20 May 2008 (Revised 17 December 2008)

Proposal
For
Two Undergraduate Minors in Technological Literacy
A. Engineering Sciences Minor
B. Technological Studies Minor

Sponsoring Unit: Offered by College of Engineering, Administered through Engineering Education Innovation Center

Contact Person (s):

Ann C. Christy, Interim Associate Dean for Undergraduate Education and Student Services, College of Engineering
Robert J. Gustafson, Director, Engineering Education Innovation Center

Development of the Minors

University review of General Education at Ohio State has brought forth the need for technological literacy as an insight area within general education. However, to date no satisfactory solutions to address this insight area have been established. In December of 2006, within the College of Engineering the Core Curriculum and College Services Committee and College Committee on Academic Affairs agreed to establish a joint task force to consider what the College of Engineering could offer for non-engineering students in terms of one or more minors, with particular focus on the area of technological literacy. Members of the task force were Sandra Doty (Physics), Bob Gustafson, Chair (Associate Dean), Blaine Lilly (IWSE), Ed McCaul (College Office), Ed Newman (ECE), Andrea Severson (Advising). The task force members consulted the colleges of potential students (Business; Food, Agriculture and Environmental Sciences; Education and Human Ecology; and College of Arts and Sciences) , primarily through advisors and administrative representatives. As can be seen in the concurrence section, feedback received from the colleges was positive. The committee reported in March of 2007. It recommended the development of two minors. Both Committees include multiple student representatives. The recommendations of the report were endorsed by both committees. The following proposal outlines the objectives, audiences and content for two minors in the domain of technological literacy.

Working Definition for Technological Literacy

A review of literature and existing programs showed that there is no universally accepted definition of technological literacy. However the college has chosen to work from the basic description and general learning objectives developed by a recent Technological Literacy Task Force in the Colleges of the Arts and Sciences[1] .

> In the broadest sense, technology is the process by which we modify nature and society using knowledge of science and engineering to create new ways to meet our needs and

[1] Extracted from "Proposed Supplement to "A Model Curriculum Developed by the Special Committee for Undergraduate Curriculum Review in Arts and Sciences and Approved by the Faculty of the Colleges of the Arts and Sciences, June 8, 1988" 12/12/06

wants[2]. Technology comprises the entire system of people and organizations, knowledge, and processes that go into creating and operating technological devices and systems[3]. An especially important area of knowledge is the design process, of starting with a set of criteria and constraints and working toward a solution – a device, say, or a process – that meets those conditions. Attempts to create new technology provide tests of scientific understanding, and some new technology enables new forms of scientific measurement and theorizing, so that science and technology are mutually reinforcing.

Understanding technology, technological literacy, encompasses three interdependent dimensions – knowledge, ways of thinking and acting, and capabilities[4]. Like literacy in other areas, the goal of courses on technological literacy is to provide people with the tools to participate intelligently and thoughtfully in the world around them. Although the kinds of things a technologically literate person must know can vary from society to society and from era to era, they are consistent with the goals of an educated person as expressed by the Ohio State University General Education model.

GENERAL LEARNING OBJECTIVES

The general learning objectives most relevant to the general education can be expressed within the knowledge and ways of thinking and acting as:

Knowledge

- To recognize the pervasiveness of technology in everyday life.
- To understand basic technological/engineering concepts and terms, such as systems, constraints, and trade-offs.
- To be familiar with the nature and limitations of the design process in a technological system.
- To know some of the ways technology shapes human history and people shape technology.
- To know that all technologies entail risks, some that can be anticipated and some that cannot.
- To appreciate that the development and use of technology involve trade-offs and a balance of costs and benefits.
- To understand that technology reflects the values and culture of society.

Ways of Thinking and Acting

- Asks pertinent questions of self and others regarding the benefits and risks of technologies.
- Seeks information and hands-on skills related to existing and new technologies.
- Participates when appropriate in decisions about the development and use of technology.
- Can apply basic mathematical concepts related to probability, scale, and estimation to make informed judgments about technological risks and benefits.

[2] Pearson, G and A. T. Young (eds.). 2002. Technically Speaking, Why All Americans Need to Know More About Technology, National Academy Press, Washington, DC.
[3] Mitchem, C. 1994. Thinking Through Technology: The Path Between Engineering and Philosophy, Chicago: University Press.
[4] Pearson, G and A. T. Young (eds.). 2002. Technically Speaking, Why All Americans Need to Know More About Technology, National Academy Press, Washington, DC.

Another useful description related to technological literacy can be found through the International Technology Education Association (ITEA) documents (http://www.iteaconnect.org/Publications/publications.htm), which can be summarized as:

- A technological literacy is the ability to use, manage, assess, and understand technology. (ITEA)
- A technological literate person is a person who understands – with increasing sophistication – what technology is, how it is created, how it shapes society, and in turn is shaped by society. (ITEA)

Potential Audiences

In order to offer the most value in a minor and meet learning objectives in the most effective fashion, the conclusion was reached that it is best to view the potential audience for minors we may offer as two groups. The first group would be those who will likely be working most directly with engineers in the future and who can be expected to have mathematics capability through beginning calculus. A minor for this group is termed *Engineering Sciences Minor*. The second group would be those who are looking to the minor to build their technological literacy in a more general sense and who may not have as high a level of quantitative coursework background. A minor for this group is termed the *Technological Studies Minor* and is intended for the goal of creating a more technologically literate citizen. As will be seen in the following section, the Task Force identified examples of these key audiences, learning goals for each minor, key curriculum components, and a proposed curriculum structure. Students enrolled in degree programs within the College of Engineering would not be eligible for either of the two minors.

Model Curriculum Structure for Two Minors

Table 1 summarizes and differentiates the two minors. In each case the Learning Goals are defined in a manner appropriate to the intended audience and the curriculum is structured appropriately to the background and needs of the audience.

Engineering Sciences

The two core courses for the Engineering Sciences minor are two first courses currently taken by all engineering majors. These courses form foundational knowledge and skills that are important to the engineering profession and following courses. Since teamwork, communications and a design experience are included as significant elements of these courses, they will no doubt contribute to the ability of the non-engineering students to work with those oriented towards engineering and understand the engineering design process. The minor adds more depth by the requirement of an Engineering Science course and a Computation Technologies course. These courses will give the student exposure to technical knowledge engineers use through the design process. Criteria for engineering science courses includes that the course must be available to the students without prerequisites beyond selection of an appropriate natural science course and a basic calculus course. The minor is enhanced by an element reflected by a course in the domain of Technology and Society. The capstone class for the minor gives the student direct experience working as part of an engineering design team. This should directly build their skills towards the objective of being able to work effectively with technological experts. Table 2 further documents the courses and prerequisites for the Engineering Sciences Minor.

Technological Studies

Two options are available for the core element of the Technological Studies minor. For the first core option, two new courses are included specifically to introduce technological concepts for a non-engineering audience. Technical and practical aspects of several technology areas will be explored. A prerequisite of one science course from Biology, Chemistry or Physics, as these are considered fundamental sciences, is required. The natural science requirement assures at least some exposure in this area. The second core option may appeal to those who have the higher mathematics prerequisite and want a quantitatively more rigorous approach. Facility with computational technology is needed for technology considerations, leading to the curriculum requirement in this area for both minors. Students also need to be able to place technological development in a societal context, which is the focus of the Technology and Society course requirement for both minors. This segment uses as a reference the Foundational and Core Courses of the Societal Perspectives about Science and Technology Minor (Sci & Tech 336)[5]. A capstone seminar focusing on current technological topics of broad interest will complete the minor package. Table 3 further documents the courses and prerequisites for the Technological Studies Minor.

Table 1. Construct for Engineering Science and Technological Studies Minors

	Engineering Sciences Minor	Technological Studies Minor
Key Audience	Students who have an interest in working with technology experts/engineers and in technology based industry/environments. *Examples:* Business, Economics, Science, and Math majors *Assumptions:* Competence in mathematics through beginning concepts of calculus	Students who have interest in understanding technology at a level that will help make them be more informed citizens and perhaps more attractive to employers. *Examples:* Humanities and Arts majors *Assumption:* No particular prerequisites
Learning Goals - At the completion of the minor, students will be able to:	1 - demonstrate a basic understanding of the engineering design process	1 - appreciate the importance of methods and underlying assumptions used in cost-benefit analysis and risk-benefit analysis by engineers.
	2 – perform simple analysis and estimation using engineering methodology	2 - achieve a survey-level understanding of why particular materials and processes are used to produce simple engineering devices and systems
	3 – understand the capabilities and limitations of basic manufacturing processes and engineered systems	3 - better understand the role of technology (engineering) in society and the interactions of technology (engineering) with their major field
	4 – make informed decisions about the desirability of engineering activities by weighing the benefits of those activities against the risks.	4 – understand how to access and interpret reliable information to make informed decisions regarded technological issues
	5 – work effectively as a member of a team including technological experts.	
Key curriculum components Model Curriculum	Understand fundamentals of engineering science and design (beginning calculus prerequisite)	"How it works" (minimal level of prerequisites)
	• Introduction to Engineering	• Introduction to Engineering

