PURDUE UNIVERSITY
REQUEST FOR ADDITION, EXPIRATION,
OR REVISION OF A GRADUATE COURSE
(500-600 LEVEL)

DEPARTMENT: Mechanical Engineering
EFFECTIVE SESSION: Fall 2011

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

1. New course with supporting documents (complete proposal form)
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/number

PROPOSED:
Subject Abbreviation: ME
Course Number: 54000
Long Title: Internal Combustion Engines
Short Title: Int. Combustion Engine

EXISTING:
Subject Abbreviation: 
Course Number: 

TERMS OFFERED:
Check All That Apply
- Summer
- Fall
- Spring
- CAMPUS(ES) INVOLVED
- Calumet
- Cont Ed
- Ft. Wayne
- Indianapolis
- N. Central
- Tech Statewide
- W. Lafayette

COURSE DESCRIPTION (INCLUDE REQUIREMENTS)

ME 540 Internal Combustion Engines
Sem. 2 (alternate years), Class 3, cr. 3.
Prerequisites: ME 30000, ME 31500, ME 44000, or consent of instructor.


<table>
<thead>
<tr>
<th>Instructional Type</th>
<th>Minutes Per Week</th>
<th>Meetings Per Week</th>
<th>% of Credit Allocated</th>
<th>Delivery Method</th>
<th>Delivery Medium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture</td>
<td>75</td>
<td>2</td>
<td>16</td>
<td>Syn</td>
<td>Internet, Live</td>
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<tr>
<td>Recitation</td>
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<td>Text-Based</td>
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<td>Presentation</td>
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<td>Laboratory</td>
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<td>Lab Prep</td>
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<td>Studio</td>
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<td>Distance</td>
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<td>Clinic</td>
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<td>Experiential</td>
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<td>Research</td>
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<td>Ind. Study</td>
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<tr>
<td>Pract/Observ</td>
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</table>

CREDIT TYPE

1. Fixed Credit; Cr. Hrs.
2. Variable Credit Range:
   Minimum Cr. Hrs
   (Check One)
   Maximum Cr. Hrs

3. Equivalent Credit:
4. Thesis Credit:

INSTRUCTORS

Calumet Department Head Date
Calumet School Dean Date
Calumet Undergrad Curriculm Committee Date

Fort Wayne Department Head Date
Fort Wayne School Dean Date
Fort Wayne Chancellor Date

Indianapolis Department Head Date
Indianapolis School Dean Date
Undergrad Curriculm Committee Date

North Central Department Head Date
North Central Chancellor Date
Date Approved by Graduate Council

Graduate School Dean Date
Graduate Council Secretary Date

West Lafayette Department Head Date
West Lafayette College Dean Date
West Lafayette Registrar Date

OFFICE OF THE REGISTRAR
TO: The Faculty of the College of Engineering

FROM: The Faculty of the School of Mechanical Engineering

RE: ME 54000 Prerequisite Changes and Correction in Course Description

The Faculty of the School of Mechanical Engineering has approved the following prerequisite and course description changes. This action is now submitted to the Engineering Faculty with a recommendation for approval.

From:

ME 54000 Internal Combustion Engines
Sem. 2 (alternate years), Class 2, Lab 1, cr. 3
Prerequisite: ME 31500


To:

ME 54000 Internal Combustion Engines
Sem. 2 (alternate years), Class 3, cr. 3
Prerequisite: ME 30000, ME 31500, ME 44000, or consent of instructor


Reason: When we first offered the course ME54000 it was piggybacked on ME44000. ME54000 students took the ME44000 lectures, and had to do some additional work. The last three times we offered it, we did not follow this model. The syllabus for ME54000 is different from that for ME44000, and the lectures are at different times. ME54000 requires ME44000 or an equivalent course, or the permission of the instructor, as prerequisites. Also, there is no lab component with ME 54000 due to the emphasis on fundamental principles and advanced analytical modeling techniques. As such, ME 54000 is an excellent companion course to the more hands-on ME 44000 experience.

James D. Jones, Associate Professor and Associate Head
School of Mechanical Engineering
ME 54000
INTERNAL COMBUSTION ENGINES

Course Outcomes
1. Study the fundamentals of turbulence, boundary layers, liquid atomization, sprays, combustion, and pollutant formation as applied to internal combustion engines.
2. Study the modeling of engine flows, sprays, combustion, and pollutant formation in internal combustion engines.

