

1. Explain briefly and clearly the proposed improvement.
CHEG 2610 was used as Distribution area 7. In 2014 MATH was added as pre-requisite and course changed to CHEG 2611 to streamline the environmental area course sequence.
2. Rationale. Give your reason(s) for the proposed improvement. (If your proposal includes prerequisites, justify those, too.)
MATH 1230 was added as prerequisite to better teach the science and technology of environmental engineering
3. 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.
None
4. Effect on your department's programs. Show how the proposed change fits with other departmental offerings.
None
5. 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.
No change
6. 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?
No change
7. 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.)
No change
8. General education criteria. For a general education course, indicate how this course will meet the criteria for the area or proficiency. (See the General Education Policy for descriptions of each area and proficiency and the criteria. Attach additional pages as necessary. Attach a syllabus if (a) proposing a new course, (b) requesting certification for baccalaureate-level writing, or (c) requesting reapproval of an existing course.)
Please see the attached syllabus as the course satisfy the criteria as described in the catalog (attached)
9. List the 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.
No change in learning outcomes of the program.
10. Describe how this curriculum change is a response to assessment outcomes that are part of a departmental or college assessment plan or informal assessment activities. Streamlining of course offerings, as a result of internal assessment.
11. (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. Not Applicable

CHEG 2611 - Environmental Engineering I

Spring Semester, 2017

Catalog Data: **Environmental Engineering I (3-0)**
Credit: 3
Prerequisite: CHEM 1100, CHEM 1110 and either (MATH 1230 or MATH 1710)
Corequisite: none

The sources, impacts, and management practices for gas, liquid, and solid byproducts of natural, industrial, and municipal sources. Legal, ethical, engineering, and economic implications included in evaluation of applicable emission reduction and emission control techniques and processes will be stressed.

Required Text: G.M. Masters and W.P. Ela, Environmental Engineering and Science, Third Edition, Prentice Hall, (2008).

Lecture: TR 6:30 – 7:45 PM D109 Parkview

Coordinator: Dr. Andrew Kline, Professor
(andrew.kline@wmich.edu)
Office: A221 Parkview Campus Phone: 276-3516

Teaching Assistant: Ms. Lei Zhou (lei.zhou@wmich.edu)

Office Hours: Will be announced in class for both Dr. Kline and Ms. Zhou.

Course Objectives:

1. Students will be introduced to environmental engineering topics including air and water pollution and remediation or control of the same; solid waste management; resource availability and recovery; and government or regulatory oversight of industry in relation to environmental concerns.
2. Students will learn about professional standards and engineering ethics.
3. Students will actively consider contemporary environmental and global issues and the possible impact or influence of these issues on their engineering studies or future career or life activities.
4. Provide an opportunity for students to develop independent learning skills by engaging in learning activities outside the classroom.
5. Provide an opportunity for students to apply their knowledge to open-ended engineering problems and formulate solutions.
6. Provide an opportunity for students to practice and develop problem solving techniques and teamwork skills.

Computer Usage:

Students must be familiar with word processing programs for the Group Project and Report, and some homework assignments. A scientific calculator is needed for calculations. The ability to use spreadsheets is encouraged for homework assignments and the Group Project.

Grading Scale:	A	92 – 100 %
	BA	88 – 91
	B	80 – 87
	CB	77 – 79
	C	70 – 76
	DC	67 – 69
	D	60 – 66
	E	< 60

Assignments:

	Percent Contribution to Final Course Grade
Homework assignments working as an Individual	10
Group Project and Report	15
Exam 1, TBD	25
Exam 2, TBD	25
Final Exam, Tuesday, April 26, 7:15 PM	25

Grades on the “Group” assignment may be different for each student within a group, depending on their individual contribution and illustration of individual mastery of topics.

Course Learning Outcomes:

1. Students will be familiar with the elements of professional and ethical practice in an engineering profession.
2. Students will be able to express their understanding of contemporary environmental and global issues influencing the chemical and biological industries.
3. Students will be able to conduct independent learning activities outside the classroom.
4. Students will be able to approach open-ended engineering problems about environmental engineering topics and be able to articulate methods of solution and formulate answers.
5. Students will have developed their teamwork skills as part of a group of engineering students working to solve problems.

This course provides significant support for ABET Criterion 3 categories c, f, h, and j, and Performance Indicators 13, 16, and 19.

