Abilene Christian University

Application for a New Course v9

Course ID *Subject and Number*	ENGR 116
Date APPROVED	
Date DENIED	

I. Systems and Catalog Information Complete each item.

1	Course Developer	Kenneth Olree
2	Course Teacher	A member of the Engineering & Physics Department faculty
3	Course Title	Introduction to Engineering and Physics Laboratory
4	Course Abbreviation (if title is over 30 characters)	Intro to Engr. & Physics Lab
5	College	College of Arts and Sciences
6	Department	Engineering and Physics
7	Number of Credit Hours	1
8	Is the course Fixed Credit or Variable Credit?	Fixed
9	Is the course repeatable?	No
10	Maximum number of times course may be repeated	Zero
11	Maximum number of hours credit	1
12	Explanation for variable credit	N/A
13a	Course contact hours - LEC	0
13b	Course contact hours - Lab	3
13c	Course contact hours - Practicum	0
13d	Course contact hours - Seminar	0
13e	Course contact hours - Studio	0
13f	Course contact hours - Online	0
13g	Course contact hours - Colloquium	0
13h	Course contact hours – Field Experience	0
13j	Course contact hours - Internship	0
13k	Course contact hours - Research	0
13m	Course contact hours - Workshop	0
13n	Course contact hours – Other (specify)	0
14	Instructor Workload	3
15	Grade Mode (check all appropriate):	_**X**_ Standard ___ Credit/No Credit (undergrad only)
16	Maximum Enrollment	20
17	**Catalog Description** (50 words or less)	A laboratory class demonstrating and exploring topics covered in ENGR 115. Physical concepts such as force, work, and energy will be illustrated as well as using these concepts within engineering design.

18	List any prerequisites (course/s, test scores, class standing, major, etc.)	MATH 124 or concurrent enrollment
19	List any co-requisites	ENGR 115
20	If the course is cross listed, specify the Course ID(s) MUST have signature in Section V off all Department Chairs	
21	Does this course have any special student costs? Yes/No *Attach a completed "Request to Add or Change Course Fees" form.* *Describe in section IV-F.*	No
22	How often will it be offered? **Fall**	Offered
23a	How often will it be offered? **Spring**	Not offered
23b	How often will it be offered? **Summer**	Not offered
23c	How often will it be offered? **Fall**	Offered
24	Frequency?	Every Year
25	First semester this course will be offered *New courses may not be taught under their approved course ID until they appear in the catalog, therefore, no earlier than the coming fall.*	Fall 2014
26	List course/s that should be deleted, include the last semester for course/s being deleted *A course cannot be deleted when it is a requirement in a degree plan in any department.*	None
27	Is this course required for a degree/s? Yes/No *If "Yes," attach a revised degree plan(s) reflecting the placement of the new course.*	Yes. Degree plan is unchanged. Engineering is a new program and this course already exists in the engineering and physics degree plans (see attached pages of 2013-14 catalog). This application is to formally add the course to the catalog.
28	Has this course been offered as a Special Topics course? Yes/No *If "Yes," specify the Course ID and enrollment for each term it was taught.*	Yes. ENGR 140 L1,L2,L3,L4 – Fall 2012, Total Enrollment 36; ENGR 140 L1,L2,L3 – Fall 2013, Total Enrollment 72.
29	List any courses in which content overlaps the proposed course. (Course ID and Name) *Attach statement from instructor/dept chair of existing course justifying the new offering in Section IV-D.*	None

II. Curriculum

1	**Degree Plan** Explanation of how this course affects degree requirements.	This course does not affect degree requirements. It is already included in the catalog degree plans for engineering and physics (see attached pp. 62-64, 2013-14

		catalog). This application is simply to formally add the course to the catalog, along with the appropriate content information, prerequisites, etc.
2	**Justification** State the justification for adding this course to the current curriculum. Represent the need	This course is already a required part of the degree plan. This application is to formally add the course to the catalog.

III. Course Design

1. Audience and Course Goal

1	Describe the intended audience, including prerequisite skills.	This course is required of all engineering and physics majors. It is primarily intended to be taken in the freshmen year to orient the students to basic engineering and physics concepts. Prerequisite skills are that students have had (or are currently enrolled in) MATH 124 or its equivalent.
2	State the overarching course goal(s) in performance terms.	1) Students will understand physical concepts such as forces, work, and energy. 2) Students will develop skills to conduct and analyze data from experiments. 3) Students will understand the advantages and disadvantages of using physical models. 4) Students will gain experience and appreciation of the engineering design process.

2. Competencies and Measurements

	Competency	**Measurement**
1	Understand physical concepts such as forces, work, energy and conservation laws.	Lab Reports
2	Use engineering and physics tools to collect, analyze, and present data.	Lab Reports
3	Appreciate the role of teamwork in experiments and engineering design.	Group participation, Design Project, Oral Report
4	Appreciate real world constraints in the engineering design process.	Design Project, Oral Report
5	Understand the importance of using computer aided design to create designs and solve real problems.	CAD assignment, Design Project
6		
7		

3. Text and Resources

1. Give the full publication information of the textbook/s and other required resources and outside readings.

   No text is required for this laboratory course. Assignments and instructions were developed by instructors when the class was taught under the special topics designation ENGR 140 L.

   Required Software: Matlab® (The MathWorks, Inc.)

