**Tribology Minor**

This 15-hour multidisciplinary minor prepares students from various science and engineering majors for careers that require a background in friction, wear and lubrication (tribology). Students will be prepared for not only the lubricant and bearing manufacturing industry, but for design and maintenance in the power generation, vehicle, and manufacturing industries. Students who complete this minor will acquire the skills necessary to identify critical parameters in a tribological system, design a tribological system for the needs of a specific application, including geometry, lubricant, and surface properties. Students will also understand the chemical formulation and operating mechanisms of lubricants and additives.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>Courses required</td>
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</tr>
<tr>
<td>MECH 5240</td>
<td>Boundary and Full-Film Lubrication</td>
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<tr>
<td>or PFEN 5300</td>
<td>Rheology</td>
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<tr>
<td>or CHEN 5410</td>
<td>Macromolecular Science and Engineering</td>
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<tr>
<td>MECH 5230</td>
<td>Friction, Wear and Lubrication</td>
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<tr>
<td>CHEM 2080</td>
<td>Organic Chemistry II</td>
<td>3</td>
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<tr>
<td>or CHEM 2030</td>
<td>Survey of Organic Chemistry</td>
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<tr>
<td>or CHEM 4070</td>
<td>Physical Chemistry I</td>
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<td>Electives courses</td>
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<tr>
<td>CHEN 5430</td>
<td>Business Aspects of Chemical Engineering</td>
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<tr>
<td>MATL 5600</td>
<td>Corrosion</td>
<td>3</td>
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<tr>
<td>MECH 5830</td>
<td>Engines (This Course is newly added.)</td>
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<tr>
<td>MECH 5270</td>
<td>Metalworking and Manufacturing Tribology</td>
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<tr>
<td>CHEN 5660</td>
<td>Macroscale Assembly and Applications of Nanomaterials</td>
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<tr>
<td>MECH 5970</td>
<td>Intermediate Special Topics in Mechanical Engineering (Can be Advanced Manufacturing)</td>
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<tr>
<td>ENGR 3520</td>
<td>Integrating Business and Engineering Theory with Practice</td>
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<tr>
<td>MATL 5200</td>
<td>Materials Characterization</td>
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<tr>
<td>BSEN 5540</td>
<td>Biomass and Biofuels Engineering</td>
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<tr>
<td>CHEN 5120</td>
<td>Surface and Colloid Science</td>
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<td>CHEM 4070</td>
<td>Physical Chemistry I</td>
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<tr>
<td>MECH 5250</td>
<td>Multiscale Contact Mechanics</td>
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<tr>
<td>ENGR 3510</td>
<td>Introduction to Business and Engineering</td>
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<tr>
<td>CHEN 5420</td>
<td>Polymer Chemical Engineering</td>
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<tr>
<td>BSEN 4250</td>
<td>Hydraulic Control Systems Design</td>
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