Heat Transfer ENTC 4320  
Mechanical Engineering Technology  
Fall 2019

A. COURSE INFORMATION

Course number/section: ENTC 4320.001  
Class meeting time: 9:00-9:50 AM MWF  
Class location: O’Connor 117  
Course Website:

INSTRUCTOR INFORMATION

Instructor: Prof. Jian Sheng  
Office location: EN 313  
Office hours: 3:00–6:00 pm, MW; others as available or by appt.  
Telephone: 361-825-3731  
e-mail: jian.sheng@tamucc.edu  
Appointments: Direct contact, phone call, or e-mail

B. COURSE DESCRIPTION

Catalog Course Description  
(3 sem. hrs. 3:0) Steady and unsteady conduction in one- and two-dimensions; forced convection, internal and external flows; heat exchangers; introduction to radiation; elements of thermal system design.

Extended Course Description

This course is an introduction to heat transfer and covers conduction, convection, and radiation heat transfer. Calculus will be used to solve some of the heat transfer problems in this course.

C. PREREQUISITES AND COREQUISITES

Prerequisites

ENTC 3420 - Thermodynamics and ENTC 3406 - Fluid Mechanics

Corequisites

None.

D. REQUIRED TEXTBOOK(S), READINGS AND SUPPLIES


Optional Textbook(s) or Other References: None

Supplies: None.
E. **STUDENT LEARNING OUTCOMES AND ASSESSMENT**

Assessment is a process used by instructors to help improve learning. Assessment is essential for effective learning because it provides feedback to both students and instructors. A critical step in this process is making clear the course’s student learning outcomes that describe what students are expected to learn to be successful in the course. The student learning outcomes for this course are listed below. By collecting data and sharing it with students on how well they are accomplishing these learning outcomes students can more efficiently and effectively focus their learning efforts. This information can also help instructors identify challenging areas for students and adjust their teaching approach to facilitate learning.

By the end of this course, students should be able to:

1. Compute quantities associated with heat transfer via steady-state conduction in one and two dimensions.
2. Compute quantities associated with transient heat transfer via conduction.
3. Compute quantities associated with heat transfer via forced and free convection.
5. Compute quantities associated with radiative heat transfer.

F. **INSTRUCTIONAL METHODS AND ACTIVITIES**

Course will be based primarily on lecture, quizzes, tests, and the final exam. Weekly homework quizzes will be given to review progress on homework and learning in general.

G. **MAJOR COURSE REQUIREMENTS AND GRADING**

Suggested homework problems will be assigned. Weekly homework will be given to judge progress, and these will be worth 20% of the final course grade. Three in-class tests will be given and these will count 54% of the final course grade. The comprehensive final exam will count for 26% of the final course grade.

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>% of FINAL GRADE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tests</td>
<td>65</td>
</tr>
<tr>
<td>Homework</td>
<td>15</td>
</tr>
<tr>
<td>Final Exam</td>
<td>20</td>
</tr>
</tbody>
</table>
H. COURSE CONTENT/SCHEDULE

(dates for tests are tentative, subject to change)

Note: Changes in this course schedule may be necessary and will be announced to the class by the Instructor. The assignments and exams shown are directly related to the Student Learning Outcomes described in Section F.

<table>
<thead>
<tr>
<th>DATE (BY DAY OR WEEK)</th>
<th>TOPIC</th>
<th>CHAPTER(S)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WK1</td>
<td>First day of class; Introduction to heat transfer</td>
<td>1</td>
</tr>
<tr>
<td>WK2</td>
<td>Steady-state conductive heat transfer</td>
<td>2, 3, 4.3</td>
</tr>
<tr>
<td>WK3</td>
<td>Transient conductive heat transfer</td>
<td>5</td>
</tr>
<tr>
<td>Friday of WK4</td>
<td>Test No. 1</td>
<td></td>
</tr>
<tr>
<td>WK5</td>
<td>Convection</td>
<td>6</td>
</tr>
<tr>
<td>WK6</td>
<td>External flow</td>
<td>7</td>
</tr>
<tr>
<td>WK7</td>
<td>Internal flow</td>
<td>8</td>
</tr>
<tr>
<td>Friday of WK8</td>
<td>Test No. 2</td>
<td></td>
</tr>
<tr>
<td>WK9</td>
<td>Free convection</td>
<td>9</td>
</tr>
<tr>
<td>WK10</td>
<td>Heat exchangers</td>
<td>11</td>
</tr>
<tr>
<td>WK11</td>
<td>Radiation</td>
<td>12</td>
</tr>
<tr>
<td>WK12</td>
<td>Radiation exchange between surfaces</td>
<td>13</td>
</tr>
<tr>
<td>Friday of WK12</td>
<td>Test No. 3</td>
<td></td>
</tr>
<tr>
<td>WK13</td>
<td>Multi-mode heat transfer</td>
<td>13.4</td>
</tr>
<tr>
<td>WK14</td>
<td>Last day of class; multi-mode heat transfer</td>
<td></td>
</tr>
</tbody>
</table>