2. For **combined undergraduate/graduate** courses, make two lists:
   a. full publication information; label **Undergraduate**.
   b. full publication information; label **Graduate**. Indicate number of pages required.

IV. Supporting Documentation

Supporting documents must accompany proposal prior to preliminary approval by chair and dean.

	1	**Library** — Submit new course application and syllabus to the Director of the Library. Consult with the director and establish a deadline for completion of the library report. **Attach** the signed copy of the library director's report.
	2	**Instructional Design** — The application and syllabus must be reviewed by the Adams Center. **Attach** a copy of the Adams Center Review Letter.
	3	**Degree Plan** — The impact of the course must be reviewed by the Director of Curriculum. **Attach** degree plan signed by the Director of Curriculum.
	4	**Content Overlap** — Include one document for each course you listed in Section I-I. **Attach** statement from instructor/dept chair of existing course justifying the new offering.
	5	**Departmental Resources** — List the resources that support the course and are available only through the department, if applicable. **Attach** the list of the holdings and the location/s.
	6	**Resources** — List resources (other than library or departmental resources) that are needed to support this course (computers, lab equipment, other technology, etc.). **Attach** a complete list of all items and indicate possible sources or estimated cost of each. List the sources of any needed funds.
	7	**Expenses** — List additional expenses needed to implement this course (full-time or part-time faculty, graduate or lab assistants, student employees, travel, special student costs, room renovation, storage facility, etc.). **Attach** a complete list of all items, the estimated cost of each and the source of the funds.
	8	**Justification** — **Attach** all documents referred to in Section II-2
	9	Syllabus — **Attach** the syllabus for the course based upon the anticipated first-semester offering.
	10	Provide documentation for all additional attachments here

V. Preliminary Approvals

All supporting documentation has been assembled and attached to this application. I believe this course is ready to be presented to appropriate councils. We have a plan to fund this new course.

Primary Department

Department Chair

4-2-14

Date

Dean of the College

4-2-14

Date

Cross-listing Department *Add more lines if multiple departments are cross-listing*

Department Chair

Date

Dean of the College

Date

Cross-listing Department *Add more lines if multiple departments are cross-listing*

Department Chair

Date

Dean of the College

Date

VI. Approvals *Place all approvals on one page.*

A. Course ID: ENGR 116

Course Title: Introduction to Engineering and Physics Laboratory

1. **College Academic Council Action**: (for all courses)
   Note: Insert additional lines for College Academic Council action for each college involved in cross-listed courses.

Approved X Denied ___ _____ 4-2-14
College Dean or Director Date

Approved ___ Denied ___ _____ _____
College Dean or Director Date

2. **Graduate Council Action**: (for graduate level courses)

Approved ___ Denied ___ _____ _____
Dean of Graduate School Date

3. **University Undergraduate Academic Council Action**:
   For undergraduate level courses only

Approved ___ Denied ___ _____ _____
Associate Provost Date

4. **University General Education Council Action**: (when applicable)

Approved ___ Denied ___ _____ _____
Provost or designee Date

5. **University Budget Committee Action**: (when applicable)
When applicable – see New Course Application Instructions

Approved ___ Denied ___ _____ _____
Chair, University Budget Committee Date

6. **Academic Provost Action**: (for all courses)

Approved ___ Denied ___ _____ _____
Provost Date

7. **President of the University Action**: (for all courses)

Approved ___ Denied ___ _____ _____
President Date

Attach notes, comments, or conditions from appropriate councils:

Introduction to Engineering & Physics Laboratory
ENGR 116, Section 01
Abilene Christian University
Fall 2014

Course Description
This is a laboratory course demonstrating and exploring physical concepts such as force, work, energy, and conservation laws, and using these concepts within engineering design. This course will help to develop the hands on skills engineers and physicists need for collecting, analyzing, and presenting data. Tools common to engineers and physicists will be introduced and used to learn about how physical phenomena are used within the engineering design process. Matlab and Excel will be used for both problem solving, modeling, and design. Prerequisites: Concurrent enrollment in MATH 124 or higher. Credit hours: 1.

Class Meeting Times and Location
This class meets Mondays from 2:00 p.m. to 4:50 p.m. in Brown Library, Room 231. Concurrent enrollment in the accompanying course (ENGR 115) is also required.

Required Software
The required software package for this course is Matlab® (The MathWorks, Inc.) and can be obtained at http://www.mathworks.com/academia/student_version/index.html or purchased in the bookstore.

Catalog Description
A laboratory class demonstrating and exploring topics covered in ENGR 115. Physical concepts such as force, work, and energy will be illustrated as well as using these concepts within engineering design.

Contact Information

Name:	Dr. Kenneth Olree, Associate Professor of Engineering
Office:	Foster Science 317
Phone:	325-674-2165
Email:	kenneth.olree@acu.edu
Office hours:	Daily 8-10 a.m. Additional office hours can be arranged as needed.

Teaching Philosophy
Engineering and physics are well respected professions. The public places great trust in these professionals being 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 and physics. It will be

taught so as to give you every opportunity to begin to develop competency in these fields. This will require lab participation and interaction with your classmates, professor, and teaching assistants.

