Wright State University  
Department of Mechanical and Materials Engineering  
ME 3360/5360: Heat Transfer  
Fall 2018

*Time: MWF, 1:25 PM – 2:20 PM; Location: 160 Rike*

**Instructor:** Dr. Philippe Sucosky  
**Office:** 257 Russ Engineering Center  
**Office phone:** (937) 775-4650  
**Email:** Philippe.Sucosky@wright.edu

**WEEKLY SCHEDULE:**

<table>
<thead>
<tr>
<th>Time</th>
<th>Monday</th>
<th>Wednesday</th>
<th>Friday</th>
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<tbody>
<tr>
<td>10:30 AM – 12:00 PM</td>
<td>Office hour (257 Russ)</td>
<td>Office hour (257 Russ)</td>
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<tr>
<td>1:25 PM – 2:20 PM</td>
<td>Lecture (160 Rike)</td>
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**COURSE DESCRIPTION AND OBJECTIVES:** This is a first course in heat transfer for mechanical engineering students. The course describes the study of the movement of energy due to a temperature difference and offers a detailed look at the heat equation. The three modes of heat transfer are investigated: conduction, convection, and radiation.

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

- Understand the basic laws of heat transfer
- Account for the consequence of heat transfer in thermal analyses of engineering systems
- Analyze problems and develop solutions for steady state and transient heat conduction in simple geometries
- Obtain numerical solutions for conduction and radiation heat transfer problems
- Understand the fundamentals of convective heat transfer process
- Evaluate heat transfer coefficients for natural and forced convection
- Calculate radiation heat transfer between black body surfaces, gray body surfaces

The topics to be covered are as follows:

1. Introduction
2. Heat conduction equation
3. One-dimensional steady state conduction
4. Transient heat conduction
5. Fundamentals of convection
6. External forced convection
7. Internal forced convection
8. Fundamentals of heat radiation
9. Radiation heat transfer

**MATERIALS:**


- **READING ASSIGNMENTS:** Book chapters covering the material taught in class are indicated in the class schedule. In order to facilitate your understanding of the material presented in class, you are expected to read the book sections prior to attending the respective lecture.

- **WEBSITE:** Information about the course will be posted online on the course website: [http://www.wright.edu/~philippe.sucosky/ME3360.html](http://www.wright.edu/~philippe.sucosky/ME3360.html). Syllabus, course schedule, homework assignments and solutions, exam solutions will be accessible as pdfs.
- **Computing Resources:** Assignments may require the use of a programmable scientific calculator and Matlab (available in computer clusters).

- **Office Hours:** You are encouraged to ask questions during lectures and at office hours (3 hours/week). If you cannot attend the regular office hours, you may email the instructor at least 48 hours in advance to make an appointment. The instructor will also address questions by email.

- **Review Sessions:** A review session will be held by the instructor or a TA before each midterm/exam.

**PREREQUISITES:** ME 1020 (Engineering Programming with Matlab), MTH 2350 (Differential Equations with Matrix Algebra), ME 3350 (Fluid Dynamics)

**Assessment:** Your overall performance will be measured through weekly homework assignments and three examinations.

- **Final Score:** The final score reflecting your performance will be calculated as follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Homework</td>
<td>20%</td>
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<tr>
<td>Midterm 1</td>
<td>25%</td>
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<tr>
<td>Midterm 2</td>
<td>25%</td>
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<tr>
<td>Final exam</td>
<td>30%</td>
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- **Final Grade:** The final grade will be determined on the following tentative range:

  - A: [85, 100]
  - B: [75, 85]
  - C: [60, 75]
  - D: [50, 60]
  - F: [0, 50]

  This distribution is provided for information only and might be revised.

- **Homework Grading Scheme:** Homework assignments will be made every Friday and are due on the Friday following the date assigned, at the beginning of the lecture. The assignments should be prepared according to the format rules described below (see “homework and exam format”).

- **Final and Midterm Exams:** Midterm exams will consist of 1 or 2 problems. The final exam will consist of up to three problems. Midterm 1 covers material taught between the beginning of the semester and the last lecture before the midterm date. Midterm 2 covers material taught between midterms 1 and the last lecture before the midterm date. The final exam is cumulative and covers all the material taught during the semester.

**Policies:**

- **Homework and Exam Policies:**
  
  - Midterm and final examinations are **open note**. Calculators are permitted, unless specified otherwise. **Textbook, laptops, tablets and other electronic devices are not allowed.**
  
  - Cheating will not be tolerated and will be dealt with as severely as policy permits.
  
  - Your work is expected to be neat. Unreadable homework will not be graded.
  
  - You are encouraged to work together on homework; however, each student is expected to submit his/her own solution.
  
  - Homework and exam solutions will be posted on the course website.

- **Homework and Exam Format:**

  Work handed in for grading will be prepared according to the following rules:

  - **Use only black/blue ink. Assignments/exams written with pencils will not be graded.**
- **Grading Corrections**: In most situations, grades and scores are considered final, unless an arithmetic error has been made in the score calculation. Any disputes over grading on homework or exams should be brought to the instructor. Submit within one week of receiving the graded item:
  - The original, unaltered homework or exam.
  - A written description of the grading error.
  - What you believe a fair score for the problem should be.

- **Late Work and Make-Up Policies**:
  - Homework is due on Fridays, at the beginning of the lecture.
  - Late homework will not be accepted.
    - If it is your first late homework, it will not be accounted for in your final homework score.
    - If it is not your first late homework, it will be assigned a score of zero. No excuse or discussion.
  - Make-up examinations will not be permitted, except in the rarest of circumstances.

- **Partial Credits**: Partial credits will be given to incomplete answers providing that a credible attempt was made at solving the problem. The different steps, methods and principles required to solve the problem must be clearly stated to get partial credits.

- **Attendance**: Attendance will not be formally checked. However, the material presented in the lectures will differ from that in the text, particularly in style and level of mathematical rigor. You will be responsible for what is covered in the lectures; therefore, it is to your advantage to attend every class and take careful notes.

- **Work Load**: Heat transfer is considered challenging because of its mathematical content and the scientific rigor required to solve simple problems. Therefore, you should expect to complement each hour spent in class by at least two hours of personal work.

- **Honor Code**: Students are expected to understand and abide by the principles and procedures set forth in Wright State University's Code of Conduct (http://www.wright.edu/community-standards-and-student-conduct/code-of-student-conduct).
  - Working together, asking questions of classmates, or assisting others on exams is prohibited. Students are obliged, under the honor code, to report any improprieties during the exam. The instructor or a teaching assistant will be present during exams to answer questions.
  - Students may collaboratively discuss course assignments but are expected to write and complete their own assignments independently.

**Disclaimer**: Additions, amendments, or revisions to the present syllabus may be made throughout the semester via announcements, handouts or emails.
QUESTIONS, CONTACT INFORMATION: Questions are welcome during the lectures and during office hours. Should a conflict in schedules prohibit you from coming during the posted office hours, other arrangements can be made. Feel free to send your questions via email (expect a reply within 24 hours during the week).