

Change Undergraduate Course

Change a Course

Subject: EES-Env Engr and Science

Number: 4140

Effective Term: Spring 2019

Title: Radioecology

Honors Course:

Add Honors Course:

Last Term Course was taught: 201701

Brief Statement of Change Based on Assessment Results:

Course evolution -- I now teach the basic biology the students need, so no longer need the BIOL prerequisite

Rationale for Changing a Course

- Strengthen Program Requirement(s)
- Alignment of Student Learning Outcomes
- Alternative Delivery of Content
- Improve Time to Degree
- Evolution of the Discipline
- Changing Prerequisites
- Address DWF Rates
- General Education Modifications
- Other (Please specify.)

Change Prerequisite(s) / Corequisite(s)

From MATH 1060 or MATH 1070; and CH 1020 or CH 1060; and BIOL 1030 or BIOL 1100; and PHYS 2080 or 2210

To MATH 1060 or MATH 1070; and CH 1020 or CH 1060; and PHYS 2080 or 2210

Learning Objectives

Upon successful completion of this course students will be able to:

- Discuss the nature, scope, and societal relevance of radioecology
- Describe both natural and anthropogenic sources of environmental radioactivity
- Understand the transport, fate, and effects of environmental radioactivity and perform related calculations
- Apply principles of radiation protection in an environmental context
- Design and critically evaluate the methodology in radioecological studies
- Discuss the social and ethical dimensions of ecological radiation protection

Topical Outline

- Introduction and historical perspective (3 hours)
- Radiological principles and detection (3 hours)
- Natural sources of radiation (3 hours)
- Anthropogenic sources of radiation (3 hours)
- Ecological principles (3 hours)
- Transport properties of important radionuclides (3 hours)
- Classic observations in terrestrial (1.5 hours) and aquatic (1.5 hours) environments
- Effects of ionizing radiation within the biosphere (3 hours)
- Quantitative aspects of radionuclide transport (3 hours)
- Environmental dosimetry (3 hours)
- Environmental radiation protection frameworks (3 hours)
- Sampling techniques and study design (1.5 hours)
- Ethical aspects of ecological risks from radiation (1.5 hours)
- Countermeasures and remediation (3 hours)
- Chernobyl vs Fukushima (3 hours)
- Student presentations (3 hours)

Evaluation

Undergraduate

A 90 - 100

B 80 - 89

C 70 - 79

D 60 - 69

F < 60

4/18/2018

Change Undergraduate Course - Curriculum & Course Change System

Quizzes	20%
Midterm Exam	25%
Final Exam	35%
Homework	10%
Class Participation	10%

SyllabusUpload File: [EES 4140 Syllabus CC submission-20180418133805.docx](#)**Form**

User ID:	nmarti3	Name:	Nicole Martinez
Date:	04/18/2018	Number:	39500

4/18/2018

Kevin T. Finneran

Charge Undergraduate Course - Curriculum & Course Change System
Digitally signed by Kevin T. Finneran
Date: 2018.04.23 16:30:29 -04'00'

000098

Chair, Department Curriculum Committee	<i>David J. Treahman</i>	4/20/2018
Department Chair	<i>[Signature]</i>	4/24/18
Chair, College Curriculum Committee	<i>[Signature]</i>	4/24/18
College Dean	<i>[Signature]</i>	
Director, Calhoun Honors College	<i>John D. Hippi</i>	5/4/2018
Chair, Undergraduate Curriculum Committee		
Chair, Graduate Curriculum Committee	<i>Robert S. Jones</i>	7/26/18
Provost		
President		

Change Undergraduate Course

Change a Course

Subject: EES-Env Engr and Science
Number: 4750
Effective Term: Fall 2018
Title: Capstone Design Project
Honors Course:
 Add Honors Course:
Last Term Course was taught: 201701

Brief Statement of Change Based on Assessment Results:

Adding that CE 3410 (Introduction to Fluid Mechanics) needs to be passed with a C or better in order to enroll in EES 4750. CE 3410 is already a prerequisite for the course; the "C or better" requirement is new. Students with a C or better in Fluids have generally been more successful with the quantitative portions of the capstone design.

Rationale for Changing a Course

- Strengthen Program Requirement(s)
- Alignment of Student Learning Outcomes
- Alternative Delivery of Content
- Improve Time to Degree
- Evolution of the Discipline
- Changing Prerequisites
- Address DWF Rates
- General Education Modifications
- Other (Please specify.)

Change Prerequisite(s) / Corequisite(s)

From Preq: CE 3410 and EES 3030 and EES 3040 and EES 3050 and EES 4300; and an engineering grade point average of 2.0 or better. Coreq: EES 4751.
To Preq: CE 3410 (passed with a C or better) and EES 3030 and EES 3040 and EES 3050 and EES 4300; and an engineering grade point average of 2.0 or better. Coreq: EES 4751.

Syllabus

Description: EES 4750 Capstone Design syllabus

Form

User ID: ladner **Name:** David Ladner
Date: 04/20/2018 **Number:** 39267

4/20/2018

Digital Signature by Kevin T. Finneran
Finneran
Date: 2018.04.23 16:29:59 -04'00'

Kevin T. Finneran

Chair, Department Curriculum Committee

Date

David J. Freshman

4/20/2018

Department Chair

Date

[Signature]

4/24/18

Chair, College Curriculum Committee

Date

[Signature]

4/24/18

College Dean

Date

Director, Calhoun Honors College

Date

John D. Stiffi

5/4/2018

Chair, Undergraduate Curriculum Committee

Date

Chair, Graduate Curriculum Committee

Date

Robert S. Jones

7/26/18

Provost

Date

President

Date

Change Major

If Gen Ed requirements are changed a separate Gen Ed Checklist form must accompany this form.

Major Name: Environmental Engr

Degree: Bachelor of Science

Effective Catalog Year: 2019-2020

Curriculum Map: Proposed Curriculum Map 2018-04-20-20180420065041.pdf

Description: Proposed Curriculum Map

Additional Information:

Description:

Summary/Explanation

Our existing list of engineering or science requirements reads as follows:

Select from BCHM 3050, BE 3220, BE 4150, BE 4220, BE 4240, BE 4400, BE 4640, BIOL 2110, BIOL 4100, BIOL 4430, BIOL 4440, CE 2060, CE 2550, CE 3210, CE 3310, CE 3420, CE 4430, CE 4470, CE 4820, CH 3300, CH 3310, CH 4130, ECE 2070, ECE 2080, EES 3000, EES 3010, EES 4000, EES 4100, EES 4110, EES 4120, EES 4370, EES 4910, EES 4950, ENSP 4000, GEOL 2700, GEOL 3000, GEOL 3180, GEOL 4210, GEOL 4820, ME 4260, MICR 3050, MICR 4100, MATH 3110, MATH 3650, MATH 4340, PES 4850, PHYS 2400, PHYS 2450, PHYS 4200

We are removing MICR 3050 from this list, as it is already a requirement in our curriculum.

Not shown in this list, but currently counting as meeting this requirement through Degree Works is GEOL 1010. We want to change Degree Works so that GEOL 1010 no longer counts as meeting the engineering or science requirement.

We want to add two courses to the list: EES 4140 (Radioecology) and EES 4270 (Ecohydrology).

So the new list of engineering or science requirements should read as follows:

Select from BCHM 3050, BE 3220, BE 4150, BE 4220, BE 4240, BE 4400, BE 4640, BIOL 2110, BIOL 4100, BIOL 4430, BIOL 4440, CE 2060, CE 2550, CE 3210, CE 3310, CE 3420, CE 4430, CE 4470, CE 4820, CH 3300, CH 3310, CH 4130, ECE 2070, ECE 2080, EES 3000, EES 3010, EES 4000, EES 4100, EES 4110, EES 4120, EES 4140, EES 4270, EES 4370, EES 4910, EES 4950, ENSP 4000, GEOL 2700, GEOL 3000, GEOL 3180, GEOL 4210, GEOL 4820, ME 4260, MICR 4100, MATH 3110, MATH 3650, MATH 4340, PES 4850, PHYS 2400, PHYS 2450, PHYS 4200

In addition to the above change, we need to move EES 4840 (Municipal Solid Waste Mgmt) from Spring of Junior year to Fall of Senior year because of an altered teaching schedule. With that, we will move EES 4860 (Environmental Sustainability) from Fall of Senior Year to Spring of Junior Year.