Learning Objectives
In this course students will learn to: understand physical concepts such as forces, work, and energy; develop the skills needed to collect, analyze and present data, appreciate and experience the engineering design process, and to understand the advantages and disadvantages of using physical models for problem solving. Students will also learn to use Matlab and Excel for modeling problems and creating designs. The degree to which you achieve these objectives will be measured using lab reports, a design project, group participation in labs and in the design project, and an oral report.

Competencies
By the end of this course students will be able to:
1) understand physical concepts such as forces, work, energy, and conservation laws.
2) use engineering and physics tools to collect, analyze, and present data.
3) appreciate the role of teamwork in experiments and engineering design.
4) appreciate real world constraints in the engineering design process.
5) understand the importance of using computer aided design to create designs and solve real problems.

These competencies will be assessed using lab reports, observation of group participation, a design project, CAD assignment, and oral report.

Student Conduct Policy
Students are expected to show respect for one another, the professor, and for Abilene Christian University property and to adhere to the "Student Regulations" as stipulated in the ACU Catalog and Student Handbook. Cheating, lying, and other forms of academic misconduct are incompatible with Christian faith and action. Sanctions up to and including dismissal from the lab with a failing grade may be imposed for engaging in these actions. Students are also expected to adhere to the dress code policy as outlined in the ACU Student Handbook. Failure to adhere to the dress code may result in an unexcused absence and lab grade of zero for each offense. Repeated failure to adhere to these standards may result in a grade reduction or course withdrawal and/or other actions as deemed appropriate and consistent with ACU guidelines.

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) Failure to give credit to sources used in a work in an attempt to present the work as one's own, 2) Submission of papers or projects obtained from another source (e.g., research service or club paper file) as one's own, and 3) Falsifying information orally or in writing. 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/campusoffices/studentlife/judicialDocuments/AcademicIntegrityPolicy.pdf.

Attendance Policy
Your attendance and participation in lab is crucial to your success this semester. Therefore you are expected to attend every session except for university-approved absences. Contact your professor immediately if you know you will be absent. Under extreme emergencies it may be possible to arrange for you to attend another lab section during the same week. Labs turned in late may result in a grade of zero for that lab. *If you miss lab and have not contacted your professor, you will receive a zero for any work given that day.*

Class Participation Policy
To receive full credit for any grade you must arrive on time, be prepared to work, make efficient use of your time during lab, participate in group projects, and be responsible for cleaning up your lab station when finished. It is not appropriate to wear headphones, send emails or texts, or check FaceBook during lab. During group projects, we reserve the right to give any individual a lower grade than the rest of the group for not making adequate contributions to the project.

Grading Policy
There will be two types of grades: weekly lab work and the group project. Weekly lab work consists of lab reports, programming assignments (simulations), and other activities. Weekly lab work will consist of 75% of your final course grade. The group project will consist of several weeks of design, planning, simulation, building, testing, and presenting the final results. This project will provide 25% of your final course grade.

The final course grade will be weighted and assigned as follows:

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

The grade you earn in lab is separate from the grade you earn in the lecture section of ENGR 115.

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.

Tentative Course Schedule

While every effort will be made to closely follow this schedule, there may be a need to deviate from it. The instructor reserves the right to alter this schedule to best achieve the objectives of the lab.

Week #1
Mon., Aug. 25 – Lab Intro / Modeling Biomedical Problems in Matlab (no assignment)

Week #2
Mon., Sept. 1 - Intro to Matlab / Working from the Command Line / Simple Operations (Complete Matlab tutorial handout for lab report, due at end of lab)

Week #3
Mon., Sept. 8 - Intro to Programming in Matlab (Complete Matlab programming handout for lab report, due at beginning of lab period next week)

Week #4
Mon., Sept 15 – Intro to Excel (Complete Excel handout for lab report, due at beginning of lab period next week)

Week #5
Mon., Sept. 22 - Potential and Kinetic Energy (Complete lab handout for lab report, due at the end of lab)

Week #6
Mon., Sept. 29 – Hooke's Law (Complete lab handout for lab report, due at the beginning of lab next week)

Week #7
Mon., Oct. 6 - Projectile Motion (Complete lab handout for lab report, due at the end of lab next week)

Week #8
Mon., Oct. 13 - Projectile Motion / Angry Bird Launcher Design (Finish the lab handout from week #7 and turn in by the end of this lab, design Angry Bird Launcher by the end of this lab, Purchase needed supplies for week #9 lab, due at the beginning of lab next week)

Week #9
Mon., Oct. 20 - Build Angry Bird Launcher (bring purchased supplies to lab and build your Angry Bird Launcher, due by start of lab period next week)

Week #10
Mon., Oct. 27 - Angry Bird Launcher Competition (be ready to compete in the competition, start the disassembly of your launcher following the competition)

Week #11

Mon., Nov. 3 - Oral Reports Regarding the Design, Build, and Test of the Angry Bird Launchers (to be given during the lab period, you must be present for all reports)

Week #12

Mon., Nov. 10 - Christmas Ornament Design using 3D printer (Complete the CAD assignment to create a Christmas ornament on the 3D printer, complete and turn in as soon as possible, but not later than 5:00 p.m. on the Tuesday of Thanksgiving week)

Week #13

Mon., Nov. 17 - Truss Design with Constraints (Complete the truss handout and use the laser engraver to cut out truss for testing during week 15, complete and turn in as soon as possible, but not later than 5:00 p.m. on the Tuesday of Thanksgiving week)

Week #14

Mon., Nov. 24 - Thanksgiving week – No official lab, but you can use this time to finish disassembly of your Angry Bird Launcher, finish your Christmas ornament, or finish cutting your truss design).

