

UNDERGRADUATE CURRICULUM PROPOSAL COVER SHEET

RECORDS

Title of Proposal - Must begin with Department Abbreviation:

ENGR 3010: The Ethics of Contemporary and Emerging Technologies (New Course)

Check One: [X] Full Proposal or [] Information Item

Effective Date for Curricular Offering: Fall 2012

FROM: Dr. Claire McCullough, Computer Science and Engineering, EMCS 314C, X4352, claire-mccullough@utc.edu (proposal originator: include spokesperson's name, department, office number, telephone, e-mail)

Does this require new resources from the originating department or other department? No Please include an explanation if yes.

Faculty of the originating department approved this proposal on NA (date), by a vote of ___ aye votes; ___ nay votes; ___ abstentions; ___ eligible voting members absent.

The following have examined this proposal:

Dept Head/Director: Cecelia M. Wigal (Printed name), Cecelia M. Wigal 11-18-11 (Signature, date), [X] (Approve), [] (Neutral), [] (Disapprove*)

College Curriculum Committee Date: 11-18-11 Vote: 6-0-2 Signature of Chair: Cecelia M. Wigal

Spokespersons for Affected Departments:

Table with 5 columns: Printed Name, Department, Signature, Date, Approve, Neutral, Disapprove*. Rows are blank.

Dean/Director: W.H. Sutton (Printed name), W.H. Sutton 11/18/11 (Signature, date), [X] (Approve), [] (Neutral), [] (Disapprove*)

University Registrar: Linda Orth (Printed name), Linda Orth (Signature, date), [] (Approve), [] (Neutral), [] (Disapprove*)

Provost/Representative: J Sanders (Printed name), J Sanders 11/29/11 (Signature, date), [X] (Approve), [] (Neutral), [] (Disapprove*)

Lab/studio fee requested: []

Provost: Phil Oldham (Printed name), Phil Oldham (Signature, date), [] (Approve), [] (Disapprove*)

*Those who disapprove may attach an explanation

Table with 3 columns: ACTIONS on this proposal, Curriculum Committee, Faculty Senate. Rows include Date the proposal was considered, Vote of the body, Accepted as information item, Approved as submitted, Approved with amendments, and Signature of Chair.

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CATALOG DESCRIPTION

Course Symbol: ENGR 3010

Title: The Ethics of Contemporary and Emerging Technologies

Hours of credit: 3

Catalog Course Description

This course examines the ethical and social issues arising from leading edge advances in technical fields such as engineering, medicine, and the sciences, and the responsibility that professionals in these areas have with regard to the professions and society. The course will include coverage of ethical theories, the link between ethics and the law, how both try to define the validity of human actions, and on the moral and ethical dilemmas created by emerging technologies. Prerequisite: ENGL 1020 with a grade of C or better, or permission of the instructor.

Justification/Rational

Technologies are developing at such an accelerated pace that laws, and even ethical evaluation, have not yet addressed many critical new areas. This class will enable students to identify, assess, and critically evaluate ethical issues and dilemmas in a variety of rapidly evolving technical areas. Many of the engineering disciplines have required technical electives for which this course could apply.

Learning outcomes include

- students will understand ethical theories and their implications in society;
- students will be able to understand and apply relevant codes of ethics in various professions;
- students will understand the ethics associated with research and publication in their fields;
- students will recognize, and be able to critically evaluate, ethical issues in emerging technologies, including such areas as artificial intelligence, stem cell research, robotics, and genetically modified organisms;
- students will be able to present analyses both orally and in writing.

Economic and Pedagogical Consequences

This proposal does not require any additional resources such as staff support, financial resources or physical facilities from the College of Engineering and Computer Science or any other departments or programs. This course will allow us to more fully use the resources we have already in the College. This course will be appropriate for undergraduate students in many departments other than engineering, and will be particularly valuable to those in scientific majors.

ABET, the engineering accreditation agency requires that the accredited programs document that graduating students have

- an understanding of professional and ethical responsibility
- the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
- a knowledge of contemporary issues

This course will play an important role in the college in documenting how (1) the program addresses these outcomes and (2) how students meet the outcomes. It is understood that even though only a segment of the engineering student body may choose to take this course, the course will provide another means to measure the outcomes mentioned above.

Planned Frequency

Fall semesters

Proposed Course Instructor

Dr. Claire L. McCullough, Claire-McCullough@utc.edu , 423-425-4352, EMCS 314C

Dr. McCullough has established credibility in the study of ethics in technical applications. She has experience teaching the ethics course for the computer science program (CPSC 3610, Ethical and Social Issues in Computing). She has also taught ethics topics in various design courses in the engineering programs.

Additional Information

Additional Information, including means of evaluation, topic coverage, text, course policies, etc., are included in the attached course syllabus.

Relationship of Course to other Departments

There are presently two courses offered on campus with similar titles; however, there is no duplication or overlapping of the proposed course content with these courses offered from other departments.