Rationale for Change Major

- Strengthen Program Requirement(s)
- Alignment of Student Learning Outcomes
- Alternative Delivery of Content
- Improve Time to Degree
- Evolution of the Discipline
- Changing Prerequisites
- Address DWF Rates
- General Education Modifications
- Other (Please specify.)

Changing the list of technical electives to fit our curriculum and new course offerings.

Form

User ID: ladner Name: David Ladner
Date: 04/20/2018 Number: 39293

4/20/2018

Kevin T. Finneran

Digitally signed by Kevin Finneran
Date: 2018.04.23 16:29:31 -04'00'

Chair, Department Curriculum Committee

Date

David J. Trachten

4/20/2018

Department Chair

Date

[Signature]

4/24/18

Chair, College Curriculum Committee

Date

[Signature]

4/24/18

College Dean

Date

Director, Calhoun Honors College

Date

John D. Hippi

5/4/2018

Chair, Undergraduate Curriculum Committee

Date

Chair, Graduate Curriculum Committee

Date

Robert S. Jones

7/26/18

Provost

Date

President

Date

000104

Change Undergraduate Course**Change a Course**

Subject: GEOL-Geology
Number: 4030
Effective Term: Fall 2018
Title: Invertebrate Paleontology

Honors Course:

Add Honors Course:

Last Term Course was taught: 200801

Brief Statement of Change Based on Assessment Results:
 Updating GEOL prerequisite from GEOL 1020 to GEOL 2020

Rationale for Changing a Course

- Strengthen Program Requirement(s)
- Alignment of Student Learning Outcomes
- Alternative Delivery of Content
- Improve Time to Degree
- Evolution of the Discipline
- Changing Prerequisites
- Address DWF Rates
- General Education Modifications
- Other (Please specify.)

 Change Prerequisite(s) / Corequisite(s)

From GEOL 1020
 To GEOL 2020

Learning Objectives

tbd

Topical Outline

tbd

Evaluation

Undergraduate

A 90 - 100

B 80 - 89

C 70 - 79

D 60 - 69

F < 60

tbd

Syllabus

Upload File: [geol 4030 syllabus v1-20180419171640.docx](#)

Description: syllabus

Form

User ID: acoulso Name: Alan Coulson

Date: 04/24/2018 Number: 39557

Digitally signed by Kevin Thomas

Kevin Thomas Finneran

000105

Date: 2018.04.24 11:17:00 -04'00'

Chair, Department Curriculum Committee

Date

David J. Ingham

4/20/2018

Department Chair

Date

[Signature]

4/23/18

Chair, College Curriculum Committee

Date

[Signature]

4/24/18

College Dean

Date

Director, Calhoun Honors College

Date

John D. Stiff

5/4/2018

Chair, Undergraduate Curriculum Committee

Date

Chair, Graduate Curriculum Committee

Date

Robert S. Jones

7/26/18

Provost

Date

President

Date

4/11/2018

Change Undergraduate Course

Change a Course

Subject: CES-Coll of Eng and Science
 Number: 1900
 Effective Term: Fall 2019
 Title: CI in Engineering & Science I
 Honors Course:
 Add Honors Course:
 Last Term Course was taught: 201705

Brief Statement of Change Based on Assessment Results:

The CES rubric was previously designated for the College of Engineering and Sciences. The name of the college changed to the College of Engineering, Computing, and Applied Sciences. We request that the CES be changed to ECAS.

Rationale for Changing a Course

- Strengthen Program Requirement(s)
 Alignment of Student Learning Outcomes
 Alternative Delivery of Content
 Improve Time to Degree
 Evolution of the Discipline
 Changing Prerequisites
 Address DWF Rates
 General Education Modifications
 Other (Please specify.)

 Change Subject

To ECAS-Coll Engr, Comp, App Sci

 Change Number

To 1990

 Change Catalog Title

From Creative Inquiry in Engineering and Science I

To Creative Inquiry in Engineering, Computing and Applied Science I

 Change Transcript Title

From CI in Engineering & Science I

To CI in Engineering Computing & Applied Science I

 Change Catalog Description

From Individual or group projects in engineering and/or science. Projects may be interdisciplinary and involve analysis, design, and/or implementation. Instruction in methods, tools, and equipment will be included when appropriate. Includes Honors sections. May be repeated for a maximum of six credits.

To Individual or group projects in engineering, computing and/or applied science. Projects may be interdisciplinary and involve analysis, design, and/or implementation. Instruction in methods, tools, and equipment will be included when appropriate. Includes Honors sections. May be repeated for a maximum of six credits.

Learning Objectives

No Change

Topical Outline

No Change

Evaluation

Undergraduate

A 90 - 100

B 80 - 89

C 70 - 79

D 60 - 69

F < 60

No Change

Syllabus

Upload File: [CES to ECAS-20180411220421.pdf](#)

4/11/2018

Change Undergraduate Course - Curriculum & Course Change System

000107

Description: ECAS

Form

User ID: ckitch Name: Christopher Kitchens
Date: 04/11/2018 Number: 39299

4/11/2018

Change Undergraduate Course - Curriculum & Course Change System

000108

4/22/18

[Signature]

Chair, Department Curriculum Committee

Date

4/23/18

[Signature]
Department Chair

Date

4/22/18

[Signature]
Chair, College Curriculum Committee

Date

4/23/18

[Signature]
College Dean

Date

Director, Calhoun Honors College

Date

5/4/2018

[Signature]
Chair, Undergraduate Curriculum Committee

Date

Chair, Graduate Curriculum Committee

Date

7/26/18

[Signature]
Provost

Date

President

Date

4/11/2018

Change Undergraduate Course

Change a Course

Subject: CES-Coll of Eng and Science
Number: 2900
Effective Term: Fall 2019
Title: CI in Engineering & Science II
Honors Course:
 Add Honors Course:
Last Term Course was taught: 201605

Brief Statement of Change Based on Assessment Results:
 The CES rubric was previously designated for the College of Engineering and Sciences. The name of the college changed to the College of Engineering, Computing, and Applied Sciences. We request that the CES be changed to ECAS.

Rationale for Changing a Course

- Strengthen Program Requirement(s)
- Alignment of Student Learning Outcomes
- Alternative Delivery of Content
- Improve Time to Degree
- Evolution of the Discipline
- Changing Prerequisites
- Address DWF Rates
- General Education Modifications
- Other (Please specify.)

Change Subject

To ECAS-Coll Engr, Comp, App Sci

Change Number

To 2990

Change Catalog Title

From Creative Inquiry in Engineering and Science II
To Creative Inquiry in Engineering, Computing and Applied Science II

Change Transcript Title

From CI in Engineering & Science II
To CI in Engineering Computing & Applied Science II

Change Catalog Description

From Individual or group projects in engineering and/or science. Projects may be interdisciplinary and involve analysis, design, and/or implementation. Instruction in methods, tools, and equipment will be included when appropriate. Includes Honors sections. May be repeated for a maximum of six credits.
To Individual or group projects in engineering, computing and/or applied science. Projects may be interdisciplinary and involve analysis, design, and/or implementation. Instruction in methods, tools, and equipment will be included when appropriate. Includes Honors sections. May be repeated for a maximum of six credits.

Learning Objectives

No Change

Topical Outline

No Change

Evaluation

Undergraduate
A 90 - 100
B 80 - 89
C 70 - 79
D 60 - 69
F < 60
 No Change

Syllabus

Upload File: [CES to ECAS-20180411221201.pdf](#)

4/11/2018

000110

Description: ECAS

Form

User ID: ckitch Name: Christopher Kitchens

Date: 04/11/2018 Number: 39301

4/11/2018

Change Undergraduate Course - Curriculum & Course Change System

000111

4/22/18

[Signature]

Chair, Department Curriculum Committee

Date

4/23/18

[Signature]

Department Chair

Date

4/22/18

[Signature]

Chair, College Curriculum Committee

Date

4/23/18

[Signature]

College Dean

Date

Director, Calhoun Honors College

5/4/2018

John D. Hillfi

Date

Chair, Undergraduate Curriculum Committee

Date

Chair, Graduate Curriculum Committee

7/26/18

Robert S. Jones

Date

Provost

Date

President

Date

Change Undergraduate Course

Change a Course

Subject: CES-Coll of Eng and Science
 Number: 3900
 Effective Term: Fall 2019
 Title: CI in Engineering & Scienc III
 Honors Course:
 Add Honors Course:
 Last Term Course was taught: 999999

Brief Statement of Change Based on Assessment Results:
 The CES rubric was previously designated for the College of Engineering and Sciences. The name of the college changed to the College of Engineering, Computing, and Applied Sciences. We request that the CES be changed to ECAS.