Week #15

Mon., Dec. 1 - Truss test (be ready to load your truss until the point of failure, completed during the lab period)

ABILENE CHRISTIAN UNIVERSITY

LIBRARY

M E M O R A N D U M

DATE: 03-02-2014

TO: Dr. Ken Olree

FROM: Mark McCallon, Associate Dean for Library Services

RE: New Course Proposal, ENGR 116 - Intro to Engineering and Physics Lab

The library has examined the course proposal and is able to support the proposed course. Thank you for letting us review the course application.

service agencies, management, criminal justice, community research, gerontology, public relations, medical facilities, church ministries, case workers, lobbyists, community planning, public school teaching, legal offices, public/social policy, and numerous others.

Many undergraduates in sociology pursue their master's and doctorates in specialized fields of sociology. Others use their sociology training in diverse graduate fields such as community studies and development, family therapy, social work, urban planning, church ministry and missions. Sociology also provides excellent preparation for law school by exposing students to critical thinking and research skills, interpersonal and organizational dynamics, and social policy issues.

SOCIOLOGY (BS)

BS: SOCIOLOGY DEGREE PLAN (SOCI)	
UNIVERSITY REQUIREMENTS	
Please see the University Requirements section of this catalog (page 40).	
MAJOR REQUIREMENTS	
Sociology	
SOCI 111 Introduction to Sociology	(3)[1]
SOCI 385 Social Theory (writing-intensive course)	3
SOCI 415 Social Research (writing-intensive course)	3
SOCI 416 Social Statistics	3
SOCI 498 Sociological Practice I	3
BIBP 486 Ethics	(3)[1]
Choose eight from: ECON 438, PSYC 370, SOCW 329, SOCI 350, SOCI 355, SOCI 362, SOCI 380, SOCI 388, SOCI 410, SOCI 477, SOCI 480	24
TOTAL	**36**
[1]Hours (in parentheses) may also fulfill university requirements and are not included in total major hours	
ELECTIVES	
Minimum	36
TOTAL MAJOR HOURS	**72**
OTHER GRADUATION REQUIREMENTS	
Minimum grade for each course in major	C
Minimum GPA in major	2.25
Minimum GPA for graduation	2.00
Minimum advanced hours	33
Minimum total hours	128
*Courses numbered 0** do not count in minimum hours required for degree.*	

Minor in Sociology

MINOR: SOCIOLOGY (SOCI)	
SOCI 111 Introduction to Sociology	3
SOCI 385 Social Theory	3
SOCI 415 Social Research (writing-intensive course)	3
Choose from: SOCI 300-499	9
TOTAL	**18**

CERTIFICATE IN GERONTOLOGY (BS)

The undergraduate Certificate of Studies in Gerontology requires 15 semester hours. See the *Gerontology* section in *Interdisciplinary Programs* for specific requirements (page 122).

Course Descriptions

Please see the *Course Descriptions* section of this catalog (page 163). Courses offered by the Department of Communication and Sociology include those with the following designations: COMS, FAM, GERO, SOCI.

Engineering and Physics

Rusty Towell, *Chair*
ACU Box 27963
Abilene, Texas 79699-7963
Foster Science Building, Room 317

Phone: 325-674-2165
Fax: 325-674-2146
Email: rusty.towell@acu.edu
Web: www.acu.edu/physics

Faculty
Jeff E. Arrington, *Associate Professor*
Michael Daugherity, *Assistant Professor*
Jess Dowdy, *Associate Professor and Assistant Department Chair*
Tim Head, *Associate Professor*
Donald Isenhower, *Professor*
Paul Edwin Morris, *Professor*
Kenneth Olree, *Associate Professor*
Michael Ervin Sadler, *Professor*
Rusty Towell, *Professor*
Joshua Willis, *Assistant Professor*

Majors and Tracks:
Applied Physics (BS)
Computational Physics (BS)
Engineering (BSE)
Engineering Science (BS)
Engineering Physics (BS)
Electrical Engineering (Cooperative)
Industrial and Manufacturing Systems Engineering (Cooperative)
Physics (BS)
High School Teacher Certification - Physics and Mathematics (BS)

Minors: Engineering Science
Physics

The Department of Engineering and Physics offers three different Bachelor of Science (BS) degrees and a Bachelor of Science in Engineering (BSE) degree. The BS degrees are awarded for majors in Physics, Engineering Science (Cooperative), and Physics and Math Teaching. The Physics major has four tracks: Physics (PHYS), Applied Physics (PHYA), Engineering Physics (PHYN), and Computational Physics (PHYC). The BSE degree is awarded for the Engineering major. The department works with the Department of Teacher Education and the Department of Chemistry and Biochemistry to offer teacher certification in physical science (see the *Chemistry and Biochemistry* section of this catalog, page 54). A minor in engineering science or physics may be added to other majors.

Introduction

In the Abilene Christian University Department of Engineering and Physics, students share in an intellectual atmosphere that promotes the growth of individual abilities. The faculty and students in engineering and physics do not confine learning to the classroom, but rather join in a broad spectrum of activities that includes doing basic research, completing engineering internships, teaching in the laboratory, participating in national student organizations and working in the astronomical observatory.

