DATE: January 11, 2017

TO: Undergraduate Curriculum Committee

THROUGH: Ed Kalajian, Associate Dean of Academics, College of Engineering

FROM: Hamid Hefazi, Department Head, Mechanical & Aerospace Engineering Dept.

The Mechanical & Aerospace Engineering Dept. is requesting to change the name of the course MAE 3291 from “Junior Design” to “AE Junior Design.” No other changes are sought on this course at this time.
REQUEST TO CHANGE THE REQUIREMENTS FOR A COURSE

Any change, addition or removal of any restriction, or change in credit hours or availability for a course requires this form, accompanied by any supporting documentation, be completed and approved as indicated below.

COLLEGE Engineering

DEPARTMENT Mechanical & Aerospace Engineering

REQUEST IS FOR CHANGE IN COURSE M A E 3 2 9 1 Junior Design

Prefix Number Course Title

TO BE INCLUDED IN 20_17_ /20_18_ CATALOG

Course changes are effective beginning with the fall term in which they appear in the University Catalog.

IS REQUEST FOR A CHANGE IN THE NAME LISTED ABOVE? ☐ Yes ☐ No If yes, requested name AE Junior Design

IS REQUEST FOR A CHANGE IN CREDITS FOR COURSE LISTED ABOVE? ☐ Yes ☐ No If yes, current credits requested credits

IS REQUEST TO CHANGE RESTRICTIONS FOR COURSE LISTED ABOVE? ☐ Yes ☐ No If yes, please check all that apply:

☐ Add ☐ Remove ☐ Prerequisite ☐ Corequisite ☐ and ☐ or

☐ Add ☐ Remove ☐ Prerequisite ☐ Corequisite ☐ and ☐ or

☐ Add ☐ Remove ☐ Other Restrictions* ☐ Yes ☐ No If yes, please use box below:

*Other restrictions may include changing the grade mode (P/F, S/U, A-F, CEU), deactivating a course already in the system, majors or class levels restricted from registration, or other restrictions. Please enter the complete prerequisite/restriction list as it should appear if this change is approved.

☐ Yes ☐ No Is this request for the course to be used to measure program-level student learning outcomes?

☐ Yes ☐ No Is this request for the course to satisfy the scholarly inquiry requirement? If yes, attach "O" materials for review.

☐ Yes ☐ No Will this change impact any existing programs? If yes, attach "Changing Graduation Requirements" form for each program that is impacted.

APPROVALS: Once appropriate department approvals are completed, submit to the Office of Graduate Programs, or Undergraduate Curriculum Committee Chair for placement on agenda.

1) Original

Date

Chair, Graduate Council

Date

OR

2) Department Head/Program Chair

Date

Chair, Undergraduate Curriculum Committee

Date

3) Dean or Associate Dean

Date

CATALOG & CURRICULUM MANAGER'S USE ONLY

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SCABASE SCARRES APCALOG Operator Initials Date

DISTRIBUTION

Original – Catalog & Curriculum Manager
Copy – Academic Unit
To: Dr. Mark Archambault, Chair  
UG curriculum committee  

Via: Dr. Edward Kalajian, Associate Dean  
COE curriculum committee  

From: Hamid Hefazi, Department Head  

The MAE department would like to propose MAE 4806 Space Mission Engineering as a new course. The course will cover subject material that is not taught anywhere else in the undergraduate Aerospace Engineering (AE) curriculum. It has been offered once as a special topic course and has been well received by students. MAE 4806 will be a technical elective in the BSAE program and allows students to focus more on the area of spacecraft engineering. The initial plan is to offer the course once a year in the spring semester.

Sincerely,

Dr. Hamid Hefazi, Ph.D.  
Professor and Department Head  
Mechanical & Aerospace Engineering
New courses are available beginning with the fall term in which they appear in the University Catalog.

Subject: MAE
Course No.: 4806
Credit Hours: 3
Academic Year to be added to the file: Fall 2017

Department: Mechanical and Aerospace Engineering
(Special Sciences)

Schedule Type: Lecture (A)

Restrictions:
- College of Aeronautics - 23
- College of Business - 24
- College of Engineering - 1
- College of Psychology and Liberal Arts - 25

Catalog Title: Space Mission Engineering

Catalog Description of Course:

Discusses the multidisciplinary challenges of spacecraft system design. Provides an overview of types and applications of spacecraft. Includes economics and regulations of space flight. Discusses design and performance trade-offs. Also gives an overview of testing requirements and methods. Meets with MAE 5606.

In addition, please attach a course syllabus and/or more detailed description.

Grades to be Issued:
- A, B, C, D, F
- A, B, C, D, F, CEU/Audit
- CEU
- S, U
- Pass/Fail
- Other

If this course replaces a course currently offered in BANNER, please indicate old course information and the date/term the course may be removed from the system.