Rationale for Changing a Course

- Strengthen Program Requirement(s)
- Alignment of Student Learning Outcomes
- Alternative Delivery of Content
- Improve Time to Degree
- Evolution of the Discipline
- Changing Prerequisites
- Address DWF Rates
- General Education Modifications
- Other (Please specify.)

Change Subject

To ECAS-Coll Engr, Comp, App Sci

Change Number

To 3990

Change Catalog Title

From Creative Inquiry in Engineering and Science III
 To Creative Inquiry in Engineering, Computing and Applied Science III

Change Transcript Title

From CI in Engineering & Scienc III
 To CI in Engineering Computing & Applied Science III

Change Catalog Description

From Individual or group projects in engineering and/or science. Projects may be interdisciplinary and involve analysis, design, and/or implementation. Instruction in methods, tools, and equipment will be included when appropriate. Includes Honors sections. May be repeated for a maximum of six credits.
 To Individual or group projects in engineering, computing and/or applied science. Projects may be interdisciplinary and involve analysis, design, and/or implementation. Instruction in methods, tools, and equipment will be included when appropriate. Includes Honors sections. May be repeated for a maximum of six credits.

Learning Objectives

No Change

Topical Outline

No Change

Evaluation

Undergraduate
 A 90 - 100
 B 80 - 89
 C 70 - 79
 D 60 - 69
 F < 60
 No Change

Syllabus

Upload File: [CES to ECAS-20180411221721.pdf](#)

4/11/2018

Description: ECAS

Form

User ID: ckitche Name: Christopher Kitchens

Date: 04/11/2018 Number: 39303

4/11/2018

Change Undergraduate Course - Curriculum & Course Change System

000114

4/22/18

[Signature]
Chair, Department Curriculum Committee

Date

4/23/18

[Signature]
Department Chair

Date

4/22/18

[Signature]
Chair, College Curriculum Committee

Date

4/23/18

[Signature]
College Dean

Date

Director, Calhoun Honors College
[Signature]

Date

5/4/2018

Chair, Undergraduate Curriculum Committee

Date

Chair, Graduate Curriculum Committee
[Signature]

Date

7/26/18

Provost

Date

President

Date

Change Undergraduate Course

Change a Course

Subject: CES-Coll of Eng and Science
 Number: 4900
 Effective Term: Fall 2019
 Title: CI in Engineering & Science IV
 Honors Course:
 Add Honors Course:
 Last Term Course was taught: 999999

Brief Statement of Change Based on Assessment Results:
 The CES rubric was previously designated for the College of Engineering and Sciences. The name of the college changed to the College of Engineering, Computing, and Applied Sciences. We request that the CES be changed to ECAS.

Rationale for Changing a Course

- Strengthen Program Requirement(s)
- Alignment of Student Learning Outcomes
- Alternative Delivery of Content
- Improve Time to Degree
- Evolution of the Discipline
- Changing Prerequisites
- Address DWF Rates
- General Education Modifications
- Other (Please specify.)

Change Subject

To ECAS-Coll Engr, Comp, App Sci

Change Number

To 4990

Change Catalog Title

From Creative Inquiry in Engineering and Science IV
 To Creative Inquiry in Engineering, Computing and Applied Science IV

Change Transcript Title

From CI in Engineering & Science IV
 To CI in Engineering Computing & Applied Science IV

Change Catalog Description

From Individual or group projects in engineering and/or science. Projects may be interdisciplinary and involve analysis, design, and/or implementation. Instruction in methods, tools, and equipment will be included when appropriate. Includes Honors sections. May be repeated for a maximum of six credits.
 To Individual or group projects in engineering, computing and/or applied science. Projects may be interdisciplinary and involve analysis, design, and/or implementation. Instruction in methods, tools, and equipment will be included when appropriate. Includes Honors sections. May be repeated for a maximum of six credits.

Learning Objectives

No Change

Topical Outline

No Change

Evaluation

Undergraduate

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

No Change

Syllabus

Upload File: [CES to ECAS-20180411222155.pdf](#)

4/11/2018

000116

Description: ECAS


Form

User ID: ckitch Name: Christopher Kitchens
Date: 04/11/2018 Number: 39304

4/11/2018

Change Undergraduate Course - Curriculum & Course Change System


000117


Chair, Department Curriculum Committee


4/22/18
Date


Department Chair

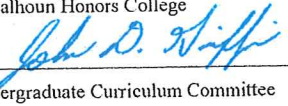
4/23/18
Date


Chair, College Curriculum Committee

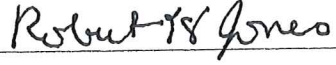
4/22/18
Date


College Dean

4/23/18
Date

Director, Calhoun Honors College

Chair, Undergraduate Curriculum Committee

5/4/2018
Date

Chair, Graduate Curriculum Committee

Provost

7/26/18
Date

President

Date

Change 4000/6000 Course

Change a Course

Subject: AUE-Automotive Engineering
 Number: 4010/6010
 Effective Term: Fall 2019
 Title: **Vehicle Dynamics**
 Honors Course:
 Add Honors Course:
 Last Term Course was taught: 201708

Brief Statement of Change Based on Assessment Results:

Decoupling lab section of course from the lecture. Based on student feedback. Enables more students on main campus as well as industry professionals to take the class remotely. Lab section will be turned into a separate course which will be offered independently of 4010/6010.

Rationale for Changing a Course

- Strengthen Program Requirement(s)
- Alignment of Student Learning Outcomes
- Alternative Delivery of Content
- Improve Time to Degree
- Evolution of the Discipline
- Changing Prerequisites
- Address DWF Rates
- General Education Modifications
- Other (Please specify.)

Change Schedule Type

From	To
<input type="checkbox"/> Field Course	<input type="checkbox"/> Field Course
<input type="checkbox"/> Independent Study	<input type="checkbox"/> Independent Study
<input type="checkbox"/> Internship	<input type="checkbox"/> Internship
<input type="checkbox"/> Lab No Fee	<input type="checkbox"/> Lab No Fee
<input type="checkbox"/> Lab With Fee	<input type="checkbox"/> Lab With Fee
<input type="checkbox"/> Lecture	<input checked="" type="checkbox"/> Lecture
<input checked="" type="checkbox"/> Other	<input type="checkbox"/> Other
<input type="checkbox"/> Seminar	<input type="checkbox"/> Seminar
<input type="checkbox"/> Studio	<input type="checkbox"/> Studio
<input type="checkbox"/> Tutorial	<input type="checkbox"/> Tutorial

Change of Credit

From

Fixed Credit Course

Credit Hrs Contact Hrs

4 3

Variable Credit Course

Credit Hrs Contact Hrs

Min Max Min Max

To

Fixed Credit Course

Credit Hrs Contact Hrs

3 3

Variable Credit Course

Credit Hrs Contact Hrs

Min Max Min Max

 Change Catalog Description

From AuE 4010/6010 4(3): This course discusses fundamental concepts in the dynamic behavior of ground vehicles, mainly two and four-wheeled vehicles. It stresses the application of dynamic systems modeling and analysis to understand ride performance, handling, and straight-line running. Practical considerations in vehicle design and its influence on vehicle performance are

To AuE 4010/6010 3(3): This course discusses fundamental concepts in the dynamic behavior of ground vehicles, mainly two and four-wheeled vehicles. It stresses the application of dynamic systems modeling and analysis to understand ride performance, handling, and straight-line running as well as practical considerations in vehicle design.

 Change Prerequisite(s) / Corequisite(s)

From Pre-req: ME 3050 or equivalent or permission of Instructor, Co-req: AuE 4011/6011

To ME 3050 or equivalent or permission of Instructor

 Change In Student Learning Objectives

Added Learning objectives for AuE 6010 separate from AuE 4010, These are:
AuE 6010 Students

1. Students will be able to demonstrate an advanced understanding of systems concepts and how they pertain to the automobile.
2. Students will be able to apply Newton's Laws and other systems analysis tools to enhance understanding of vehicle performance.
3. Students will be able to demonstrate an understanding of automotive subsystems and their contributions to the dynamic performance of ground vehicles.
4. Students will be able to demonstrate an understanding of vehicle dynamic performance criteria and their application to design evaluation.
5. Students will be able to demonstrate an understanding of practical constraints in designing a vehicle to meet performance criteria.
6. Students will be able to apply modeling and analysis techniques to design evaluation of ground vehicles.
7. Students will be able to analyze and evaluate state-of-the-art developments in vehicle dynamics through review of appropriate peer-reviewed publications.
8. Students will be able to synthesize and orally present their findings in section 7 above to their peers in a professional manner.