[5] See description at http://artsandsciences.osu.edu/currofc/GEC/minors/ScienceTechnology.pdf

	o Design process o Communication with graphics tools o Numerical approaches to problem solving • Science base and complimentary engineering science base • Computational technology competence • Appreciation of interaction of technology and society • Capstone interdisciplinary teamwork experience.	o Design process o Communication with graphics tools o Quantitative approaches to problem solving • Science base • Computational technology competence • Appreciation of interaction of technology and society
	Prerequisites: Math 117, 131 or 151; and Natural Science Dependent on Engineering Science selected.	**Prerequisites:** Any GEC approved Natural Science course in Biology, or Chemistry or Physics
	Core (6-8 credits) ENG 181 (3) Introduction to Engineering I ENG 183 (3) Introduction to Engineering II Or ENG 191H (4) Engineering Fundamentals and Laboratory I ENG 193H (4) Engineering Fundamentals and Laboratory III	**Core** (9 -11 credits) Option 1: ENG 201 (5) Technological Studies I: Analyzing Our World, (New Course) and ENG 202 (5) Technological Studies II: Analyzing Our World, (New Course) Or Option 2: ENG 181 (3) Introduction to Engineering I, ENG 183 (3) Introduction to Engineering II ISE 504 (3) Engineering Economic Analysis Or ENG 191H (4) Engineering Fundamentals and Laboratory I ENG 193H (4) Engineering Fundamentals and Laboratory III ISE 504 (3) Engineering Economic Analysis
	Engineering Science (3 credits minimum): AERO 200 (5) Introduction to Aerospace Engineering CE 410 (3) Environmental Pollution and Control CE 511 (3) Introduction to Environmental Engineering Educ: T&L 220 (3) Design of Constructed and Manufactured Goods FABE 481 (4) Introduction to Food Process Engineering II&VCD 230 (3) Basic Design Concepts for Non-majors ISE 311 (3) Manufacturing Engineering ISE 406 (4) Industrial Quality Control ISE 504 (3) Engineering Economic Analysis MSE 205 (3) Introduction to Materials Science and Engineering MSE 281 (1) Materials Processing	

	Laboratory WE 300 (3) Survey of Welding Engineering WE 350 (1) Introduction to Welding Laboratory Other Engineering courses by permission of the Minor Coordinator	
	Computation Technologies (4 – 5 credits) CSE 200 (5) Computer Assisted Problem Solving for Business CSE 201 (4) Elementary Computer Programming CSE 202 (4) Introduction to Programming and Algorithms for Engineers and Scientists CSE 203 (4) Computational Thinking in Context: Interactive Video and Games CSE 204(4) Computational Thinking in Context: Digital Images and Sound or Higher Level CSE class	**Computation Technologies** (4 – 5 credits) CSE 200 (5) Computer Assisted Problem Solving for Business CSE 201 (4) Elementary Computer Programming CSE 202 (4) Introduction to Programming and Algorithms for Engineers and Scientists CSE 203 (4) Computational Thinking in Context: Interactive Video and Games CSE 204(4) Computational Thinking in Context: Digital Images and Sound or Higher Level CSE class
	Technology and Society (5 credits) Comparative Studies 272 (5) Science and Society Comparative Studies 597.01 (5) Global Studies of Science and Technology ENG 360.02 (5) History of American Technology (New course) ENG 367 (5) American Attitudes about Technology History 362 (5) History of Technology Physics 367 (5) Use of Science in Solving Problems of Society Sociology 302 (5) Technology and Global Society	**Technology and Society** (5 credits) Comparative Studies 272 (5) Science and Society Comparative Studies 597.01 (5) Global Studies of Science and Technology ENG 360.02 (5) History of American Technology (New course) ENG 367 (5) American Attitudes about Technology History 362 (5) History of Technology Physics 367 (5) Use of Science in Solving Problems of Society Sociology 302 (5) Technology and Global Society
	Capstone Experience (4 - 8 credits): ENG 581 (4-8) Engineering Capstone Collaboration (New course)	**Capstone Seminar** (2 credits) ENG 582 (2) Technology Issues Seminar (New Course)
	22 credits minimum	20 credits minimum

Table 2. Engineering Science Minor: Courses and Prerequisites

Course (Credits)	Title	Prerequisites	Concurrences
Core (6-8 credits)			
ENG 181 (3)/191H (4)	Introduction to Engineering I/Engineering Fundamentals and Laboratory I	Prereq or Concur Math 150 or higher/Math 151 or higher and honors status	Student pursuing the minor will be admitted to ENG 181 with Math 130 concurrent
ENG 183 (3)/193H (4)	Introduction to Engineering II/ Engineering Fundamentals and Laboratory II	ENG 181/ENG 192H	NA
Engineering Science (3 credits minimum):			
AERO 200 (5)	Introduction to Aerospace Engineering	Prereq or Concur: Math 152, Physics 131, and minimum cumulative Pt-hr ratio of 2.00	NA
CE 410 (3)	Environmental Pollution and Control	Chem 101 or equiv with written permission of instructor	NA
CE 510 (3)	Principles of Hydraulics	Math 151 and Physics 111 or 131	NA
CE 520 (3)	Design of Treatment Facilities	Chem 122 or 125	NA
Educ: T&L 220 (3)	Design of Constructed and Manufactured Goods	EN Graph 121	Education concurs with use of course. ENG 183 will substitute for En Graph 121 (See Appendix B)
FABE 481 (4)	Introduction to Food Process Engineering	Math 148,and Physics 106 or 111. Open to non-engineering majors only.	NA
II&VCD 230 (3)	Basic Design Concepts for Non-majors	Not open to majors in design or pre-design.	Concurrence requested but no response received. Will withdraw course from minor if offering department requests such action
ISE 311 (3)	Manufacturing Engineering	2nd yr standing or written permission of instructor	NA
ISE 406 (4)	Industrial Quality Control	Math 153	NA
ISE 504 (3)	Engineering Economic Analysis	3rd yr standing or concur with 500 or written permission of instructor	NA
MSE 205 (3)	Introduction to Materials Science and Engineering	Math 141 or 151 or 161;Physics 131, and Chem 121 or Chem H201	NA
MSE 281(1)	Materials Processing Laboratory	MSE 205 or concur	NA
WE 300 (3)	Survey of Welding Engineering	One unit high school physics	NA
WE 350 (1)	Introduction to Welding Laboratory	Concur: 300 and acceptance into Weld Eng	NA

		major or written permission of instructor	
Computation Technologies (4 – 5 credits)			
CSE 200 (5)	Computer Assisted Problem Solving for Business	Math 116, 130 or 148	NA
CSE 201 (4)	Elementary Computer Programming	Math 075	NA
CSE 202 (4)	Introduction to Programming and Algorithms for Engineers and Scientists	Math 151	NA
CSE 203 (4)	Computational Thinking in Context: Interactive Video and Games	None	NA
CSE 204(4)	Computational Thinking in Context: Digital Images and Sound	None	NA
Technology and Society (5 credits)			
Comparative Studies 272 (5)	Science and Society	English 110 or equiv.	Concurrence received 3/6/08
Comparative Studies 597.01 (5)	Global Studies of Science and Technology	Completion of GEC second writing course, quantitative and logical skills requirement, and natural science sequence; or permission of instructor.	Concurrence received 3/18/08
ENG 360.02 (5)	History of American Technology	English 110 or 111	NA
ENG 367 (5)	American Attitudes about Technology	English 110 or 111, Soph standing or above.	NA
History 362 (5)	History of Technology		Concurrence requested but no response received. Will withdrawal course from minor if offering department requests such action
Physics 367 (5)	Use of Science in Solving Problems of Society	Math Placement S or higher; 1 5hr 100-level course in either astron, bio sci, chem., geol sci, or physics; English 110or 111 or equiv.	Concurrence requested but no response received. Will withdrawal course from minor if offering department requests such action
Sociology 302 (5) Technology and Global Society	Technology and Global Society		Concurrence Received 3/18/08
Capstone Experience (4-8 credits)			
ENG 581 (4-8)	Engineering Capstone Collaboration		NA

Table 3. Technological Studies Minor: Courses and Prerequisites

Course (Credits)	Title	Prerequisites	
Core (9-11 credits)			
Option 1			
ENG 201 (5)	Technological Studies I: Analyzing Our World	GEC Natural Science course in Biology, Chemistry or Physics	NA
ENG 202 (5)	Technological Studies II: Analyzing Our World	ENG 201	NA
Option 2			
ENG 181 (3)/191H (4)	Introduction to Engineering I/Engineering Fundamentals and Laboratory I	Prereq or Concur Math 150 or higher/Math 151 or higher and honors status	Student pursuing the minor will be admitted to ENG 181 with Math 130 concurrent
ENG 183 (3)/193H (4)	Introduction to Engineering II/ Engineering Fundamentals and Laboratory II	ENG 181/ENG 192H	NA
ISE 504 (3)	Engineering Economic Analysis	3rd yr standing or concur with 500 or written permission of instructor	NA
Computation Technologies (4 – 5 credits)			
CSE 200 (5)	Computer Assisted Problem Solving for Business	Math 116, 130 or 148	NA
CSE 201 (4)	Elementary Computer Programming	Math 075	NA
CSE 202 (4)	Introduction to Programming and Algorithms for Engineers and Scientists	Math 151	
CSE 203 (4)	Computational Thinking in Context: Interactive Video and Games,	None	NA
CSE 204(4)	Computational Thinking in Context: Digital Images and Sound	None	NA
Technology and Society (5 credits)			
Comparative Studies 272 (5)	Science and Society	English 110 or equiv.	Concurrence received 3/6/08
Comparative Studies 597.01 (5)	Global Studies of Science and Technology	Completion of GEC second writing course, quantitative and logical skills requirement, and natural science sequence; or permission of instructor.	Concurrence requested but no response received. Will withdrawal course from minor if offering department requests such action
ENG 360.02 (5)	History of American Technology	English 110 or 111	NA
ENG 367 (5)	American Attitudes about Technology	English 110 or 111, Soph standing or above.	NA

History 362 (5)	History of Technology		Concurrence requested but no response received. Will withdrawal course from minor if offering department requests such action
Physics 367 (5)	Use of Science in Solving Problems of Society	Math Placement S or higher; 1 5hr 100-level course in either astron, bio sci, chem., geol sci, or physics; English 110or 111 or equiv.	Concurrence requested but no response received. Will withdrawal course from minor if offering department requests such action
Sociology 302 (5) Technology and Global Society	Technology and Global Society		Concurrence received 3/15/08
Capstone Seminar (2 credits)			
ENG 582 (2)	Technologies Issues Seminar	ENG 202	NA

Deviation from College Policy of Minor – 100 Level Courses

This proposal is seeking concurrence from approval bodies for a deviation from one specification with the College of Engineering's Undergraduate Minor Program Policy (as Revised 9 February 2005). That is "100 level courses may not count as credit toward a minor." This proposal includes the use of Engineering 181 and 183. A brief description of each course is given below and syllabi are included in Appendix C. Although numbered at the 100 level, these courses have content appropriate to the objectives of the proposed minors and are rigorous in their approach and could be justifiably renumbered as 200 level courses for the minor. However, this would not be desirable for the engineering curriculum structure. The math prerequisites help assure the students have the quantitative skills needed to address the topics in a rigorous fashion.