ABET category content as estimated by faculty member who prepared this course description:

Engineering Science: 3 credits

Academic Integrity

“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 the Undergraduate Catalog at <http://catalog.wmich.edu/content.php?catoid=24&navoid=974> and the Graduate Catalog at <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. In addition, students are encouraged to access the Code of Honor, 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
- Division of Student Affairs www.wmich.edu/students/diversity

- Registrar's Office www.wmich.edu/registrar and <http://www.wmich.edu/registrar/calendars/interfaith>
- Disability Services for Students www.wmich.edu/disabilityservices.”

Class Attendance

If you know in advance that you will not be here, please contact the instructor at least 5 business days before your anticipated absence to determine if your absence qualifies as being excused. If you are absent for any reason, it is your responsibility to contact the instructor (written memo, either hard copy or by e-mail) as soon as practical to explain your absence. The instructor will not assist students in making up missed work who are absent from class and who do not have a valid explanation.

Course Administration

While you may, and should, consult with others if you are having difficulty, all submitted work on the individual projects, homework assignments, and exams must be on your own. The work submitted for group projects must be the work of the members of the group. All students are expected to comply with the WMU code of ethics as defined in the student handbook. Failure to follow these rules is cheating. Anyone found cheating will be given a failing grade in the course as well as being subject to Departmental and University actions.

Use of University E-mail Addresses for Course Activities

The only e-mail address that Dr. Kline will be sending course information or notices to is your official WMU e-mail address. It is your responsibility to check that address on a regular basis to receive information. Students e-mailing Dr. Kline should also use their university e-mail account, and include a specific subject line topic. Dr. Kline routinely deletes without reading all e-mail from unknown e-mail addresses, or that have generic subject lines that are interpreted as SPAM.

Regrade Requests

If you suspect that a mistake has been made in the grading of an exam or a homework assignment, you may submit it for a regrade. To do so, you must compose a typed memo describing in detail what you believe is in error. Under no circumstances should you alter your homework or exam in any manner, including adding extra information, erasing, etc. Submit your written memo with the complete solution to your exam or homework to Dr. Kline, within five business days of when the graded assignment was returned to you.

Guidelines for Submitting Assignments and Exams

Attached are formats and guidelines for all calculations that are a part of homework assignments and exams to be turned in for CHEG 2611. Also included are directions for submitting requests for regrades.

Homework Guidelines and Hand Written Calculations in Report Appendices

1. Attach a copy of the original problem statement with your solution.
2. Unless a problem is extremely short (less than one-half sheet of paper), start each problem on a new sheet of paper. Number all pages in consecutive order, in the order that you want them graded. **Include the problem number with your solution.**
3. Use only engineering notepad paper for hand written calculations.
4. Use only one side of the paper.
5. Medium to dark pencil is preferred. Dark blue or black ink is also acceptable.
6. Box in all final answers.
7. If spreadsheets or other computer generated items are submitted, a printout of the equations used and an example calculation of how each equation was used are required.
8. Equipment items, process streams, and other variables used in your solution will be clearly labeled on a process flow diagram (PFD). Organizing your process stream information into a material balance table is highly recommended. The equipment and stream labels will be used in your accompanying hand-written calculations so that the reader may cross-reference your calculations to your PFD and the material balance table.
9. Materials used in your solution that are not considered “general engineering knowledge” will be referenced as to their source. Such material would include heat capacities, vapor pressure values, equipment design equations, or prices of equipment or commodities. A note will be written in your calculations where the information is used, giving the author, year published, and page number. A complete citation will be included on a reference page to be included with your solution.

The order of submission of “memo format” materials for a homework solution:

- a. Memo discussing your results
- b. Summary tables or figures (numbered, in order of their discussion)
- c. Reference page
- d. Original problem statement as first page(s) of an appendix
- e. Hand calculations organized into appropriate appendices, which would include spreadsheet printouts (see item 7).

Homework assignments or report appendices that do not follow this format, or that so poorly follow the format as to be difficult to review for grading purposes will be returned to the student. The student will have three business days to resubmit their revised solution using the accepted format, with an automatic reduction of 15% for that assignment. Submitting an unacceptable format a second time for the same assignment will result in a grade of zero for that assignment.

Late assignments are not accepted unless the student has made arrangements for an excused absence.

Exam Guidelines

Exams use comprehensive open-ended problems that often have multiple solution methods that reach a single correct answer. For this reason, they can be extremely time consuming to grade. You will use the format given below during exams in order to organize your solutions.

