COURSE OUTLINE

DIVISION: Workforce Development

COURSE: IMT 1200; Equipment Maintenance

Date: Spring 2014

Credit Hours: 3.0

Prerequisite(s): None

Delivery Method:
- Lecture: 2 Contact Hours (1 contact = 1 credit hour)
- Lab: 2 Contact Hours (2 contact = 1 credit hour)
- Clinical: 0 Contact Hours (3 contact = 1 credit hour)

Offered:  ☑ Fall  ☐ Spring  ☐ Summer

IAI Equivalent –Only for Transfer Courses-go to http://www.itransfer.org:

CATALOG DESCRIPTION:
This course provides a basic theory of power transmission equipment and practical applications of it. Basic concepts and procedures for the maintenance and replacement of bearings, vee, timing, and flat belts, chain and chain drives, shaft couplings, gearing, clutches and brakes, lubrication, centrifugal pumps, bearings, screw threads, mechanical fasteners, and packing and seals will be studied. Basic troubleshooting techniques needed to maintain this equipment will be studied.
GENERAL EDUCATION GOALS ADDRESSED
[See the last page of this form for more information.]

Upon completion of the course, the student will be able:
[Choose those goals that apply to this course.]

- To apply analytical and problem solving skills to personal, social and professional issues and situations.
- To communicate orally and in writing, socially and interpersonally.
- To develop an awareness of the contributions made to civilization by the diverse cultures of the world.
- To understand and use contemporary technology effectively and to understand its impact on the individual and society.
- To work and study effectively both individually and in collaboration with others.
- To understand what it means to act ethically and responsibly as an individual in one’s career and as a member of society.
- To develop and maintain a healthy lifestyle physically, mentally, and spiritually.
- To appreciate the ongoing values of learning, self-improvement, and career planning.

EXPECTED LEARNING OUTCOMES AND RELATED COMPETENCIES:
[Outcomes related to course specific goals.]

Upon completion of the course, the student will be able to:
This student will be able to:

1.0 Develop a general understanding of the mechanical design, operation, maintenance, and application of basic components to mechanical systems.
2.0 Develop classroom and laboratory experiences that will simulate typical industrial applications.
3.0 Understand basic principles of weight, mass, gravity, energy, and force systems.
4.0 Recognize basic principles of bearings. Be familiar with the types of bearings, their applications, and standards.
5.0 Be familiar with basic power transmission devices, such as belting, chains, and couplings.
6.0 Become familiar with various types of mechanical fasteners, their applications, and markings.
7.0 Be able to identify industrial applications of gears, gear and variable speed drives, clutches and brakes and accessories.
8.0 Be familiar with basic lubrication systems and materials. Understand words such as: viscosity, pour point, and penetration.
9.0 Be able to recognize warning signs and causes of equipment failure and review basic trouble-shooting concepts.

COURSE TOPICS AND CONTENT REQUIREMENTS:
I. Introduction to Course Content
   A. Introduction to Basic Power Facts
      1. Weight, mass and gravity
   B. Energy and Force Systems
      1. Energy - chemical potential and kinetic energies
      2. Force, work, torque, power
3. Law of Levers and Moments
4. Inertia and centrifugal/centripetal forces

C. Basic Behavior of Materials

II. Belt Drives
A. "V" belts
B. Variations of belting - flat belts
C. Gearbelt
D. Poly "V"
E. HP rating/calculations/pulleys

III. Gears – Open
A. Theory- Pressure angle
B. Types – Standards
C. Maintenance – Wear – Breakage

IV. Gears – Enclosed – Speed Reducers
A. Basic Gear Reduction Types
B. Service Factors
C. Selection/Maintenance

V. Chain Drives
A. Material
B. Types
C. Lubrication
D. Power transmitted
E. Calculations for Chain

VI. Couplings and U-Joints
A. Flexible disc
B. Lovejoy
C. Chain
D. Rubber flex
E. Application/selection/alignment

VII. Packings and Seals
A. Types/Installation Methods

VIII. Bearings
A. Plain bearings
B. Ball and roller bearings
C. Taper roller bearing
D. Needle bearing
E. Applications of types of bearing
F. Bearing standards
G. Replacement procedures

IX. Screw Threads and Mechanical Fasteners
A. Screw Thread Standards
B. Types and Applications

X. Clutches and Brakes
A. Theory
B. Types
C. Selection/Maintenance

XI. Conveyor Components
A. Types/Applications
B. Drives
XII. Lubrication
   A. Types of Systems/Oils/Greases
   B. Applications

XIII. Centrifugal Pumps
   A. Theory – pump hydraulics
   B. Types of impellers

INSTRUCTIONAL METHODS:
1. Lecture
2. Demonstration
3. Audio-visual assistance
4. Laboratory

INSTRUCTIONAL MATERIALS:


STUDENT REQUIREMENTS AND METHODS OF EVALUATION:
1. Ability to work with others.
2. Be familiar with fundamental mathematics.

OTHER REFERENCES
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## Course Competency/Assessment Methods Matrix

### IMT 1200; Equipment Maintenance

For each competency/outcome place an "X" below the method of assessment to be used.

<table>
<thead>
<tr>
<th>Assessment Measures – Are direct or indirect as indicated. List competencies/outcomes below.</th>
<th>Assessment Options</th>
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<tbody>
<tr>
<td>Direct/Indirect</td>
<td>Assessment of Student Learning</td>
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<tr>
<td>1.0 Develop a general understanding of the mechanical design, operation, maintenance, and application of basic components to mechanical systems.</td>
<td>X</td>
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<tr>
<td>2.0 Develop classroom and laboratory experiences that will simulate typical industrial applications.</td>
<td>X</td>
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<tr>
<td>3.0 Understand basic principles of weight, mass, gravity, energy, and force systems.</td>
<td>X</td>
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<tr>
<td>4.0 Recognize basic principles of bearings. Be familiar with the types of bearings, their applications, and standards.</td>
<td>X</td>
</tr>
<tr>
<td>5.0 Be familiar with basic power transmission devices, such as belting, chains, and couplings.</td>
<td>X</td>
</tr>
<tr>
<td>6.0 Become familiar with various types of mechanical fasteners, their applications, and markings.</td>
<td>X</td>
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Curriculum Committee – Course Outline Form Revised 02/2/10

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<td>7.0 Be able to identify industrial applications of gears, gear and variable speed drives, clutches and brakes and accessories.</td>
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<td>Article Review</td>
<td>Case Studies</td>
<td>Group Projects</td>
<td>Lab Work</td>
<td>Oral Presentations</td>
<td>Pre-Post Tests</td>
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<td>Written Exams</td>
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<td>Oral Exit Interviews</td>
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<td>Employer Surveys</td>
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<td>8.0 Be familiar with basic lubrication systems and materials. Understand words such as: viscosity, pour point, and penetration.</td>
<td>Direct/Indirect</td>
<td>Article Review</td>
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