Core and Capstone Course Descriptions

ENG 181 (3) Introduction to Engineering I

Visualization and sketches, introduction to spreadsheets and CAD, working drawings, experimental design and data analysis, problem solving approaches, hands-on lab, reporting, and production dissection. Prereq or concur: Math 150 or higher

ENG 183 (3) Introduction to Engineering II

Team building, design/build project; project management, introduction to MATLAB, written and oral reports, preparation of visual aids, hands-on lab and reporting. Prereq: ENG 181 or H191.

ENG 201 (5) Technological Studies I: Analyzing Our World (New Course - Course Syllabus appended)

An introduction to technology concepts for students without extensive math or science backgrounds. Technical and practical aspects of several technology areas will be explored including design, communications, energy, and manufacturing. This course is intended for non-engineering students who want to better understand how technology impacts their lives.

ENG 202 (5) Technological Studies II: Analyzing Our World (New Course - Course Syllabus appended)

This is the second course in a two-course sequence which serves as an introduction to technology concepts for students without extensive math or science backgrounds. Technical and practical aspects of several technology areas will be explored including nanotechnology, bio-related technology, transportation, and construction. This course is intended for non-engineering students who want to better understand how technology impacts their lives.

ISE 504 (3) Engineering Economic Analysis

Economic analysis of engineering projects and methods of operation; the analysis of public investments, and introduction to analysis of engineering decisions. Prereq: 3rd yr standing or concur with 500 or written permission of instructor.

ENG 581 (4, repeatable to 8) Engineering Capstone Collaboration

This is a new course being developed. It is anticipated that students enrolled in this course will contract to collaborate with an existing capstone design team (within any program of the College expressing willingness to collaborate). The students will be expected to bring a disciplinary expertise outside of engineering to the project. This course is to be managed by the Engineering Education Innovation Center. A proposed course syllabus is appended.

ENG 582 (2) Technology Issues Seminar

This is a new course being developed. This course is intended as a culminating seminar experience for non-engineering students who are completing the Technological Studies Minor. A series of current technological issues within areas of focus of the college, (e.g. energy, transportation, environment, biomedical technologies, advanced materials) will be addressed by leading technologists. This should directly build their skills towards understanding issues of the day.

Additional Requirements

1. No grade below a C- will be permitted in courses comprising the minor; the minimum overall CPHR of the minor shall be 2.00.
2. No more than 10 hours of transfer credit may be applied to the minor.
3. Variations in the program are generally not permitted; any variation must be approved by the Chair of the Minors Oversight Committee.
4. Although the College of Engineering places no restrictions on use of course both in a minor and major program (double counting), students should consult their major program for any constraints that might be applied there.
5. A minor program form, to be available on College of Engineering website, must be filed at least by the time the graduation application is submitted. It requires signature by the student and student's major program advisor. This is then submitted to the advisor for the minor program for approval. Once the minor has been filed, any changes must be approved by the Chair of the Minors Oversight Committee.

Administration and Advising

The two minors offered by the College of Engineering will be administratively supported by the Engineering Education Innovation Center (EEIC). The EEIC Director (or designee of the Director) will chair of the Minors Oversight Committee, assure the advising of students, certification of completion, review of courses and be responsible for on-going development of the minor. This oversight committee will report to the Core Curriculum and College Services Committee of the College (acting as curriculum committee for both minors.)

Estimates of Student Interest and Needed Instructional Resources

Although difficult to anticipate, demand for the two minors is initially projected at 50 to 75 students per year for each minor. This would likely necessitate an additional section of the ENG 181, 183 sequence. Enrollment in the two new courses suggested for the core of the Technological Studies minor may be impacted by pending consideration of GEC requirements for ASC students and approval of the courses for GEC credit. It is anticipated that space and laboratory needs for the additional sections of ENG 181/183 and the new courses will be accommodated through the First-Year Engineering program of the College.

Staffing of the Core course can be accomplished through the current First-Year Engineering Program (FEP). FEP will be responsible for staffing, space and equipment needs for the courses. As interest in the course develops, it is anticipated that the fiscal resources generated will be adequate to cover the additional expenses. For the elective elements of the minors, the additional student demand in specific courses should not be a constraint.

Student Learning Outcome Assessment Plan

The Minors Oversight Committee will be charged with assuring the assessment of student learning outcomes. The EEIC will administer a minor completion survey. The survey will explore student perceptions of: 1) the attainment of the learning goals indicated for the minor, and 2) structure, availability, and appropriateness of courses in the minor. This data, along with enrollment data, will be reviewed annually by the oversight committee.

Implementation Date

The minors are proposed for implementation in Winter Quarter of 2009.

Appendices

Appendix A – Core Course Syllabi
Appendix B – Letters of Concurrence
Appendix C – Reduced Sample Syllabi for ENG 181 and 183

OHIO STATE NEW COURSE REQUEST

College: Engineering

Academic unit: Engineering Book 3 Listing: Engineering
(e.g., Portuguese)

Proposed
Course No: 201 Full Title of Course: Technologies Studies I: Analyzing Our World

Proposed Effective Qtr/Yr: SU ☐ AU ☐ WI X☐ SP ☐ YEAR: 2009 (See *OAA Academic Organization and Curriculum Handbook* for Deadlines)

A. Course Offerings Bulletin Information.

Follow instructions in the *OAA Academic Organization and Curriculum Handbook.*

Is this a course with decimal subdivisions? If so, use one New Course Request form for the generic information that will apply to all subdivisions. Use separate forms for each new decimal subdivision, including on each form only the information that is unique to that subdivision.

18-Character Transcript Abbreviation: Tech Studies I Level U X☐ G ☐ P ☐ Credit Hours: 5

Description (*not to exceed 25 words*):
Introduction to technology concepts for students without extensive math or science backgrounds. Course explores aspects of design, communications, energy, and manufacturing.

Quarter offered (*check*)): SU ☐ AU X☐ WI X☐ SP ☐ *Distribution of class time/contact hours: _2 1.5 hr Cl; 1 2hr L_____
Quarter and contact/class time hours information should be omitted from Book 3 publication: (check here) ☐

Prerequisite (s): GEC Natural Science course in Biology, Chemistry or Physics

Exclusion or limiting clause: Not open to Engineering Majors

Repeatable to a maximum of ___ credit hours.

Cross-listed with:

Grade Option (Please check): Letter X☐ S/U ☐ Progress ☐

If this course is Progress graded, what course is the last one in the series?

Honors Statement: Yes ☐ No X☐ GEC: Yes ☐ No X☐ Admission Condition
Off-Campus**:** Yes ☐ No X☐ EM: Yes ☐ No X☐ Course: Yes ☐ No X ☐
Embedded Honors Statement: Yes ☐ No X☐
Service Learning Course*: Yes ☐ No X☐
*To learn more about this option, please visit http://artsandsciences.osu.edu/currofc/

Other General Course Information:
(e.g. "Taught in English." "Credit does not count toward BSBA degree.")
Subject Code_150000_____ Subsidy Level (V, G, T, B, M, D, or P)_____B_____
(If you have questions please email Jed Dickhaut @ dickhaut.1@osu.edu)

Will course be taught in distance learning format: Yes ☐ No X☐

B. General Information:

1. Provide the rationale for proposing this course:
First of two core courses for proposed technological studies minor.

2. List Major/Minor affected by the creation of this new course. Attach revisions of all affected programs.
This course is (check one) Required X☐ Elective ☐ Other (Explain) ☐:

*** If the course offered is less than quarter, term, or semester, please also complete the Flexibly Scheduled/Off Campus/Workshop Request form.**

3. Indicate the nature of the program adjustments, new funding, and/or withdrawals that make possible the implementation of this new course.
New course offering to be funded by College of Engineering.