Learning Objectives**AuE 4010 Students**

1. Students will be able to demonstrate an understanding of systems concepts and how they pertain to the automobile.
2. Students will be able to apply Newton's Laws and other systems analysis tools to enhance understanding of vehicle performance.
3. Students will be able to demonstrate an understanding of automotive subsystems and their contributions to the dynamic performance of ground vehicles.
4. Students will be able to demonstrate an understanding of vehicle dynamic performance criteria and their application to design evaluation.
5. Students will be able to demonstrate an understanding of practical constraints in designing a vehicle to meet performance criteria.
6. Students will be able to apply modeling and analysis techniques to design evaluation of ground vehicles.

AuE 6010 Students

1. Students will be able to demonstrate an advanced understanding of systems concepts and how they pertain to the automobile.
2. Students will be able to apply Newton's Laws and other systems analysis tools to enhance understanding of vehicle performance.
3. Students will be able to demonstrate an understanding of automotive subsystems and their contributions to the dynamic performance of ground vehicles.
4. Students will be able to demonstrate an understanding of vehicle dynamic performance criteria and their application to design evaluation.
5. Students will be able to demonstrate an understanding of practical constraints in designing a vehicle to meet performance criteria.
6. Students will be able to apply modeling and analysis techniques to design evaluation of ground vehicles
7. Students will be able to analyze and evaluate state-of-the-art developments in vehicle dynamics through review of appropriate peer-reviewed publications.
8. Students will be able to synthesize and orally present their findings in section 7 above to their peers in a professional manner.

Topical Outline

1. Introduction -1.0 hours ~ Week 1
2. Dynamic performance criteria for ground vehicles - 2 hours ~ Week 1
3. Automotive subsystem characteristics - 3 hours ~ Week 2
4. Vehicle Ride Performance - 9 hours ~ Weeks 3-5
5. Mechanics of Pneumatic Tires - construction, force generation, performance impact on ground vehicles - 3 hours ~ Week 6
6. Introduction to aerodynamics -3 hours ~ Week 7
7. Acceleration Performance of ground vehicles -9 hours ~ Weeks 8-10
8. Braking Performance of ground vehicles - 3 hours ~ Week 11
9. Lateral handling performance -Steady state and transient performance -12 hours ~ Weeks 12-15

Evaluation

4000		6000	
A	90 - 100	A	90 - 100
B	80 - 89	B	80 - 89
C	70 - 79	C	70 - 79
D	60 - 69	F	< 70
F	< 60		

Homework: 30%; Tests: 30%, Paper Reviews and in-class presentation, 20%, Final Exam: 20%.


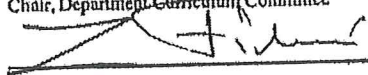



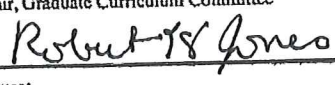
Homework: 30%; Tests: 30%, Final Exam: 40%.

SyllabusUpload File: [AuE_4010_6010_Vehicle_Dynamics_Lecture only-3 cr-20180417115206.docx](#)

Description: Course Handout

Form

User ID: sih Name: Intiaz Huque
 Date: 04/17/2018 Number: 38957

	4/17/2018	Date
Chair, Department Curriculum Committee		
	4/17/18	Date
Department Chair		
	4/22/18	Date
Chair, College Curriculum Committee		
	4/23/18	Date
College Dean		
Director, Calhoun Honors College		
	5/4/2018	Date
Chair, Undergraduate Curriculum Committee		
Chair, Graduate Curriculum Committee		
	7/26/18	Date
Provost		
President		

4/17/2018

Delete 4000/6000 Course - Curriculum & Course Change System

Delete 4000/6000 Course

Delete a Course	
Subject:	AUE-Automotive Engineering
Number:	4011/6011
Effective Term:	Spring 2019
Title:	Vehicle Dynamics Lab
Delete Honors Course:	
Last Term Course was taught:	999999
Brief Statement of Change Based on Assessment Results:	
Change in Certificate Program Requirements. Lab content absorbed in another course.	

Rationale for Delete Course	
<input checked="" type="checkbox"/>	Strengthen Program Requirement(s)
	Alignment of Student Learning Outcomes
	Alternative Delivery of Content
	Improve Time to Degree
	Evolution of the Discipline
	Changing Prerequisites
	Address DWT Rates
	General Education Modifications
<input checked="" type="checkbox"/>	Other (Please specify.)
	Lab content absorbed in another course.


Form	
User ID: beshah	Name: Beshah Ayalew
Date: 04/17/2018	Number: 39455

4/17/2018

Delete 4000/6000 Course - Curriculum & Course Change System


4/17/2018

Date


Chair, Department Curriculum Committee


4/18/18

Date


Department Chair

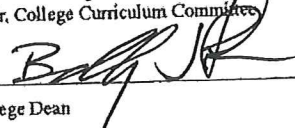
4/22/18

Date


Chair, College Curriculum Committee

4/23/18

Date


College Dean


Director, Calhoun Honors College

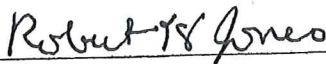
5/4/2018

Date

Chair, Undergraduate Curriculum Committee

Date

Chair, Graduate Curriculum Committee


Robert S. Jones

7/26/18

Date

Provost

Date

President

Date

4/17/2018

Change Undergraduate Course - Curriculum & Course Change System

Change Undergraduate Course

Change a Course		Rationale for Changing a Course	
Subject:	AUE-Automotive Engineering	<input type="checkbox"/>	Strengthen Program Requirement(s)
Number:	4020	<input type="checkbox"/>	Alignment of Student Learning Outcomes
Effective Term:	Spring 2019	<input type="checkbox"/>	Alternative Delivery of Content
Title:	Automobile Powertrain Systems	<input type="checkbox"/>	Improve Time to Degree
Honors Course:		<input checked="" type="checkbox"/>	Evolution of the Discipline
<input type="checkbox"/> Add Honors Course:		<input type="checkbox"/>	Changing Prerequisites
Last Term Course was taught:	999999	<input type="checkbox"/>	Address DWF Rates
Brief Statement of Change Based on Assessment Results: Lab deletion (AuE 4021), remove all lab content/grading from AuE 4020. Total credit hour reduction from 4 to 3 since lab is removed. Change title to more accurately reflect content.		<input type="checkbox"/>	General Education Modifications
		<input type="checkbox"/>	Other (Please specify)

<input checked="" type="checkbox"/> Change Catalog Title	<input checked="" type="checkbox"/> Change Transcript Title
From Automobile Powertrain Systems	From Automobile Powertrain Systems
To Advanced and Electrified Powertrains	To Advanced and Electrified Powertrains

<input checked="" type="checkbox"/> Change of Credit	<input checked="" type="checkbox"/> Change Prerequisite(s) / Corequisite(s)
From Fixed Credit Course	From Co-Req of AuE 4021
Credit Hrs Contact Hrs	To No Co-Req requirements
4 3	
Variable Credit Course	
Credit Hrs Contact Hrs	
Min Max Min Max	
To	
Fixed Credit Course	
Credit Hrs Contact Hrs	
3 3	
Variable Credit Course	
Credit Hrs Contact Hrs	
Min Max Min Max	

<input checked="" type="checkbox"/> Change In Student Learning Objectives
After completing this course, individuals will be able to:
<ul style="list-style-type: none"> Utilize vehicle models that estimate powertrain performance and efficiency requirements Describe how customer preferences and government regulation influence powertrain design Determine the influence of vehicle duty-cycle on powertrain design specifications Identify engine type and displacement to meet vehicle-level requirements Calculate the influence of operating conditions on engine fuel efficiency Differentiate the function and basic control of modern emissions control devices/systems Estimate the influence of transmission design on fuel economy and vehicle performance Generate approximate size requirements for high voltage battery systems Size electric motors relative to powertrain requirements Calculate functional requirements of powertrain thermal management systems Evaluate the influence on fuel economy and performance of various powertrain control methodologies