Final exam: Wednesday, 11:00 am – 1:30 pm

I. COURSE POLICIES

Attendance/Tardiness
Attendance will be taken on a daily basis. Students are expected to arrive on time for the beginning of the class. Each student is responsible for what takes place in class each day, whether or not the student is present.

Late Work and Make-up Exams
The only graded exercises in the class will be the in-class quizzes, the three tests, and the final exam. No make-up quizzes will be given; quizzes missed due to absences will be
the dropped quiz scores. Tests missed as a result of unexcused absences will result in a score of zero. Under most circumstances, the final exam grade will be substituted for tests missed due to excused absences. The absence must be excused in advance except in case of extreme emergency. No makeup exams will be given, except under unusual circumstances and entirely at the discretion of the instructor.

Cell Phone Use
Cell phones should be turned off and put away during class.

Laptop Use
Laptops should be turned off during class, unless a student is using the electronic form of the textbook. Laptops may be used during tests if the student has only the electronic form of the book. These students should sit on the front two rows of the classroom during tests and the final exam.

Missed Exam
See “Late Work and Make-up Exams,” above.

Communications
All outside-of-class communications will be conducted through the message and e-mail functions of the Blackboard site for the class. Each student should make sure his or her preferred e-mail address is the one in the Blackboard system, and each student should check e-mail and the Blackboard message site regularly.

J. COLLEGE AND UNIVERSITY POLICIES

- **Academic Integrity (University)**
  It is expected that university students will demonstrate a high level of maturity, self-direction, and ability to manage their own affairs. Students are viewed as individuals who possess the qualities of worth, dignity, and the capacity for self-direction in personal behavior.
  See Full University Policy at [http://catalog.tamucc.edu/content.php?catoid=10&navoid=313#Academic_Integrity](http://catalog.tamucc.edu/content.php?catoid=10&navoid=313#Academic_Integrity)

- **Deadline for Dropping a Course with a Grade of W (University)**
  The grade of W will be assigned to any student officially dropping a course by Friday, November 11, 2016. No student is eligible to receive a W without completing the official drop process by this deadline. Visit the Office of the University Registrar for the Course Drop Form that must submitted. After November 11, 2016, a student will not be allowed to drop a course.

- **Grade Appeals (College of Science and Engineering)**
  As stated in University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures, a student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus, equitable evaluation procedures, or appropriate grading,
may appeal the final grade given in the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, see University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules website at [http://www.tamucc.edu/provost/university_rules/index.html](http://www.tamucc.edu/provost/university_rules/index.html), and the College of Science and Engineering Grade Appeals webpage at [http://sci.tamucc.edu/students/GradeAppeal.html](http://sci.tamucc.edu/students/GradeAppeal.html). For assistance and/or guidance in the grade appeal process, students may contact the chair or director of the appropriate department or school, the Office of the College of Science and Engineering Dean, or the Office of the Provost.

- **Disability Services**
  The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please call (361) 825-5816 or visit Disability Services in Corpus Christi Hall 116.

  If you are a returning veteran and are experiencing cognitive and/or physical access issues in the classroom or on campus, please contact the Disability Services office for assistance at (361) 825-5816.

  [http://disabilityservices.tamucc.edu/](http://disabilityservices.tamucc.edu/)

**GENERAL DISCLAIMER**

I reserve the right to modify the information, schedule, assignments, deadlines, and course policies in this syllabus if and when necessary. I will announce such changes in a timely manner during regularly scheduled lecture periods.