

Cover Sheet: Request 13072

Change Critical Tracking Criteria for Mechanical Engineering

Info

Process	Major Curriculum Modify Ugrad/Pro
Status	Pending at PV - University Curriculum Committee (UCC)
Submitter	Bruce Carroll bfc@ufl.edu
Created	9/19/2018 8:28:19 AM
Updated	1/22/2019 10:05:25 AM
Description of request	Change critical tracking criteria for undergraduate mechanical engineering degree. Raise minimum critical tracking gpa from 2.5 to 2.8. Remove "approved science elective" and replace with "EML2023 Computer Aided Graphics and Design" as a critical tracking course.

Actions

Step	Status	Group	User	Comment	Updated
Department	Approved	ENG - Mechanical and Aerospace Engineering 011902000	Bruce Carroll		9/19/2018
Revision to BSAE and BSME Critical Tracking.docx					9/19/2018
MECHANICAL ENGINEERING - catalog markup - critical tracking changes.docx					9/19/2018
College	Approved	ENG - College of Engineering	Heidi Dublin	Approved by the HWCOE Curriculum Committee and Faculty Council	10/23/2018
No document changes					
Associate Provost for Undergraduate Affairs	Approved	PV - APUG Review	Casey Griffith		1/22/2019
No document changes					
University Curriculum Committee	Pending	PV - University Curriculum Committee (UCC)			1/22/2019
No document changes					
Office of the Registrar					
No document changes					
Student Academic Support System					
No document changes					
Catalog					
No document changes					
Academic Assessment Committee Notified					
No document changes					
College Notified					
No document changes					

Major|Modify_Curriculum for request 13072

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Submitter: Bruce Carroll bfc@ufl.edu

Created: 9/19/2018 8:24:05 AM

Form version: 1

Responses

Major Name Mechanical Engineering

Major Code ME

Degree Program Name Mechanical Engineering

Undergraduate Innovation Academy Program No

Effective Term Fall

Effective Year 2019

Current Curriculum for Major See attached discussion

Proposed Curriculum Changes See attached discussion

Pedagogical Rationale/Justification See attached discussion

Impact on Enrollment, Retention, Graduation No impact on currently enrolled students.

See attached discussion for anticipated impact on future students.

Assessment Data Review Related to Educational Objectives published in Undergraduate Catalog:

EDUCATIONAL OBJECTIVES

The objective of the mechanical engineering program at UF is to prepare students to attain the following goals within a few years of graduation:

Graduates will meet the expectations of employers of mechanical engineers.

Qualified graduates will pursue advanced study if they so desire.

Academic Learning Compact and Academic Assessment Plan No impact on ALC or AAP

MECHANICAL ENGINEERING

MAJOR

Critical Tracking records each student's progress in courses that are required for entry to each major. Please note the critical-tracking requirements below on a per-semester basis.

Equivalent critical-tracking courses as determined by the State of Florida [Common Course Prerequisites](#) may be used for transfer students.

SEMESTER 1

- Complete 1 of 8 tracking courses with a minimum grade of C within two attempts: [CHM 2045](#) or [CHM 2095](#), ~~approved science~~ ~~elective~~ [EML2023](#), [MAC 2311](#), [MAC 2312](#), [MAC 2313](#), [MAP 2302](#), [PHY 2048](#), [PHY 2049](#)
- [2.58](#) GPA required for all critical-tracking courses
- 2.0 UF GPA required

SEMESTER 2

- Complete 1 additional critical-tracking course with a minimum grade of C within two attempts
- [2.58](#) GPA required for all critical-tracking courses
- 2.0 UF GPA required

SEMESTER 3

- Complete 2 additional critical-tracking courses with minimum grades of C within two attempts
- [2.58](#) GPA required for all critical-tracking courses
- 2.0 UF GPA required

SEMESTER 4

- Complete 2 additional critical-tracking courses with minimum grades of C within two attempts
- 2.58 GPA required for all critical-tracking courses
- 2.0 UF GPA required

SEMESTER 5

- Complete all 8 critical-tracking courses with minimum grades of C within two attempts
- 2.58 GPA required for all critical-tracking courses
- 2.0 UF GPA required

**Proposed Revision of Critical Tracking Criteria
BS Aerospace Engineering and BS Mechanical Engineering Programs
Department of Mechanical and Aerospace Engineering
University of Florida**

The department of mechanical and aerospace engineering proposes changes to the critical tracking criteria for the Bachelor of Science in Aerospace Engineering and the Bachelor of Science in Mechanical Engineering degree programs.

