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

**DEPARTMENT** Mechanical Engineering  
**EFFECTIVE SESSION** Spring 2015

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

- New course with supporting documents
- 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 (department head signature only)
- Change in instructional hours
- Change in course description
- Change in course requisites
- Change in semesters offered (department head signature only)
- Transfer from one department to another

**PROPOSED:**
Subject Abbreviation
Course Number
Long Title  Basic Mechanics I
Short Title

**EXISTING:**
Subject Abbreviation ME
Course Number 27000
Long Title
Short Title

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

**CREDIT TYPE**
1. Fixed Credit: Cr. Hrs.
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
4. Credit by Examination
5. Fees: Coop Lab Rate Request
   Include comment to explain fee
6. Registration Approval Type Department Instructor
7. Variable Title
8. Honors
9. Full Time Privilege
10. Off Campus Experience

**TERMS OFFERED:**
- Fall
- Spring
- Summer

**CAMPUS(ES) INVOLVED**
- Calumet
- Cont Ed
- Ft. Wayne
- Tech Statewide
- Indianapolis
- W. Lafayette

**SCHEDULE TYPE**
- Minutes Per Mtg
- Meetings Per Week
- Weeks Offered
- % of Credit Allocated

- Lecture
- Recitation
- Presentation
- Laboratory
- Lab Prep
- Studio
- Distance
- Clinic
- Experiential
- Research
- Ind. Study
- Pract/Observ

**COURSE DESCRIPTION (INCLUDE REQUISITES/RESTRICTIONS):**
See attached.

**COURSE LEARNING OUTCOMES:**

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**Calumet Department Head**

**Calumet School Dean**

**Fort Wayne Department Head**

**Fort Wayne School Dean**

**Indianapolis Department Head**

**Indianapolis School Dean**

**North Central Faculty Senate Chair**

**Vice Chancellor for Academic Affairs**

**West Lafayette Department Head**

**West Lafayette College School Dean**

**West Lafayette Registrar**

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

FROM: The Faculty of the School of Mechanical Engineering

RE: ME 27000 Changes in Topical Emphasis and Course Description

The Faculty of the School of Mechanical Engineering has approved the following change in ME 27000. This action is now submitted to the Engineering Faculty with a recommendation for approval.

From:

ME 27000 - Basic Mechanics I
Credit Hours: 3.00.

Vector operations, forces and couples, free body diagrams, equilibrium of a particle and of rigid bodies. Friction. Distributed forces. Centers of gravity and centroids. Applications from structural and machine elements, such as bars, trusses, and friction devices. Kinematics and equations of motion of a particle for rectilinear and curvilinear motion. Typically offered Fall, Spring, Summer.

To:

ME 27000 - Basic Mechanics I
Credit Hours: 3.00.

Vector operations, forces and couples. Free body diagrams, equilibrium of a particle and of rigid bodies. Distributed forces. Centers of gravity and centroids. Friction. Trusses, frames, and machines. Internal reactions resulting from axial, shear, torsional, and bending loading. Stress and strain analyses and elementary failure criteria. Typically offered Fall, Spring, Summer.

Reason: Historically, the last 1/3 of ME 27000 has served as an introduction to dynamics, specifically focused on particle kinematic and kinetics. However, this overlap primarily benefitted the ME students since most other disciplines do not require ME 27400 Basic Mechanics II (Dynamics). A much more significant number of students do take either ME 323 Mechanics of Materials or NUCL 273 Mechanics of Materials. We felt an introduction to this topic would be more broadly beneficial and provide a more complete development of the material. Also, in our own ME 26300 Introduction for ME Design, Innovation, and Entrepreneurship course, most students have no exposure to stress and strain, yet many of them would benefit from having some cursory knowledge. This is also a direct benefit of this proposed change.