4. Is the approval of this request contingent upon the approval of other course requests or curricular requests?

Yes X☐ No ☐ List: Technological Studies Minor; ENG 202, ENG 582

5. If this course is part of a sequence, list the number of the other course(s) in the sequence: ENG 202

6. Expected section size:50 Proposed number of sections per year:2

7. Do you want prerequisites enforced electronically? (See OAA Curriculum Manual for what can be enforced.) Yes ☐

8. This course has been discussed with and has the concurrence of the following academic units needing this course or with academic units having directly related interests (*List units and attach letters and/or forms*): Not Applicable X☐

9. Attach a course syllabus that includes a topical outline of the course, student learning outcomes and/or course objectives, off-campus field experience, methods of evaluation, and other items as stated in the *OAA Curriculum Handbook.*

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APPROVAL SIGNATURES (As needed. All signatures on lines in ALL CAPS (e.g. ACADEMIC UNIT) must be completed

Academic Unit Undergraduate Studies Committee Chair (Undergraduate course)	Printed Name	Date
Academic Unit Graduate Studies Committee Chair(Undergraduate/Graduate course)	Printed Name	Date
School /College Undergrad Curriculum Committee (Undergraduate/Graduate course)	Printed Name	Date
School /College Graduate Curriculum Committee (Undergraduate/Graduate course)	Printed Name	Date
ACADEMIC UNIT CHAIR /SCHOOL DIRECTOR	**Printed Name**	**Date**
COLLEGE DEAN	**Printed Name**	**Date**
Graduate School (If Appropriate)	Printed Name	Date
ASC Curriculum Committee Chair (If Appropriate))	Printed Name	Date
University Honors Center (If Appropriate)	Printed Name	Date
Office of International Education (study tour only)	Printed Name	Date
ACADEMIC AFFAIRS	**Printed Name**	**Date**

ENGINEERING 201
Technological Studies I: Analyzing Our World

Core Course: Technological Studies Minor

Description: Introduction to technology concepts for students without extensive math or science backgrounds. Course explores aspects of design, communications, energy, and manufacturing.

Level, Credits: U5

Class Time Distribution: Two 1.5 lectures and one 2 hr lab

Prerequisites: GEC Natural Science course in Biology, Chemistry or Physics

Quarters Offered: TBD

General Information: This course is intended for non-engineering students who want to prepare for careers in which technological understand is beneficial and for better understand how technology impacts their lives. Content is based on national standards for technological literacy (ITEA).

Exclusions: Not open to Engineering Majors

Cross-Listings: None

Learning Outcomes: To provide students, without a strong technical background, a working understanding of how technology impacts their lives. There are both positive and negative consequences of technology on society. The students will learn to research topics of technology challenges, critically evaluate multiple points of view, and develop a conclusion based upon the best current information. The course will contain weekly laboratories which allow for hands-on experiences with varied forms of technology and products to insure a practical understanding.

Textbooks and Other Materials: "Technology Engineering and Design", Glencoe/McGraw Hill, 2008

Topics (including approximate duration, adding up to the course length in classroom hours or weeks):
Technology Fundamentals 1.5 hr
The Engineering Design Process 1.5 hr
Communications Fundamentals 1.5 hr
Information Technology 1.5 hr
Electronic Communication 1.5 hr
Graphic Communication 1.5 hr
Energy & Power Fundamentals 1.5 hr
Energy Sources & Conversions 1.5 hr
Power Systems 1.5 hr
Materials Properties and Uses 1.5 hr
Manufacturing Engineering Fundamentals 1.5 hr
Product Development 1.5 hr
Production Planning & Production 1.5 hr
High-Performance Manufacturing 1.5 hr
Oral Presentations (Describing the design/operating principles of chosen project) 3.0 hrs

Representative Lab Assignments:
Bridge Construction 2 hrs
Bridge Testing Competition 2 hrs
Beam Bending 2 hrs

Basic Electronics 2 hrs
Analog and Digital Circuits 2 hrs
Sensors and Measurements 2 hrs
Actuators 2 hrs
Kodak Camera Manufacturing 2 hrs

Grading Plan:
Midterm 25%
Final 25%
Lab Projects 30%
Oral Presentation 10%
Quizzes 5%
Practicum 5%

Relationship to ABET Criterion 3 Outcomes (a-k): N/A

Relationship to ABET-Accredited Program Outcomes: N/A

Preparer Information (including date of preparation): B. Trott, R. Gustafson, 11/6/07

OHIO STATE NEW COURSE REQUEST

College: Engineering

Academic unit: Engineering Book 3 Listing: Engineering
(e.g., Portuguese)

Proposed
Course No: 202 Full Title of Course: Technologies Studies II: Analyzing Our World

Proposed Effective Qtr/Yr: SU ☐ AU ☐ WI ☐ SP X☐ YEAR: 2009 (See *OAA Academic Organization and Curriculum Handbook* for Deadlines)

A. Course Offerings Bulletin Information.

Follow instructions in the *OAA Academic Organization and Curriculum Handbook.*

Is this a course with decimal subdivisions? If so, use one New Course Request form for the generic information that will apply to all subdivisions. Use separate forms for each new decimal subdivision, including on each form only the information that is unique to that subdivision.

18-Character Transcript Abbreviation: Tech Studies II Level U X☐ G ☐ P ☐ Credit Hours: 5

Description (*not to exceed 25 words*):

Introduction to technology concepts for students without extensive math or science backgrounds. Course explores aspects of design, communications, energy, and manufacturing.

Quarter offered (*check*)): SU ☐ AU ☐ WI X☐ SP X☐ *Distribution of class time/contact hours: _2 1.5 hr Cl; 1 2hr L_____
Quarter and contact/class time hours information should be omitted from Book 3 publication: (check here) ☐

Prerequisite (s): ENG 201

Exclusion or limiting clause: Not open to Engineering Majors

Repeatable to a maximum of ___ credit hours.

Cross-listed with:

Grade Option (Please check): Letter X☐ S/U ☐ Progress ☐

If this course is Progress graded, what course is the last one in the series?

Honors Statement: Yes ☐ No X☐ GEC: Yes ☐ No X☐ Admission Condition
Off-Campus**:** Yes ☐ No X☐ EM: Yes ☐ No X☐ Course: Yes ☐ No X ☐
Embedded Honors Statement: Yes ☐ No X☐
Service Learning Course*: Yes ☐ No X☐
*To learn more about this option, please visit http://artsandsciences.osu.edu/currofc/

Other General Course Information:
(e.g. "Taught in English." "Credit does not count toward BSBA degree.")
Subject Code___150000_____ Subsidy Level (V, G, T, B, M, D, or P)__B_____
(If you have questions please email Jed Dickhaut @ dickhaut.1@osu.edu)

Will course be taught in distance learning format: Yes ☐ No X☐

B. General Information:

1. Provide the rationale for proposing this course:

Second of two core courses for proposed technological studies minor.

2. List Major/Minor affected by the creation of this new course. Attach revisions of all affected programs.
   This course is (check one) Required X☐ Elective ☐ Other (Explain) ☐:

*** If the course offered is less than quarter, term, or semester, please also complete the Flexibly Scheduled/Off Campus/Workshop Request form.**

3. Indicate the nature of the program adjustments, new funding, and/or withdrawals that make possible the implementation of this new course.

New course offering to be funded by College of Engineering.

4. Is the approval of this request contingent upon the approval of other course requests or curricular requests?

Yes X☐ No ☐ List: Technological Studies Minor; ENG 201, ENG 582

5. If this course is part of a sequence, list the number of the other course(s) in the sequence: ENG 201

6. Expected section size:50 Proposed number of sections per year:2

7. Do you want prerequisites enforced electronically? (See OAA Curriculum Manual for what can be enforced.) Yes X☐

8. This course has been discussed with and has the concurrence of the following academic units needing this course or with academic units having directly related interests (*List units and attach letters and/or forms*): Not Applicable X☐

9. Attach a course syllabus that includes a topical outline of the course, student learning outcomes and/or course objectives, off-campus field experience, methods of evaluation, and other items as stated in the *OAA Curriculum Handbook.*

****

APPROVAL SIGNATURES (As needed. All signatures on lines in ALL CAPS (e.g. ACADEMIC UNIT) must be completed

Academic Unit Undergraduate Studies Committee Chair (Undergraduate course)	Printed Name	Date
Academic Unit Graduate Studies Committee Chair(Undergraduate/Graduate course)	Printed Name	Date
School /College Undergrad Curriculum Committee (Undergraduate/Graduate course)	Printed Name	Date
School /College Graduate Curriculum Committee (Undergraduate/Graduate course)	Printed Name	Date
ACADEMIC UNIT CHAIR /SCHOOL DIRECTOR	**Printed Name**	**Date**
COLLEGE DEAN	**Printed Name**	**Date**
Graduate School (If Appropriate)	Printed Name	Date
ASC Curriculum Committee Chair (If Appropriate))	Printed Name	Date
University Honors Center (If Appropriate)	Printed Name	Date
Office of International Education (study tour only)	Printed Name	Date
ACADEMIC AFFAIRS	**Printed Name**	**Date**

ENGINEERING 202
Technological Studies II: Analyzing Our World

Core Course: Technological Studies Minor

Description: Introduction to technology concepts for students without extensive math or science backgrounds. Course explores aspects of nanotechnology, bio-related technology, transportation, and construction.

Level, Credits: U5

Class Time Distribution: Two 1.5 lectures and one 2 hr lab

Prerequisites: Engineering 201

Quarters Offered: TBD

General Information: Continuation of ENG 201. This course is intended for non-engineering students who want to prepare for careers in which technological understand is beneficial and for better understand how technology impacts their lives. Content is based on national standards for technological literacy (ITEA).

Exclusions: Not open to Engineering Majors

Cross-Listings: None

Learning Outcomes: To provide students, without a strong technical background, a working understanding of how technology impacts their lives. There are both positive and negative consequences of technology on society. The students will learn to research topics of technology challenges, critically evaluate multiple points of view, and develop a conclusion based upon the best current information. The course will contain weekly laboratories which allow for hands-on experiences with varied forms of technology and products to insure a practical understanding.