Current Critical Tracking Requirements

- A) Students must complete the following courses with a minimum grade of C within two attempts:
 - 1. CHM2045 General Chemistry or CHM2095 Chemistry for Engineers 1
 - 2. Approved Science Elective (AST3018, AST3019, BSC2010, CHM2046, CHM2096, or PHY3101)
 - 3. MAC2311 Analytical Geometry and Calculus 1
 - 4. MAC2312 Analytical Geometry and Calculus 2
 - 5. MAC2313 Analytical Geometry and Calculus 3
 - 6. MAP2302 Elementary Differential Equations
 - 7. PHY2048 Physics with Calculus 1
 - 8. PHY2049 Physics with Calculus 2

- B) Students must maintain a minimum critical tracking GPA of 2.5 (based on best attempt in each tracking course)

Proposed Critical Tracking Requirements (Changes in Bold)

- A) Students must complete the following courses with a minimum grade of C within two attempts:
 - 1. CHM2045 General Chemistry or CHM2095 Chemistry for Engineers 1
 - 2. **EML2023 Computer Aided Graphics and Design**
 - 3. MAC2311 Analytical Geometry and Calculus 1
 - 4. MAC2312 Analytical Geometry and Calculus 2
 - 5. MAC2313 Analytical Geometry and Calculus 3
 - 6. MAP2302 Elementary Differential Equations
 - 7. PHY2048 Physics with Calculus 1
 - 8. PHY2049 Physics with Calculus 2
 - 9. ~~Approved Science Elective (AST3018, AST3019, BSC2010, CHM2046, CHM2096, or PHY3101)~~

- B) Students must maintain a minimum critical tracking ~~GPA of 2.5~~ **GPA of 2.8** (based on best attempt in each tracking course)

Discussion and Anticipated Impact

The MAE department has completed a review of the BSAE and BSME degree programs as a part of its ongoing quality improvement program. Recognizing the educational objectives of the BSAE and BSME degree programs to prepare students to meet the expectations of employers, the MAE department solicited input from employers and the departmental external advisory board. The proposed changes will help ensure that graduates meet the needs of these constituencies and the long-term career goals of our graduates. The

department also reviewed historical academic records to correlate success in the major to specific courses taken during the first four semesters. Historical data was utilized to predict the impact of the proposed changes on current and future students.

Past experience has demonstrated that performance in the Science Elective is poorly correlated to performance in upper level courses within the BSAE and BSME programs. Also, BSAE and BSME students often postpone taking the science elective since it is not a prerequisite for other courses in the program. These two factors make the Science Elective ineffective as a Critical Tracking course.

The department undertook a study to identify a more suitable Critical Tracking course. Results showed that the course EML2023 Computer Aided Graphics and Design is an excellent predictor of success in the upper level engineering courses. Student performance in EML2023 was also neutral in terms of performance of underrepresented groups (female and minority students.) Most students complete the course EML2023 during early in their degree program (most during the second semester) and EML2023 is a prerequisite for other important courses in the major. For these reasons the department wishes to remove the science elective as a Critical Tracking Course and replace it with EML2023.

Increasingly employers of mechanical and aerospace engineers are seeking graduates with an overall UF GPA of 3.0 or higher. Additionally graduate study requires a minimum GPA of 3.0 or higher. A linear correlation between Critical Tracking GPA and UF GPA at graduation was performed on academic records for students spanning a ten year period. This analysis indicates raising Critical Tracking GPA from 2.5 to 2.8 is desirable to meet the goal stated above.

One of the current issues facing the BSAE and BSME degree programs is excessive time to graduation, with students taking over 8 semesters to complete the degree. Part of the reason for this is students entering the program who must repeat key sophomore and junior level engineering analysis courses. Both the BSAE and BSME programs require a C or better in the following engineering courses: EGM2511 Engineering Mechanics: Statics, EGM3401 Engineering Mechanics: Dynamics; EGM3520 Mechanics of Materials, EML3100 Thermodynamics, and EGM3314 Numerical Methods of Engineering Analysis. Students who do not earn a C or better in these course must repeat the course to earn a sufficient grade prior to matriculating into the upper level engineering courses. This effectively delays graduation due to the long prerequisite chain for the upper level courses. Raising the Critical Tracking GPA from 2.5 to 2.8 will help correct this problem related to 8 semester graduation rates by ensuring students have sufficiently strong math and physics skills to complete the degree in a timely manner.

To summarize, the anticipated impacts of these changes are:

- reduce time to graduation;
- raise target GPA of undergraduates (on average) to 3.0 ;
- anticipate up to 10% reduction in enrollment of upper division courses (based on historical data); and
- no adverse impact on under-represented groups anticipated (based on historical data).
- Students affected by this change will be eligible to change major to other programs at UF (both inside and outside the college of engineering.)
- Transfer students with articulation agreements in place may not have completed the critical tracking course EML2023 Computer Aided Graphics and Design. To accommodate these students, the BSAE and BSME programs will continue to use the Science Elective for transfer admission purposes.