

Abilene Approval Chart for Curriculum Changes

A = Approve I = Information Item R = Respond in Writing

Course Number ENGR 350 or Degree Plan(s) _____

State the requested change and reason. A memo may be attached if more space is necessary.

We would like to add ENGR 350, Engineering Economics, to the menu for the Social and Behavioral Sciences in the University Requirements. Explanation and justification is provided in the attached application.

Indicate the requested change.

	Change to a Course	Dept./School ¹	College	Dean	TEC	UGEC	AUAC/Grad	Provost	President
1.	Title (description unchanged)	A	A	A	I	-	I	I	I
2.	Description (not affecting content)	A	A	A	I	-	I	I	I
3.	Course term(s)	A	I	A	I	-	I	I	I
4.	Content (change of course outcomes)	A	A	A	I	-	I	A	I
5.	Number of hours (lecture, lab, contact)	A	A	A	A	-	A	A	I
6.	Course number within the hundred	A	A	I	I	-	I	I	I
7.	Course number beyond the hundred	A	A	A	A	-	A	A	I
8.	Prerequisites	A	A	A	I	-	I	I	I
9.	Course fee(s)	A	-	A	-	-	-	A	I
10.	From U to G or G to U	A	A	A	A	-	A	A	I
11.	Cross-list course	A	A	A	A	-	A	A	I
12.	Department of record	A	A	A	A	-	A	A	I
13.	Close a course	A	A	A	A	-	A	A	I
14.	New course (includes combining or splitting courses)	A	A	A	A	-	A	A	I

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	Change to the University Requirements (All Campuses)	Dept./School ¹	College	Dean	TEC	UGEC	AUAC/Grad	Provost	Faculty	President	Trustees
1.	University Requirements — Change course outcomes of an included course ²	A	A	A	—	A	—	A	—	A	—
2.	University Requirements — Add or drop a required course from the University Requirements ²	A	A	A	—	A	—	A	A	A	—
3.	University Requirements — Add or drop a course from a menu within the University Requirements ²	A	—	—	—	A	—	A	—	A	—
4.	University Requirements — Change hours within a menu in the University Requirements ²	A	A	A	—	A	—	A	A	A	—
	Change to Catalog Information (for Campus)										
1.	General Requirements for Bachelor's Degrees and Associate's Degrees	—	—	—	—	—	A	A	A	A	—
2.	Policies governing academic probation and suspension	—	—	—	—	—	A	A	A	A	—
3.	Requirements for graduating with honors	—	—	—	—	—	A	A	A	A	—
	Change to a Degree Plan Proposed by Faculty or College										
5.	Educational Program — Revise ³	A	A	A	A	—	A	A	—	A	—
6.	Educational Program — Adopt/change admission requirements	A	A	A	A	—	A	A	—	A	—
7.	Educational Program — Add ³	A	A	A	A	—	A	A	A	A	I
8.	Educational Program — Discontinue	A	A	A	A	—	A	A	A	A	I
9.	GPA — Revise program-required GPAs	A	A	A	A	—	A	A	—	A	—
10.	Minor — Revise	A	A	A	I	—	I	I	—	I	—
11.	Minor — Add	A	A	A	A	—	A	A	—	A	—
12.	Minor — Discontinue	A	A	A	A	—	A	A	—	A	—
13.	Degree — Add	A	A	A	A	—	A	A	A	A	I
14.	Degree — Discontinue	A	A	A	A	—	A	A	A	A	I
	Change to a Degree Plan Proposed By Provost										
15.	Educational Program — Discontinue	R	—	R	A	—	A	A	A	A	I
16.	Minor — Discontinue	R	—	R	A	—	A	A	—	A	—
17.	Degree — Discontinue	R	—	R	A	—	A	A	A	A	I

¹ When an academic unit does not have a council, the UGEC and/or AUAC will serve as its academic council, depending on the nature of the issue.

² Courses that satisfy ACU's University Requirements will normally have lower-level numbering, be free of prerequisites and co-requisites, appeal to more than one or two majors, and "not narrowly focus on those skills, techniques, and procedures specific to a particular occupation or profession" (SACS 2.7.3). Departments may request exceptions to the first three criteria.

³ For undergraduate majors, a minimum of 30 hours is required. These programs must have a minimum of 6 elective hours, unless the requirements of external accrediting bodies make it impossible.

