Office of the Registrar
FORM 40 REV. 11/09

PURDUE UNIVERSITY
REQUEST FOR ADDITION, EXPIRATION, OR REVISION OF AN UNDERGRADUATE COURSE
(10000-40000 LEVEL)

Print Form

EFD 20-11

DEPARTMENT School of Aeronautics and Astronautics

EFFECTIVE SESSION Spring 2011

INSTRUCTIONS: Please check the items below which describe the purpose of this request.

- [X] 1. New course with supporting documents
- [ ] 2. Add existing course offered at another campus
- [ ] 3. Expiration of a course
- [ ] 4. Change in course number
- [ ] 5. Change in course title
- [ ] 6. Change in course credit/type
- [ ] 7. Change in course attributes (department head signature only)
- [ ] 8. Change in instructional hours
- [ ] 9. Change in course description
- [ ] 10. Change in course requisites
- [ ] 11. Change in semesters offered (department head signature only)
- [ ] 12. Transfer from one department to another

PROPOSED:	EXISTING:
Subject Abbreviation AAE	Subject Abbreviation
Course Number ~~35100~~ 35103	Course Number
Long Title Aerospace Systems Design	
Short Title Aerospace Systems Design	

Abbreviated title will be entered by the Office of the Registrar if omitted. (30 CHARACTERS ONLY)

TERMS OFFERED
Check All That Apply:
[ ] Summer [ ] Fall [X] Spring

CAMPUS(ES) INVOLVED
[ ] Calumet [ ] N. Central
[ ] Cont Ed [ ] Tech Statewide
[ ] Ft. Wayne [X] W. Lafayette
[ ] Indianapolis

CREDIT TYPE
1. Fixed Credit: Cr. Hrs. 3
2. Variable Credit Range: Minimum Cr. Hrs
(Check One) To [ ] Or [ ]
Maximum Cr. Hrs.
3. Equivalent Credit: Yes [ ] No [ ]

COURSE ATTRIBUTES: Check All That Apply
1. Pass/Not Pass Only [ ]
2. Satisfactory/Unsatisfactory Only [ ]
3. Repeatable [ ]
Maximum Repeatable Credit: [ ]
4. Credit by Examination [ ]
5. Special Fees [ ]
6. Registration Approval Type
Department [ ] Instructor [ ]
7. Variable Title [ ]
8. Honors [ ]
9. Full Time Privilege [ ]
10. Off Campus Experience [ ]

ScheduleType	Minutes Per Mtg	Meetings Per Week	Weeks Offered	% of Credit Allocated
ecture	50	3	14	100
citation				
resentation				
Laboratory				
Lab Prep				
Studio				
Distance				
Clinic				
Experiential				
Research				
Ind. Study				
Pract/Observ				

Cross-Listed Courses

COURSE DESCRIPTION (INCLUDE REQUISITES/RESTRICTIONS):
Prerequisite: AAE25100
Aerospace system lifecycle and design process. Stakeholder needs elicitation and requirements generation. Quality function deployment and hierarchical objective trees. Concept generation and creativity techniques. Introduction to safety, risk, cost and value analysis. Critical evaluation of the applicability of systems engineering techniques in specific contexts. Application of these techniques to a team semester design project.

*COURSE LEARNING OUTCOMES:
By the end of this course, it is expected that students will make gains in their ability to:
1) identify appropriate tools, methods and processes to formulate an aerospace system design problem including realistic constraints from technical, economic, social, political, safety, and other relevant contexts
2) apply those tools, methods and processes to generate solutions to the aerospace system design problem

Calumet Department Head	Date	Calumet School Dean	Date
Fort Wayne Department Head	Date	Fort Wayne School Dean	Date
Indianapolis Department Head	Date	Indianapolis School Dean	Date
th Central Department Head	Date	North Central Chancellor	Date
West Lafayette Department Head 10/4/10	Date	West Lafayette College/School Dean 11/29/2010	Date
		West Lafayette Registrar 11/11/11	Date

OFFICE OF THE REGISTRAR

11/11/11

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PROPOSED:		EXISTING:	
Subject Abbreviation	AAE	Subject Abbreviation	
Course Number	35100	Course Number	
Long Title	Aerospace Systems Design		
Short Title	Aerospace Systems Design		

Abbreviated title will be entered by the Office of the Registrar if omitted. (30 CHARACTERS ONLY)

TERMS OFFERED
Check All That Apply:
[ ] Summer [ ] Fall [X] Spring

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(Check One) To [ ] Or [ ]
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3. Repeatable [ ]
Maximum Repeatable Credit: [ ]
4. Credit by Examination [ ]
5. Special Fees [ ]
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Presentation				
Laboratory				
Lab Prep				
Studio				
Distance				
Clinic				
Experiential				
Research				
Ind. Study				
Pract/Observ				

Cross-Listed Courses

COURSE DESCRIPTION (INCLUDE REQUISITES/RESTRICTIONS):
Prerequisite: AAE25100
Aerospace system lifecycle and design process. Stakeholder needs elicitation and requirements generation. Quality function deployment and hierarchical objective trees. Concept generation and creativity techniques. Introduction to safety, risk, cost and value analysis. Critical evaluation of the applicability of systems engineering techniques in specific contexts. Application of these techniques to a team semester design project.

