Instructor
Dr. Sandip Mazumder
Room E410, Scott Laboratory
Phone: 247-8099
Email: mazumder.2@osu.edu

Office Hours
Anytime except one hour before class time, preferably by appointment.
Questions, related to homework assignments, if sent by E-mail, should be sent sufficiently (typically at least 24 hrs) in advance.

Course Website
All relevant material related to the course will be made available through the Carmen Course Management System (carmen.osu.edu). You must check the system at least twice a week for updates.

Reading Material
Textbook
There is no designated textbook for this course.

References for Supplementary Reading

Prerequisites
This instructor will assume that you are familiar with course material covered in undergraduate heat transfer, fluid mechanics, thermodynamics, calculus and numerical methods. You will be expected to write computer programs during the course and therefore, must be familiar with at least one programming language/environment, such as Fortran, Pascal, C, C++, or Matlab™. If you are not familiar with any programming language or Matlab™, you are advised to drop out.

Grading Policy
Homeworks (approximately 6): 15%
Computer Projects (3): 45%
Midterm Exam: 20%
Final Exam: 20%

Tentative Grading Scale
88% and above: A
78% to 87%: A-
68% to 77%: B+
58% to 67%: B
48% to 57%: B-
Below 48%: C

Note: The above grading scale is meant to serve only as a guideline.

**Academic Misconduct**
Please read [http://studentaffairs.osu.edu/resource_csc.asp](http://studentaffairs.osu.edu/resource_csc.asp) to understand your responsibilities as a student. Failure to abide by the rules stated in this section is severely punishable by the University.

**Homework Policy**
Homework will generally be posted every week and will be due the same day of the following week. They will be available from Carmen only. Late submission of homework is not acceptable, unless you are seriously ill. If you are absent, please make sure that you either hand over the homework in advance or hand it to a classmate for submission.

Group discussion for homework solution is encouraged. However, copying someone else’s homework solution is not permitted and will be assigned a zero grade. Such decisions are entirely at the discretion of the instructor and no complaints will be entertained. Please also note that it is in your best interest to do the homework yourself in order to earn good grades in the exams.

Homework solutions will be posted on Carmen. They are meant to only serve as a guide. You are strongly advised to solve the homework problems yourself (with the aid of the solution posted) in order to do well in the exams even if you have not managed to turn in the homework in time.

**Computer Projects**
During the quarter, you will be assigned three computer projects. Each project accounts for 15% of your grade. The tentative dates for each project are as follows:
Project 1: Assigned on October 13, Due on November 3.
Project 2: Assigned on November 3, Due on November 24.
Project 3: Assigned on November 24, Due on December 10.

Copying and/or using someone else’s computer program are strictly prohibited. If the instructor feels that you have done so, he may ask you to explain and demonstrate the program during a one-on-one session with him. Failure to conduct this demonstration satisfactorily will result in a zero grade on the project.

**Electronic Submission of Homeworks and Projects**
*Electronic submission of reports is strongly discouraged.* If you do plan on submitting reports electronically, please follow the following guidelines:
- Email them to sandip23m@yahoo.com rather than the instructor’s regular OSU E-mail address
The report must be a single self-contained document (including all Matlab scripts etc.) and must be in PDF format. Word documents will not be accepted.

Make minimum use of color in figures. The instructor will not be responsible for making color printouts.

Absence from Examination / Late Submission of Homework

If you do not appear for an examination, you will automatically receive a zero grade. Makeup exams will be entertained only if the instructor is notified at least one week in advance. Late submission of homework or project reports will not be entertained. Exceptions include only medical emergencies and family crises of a very serious nature. Medical emergencies must be supplemented by a written (and signed) explanation of the nature of medical emergency by a medical professional.

Examinations

Both examinations will be open book/notes and in class. The format of the examination and other relevant details will be discussed in class prior to the examination.

Syllabus and Course Schedule

<table>
<thead>
<tr>
<th>Date</th>
<th>Topics Covered/Major Deadlines</th>
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<tbody>
<tr>
<td>9/22 (W)</td>
<td>Introductions, relation between thermodynamics and heat transfer</td>
</tr>
<tr>
<td>9/27 (M)</td>
<td>Energy balance (First Law), derivation of energy transport equation</td>
</tr>
<tr>
<td>9/29 (W)</td>
<td>Reductions of the energy equation, steady state heat conduction equation</td>
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<tr>
<td>10/4 (M)</td>
<td>Separation of variables for multi-dimensional steady heat conduction</td>
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<tr>
<td>10/6 (W)</td>
<td>Multi-dimensional steady heat conduction continued, various types of boundary conditions and coordinate systems</td>
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<tr>
<td>10/11 (M)</td>
<td>Unsteady heat conduction, Biot number, lumped mass analysis</td>
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<tr>
<td>10/13 (W)</td>
<td>Unsteady heat conduction, large Biot number (spatio-temporal effects)</td>
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<tr>
<td>10/18 (M)</td>
<td>Numerical methods for heat conduction, finite difference techniques</td>
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<tr>
<td>10/20 (W)</td>
<td>Numerical methods, treatment of BCs, iterative solution techniques</td>
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<tr>
<td>10/25 (M)</td>
<td>Convective heat transfer basics, dimensional analysis, Prandtl and Nusselt numbers</td>
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<tr>
<td>10/27 (W)</td>
<td><strong>MIDTERM EXAMINATION, in class</strong></td>
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<tr>
<td>11/1 (M)</td>
<td>Thermal boundary layer, forced convection</td>
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<tr>
<td>11/3 (W)</td>
<td>Forced convection in pipes/channels</td>
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<tr>
<td>11/8 (M)</td>
<td>Natural convection, Grashof and Rayleigh numbers</td>
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<tr>
<td>11/10 (W)</td>
<td>Mixed conduction-convection, examples, numerical methods</td>
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<tr>
<td>11/15 (M)</td>
<td>Introduction to thermal radiation: basic concepts and laws</td>
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<tr>
<td>11/17 (W)</td>
<td>Surface-to-surface radiation, view-factor calculations</td>
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<tr>
<td>11/22 (M)</td>
<td>Radiation in non-participating enclosures, solution techniques</td>
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<tr>
<td>11/24 (W)</td>
<td>Radiation in participating media, radiative transport equation</td>
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<tr>
<td>11/29 (M)</td>
<td>Approximations to the radiative transport equation and solution</td>
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<tr>
<td>12/1 (W)</td>
<td>Combined mode problems, examples</td>
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<tr>
<td>12/9 (Thurs)</td>
<td><strong>FINAL EXAMINATION, 11.30-1.18 pm</strong> (please doublecheck)</td>
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