James D. Jones, Associate Professor and Associate Head
School of Mechanical Engineering
BASIC MECHANICS I

Course Outcomes [Related ME Program Outcomes in brackets]
1. Develop an understanding of static equilibrium and Newton's laws of motion and how to apply them to engineering systems. [A1, A2]
2. Develop an understanding of free-body and bending-moment diagrams and basic stress analysis. [A1, A2]
3. Learn a systematic approach to problem solving. [A3]
4. Foster effective mathematical and graphical communication skills. [B1]

Stresses in Statically Determinate Structures (6 wks)
- Internal Loads (1 wk)
  1. Internal Forces/Couple Analysis
  2. Shear-Force Diagrams
  3. Bending-Moment Diagrams

Equivalent Systems (2 wks)
- Equilibrium of a Particle (2D, 3D)
  1. Force Couples
  2. Equivalent Force Systems
  3. Center of Mass
  4. Center of Mass and Center of Gravity
  5. Fluid Statics

Statics of Rigid Bodies (5 wks)
- Equilibrium of a Particulate (2D, 3D)
  1. Support Reactions and Free Body Diagrams
  2. 2-D and 3-D Static Equilibrium
  3. Partial Constraints
  4. Coulomb's Laws
  5. Frictional Forces

Fundamentals (2 wks)
- Newton's Laws
  1. Newton's First Law
  2. Newton's Second Law
  3. Newton's Third Law
- Vector Algebra
  1. Vectors
  2. Vector Components
  3. Position, Unit and Force Vectors
- Derivatives
  1. Position
  2. Velocity
  3. Acceleration

Revision Date: May 06, 2014
<table>
<thead>
<tr>
<th>COURSE NUMBER:</th>
<th>ME 27000</th>
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<tbody>
<tr>
<td>REQUIRED COURSE OR ELECTIVE COURSE:</td>
<td>Required</td>
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<tr>
<td>COORDINATING FACULTY:</td>
<td>E.A. Nauman</td>
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<tr>
<td>ASSESSMENTS TOOLS:</td>
<td>1. Daily homework.</td>
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<td>2. Periodic announced or unannounced quizzes during lecture periods.</td>
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<td>3. Three, one-hour exams.</td>
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<td>4. One comprehensive final exam.</td>
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<td>PROFESSIONAL COMPONENT:</td>
<td>1. Engineering Topics: Engineering Science – 3 credits (100%)</td>
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<td>COMPUTER USAGE:</td>
<td>None</td>
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<tr>
<td>COURSE STRUCTURE/SCHEDULE:</td>
<td>1. Lecture - 3 days per week at 50 minutes</td>
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<tr>
<td>PREPARED BY:</td>
<td>E.A. Nauman</td>
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<tr>
<td>REVISION DATE:</td>
<td>May 06, 2014</td>
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<thead>
<tr>
<th>COURSE TITLE:</th>
<th>Basic Mechanics I</th>
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<tbody>
<tr>
<td>TERMS OFFERED:</td>
<td>Fall, Spring and Summer</td>
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<tr>
<td>PRE-REQUISITES:</td>
<td>PHYS 17200 -Modern Mechanics and MA 16600-Analytical Geometry &amp; Calculus II or equivalent</td>
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<td>CONCURRENT PRE-REQUISITES:</td>
<td>MA 26100-Multivariate Calculus and ENGR 13200-Transforming Ideas to Innovation II</td>
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<tr>
<td>COURSE OUTCOMES</td>
<td>[Related ME Program Outcomes in brackets]:</td>
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<tr>
<td></td>
<td>1. Develop an understanding of static equilibrium and stresses in statically determinate structures and how to apply them to engineering systems. [A1, A2]</td>
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<td>2. Learn a systematic approach to problem solving. [A2]</td>
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<td>3. Foster effective mathematical and graphical communication skills. [B1]</td>
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<tr>
<td>ME PROGRAM OUTCOMES:</td>
<td>A1. Engineering Fundamentals; B3. Prof/Ethical Responsibility;</td>
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<td>A3. Experimental Skills; B5. Life-Long Learning;</td>
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<td>A4. Modern Engr Tools; C1. Leadership;</td>
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<td>A5. Design Skills; C2. Global Engineering Skills;</td>
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<td>A6. Impact of Engr Solns; C3. Innovation;</td>
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<td>B1. Communication Skills; C4. Entrepreneurship;</td>
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<td>B2. Teamwork Skills;</td>
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