TO: The Faculty of the College of Engineering

FROM: The Faculty of the School of Industrial Engineering

RE: Creation of new course – IE 56100: Introduction to Convex Optimization, and cross-listing with AAE course (AAE 56100 – Introduction to Convex Optimization)

The faculty of the School of Industrial Engineering has approved the following new course number, and cross-listing with the previously approved course in AAE. This action is now submitted to the Engineering Faculty with a recommendation for approval.

Course #: IE 56100 – Introduction to Convex Optimization
Term Offered: Sem. 1; Lecture 3, Cr. 3

Prerequisites: Graduate Standing or Instructor Permission
Description: See EFD 75-16

Reason: Convex Optimization courses have been offered within both AAE and IE in recent years. AAE has determined that establishing a permanent course number for a course in convex optimization is prudent and submitted EFD 75-16 to do so. Given that optimization and operations research is a core area within IE, the faculty wish to create a corresponding course number in IE and cross-list the sections when offered. Many IE students have taken the previous offerings of convex optimization in AAE.

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

Abhijit Deshmukh
Professor and Head
School of Industrial Engineering
# Purdue University
REQUEST FOR ADDITION, EXPIRATION,
OR REVISION OF A GRADUATE COURSE
(50000-60000 LEVEL)

**DEPARTMENT:** School of Aeronautics & Astronautics  
**EFFECTIVE SESSION:** Fall 2017

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

- [ ] New course with supporting documents (complete proposal form)
- [ ] Add existing course offered at another campus
- [ ] Expiration of a course
- [ ] Change in course number
- [ ] Change in course title
- [ ] Change in course credit/type
- [ ] Change in course attributes
- [ ] Change in instructional hours
- [ ] Change in course description
- [ ] Change in course requisites
- [ ] Change in semesters offered
- [ ] Transfer from one department to another

### PROPOSED:

<table>
<thead>
<tr>
<th>Subject Abbreviation</th>
<th>AAE</th>
<th>Subject Abbreviation</th>
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</thead>
<tbody>
<tr>
<td>Course Number</td>
<td>56100</td>
<td>Course Number</td>
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<tr>
<td>Long Title</td>
<td>Intro. Convex Opt.</td>
<td>EXISTING:</td>
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<tr>
<td>Short Title</td>
<td>Intro. Convex Opt.</td>
<td>TERMS OFFERED:</td>
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- [ ] Fall  
- [ ] Spring  
- [ ] Summer

### CREDIT TYPE:

<table>
<thead>
<tr>
<th>Schedule Type</th>
<th>Minutes</th>
<th>Meetings Per Week</th>
<th>Weeks</th>
<th>% of Credit Offered</th>
<th>Allocated</th>
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<tbody>
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<td>2</td>
<td>15</td>
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<td>Recitation</td>
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### COURSE ATTRIBUTES:

- [ ] Pass/Not Pass Only
- [ ] Satisfactory/Unsatisfactory Only
- [ ] Repeatable
- [ ] Maximum Repeatable Credit
- [ ] Credit by Examination
- [ ] Fee
- [ ] Coop
- [ ] Lab
- [ ] Rate Request
- [ ] Off Campus Experience

### COURSE DESCRIPTION (INCLUDE REQUISITES/RESTRICTIONS):

Introduction to convex analysis, convex optimization problems, algorithms of convex optimization and measures of their complexity, and applications of convex optimization in aerospace engineering. Recognition of convex optimization problems that arise in scientific and engineering applications. Introduction to software tools to solve convex optimization problems. (Requisites: Graduate Standing or Instructor Permission)

### COURSE LEARNING OUTCOMES:

Be able to… 1. understand basics of convex analysis and convex optimization problems; 2. understand and develop basic algorithms of convex optimization and their complexities; 3. apply convex optimization to solve engineering problems;

### Cross-Listed Courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>IE 56100</td>
<td>3</td>
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### OFFICE OF THE REGISTRAR

Grad Form 40G must include the Graduate Council's supporting document, which is available at http://www.purdue.edu/registrar/forms/form_40_intro.html
 Purdue University

Request for Addition, Expiration, or Revision of a Graduate Course
(50000-60000 Level)

Department: Industrial Engineering
Effective Session: Fall 2017

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

- New course with supporting documents (complete proposal form)
- Add existing course offered at another campus
- Expiration of a course
- Change in course number
- Change in course title
- Change in course credit type
- Change in course attributes
- Change in instructional hours
- Change in course description
- Change in course requisites
- Change in semesters offered
- Transfer from one department to another

Proposed:

- Subject Abbreviation: IE
- Course Number: 56100
- Long Title: Introduction to Convex Optimization

Existing:

- Subject Abbreviation
- Course Number

Terms Offered:

- Check All That Apply:
  - Fall
  - Spring
  - Summer

Campus(es) Involved:

- Calumet
- Fort Wayne
- Indianapolis
- N Central
- Tech Statewide
- W Lafayette

Credit Type:

1. Fixed Credit: Cr. Hrs.
   - 3

2. Variable Credit Range:
   - Minimum Cr. Hrs: ______
   - Maximum Cr. Hrs: ______

3. Equivalent Credit: Yes [x] No

4. Thesis Credit: Yes [x] No

Course Attributes:

- Pass/Not Pass Only
- Satisfactory/ Unsatisfactory Only
- Repeatable
- Maximum Repeatable Credit: ______
- Credit by Examination
- Full Time Privilege
- Fees [x] Coop [ ] Lab [ ] Rate Request

Schedule Type:

- Lecture: 15U
- Recitation
- Presentation
- Laboratory
- Lab Prep
- Studio
- Distance
- Clinic
- Experimental
- Research
- Ind. Study
- Pract/Observe

Minutes Per Week: 2

Weeks Offered: 15

% of Credit Allocated: 100

Cross-Listed Courses

Description of Course (Include Requisites/Restrictions):

Introduction to convex analysis, convex optimization problems, algorithms of convex optimization and measures of their complexity, and applications of convex optimization in aerospace engineering. Recognition of convex optimization problems that arise in scientific and engineering applications. Introduction to software tools to solve convex optimization problems. (Requisites: Graduate Standing or Instructors Permission)

Learning Outcomes:

Be able to... 1. understand basics of convex analysis and convex optimization problems; 2. understand and develop basic algorithms of convex optimization and their complexities; 3. apply convex optimization to solve engineering problems.

Calumet Department Head
Date: __________________________
Calumet School Dean
Date: __________________________
Calumet Director of Graduate Studies
Date: __________________________

Fort Wayne Department Head
Date: __________________________
Fort Wayne School Dean
Date: __________________________
Fort Wayne Director of Graduate Studies
Date: __________________________

Indianapolis Department Head
Date: __________________________
Indianapolis School Dean
Date: __________________________
IUPUI Associate Dean for Graduate Education
Date: __________________________

North Central Department Head
Date: __________________________
North Central School Dean
Date: __________________________
North Central Director of Graduate Studies
Date: __________________________

West Lafayette Department Head
Date: __________________________
West Lafayette College School Dean
Date: __________________________
Date Approved by Graduate Council
Date: __________________________

Graduate Area Committee Convener
Date: __________________________
Graduate Dean
Date: __________________________
Graduate Council Secretary
Date: __________________________

West Lafayette Registrar
Date: __________________________

Office of the Registrar

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