Many of our graduates have gone into graduate programs with fellowships and assistantships at excellent universities in physics, engineering physics, medicine, medical physics, computer science, astronomy, and many fields of engineering throughout the country while others have gone directly into industry positions. Our graduates

agree that their undergraduate training at ACU was particularly well suited for their endeavors.

Electronics and Instrumentation
The department is well equipped to offer electronics and instrumentation to science and engineering majors and others who need this training. The instrumentation laboratory contains modern equipment and features microprocessor technology with an emphasis on the interface between hardware and software.

Applied Physics M.S. Program at Texas Tech University
Under an articulation agreement, ACU students are guaranteed acceptance into Texas Tech University's MS degree program in physics after completing a BS degree at ACU in physics with the following stipulations:

1. Have a minimum cumulative GPA of 3.00 and GPA of 3.25 in advanced physics courses;
2. Receive at least a "B" in PHYS 432, 491, 472, and 342; and
3. Meet all of the requirements of the Texas Tech Graduate School.

Special Offerings for Non-Majors
Physics can help students explore the universe with a telescope, consider the stewardship of creation, think about the influence which science has had on the world, and think about the relationship between science and religion. The Department of Physics has courses for non-majors, which explore each of these areas. PHYS 101, Astronomy, uses telescopes to look at the universe. PHYS 378, History and Philosophy of Science, and PHYS 379, Religion and Science, both explore the relationship between science, religion, literature, social science and the arts. These courses will satisfy three hours of the university science requirement.

Study Abroad Expectations
All students are encouraged to participate in ACU's Study Abroad program. Classes offered at Study Abroad sites vary depending on the site. Academic advisors can assist students in planning ahead for their Study Abroad experience and should be consulted during the freshman year.

Bachelor of Science in Engineering Degree (BSE)

General Departmental Requirements
Engineering majors must develop mathematical skills as well as design, experimental, and computational abilities. At the point of enrolling in PHYS 120/121, a student must have ability in mathematics sufficient for enrollment in Calculus I. If the student does not qualify to take Precalculus II (MATH 124) when the student enters ACU, his or her graduation may be delayed.

Admission Requirements
Before being admitted to the Engineering program, students must satisfy the requirements listed in the *ACT/SAT Placement Information* section of this catalog (page 20) and place in MATH 124. Before being admitted to any degree in this department, a student must score a 28 on the math section of the ACT (or equivalent math SAT score) or satisfy the prerequisite for ENGR 115.

ENGINEERING (BSE)

BS: ENGINEERING DEGREE PLAN (ENGR)	
UNIVERSITY REQUIREMENTS	
Please see the University Requirements section of this catalog (page 36).	
MAJOR REQUIREMENTS	
Engineering Physics	
PHYS 120 Engineering Physics I	(3)[1]
PHYS 121 Engineering Physics I Laboratory	(1)[1]
PHYS 122 Engineering Physics II	(3)[1]
PHYS 123 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
ENGR 200-499	15
ENGR 430 Capstone/Design I	4
ENGR 432 Capstone/Design II	4
Physics	
PHYS 230/231 Modern Physics Lecture/Lab	4
Philosophy	
PHIL 379 Philosophy, Religion and Science	(3)[1]
Mathematics	
MATH 185 Calculus I	(3)[1]
MATH 186, 286, 361	9
Math/Science Selections	
College Level Math, Chemistry, Physics, or Biology	8
Economics	
ECON 261Principles 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	0-6
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	128-134
*Courses numbered 0** do not count in minimum hours required for degree.*	

Bachelor of Science Degrees (BS)

General Departmental Requirements
Engineering and physics majors must develop mathematical skills as well as experimental, theoretical, and computational abilities. At the point of enrolling in PHYS 120/121, a student must have ability in mathematics sufficient for enrollment in Calculus I. If the student does not qualify to take Calculus I when the student enters ACU, his or her graduation may be delayed.

Admission Requirements
Before being admitted to one of these programs, students must satisfy the requirements listed in the *ACT/SAT Placement Information* section of this catalog (page 20) and place into MATH 124. Before being admitted to any degree in this department, a student must score a 28 on the math section of the ACT (or equivalent math SAT score) or satisfy the prerequisite for ENGR 115.

PHYSICS (BS)

BS: PHYSICS DEGREE PLAN (PHYS)	
UNIVERSITY REQUIREMENTS	
Please see the University Requirements section of this catalog (page 40).	
MAJOR REQUIREMENTS	
Mathematics	
MATH 185 Calculus I	(3)[1]
Physics	
PHYS 120 Engineering Physics I	(3)[1]

PHYS 121 Engineering Physics I Lab	(1)[1]
PHYS 122 Engineering Physics II	(3)[1]
PHYS 123 Engineering Physics II Lab	(1)[1]
PHYS 230/231 Modern Physics Lecture/Lab	4
PHYS 360 Electricity and Magnetism	3
PHYS 362/363 Optics	4
PHYS 371 Classical Mechanics	3
PHYS 385 Math of Physics and Engineering	3
PHYS 481 Thermodynamics	3
PHYS 491 Quantum Mechanics (writing-intensive course)	3
Other Required Course	
PHIL 379 Philosophy, Religion and Science	(3)[1]
TOTAL	**26**

[1]Hours (in parentheses) may also fulfill university requirements and are not included in total major hours