Department/School Chair(s)	
 _____ <i>Signature</i>	9/14/22 _____ <i>Approval date</i>
_____ <i>Signature</i>	_____ <i>Approval date</i>

College Academic Council(s)	
_____ <i>Signature</i>	_____ <i>Approval date</i>
_____ <i>Signature</i>	_____ <i>Approval date</i>

Dean(s)	
_____ <i>Signature</i>	_____ <i>Approval date</i>
_____ <i>Signature</i>	_____ <i>Approval date</i>

Teacher Education Council	
_____ <i>Chair's signature</i>	_____ <i>Approval date</i>

University General Education Council	
_____ <i>Chair's signature</i>	_____ <i>Approval date</i>

Abilene Undergraduate Academic Council	
_____ <i>Chair's signature</i>	_____ <i>Approval date</i>

Graduate Council	
_____ <i>Chair's signature</i>	_____ <i>Approval date</i>

Provost	
_____ <i>Signature</i>	_____ <i>Approval date</i>

Faculty	
_____ <i>Chair of Faculty Senate</i>	_____ <i>Approval date</i>

President	
_____ <i>Signature</i>	_____ <i>Approval date</i>

Application for Social and Behavioral Science Menu

Guidelines For All General Education Courses

1. All general education courses must be 100-level or above.
2. General education courses should present a breadth of knowledge, not focusing on skills, techniques, and procedures specific to a particular occupation or profession.
3. Individual courses will fulfill only a single general education requirement.
4. Courses free of prerequisites are preferred. Applications to add courses with prerequisites must provide additional evidence that the course contributes to a student's breadth of knowledge and is not specific to a particular occupation or profession.
5. Each course may appear on a maximum of two menus that accept applications (arts and humanities, cultural literacy, life and physical sciences, and social and behavioral sciences).

Social and Behavioral Science Description

Courses within this domain help students examine behavior and interactions among individuals, groups, institutions, and events to understand the complexities of social systems.

Instructions

Complete this form and submit it with a course syllabus and approval chart to the University General Education Council. Faculty submitting an application should be prepared to perform annual assessment for their course. The assessment will be based on the rubric submitted as part of this course application.

Subject code, course number, and title of course:	ENGR 350, Engineering Economics
Terms offered:	Fall
Catalog description:	Modifications submitted to councils included below: Application of economic analysis techniques to analyze and compare engineering projects or other types of investments. Topics covered include principles of economic equivalence, time value of money, analysis of investments and alternatives, comparison of alternatives, equipment depreciation and income taxes, inflation, and uncertainty, costs, and selected topics in sustainability and ethical, global, and societal needs. Prerequisite: MATH 131 or MATH 185. May be used to satisfy University Requirements.
Course prerequisites:	MATH 131 or MATH 185
Cross-listed courses: *Note: Many gen ed courses are cross-listed between the Abilene and Dallas campuses.	N/A
Other general education menus on which the course appears or you are applying for:	N/A

Description of Menu Fit

Please describe how your class fits into the Social and Behavioral Sciences Menu (200 words or less).

Engineering Economics is considered a Social and Behavioral Science at many other universities, including Baylor and Texas Tech. The purpose of engineering economic analysis is to determine whether engineering projects are viable, based on economic needs, alongside global, environmental, and societal contexts (ABET Student Outcome 4). While we feel like the course is already a good match for the SBS menu, we are changing the course description to ensure that SBS topics are continually taught, and that the course will continue to meet the SBS subject matter.

Course Content

Using your syllabus as evidence, demonstrate that either the majority of course content or the majority of graded student work adheres to the Social and Behavioral Sciences description above (200 words or less).

Case studies predominantly adhere to the SBS criteria, and make up 40% of the course grade. Additionally, SBS problems on the Exams will make up an additional 10% of the course grade. Between these two categories, 50% of graded material will address the SBS criteria.

Case studies will address A2 through economic analyses and evaluation of the claims in the study. C1 will be addressed by looking at societal, global, and sustainability requirements of the study. C2 is intrinsic to economic case studies, as they will need to perform economic analyses to draw informed conclusions.

Prerequisites

If the course has prerequisites, provide evidence that the course contributes to a student's breadth of knowledge. Also provide evidence that the course content is not specific to a particular occupation or profession (200 words or less).

Our course is designed to be accessible and helpful for not just engineering, but also business and other majors. While it does have prerequisites, those are at the 100-level. When taught at other universities, the equivalent of MATH 131 or 185 is a common prerequisite.

