

# OREGON INSTITUTE OF TECHNOLOGY

## Renewable Energy Engineering

### - Mech 323 Heat Transfer -

**Credit Hours:** (3-0-3)

**Prerequisites:** Fluid Mechanics

**Instructor:** Joey Mohr, B.S., J.D. **Email:** joey@mohriplaw.com **Phone:** (503) 336-1214

**Office Hours:** By appointment or by phone.

**Objectives:** This course introduces the student to the three primary modes of heat transfer: conduction, convection and radiation. Theoretical and practical applications of heat transfer are investigated. Both analytical and empirical techniques are studied, including those for which computer applications are most suited.

**Textbook:** Cengel, Yunus, "Heat and Mass Transfer: A Practical Approach," 4<sup>th</sup> ed., McGraw-Hill, 2010.

<b>Grading:</b>	Midterm Exam	30%	90-100% = A
	Final Exam	40%	80- 89% = B
	Homework	30%	70- 79% = C
			60- 69% = D
			<60% = F

Late homework will be penalized 25% and will be accepted for only one week after its due date. This policy will be strictly enforced. Deviations from this policy will be considered on an assignment-by-assignment basis only. Your completed assignments need to be turned in at the beginning of class on the days that they are due.

Note: I am a firm believer that exam questions should be of similar scope and difficulty as the homework problems assigned throughout the semester. Accordingly, the time and effort you put into completing and understanding the homework will undoubtedly translate into higher scores on my exams.

#### **Student Disability:**

If there is any student with a disability in this class who requires accommodations, please feel free to discuss your needs with me during my office hours or after class. Information will be kept confidential.

#### **Oral and written communication requirements:**

No formal requirements for this course, but class participation is encouraged.

## TENTATIVE COURSE SCHEDULE

Lecture	Material Covered	Subject Matter of Material
1	1.1-1.8	Intro to Heat Transfer
2	2.1-2.5	Differential Heat Conduction Analysis
3	3.1, 3.3-3.5, 3.7	Steady Heat Conduction
4	4.1 and 4.2	Transient Conduction
5	5.1-5.3, 5.5 (1-D)	Numerical Methods
<b>6</b>	-----	<b>MIDTERM EXAM</b>
7	6.1-6.5 7.1-7.4	Convection Fundamentals External Forced Convection
8	8.1-8.6	Internal Forced Convection
9	9.1-9.3 12.1-12.3	Natural Convection Radiation Heat Transfer Fundamentals
10	13.1-13.4	Radiation Heat Transfer Applications
<b>11</b>	-----	<b>FINAL EXAM</b>

### Goals/Objectives:

Understand the difference between the three modes of heat transfer: conduction, convection, and radiation.

Apply the heat diffusion equation to conduction heat transfer problems, and determine appropriate initial and boundary conditions.

Solve steady-state conduction problems

Solve transient conduction problems by analytical and numerical methods.

Determine the boundary layer thickness for laminar and turbulent flows.

Solve external and internal forced convection problems.

Solve natural (free) convection problems.

Understand the theory behind radiation heat transfer.

Determine the radiation exchange between gray/black surfaces.