CONCENTRATIONS (CHOOSE ONE)

Physics Track (PHYS)	
ENGR 115/116 Introduction to Engineering and Physics	4
12 additional hours from PHYS 300-499 (except 378)	12
TOTAL	**16**
Applied Physics (PHYA)	
CS 130 Programming II and Data Structures	3
DSGN 232 Digital Design Communication	3
ENGR 115/116	4
MATH 341 Numerical Methods *or*	
MATH 325 Linear Algebra *or*	
MATH 377 Statistical Methods I	3
PHYS 335/336 Introduction to Electronics Lecture/Lab	3
PHYS 342/343 Instrumentation Lecture/Lab	3
PHYS 388 Network Analysis	3
3 additional hours from PHYS 300-499 (except 378)	3
TOTAL	**25**
Engineering Physics (PHYN)	
CS 130 Programming II and Data Structures	3
ENGR 115/116 Introduction to Engineering and Physics	4
DSGN 232 Digital Design Communication	3
ENGR 220 Engineering Mechanics: Statistics	3
ENGR 222 Engineering Mechanics: Dynamics	3
MATH 341 Numerical Methods *or*	
MATH 377 Statistical Methods I	3
PHYS 335/336 Introduction to Electronics Lecture/Lab	3
PHYS 342/343 Instrumentation Lecture/Lab *or*	
PHYS 388 Network Analysis	3
TOTAL	**25**
Computational Physics (PHYC)	
CS 130 Programming II and Data Structures	3
ENGR 115/116 Introduction to Engineering and Physics	4
MATH 341 Numerical Methods	3
MATH 377 Statistical Methods I	3
PHYS 451 Computational Physics I: Simulation and Modeling	3
PHYS 453 Computational Physics II: Pattern Recognition	3
3 additional hours from CS 300-499 *or*	
PHYS 300-499 (except 378)	3
3 additional hours from PHYS 300-499 (except 378)	3
TOTAL	**25**

SUPPLEMENT FOR MAJOR

Chemistry/Computer Science/Mathematics	
CHEM 133/131 General Chemistry I Lecture/Lab	4
PHYS 497/498 Capstone I/II	4
CS 120 Programming I	3
MATH 186 Calculus II	3
MATH 286 Calculus III	3
MATH 361 Ordinary Differential Equations	3
TOTAL	**20**

ELECTIVES

Physics Track (PHYS)	10
Applied Physics (PHYA)	1
Engineering Physics (PHYN)	1
Computational Physics (PHYC)	1
Minimum Electives	1-10
TOTAL MAJOR HOURS	**72**

OTHER GRADUATION REQUIREMENTS

Minimum grade for PHYS courses	C
Minimum GPA for graduation	2.00
Minimum advanced hours	33
Minimum total hours	128

*Courses numbered 0** do not count in minimum hours required for degree.*

HIGH SCHOOL TEACHER CERTIFICATION PHYSICS AND MATHEMATICS (BS)

BS: HIGH SCHOOL TEACHER CERTIFICATION PHYSICS AND MATHEMATICS DEGREE PLAN (PHMT)

UNIVERSITY REQUIREMENTS

Please see the University Requirements section of this catalog (page 40).

MAJOR REQUIREMENTS

Physics	
PHYS 120 Engineering Physics I	(3)[1]
PHYS 121 Engineering Physics I Lab	(1)[1]
PHYS 122 Engineering Physics II	(3)[1]
PHYS 123 Engineering Physics II Lab	(1)[1]
PHYS 230/231 Modern Physics Lecture/Lab	4
12 additional hours (9 must be advanced from PHYS 300-499 (except 378)	12
TOTAL	**16**
Mathematics	
MATH 185 Calculus I	(3)[1]
MATH 186 Calculus II	3
MATH 187 Calculus Computer Lab	1
MATH 227 Discrete Mathematics	3
MATH 286 Calculus III	3
MATH 309 Algebraic Concepts for Teachers I	3
MATH 311 Geometric Concepts for Teachers I	3
MATH 361 Ordinary Differential Equations	3
MATH 377 Statistical Methods I	3
MATH 397 Mathematics Seminar	2
MATH 497 Mathematics Capstone (capstone and writing-intensive course)	2
TOTAL	**26**

[1]Hours (in parentheses) may also fulfill university requirements and are not included in total major hours

OTHER REQUIREMENTS

Teacher Education Requirements	
EDUC 211 Educational Foundations and Multicultural Perspectives	3
EDUC 221 Educational Psychology	(3)[1]
EDUC 412 Secondary Curriculum and Media (capstone course)	3
EDUC 432 Secondary Management and Methods (capstone course)	3
EDUC 476 Effective Strategies for English Language Learners	3
EDUC 490 Student Teaching (capstone course)	6
READ 322 Reading in Secondary Content Areas	3
SPED 371 Teaching Students With Special Needs (writing-intensive course)	3
Other Required Course	
ENGR 115/116 Introduction to Engineering and Physics	4
PHIL 379 Philosophy, Religion and Science	(3)[1]
TOTAL	**28**

[1]Hours (in parentheses) may also fulfill university requirements and are not

	included in total major hours
ELECTIVES	
Minimum	2
TOTAL MAJOR HOURS	**72**

CRITERIA FOR ADMISSION TO TEACHER EDUCATION

In accordance with Texas state law, students must meet the admission criteria described on page 115.

