Heat Transfer ENTC 4320  
Department of Engineering  
Spring 2020

A. COURSE INFORMATION

Course number/section: ENTC 4320.001  
Class meeting time: MWF 9:00-9:50 am  
Class location: RFEB 104  
Course Website: bb9.tamucc.edu

B. INSTRUCTOR INFORMATION

Instructor: Byung Cheol (Bruce) Lee  
Office: RFEB 315  
Office hours: 3:30 – 5:30 pm, Tue/Wed/Thr, or by appointment  
Telephone: 361-825-4134  
e-mail: bruce.lee@tamucc.edu

C. COURSE DESCRIPTION

Catalog Course Description
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.

D. PREREQUISITES AND COREQUISITES

Prerequisites
ENGR 2316 - Thermodynamics and ENGR 3315 - Fluid Mechanics

E. REQUIRED TEXTBOOK(S), READINGS AND SUPPLIES


Optional Textbook(s) or Other References: None
Supplies: None.

F. 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.

G. 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.

H. MAJOR COURSE REQUIREMENTS AND GRADING

Suggested homework problems will be assigned but not collected or graded. Weekly homework quizzes will be given to judge progress, and these will be worth 15% of the final course grade. Your lowest two quiz scores will be dropped. Three tests will be given and these will count 60% of the final course grade. The comprehensive final exam will count for 25% of the final course grade.

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>% of FINAL GRADE</th>
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<tbody>
<tr>
<td>Tests (3 times)</td>
<td>60</td>
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<tr>
<td>Quizzes &amp; Homework</td>
<td>15</td>
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<tr>
<td>Final Exam</td>
<td>25</td>
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I. COURSE CONTENT/SCHEDULE

(dates for tests are tentative, subject to change)

<table>
<thead>
<tr>
<th>DATE (BY DAY OR WEEK)</th>
<th>TOPIC</th>
<th>CHAPTER(S)</th>
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<tbody>
<tr>
<td>22 Jan</td>
<td>First day of class; Introduction to heat transfer</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Steady-state conductive heat transfer</td>
<td>2, 3, 4.3</td>
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<tr>
<td></td>
<td>Transient conductive heat transfer</td>
<td>5</td>
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<tr>
<td>19 Feb</td>
<td><strong>Test No. 1</strong></td>
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<tr>
<td></td>
<td>Convection</td>
<td>6</td>
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<tr>
<td></td>
<td>External flow</td>
<td>7</td>
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<tr>
<td></td>
<td>Internal flow</td>
<td>8</td>
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<tr>
<td></td>
<td>Free convection</td>
<td>9</td>
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<tr>
<td>9-13 Mar</td>
<td><strong>Spring Break</strong></td>
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<tr>
<td>20 Mar</td>
<td><strong>Test No. 2</strong></td>
<td></td>
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<td></td>
<td>Heat exchangers</td>
<td>11</td>
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<tr>
<td></td>
<td>Radiation</td>
<td>12</td>
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<tr>
<td></td>
<td>Radiation exchange between surfaces</td>
<td>13</td>
</tr>
<tr>
<td>10 Apr</td>
<td><strong>Last day to drop a class</strong></td>
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<td>22 Apr</td>
<td><strong>Test No. 3</strong></td>
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<td></td>
<td>Multi-mode heat transfer</td>
<td>13.4</td>
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<td>6 May</td>
<td>Last day of class; multi-mode heat transfer</td>
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<td>11 May</td>
<td><strong>Final exam</strong>: Monday, 8:00 am – 10:30 am</td>
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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.
J. COURSE POLICIES

Attendance/Tardiness
You are advised to attend all lectures and laboratories. If you miss a class period, you are responsible for whatever is covered or announced during your absence. There will be no make-ups for oral presentations or quizzes. The students are expected to display responsible conduct in the classroom and laboratory, including but not limited to adhering to the rules and regulations, and respecting the instructor and fellow classmates.

Late Work and Make-up Exams
No makeup examinations will be given except in the case of a documented extreme emergency, or University-accepted excuse. Makeup exams will be different from the regular exams and more challenging.

All assignments, both individual and team, must be uploaded by each student to Black Board online system as well as hard copies handed to the course professor in class by the due dates. Late assignments will only be accepted with penalty and with prior notification. There will be a 20 point deduction per late week from the total score of maximum 100 up to 5 weeks, after which a late assignment will not be accepted. Late assignments will not be accepted after the graded assignments are returned to class.