Textbooks and Other Materials: "Technology Engineering and Design", Glencoe/McGraw Hill, 2008

Topics (including approximate duration, adding up to the course length in classroom hours or weeks):
Construction Fundamentals 1.5 hr
Planning Construction 1.5 hr
Managing Construction 1.5 hr
Constructing Buildings 1.5 hr
Large Scale Construction 1.5 hr
Transportation Fundamentals 1.5 hr
Structure of Transportation 1.5 hr
Powering Transportation 1.5 hr
Bio-related Fundamentals 1.5 hr
Medical Technologies 1.5 hr
Agricultural Technologies 1.5 hr
Nanotechnology 1.5 hr

Representative Lab Assignments (Tentative):
Electrical Power Technology
- Principles of switching and control
- Residential wiring systems

Advanced energy technology for residences
Transportation
Traffic Analysis
Automotive energy analysis
Developing automotive technologies
Communications and Networks
Networking computers
Internet structure

Quarter Long Project: Develop a position paper and oral presentation related to a current technology related topic (e.g. global warning, use of fossil fuels, alternative energy, world hunger)

Grading Plan:
Midterm 25%
Final 25%
Lab Projects 15%
Homework 10%
Quarter Long Project 25%

Relationship to ABET Criterion 3 Outcomes (a-k): N/A

Relationship to ABET-Accredited Program Outcomes: N/A

Preparer Information (including date of preparation): B. Trott, R. Gustafson, 11/5/07

OHIO STATE NEW COURSE REQUEST

College: Engineering

Academic unit: Engineering Book 3 Listing: Engineering
(e.g., Portuguese)

Proposed
Course No: 581 Full Title of Course: Engineering Capstone Collaboration

Proposed Effective Qtr/Yr: SU ☐ AU ☐ WI X☐ SP ☐ YEAR: 2009 (See *OAA Academic Organization and Curriculum Handbook* for Deadlines)

A. Course Offerings Bulletin Information.

Follow instructions in the *OAA Academic Organization and Curriculum Handbook.*

Is this a course with decimal subdivisions? If so, use one New Course Request form for the generic information that will apply to all subdivisions. Use separate forms for each new decimal subdivision, including on each form only the information that is unique to that subdivision.

18-Character Transcript Abbreviation: Eng Capstone Coll Level U X☐ G ☐ P ☐ Credit Hours: 2-4

Description (*not to exceed 25 words*):
Students contract to collaborate with an engineering capstone design team for at least one quarter and contribute their disciplinary expertise.

Quarter offered (*check*)): SU ☐ AU X☐ WI X☐ SP X☐ *Distribution of class time/contact hours: _ARR_____
Quarter and contact/class time hours information should be omitted from Book 3 publication: (check here) ☐

Prerequisite (s): Engineering Departmental Permission

Exclusion or limiting clause: Not open to Engineering Majors

Repeatable to a maximum of _8__ credit hours.

Cross-listed with:

Grade Option (Please check): Letter X☐ S/U ☐ Progress ☐

If this course is Progress graded, what course is the last one in the series?

Honors Statement: Yes ☐ No X☐ GEC: Yes ☐ No X☐ Admission Condition
Off-Campus**:** Yes ☐ No X☐ EM: Yes ☐ No X☐ Course: Yes ☐ No X ☐
Embedded Honors Statement: Yes ☐ No X☐
Service Learning Course*: Yes ☐ No X☐
*To learn more about this option, please visit http://artsandsciences.osu.edu/currofc/

Other General Course Information:
(e.g. “Taught in English.” “Credit does not count toward BSBA degree.”)

Subject Code___150000_____ Subsidy Level (V, G, T, B, M, D, or P)__B_____
(If you have questions please email Jed Dickhaut @ dickhaut.1@osu.edu)

Will course be taught in distance learning format: Yes ☐ No X☐

B. General Information:

1. Provide the rationale for proposing this course:
Capstone requirement within Engineering Sciences minor

2. List Major/Minor affected by the creation of this new course. Attach revisions of all affected programs.
This course is (check one) Required X☐ Elective ☐ Other (Explain) ☐:

*** If the course offered is less than quarter, term, or semester, please also complete the Flexibly Scheduled/Off Campus/Workshop Request form.**

3. Indicate the nature of the program adjustments, new funding, and/or withdrawals that make possible the implementation of this new course.
New course offering to be funded by College of Engineering.

4. Is the approval of this request contingent upon the approval of other course requests or curricular requests?

Yes X☐ No ☐ List: Engineering Sciences Minor

5. If this course is part of a sequence, list the number of the other course(s) in the sequence: _____

6. Expected section size:20 Proposed number of sections per year:3

7. Do you want prerequisites enforced electronically? (See OAA Curriculum Manual for what can be enforced.) Yes X☐

8. This course has been discussed with and has the concurrence of the following academic units needing this course or with academic units having directly related interests (*List units and attach letters and/or forms*): Not Applicable X☐

9. Attach a course syllabus that includes a topical outline of the course, student learning outcomes and/or course objectives, off-campus field experience, methods of evaluation, and other items as stated in the *OAA Curriculum Handbook.*

****

APPROVAL SIGNATURES (As needed. All signatures on lines in ALL CAPS (e.g. ACADEMIC UNIT) must be completed

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Graduate School (If Appropriate)	Printed Name	Date
ASC Curriculum Committee Chair (If Appropriate))	Printed Name	Date
University Honors Center (If Appropriate)	Printed Name	Date
Office of International Education (study tour only)	Printed Name	Date
ACADEMIC AFFAIRS	**Printed Name**	**Date**

ENGINEERING 581
Engineering Capstone Collaboration

Core Course: Engineering Sciences Minor

Description: Students contract to collaborate with an engineering capstone design team for at least one quarter and contribute their disciplinary expertise.

Level, Credits: U 2 – 4 repeatable up to 8 credits

Class Time Distribution: Arranged in conjunction with an Engineering Capstone Course

Prerequisites: Engineering Departmental Permission

Quarters Offered: AU, WI, SP

General Information: This course is intended as a capstone experience for non-engineering students who are completing the Engineering Sciences Minor. The capstone class for the minor gives the student direct experience working as part of an engineering design team. This should directly build their skills towards the objective of being able to work effectively with technological experts.

Course will be coordinated by the Director of the Engineering Education Innovation Center or the Director's designee. Students will develop a course contract in conjunction with the course coordinator (Director EEIC or Director's designee), the design course coordinator and the capstone design team.

Exclusions: Not open to Engineering Majors

Cross-Listings: None

Learning Outcomes:

The students are expected to 1) experience the process of participating in decisions about the development and use of technology, 2) further their appreciation for the development and use of technology involving trade-offs and a balance of costs and benefits, 3) be able to asks pertinent questions of self and others regarding the benefits and risks of technologies, and 4) enhance multi-disciplinary teamwork skills.

Textbooks and Other Materials: NA

Topics: To be determined, dependent on design project.

Grading Plan: Students will develop a course contract in conjunction with the course coordinator (Director EEIC or Director's designee), the design course coordinator and the capstone design team. Each contract will specify the grading plan that will be used for the student's undertaking.

Relationship to ABET Criterion 3 Outcomes (a-k): N/A

Relationship to ABET-Accredited Program Outcomes: N/A

Preparer Information (including date of preparation): R. Gustafson, 12/7/07

OHIO STATE NEW COURSE REQUEST

College: Engineering

Academic unit: Engineering Book 3 Listing: Engineering
(e.g., Portuguese)

Proposed
Course No: 582 Full Title of Course: Technology Issues Seminar

Proposed Effective Qtr/Yr: SU ☐ AU ☐ WI X☐ SP ☐ YEAR: 2009 (See *OAA Academic Organization and Curriculum Handbook* for Deadlines)

A. Course Offerings Bulletin Information.

Follow instructions in the *OAA Academic Organization and Curriculum Handbook.*

Is this a course with decimal subdivisions? If so, use one New Course Request form for the generic information that will apply to all subdivisions. Use separate forms for each new decimal subdivision, including on each form only the information that is unique to that subdivision.

18-Character Transcript Abbreviation: Tech Issues Sem Level U X☐ G ☐ P ☐ Credit Hours: 2

Description (*not to exceed 25 words*):
Lecture and discussion of current technological issues and their implications presented by leading experts in the area. Builds understanding of issue for informed citizenship.

Quarter offered (*check*)): SU ☐ AU X☐ WI X☐ SP ☐ *Distribution of class time/contact hours: _1 2hr Cl_____
Quarter and contact/class time hours information should be omitted from Book 3 publication: (check here) ☐

Prerequisite (s): ENG 183 or ENG 193H or ENG 185 or ENG 202

Exclusion or limiting clause:

Repeatable to a maximum of ___ credit hours.

Cross-listed with:

Grade Option (Please check): Letter X☐ S/U ☐ Progress ☐

If this course is Progress graded, what course is the last one in the series?

Honors Statement: Yes ☐ No X☐ GEC: Yes ☐ No X☐ Admission Condition
Off-Campus**:** Yes ☐ No X☐ EM: Yes ☐ No X☐ Course: Yes ☐ No X ☐
Embedded Honors Statement: Yes ☐ No X☐
Service Learning Course*: Yes ☐ No X☐
*To learn more about this option, please visit http://artsandsciences.osu.edu/currofc/

Other General Course Information:
(e.g. "Taught in English." "Credit does not count toward BSBA degree.")

Subject Code___150000_____ Subsidy Level (V, G, T, B, M, D, or P)__B_____
(If you have questions please email Jed Dickhaut @ dickhaut.1@osu.edu)

Will course be taught in distance learning format: Yes ☐ No X☐

B. General Information:

1. Provide the rationale for proposing this course:
Requirement within Technological Studies minor

2. List Major/Minor affected by the creation of this new course. Attach revisions of all affected programs.
This course is (check one) Required X☐ Elective ☐ Other (Explain) ☐:

*** If the course offered is less than quarter, term, or semester, please also complete the Flexibly Scheduled/Off Campus/Workshop Request form.**

3. Indicate the nature of the program adjustments, new funding, and/or withdrawals that make possible the implementation of this new course.
New course offering to be funded by College of Engineering.

