

Approval Chart for Curriculum Changes

A = Approve I= Information Item¹ R= Advise & Respond²

Course Number Multiple - see cover memo _____ or Degree Plan(s) Bachelor of Science in Engineering
State the requested change and reason. A memo may be attached if more space is necessary.

Please contact Jeff Arrington for any questions.
jeff.arrington@acu.edu
X2209 or 325.513.0215

Circle the number that corresponds to the requested change. Degree plan changes are on the second page.

		COUNCIL ³								
	Change to a Course	Dept./School	College Academic	Deans	TEC	UGEC	UUAC	GRAD	Provost	President
	Cross list a course within the department									
1.	Title (description unchanged)	A	A	A		I			I	I
2.	Description (not affecting content)	A	A	A		I			I	I
3.	Content (substantive change)	A	A	A		I			A	A
4.	Number of hours (lecture, lab, contact)	A	A	A		A			A	A
5.	Course number within the hundred	A	A	I		I			I	I
6.	Course number beyond the hundred	A	A	A		A			A	A
7.	Prerequisites	A	A	A		I			I	I
8.	Course fee(s)	A	--	A		--			A	I
9.	From U to G or G to U	A	A	A		A			A	A
10.	Cross list with another department: U or G level	A	A	A		A			A	A
11.	Department of record	A	A	A		A			A	A
12.	Open or close a course	A	A	A		A			A	A
13.	New course — See website for application and process. This change includes combining or splitting a course(s).	A	A	A		A			A	A

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

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		COUNCIL ³										
	Change to a Degree Plan	Dept./School	College Academic	Deans	TEC	UGEC	UUAC	GRAD	Provost	Faculty	President	Board of Trustees
1.	University Requirements — Change in approved course content ⁶	A	A	A	A				A	--	A	--
2.	University Requirements — Add or drop a required course from the University Requirements chart ⁶	A	A	A	A				A	A	A	--
3.	University Requirements — Add or drop a course from a menu within the University Requirements ⁶	A	A	A	A				A	--	A	--
4.	University Requirements — Change hours within a menu on the University Requirements chart ⁶	A	A	A	A				A	A	A	--
5.	Major — Revision of major ^{4,5}	A	A	A	A				A	--	A	--
6.	Major — Adopt or change admission requirements	A	A	A	A				A	--	A	--
7.	Major — Add ^{4,5}	A	A	A	A				A	A	A	I
8.	Major – Discontinue (proposed by the department or college)	A	A	A	A				A	A	A	I
9.	Major – Discontinue (proposed by the Provost)	See below.										
10.	GPA — Revise major or cumulative requirement	A	A	A	A				A	A	A	--
11.	Minor — Revise course selection	A	A	A	I				I	--	I	--
12.	Minor — Add	A	A	A	A				A	--	A	--
13.	Minor – Discontinue (proposed by the department or college)	A	A	A	A				A	--	A	--
14.	Minor – Discontinue (proposed by the Provost)	See below.										
15.	Degree — Add	A	A	A	A				A	A	A	I
16.	Degree – Discontinue (proposed by the department or college)	A	A	A	A				A	A	A	I
17.	Degree – Discontinue (proposed by the Provost)	See below.										
18.	Any change to a graduate degree program	A	A	A	A				A	--	A	--

COUNCIL ³										
	Provost-Proposed Change	Provost	Department	Dean	TEC	UUAC	Graduate	Faculty	President	Board of Trustees
1.	Major/Graduate Program – Discontinue (proposed by the Provost)	A	R	R	A			A	A	I
2.	Minor – Discontinue (proposed by the Provost)	A	R	R	A			--	A	--
3.	Degree – Discontinue (proposed by the Provost)	A	R	R	A			A	A	I

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COUNCIL³

	Change to the Catalog Information	Dept./School	College Academic	Deans	UGEC	UUAC	GRAD	Provost	Faculty	President
1.	General requirements for graduation including course requirements that are common to all majors for all degrees ⁷	--	I	--		A		A	A	A
2.	Admission requirements	--	--	--		A		A	A	A
3.	Policies governing academic probation and suspension	--	--	--		A		A	A	A
4.	Requirements for graduating with honors	--	--	--		A		A	A	A
5.	Other academic policy changes	--	--	--		A		A	--	A

¹ Councils may request additional information about “Information” items. These items are approved as “Consent Agenda.”

² The Dean and Department should respond to the Provost’s recommendation to close a program in writing. Advise & Respond (R) requires that the voting body should receive the written responses at least one week prior to the vote.

³ All courses that meet University Requirements for general education must go through UGEC. Courses or degrees offered only to students seeking teacher certification must go through the Teacher Education Council. All undergraduate changes must go before the UUAC. All graduate degree plan changes must go through the Graduate Council.

