SYLLABUS

Applied Statics
PHY 214

FALL 2003

Wayne State College
Physical Sciences and Mathematics
COURSE DESCRIPTION:

PHY 214 Applied Statics  Fall 2003  Semester Hours: 3

Instructor:  Dr. J. Bauer
Office:   CS 103
Office Hours:
Telephone:  (402) 375-7334
Email:   jebauer1@wsc.edu
Website: http://academic.wsc.edu/faculty/jebauer1

Description: The study of stationary bodies in equilibrium; requires a general knowledge of vector algebra and calculus. Two- and three-dimensional force systems are studied. Trusses, frames and machines, and friction are discussed along with centroids and moments of inertia.

The course is a requirement for pre-professional studies in engineering.

Prerequisite: MAT 140, Calculus I, and PHY 301, University Physics I

Class Meeting Time/Place: 12:30-1:45 P.M. TR, CH 22

COURSE COMPETENCIES: The course will adhere to the Accreditation Board for Engineering and Technology (ABET) Engineering Criteria 2000. More specifically, the course will concentrate on criterion 3(a), 3(c), 3(e), and 3(k).

The student will demonstrate;

(a)  An ability to apply knowledge of mathematics, science, and engineering,
(c)  An ability to design a system, component, or process to meet desired needs,
(e)  An ability to identify, formulate, and solve engineering problems, and
(k)  An ability to use techniques, skills, and modern engineering tools necessary for engineering practice.

COURSE GOALS: It is the course's intent;

• To provide a sound knowledge base in applied statics,
• To prepare the student for applied dynamics,
• To provide the student with means for applying learned concepts to specific situations,
• To increase the student's ability to rationalize and organize information, and
• To create a positive outlook toward engineering science.
INSTRUCTIONAL MATERIALS:

Required Text:


References:


Recommended Equipment: Graphing calculator, downloaded version of Octave.

Resources/Equipment: Octave (accessible from the MAT Linux-lab)
COURSE OUTLINE:

I. Statics of Particles
   • Addition and Resolution of Forces
   • Rectangular Components
   • Equilibrium of a Particle
   • Forces in Space
   • Equilibrium in Space

II. Rigid Bodies: Equivalent Systems of Forces
   • Vector Products; Moments of a Force about a Point
   • Scalar Products; Moment of a Force about an Axis
   • Couples
   • Equivalent Systems of Forces

III. Equilibrium of Rigid Bodies
   • Equilibrium in Two-Dimensions
   • Indeterminate Reactions and Partial Constraints
   • Two- and Three-Force Bodies
   • Equilibrium in Three-Dimensions

IV. Centroids and Centers of Gravity
   • Centroids and First Moments of Areas and Curves
   • Centroids by Integration
   • Centroids of Volumes

V. Analysis of Structures
   • Trusses by Method of Joints
   • Trusses by Method of Sections
   • Frames
   • Machines

VI. Friction
   • Laws of Friction and Applications
   • Wedges and Screws
   • Belt Friction

VII. Moments of Inertia
   • Moment of Inertia of an Area
   • Composite Areas
   • Moments of Inertia of Masses

EVALUATION: Students may be evaluated on the basis of test scores, homework, and attendance. Each test is worth 20% and will consist of four questions. A fifth question will be randomly selected from assigned homework on the day of the test. Grades will be determined on 10% intervals, i.e. the 90s are an A, the 80s are a B, ... Students will be given a comprehensive final. The final will count 20% of the final grade.
WSC STATEMENT OF STUDENT RESPONSIBILITIES:

Wayne State College strives to develop students of a wide range of academic abilities through quality teaching and support. It is our desire to prepare students to accept the privileges, duties, and responsibilities of global citizens; to develop moral and ethical values, to encourage creative ability and develop aesthetic judgments, to encourage the ability to think critically about their world and work; and promote competence in and understanding of fields of knowledge which are required of educated people.

To this end we, the faculty and staff of WSC, have established a standard of student responsibilities in the following statement:

All students will:

Take responsibility for their education. This will include:

- Being knowledgeable of academic requirements and college policies concerning registration, academic standing, payment of tuition and fees, withdrawal and graduation.
- Initiating communication with faculty, advisors and administration regarding questions, concerns and intellectual dialogue.

Cultivate an attitude of integrity both in and out of the class. Integrity is demonstrated by:

- Showing courtesy, dependability, honesty, and respect for instructor expectations concerning attendance, assignments, deadlines and appointments.
- Showing courtesy and respect toward others with diverse points of view in and out of class.
- Displaying a positive work ethic and a genuine interest in welfare of others.
Assignments for Vector Mechanics for Engineers: Statics, 6E

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<thead>
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<th>Sections</th>
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<td>2.9-2.11</td>
<td>2.46, 49, 60, 65, 2.56</td>
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<td>2.12-2.14</td>
<td>2.72, 81, 86, 93, 2.84</td>
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<td>2.10 4, 10 7, 114, 121, 2.119</td>
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<td>3.1-3.8</td>
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<td>3.9-3.11</td>
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<td>3.12-3.16</td>
<td>3.72, 81, 88, 94, 3.91</td>
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<td>3.17-3.20</td>
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**Exam One**

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<td>4.1-4.5</td>
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<td>5.1-5.5</td>
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<td>5.6-5.7</td>
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<td>5.10-5.12</td>
<td>5.114, 116, 128, 132, 5.123</td>
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**Exam Two**

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<td>6.12</td>
<td>6.124, 129, 144, 151 6.127</td>
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<td>Review All Sections</td>
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**Exam Three**

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<td>8.10</td>
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<td>9.6-9.7</td>
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**Exam Four**

Final (Thursday, December 18 @ 10:30 - 12:30 PM)