4. Is the approval of this request contingent upon the approval of other course requests or curricular requests?

Yes X☐ No ☐ List: Technological Studies Minor

5. If this course is part of a sequence, list the number of the other course(s) in the sequence: _____

6. Expected section size:50 Proposed number of sections per year:2

7. Do you want prerequisites enforced electronically? (See OAA Curriculum Manual for what can be enforced.) Yes X☐

8. This course has been discussed with and has the concurrence of the following academic units needing this course or with academic units having directly related interests (*List units and attach letters and/or forms*): Not Applicable X☐

9. Attach a course syllabus that includes a topical outline of the course, student learning outcomes and/or course objectives, off-campus field experience, methods of evaluation, and other items as stated in the *OAA Curriculum Handbook.*

****

APPROVAL SIGNATURES (As needed. All signatures on lines in ALL CAPS (e.g. ACADEMIC UNIT) must be completed

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COLLEGE DEAN	**Printed Name**	**Date**
Graduate School (If Appropriate)	Printed Name	Date
ASC Curriculum Committee Chair (If Appropriate))	Printed Name	Date
University Honors Center (If Appropriate)	Printed Name	Date
Office of International Education (study tour only)	Printed Name	Date
ACADEMIC AFFAIRS	**Printed Name**	**Date**

ENGINEERING 582
Technology Issues Seminar

Core Course: Technology Studies Minor

Description: Lecture and discussion of current technological issues and their implications presented by leading experts in the area. Builds understanding of issue for informed citizenship.

Level, Credits: U 2

Class Time Distribution: 1 2hr cl

Prerequisites: ENG 183 or ENG 193H or ENG 185 or ENG 202

Quarters Offered: TBD

General Information: This course is intended as a culminating seminar experience for non-engineering students who are completing the Technological Studies Minor. A series of current technological issues within areas of focus of the college, (e.g. energy, transportation, environment, biomedical technologies, advanced materials) will be addressed by leading technologist. This should directly build their skills towards understanding issues of the day.

Course will be coordinated by the Director of the Engineering Education Innovation Center or the Director's designee. Students will be expected to write 1-2 page reflection papers for the seminars. Students will be expected to develop a written position piece on a current technological issue approved by the instructor.

Exclusions: None

Cross-Listings: None

Learning Outcomes:

The students are expected to 1) recognize the nature and complexity of current technological issues, 2) further their appreciation for the development and use of technology involving trade-offs and a balance of costs and benefits, 3) be able to asks pertinent questions of self and others regarding the benefits and risks of technologies, and 4) enhance written communication skills.

Textbooks and Other Materials: NA

Topics: To be determined, dependent on design project.

Grading Plan:

Reflection Papers (8-10)	50%
Issue Paper	50%

Relationship to ABET Criterion 3 Outcomes (a-k): N/A

Relationship to ABET-Accredited Program Outcomes: N/A

Preparer Information (including date of preparation): R. Gustafson, 2/27/08

Concurrence and Letters of Support

1. College of Food, Agricultural and Environmental Sciences – requested response to draft proposal

Response to an earlier draft proposal, received 12/21/07

> Bob: Sorry for the delay but let me respond to your minor proposals. We think the minors are a good idea and can be attractive to many groups of students. I am assuming that Engineering majors can not select either minor since you have exclusion clauses on the new courses. The only suggestion is remove the Natural Science requirement. This should be a prerequisite for the minor similar to the Engineering Sciences minor. Many students take these courses already as a Natural Science. There already may be overlap in the Technology and Society with CS 272, Eng 360.02, 367 and History 362. To replace those hours you might have select two courses from Computational Studies.
>
> Thanks for the opportunity to review the proposals. Enjoy the holiday season.
>
> **Jill A. Pfister**
> Assistant Dean, Academic Affairs
> Honors Director and College Secretary

*Note suggestion on Natural Science has been implemented in the current proposal.

2. Fisher College of Business– requested response to draft proposal

Bob,

I reviewed this quickly, and Rao will need to respond to this, but I have some questions/observations of note:

1) The pre-req for ENG 181 is Math 150 or higher. While about 25% or so of BUS students take (or at least start) the 150's series or higher, most do not. I assume that 131 as indicated elsewhere in the proposal will be sufficient, but note that students who start at Math 130 will not necessarily have had any trig or analytic (but likely will have had some exposure to it in high school if they took pre-calc).*
2) Many of the Engineering Science options will require careful planning by students to ensure that they have the right math and/or science, but I note that there are several options with minimal pre-reqs that can be taken for those who make late decisions and/or have not planned anticipating the minor.
3) I am curious how you see students positioning the minor in their program, e.g. whether you see them beginning as freshmen, sophomores, etc., both from ideal and realistic perspectives.

It's probably obvious that my bias for our students is toward Engineering Science rather than Technological Studies, but overall, I think the minor proposals would provide attractive opportunities for our students. As I mentioned to you, we have interests in identifying enriching opportunities for our students in product design and science areas, among others, and I think your proposal particularly for the ES minor is certainly one way to address those interests at some level.

One more question: I assume that students can double count courses in the minors and general education where those opportunities present themselves (such as 2nd writing, lit, or history)?*

Thanks.
Jay Yutzey

*Note these two concerns have been addressed by changes/additions to the proposal.

3/19/08
Bob,

This proposal is a very good one and the Undergraduate Program at Fisher is excited about the possibility of some of our students getting their minor in Engg. Science. Please let us know if we can help in any way as the minor unfolds. Thanks.

Rao Unnava

3. Colleges of the Arts and Sciences – requested response to draft proposal through Ed Adelson

   Request for input made 12/11/07;

4. College of Education and Human Ecology – Concurrence for inclusion of Ed T & L 220

   We are willing to include Ed T and L 220 in the proposed structure of your minor in technological literacy.

   Let me know how we can be of further help.

   Rebecca Kantor
   Director, School of Teaching and Learning

   Use of Eng 183 as prerequisite for T&L 220
   Bob,
   I did not get the attachments but I have no problem using 183 as a prerequisite. I could also add 181 if that would help. If the students interested in 220 would have already had 183 anyway that it doesn't matter.
   Paul (Paul Post)

5. Department of History – Concurrence for inclusion of History 362

   Request for concurrence made 2/6/08;

6. Department of Comparative Studies – Concurrence for inclusion of Comp Studies 272

3/18/08
… we are happy to have our courses included in the proposal.

David G. Horn, Professor and Chair
Department of Comparative Studies

7. Department of Industrial, Interior, and Visual Communication Design – concurrence for inclusion of II&VCD 230

   Request for concurrent sent 11/6/07; Second request sent 2/6/08;

8. Sociology

The idea of including Soc 302 in the minor list is excellent.

I would assume at least initially the number of new student requests for Soc 302 would be limited but, with time, it might grow. This is quite sustainable.

Let me know if you need a formal letter of endorsement or if this email suffices.
J. Craig Jenkins
Chair of Sociology & Professor of Sociology and Political Science 300 Bricker/190 N. Oval Mall Ohio State

9. Physics Department

Request for concurrence made 3/14/08;

ENGINEERING 181-WINTER QUARTER 2008
Fundamentals of Engineering - I

Classrooms: HI 224 Laboratories: HI 214 – HI 216 Computer HI 342

Course Objectives: The goal of this course is to provide you with knowledge of engineering fundamentals: graphics, technical communications, problem solving, the design process, data collection and data analysis. The goal of the two-course sequence is to expand that knowledge to a point of maximum usefulness with respect to both your future academic work and professional career. This course is divided into two segments: (1) Basic Skills and (2) Hands-on Laboratory.

Basic Skills: Each week, you will be introduced to important engineering skills and given an opportunity to practice those skills. Homework assignments will be made in each session and will be due on the date indicated on the Daily Assignment List. Assignments received more than one session late will be marked but will not earn credit. One mid-term exam and one final exam will be given. Exams are given closed book, closed notes, closed outside resources unless otherwise stated at the time of the exam. Note: No food or beverages are allowed in the classrooms or labs.

Hands-On Laboratory: Each week students will attend a 2-hour Hands-on Laboratory session. There will be three sets of labs. The first set, Fundamental Concepts, consists of labs 2, 3, and 4. The second set, Transport Phenomena, consists of labs 5 and 6. The third set, Camera Labs, consists of labs 7, 8, & 9. During the 10th and final lab, each team will make an oral presentation on an engineering design project. During the laboratory sessions, students will perform a variety of hands-on activities including disassembling and reassembling objects, testing components, and collecting and analyzing data. Homework assignments will include gathering additional information from the internet or library, solving problems related to the lab work, and preparing lab reports. Students will also prepare and present an oral report. Each assignment will be graded. Questions on important concepts covered in the laboratories will be included on the final exam. There may be time in the second half of your two-hour Basics sessions for teams to work on lab reports and pre-lab work, where required.

Grading: The contribution of each course segment to the overall course grade is outlined below.

Basic Skills	**25%**
Daily Assignments	25%
Labs	**25%**
Individual Labs	7%
Team Labs	12%
Engineering Discipline Project	6%
Exams (Basics and Labs)	**45%**
Midterm	20%
Final	25%
Final Team Evaluations	**3%**
Journal Entries	**1%**
Attendance	**1%**
Creativity in Engineering Design Assessment (Bonus)	**2%**

Assessment and Evaluation: Individual and team-based evaluations will be conducted throughout the quarter. Electronic journal entries are required and factored into the course grade. The final team evaluation results will also be a factor in assigning a final team grade.