⁴ A minimum of 30 hours is required for a major. A maximum is specified for each degree (e.g., BA, BS). The university minimum for elective hours is 6, unless the requirements of external accrediting bodies make it impossible.

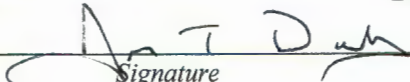
⁵ Program or course changes that apply to any major that includes Teacher Certification will be reviewed by the college, the Teacher Education Council (TEC), and then the UUAC.

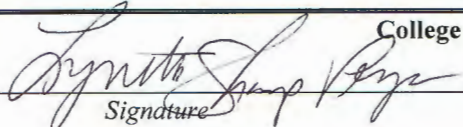
⁶ Courses that satisfy ACU’s University Requirements (General Education) will normally have lower-level numbering, be free of prerequisites and co-requisites, appeal to more than one or two majors, and “not narrowly focus on those skills, techniques, and procedures specific to a particular occupation or profession” (SACS 2.7.3). Departments may request exceptions to the first three criteria.

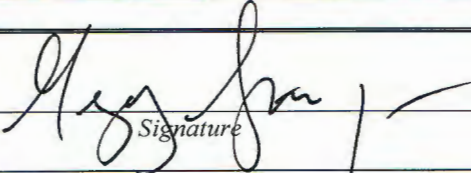
⁷ The UUAC approved the clarification that “general requirements for graduation” means the enumerated items in the “General Requirements for Bachelor’s Degrees” section of the catalog.

Revised 10-16-13

Curriculum/Catalog Changes Signature Page

Department/School Chair(s)	
 Signature	4/21/2015 Approval date
_____ Signature	_____ Approval date

College Academic Council(s)	
 Signature	4-23-15 Approval date
_____ Signature	_____ Approval date

Dean(s)	
 Signature	4/23/15 Approval date
_____ Signature	_____ Approval date

Teacher Education Council	
_____ Chair's signature	_____ Approval date

General Education Council	
_____ Chair's signature	_____ Approval date

Undergraduate Academic Council	
_____ Chair's signature	_____ Approval date

Graduate Council	
_____ Chair's signature	_____ Approval date

Provost	
_____ Signature	_____ Approval date

Faculty	
_____ Chair of faculty senate	_____ Approval date

President	
_____ Signature	_____ Approval date

College of Arts and Sciences

ABILENE CHRISTIAN UNIVERSITY

To: CASAC Members and Chair

From: Jeff E. Arrington, Ph.D.
Associate Dean
Director of Engineering

Date: April 10, 2015

Re: Council actions requested

This cover memo serves as introduction for (I) a significant revision of the degree plan for the Bachelor of Science in Engineering, (II) submission of 12 new engineering courses, (III) a request to include one of the new courses in the list of courses that may be taken to satisfy the Social Science/Fine Arts/Humanities requirement (pg 40 of current catalog), (IV) changes to four existing courses and (V) an expansion of the math and science courses that a student may choose as a "math or science selection." The curriculum outlined in this memo will be proposed for accreditation of the engineering program in a self-study to be completed during the spring, 2016 semester and submitted to ABET by July 1, 2016.

I. Degree Plan

- A. ABET requires 32 hours of math/science (not engineering) and 48 hours of engineering in order to accredit a plan of study. We have been advised to prepare a curriculum that exceeds the number of engineering hours in case some of the courses we propose as "engineering" are not accepted by our accreditation team. This degree is in general engineering (a BS in Engineering, as opposed to a BS in Mechanical Engineering), but each student will choose 14 hours of engineering coursework in consultation with his or her advisor.
- B. The degree plan requires at least 45 hours of advanced coursework. Though not under the purview of the CASAC, the proposed curriculum satisfies university requirements for a capstone experience and for inclusion of a Writing Intensive course.
- C. The degree plan is presented through a side-by-side listing of the current and proposed degree plans.

II. New Courses Submitted for Approval

- A. All courses submitted for approval are either required of all students, or are included in the set of elective courses that students can choose to provide depth in an engineering discipline (mechanical or electrical).
- B. New courses
 - (1) ENGR 210/211 Digital Logic/Lab
 - (2) ENGR 320 Material Science
 - (3) ENGR 334 Heat and Mass Transfer
 - (4) ENGR 350 Engineering Economics
 - (5) ENGR 355/356 Electronic Devices/Lab
 - (6) ENGR 390 Junior Clinic

- (7) ENGR 422/423 Embedded Systems/Lab
- (8) ENGR 434 Fluid Thermal Systems
- (9) ENGR 430 Senior Clinic 1
- (10) ENGR 431 Senior Clinic Studio 1
- (11) ENGR 432 Senior Clinic 2
- (12) ENGR 433 Senior Clinic Studio 2

III. Proposal for inclusion in general education menu

It is proposed to include ENGR 350 Engineering Economics in the list of courses that satisfy the SS/FA/H requirement for all students as found on page 39 in the current catalog.

