

# SYLLABUS

## ENME 631 Advanced Conduction and Radiation Heat Transfer, Fall 2020

### Course Description:

This course covers two modes of heat transfer, radiation and conduction. It focuses on physical and mathematical insight into thermal properties of matter and heat transfer by radiation and conduction. It is designed to build students' knowledge for and confidence in applying radiation and conduction in their thermal design and analysis.

### Course Design

This course is delivered synchronously via ZOOM. The course's Canvas site is at [www.elms.umd.edu/](http://www.elms.umd.edu/). Announcements, homework, lecture slides, grades and other course related materials will be posted in Canvas. Course content will incorporate lectures, readings, exercises, and discussion. You will complete graded assignments as an individual and submit them via Canvas.

### Class Times:

Class Meetings: Monday and Tuesday, 2:00pm- 3:15pm EST on ZOOM

### Instructors:

Dr. Bao Yang

Phone: 301-405-6007, Email: baoyang@umd.edu

Virtual Office Hours: 2:00pm-4:00pm, Friday, or by advanced appointment (Zoom or phone)

### Textbook:

Radiation: *Thermal Radiative Transfer and Properties*, Quinn Brewster, John Wiley & Sons.

Conduction: *Analytical Methods in Conduction Heat Transfer*, G.E. Myers, Second Edition, AMCHT Publications.

Both books are reserved in EPSL

### Evaluation / Grading Criteria:

The course grade will be calculated as follows:

Class Participation	8%
Homework	10%
Term Paper	10%
Midterm Exam	40%
Final Exam	<u>32%</u>
TOTAL	100%

### Requirements and Considerations:

1. Attendance and active participation are required. Please refer to the Absences, Assessment, Attendance and Syllabus policy given in

<https://academiccatalog.umd.edu/undergraduate/registration-academic-requirements-regulations/academic-records-regulations/>

In exceptional circumstances (illness, university business, religious observances) extensions may be granted for assignments. However, all extensions must be approved by the instructor BEFORE the due date.

Please refer to the Course Related Policies given on the web

<http://www.ugst.umd.edu/courserelatedpolicies.html>

2. **Lectures** will normally be given by the Instructors. Occasionally, there will be a substitute. Lectures will deal with the general subject matter of the textbook but will also include material not in the text.

3. **Homework** will be assigned for each chapter. Homework problem solutions will be posted online. Students should view homework assignments as learning experiences. *You may consult with your classmates, but you must work on your homework individually. This is the only way you can assure yourself that you are ready for exams.*

As a courtesy to the professor, solutions should be written neatly

4. The **Term Paper topic** will be posted on the course website right after the Midterm Exam. The project is due on the University-assigned Final Exam Day, 12pm noon. The students need to send their project report to the professor via email.

6. **Midterm Exam and Final Exam** are currently scheduled for Nov. 2, 2:00pm-3:15pm and Dec. 14, 2:00pm-3:15pm, respectively. These dates will be confirmed at least one week in advance. It is open book exam. It is important that you show all your work in order to receive full credit. No points will be given for an answer that doesn't include the procedure used to obtain it.

Makeup exams will be given only when a student can present evidence that an absence was caused by serious illness, a death in the immediate family, religious observance, or participation in University activities at the request of University authorities. Please contact the instructor before an anticipated exam absence, if at all possible.

7. **Technical Support.** Please review the *Student Resources to Learn Remotely* website, for help getting started with the tools you'll need in this course:  
<https://ugst.umd.edu/keeplearning/technology.html>.

For assistance with technical and computing issues, contact the Office of Information Technology (OIT) by phone at 301-738-6363, or email at [usg-it servicedesk@umd.edu](mailto:usg-it servicedesk@umd.edu).

### **Communication**

I am required to communicate with you through your UMD email address. If you prefer to use another address, please consult the Office of Information Technology (OIT) to obtain directions for forwarding your UMD email to your preferred address if you don't wish to check both accounts.

Please don't hesitate to email me with updates, questions, or concerns. I will typically respond within 24 hours during the week and 48 hours on the weekend. I will notify you if I will have conflicts for which connection issues may delay a response.

### **Academic Integrity**

*The University of Maryland, College Park has a nationally recognized code of Academic Integrity, administered by the Student Honor Council. This Code sets standards for academic integrity at Maryland for all undergraduates and graduate students. As a student you are responsible for upholding these standards for this course. It is very important for you to be aware of the consequences of cheating, fabrication, facilitation, and plagiarism. For more information, please visit <https://studentconduct.umd.edu/>*

Academic integrity is a foundation for learning. The University has approved a Code of Academic Integrity available on the *Academic Integrity and Student Conduct Codes* web at

<https://academiccatalog.umd.edu/undergraduate/registration-academic-requirements-regulations/academic-integrity-student-conduct-codes/>.

The Code prohibits students from cheating on exams, plagiarizing papers, forging signatures, etc. The Code is administered by a Student Honor Council, which strives to promote a community of trust on the College Park campus. Allegations of academic dishonesty can be reported directly to the Honor Council (301-314-8204) by any member of the campus community.

The University Senate requires that students sign this statement if it is included on an exam or assignment:

*“I pledge on my honor that I have not given or received any unauthorized assistance on this examination (or assignment).”*

**Disclaimer**

Please be aware revisions may be made to this syllabus over the course of the semester, and as such, the content contained within may be subject to change. I will announce any revisions via the discussion in Canvas and during live sessions.

## Course Outline – Tentative!

### Textbook:

Radiation: *Thermal Radiative Transfer and Properties*, Quinn Brewster, John Wiley & Sons.

Conduction: *Analytical Methods in Conduction Heat Transfer*, G.E. Myers, Second Edition, AMCHT Publications.

Aug. 31	Introduction
Sept. 2	Radiation Quantities
Sept. 7	Labor Day
Sept. 9	Radiation Quantities
Sept. 14	Radiation Properties I
Sept. 16	Radiation Properties II
Sept. 21	Diffuse Surface Transfer I
Sept. 23	Diffuse Surface Transfer II
Sept. 28	Diffuse Surface Transfer III
Sept. 30	Electromagnetic Theory I
Oct. 5	Electromagnetic Theory II
Oct. 7	Electromagnetic Theory III
Oct. 12	Electromagnetic Theory IV
Oct. 14	Classical Dispersion Theory I
Oct. 19	Classical Dispersion Theory II
Oct. 21	Classical Dispersion Theory III
Oct. 26	Radiative Transfer Equation I
Oct. 28	Radiative Transfer Equation II
Nov. 2	<b>Midterm</b>
Nov. 4	Elementary Heat Conduction Problems
Nov. 9	Heat Equation, Circular Fin
Nov. 11	Bessel Equation
Nov. 16	Separation of variables I
Nov. 18	Separation of variables II
Nov. 23	Separation of variables III
Nov. 25	<i>(Thanksgiving)</i>
Nov. 30	Separation of variables IV
Dec. 2	Separation of variables V
Dec. 7	Laplace Equation
Dec. 9	Laplace Equation / Review
Dec. 14	<b>Final Exam</b>

### Midterm Exam (Virtual):

Nov. 2, 2:00pm-3:15pm

### Final Exam (Virtual):

Dec. 14, 2:00pm-3:15pm