Learning Objectives
After completing this course, individuals will be able to:
<ul style="list-style-type: none"> Utilize vehicle models that estimate powertrain performance and efficiency requirements Describe how customer preferences and government regulation influence powertrain design Determine the influence of vehicle duty-cycle on powertrain design specifications Identify engine type and displacement to meet vehicle-level requirements Calculate the influence of operating conditions on engine fuel efficiency Differentiate the function and basic control of modern emissions control devices/systems Estimate the influence of transmission design on fuel economy and vehicle performance Generate approximate size requirements for high voltage battery systems Size electric motors relative to powertrain requirements Calculate functional requirements of powertrain thermal management systems Evaluate the influence on fuel economy and performance of various powertrain control methodologies

Topical Outline
<ul style="list-style-type: none"> Powertrain operational requirements for vehicle performance, fuel economy and emissions (3 hours) Performance evaluation and testing procedures (6 hours) Customer preferences, societal issues and government regulation regarding powertrains (3 hours) Internal combustion engine design, performance, and emissions (12 hours) After-treatment system function, design, and control (3 hours) Transmission design and function (3 hours) Hybrid powertrain architecture and design (3 hours) High voltage battery design, function and control (3 hours) Motor/generator and power electronics performance and design (3 hours) Thermal management of powertrain components (1.5 hour) Supervisory control strategy concepts (e.g. torque control, system constraints, etc.) (1.5 hours) Exams (3 hours)

Evaluation

4/17/2018

Change Undergraduate Course - Curriculum & Course Change System

Undergraduate

A 90 - 100

B 80 - 89

C 70 - 79

D 60 - 69

F < 60

- o Homework = 40%
- o Midterm Exam = 30%
- o Final Exam = 30%

SyllabusUpload File: [AuE_4020_Advanced_and_Electrified_Powertrains_Syllabus-20180417125331.docx](#)

Description: AuE 4020 Advanced and Electrified Powertrains

Form


User ID: rprucka Name: Robert Prucka

Date: 04/17/2018 Number: 39441

4/17/2018


Change Undergraduate Course - Curriculum & Course Change System

4/17/2018


Chair, Department Curriculum Committee

Date

4/17/18


Department Chair

Date

4/22/18



Chair, College Curriculum Committee

Date

4/23/18


College Dean

Date


Director, Calhoun Honors College

Date

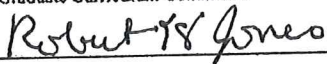
5/4/2018

Chair, Undergraduate Curriculum Committee

Date

Chair, Graduate Curriculum Committee

Date


Robert S. Jones

7/26/18

Provost

Date

President

Date

4/17/2018

Delete Undergraduate Course - Curriculum & Course Change System

Delete Undergraduate Course

Delete a Course	
Subject:	AUE-Automotive Engineering
Number:	4021
Effective Term:	Spring 2019
Title:	Automobile Powertrain Sys Lab
Delete Honors Course:	
Last Term Course was taught:	999999
Brief Statement of Change Based on Assessment Results:	
Change in Certificate Program requirements. Lab content absorbed in another course.	

Rationale for Delete Course	
<input checked="" type="checkbox"/>	Strengthen Program Requirement(s)
	Alignment of Student Learning Outcomes
	Alternative Delivery of Content
	Improve Time to Degree
	Evolution of the Discipline
	Changing Prerequisites
	Address DWF Rates
	General Education Modifications
<input checked="" type="checkbox"/>	Other (Please specify.)
	Lab content absorbed in another course.

Form	
User ID:	heshah
Name:	Beshah Ayalew
Date:	04/17/2018
Number:	39454

4/17/2018

Delete Undergraduate Course - Curriculum & Course Change System

4/17/2018

Chair, Department Curriculum Committee

Date

[Signature]

4/18/18

Department Chair

Date

[Signature]

4/22/18

Chair, College Curriculum Committee

Date

[Signature]

4/23/18

College Dean

Date

Director, Calhoun Honors College

Date

[Signature]

5/4/2018

Chair, Undergraduate Curriculum Committee

Date

Chair, Graduate Curriculum Committee

Date

[Signature]

7/26/18

Provost

Date

President

Date

4/18/2018

Change Undergraduate Course - Curriculum & Course Change System

Change Undergraduate Course

Change a Course

Subject: AUE-Automotive Engineering
 Number: 4030
 Effective Term: Spring 2019
 Title: Automotive Engr Project Tools
 Honors Course:
 Add Honors Course:
 Last Term Course was taught: 201708

Brief Statement of Change Based on Assessment Results:
 Increasing the contact hours from 2 to 3 to add additional content required for the AuE certificate program.

Rationale for Changing a Course

- Strengthen Program Requirement(s)
 Alignment of Student Learning Outcomes
 Alternative Delivery of Content
 Improve Time to Degree
 Evolution of the Discipline
 Changing Prerequisites
 Address DWF Rates
 General Education Modifications
 Other (Please specify)

Change Catalog Title

From Automotive Engr Project Tools
 To Automotive Project Tools and Prototyping

Change Transcript Title

From Automotive Engr Project Tools
 To Automotive Project Tools and Prototyping

Change of Credit

From
 Fixed Credit Course
 Credit Hrs Contact Hrs
 2 2
 Variable Credit Course
 Credit Hrs Contact Hrs
 Min Max Min Max
 To
 Fixed Credit Course
 Credit Hrs Contact Hrs
 3 3
 Variable Credit Course
 Credit Hrs Contact Hrs
 Min Max Min Max

Change Catalog Description

From This team-based project course covers state-of-the-art analysis tools and methods for executing automotive system/subsystem design and integration. Topics include automotive development processes, hands-on training on select design software covering different disciplines, and team projects utilizing the same.
To The course introduces the concept of mobility systems engineering and new product development. Students will learn through project-based learning and application of product development, innovation management and concept validation through engineering tools. Project culminates with a prototype build and final demonstration. Project will follow automotive industry standard "APQP/PPAP" process.

Change In Student Learning Objectives

Team collaboration and the ability to manage engineering projects is a critical skill for success in the automotive industry. The Advanced Product Quality Planning process is standardized by the AIAG as the common methodology employed by all automotive OEM and Tier suppliers for introducing new technology. An ability to work within this framework is critical to an automotive engineer's success, regardless of their role in the industry, as it permeates all functions: research and development; voice of the customer; engineering; manufacturing; quality; and supply chain management. This course is essential for

4/18/2018

Change Undergraduate Course - Curriculum & Course Change System

the automotive engineer to be effective in their role in industry. This course employs a project-based learning approach to ensure students experience these concepts in a tangible and meaningful way that combines theoretical concepts with hands-on application of skills.

Learning Objectives

At the end of the course, students will do or demonstrate the following:

- Explain the role of transportation and mobility in the global society
- Apply a systems-based approach to mobility concepts
- Use quantification techniques to describe and analyze the Voice of the Customer
- Use and correctly apply fundamental tools for project management in the automotive industry
- Demonstrate creativity techniques for product innovation
- Apply automotive industry-standard process for new product development using APQP/PPAP
- Work effectively in teams to accomplish an engineering project goal

Topical Outline

- 1 Transportation and Society / Mobility Concepts for the Future (3 hours)
- 2 Project management fundamentals: RACI; Mind Mapping/WBS/Gantt, Critical Path (3 hours)
- 3 Risk based thinking fundamentals: SWOT/PEST/FMEA (3 hours)
- 4 Voice of the Customer concepts and tools: Surveys/QFD (3 hours)
- 5 Intellectual property / Research tools / Project feasibility (3 hours)
- 6 Team dynamics / personal leadership styles (3 hours)
- 7 New product development cycles / stage-gate processes (3 hours)
- 8 Systems thinking concepts / Leadership and Ethics in project management (3 hours)
- 9 Innovation and Creativity using TRIZ (3 hours)
- 10 TRIZ concepts for product development (3 hours)
- 11 Introduction to APQP / PPAP for the automotive industry - concepts and history (3 hours)
- 12 Introduction to APQP / PPAP for the automotive industry - tools and application (3 hours)
- 13 Basics of design for manufacturing and assembly / GD&T / APQP guidelines for technical documentation (3 hours)
- 14 Introduction to quality management systems and supply chain planning (3 hours)
- 15 Cost effective prototyping methodologies / Validation, testing, and statistical analysis techniques for concept verification (3 hours)

Evaluation

Undergraduate

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

Homework Assignments: 25%

Quizzes: 25%

Team Project Assignments: 25% of grade

Final Exam: 25% of grade

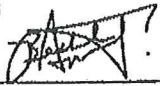
SyllabusUpload File: [AUE 4030 Automotive Project Tools and Prototyping_Final2-20180417131329.docx](#)**Form**

