

Oklahoma State University Institute of Technology
Course Syllabus
Summer 2017

ETDE 3313 Heat Transfer and Fluid Mechanics

Course Description:

A calculus-based course covering fundamental principles of thermal-fluid sciences important to the design, synthesis and operation of process control systems. Students analyze fluid systems using Bernoulli and general energy equations, laminar and turbulent flows, flow and pressure measurements, and flow forces. They will study heat transfer by conduction, convection and radiation.

Type of course: Theory
Total Credit Hours: 3; Total hours of theory per semester: 75
Class length: Full Semester
Class days & times: TTR: 8.00 am to 9.25 am
Prerequisites: MATH 2144, PHYS 1214, ETDE 2253

Instructor Name: Asif Hoque **Instructor Phone:** (918) 293-5375
Office: ET bldg. A11, Room 15J **Instructor E-mail:** asif.hoque@okstate.edu
Contact: My preferred method of contact is e-mail. Please allow 24-48 hours to return your correspondence during the normal work week.

Instructor's Office Hours: Monday, Wednesday, Friday: 10.00 am to 11.00 am
Tuesday, Thursday: 10.30 am to 11.30 am

Division Name: Engineering Technologies **Division Phone:** (918) 293-5150

REQUIRED TEXT, REFERENCES, AND MATERIALS

Text Book: Fundamentals of Thermal-Fluid Sciences, 4th Edition, McGraw Hill, Cengel, ISBN 9780073380209

Classroom Materials:

- Notebook, Pencils & Pens
- Scientific Calculator
- Engineering Work Pad

Estimated Cost for Materials: \$ 300

Estimated Cost for Uniform/Tools: NA

Students must demonstrate the ability to:

Course Outcomes	Assessment Method
1. Comprehend the basic principles of thermal & fluid sciences.	Homework/Exams/Quizzes
2. Apply acquired knowledge of fluids, heat, and the laws of thermodynamics.	Home works/Exams/Quizzes
3. Use Bernoulli's equation to analyze the nature of fluids and their impact on the selection of proper measurement instruments for accessing their flow.	Home works/Exams/Quizzes
4. State the conservation principles of mass, linear momentum, and energy for fluid flow.	Home works/Exams/Quizzes
5. Determine the basic forces and moments acting on simple profiles and shapes in an in viscid, steady fluid flow.	Home works/Exams/Quizzes
6. Recommend a heat exchanger for different heat transfer applications, to be incorporated as a part of a process control systems.	Home works/Exams/Quizzes

COURSE ACTIVITIES

In this course students will:

- *View videos that depict the various concepts.*
- *Compile a portfolio of work produced.*
- *Take examinations.*
- *Complete reading assignments.*
- *May be required to do quizzes.*

Grades will be based on the quality and completion of these tasks:

Pop Quizzes.....20%
 Homeworks.....30%
 2 unit Exams....30%
 Final Exam.....20%

OSUIT Grading Scale
A = 90.00 - 100.00
B = 80.00 - 89.99
C = 70.00 - 79.99
D = 60.00 - 69.99
F = 00.00 - 59.99

*The student's grade for the Final Exam will be used in the university's assessment of student learning. A 70% competency or higher receives a Pass rating. This Pass/Fail rating is independent of the student's course grade.

AUTHORIZED TOOLS

Instructors Policy to Submit Work

To provide students with improved feedback, technical documents shall be submitted electronically via D2L unless approval is received for other methods. To ensure students learn to submit documents electronically, students are required to submit work in pdf format and follow a pre-define template and format. Students will be asked to meet a goal in data recording and analysis by submitted data plots in pdf format (after creating in a MicroSoft Excel or other professional software format) with the aid of team members and instructor advisement. All submissions must be submitted as **one** pdf document unless instructed otherwise. Documents that are not legible will be given a grade of zero. **NO EXCEPTIONS!**

Student Conduct and Other Lab and Classroom Policies

Students are expected to cooperate in maintaining a classroom environment conducive to learning. **Courteous and respectful behavior will be expected from all students each day.** This is a BYOD allowed environment. You can bring your smart devices and laptops to class to be used as a learning tool during class time. If I determine that its use is disrupting class I will require you to turn it off. The use of tobacco in any form in University buildings is prohibited.

