiencies. The principal objectives of the course are to:
1. Calculate properties of pure substances
2. Use tables of property data to determine thermodynamic states
3. Use property diagrams to represent thermodynamic states, processes, and cycles
4. Understand the fundamental laws of thermodynamics
5. Apply the First Law of Thermodynamics for the analysis of closed (control-mass) and open
   (control-volume) systems.
6. Apply equations of state in the analysis of representative engineering problems.
(ii) LATE means after I collect the homework at the beginning of class. EVEN IF YOU ARE 30 SECONDS LATE! So, make sure you get to class on time
(iii) Late homework assignments will receive 50% credit until 5 pm on the business day following its due date.
(iv) Homework solutions will be posted on the course website sometime after the late homework due date.
(v) Homework assignments are meant to be challenging. You are encouraged to work with fellow students, come to office hours for help, attend tutoring sessions, and seek help from the Student Success Centers, but every student must do their own work and turn in their own homework set. If you understand how to do the homework, you should be successful on the exams.
(vi) I write my own homework sets, and therefore, there are errors occasionally. Please be patient, and let me know if you find any.
(vii) Homework sets must follow the format discussed in class or points will be deducted at the grader's discretion. This includes:
- Neat,
- Begin each problem on a new page (or side of the page),
- Stapled,
- No fringes from a spiral bound notebook.
- 8.5” x 11” paper (or similar, no legal sized paper)

Exams:

(i) Any missed exams will be graded as a “ZERO.”
(ii) If an exam MUST be missed, the student is required to let the instructor know BEFORE the time of the exam. AT THE DISCRETION OF THE INSTRUCTOR, arrangements may be made to makeup the missed points.
(iii) Exams are open book/open note. Cell phones and other mobile devices capable of connecting to the internet CANNOT be used during exams! Keep this in mind when taking/printing notes or deciding on a calculator. Nothing is allowed that can connect to the internet.
(iv) Exams may cover material from homework that has not yet been graded and returned to you. Be aware of that before the exam, and make sure you understand how to do the homework BEFORE you turn it in. I am available in office hours, and there are tutoring hours. The Student Success Center is a great resource for you also.
(v) Exams should challenge you. If you are able to leave the exam early, then I have not sufficiently challenged you. As such, do not be surprised if you cannot finish an exam in the allotted time. If required, exam grades will be bumped up (never downward).

Re-grades: A request for a re-grade will be honored as long as the student submits the request in writing within two weeks of the instructor returning the graded material. In such situations, the instructor reserves the right to re-grade the entire submission.

Lecture: You are expected to attend lecture and arrive on time. If you cannot attend lecture, you should let the instructor know prior to the class period. At the discretion of the instructor, arrangements may be made for any missed material. The instructor may reward extra homework points at random times throughout the semester for class attendance and participation.
# ME 2320 WMU Essential Studies Assessment

All sections follow same assessment plan

## Level II: Exploration and Discovery

### Science and Technology

<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>
</table>
| X Demonstrate and apply scientific literacy   | Homework and exam problems that test understanding and application of the fundamental laws of thermodynamics to open and closed systems and cycles, ability to use equations of state for representative engineering problems, ability to determine irreversibilities that preclude attaining ideal efficiencies in thermodynamic systems, and understanding of alternative technologies for power generation. | Content Delivery: Weeks 1, 2, 5, 6, 7, 8, 9, 10, 11, and 13
|                                              |                                                                                                  | Weekly HW, Exam 1, Exam 2, and Final Exam |

### Choose One Student Learning Outcome From Below

<table>
<thead>
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</tr>
</thead>
<tbody>
<tr>
<td>☐ Develop understanding and practices for personal wellness</td>
<td></td>
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</tr>
<tr>
<td>☐ Demonstrate familiarity with a language other than English and/or the culture associated with it</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| X Increase foundational knowledge of the sciences, social sciences, or the arts | Homework and exam problems that requires students to calculate properties of pure substances, use property data tables and diagrams, understand and apply the fundamental laws of thermodynamics, determine irreversibilities that preclude attaining ideal efficiencies in thermodynamic systems, and compare traditional technology with alternative technologies for power generation. | Content Delivery: Weeks 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10
|                                              |                                                                                                  | Weekly HW, Exam 1, Exam 2, and Final Exam |
| ☐ Develop creative and critical thinking      |                                                                                                  |                                        |
| ☐ Apply different methods of intellectual inquiry, investigation and discovery                  |                                                                                                  |                                        |
| ☐ Develop sensitivity to diversity and inclusion                                            |                                                                                                  |                                        |
| ☐ Develop practices for planetary sustainability                                             |                                                                                                  |                                        |