Course Materials: The following materials are required for this course:

- **Books (At OSU Bookstores)**
  - *A Guide to Writing as an Engineer* by David Beer & David McMurrey
  - "*Technical Graphics, 2nd Edition*", by Meyers, et al
  - "*Tools and Tactics of Design*", by Dominick, et al
  - "*An Introduction to Autodesk Inventor 2008 and AutoCAD 2008*", by Shih, Schroff Development Corporation, Mission, Kansas, 2003.
- **Engineering 181 Student Course Packet** (*Purchased at Tuttle Uniprint*) (contains all drawing assignments & necessary lab materials)
- **Storage Medium** – USB flash drives (preferred) or 3.5" High Density disks. **Note:** 3GB storage space on a network drive accessible by FTP (File Transfer Protocol) from outside of class is provided by the First-Year Engineering Program.
- **Mechanical pencil, eraser, 6" scale (inches and metric)**
- **AutoDesk Inventor® Professional 2008 (provided by the First-Year Engineering Program)**

CAD Computer Graphics Lab: In addition to your classrooms and labs, you will have access to the Hitchcock Computer Graphics Lab (HCGL) located in Hitchcock Hall Room 342. For the most up to date schedule, please consult postings outside the room. You are to use only the software supplied in theses labs; that is, you may not install any software onto, or copy any software from the lab computers. **Food and drink are not permitted in the lab.** Violation of these policies will result in expulsion from the lab.

Accreditation Board for Engineering and Technology - Program Criteria 2000:

Engineering programs must demonstrate that their graduates have:

(a) an ability to apply knowledge of mathematics, science, and engineering	X
(b) an ability to design and conduct experiments, as well as to analyze and interpret data	
(c) an ability to design a system, component, or process to meet desired needs	
(d) ability to function on multi-disciplinary teams	X
(e) an ability to identify, formulate, and solve engineering problems	X
(f) an understanding of professional and ethical responsibility	
(g) an ability to communicate effectively	X
(h) the broad education necessary to understand the impact of engineering solutions in a global and societal context	
(i) a recognition of the need for, and an ability to engage in life-long learning	X
(j) a knowledge of contemporary issues	
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice	X

**ENG181 ascribes to the criteria as marked with an "X"*

Daily Assignment List
Engineering 181 WI08 -- Section 7A Only (no Section 7B)

Week	Day	Date	Session	Session Topic(s)	Reading	Assigned Work	Assignments Due
1	F	4	Basics 3	Course Introduction / Excel - Graphing; Excel - Data Analysis	TG Ch. 12.1 - 12.2.3; WE Ch. 7	Purdue Visualization Test (pre - online); Group Creation Survey*; Learning Styles Inventory; Read Significant Figures Module (Carmen Content); Excel 1, 2, & 3	Group Creation Survey*
2	M	7	Basics 4	Sketching and Isometric Pictorials / Oral Presentation: Engineering Product / Team Building	TG Ch. 2 TTD Ch. 3 + 5.3	DWG 1*; Email Oral Prentation Topic; Quiz on Significant Figures; Team Working Agreement; Journal Entry #1	DWG 1*; Read Significant Figures Module; Learning Styles Inventory
	W	9	Lab 2	Fundamental Concepts A (Beam Bending)		Lab 2 Memo (individual - paper)	Quiz on Significant Figures; Email Oral Presentation Topic
	F	11	Basics 5	Inventor: Getting Started		INV 1*, INV 2; Schedule Research Meeting	INV 1*; Excel 1, 2, & 3; Purdue Visualization Test (pre - online); Journal Entry #1
3	M	14	Basics 6	The Isometric Ellipse	TG Ch. 4	DWG 2*	DWG 2*
	W	16	Lab 3	Fundamental Concepts B (Static/Dynamic Meas.)		Lab 3 Memo (team - electronic)	Lab 2 Memo (individual - paper); Team Working Agreement
	F	18	Basics 7	Orthographic Projections	TG Ch. 3	DWG 3*	INV 2; DWG 3*
4	M	21	Martin Luther King Holiday - no class			Journal Entry #2	
	W	23	Lab 4	Fundamental Concepts C (Bridge Competition / Reverse Engineering)		Lab 4 Memo (team - electronic); Lab 2 Memo Rewrite (paper - include original)	Lab 3 Memo (team - electronic) ╪

	F	25	Basics 9	Inventor: Constructive Solid Geometry & Model History Tree		INV 3*, INV 4, INV 5; Mid-quarter Team Evaluation	INV 3*; Journal Entry #2
5	M	28	Basics 8	Orthographic Drawing Skills	TG Ch. 3	DWG 4, DWG 5; Mid-quarter Team Evaluation	
	W	30	Lab 5	Transport Phenomena Lab A (Fluid Flow and Introduction to Rheology)		Lab 5 Memo (team - electronic); Outline of Oral Presentation	Lab 2 Memo Rewrite (paper - include original); Lab 4 Memo (team - electronic)╪
	F	1	Basics 10	Drawing an Isometric from a Set of Orthographic Views / Design Your Own Object Part I		DWG 6, DWG 7, DWG 8	DWG 4, DWG 5; INV 4, INV 5; Complete Research Meeting; Mid-quarter Team Evaluation
6	M	4	Basics 12	Dimensioning Fundamentals	TG Ch. 6.3 - 6.7 & 6.13	DWG 9, DWG 10; Journal Entry #3	DWG 6, DWG 7, DWG 8
	W	6	Lab 6	Transport Phenomena Lab B (Energy Flow and Instrumentation)		Lab 6 Memo (team - electronic); ENG Proj Interview	Lab 5 Memo (team - electronic) ╪; Outline of Oral Presentation (team - electronic)╪
	F	8	Basics 11	MIDTERM EXAM			Journal Entry #3
7	M	11	Basics 14	Missing Line; Design Your Own Object Part II		DWG 11, DWG 12	DWG 9, DWG 10
	W	13	Lab 7	Camera Lab A (Shutter Mechanism)		Lab 7 & 8 combined Report (team - electronic); Lab 8 Pre-Lab (individual--paper)	Lab 6 Memo (team - electronic)╪
	F	15	Basics 13	Oral Presentation Review / Inventor: Additional Modeling Tools	TG Ch. 13.4 & WE Ch. 9	INV 6*, INV 7	INV 6*

8	M	18	Basics 16	Missing View		DWG 13; Journal Entry #4	DWG 11, DWG 12 (include corrected DWG 8); Draft of Oral Presentation Slides
	W	20	Lab 8	Camera Lab B (Camera Circuitry)		Draft of Oral Presentation Slides	Lab 8 Pre-Lab (individual - paper);
	F	22	Basics 15	Inventor: Extracting Orthographic Views		INV 8*, INV 9	INV 7, INV 8*; Journal Entry #4
9	M	25	Basics 18	Section Views	TG Ch. 5	DWG 14	DWG 13
	W	27	Lab 9	Camera Lab C (Manufacturing)		Lab 9 Memo (individual - electronic)	Lab 7 & 8 combined Report (team - electronic)╪
	F	29	Basics 17	Inventor: Parametric Constraints		INV 10*, INV 11	INV 9, INV 10*
10	M	2	Basics 19	Inventor: Geometric Construction Tools		INV 12, INV 13; Final Course Evaluation (Journal Entry #5); Final Team Evaluation; Purdue Visualization Test (post - online)	DWG 14, INV 11; Lab 9 Memo (individual - electronic)╪
	W	4	Lab 10	Oral Presentations: Engineering Product			Final Presentation Slides (team - electronic) ╪; Final Handout
	F	7	Basics 20	Team Building Wrap-up; Final Exam Review; Inventor Work Time	TTD Ch. 8.4	SEI*; Complete evaluations in class as time permits	SEI*; Final Course Evaluation (Journal Entry #5); Final Team Evaluation; INV 12*, INV 13; Purdue Visualization Test (post - online)

* Assignments given & collected on the same day; DWG=Drawing; INV=Inventor; ╪ Electronic copy due midnight of prior day
TG="Technical Graphics", TTD="Tools and Tactics of Design", WE="Writing as an Engineer"

ENGINEERING 183 – WINTER QUARTER 2008
Fundamentals of Engineering – II

Classrooms: HI 224 Laboratories: HI 214 – HI 216 Computer: HI 342

Course Goals: The goals of this course are twofold: (1) to build on the skills you gained in 181, and (2) to engage you in a quarter-long design/build project. This course is divided into two segments: (1) Basic Skills and (2) Hands-on Laboratory.

Basic Skills: Each week, you will be introduced to important engineering skills and given an opportunity to practice those skills. Homework assignments will be made in each session and will be due on the date indicated on the Daily Assignment List. Assignments received more than one session late will be marked but will not earn credit. One mid-term exam and one final exam will be given. Exams are given closed book, closed notes, closed outside resources unless otherwise stated at the time of the exam. Note: No food or beverages are allowed in the classrooms or labs.

Hands-On Laboratory (2 hrs): Each week you will attend one 2-hour Hands-on Laboratory sessions. During the laboratory sessions, student teams will design and build a roller coaster given certain requirements. Weekly milestones will be set and related assignments will be made. You will be graded on whether they meet the deadlines and the quality of work on their assignments. Situations involving late reports or missed labs will be handled at the discretion of the TA and instructor. However, penalties can range from a 20% deduction to no credit. Toward the end of the quarter, a competition will be held to determine the degree to which each team's roller coaster meets the design criteria. A more detailed description of the design project, deadlines, and grading criteria is provided in your course packet. Please note that all tools and supplies assigned to a team must be returned in good working order and formally accounted for at the end of the quarter. Any lost or damaged items must be replaced at the team's expense. Failure to return any object will result in grades being withheld for the team until the object is found or replaced.