Relevant Outcomes

At a minimum, a course applying to the Social and Behavioral Science menu must address at least one performance indicator from each of the following areas:

- Social and Behavioral Sciences Subject Matter
- A2: Listen to, understand, and critically evaluate rhetorical claims.
- C1: Evaluate widely disparate sources of information and competing evidence to form their own reasoned positions.
- C2: Analyze quantitative data, published writing, or observable phenomena to draw informed conclusions.

Ideally, assessment will occur within one or two exams/assignments. Please indicate which exams or assignments will be used for each performance indicator. Provide assignment prompts if available.

Area to Be Assessed	Assessment Artifact
SBS subject matter	Case Study
Outcome A2	Case Study
Outcome C1	Case Study
Outcome C2	Case Study

Please use the following rubric to perform assessment each year. If a performance indicator is not assessed, please write “Not Assessed” in the “Meets Expectations” section. The last two pages have rubric examples for your reference; these pages may be deleted before submitting your application.

Social and Behavioral Science Subject Matter

Students will be able to:	Shortcomings	Meets Expectations	Points of Excellence
Understand and/or investigate behavior and interactions among individuals, groups, institutions, events, and social systems	Students fail to address one or more of the societal, global, and sustainability aspects of the study in their report.	Students address the societal, global, and sustainability aspects of the study in their report.	N/A

Student Learning Outcome A2 (select at least one)

Students will be able to:	Shortcomings	Meets Expectations	Points of Excellence
Understand intent of source	Students misinterpret one or more data, or use data in an unintended manner.	Students correctly read the case study prompt and use given information as intended.	N/A
Interpret source within rhetorical context		Not assessed.	
Evaluate relevance of source within multiple contexts		Not assessed.	

Student Learning Outcome C1 (select at least one)

Students will be able to:	Shortcomings	Meets Expectations	Points of Excellence
Compare and contrast multiple viewpoints on a topic		Not assessed.	
Develop and express an evidence-based viewpoint on a topic	Students fail to reference the evidence provided or fail to justify their viewpoint with that evidence.	Students reference the evidence provided as the rationale for their case study report.	Students find additional evidence outside of that provided as rationale for their case study report.
Synthesize information from multiple sources		Not assessed.	

Student Learning Outcome C2

Students will be able to:	Shortcomings	Meets Expectations	Points of Excellence
Read and interpret data in a form that is appropriate for the discipline	Students make one or more errors in their use of provided data.	Students correctly use provided data in their case study analysis.	N/A

Engineering Economics

Abilene Christian University

Semester and Year: Fall 20XX

Class Meeting Times and Location

Assigned class meeting time is M/W/F in Bennett 219 from 10:00 – 10:50 am.

The final exam period is scheduled for 10:00 – 11:45 am on Tuesday, Dec X, 20XX.

Required Text

The required text for this course is *Fundamentals of Engineering Economics*, 3rd edition, by Chan Park, Pearson Education, Inc, 2013, ISBN 978-0-13-277542-7.

Intended Audience

ENGR 350 is a required course for engineering majors and intended to be completed during the fall semester of the sophomore or junior year.

Contact Information

Name: TBD

Office: TBD

Email: TBD

Office Hours: TBD

I have an open door policy; if my door is open you are welcome to come in. The times listed above are when I anticipate being in my office and will make every effort to be available. At times I have to be off campus or in meetings out of my office due to other departmental and campus responsibilities; in the event you need me and do not find me in my office please send me an email and we can set up a meeting as soon as possible.

Catalog Description

Application of economic analysis techniques to analyze and compare engineering projects or other types of investments. Topics covered include principles of time value of money, analysis of investments and alternatives, uncertainty, costs, and selected topics in sustainability and ethical, global, and societal needs.

Prerequisite: MATH 131 or MATH 185. May be used to satisfy University Requirements.

TEACHING PHILOSOPHY

Engineering is a well-respected profession. The public entrusts engineers to be honest, competent, and ethical. Many codes of ethics for these fields indicate that the commitment to protecting the health, safety, and welfare of the public is of paramount importance. These values are in harmony with Christian principles and ideals. Christian engineers should be honest (Matthew 5:37), work hard to ensure competency (Colossians 3:23), and put the public's interest ahead of his or her own (Luke 6:31). In light of these principles, this course will be taught such that you will gain an appreciation for the professional nature of engineering. It will be taught so as to give you every opportunity to begin to develop competency in these fields. The instructor especially encourages the discussion of topics that would bear on integrating faith and professional responsibilities (cheating on licensure exams, weapons design and manufacture, environmental laws and employment opportunities in developing nations, etc.)

