A. **TITLE:** Electromechanical Technology

B. **COURSE NUMBER:** MECH 128

C. **CREDIT HOURS:** 3

D. **WRITING INTENSIVE COURSE:** No

E. **COURSE LENGTH:** 15 weeks

F. **SEMESTER(S) OFFERED:** Spring

G. **HOURS OF LECTURE, LABORATORY, RECITATION, TUTORIAL, ACTIVITY:**
   - 2 Hours of lecture and 2 Hours of lab per week

H. **CATALOG DESCRIPTION:**
   This course provides the knowledge base needed to understand the principles, concepts, and applications of electro-mechanics. It presents problem-solving techniques that are critical for troubleshooting situations. Topics covered include: Nature of motion, simple and compound machines, torque, power transmission, motion devices, electric circuits, electromagnetic circuits and devices, and maintenance procedure for electrical and mechanical machines.

I. **PRE-REQUISITES/CO-REQUISITES:**
   a. Pre-requisite(s): MATH 123: Pre-Calculus and PHYS 121/125 (Physics I and lab)
   b. Co-requisite(s): None

J. **GOALS (STUDENT LEARNING OUTCOMES):**
   By the end of this course, the student will be able to:

<table>
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<tr>
<th>Course Objective</th>
<th>Institutional SLO</th>
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<tr>
<td>1. Explain the interrelationship of electrical and mechanical machine elements and their underlying principles of operation</td>
<td>1. Communication</td>
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<tr>
<td>2. Discuss the use of mechanical coupling, gearing, belt drives, chain drives, bearings, and rigging</td>
<td>1. Communication</td>
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<td>3. Differentiate between electrical, mechanical and pneumatic devices</td>
<td>2. Critical Thinking</td>
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<td>4. Develop basic mechanical and electrical skills</td>
<td>3. Professional Competence</td>
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<td>5. Work and share responsibilities on a team project</td>
<td>4. Inter-Intrapersonal Skills</td>
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<tr>
<td>6. Perform basic calculations</td>
<td>2. Critical Thinking</td>
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<td>7. Explain the importance of mechanical oscillation and mechanical feedback systems</td>
<td>1. Communication</td>
</tr>
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K. **TEXTS:** None

L. **REFERENCES:** None

M. **EQUIPMENT:** Electrical and Mechanical laboratories will be used.
N. **GRADING METHOD:** A-F

O. **MEASUREMENT CRITERIA/METHODS:**
   - Exams
   - Quizzes
   - Homework
   - Participation

P. **DETAILED COURSE OUTLINE:**
   1. Basic Electrical Circuits
      A. Electrical Conductors and Insulators
      B. Resistors and Capacitors
      C. Current, Voltage, Resistance, and Power
      D. Series, Parallel, and Series Parallel Circuits
      E. DC Motor Operation
      F. Stepper Motors
      K. Transducers and Sensors
   2. Data acquisition (DAQ)
      A. Components for data acquisition
      B. Software for data acquisition
   3. Simple machines
      A. Lever
      B. Wheel + axle
      C. Pulley
      D. Inclined plane + wedge
      E. Screw
   4. Gearing, Belt, and Chain Drives
      A. Gear Ratio
      B. Torque Ratio
      C. Efficiency
      D. Gear Trains
      E. The V-Belt and replacement procedure
      F. Synchronous Belt Drives
      G. Timing Belt Pulleys
   5. Rotation, Linear, and Intermittent-Motion Devices
      A. Coupling, Universal Joints, Clutches, Moment of Inertia
      B. Rack and Pinion
      C. Cam and Follower
      D. Geneva Drive Mechanism

Q. **LABORATORY OUTLINE:**

   I. Lego Mind-Storms
   II. Data acquisition
   III. Testing of sensors (e.g., temperature, pressure, strain gauges, force transducers)
   IV. Simple machines
   V. Gears
   VI. Final Project