Heat Transfer

AEROENG 3580

Credit Hours:
3.00

Course Coordinator:

Course Length:
14 weeks (autumn or spring)
12 weeks (summer only)

Representative Textbooks and Other Course Materials:

<table>
<thead>
<tr>
<th>Title</th>
<th>Author</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fundamentals of Aerodynamics</td>
<td>Anderson, John, Jr.</td>
<td></td>
</tr>
</tbody>
</table>

Course Description:
Fundamentals of conduction, convection, and radiation.

Prerequisites and Co-requisites:
Prereq: 3560 (560 and 570), and enrollment as AeroEng-BS student (No pre-majors can enroll in this class).

Designation:
Required

Course Goals / Objectives:
A fluency with the subject matter including: conduction, convection, and radiation.
**ABET-EAC Criterion 3 Outcomes:**

<table>
<thead>
<tr>
<th>Contribution Type</th>
<th>Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Significant contribution (7+ hours)</td>
<td>1</td>
<td>an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics</td>
</tr>
<tr>
<td>Significant contribution (7+ hours)</td>
<td>2</td>
<td>an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors</td>
</tr>
<tr>
<td>Substantial contribution (3-6 hours)</td>
<td>3</td>
<td>an ability to communicate effectively with a range of audiences - pre-2019 EAC SLO (g)</td>
</tr>
<tr>
<td>Some contribution (1-2 hours)</td>
<td>4</td>
<td>an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts</td>
</tr>
<tr>
<td>Substantial contribution (3-6 hours)</td>
<td>6</td>
<td>an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions</td>
</tr>
<tr>
<td>Some contribution (1-2 hours)</td>
<td>7</td>
<td>an ability to acquire and apply new knowledge as needed, using appropriate learning strategies</td>
</tr>
</tbody>
</table>
**Course Topics:**

- Viscosity and Navier-Stokes equations
- Couette Flow
- Poiseuille Flow and other closed form solutions
- Boundary Layers
- Blasius, Falkner-Skan
- Compressible boundary layers
- Reynolds analogy
- Boundary Layer transition and turbulence
- Conduction
- Convection
- Radiation