San José State University
Mechanical Engineering Department
ME 114: Heat Transfer – Section 2, Spring 2020

Course and Contact Information

Instructor:

Course Learning Outcomes (CLO)

By the end of the course, each student should demonstrate an ability to

1. Apply the heat diffusion equation to calculate temperature distributions and heat transfer rates in simple geometries.
2. Determine the variation of thermal conductivity between classes of materials (metals, ceramics, and polymers), phases of matter, and with temperature (and pressure for gases).
3. Calculate thermal resistances, including contact resistances, and develop thermal circuits.
4. Analyze heat transfer from finned surfaces.
5. Apply finite difference techniques to compute heat conduction in 1- and 2-dimensional configurations, under steady and transient conditions.
6. State sources of uncertainty in computational fluid dynamics programs and determine ways to improve their accuracy
7. Analyze transient conduction using lumped capacitance and determine when its use is appropriate.
8. Calculate temperatures for transient heat conduction in multi-dimensional geometries where lumped capacitance does not apply.
9. Explain the importance of boundary layers to heat transfer.
10. Explain the importance and source of the convection transfer equations.
11. Explain the significance of non-dimensional parameters such as Re, Pr, Nu, and Sc.
12. Explain the analogy between heat and mass transfer.
13. Use correlations to determine heat transfer coefficients and/or temperatures for external flow over plates, cylinders, and spheres.
14. Use correlations to determine heat transfer coefficients and/or temperatures for internal flow in tubes.
15. Determine conditions under which convection is natural, forced, or mixed.
16. State the main categories of heat exchangers.
17. Determine overall heat exchanger coefficients for heat exchangers using the log-mean-temperature-difference (LMTD) and number of transfer units (NTU) methods.
18. Calculate heat transfer and pressure drop for a heat exchanger given a graph of j and f vs. Re.
19. Explain the differences among intensity, emissive power, radiosity, and irradiation and between spectral and hemispherical.
20. Explain the difference between diffuse and grey.
21. Apply Wien’s Displacement Law, the Stefan-

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Without a documented excuse, exams must be taken on the indicated dates. If you have any serious problems with the examination dates, please see me ASAP. An alternative arrangement can be made in case of college-approved circumstance (e.g. participating a technical conference related to work with SJSU faculty). The request for exam rescheduling should be made a minimum of three weeks before a scheduled midterm exam and four weeks before a final exam.

Grading Information

Grade Weighting

Homework	10%
In-Class Worksheets	10%
Quizzes	20%
Midterms	35%
Final Exam	25%*
Connect HW related problems	up to 3

A summary of the problem statement (for homework problems).
A drawing or illustration of the problem.
A list of all assumptions.
Equations written in symbolic form first, before plugging in numbers.
The final answer indicated clearly, including units.

Grade Errors and Regrades

Clear grading errors (points added or recorded incorrectly) may be corrected at any time. Regrading (when you believe you deserve more points for something) may only be requested

. To bring an error to my attention or request a regrade, please return the document to me in class with an attached note about why you believe you deserve more points.

Classroom Protocol

ME 114: Heat Transfer, Spring 2020
Tentative Course Schedule

Date	Topics, Readings, Assignments, Deadlines	Reading	Assignments