Heat Transfer

AEROENG 3580

Description / Conditions

Transcript Abbreviation:
Heat Transfer

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

Course Levels:
Undergraduate (1000-5000 level)

Designation:
Required

General Education Course:
(N/A)

Cross-Listings:
(N/A)

Course Detail

Credit Hours (Minimum if “Range” selected):
3.00

Max Credit Hours:
(N/A)

Select if Repeatable:
Off
Maximum Repeatable Credits:
(N/A)

Total Completions Allowed:
(N/A)

Allow Multiple Enrollments in Term:
No

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

Off Campus:
Never

Campus Location:
Columbus

Instruction Modes:
In Person (75-100% campus; 0-24% online)

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

Electronically Enforced:
No

Exclusions:
Not open to students with credit for 570.

**Course Goals and Learning Objectives**

Course Goals / Objectives:
A fluency with the subject matter including: conduction, convection, and radiation.

Check if concurrence sought:
No

**Contact Hours**
Contact Hours:

<table>
<thead>
<tr>
<th>Topic</th>
<th>LEC</th>
<th>REC out-of-class</th>
<th>REC in-class</th>
<th>Weekly LAB out-of-class</th>
<th>Weekly LAB in-class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viscosity and Navier-Stokes equations</td>
<td>4.0</td>
<td>0.0</td>
<td>0</td>
<td>1.0</td>
<td>0</td>
</tr>
<tr>
<td>Couette Flow</td>
<td>4.0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
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<tr>
<td>Poiseuille Flow and other closed form solutions</td>
<td>4.0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
</tr>
<tr>
<td>Boundary Layers</td>
<td>3.0</td>
<td>0.0</td>
<td>0</td>
<td>2.0</td>
<td>0</td>
</tr>
<tr>
<td>Blasius, Falkner-Skan</td>
<td>3.0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
</tr>
<tr>
<td>Compressible boundary layers</td>
<td>2.0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
</tr>
<tr>
<td>Reynolds analogy</td>
<td>1.0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
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<tr>
<td>Boundary Layer transition and turbulence</td>
<td>3.0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
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<tr>
<td>Conduction</td>
<td>9.0</td>
<td>0.0</td>
<td>0</td>
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<tr>
<td>Convection</td>
<td>3.0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
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<tr>
<td>Radiation</td>
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<td>0</td>
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<tr>
<td>Total</td>
<td>39</td>
<td>0</td>
<td>0</td>
<td>3</td>
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</table>

Grading and Texts

Grading Plan:
Letter Grade

Course Components:
Lecture
Lab
Grade Roster Component:
Lecture

Credit by Exam (EM):
No

Grades Breakdown:

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Percent</th>
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</thead>
<tbody>
<tr>
<td>Homework</td>
<td>30%</td>
</tr>
<tr>
<td>Labs</td>
<td>10%</td>
</tr>
<tr>
<td>Midterm Exams</td>
<td>35%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>25%</td>
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</table>

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>

ABET Student Learning Outcomes

ABET-CAC Criterion 3 Outcomes:
(N/A)

ABET-ETAC Criterion 3 Outcomes:
(N/A)
### ABET-EAC Criterion 3 Outcomes:

<table>
<thead>
<tr>
<th>Significant contribution (7+ hours)</th>
<th>1</th>
<th>an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics</th>
</tr>
</thead>
<tbody>
<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>

### Embedded Literacies (UG courses only)

**Embedded Literacies Info:**

### Attachments / Additional Notes or Comments

**Attachments:**

(N/A)

**Additional Notes or Comments:**

(N/A)