A. **Course Description**

- (1) This course will equip students to analyze and compare engineering projects or other types of investments using basic economic analysis techniques. Topics covered include principles of economic equivalence, time value of money, analysis of investments, comparison of alternatives, equipment depreciation and income taxes, inflation, and uncertainty. **Prerequisites: MATH 185 or MATH 131.**
Credit hours: 3.

B. **Rationale**

The rationale for this proposal is developed in light of the "UGEC Criteria for Social Science Menu" as revised on 3.24.2014. (A copy of this document is in the ENGR folder shared with council members.)

(1) **With regard to the general criteria:**

MATH 185 or MATH 131 is listed as a required course for all majors from the College of Business Administration, and for all majors from the College of Arts and Sciences in the departments of Chemistry and Biochemistry, Engineering and Physics, and Mathematics. The courses are listed alternatives for some majors in the departments of Biology and Kinesiology and Nutrition. Thus, while the course does have prerequisites, the listed prerequisites do not appear to excessively narrow the pool of qualified and/or potentially interested students to one or two majors. In reference to SACS criteria 2.7.3, this course introduces students to the analysis and comparison of any project that proposes to produce return on the investment of time or money. Thus, any graduate who finds himself/herself in the leadership position of choosing or recommending the best solution from many available solutions would benefit from the course.

(2) **With regard to the enumerated Social Sciences criteria:**

- 1. In reference to criteria 1, this course falls within the discipline of economics.
- 2. In reference to criteria 2, this course considers the investment of human and financial resources held by individuals or organizations for the purposes of achieving the purposes of the individual or organization in an efficient and effective manner. Thus, this course explores means of assessing how people and organizations use available resources to produce goods and services. This meets Definition 2b.
- 3. In reference to criteria 3a, the course description "Topics covered include principles of economic equivalence, time value of money, analysis of investments, comparison of alternatives, equipment depreciation and income taxes, inflation, and uncertainty." affirms that this course will "introduce students to the discipline within the social sciences (economics), with an emphasis on its basic methods of inquiry, ... , key concepts and key terminology and (some of) the major topics common to the discipline" as required by the 3rd UUAC social sciences criteria.

C. **Conclusion**

The content and goals of this course satisfy required elements of the UGEC criteria and the number of

students who will satisfy the math prerequisites in the process of satisfying the general education math requirements of their degree plans warrant council exception to the appealable criteria.

IV. Proposed changes to existing courses

- A. ENGR 115 Introduction to Engineering and Physics (the associated lab, ENGR 116, will not be changed)
 - (1) Reduce from 3 credit hours to 2 credit hours
 - (2) Rationale - After teaching the course for two years and evaluating the time necessary to deal with the intended topics, the faculty teaching this course have recommended reduction of the lecture portion of this course from 3 hrs to 2 hrs. The meeting schedule for ENGR 115 will be adjusted to two 50-minute periods per week. Content, requirements, learning outcomes, etc. will remain unchanged.
- B. PHYS 481 Thermodynamics
 - (1) Change course description
Fundamental concepts of thermodynamic systems. Law of thermodynamics, properties of simple compressible substances, entropy, energy availability, ideal gas mixtures and psychometrics, and thermodynamic cycles. Application to engines, refrigeration systems and energy conversion.
 - (2) Existing course PHYS 481 Thermodynamics, cross-listed to ENGR 481 Thermodynamics
- C. PHYS 342 Instrumentation
 - (1) Change name to Measurement Techniques.
 - (2) Change course description to
An introduction to transducers for measuring physical phenomena such as temperature, pressure, and acceleration. Signal processing and statistical concepts related to measured variables are also included. Prerequisites: PHYS 222, MATH 361. Concurrent enrollment in PHYS 343 required. (3 hours)
 - (3) Existing course PHYS 342 Measurement Techniques cross-listed to ENGR 342 Measurement Techniques. The course description is the same as C(2), except that concurrent enrollment in ENGR 343 is required.
- D. PHYS 343 Instrumentation Lab
 - (1) Change name to Measurement Techniques Lab.
 - (2) Change course description to
A laboratory introduction to transducers for measuring physical phenomena such as temperature, pressure, and acceleration. Signal processing and statistical concepts related to measured variables are also included. Prerequisites: PHYS 222, MATH 361. Concurrent enrollment in PHYS 342 required. (1 hour)
 - (3) Existing course PHYS 343 Instrumentation Lab cross-listed to ENGR 343 Measurement Techniques Lab. The course description is the same as D(2), except that concurrent enrollment in ENGR 342 is required.