- The proposed course follows the model of the successful CPSC 3610, **Ethical and Social Issues in Computing**, but with significantly different topic coverage areas.
- Philosophy offers a course. **PHIL 4250 - Ethics and the Professions**, which might, to a casual glance, appear similar.

An examination of ethical issues and principles related to problems and standards in the professions. Special attention to professional codes and case studies in relation to traditional and contemporary moral philosophy. Designed as a general course for students not majoring in philosophy and religion. Fall semester. (From the 2011-12 Undergraduate Catalog)

An examination of the course catalog description indicates that both the target audience and the proposed course coverage are significantly different from those of the proposed course. For example, the proposed course is geared only toward highly volatile, highly technical professions (rather than professions such as business and law), and only toward the areas where the technology has outstripped the law, and even the ethical and social mores of society, necessitating an in depth look at those areas in particular.

COURSE SYLLABUS

COURSE : ENGR 3010

TITLE: The Ethics of Contemporary and Emerging Technologies

CREDIT: 3 Credit Hours

FACULTY: Claire McCullough Office Hours: 12:00-3:00 MW
314D EMCS Building 1:00-4:00 TT
Phone: 425-4352 (office) e-mail: Claire-McCullough@utc.edu

PREREQUISITES: ENGL 1020 with a grade of C or better, or permission of the instructor.

COURSE DESCRIPTION: Technologies are developing at such an accelerated pace that laws, and even ethical evaluation, have not yet addressed many critical new areas. This class will enable students to identify, assess, and critically evaluate ethical issues and dilemmas in a variety of rapidly evolving technical areas. This course examines the ethical and social issues arising from advances in technical professions such as engineering, medicine, and the sciences, and the responsibility that professionals in these areas have with regard to the professions and society. The course will include coverage of ethical theories, the link between ethics and the law, how both try to define the validity of human actions, and on the moral and ethical dilemmas created by emerging technologies.

COURSE OBJECTIVES:

- students will understand ethical theories and their implications in society;
- students will be able to understand and apply relevant codes of ethics in various professions;
- students will understand the ethics associated with research and publication in their fields;
- students will recognize, and be able to critically evaluate, ethical issues in emerging technologies, including such areas as artificial intelligence, stem cell research, robotics, and genetically modified organisms;
- students will be able to present analyses both orally and in writing.

ABET-related outcomes expected of this course:

- (f) an understanding of professional and ethical responsibility
- (g) an ability to communicate effectively
- (h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
- (i) a recognition of the need for, and an ability to engage in life-long learning
- (j) a knowledge of contemporary issues

TEXTBOOKS:

- *Ethics in Science and Engineering*, James Speight and Russell Foote, John Wiley and Sons, Inc., Hoboken, NJ, 2011.
- Materials from current journals and conference proceedings will also be used, but are not required to be purchased by the student.
- Additional texts, such as *Ethics of Emerging Technologies*, Thomas Budinger and Miriam Budinger, John Wiley and Sons, Inc., Hoboken, NJ, 2006, could be used as references in some topic areas.

EVALUATION CRITERIA

Grading Scale

- 90-100 **A**
- 80-89 **B**
- 70-79 **C**
- 60-69 **D**
- Below 60 **F**

Grade will consist of homework, a midterm exam, and a final paper, each of which will count 1/3 of the final grade.

Homework

- Assignments will consist of two major types:
 1. Written summary and ethical viewpoint on issues discussed in class;
 - these will count as 10 points each.
 - each student will do one of these approximately weekly.
 - these will include your view of the important issues discussed, how each of the major ethical groups would address the issues, and your ethical position on the issues.
 2. Detailed preparation of issues for the class to discuss;
 - these will count as 50 points each.
 - each student will do approximately two to three of these during the semester.
 - these are to be detailed, highlight key issues and points for class discussion;
 - these must include at least one news story or current event related to the issues;
 - these must have at least three references—presenting only the material in the text is NOT sufficient for these assignments;
 - these must be presented to the class in some manner, and must include written documentation for grading turned in to Dr. Claire;
 - these may include written material, news stories, film clips, etc.
- The homework average will be the total number of points you received on your homework during the semester, divided by the possible number of points available.
- Late homework will only be accepted for an excusable reason (e.g., illness).
- Pop tests and learning reflections will be counted 10 points each, and will be included in the homework average.

Midterm exam

- The midterm exam will consist of two parts.
 1. One exam will be given during class time; this will be 50% of the midterm exam grade.
 - This exam will include such items as analysis of issues, use and understanding of ethical theories, ability to construct an argument, and evaluating the quality of information sources.
 2. The remaining 50% of the midterm exam grade will be a paper of approximately 5 pages, single-spaced, with at least 3 references in addition to your text.
 - The paper should be a detailed discussion of an ethical theory, including both its history, details of the theory, identification of high technology issues to which this theory is, or would be, particularly applicable, and a discussion of how this theory agrees and/or contrasts with your own personal ethics.
- **Target date for test is February 17.** However, this is subject to change. The paper will be due at the beginning of the class period in which the exam is given.