Extra Credit
Extra credit may be assigned at the discretion of the instructor.

Food in Class
Eating or drinking is strictly prohibited in the labs, and not permitted in the lecture rooms. Students with food or drink in visible sight will be asked to discard them, or leave the room. All signage regarding health and safety must be followed in the lecture rooms and laboratories.

Missed Exam
No makeup examinations will be given except in the case of a documented extreme emergency, or University-accepted excuse. Makeup exams will be different from the regular exams and more challenging.

Participation
Students are expected to participate in the in-class and online exercises, discussions, and team work.

Use of Electronic Devices
The use of cell phones, electronic devices, or computers for purposes other than those of the course objectives of the day is not permitted. Restricted activities include but are not limited to text messaging, twittering, talking on the phone, instramgramming, browsing on the internet, and disrupting the classroom activities. Anyone displaying unsuitable classroom behavior will be asked to leave the classroom or the laboratory. Recording of part or all of the lecture or lab
instruction and materials requires approval of the course instructor.

Safety
The safety of students, faculty, staff and visitors to the engineering laboratories is of paramount importance to the Mechanical Engineering and Engineering Technology programs. You must follow all safety procedures and use personal protective equipment as required in each laboratory and workshop. Any student who attempts to use equipment without authorization or violates any safety policy or regulation will be immediately removed from the laboratory.

K. COLLEGE AND UNIVERSITY POLICIES

• Academic Integrity (University)
  University students are expected to conduct themselves in accordance with the highest standards of academic honesty. Academic misconduct for which a student is subject to penalty includes all forms of cheating, such as illicit possession of examinations or examination materials, falsification, forgery, complicity or plagiarism. (Plagiarism is the presentation of the work of another as one’s own work.) In this class, academic misconduct or complicity in an act of academic misconduct on an assignment or test will result in a failing grade.

• Classroom/Professional Behavior
  Texas A&M University-Corpus Christi, as an academic community, requires that each individual respect the needs of others to study and learn in a peaceful atmosphere. Under Article III of the Student Code of Conduct, classroom behavior that interferes with either (a) the instructor’s ability to conduct the class or (b) the ability of other students to profit from the instructional program may be considered a breach of the peace and is subject to disciplinary sanction outlined in article VII of the Student Code of Conduct. Students engaging in unacceptable behavior may be instructed to leave the classroom. This prohibition applies to all instructional forums, including classrooms, electronic classrooms, labs, discussion groups, field trips, etc.

• Statement of Civility
  Texas A&M University-Corpus Christi has a diverse student population that represents the population of the state. Our goal is to provide you with a high quality educational experience that is free from repression. You are responsible for following the rules of the University, city, state and federal government. We expect that you will behave in a manner that is dignified, respectful and courteous to all people, regardless of sex, ethnic/racial origin, religious background, sexual orientation or disability. Behaviors that infringe on the rights of another individual will not be tolerated.

• Deadline for Dropping a Course with a Grade of W (University)
  I hope that you never find it necessary to drop this or any other class. However, events can sometimes occur that make dropping a course necessary or wise. *Please consult with your academic advisor, the Financial Aid Office, and me,*
before you decide to drop this course. Should dropping the course be the best course of action, you must initiate the process to drop the course by going to the Student Services Center and filling out a course drop form. Just stopping attendance and participation WILL NOT automatically result in your being dropped from the class. Please consult the Academic Calendar (http://www.tamucc.edu/academics/calendar/) for the last day 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, and the College of Science and Engineering Grade Appeals webpage at 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/

Statement of Academic Continuity
In the event of an unforeseen adverse event, such as a major hurricane and classes could not be held on the campus of Texas A&M University–Corpus Christi; this course would continue through the use of Blackboard and/or email. In addition, the syllabus and class activities may be modified to allow continuation of the course. Ideally, University facilities (i.e., emails, web sites, and Blackboard)
will be operational within two days of the closing of the physical campus. However, students need to make certain that the course instructor has a primary and a secondary means of contacting each student.

L. OTHER INFORMATION

- Academic Advising
  The College of Science & Engineering requires that students meet with an Academic Advisor as soon as they are ready to declare a major. The Academic Advisor will set up a degree plan, which must be signed by the student, a faculty mentor, and the department chair. Meetings are by appointment only; advisors do not take walk-ins. Please call or stop by the Advising Center to check availability and schedule an appointment. The College’s Academic Advising Center is located in Center for Instruction 350 or can be reached at (361) 825-3928.

GENERAL DISCLAIMER

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