

<b>COURSE NUMBER:</b> ME 5361, 4 credits.	<b>COURSE TITLE:</b> Plasma-Aided Manufacturing
<b>TERMS OFFERED:</b> 1 semester alternate years	<b>PREREQUISITES:</b> ME 3331, ME 3332 (thermal sciences I, II)
<b>TEXTBOOKS/REQUIRED MATERIAL:</b> course notes will be distributed	<b>PREPARED BY:</b> J. Heberlein  <b>DATE OF PREPARATION:</b> May 5, 2007
<b>COURSE LEADER(S):</b> J. Heberlein D. Ernie	<b>CLASS/LABORATORY SCHEDULE:</b> Three 50-minute lectures per week  <b>CONTRIBUTION OF COURSE TO MEETING PROFESSIONAL OBJECTIVES:</b> 100% Engineering topics
<b>CATALOG DESCRIPTION:</b> Present properties of plasmas as processing media, process control and system design considerations using specific examples of plasma spray coating, microelectronic processing, and selected other applications.	<b>COURSE TOPICS:</b> <ol style="list-style-type: none"> <li>1. Fundamentals of atomic physics, gas discharges, description of arc discharges and instabilities.</li> <li>2. Overview of thermal plasma generation and of various applications.</li> <li>3. Introduction to plasma spraying and other plasma coating processes.</li> <li>4. Control diagnostics for plasma spraying.</li> <li>5. Fundamentals of glow discharge processing, plasma etching and thin film deposition.</li> <li>6. Overview of approaches to other plasma processing applications</li> </ol>

<b>COURSE OBJECTIVES</b>	<ol style="list-style-type: none"> <li>1. Establish the fundamental knowledge necessary for dealing with plasmas as a manufacturing tool.</li> <li>2. Identify needs for process controls and describe different approaches on hand of specific examples of plasma spraying and microelectronics processing.</li> <li>3. Raise familiarity with industrial plasma applications through use of industrial speakers and industry site visits.</li> </ol>
<b>COURSE OUTCOMES</b>	<p><b>(Letters shown in brackets are linked to program outcomes a-k)</b></p> <ol style="list-style-type: none"> <li>1. An ability to decide on when to select plasmas as a processing medium for industrial applications [c].</li> <li>2. An ability to design and conduct experiments using plasmas and to interpret the results [b].</li> <li>3. An ability to design plasma processing systems and select appropriate controls [c, e].</li> <li>4. An ability to acquire and use more specialized knowledge for specific plasma applications [h, i, j, k].</li> </ol>
<b>ASSESSMENT TOOLS:</b>	<ol style="list-style-type: none"> <li>1. Several take home exams and homework problems.</li> <li>2. Term paper.</li> </ol>

## ME 5361

### *Nature of Changes*

1. *Metallurgical and waste processing was removed from the Catalog description.*
2. *Under Course topic 3, plasma welding was replaced with “other plasma coating processes”*
3. *The order of course topics 5 and 6 were switched*
4. *Homework problems are now part of the course assessment tools*