Final paper

- The paper will take the place of a final exam, and will be due on the last scheduled day of this class, April 21. Late papers will be accepted only under EXCEPTIONAL circumstances, which can be objectively documented.
- The paper should be approximately 10 pages, single-spaced (references and title page do not count as part of the 10 pages), and have at least 5 references in addition to your text.
- The paper should be a detailed discussion of a current technology-related ethical issue, including details of the issue, news stories or current events related to the issue, an examination of how this issue would be regarded by proponents of different ethical theories, and a discussion of your ethical position on this issue, including reasoned arguments refuting those points which you would expect to be raised by proponents of other ethical theories.
- Topic for the paper must be approved no later than midterm, February 24.

COURSE POLICIES

Attendance

- Since discussion is a KEY component of this course, missing class can severely impact your understanding of issues, and therefore your grades; thus class attendance is REQUIRED. A sign-in sheet will be available at each class period, which it is your responsibility to locate and sign. You are allowed two free cuts during the semester. Beyond that, any unexcused absence will cause a deduction of 2 points from your final average.
- You are responsible for all material covered and homework assignments during your absence.
- You are responsible for obtaining all handouts, assignments, etc. distributed during your absence.
- If you must miss class, homework must be turned in before class.
- Makeup exams will only be given in EXCEPTIONAL circumstances, which can be objectively documented.

Working together and plagiarism

- Each student is required to compile a learning portfolio, beginning with the first returned assignment.
- Homework assignments may be discussed with other students, but your written homework must be your own, original work.
- Discussion of course material with other students is encouraged.
- Collaboration on in class exams, homework quizzes, or pop tests is prohibited, and, if proved, will result in failure of the entire course.
- Plagiarism, if proved, will result in failure for the entire course, and a report to the Honor Court. Plagiarism guidelines will be discussed in class, and will be posted on Blackboard, but if you have any questions regarding plagiarism or proper citation of material, see Dr. Claire.

Learning Portfolios

- Each student is required to compile a learning portfolio, beginning with the first returned assignment.
- This portfolio will contain *all* graded work.
- During the course of the semester you will be asked to reflect on the items currently in your portfolio, and to write an assessment of your progress, as well as any difficulties you are encountering.
- Both portfolio and reflections will be examined several times during the semester.
- Your completed portfolio must be turned in on the final day of class.
- Not all portfolios will be returned, so retain a Xerox of any information you wish to keep.
- No final grade can be assigned for the course until completed portfolio is turned in.

RESPONSIBILITIES:

Student Responsibilities

- To prepare for class
- To work and turn in all assignments
- To do as much additional work as necessary to know what you don't understand
- To seek help as needed
- To treat Dr. McCullough and fellow students with respect
- To maintain a positive attitude at all times

Dr. McCullough's Responsibilities

- To prepare for class
- To provide meaningful assignments
- To grade and return all assignments to provide feedback to students on their progress
- To be available to help students as necessary
- To treat students with respect
- To maintain a positive attitude at all times

TOPICAL OUTLINE OF THE COURSE:

The first few weeks of class will address issues not discussed in detail in your text, including such items as

- Classical ethical theories
- Critical thinking
- Determining quality of sources of information, and
- Plagiarism

This coverage will be presented primarily by Dr. Claire, and will provide the framework for discussion of the professional issues related to high technology issues, including those covered in chapters 5-9 of your text.

The issue material in the course will be prepared, augmented, and issues identified for the class by a group of students assigned to each issue, as discussed in the Homework section of this syllabus. The material presented will then be discussed in small groups, to allow for more complete student participation, and finally, the small groups will present the key points of their discussion to the class. Each week each student will write a written précis of the key issues (as discussed in Homework).

It is one of the goals of this course that students be allowed to explore issues of particular interest to them, so the actual issue coverage will change based on the composition of the class. However, it is expected that issues will include topics such as:

- Professional codes of ethics;
- Ethics of research and publication;
- Ethics of engineering design;
- Artificial intelligence;
- Environmental ethics;
- Genetically modified organisms;
- Ethical implications of nanotechnologies;
- Ethics of energy technologies;
- Space exploration and exploitation;
- Human and animal testing;
- Role of the government in evaluating and regulating risks of emerging technologies.

This syllabus will be posted on Blackboard, and may be changed by providing notice to the class and posting the revised syllabus.

ADA STATEMENT: Attention: If you are a student with a disability (e.g. physical, learning, psychiatric, vision, hearing, etc.) and think that you might need special assistance or a special accommodation in this class or any other class, call the Office for Students with Disabilities at 425-4006, come by the office - 102 Frist Hall or see <http://www.utc.edu/OSD/>.

If you find that personal problems, career indecision, study and time management difficulties, etc. are adversely affecting your successful progress at UTC, please contact the Counseling and Career Planning Center at 425-4438 or <http://www.utc.edu/Administration/CounselingAndCareerPlanning/>.