<table>
<thead>
<tr>
<th>Engine Basics (2 wks)</th>
<th>In-cylinder fluid motion (2 wks)</th>
<th>Fuel Injection and Sprays (3.5 weeks)</th>
<th>Combustion in engines (4.5 wks)</th>
<th>Pollutant in engines (3 wks)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Performance parameters</td>
<td>2. Boundary layers</td>
<td>2. Liquid jet breakup mechanisms</td>
<td>2. Regimes of turbulent combustion</td>
<td>2. UHC, CO, NO, soot formation mechanisms in engines</td>
</tr>
</tbody>
</table>

Revision Date: 11/19/2009
<table>
<thead>
<tr>
<th>COURSE TITLE: Internal Combustion Engines</th>
<th>( \text{Required Course or Elective Course: Elective} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>TERMS OFFERED:</td>
<td>Spring (Alternate Years)</td>
</tr>
<tr>
<td>PRE-REQUISITES:</td>
<td>ME 30,000, ME 31,500, ECE 4,400, or consent of instructor.</td>
</tr>
<tr>
<td>COURSE OUTCOMES:</td>
<td>1. Study the fundamentals of turbulence, boundary layers, liquid atomization, sprays, combustion, and pollutant formation as applied to internal combustion engines.</td>
</tr>
<tr>
<td>2. Study the modeling of engine flows, sprays, combustion, and pollutant formation in internal combustion engines.</td>
<td></td>
</tr>
<tr>
<td>RELATED ME PROGRAM OUTCOMES:</td>
<td>N/A</td>
</tr>
<tr>
<td>COORDINATING FACULTY:</td>
<td>J. Abraham</td>
</tr>
<tr>
<td>COURSE DESCRIPTION:</td>
<td>Specialization of fundamental principles of combustion processes. Study of the fundamentals of fluid dynamics, boundary layers, liquid atomization, sprays, combustion, and pollutant formation as applied to engine flows. Engine airflow, modeling of engine flows, sprays, combustion, and pollutants. Offered in alternate years.</td>
</tr>
<tr>
<td>ASSESSMENTS TOOLS:</td>
<td>1. Six homework assignments.</td>
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<tr>
<td>2. One mid-term oral examination.</td>
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<tr>
<td>3. Final project and oral presentation.</td>
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<tr>
<td>PROFESSIONAL COMPONENT:</td>
<td>1. Engineering Design: ( \text{2.4 credits (60%)} )</td>
</tr>
<tr>
<td>2. Engineering Science: ( \text{0.6 credits (20%)} )</td>
<td></td>
</tr>
<tr>
<td>NATURE OF DESIGN CONTENT:</td>
<td>N/A</td>
</tr>
<tr>
<td>COMPUTER USAGE:</td>
<td>EES, Matlab, cycle analysis software</td>
</tr>
<tr>
<td>COURSE STRUCTURE/SCHEDULE:</td>
<td>Lecture 2 days per week at 75 minutes.</td>
</tr>
<tr>
<td>PREPARED BY:</td>
<td>J. Abraham</td>
</tr>
</tbody>
</table>
Yes, the lab is being removed. This will be a purely lecture course.

Jim

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James D. Jones
Associate Professor and Associate Head
585 Purdue Mall
School of Mechanical Engineering
West Lafayette, IN 47907-2088
Ph: (765)494-5691
Fax: (765)494-0539
Email: jonesjd@purdue.edu

Dr. Jones,

Before I send this off to Dr. Pope and the Registrar for approval, I want to make sure I’m clear on Question #2 in red below.

Thank you,
Debbie

Debra S. Fellure
The Graduate School
Purdue University
Young Hall, Room 160
155 S. Grant St.
West Lafayette, IN 47907-2114
765-494-6963
dfellure@purdue.edu
Thanks for the email. I have responded to your questions below. Let me know if you need anything else.

Jjm

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James D. Jones
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585 Purdue Mall
School of Mechanical Engineering
West Lafayette, IN 47907-2088
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Email: jonesjd@purdue.edu

From: Fellure, Debra S. [mailto:dfellure@purdue.edu]
Sent: Thursday, May 26, 2011 1:36 PM
To: 'jonesjd@purdue.edu'
Subject: ME 54000

Dear Dr. Jones,

I have attached the Original Form 40G for ME 54000. We have a few questions regarding the following items:

1. Credit Type is marked as 3 Fixed Credit: Cr. Hrs. The INSTRUCTIONS area is not checked for (#6) Change in course credit/type. Please clarify if this is a change.
The course went from 2 lec/1 lab to 3 cr Lec. If this requires #6 to be checked, then that would be needed.

2. Instructional Type is marked as 75 Minutes Per Meeting, 2 times per week for 16 Weeks Offered, Syn as Delivery Method, and Live Delivery Medium (Audio, Internet, Live, Text-Based, Video). The INSTRUCTIONS area is not checked for (#8) Change in instructional hours. Please clarify if this is a change.
In the past we have offered this in the T/Th format since there were 2 lecture hours. Now that it is 3 crs all lecture, we may offer it t/th or MWF. I regularly make this change for lots of courses because faculty request it. We put ME 540 in the T/Th 75 min format because historically it was taught as a T/Tu class. Does this answer your questions? The Detailed Course Information (Course Catalog) on the Registrar’s web site indicates Schedule Types: Laboratory, Lecture. I want to make sure the lab is being removed?

3. Terms Offered is marked as Spring. The INSTRUCTIONS area is not checked for (#11) Change in semesters offered. Please clarify if this is a change.
ME 540 was offer in spring (alt. sem) in the past. We wil continue to offer it in spring. This has not changed.

If necessary, I will make any updates with your permission to the Form 40G.

Thank you,
Debbie

Debra S. Fellure
The Graduate School
Purdue University
Yeung Hall, Room 160
155 S. Grant St.
West Lafayette, IN 47907-2114