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Calumet Department Head	Date	Calumet School Dean	Date
Fort Wayne Department Head	Date	Fort Wayne School Dean	Date
Indianapolis Department Head	Date	Indianapolis School Dean	Date
North Central Department Head	Date	North Central Chancellor	Date
	10/4/10		11/29/2010
West Lafayette Department Head	Date	West Lafayette College/School Dean	Date

West Lafayette Registrar Date

OFFICE OF THE REGISTRAR

TO: Faculty of Schools of Engineering

FROM: Faculty of the School of Aeronautics and Astronautics

SUBJECT: New Undergraduate Course, AAE 35100

The faculty of the School of Aeronautics and Astronautics has approved the new undergraduate course. This action is now submitted to the Engineering Faculty with a recommendation for approval.

AAE 35100, Aerospace Systems Design
Sem. 2. Class 3, cr 3.
Prerequisite: AAE25100

Course Description: Aerospace system lifecycle and design process. Stakeholder needs elicitation and requirements generation. Quality function deployment and hierarchical objectives trees. Concept generation and creativity techniques. Introduction to safety, risk, cost and value analysis. Critical evaluation of the applicability of systems engineering techniques in specific contexts. Application of these techniques to a team semester design project.

Reason: This course provides students with the knowledge and tools to develop system-level concept designs for complex engineering systems. The examples used in the course are focused on aerospace, but the tools and techniques presented are applicable to any complex design problem. Emphasis is placed on critically selecting and using appropriate design tools, and on determining the domain expertise needed for a given design problem. Many program failures have been traced to poor understanding of customer needs; approximately one third of the course is spent on techniques for eliciting stakeholder needs and the generation of proper verifiable requirements. The second third is spent on techniques for generating concept designs, while the last section of the course presents ways of evaluating concepts in terms of safety, cost, value, reliability, and other "-ilities". This course will prepare students for professional careers in industry, but will also prepare them immediately for our required senior-level capstone design courses, AAE 45000 and 45100. This course has been offered four times under the temporary number AAE49000B, with enrollments of averaging 30 students, all from AAE.

Tom I-P Shih, Professor and Head
School of Aeronautics and Astronautics

APPROVED FOR THE FACULTY
OF THE SCHOOLS OF ENGINEERING
BY THE ENGINEERING
CURRICULUM COMMITTEE

ECC Minutes # 5

Date 11/16/10

Chairman ECC R. Cipra

A&AE 35100, Aerospace Systems Design

Justification: Aerospace product development is a complex process made more difficult by the need to bring together diverse technical areas with competing interests and objectives. This course introduces students to concepts and techniques that enable an ordered and disciplined progression from the identification of an initial market need to the realization of a successful system or product. Fundamental to this process is Systems Engineering, a collection of tools and approaches used to conceive, design, develop and operate complex engineering systems. Systems Engineering is particularly relevant to the aerospace system design and development since it requires orderly development of system requirements, conducting a scientific design activity, developing success metrics and working across disciplinary interfaces. The focus of this course is the design portion of product development. To ensure that students have a concrete understanding of product development, including design, manufacturing and marketing of aerospace products, this course provides a study of methods, including Systems Engineering, to develop a student's ability to organize and conduct design activities. Classroom lectures and exercises include a major team design project. Past projects have included the design of a domestic airport and a tourist spaceplane.

Prerequisite: AAE25100.

Course Instructors: Professor Karen Marais, Professor Terrence A. Weisshaar

Course Description: System lifecycle and design process. Stakeholder needs elicitation and requirements generation. Quality function deployment and hierarchical objectives trees. Concept generation and creativity techniques. Introduction to safety, risk, cost, and value analysis. Critical evaluation of the applicability of systems engineering techniques in specific contexts. Application of these techniques to a team semester design project.

Course Outline:

a) Introduction and Course Logistics. What is systems engineering? System Engineering Basics: Lifecycle, Stakeholders, Complexity. Introduction to the Design Process. Mission Statement. Team Project Introduction (2 wks)
b) Needs Assessment (1 wk)
c) Requirements Engineering. Quality Function Deployment (2 wks)
d) Architecture Concepts—Integrated, modular, and platform (1 wk)
e) Concept Generation. TRIZ. Concept Selection and Pugh Concept Selection. Concept Testing and Prototyping (2 wks)
f) Topics in System Realization: Design for Manufacture, Software Issues (2 wks)
g) Introduction to Reliability and Safety Analysis (1 wk)
h) Cost Analysis (1 wk)
i) Concepts in Financial Analysis (1 wk)
j) Teams: Final Presentations (1 wk)
k) Course evaluation and Lessons Learned (1 wk)

Text: No text. Students are provided with numerous articles and excerpts from the literature along with class notes.

Grading / Assessment: Team project: 70% (Teams of 3-4 students, semester long design project); Individual work: 20% (Approximately ten individual assignments of one week each); Class participation: 10%