The instructor reserves the right to modify this document. The most up-to-date version of the document will be available on Canvas, and changes will announced in class and/or communicated via email.

LEARNING OBJECTIVES

After completing this course students will be able to:

- conduct analysis in order to justify or reject projects/alternatives on an economic basis, including the following tasks:
 - compute and evaluate present worth, future worth, and annual worth
 - compute and evaluate rates of return
 - compute and evaluate benefit-cost analysis
 - conduct sensitivity, break-even, and scenario analysis to assess project risk
 - create, analyze, and interpret effective spreadsheet models in Excel
- incorporate additional considerations into economic analysis, including:
 - sustainability
 - ethical considerations
 - global and societal needs
- pass the engineering economics portion of the FE exam

The activities of the course support the assessment of the following ABET Outcomes:

Criterion 3

ABET Student Outcome	Learning Objective	Measurement
SO 4 - an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts	Be able to conduct analysis in order to justify or reject projects/alternatives on an economic basis.	Homework, quizzes, case study reports, and exams
	Be able to incorporate sustainability, ethical considerations, and global and societal needs into their analysis.	Case study reports and exams

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COURSE GRADING

Each of the following grade categories is discussed in more detail below.

Homework	5% (<i>completion graded</i>)
Quizzes	10% (based on homework problems)
Exam 1 (Feb 9)	10%
Exam 2 (Mar 7)	10%
Exam 3 (Apr 11)	10%
Case studies	40% (first 10%, second and third 15%)
Final exam (May 8)	15%

Calculation of Final Course Grade*

The grading scale will be as follows:

90% and above	A
80% - 89%	B
70% - 79%	C
60% - 69%	D
59% and below	F

*Instructor reserves the right to decrease the lower bound of the grade cut-offs.

Homework

Homework will be assigned approximately weekly, and each assignment will have instructions regarding when and how it should be submitted. Late homework will not be accepted; if you cannot finish an assignment in its entirety, submit what you have completed in order to earn partial credit. Often, only a subset of questions will be graded for each homework assignment; a complete solution will be made available for study purposes. It is each student's responsibility to check his or her work for errors.

Homework is intended to be a learning tool. Students are encouraged to attempt each homework assignment on their own, and then get together with a homework partner (which may be assigned) to compare approaches. *Every student must turn in his/her own written solutions.*

Quizzes

There will be a number (at least 6) of short in-class quizzes, roughly corresponding to homework due dates. These quizzes will be closed book and closed notes, will take place at the beginning of the class period, and **no make-ups will be allowed**. While a quiz won't necessarily take place following each assignment, students should expect a quiz at this time.

Exams

There will be three in-class exams and a cumulative final exam. Students will be permitted to use limited resources (i.e. notes and/or provided reference material) during in-class exams; further instructions will be provided well in advance of each exam. Make-up exams will not be given. If a student must miss an exam for a University-approved reason, the instructor should be notified as far in advance as possible.

Case Studies

Three case studies will be assigned in which students are expected to work in a group, use real data, construct an

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effective spreadsheet model in Excel, and provide written analysis and interpretation of their results. More details forthcoming.

COURSE POLICIES

Attendance and participation

Students are responsible for anything covered in class (which may include material not in the textbook). My commitment is to make our class time meaningful; I expect each student to come prepared to think and to engage, and to be on time. If a student is absent from class, it is his or her responsibility to get the notes and class assignments before the next class meeting. Note that being tardy or absent will negatively impact a student's grade on homework and quizzes. Students are required to attend at least 80% of class meetings in order to receive credit for the course. If you miss more than 20% of the classes, you will be dropped from the class with a WF.

Classroom time will be a mix of lecture, discussion, and individual and small group activities. Participation in these (and all classroom activities) is expected, and will make for a much better class experience.

Communication

ACU email and Canvas are the two official forms of class communication. General announcements and supplementary course materials will be posted on Canvas, and Canvas will also be used to report grades. Announcements that are time sensitive will be sent via ACU email.

Classroom rules

Cell Phones should be placed on 'Silent' mode while in class. In the case of an emergency you may answer your phone and quietly leave the room and return when you have finished your call. It is not in your best interest to text while in class.

Laptops, tablets, etc. are not permitted to be used in the classroom unless they are being utilized as part of an in-class activity. Students will be provided notice ahead of time when a laptop will be beneficial to have in class.