- Students are expected to maintain a clean and organized lab work place. After completion of a lab or at the end of the class period, components must be returned to the appropriate storage location they were obtained from. Instruments, test probes, and any items used to perform an experiment must also be returned to the appropriate storage location. All other instruments must be turned-off.
- Class computers are to be used for teaching/learning only. Do not use for entertainment or casual internet surfing or chatting.
- Students are expected to maintain a respectful manner during class-sleeping or otherwise assuming a laid down position will not be tolerated.
- Safety Glasses are required while in the lab setting. **NO EXCEPTIONS!**
- **NO FOOD OR DRINK IN LAB/COMPUTER AREA!**
- Students are expected to check D2L and e-mail for announcements and assignments on a regular basis.
- **All research assignments, written formal Lab Reports, project work, etc. must be submitted in the appropriate folder in the D2L dropbox.**

Dress Code

1. Shoes must cover entire foot.
2. Clothing with obscene logos are not to be worn.
3. Hats may not be worn in the classroom setting.
4. Clothing that is saggy/baggy should not be worn for safety reasons.
5. Sunglasses are not permitted

E-Mail Communication Standards

Students are encouraged to use e-mail when communicating personal issues with their instructor. E-mail corruption is a significant problem and unidentified e-mails are simply purged. Therefore a strict standard is necessary to identify a legitimate student communication. The “message line”

of student e-mails must contain in order – Subject, Name, Course, and Trimester. Example:
Missing Assignment, John Smith, ETDE 1263, Fall 2014.

LATE WORK

- *No late work will be accepted unless it meets the requirements for an excused absence according to OSUIT policy or at instructor discretion.*
- **Quizzes and Group Activities** are in-class lecture assessments that cannot be made-up under any circumstances. Attendance is mandatory.
- **Research, Homework, Lab and Project** reports submitted before the posted due date and time on D2L or written assignment sheet is considered to be on time. Presentations CANNOT be made up.
- **Unit Exams and Final Exam** CANNOT be made up without strict approval and penalty! If you miss an exam, it cannot be made up unless your absence meets the requirements for an approved absence. Make-up exams may be different from the exam given in class and may be more difficult. If you know in advance that you will miss an exam, special arrangements to re-schedule the exam may be possible for hardship circumstances.

TESTING

The following guidelines will be enforced during in class exams:

- All materials not required for the exam must be placed off the desk
- Scientific/Engineering Calculators are allowed unless otherwise noted
- Once testing has started you are not allowed to leave the room until you have completed the test. Doing so will immediately end the test for you.
- All material associated with the exam must be submitted upon completion.
- All tests will have a defined time for completion.
- Exceptions may be made to these rules at the instructor's discretion

UNIVERSITY & COURSE EXPECTATIONS

It is the responsibility of each OSUIT student to read, abide by and maintain a copy of the syllabus for this course. Syllabi are available on the OSUIT website.

Students understand that excerpts or portions of their work may be utilized for institutional assessment purposes. The purpose of institutional assessment is for verification of student learning and program improvement. Every effort will be made to keep this information confidential.

ATTENDANCE POLICY FOR FACE-TO-FACE COURSES

A primary component of OSUIT's Mission is *“to prepare and sustain a diverse student body as competitive members of a world-class workforce.”* Regular and consistent attendance not only aids in academic success, dependable attendance is a requirement in today's real-world employment; therefore, regular and consistent attendance is a requirement in all OSUIT courses.

Definitions:

Absent: Failing to attend all or a significant portion of a class or lab session.

- A. Students may not be marked as absent if missing class for situations such as, but not limited to
 1. participating in a required university activity such as a field trip;
 2. fulfilling a military obligation;
 3. a mandatory court appearance;
 4. death in the immediate family;
 5. extreme illness or accident to oneself or immediate family. Instructors, at their discretion, may require proof of such events.
- B. It is the responsibility of the student to contact and inform the instructor and/or department in advance of such excused absences whenever possible.