OTHER GRADUATION REQUIREMENTS	
Minimum GPA in major requirements	2.75
Minimum GPA for graduation	2.75
Minimum advanced hours	33
Minimum total hours	128

*Courses numbered 0** do not count in minimum hours required for degree.*

Cooperative Bachelor of Science Degrees

Admission Requirements

Before being admitted to a program, a student must satisfy the requirements listed in the *ACT/SAT Placement Information* section of this catalog (page 20). Before being admitted to any degree in this department, a student must score a 28 on the math section of the ACT (or equivalent math SAT score) or satisfy the prerequisite for ENGR 115.

ENGINEERING SCIENCE (BS)

The Engineering Science major is designed for students that want a specialized engineering degree not currently offered at ACU. After building a solid foundation at ACU including basic engineering and science classes and courses from the liberal arts, a student may transfer to another school. Students wishing to spend three years at ACU may, after receiving his or her engineering degree, be awarded the Engineering Science (BS) by ACU. To qualify for this degree, a student must complete at least 95 hours at ACU, including at least 17 hours of mathematics, 8 hours of chemistry and 21 hours of physics or engineering course work. All general requirements for the BS degree must also be completed. Course selections are made in consultation with the engineering academic advisor.

The Department of Engineering and Physics at Abilene Christian University offers two cooperative degrees in association with the University of Texas at Arlington (UTA). The ACU degree is a 128-hour Bachelor of Science in Engineering Science. The student will receive a BS degree in engineering science after the successful completion of three years at ACU and one year (29 hours of "C" or better) of specified course work (or approved substitutions) at UTA. Courses taken at ACU to satisfy this degree also satisfy part of the requirements toward a degree in engineering at UTA in electrical engineering (BSEE) or industrial and manufacturing systems engineering (BSIE). The total number of hours for the BSEE is 156 (100 at ACU and 56 at UTA). The total number of hours for the BSIE is 159 (100 at ACU and 59 at UTA).

The ACU-UTA cooperative program in engineering offers students the opportunity to take advantage of the strengths of each of the participating schools resulting in a solid well-rounded education in engineering. Graduates from these programs will be well prepared to pursue employment in industry or to pursue graduate degrees in engineering or other fields.

A minimum cumulative grade point average of 2.50 is required. A grade of "C" or better is required for any course to transfer from ACU to UTA.

The degrees in electrical and industrial engineering at UTA are accredited by the ABET Engineering Accreditation Commission.

BS: (COOPERATIVE) ENGINEERING SCIENCE DEGREE PLAN (ENGS)

BSIE: Industrial and Manufacturing Systems Engineering from the University of Texas at Arlington

UNIVERSITY REQUIREMENTS

Please see the University Requirements section of this catalog (page 40).

MAJOR REQUIREMENTS

Physics	
PHYS 120 Engineering Physics I	(3)[1]
PHYS 121 Engineering Physics I Lab	(1)[1]
PHYS 122/123 Engineering Physics II Lecture/Lab	(4)[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	3
ENGR 388 Network Analysis	3
Successful completion of 32 hours of engineering courses at the University of Texas at Arlington (≥C)	32
TOTAL	**48**

[1]Hours (in parentheses) may also fulfill university requirements and are not included in total major hours

SUPPLEMENT FOR MAJOR

Chemistry	
CHEM 133 General Chemistry I	3
CHEM 131 General Chemistry I Lab	1
CHEM 132/134 General Chemistry II Lecture/Lab	4
Computer Science	
CS 120 Programming I	3
CS 130 Programming II and Data Structures	3
Mathematics	
MATH 185 Calculus I	(3)[1]
MATH 187 Calculus Computer Lab	1
MATH 186 Calculus II	3
MATH 286 Calculus III	3
MATH 287 Projects in Calculus	1
MATH 361 Ordinary Differential Equations	3
History	
HIST 117, 118, 221,222	(6)[1]
TOTAL	**25**

[1]Hours (in parentheses) may also fulfill university requirements and are not included in total major hours

ELECTIVES	
Minimum	1
TOTAL MAJOR HOURS	**75**

OTHER GRADUATION REQUIREMENTS

Only courses ≥C transfer to UTA	
Only courses ≥C at UTA can be used toward completion	
Minimum GPA for acceptance to UTA	2.50
Minimum advanced hours	33
Minimum total ACU hours	96
Minimum total hours	128

*Courses numbered 0** do not count in minimum hours required for degree.*

BS: (COOPERATIVE) ENGINEERING SCIENCE DEGREE PLAN (ENGS)
BSEE: Electrical Engineering From The University of Texas at Arlington

UNIVERSITY Requirements

Please see the University Requirements section of this catalog (page 40).