Professional Behavior

Engineers are expected to behave in a professional manner. For the purposes of this course, professionalism means that students show up, are prepared, are engaged, treat peers and the instructor with respect (both verbally and in written communication), and do not engage in disruptive classroom activities. Disruptive activities include but are not limited to: inappropriate use of phones, computers, tablets, etc.; "sidebar" conversations during class discussions or presentations, arriving late, leaving or packing up early, and repeatedly exiting and entering the classroom.

Removal from course

The instructor reserves the right to remove from the course any student whose behavior is disruptive to the learning environment for students or faculty.

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DEPARTMENT POLICIES**Calculators**

If the course instructor determines that calculators may be used during the exams or other in-class graded activities, only NCEES approved calculators will be permitted. This is to help you begin preparing for the FE exam. Also per NCEES policy, software that simulates approved calculators will not be permitted. The NCEES policy may be reviewed at <http://ncees.org/exams/calculator-policy>. If you are unsure about your calculator, it is your responsibility to check with the instructor for approval. If you are caught using a non-approved calculator, you will not be allowed to complete the activity, and you will receive a zero for that activity (including tests).

The approved calculators include the following:

- Hewlett Packard – HP 33s, HP 35s, and no other
- Casio – All FX-115 models. Any Casio calculator must contain FX-115 in its model name.
- Texas Instruments – All TI-30X and TI 36X models. Any TI calculator must contain either TI-30X or TI-36X in its model name.

Late work: In order to assist students in developing the discipline of meeting deadlines, assignments must be turned in on time in order to receive credit. Students who are absent, for any reason and including absences for University approved activities, on the day an assignment is due should contact the instructor before the assignment is due for directions.

Engineering computation paper: All handwritten quantitative homework solutions must be submitted on engineering paper. ESA engineering paper may be purchased from ESA in Mr. Ray Smith's office. Each page should be labeled as indicated on the ESA pages, or as follows on other engineering paper:

<i>Student Name</i>	<i>Date submitted</i>	<i>Course and Assignment</i>	<i>Pg #</i>
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ACADEMIC INTEGRITY POLICY

Academic integrity is defined as academic work completed as assigned for each class by the individual or group responsible for the work. Violations of academic integrity and other forms of cheating involve the intention to deceive, mislead, or misrepresent and therefore, are a form of lying. Such actions are contrary to behavioral norms that flow from the nature of God. Academic misconduct includes, but is not limited to, the following: 1) Failing to give credit to sources used in a work in an attempt to present the work as one's own, 2) Submitting papers or projects obtained from another source (e.g., research service or club paper file) as one's own, 3) Falsifying information orally or in writing, and 4) Receiving, giving, or using unauthorized aid on an examination or quiz. Academic misconduct may result in, but is not limited to, a zero on the assignment and/or an F in the course. Additionally, the department chair, Dean of the College of Arts and Sciences, and the Dean of Student Life will be notified. See the full university policy, including how to appeal a decision, by following this link: <http://www.acu.edu/community/offices/administrative/office-of-the-provost/academic-integrity-policy.html>

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ADA COMPLIANCE STATEMENT

“Abilene Christian University is dedicated to removing barriers and opening access for students with disabilities in compliance with ADA and Section 504 of the Rehabilitation Act. The Alpha Scholars Program facilitates disability accommodations in cooperation with instructors. In order to receive accommodations, you must be registered with Alpha Scholars Program, and you must complete a specific request for each class in which you need accommodations. If you have a documented disability and wish to discuss academic accommodations, please call our office directly at 325-674-2667.”

THE MISSION OF ACU:

To educate students for Christian service and leadership throughout the world.

THE MISSION OF THE COLLEGE OF ARTS AND SCIENCES:

The College of Arts and Sciences engages students with humanity’s greatest ideas to create understanding, apply insights, and serve the world as Christian thinkers and problem solvers.

THE MISSION OF THE ENGINEERING AND PHYSICS DEPARTMENT:

The ACU engineering program strongly supports the university's mission of educating students for Christian service and leadership throughout the world. In support of this mission, ACU engineering graduates will attain:

- a deep and broad understanding of engineering principles and practices as evidenced by professional employment, continued professional development, and graduate study in engineering or other professional fields.
- an extensive knowledge of the innovative design processes unique to engineering professionals as demonstrated by using critical thinking skills to contribute to the scientific and technical literature, patents and intellectual property, professional societies, and creative designs.
- a thorough understanding of Christian service and leadership as shown in their commitments to professionalism, ethics, and service and leadership within the engineering profession, the church, and society.

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