Grading: The contribution of each course segment to the overall course grade is outlined below.

Basic Skills	**18%**
Daily Assignments / Quizzes	18%
Labs	**35%**
Lab Memos	4%
Lab Quizzes	1%
Initial Paper Design	10%
Final System Test	5%
Oral Presentation	5%
Lab Notebook	5%
Final Written Lab Report	5%

Exams (Basics and Labs)	**40%**
Midterm	20%
Final	20%
Final Team Evaluations	**5%**
Journal Entries	**1%**
Attendance	**1%**
Creativity in Engineering Design Assessment (Bonus)	**2%**

Course Materials: The following materials are required for this course:

- **To Purchase at Tuttle Uniprint: "ENG 183 – Fundamentals of Engineering Student Course Packet"**
- **Books (ALL CAMPUS BOOKSTORES)**
  - **To Purchase: MATLAB: An Introduction with Applications**, 3rd Edition, by Gilat

- **Reuse from 181:**
  - **Technical Graphics**, 2nd Edition, by Meyers, et al
  - **Tools and Tactics of Design**, by Dominick, et al
  - **A Guide to Writing as an Engineer**, by David Beer & David McMurrey
  - **An Introduction to Autodesk Inventor 2008 and AutoCAD 2008**, by Shih, Schroff Development Corporation, Mission, Kansas, 2003.

- **Storage Medium** – USB flash drives (preferred) or 3.5" High Density disks. **Note:** 3GB storage space on a network drive accessible by FTP (File Transfer Protocol) from outside of class is provided by the First-Year Engineering Program.
- **Mechanical pencil, eraser, 6" scale (inches and metric)** – sold as a group in a blue pocket protector at the OSU Bookstore
- **AutoDesk Inventor® Professional 2008 (provided by the First-Year Engineering Program, reuse from 181)**

CAD Computer Graphics Lab: In addition to your classrooms and labs, you will have access to the Hitchcock Computer Graphics Lab (HCGL) located in Hitchcock Hall Room 342. For the most up to date schedule, please consult postings outside the room. You are to use only the software supplied in theses labs; that is, you may not install any software onto, or copy any software from the lab computers. **Food and drink are not permitted in the lab.** Violation of these policies will result in expulsion from the lab.

Accreditation Board for Engineering and Technology - Program Criteria 2000:

Engineering programs must demonstrate that their graduates have:

(a) an ability to apply knowledge of mathematics, science, and engineering	X
(b) an ability to design and conduct experiments, as well as to analyze and interpret data	X
(c) an ability to design a system, component, or process to meet desired needs	X
(d) ability to function on multi-disciplinary teams	X
(e) an ability to identify, formulate, and solve engineering problems	X
(f) an understanding of professional and ethical responsibility	X
(g) an ability to communicate effectively	X
(h) the broad education necessary to understand the impact of engineering solutions in a global and societal context	
(i) a recognition of the need for, and an ability to engage in life-long learning	X
(j) a knowledge of contemporary issues	
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice	X

**ENG183 ascribes to the criteria as marked with an "X"*

Daily Assignment List
Engineering 183A WI08 - Friday Lab

Week	Day	Date	Session	Session Topic(s)	Reading	Assigned Work	Assignments Due
1	F	4	Lab 1	Intro to Course; Intro to Lab-on-a-Chip	Lab 1 Procedure	Lab 1 Memo; Read NTM 1; Team Working Agreement; Project Schedule; Project Notebook; Group Creation Survey; Watch Cleaning and Design Print Videos	Group Creation Survey* (due by midnight)
			Basics 1	Good Dimensioning Practices	TG 6.1 - 6.7, TG 6.13	DWG 1; Read Lab-on-a-Chip Project Description Document	(NOTE: CARMEN DO-AT-HOME MODULE)
2	M	7	Basics 2	*Brainstorming and Project Management; Lab-on-a-Chip Design (extended period)*	*TTD 1.2, 3.1, 4.2.1*	*Preliminary Chip Design (paper); Read Nano-technology Project Description Document; Journal Entry #1; pre-DWG 2;*	
	W	9	Basics 3	*Electronic Circuits; Functional Dimensioning*	*TG 6.8*	*CKT 1; DWG 2; pre-DWG 3; Circuit Quizzes 1,2*	*pre-DWG 2; DWG 1*
	F	11	Lab 2	Microfluidics	Lab 2 Procedure	Lab 2 Memo; Read NTM 2	Lab 1 Memo; Team Working Agreement; Watch Cleaning and Design Print Videos; Journal Entry #1
3	M	14	Basics 4	*Tolerancing*	*TG 6.11*	*DWG 3, 4*	*pre-DWG 3; CKT 1; Circuit Quizzes 1,2;*
	W	16	Basics 5	Inventor: Symmetrical Parts / Rotation		INV 1*, 2	NTM 2 Quiz; *DWG 2; INV 1*;* In-class Review of Preliminary Chip Design (paper)
	F	18	Lab 3	Detection Circuit Building Lab 1/Nano Tours	Lab 3&4 Procedure	Lab 3 & 4 Memo; Read NTM 3 & 4; Final Chip Design (Inventor);	Lab 2 Memo; Preliminary Chip Design (paper); Project Notebook

	M	21	Martin Luther King Holiday - No Class			Journal Entry #2	
4	W	23	Basics 6	Inventor: Assembly Modeling; Initial Paper Design Review		INV 3*, *4*	NTM 3 & 4 Quiz; *DWG 3, 4;* INV 2, 3*
	F	25	Lab 4	Detection Circuit Building Lab 1/Nano Tours	Lab 3&4 Procedure	Lab Tour Summary	Final Chip Design (Inventor); Journal Entry #2
5	M	28	Basics 7	*Detail and Working Drawings;*	*TG 9.1 - 9.3*	*DWG 5 (after completing INV 4);* Mid-Quarter Team Evaluation	*Lab Tour Summary*
	W	30	Basics 8	MATLAB 1: Introduction and Script Files	MAT 1,4	MAT 1 / MAT 1 Quiz	*DWG 5; INV 4;*
	F	1	Lab 5	Detection Circuit Building Lab 2	Lab 5 Procedure	Lab 5 Memo	Lab 3 & 4 Memo; Project Schedule; Mid-Quarter Team Evaluation
6	M	4	Basics 9	MATLAB 2: Arrays, Strings	MAT 2	MAT 2 / MAT 2 Quiz; Journal Entry #3	MAT 1; MAT 1 Quiz
	W	6	Basics 10	Midterm			
	F	8	Lab 6	Microfabrication/Molding Lab	Lab 6 Procedure	Lab 6 Memo; Read NTM 5 & 6; Watch Demolding Video	Lab 5 Memo; Journal Entry #3
7	M	11	Basics 11	MATLAB 3: Matrix Math, Output	MAT 3	MAT 3 / MAT 3 Quiz	MAT 2; MAT 2 Quiz
	W	13	Basics 12	Co-op Presentation / MATLAB 4: Plotting	MAT 5	MAT 4 / MAT 4 Quiz	NTM 5 & 6 Quiz; MAT 3; MAT 3 Quiz
	F	15	Lab 7	Nano-Tools / De-Molding Lab	Lab 7 Procedure	Draft of Oral Presentation Slides; Draft Final Report	Lab 6 Memo; Watch Demolding Video; Outline of Oral Presentation
8	M	18	Basics 13	MATLAB 5: Introduction to Programming		MAT 5 / MAT 5 Quiz; Journal Entry #4	MAT 4; MAT 4 Quiz
	W	20	Basics 14	MATLAB 6: Relational and Logical Operators	MAT 7.1 - 7.3	MAT 6 / MAT 6 Quiz	MAT 5; MAT 5 Quiz

	F	22	Lab 8	IC Evolution / Preliminary Testing			Journal Entry #4; Draft of Oral Presentation Slides
9	M	25	Basics 15	MATLAB 7: Loops	MAT 7.4 - 7.6	MAT 7 / MAT 7 Quiz	MAT 6; MAT 6 Quiz
	W	27	Basics 16	MATLAB 8: Functions	MAT 6 , WE 6	MAT 8 / MAT 8 Quiz	MAT 7; MAT 7 Quiz; Draft Final Report
	F	29	Lab 9	Final Testing		[Final Report; Final Paper Design; Final Presentation Slides] (Hardcopy and on CD)	*Final Test Results*
10	M	3	Basics 17	Co-op Presentation / MATLAB 9: Programming (possible extended period)		Final Course Evaluation (Journal #5); Final Team Evaluation; MAT 9 / MAT 9 Quiz, *Ethics Learning Module Content: (Overview, Sample Case Study, & Sample Case Quiz)*	MAT 8; MAT 8 Quiz
	W	5	Basics 18	Ethics / Final Exam Review		SEI*; Ethics Learning Module Content: (Case Study, *Assigned Ethics Case Quiz*, Module Survey)	SEI*; MAT 9; MAT 9 Quiz; Ethics Learning Module Content: (Overview, Sample Case Study, & Sample Case Quiz)
	F	7	Lab 10	Project Presentations			[Final Report; Project Notebook; Final Paper Design; Final Presentation Slides] (Hardcopy and on CD); Final Course Evaluation (Journal #5); Final Team Evaluation; Ethics Learning Module Content: (Online Case Study, *Assigned Ethics Case Quiz*, Module Survey)

*Assignments given & collected on the same day.

TG="Technical Graphics", TTD="Tools and Tactics of Design", WE="Writing as an Engineer"