V. Expansion of math and science courses a student may choose.

ABET requires a student to complete 32 credit hours in math and science (not engineering). In order to provide maximum flexibility to students, the menu of available courses has been adapted to include the following: Math 325, 341, 377, 463; BIOL 112 or above, excluding 203; CHEM 114 or above, excluding 203; and PHYS above 331, excluding 335/336, 342/343, 379, 388 and 401. Courses excluded generally include pedagogy oriented courses or courses already included in the degree plan.

2014-2015 Catalog

BS: ENGINEERING DEGREE PLAN (ENGR)	
UNIVERSITY REQUIREMENTS	
Please see the University Requirements section of this catalog (page 39).	
MAJOR REQUIREMENTS	
Engineering Physics	
PHYS 220 Engineering Physics I	(3) ¹
PHYS 221 Engineering Physics I Laboratory	(1) ¹
PHYS 222 Engineering Physics II	(3) ¹
PHYS 223 Engineering Physics II Laboratory	(1) ¹
Engineering	
ENGR 115/116 Introduction to Engineering and Physics	4
ENGR 220 Engineering Mechanics: Statics	3
ENGR 222 Engineering Mechanics: Dynamics	3
ENGR 335/336 Introduction to Electronics Lecture/Lab and ENGR 342/343	6
Fluid Dynamics, Mechanics of Materials, ENGR 481	9
Choose 5 from ENGR 200-499	15
ENGR 430 Capstone/Design I	4
ENGR 432 Capstone/Design II	4
Physics	
PHYS 330/331 Modern Physics Lecture/Lab	4
Philosophy	
PHIL 379 Philosophy, Religion and Science	(3) ¹
Mathematics	
MATH 185 Calculus I	(3) ¹
MATH 186 Calculus II, 286 Calculus III, 361 Ordinary Differential Equations	9
Math/Science Selections	
College Level Math, Chemistry, Physics, or Biology	8
Economics	
ECON 261 Principles of Microeconomics	(3) ¹
Design	
DSGN 232 Digital Design Communication	3
TOTAL	72
¹ Hours (in parenthesis) may also fulfill university requirements and are not included in total major hours	
ELECTIVES	
Minimum	0
TOTAL MAJOR HOURS	72
OTHER GRADUATION REQUIREMENTS	
Minimum grade for PHYS or ENGR	C
Minimum GPA for graduation	2.00
Minimum advanced hours	33
Minimum total hours	128
<i>Courses numbered 0** do not count in minimum hours required for degree.</i>	

Proposed

BS: ENGINEERING DEGREE PLAN (ENGR)	
UNIVERSITY REQUIREMENTS	
Please see the University Requirements section of this catalog (page 39).	
MAJOR REQUIREMENTS	
Chemistry	
CHEM 133/131 General Chemistry I and Laboratory	4
Engineering	
ENGR 115 Introduction to Engineering and Physics	2
ENGR 116 Introduction to Engineering and Physics Lab	1
ENGR 131 Computer Aided Design and Modeling	3
ENGR 135 Circuits	3
ENGR 136 Circuits Lab	1
ENGR 220 Engineering Mechanics: Statics	3
ENGR 222 Engineering Mechanics: Dynamics	3
ENGR 305 Environmental and Health Safety	2
ENGR 306 Ethics	1
ENGR 333 Fluid Mechanics	3
ENGR 342 Measurement Techniques	3
ENGR 343 Measurement Techniques Laboratory	1
ENGR 350 Engineering Economics	(3) ¹
ENGR 390 Junior Clinic	3
ENGR 430 Senior Clinic 1	3
ENGR 432 Senior Clinic 2	3
ENGR 481 Thermodynamics	3
Engineering Electives	
Selected in consultation with advisor	14
Mathematics	
MATH 185 Calculus I	(3) ¹
MATH 186 Calculus II, 286 Calculus III, 361 Ordinary Differential Equations	9
Math/Science Selections	
Choose from the following	4
MATH 325, 341, 377, 463	
BIOL 112 or above, excluding 203	
Chem 114 or above, excluding 203	
PHYS above 331, excluding 335/336, 342/343, 379, 388 and 401	
Philosophy	
PHIL 379 Philosophy, Religion and Science	(3) ¹
Physics	
PHYS 220 Engineering Physics I	(3) ¹
PHYS 221 Engineering Physics I Laboratory	1
PHYS 222 Engineering Physics II	(3) ¹
PHYS 223 Engineering Physics II Laboratory	1
PHYS 330 Modern Physics	(3) ¹
PHYS 331 Modern Physics Laboratory	1
TOTAL	72
¹ Hours (in parenthesis) may also fulfill university requirements and are not included in total major hours	
ELECTIVES	
Minimum	0
TOTAL MAJOR HOURS	72
OTHER GRADUATION REQUIREMENTS	
Minimum grade for PHYS or ENGR	C
Minimum GPA for graduation	2.00
Minimum advanced hours	33
Minimum total hours	128
<i>Courses numbered 0** do not count in minimum hours required for degree.</i>	