User ID: spilla Name: Srikanth Pilla
Date: 04/18/2018 Number: 39407

4/17/2018


Change Undergraduate Course - Curriculum & Course Change System

4/17/2018


Chair, Department Curriculum Committee

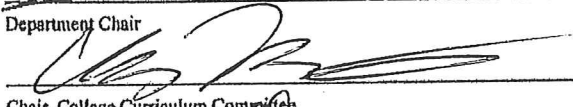
Date

4/17/18


Department Chair

Date

4/22/18


Chair, College Curriculum Committee

Date

4/23/18

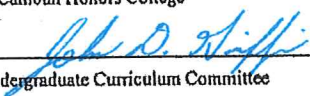

College Dean

Date

Director, Calhoun Honors College

Date

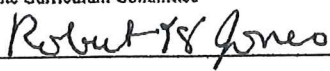
5/4/2018


Chair, Undergraduate Curriculum Committee

Date

Chair, Graduate Curriculum Committee

Date


Robert S. Jones

7/26/18

Provost

Date

President

Date

4/18/2018

Add Undergraduate Course - Curriculum & Course Change System

Add Undergraduate Course

Course Attributes

Subject Abbreviation: AUE-Automotive Engineering
 Course Number: 4050
 Effective Term: Spring 2019
 College: Engr, Comp, and Appl Sci
 Department: Campbell Grad Engr Program

Catalog Title: Autonomous Vehicle Design Additional Fee?
 Transcript Title: Auto Vehicles Justification
 Cross-reference(s):
 Grade Mode: Standard Letter

Form

User ID: yunyij Name: Yunyi Jia
 Date: 04/18/2018 Number: 39122

Hours

Fixed Credit Course
 Credit Hrs Contact Hrs

3 3

Variable Credit Course
 Credit Hrs Contact Hrs
 Min Max Min Max

Rationale for Add Course

- Strengthen Program Requirement(s)
 Alignment of Student Learning Outcomes
 Alternative Delivery of Content
 Improve Time to Degree
 Evolution of the Discipline
 Changing Prerequisites
 Address DWF Rates
 General Education Modifications
 Other (Please specify.)
 AuE Certificate

Schedule Types

- Field Course
 Independent Study
 Internship
 Lab No Fee
 Lab With Fee
 Lecture
 Other
 Seminar
 Studio
 Tutorial

Projected Enrollment

Year 1: 10
 Year 2: 20
 Year 3: 30
 Year 4: 40

Evaluation

Undergraduate
 A 90 - 100
 B 80 - 89
 C 70 - 79
 D 60 - 69
 F < 60
 Homework: 30%
 Midterm Exam: 20%
 Final Exam: 20%
 Projects: 30%

Catalog Description

This course will cover autonomous vehicle basics, basic sensors for autonomous vehicles, basic signal processing, basic vehicle planning and control algorithms, and basic artificial intelligence for autonomous vehicles.

- Prerequisite(s) Corequisite(s)

ME 3050 or equivalent or permission of Instructor.

Statement of need and justification based on assessment of student learning outcomes

Autonomous vehicles are an emerging hot topic for automotive industry. This course will teach students knowledge and skills in this area, which will benefit the students who would engage in autonomous vehicles. This is a new course for the AuE Certificate program. The AuE department will work with appropriate departments to incorporate ABET accreditation standards and assessment criteria for this course to ensure quality of coursework for students.

Textbook(s)

There is no specific textbook for this course, but reading materials will be handed out to students during the course.

Learning Objectives

After completing this course,

- Students will be able to understand and explain the fundamental knowledge of autonomous vehicles.
 Students will be able to understand and explain basic functions and components in autonomous vehicles.
 Students will be able to apply basic signal processing technologies and how to apply them to autonomous vehicles.
 Students will be able to apply basic planning and control algorithms to autonomous vehicles.
 Students will be able to understand and explain basic artificial intelligence basics and technologies for autonomous vehicles.
 Students will be able to implement the learnt knowledge by hands-on programming through online course projects.

Topical Outline

- Overview of Autonomous Vehicles (3 hours)
 Basic Sensing Systems for Autonomous Vehicles (6 hours)
 Basic Signal Processing for Autonomous Vehicles (8 hours)
 Basic Planning for Autonomous Vehicles (4 hours)
 Basic Controls for Autonomous Vehicles (4 hours)
 Basic Artificial Intelligence Technologies for Autonomous Vehicles (6 hours)


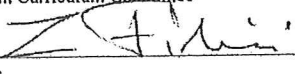
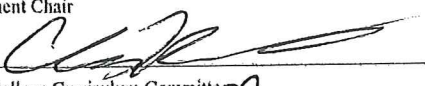

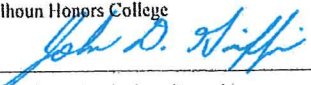
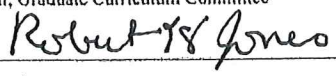
4/18/2018

Add Undergraduate Course - Curriculum & Course Change System

- Basic Programing for Autonomous Driving Projects (6 hours)
- Online Autonomous Driving Projects (8 hours)

Syllabus

Upload File: [AUF: 4050 Syllabus-20180418181701.docx](#)

 Chair, Department Curriculum Committee	4/19/18 Date
 Department Chair	4/19/18 Date
 Chair, College Curriculum Committee	4/22/18 Date
 College Dean	4/23/18 Date
Director, Cathoun Honors College	Date
 Chair, Undergraduate Curriculum Committee	Date
Chair, Graduate Curriculum Committee	Date
 Provost	7/26/18 Date
President	Date

4/19/2018

Add 4000/6000 Course - Curriculum & Course Change System

Add 4000/6000 Course

Course Attributes

Subject Abbreviation: AUE-Automotive Engineering
 Course Number: 4080 / 6080
 Effective Term: Fall 2018
 College: Engr, Comp, and Appl Sci
 Department: Campbell Grad Engr Program

Catalog Title: Vehicle Testing and Characterization Additional Fee?
 Transcript Title: Vehicle Testing and Characteri Justification
 Cross-reference(s):
 Grade Mode: Standard Letter

Form

User ID: beshah Name: Beshah Ayalew
 Date: 04/19/2018 Number: 39106

Hours

Fixed Credit Course
 Credit Hrs Contact Hrs

3 2

Variable Credit Course
 Credit Hrs Contact Hrs
 Min Max Min Max

Rationale for Add Course

- Strengthen Program Requirement(s)
- Alignment of Student Learning Outcomes
- Alternative Delivery of Content
- Improve Time to Degree
- Evolution of the Discipline
- Changing Prerequisites
- Address DWF Rates
- General Education Modifications
- Other (Please specify.)

Schedule Types

- Field Course
- Independent Study
- Internship
- Lab No Fee
- Lab With Fee
- Lecture
- Other
- Seminar
- Studio
- Tutorial

Projected Enrollment

Year 1: 20
 Year 2: 40
 Year 3: 40
 Year 4: 40

Evaluation

4000

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

6000

A 90 - 100
 B 80 - 89
 C 70 - 79
 F < 70

Lab Reports: 70%, Lab conduct and attendance:30%
 Lab Reports: 50%, Lab Conduct and attendance 20%, Team Leaderships 10% Mini projects 20%

Catalog Description

This course gives hands-on laboratory experience in vehicle testing and characterization. It combines the instrumentation of vehicles, and the acquisition and analysis of data for evaluating typical vehicle dynamics and powertrain performance on modern vehicles. It introduces typical auto industry test instrumentation, equipment and processes.

Prerequisite(s) Corequisite(s)

Pre-requisites: ENGR 1400 and ENGR 2080 or equivalent. ME 3050 or Equivalent
 Industry participants must have taken an equivalent course to ENGR 1410 and ENGR 2080

Co-requisite: AuE 4081/AuE6081

Statement of need and justification based on assessment of student learning outcomes

This course is part of the AuE Certificate Program: Combines previously separate laboratory oriented lectures attached to two other courses into one course (with a single laboratory co-requisite) to provide more convenience for more Clemson students and those in industry.

Textbook(s)

None. Instructor notes and laboratory manuals.