MAJOR REQUIREMENTS

Physics
PHYS 120 Engineering Physics I ..... (3)[1]
PHYS 121 Engineering Physics I Lab ..... (1)[1]
PHYS 122 Engineering Physics II Lecture..... (3)[1]
PHYS 123 Engineering Physics II Lab ..... (1)[1]
PHYS 230/231 Modern Physics Lecture/Lab 4

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 3
ENGR 388 Network Analysis 3

Successful completion of 32 hours of engineering courses at the University of Texas at Arlington (≥C) 32

TOTAL 52

[1]Hours (in parentheses) may also fulfill university requirements and are not included in total major hours

SUPPLEMENT FOR MAJOR

Chemistry
CHEM 133 General Chemistry I 3
CHEM 131 General Chemistry I Lab 1
CHEM 132/134 General Chemistry II Lecture/Lab 4

Computer Science
CS 120 Programming I 3
CS 130 Programming II and Data Structures 3

Mathematics
MATH 185 Calculus I ..... (3)[1]
MATH 187 Calculus Computer Lab 1
MATH 186 Calculus II 3
MATH 286 Calculus III 3
MATH 287 Projects in Calculus 1
MATH 361 Ordinary Differential Equations 3

History
HIST 117, 118, 221, 222 ..... (6)[1]

TOTAL 25

[1]Hours (in parentheses) may also fulfill university requirements and are not included in total major hours

ELECTIVES

Minimum 0

TOTAL MAJOR HOURS 78

OTHER GRADUATION REQUIREMENTS

Only courses ≥C transfer to UTA
Only courses ≥C at UTA can be used toward completion
Minimum GPA for acceptance to UTA 2.50
Minimum advanced hours 33
Minimum total ACU hours 99
Minimum total hours 130
Courses numbered 0** do not count in minimum hours required for degree.

Minor in Engineering Science

MINOR: ENGINEERING SCIENCE (ENGS)

ENGR 220 Engineering Mechanics: Statics 3
ENGR 222 Engineering Mechanics: Dynamics 3
PHYS 335/336 Introduction to Electronics Lecture/Lab 3
Additional hours approved by engineering academics advisor 9
TOTAL 18

Minor in Physics

MINOR: PHYSICS (PHYS)

PHYS 120/121 Engineering Physics I Lecture/Lab 4
PHYS 122/123 Engineering Physics II Lecture/Lab 4
PHYS 230/231 Modern Physics Lecture/Lab 4
Choose from: PHYS 300-499 6
TOTAL 18

Course Descriptions

Please see the *Course Descriptions* section of this catalog (page 163). Courses offered by the Department of Physics include those with the following designations: ENGR, PHYS.

Edit this form

ACU Syllabus Checklist

Course Number and Title

ENGR 115:Introductic

Reviewer:

Berlin Fang

Developer:

Dr. Kenneth Olree

About the Course

- [x] Course number and title
- [x] Catalog description
- [x] Credit hours
- [ ] Intended audience
- [x] Meeting time
- [x] Classroom location or online access information

About the Instructors

- [x] Name, title or rank
- [ ] Professional website (optional)
- [x] Office location
- [x] Phone number(s)
- [x] Email address
- [x] Office hours
- [ ] Contact expectations

About Our Mission

- [x] University mission
- [ ] College mission
- [ ] Department mission

Christian Perspective

- [x] Teaching philosophy
- [ ] Policy regarding questionable materials
- [x] Scripture related to course content
- [x] Faith/learning resource

Learning Objectives

- [x] Specific competencies stated in measurable terms

- [x] Measurement instrument: state which assignments or instruments used to assess the competencies

Course Content

- [x] Outline or main topics
- [x] Format of class
- [x] Course calendar

Instructional Materials

- [x] Texbook
- [x] Other instructional materials

Assessment

- [x] Weight or point value of all graded elements
- [x] Grading scale with clear expectations for grades
- [ ] Extra credit opportunities (optional)
- [ ] Assessment logistics (optional)
- [ ] Rules for discussing grades

Course Policies

- [x] Attendance
- [x] Tardiness
- [x] Participation
- [ ] Inclement weather
- [x] Late assignment/exam policy
- [x] Academic integrity
- [ ] Technology use

University Resources

- [x] Special needs (ADA) assistance
- [ ] Other campus services

Any comments?

Submit

Never submit passwords through Google Forms.

January 9, 2014

Dr. Kenneth Olree
Foster Science 317
Abilene Christian University
Tel: (325)674 2165
Email: kenneth.olree@acu.edu

Re: Review of ENGR115: Introduction to Engineering & Physics – ENGR 115 and 116

Dear Dr. Olree,

Thank you for the submission of the application for the new course ENGR115: Introduction to Engineering & Physics, as well as ENGR116 (lab). We reviewed the syllabus based on the ACU Syllabus Guidelines. We found that you have met or in many cases exceed the expectations in this guideline. The syllabi are very clear in describing your expectations and requirements for the course. Congratulations on the truly exceptional work.

Here are some minor suggestions for you to consider:

- I checked both syllabi with a "checklist" (based on the guideline) and a few items may be missing. However, some of these are optional, so please use your best judgment to decide whether it helps to add them.
- I wonder if similar content can be moved closer together, such as "learning objectives" and description of the competencies. Similarly, I wonder if you can move "teaching philosophy" somewhere closer to the part about the course instructor. You probably should also consider moving all "policies" closer together, such as attendance and student conduct.

You can make these changes yourself, if you decide to do so. You do not need to bring them back to the Adams Center for another review.

If there is any aspect of the application or course development you would like to discuss further, please let me know and we can schedule a time to meet. Please know the Adams Center is here to serve you in any aspect of your course development, implementation, and/or ongoing teaching of the course.

Again, thank you for allowing the Adams Center team to review your course application and if there is any way we can serve you, please know we are here to serve you.

Berlin Fang
Director, Instructional Design, Adams Center