Subject: Alpha Prefix (e.g., CSE)
Course No. (e.g., 1301)
Term to Inactivate:
- Yes
- No

Will this course be used to measure program-level student learning outcomes? If yes, review and signature required.

Will this course be used to satisfy the scholarly inquiry requirement? If yes, attach "Q" materials for review.

Will this course impact any existing programs? If yes, attach "Changing Graduation Requirements" form for each program impacted.

Approvals: On completion of description and course number verification, affix appropriate signatures as indicated, and submit to the Office of Graduate Programs, or Undergraduate Curriculum Committee Chair for placement on agenda.

Catalog & Curriculum Manager: Date

Registrar’s Use Only:
- SCACRSE
- SCACURL
- SCAREQ
- SCABASE
- SCAREE
- CIP Code
- Operator Init.
- Date

Florida Institute of Technology • Office of the Registrar
150 West University Boulevard, Melbourne, FL 32901-6975 • (321) 674-8114 • Fax (321) 674-7827

RGR-287-816
MAE 4806 SPACE MISSION ENGINEERING
Fall 2017

Catalog Data: Space Mission Engineering. Discusses the multi-disciplinary challenges of spacecraft systems design. Provides an overview of types and applications of spacecraft, including economics and regulations of space flight. Discusses design and performance tradeoffs. Also gives an overview of testing requirements and methods.

Credits and Contact Hours: 3 credits. 45 contact hours

Required or Elective or Selected Elective: Elective.

Prerequisite and Co-Requisite Courses: MAE2201, MTH2201, or equivalent.

Prerequisite and Co-requisite Topic: Spaceflight Mechanics, Differential Equations, Senior standing.

Textbook (T) and References (R):

Course Outcomes: Upon completion of this course the student will be able to:
1. Design spacecraft attitude and orbital control systems, space power systems, and space communication systems to meet desired mission needs.
2. Identify, formulate, and solve engineering problems spawned by the requirements of individual spacecraft subsystems and the interaction of the subsystems in an integrated system.
3. Understand the impact of engineering solutions in the context of space operations regulations regarding radio frequency allocations, space debris mitigation, and international treaties on the use of space.
4. Apply knowledge of contemporary issues in the fields of space business and space policy on the system design process, with particular emphasis on the commercialization of space flight and the growing importance of space for governments.

Topics Covered and Associated Time:
1. Space system types and applications (2 hrs.)
2. The space mission design process (2 hrs.)
3. Economics and politics of space flight (3 hrs.)
4. Space mission environment and its impact on system design (6 hrs.)
5. Environmental testing (3 hrs.)
6. Payloads and their Impact on Mission Engineering (4 hrs.)
7. Orbit selection based on payload and communication constraints (3 hrs.)
8. Design of Spacecraft Communications Systems (3 hrs.)
9. Spacecraft Command and Telemetry (2 hrs.)
10. Design of Spacecraft Power Systems (4 hrs.)
11. Design of Attitude and Orbital Control Systems (4 hrs.)
12. Design of Spacecraft Thermal Control Systems (4 hrs.)
13. Design of Atmospheric Entry and Thermal Protection Systems (3 hrs.)
14. Midterm Exam (2 hrs.)

Total: 45 hrs.

Grading:
Homework: 20%
Midterm Exam: 20%
Class Project: 30%
Final Exam: 30%

Grading will follow the FIT undergraduate grading policy.
A score ≥ 90%
B 80% ≤ score < 90%
C 70% ≤ score < 80%
D 60% ≤ score < 70%
F score < 60%

Class Schedule: tbd

Relationship of Course Outcomes to Students Outcomes: See assessment matrix and course notebook.

Note on Assessment Process: Graded lecture-based homework, graded midterm examination, final examination, class project.

Prepared By: Markus Wilde, Ph.D., Assistant Professor of Aerospace Engineering

Outcomes Assessment Matrix for MAE 4600

<table>
<thead>
<tr>
<th>Course Outcomes</th>
<th>Relationship of Course Outcomes to Student Outcomes</th>
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<tbody>
<tr>
<td>a</td>
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Key |

Student Outcome Descriptions

a An ability to apply knowledge of mathematics, science, and engineering
b An ability to design and conduct experiments, as well as analyze and interpret data
c An ability to design a system, component, or process to meet desired needs
d An ability to function on multi-disciplinary teams
e An ability to identify, formulate, and solve engineering problems
f An understanding of professional and ethical responsibility
g An ability to communicate effectively
h A broad education necessary to understand the impact of engineering solutions in a global and societal context
i Recognition of the need for, and an ability to engage in, lifelong learning
j Knowledge of contemporary issues
k An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

◊ = The course outcome lightly addresses the Student Outcome
◆ = The course outcome strongly addresses the Student Outcome

Course outcomes assessment matrix completed by: Markus Wilde, Ph.D., Assistant Professor of Aerospace Engineering.
Date: 09/15/2016