4/19/2018

Add 4000/6000 Course - Curriculum & Course Change System

Learning Objectives

- 1. Students will be able to:
 - 1. Demonstrate familiarity with principles in vehicle dynamics and powertrain data acquisition equipment, sensors, and the acquisition of data.
 - 2. Demonstrate understanding of vehicle dynamics testing methods and their relationship to metrics used to define vehicle ride and handling performance.
 - 3. Demonstrate understanding of the methods/procedures for analysis of vehicle powertrain performance data on collected on dynamometers
 - 4. Explain the role of testing and characterization in system level fuel-efficiency, emissions, power and other vehicle performance targets
- Student Learning Outcomes (6080): In addition to the above 4 outcomes:

- 5. Graduate students will be able to demonstrate skills in planning and execution of testing procedures: synthesizing test procedures, facilitate teamwork, and offer conclusions in lab modules and in mini-projects.

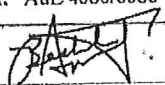
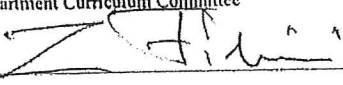
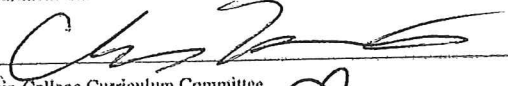
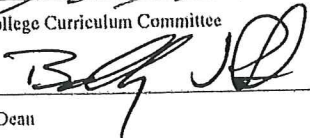
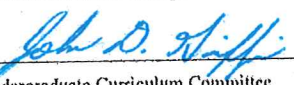
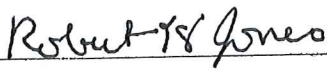
Topical Outline

- 1. Vehicle powertrain instrumentation and data acquisition setup for drive cycle fuel economy evaluation (3 hours)
- 2. Transient and steady state assessment of electric propulsion systems (5 hours)
- 3. Internal combustion engine combustion diagnostics and efficiency (3 hours)
- 4. Vehicle driveability assessment (4 hours)
- 5. Sensors and instrumentation for vehicle dynamics testing: data acquisition and processing (6 hours)
- 6. Four-post shaker vibration testing (Ride simulation) (4 hours)
- 7. Vehicle handling performance testing / objective evaluation (5 hours)

Add course requirements for 6000-level courses

Additional 6080 requirements: Most of the laboratory modules will be conducted in teams led by Graduate students. Graduate students will be expected to make in-class presentations before and/or after execution of each lab regarding procedures and conclusions of each lab exercise. Graduate Students will also complete two mini-projects in vehicle dynamics testing and powertrain characterization.

Syllabus
 Upload File: [AuE 4080 6080 Vehicle Testing Characterization lab-20180419124935.pdf](#)
 Description: AuE 4080/6080 Vehicle Testing and Characterization Lab

 Chair, Department Curriculum Committee	04/19/2018 Date
 Department Chair	4/19/18 Date
 Chair, College Curriculum Committee	4/22/18 Date
 College Dean	4/23/18 Date
Director, Calhoun Honors College 	5/4/2018 Date
Chair, Undergraduate Curriculum Committee	
Chair, Graduate Curriculum Committee 	7/26/18 Date
Provost	
President	Date

MEMO

To: Dr Chris Kitchens, Undergraduate Curriculum Committee
From: Dr Zoran Filipi, AuE Dept. Chair

Dear Chris

Automotive Engineering Department launched an initiative to update the AuE UG Certificate curriculum during the 2018 Spring semester. Efforts of the AuE GRC and faculty members already engaged in the Program culminated in discussions and a vote of all faculty on April 2, 2018th. This included a vote specifically about the new 4080/6080 course, Vehicle Testing and Characterization Lab, and it was approved to be offered with no final exam.

--

Zoran Filipi

Chair, Department of Automotive Engineering
Professor and Timken Chair in Vehicle System Design
Executive Director, Campbell Graduate Engineering Center
Clemson University
International Center for Automotive Research, Greenville, SC
Phone: (864) 283-7222 Fax: (864) 283-7225
e-mail: zfilipi@clemson.edu

4/19/2018

Add 4000/6000 Course - Curriculum & Course Change System

Add 4000/6000 Course

Course Attributes

Subject Abbreviation: AUE-Automotive Engineering
 Course Number: 4081 / 6081
 Effective Term: Fall 2018
 Colleges: Engr, Comp, and Appl Sci
 Department: Campbell Grad Engr Program

Catalog Title: Vehicle Testing and Characterization Lab Additional Fee?
 Transcript Title: Vehicle Testing Lab Justification
 Cross-reference(s):
 Grade Mode: Non-Gradeable

Form
 User ID: beshah Name: Beshah Ayalew
 Date: 04/19/2018 Number: 39107

Hours

Fixed Credit Course	
Credit Hrs	Contact Hrs
0	3
Variable Credit Course	
Credit Hrs	Contact Hrs
Min	Max

Rationale for Add Course

- Strengthen Program Requirement(s)
- Alignment of Student Learning Outcomes
- Alternative Delivery of Content
- Improve Time to Degree
- Evolution of the Discipline
- Changing Prerequisites
- Address DWF Rates
- General Education Modifications
- Other (Please specify)

Schedule Types

- Field Course
- Independent Study
- Internship
- Lab No Fee
- Lab With Fee
- Lecture
- Other
- Seminar
- Studio
- Tutorial

Projected Enrollment

Year 1: 20
 Year 2: 40
 Year 3: 40
 Year 4: 40

Evaluation

4000

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

4081: Lab Reports: 70%, Lab conduct and attendance:30%

6000

A	90	-	100
B	80	-	89
C	70	-	79
F	<		70

6081: Lab Reports: 50%, Lab Conduct and attendance 20%, Team Leaderships 10% Mini projects 20%

Catalog Description

Non-credit laboratory course to accompany AuE 4080/6080
 It gives hands-on laboratory experience in vehicle testing and characterization. It combines the instrumentation of vehicles, and the acquisition and analysis of data for evaluating typical vehicle dynamics and powertrain performance on modern vehicles. It introduces typical auto industry test instrumentation, equipment and processes.

Prerequisite(s) Corequisite(s)

Prerequisites: ENGR 1400 and ENGR 2080 or equivalent. ME 3050 or Equivalent
 Industry participants must have taken an equivalent course to ENGR 1410 and ENGR 2080

 _____ Date 4/19/2018

Chair, Department Curriculum Committee

 _____ Date 4/19/18

Department Chair

 _____ Date 4/22/18

Chair, College Curriculum Committee

 _____ Date 4/23/18

College Dean

Date

Director, Calhoun Honors College

 _____ Date 5/4/2018

Chair, Undergraduate Curriculum Committee

Date

Chair, Graduate Curriculum Committee

 _____ Date 7/26/18

Provost

Date

President

Add 4000/6000 Course

Course Attributes

Subject Abbreviation: AUE-Automotive Engineering Catalog Title: Digital Automotive Manufacturing Additional Fee?
 Course Number: 4860 / 6860 Transcript Title: Digital Automotive Manufacturi Justification
 Effective Term: Spring 2019 Cross-reference(s):
 College: Engr, Comp, and Appl Sci Grade Mode: Standard Letter
 Department: CU ICAR

Form

User ID: mears Name: Michael Mears
 Date: 04/19/2018 Number: 38760

Hours

Fixed Credit Course
 Credit Hrs Contact Hrs
 3 3

Variable Credit Course
 Credit Hrs Contact Hrs
 Min Max Min Max

Rationale for Add Course

- Strengthen Program Requirement(s)
- Alignment of Student Learning Outcomes
- Alternative Delivery of Content
- Improve Time to Degree
- Evolution of the Discipline
- Changing Prerequisites
- Address DWF Rates
- General Education Modifications
- Other (Please specify.)

Schedule Types

- Field Course
- Independent Study
- Internship
- Lab No Fee
- Lab With Fee
- Lecture
- Other
- Seminar
- Studio
- Tutorial

Projected Enrollment

Year 1: 10
 Year 2: 15
 Year 3: 20
 Year 4: 25

Evaluation

4000		6000	
A	90 - 100	A	90 - 100
B	80 - 89	B	80 - 89
C	70 - 79	C	70 - 79
D	60 - 69	F	< 70
F	< 60	Homework 10%, Projects 50%, Final exam 35%, Participation 5%	
Homework 30%, Projects 25%, Final exam 40%, Participation 5%			

Catalog Description

Digital and Smart Manufacturing sensing, control and information generation technologies in use in the automotive industry. This course explores the framework and definitions of Smart Manufacturing systems, information generation approaches and tradeoffs, signal processing and fusion strategies and their selection, and considerations for local (edge) computing and cloud analytics.