Tardy: Arriving late to class as defined by the individual class instructor. Faculty, at their discretion, may equate three tardies to equal one absence.

Procedures:

Early Intervention

- A. Any student who misses 10% of an individual course (or earlier at faculty discretion) during a regular fifteen-week semester, or the equivalent portion of time in a shorter session, will have their name submitted by that course instructor to the OSUIT Early Alert System for retention intervention.
- B. At the point the Early Alert is issued, the student *must* meet with their assigned faculty advisor or designated faculty/staff member within seven (7) academic calendar days for counseling on how to improve their attendance and academic success.

Excessive Absences

- A. The University reserves the right to administratively withdraw any student from an individual course who misses 20% of that course, whether excused or unexcused, and, in the opinion of the instructor, the student does not have a reasonable opportunity to be successful in the course.
- B. Students should be aware any of the following may impact their financial aid:
 1. being administratively withdrawn from a course
 2. dropping a course
 3. their last date of attendance in a course

Please see OSUIT Policy 2-021 for full details and procedures.

AMERICANS WITH DISABILITIES ACT (ADA)

According to the ADA, each student with a disability is responsible for notifying the University of his/her disability and requesting accommodations. If you think you have a qualified disability and need classroom accommodations, contact the Access Services Office located in the College Readiness Center. Please advise the instructor of your disability as soon as possible, to ensure timely implementation of appropriate accommodations. Faculty have an obligation to respond when they receive official notice of a disability from the Access Services Office but are under no obligation to provide retroactive accommodations. To receive services, you must submit appropriate documentation and complete an intake process during which the existence of a qualified disability is verified and reasonable accommodations are identified. Call 293.4988 for more information.

ACADEMIC DISHONESTY

Academic dishonesty or misconduct is neither condoned nor tolerated at OSUIT. Any student found guilty of academic dishonesty or misconduct shall be subject to disciplinary action. Academic dishonesty and/or misconduct includes, but is not limited to, the following actions: (1) Plagiarism: the representation of previously written, published, or creative work as one's own; (2) Unauthorized collaboration on projects; (3) Cheating on examinations; (4) Unauthorized advance access to exams; (5) Fraudulent alteration of academic materials; (6) Knowing cooperation with another person in an academically dishonest undertaking. Students are required to actively protect their work against misuse by others. For details, refer to The OSUIT Student Handbook (Student Rights and Responsibilities Governing Student Behavior) available online at http://www.osuit.edu/academics/forms/student_rights_responsibility.pdf.

Course Schedule			
Course Outline Schedule	Topic	Assignment	Due Date
<i>Week 1</i>	Introduction & Overview		
<i>Week 2</i>	Basic concepts of Thermodynamics	Homework 1	05/11/17
<i>Week 3</i>	Energy, Energy Transfer, & General Energy Analysis		
<i>Week 4</i>	Properties of Pure Substances.	Homework 2	05/25/17
<i>Week 5</i>	Energy Analysis of Closed systems	Exam 1	06/01/17
<i>Week 6</i>	Mass & Energy Analysis of Control Volumes	Homework 3	06/08/17
<i>Week 7</i>	The second law of Thermodynamics		
<i>Week 8</i>	Entropy & Power and Refrigeration cycles	Homework 4	06/22/17
<i>Week 9</i>	Introduction and properties of fluids		
<i>Week 10</i>	Bernoulli and Energy Equations	Exam 2	07/20/17
<i>Week 11</i>	Internal Flow	Homework 5	07/27/17
<i>Week 12</i>	Mechanisms of Heat Transfer		
<i>Week 13</i>	Natural & Forced Convection	Homework 6	08/10//17
<i>Week 14</i>	Radiation Heat Transfer, Heat Exchanger		
<i>Week 15</i>	Review	Final Exam	08/24//17

*Schedule is subject to change at instructor discretion.