1. Regular exams are **open book** and **closed notes**. You are not allowed to exchange or share a book with another student during the exam.
2. Bring your calculator and pens or pencils. You are not allowed to exchange or share a calculator, pens, or pencils with another student during the exam.
3. Bring your own “blue book” to exams. It is not the responsibility of the proctor to provide this for you.
4. Unless a problem is extremely short (less than one-half sheet of paper), start each problem on a new sheet of paper within the “blue book.” This includes subsections of a numbered problem, e.g. Problem 1, a through e. **Include the problem number with your solution.**
5. Use only one side of the paper.
6. Medium to dark pencil is preferred. Dark blue or black ink is also acceptable.
7. Box in all final answers.
8. If you do not wish a portion of your calculations to be considered (i.e. you made an obvious mistake in a calculation in the middle of a page), and you do not erase it, put a large “X” through it. This material will not be considered for grading.
9. Draw an appropriately labeled Process Flow Diagram to help show your understanding of the problem, as appropriate.
10. **Organize your work.** Include problem numbers that are on the exam. For example, if Problem 1 has parts a, b, c, and d, make sure your solution clearly shows where each of these parts begins. **Neatness does count (see number 14).**
11. Materials used in your solution that are not considered “general engineering knowledge” or are not given in the exam statement must be referenced as to their source. Such material would include heat capacities, vapor pressure values, equipment design equations, or prices of equipment or commodities. A note will be written in your calculations where the information is used, giving the author, book title, year published, and page number.
12. Show all equations used, what numbers are substituted into the equation, and the result from an equation. Numbers that suddenly appear on a page (i.e. $F = 100.9$ moles), will receive zero credit towards your exam grade, even if the number is correct. The instructor can only grade what you turn in as part of your written solution, not what was pre-programmed into your calculator.
13. Make sure your name is on the front of every “blue book” you turn in as part of an exam solution.

The order of submission of your solution to an exam:

- a. The original exam statement, in its original order.
- b. Your properly formatted hand written solution in a “blue book” or “blue books.” Your solution will be clearly labeled as to what each part of the solution is.

14. Exams that do not follow the appropriate format for documenting your solution, follow the format poorly, or the handwriting is messy to the point where it is difficult to read will have points deducted from the exam score. A minimum of 5 points will be deducted, and up to a maximum of 25 (total points on an exam are 100).

15. If you have any questions during the exam as you are working on it, please raise your hand, and I will come to you. I will not answer any questions during an exam that I feel are inappropriate, or are about concepts or topics that you should know before coming to the exam.

16. Exams are held during class time. **I will not answer any questions from students on homework, class notes, or other exam-related materials after Noon on the day before a scheduled exam.**

Catalog Description of Area VII, Natural Science and Technology: Applications and Implications

If students are to understand contemporary life, they should understand the implications of natural science and technology as applied to health, social and economic welfare; the storage, transfer, and processing of information; and the management of society's impact on the environment with sensitivity to ecological interconnections. Courses in this area should help students attain this understanding and should promote the ability to evaluate and participate in the decisions of society regarding science and technology. Criteria for these courses are:

- A substantial portion of the course work must be devoted to the teaching of the relevant science and technology. Techniques and skills acquired without learning an underlying natural science do not meet this criterion.
- The courses should also explore the costs and benefits of society's decisions regarding the uses of the sciences they teach.
- A substantial portion of the course should prompt reflection on responsible choices between competing values and interests.
- Although courses will contain a core of natural science, computer science, or the technology based on these sciences, they will explore practical applications and implications by examining some of the following:
 - sciences relevant to informed judgment about social and environmental costs and benefits;
 - salient history of science and technology;
 - assessments, systems analyses, and other quantitative tools;
 - considerations of law, rights, ethics, and the political process;
 - global challenges (e.g., population growth, climate and atmospheric change, loss of biodiversity, and resource management) involving more than one science and technology; or content from the social and behavioral sciences, humanities, and fine arts.

Courses in this area lend themselves to a multi-disciplinary approach, and may be the sole responsibility of individual instructors with wide competencies, or may be team-taught, or may be offered by a group of instructors, each assuming responsibility for a module of the course.

Learning Outcomes for Area VII

- Describe the history of technological innovation and its impact, both positive and negative, on society.
- Explain the interconnection between the natural sciences and advancements in technology as they impact health, social and economic welfare; the storage, transfer, and processing of information; and the environment.
- Demonstrate the ability to evaluate and participate in making societal decisions regarding science and technology