1. Course Title:

Technical Dynamics
MET 327 & MET 327L – 4 Credits Lecture & 1 Credit Lab
MET Core Program Requirement
Prerequisite: IET 311 or permission of instructor, corequisite, MET 327LAB
This is a Technical content course under ABET Criterion 5

2. Faculty Member Information:
   Instructor: Roger Beardsley
   Office: Hogue 302
   Phone: 509-963-1596
   E-mail: beardslr@cwu.edu

3. Course Description:
Lecture Description: rectilinear and curvilinear motion, rotational kinematics, work, energy and power, linear impulse and momentum, angular impulse and momentum, rigid body motion, relative motion and vibrations
Lab Description: Practical application of dynamical systems including usage of state-of-the-art instrumentation and data recording systems.

4. Textbook and other required materials for the course:

5. Specific Learner and Expressive Outcomes and Assessment Strategies:

<table>
<thead>
<tr>
<th>ABET Outcome Criteria #</th>
<th>Learner Outcomes</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>3a,b,f 9b,f,g</td>
<td>1. demonstrate the ability to model dynamic physical systems</td>
<td>Assignments, exams, and lab reports.</td>
</tr>
<tr>
<td>3a,b,f 9b,f,g</td>
<td>2. analyze systems to predict motion of a point or a rigid body</td>
<td>The student will complete a written test and perform assignments.</td>
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<tr>
<td>3c,d,e,f 9e,n</td>
<td>3. demonstrate the ability to select proper instrumentation to support experiments and have the ability to calibrate various sensors and connect sensors to data acquisition systems.</td>
<td>laboratory experiments and reports.</td>
</tr>
<tr>
<td>3a,b,c,g,9e,f,g</td>
<td>4. Students will perform computerized data analysis and be able to present and explain experimental results with clarity.</td>
<td>This shall be assessed through laboratory experiments, written and oral reports.</td>
</tr>
<tr>
<td>3g</td>
<td>5. Students will demonstrate the ability to write various types of test reports common in the engineering field.</td>
<td>This shall be assessed through laboratory written reports.</td>
</tr>
</tbody>
</table>
6. Course Topics and Schedule:

   Introduction & Overview Chapter 12
   Lab Intro: Measurements
   Kinematics of a Particle Chapter 12
   Force and Acceleration Chapter 13
   Lab 1 Laser-timed Velocity Sled
   Work & Energy Chapter 14
   Impulse & Momentum Chapter 15
   Lab 2 Cam Motion Lab
   Review Planar Kinematics & Kinetics of Particles
   Exam #1; Chapter 12, 13, 14 & 15
   Lab 3: Centripetal Acceleration
   Kinematics of a Rigid Body Chapter 16
   Force & Acceleration Chapter 17
   Lab 4 Bounce Lab (restitution)
   Work & Energy Chapter 18
   Impulse & Momentum Chapter 19
   Lab 5: Impulse of Model Rocket Engine
   Review Planar Kinetics & Kinematics of Rigid Bodies
   Exam #2; Chapter 16, 17, 18 & 19
   Vibrations & Resonance Chapter 22
   Lab 6: Vibrating Beam Analysis Lab
   Final Exam - Comprehensive

7. Grading:       HW / Quizzes (11+) 30%
                   Exams & Final (3) 40%
                   Lab Reports. (8) 20%
                   Participation/involvement (30) 10% (weightings are approx)
A(92-100), A-(90-92), B+(88-90), B(82-88), B-(80-82), C+(78-80), C(72-78), C-(70-72), D+(68-70),
D(62-68), D-(60-62),

8. ADA Statement:

   Students who have special needs or disabilities that may affect their ability to access information
   and or material presented in this course are encouraged to contact me or Robert Harden, ADA
   Compliance Officer, Director, ADA Affairs and Students Assistance on campus at 963-2171 for
   additional disability related educational accommodations.

Prepared by Roger Beardsley June 24, 2009