Prerequisite(s) Corequisite(s)

AuE 4860: Consent of instructor AuE 6860: none

Add 4000/6000 Course - Curriculum & Course Change System

Statement of need and justification based on assessment of student learning outcomes
This is an elective course in the evolving Automotive Engineering Certificate program.

Textbook(s)

none, course notes will be provided.

Learning Objectives

All Students

- Explain terms used in digital and smart manufacturing within the automotive industry.
- Explain the current state of the art in application of digital manufacturing technologies.
- Model transducers of common sensing systems in manufacturing.
- Process and synthesize signals to generate information about process physics and dynamics.
- Prescribe and justify selection of sensing and information generation strategies.

6XXX students additional objectives

- Map the architecture of Digital Manufacturing and Smart Manufacturing systems, and differentiate their elements.
- Design a digital manufacturing system that integrates cleanly with equipment and human interacting agents.

Topical Outline

Digital and Smart Manufacturing System Definition 3 hours
 Manufacturing system sensing strategies (traditional, low-cost) 6 hours
 Signal processing and sensor fusion 6 hours
 Knowledge-based control strategies 6 hours
 Local computation hardware (PLC, PAC, embedded systems) 6 hours
 Database management and large data set analytics 6 hours
 Application example: digital automotive assembly 9 hours
 Collective review 3 hours

Duplication (if applicable)

none



Add course requirements for 6000-level courses

Second project in digital manufacturing system development


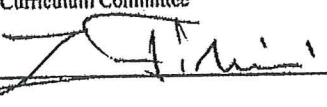


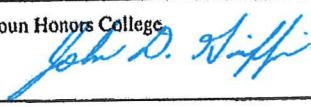
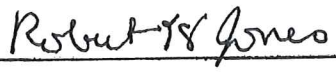
Syllabus

Upload File: [Syllabus_AuE6860_DigitalManufacturing_2018_08_E-20180419092851.docx](#)



Description: syllabus

Add 4000/6000 Course - Curriculum & Course Change System

	4/19/2018	Date
Chair, Department Curriculum Committee		
	4/19/18	Date
Department Chair		
	4/22/18	Date
Chair, College Curriculum Committee		
	4/23/18	Date
College Dean		
<hr/>		
Director, Calhoun Honors College	5/4/2018	Date
		
Chair, Undergraduate Curriculum Committee		
<hr/>		
Chair, Graduate Curriculum Committee		Date
	7/26/18	Date
Provost		
<hr/>		
President		Date

4/18/2018

Minor - Curriculum & Course Change System

Minor

Name: Automotive Engineering Certificate Program Lead Dept: Campbell Grad Engr Program

Change Minor

Effective Catalog Year: 2019-2020

 Change Minor Requirements:**Current Catalog Description**

not available

Proposed Catalog Description

The proposed program provides qualified undergraduate engineering students and working professionals the opportunity to obtain a certificate in Automotive Engineering. Requires 12 credits from a list of courses offered by the AuE department.

Summary / Explanation

It was found from student feedback that the current program has rigid requirements: 4 course and two labs that require a physical presence on the CUICAR campus. No other options. This had made it inaccessible to those working in industry or Clemson undergrads who would have to travel to the CUICAR/CGEC often. Therefore, the AuE faculty have approved a re-organized curriculum that offers 6 courses of which students choose 4 to earn the certificate. New courses have also been added to cover timely topics, such as autonomous vehicles and digital manufacturing. Some lectures could be offered via video or online. The new curriculum lists the following:

AuE 4010/6010 Vehicle Dynamics (lecture only, now 3 credits 3(3))

AuE 4020 Advanced and Electrified Vehicles (lecture only, new title, 3(3))

AuE 4030 Automotive Project Tools (lecture only, 3(3))

AuE 4050 Autonomous Vehicles (lecture only 3(3))

AuE 4860/6860 Digital Automotive Manufacturing (lecture only 3(3))

AuE 4080/6080 Vehicle Testing and Characterization (lecture 3(2) with co-req AuE 4081/6081 Vehicle Testing and Characterization Lab (lab 0(3))

These courses are independent (except the lab co-req) and student simply choose 4 out of the 6. Three will be offered in the Fall, three in the Spring (and some will be repeated depending on demand).

Rationale for Change Minor

- Strengthen Program Requirement(s)
 Alignment of Student Learning Outcomes
 Alternative Delivery of Content
 Improve Time to Degree
 Evolution of the Discipline
 Changing Prerequisites
 Address DWF Rates
 General Education Modifications
 Other (Please specify.)

Improve flexibility of program by re-configuring courses and adding courses on timely topics.

Form

User ID: beshah Name: Beshah Ayalew

Date: 04/18/2018 Number: 39096

Minor - Curriculum & Course Change System

4/18/2018

4/19/18

Chair, Department Curriculum Committee

Date

4/19/18

Date

Department Chair

4/22/18

Date

Chair, College Curriculum Committee

4/23/18

Date

College Dean

Director, Calhoun Honors College

5/4/2018

Chair, Undergraduate Curriculum Committee

Date

Chair, Graduate Curriculum Committee

7/26/18

Date

Provost

Date

President

Date

AuE Curriculum Change Map

Preparer- Beshah Ayalew 4/17/18

Current AuE Certificate Curriculum					New AuE Certificate Curriculum						
No.			credit hrs	contact hours	No.	change/add		credit hours	contact hours		
1	coreq-lab	4010/6010	Vehicle Dynamics	4	3	1	4010/6010	change	3	3	
		4011/6011	lab	0	3						
2	coreq-lab	4020	Advanced Powertrain	4	3	2	4020	change	3	3	
		4021	lab	0	3						
3		4030	Aut. Proj. Tools	2	2	3	4030	change	3	3	
4		4040	Aut. Proj. Prototyping	2	2						
						4	4050	Add	Autonomous Vehicles	3	3
						5	4850	Add	Digital Manufacturing	3	3
						6	4080/6080	Add	Vehicle Testing and Cha	3	2
					co-req	4081/6081	Add	lab	0	3	

*Must take all of the above to earn certificate (12 credits total)
4 courses+2 labs

*Can choose any 4 of the above to earn certificate (still, total 12 credits)

Delete new 4011/6011
4011/6011

these labs replaced by 4080/6080 /4081/6081

To delete in after fall 2018: 4040

Change Major

If Gen Ed requirements are changed a separate Gen Ed Checklist form must accompany this form.

Major Name: Civil Engineering
 Degree: Bachelor of Science
 Effective Catalog Year: 2018-2019
 Change Major Name to: CIVE
 Change Degree to: Bachelor of Science
 Change Curriculum Requirements
 Change General Education Requirements
 Add, Change, or Delete Concentration(s)
 Add, Change, or Delete Emphasis Area(s)

Curriculum Map: Structural Emphasis Correction 201808-20180413084633.pdf
 Description: Corrections and changes needed to be made for clarification and correction.
 Additional Information:
 Description: Corrections and changes needed to be made for clarification and correction.

Summary/Explanation

Structural Engineering emphasis requirements needed to be corrected and clarified per faculty request.

Rationale for Change Major

- Strengthen Program Requirement(s)
- Alignment of Student Learning Outcomes
- Alternative Delivery of Content
- Improve Time to Degree
- Evolution of the Discipline
- Changing Prerequisites
- Address DWF Rates
- General Education Modifications
- Other (Please specify.)
Clarification of requirements

Form

User ID: cwboldi Name: Candice Bolding
 Date: 04/13/2018 Number: 39358

000145

4/12/18

Chair, Department Curriculum Committee

Date

[Signature] for James White

4/12/18

Department Chair

Date

[Signature]

4/22/18

Chair, College Curriculum Committee

Date

[Signature]

4/23/18

College Dean

Date

Director, Calhoun Honors College

Date

[Signature]

5/4/2018

Chair, Undergraduate Curriculum Committee

Date

Chair, Graduate Curriculum Committee

Date

[Signature]

7/26/18

Provost

Date

President

Date

000146

Justification:

Structural engineering group requested to change the emphasis area requirements wording to make the requirements clear and concise.

Change From:

Structural Engineering Emphasis Area— Total of 12 credits: Nine credit hours from CE 4010, 4020, 4040, 4060, 4070, 4080; and three additional credits selected from from CE 4010, 4020, 4040, 4060, 4070, 4080, 4210, 4240, approved 4900, and approved 4910

To:

Structural Engineering Emphasis Area - Total of 12 credits: Nine credit hours from CE 4010, 4020, and 4060; with three additional credits selected from CE 4040, 4070, 4080, 4210, 4240, approved 4900