

MEEN 2250:
Computer Aided Engineering
Mondays and Wednesdays
2:00 – 3:20 pm NTDP F187

Introductory Lecture

Dr. Matthew J. Traum

Assistant Professor of Mechanical and Energy Engineering

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Today's Agenda

1. Review MEEN 2250 Course Syllabus (20 minutes)
2. Cover how to use Web site to locate assignments (10 minutes)
3. Explain Assignment 00 (5 minutes)
4. Review 12-Step Quantitative Problem Solving Method (10 minutes)
5. Assign Group Project 01 Teams (10 minutes)
6. Visit Undergraduate Teaching Lab [MEE Computer Lab] (10 minutes)

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Review MEEN 2250 Syllabus

Final Exam: There will be no final exam in MEEN 2250.

However, students must attend the final group project competition, which will occur during the MEEN 2250 final exam period: Monday, May 11, 1:30 p.m. - 3:30 p.m.

Instructor Office Hours: Wed., 4-5 pm Discovery Park, F101E

TA Office Hours: Fri., 12-1pm, Discovery Park, F101T.1

Attendance Policy: Taken at beginning of class via sign-in sheet. More than four unexcused absences result in “F”. E-mail Traum 2 weeks in advance to request excused absence.

Review MEEN 2250 Syllabus

Homework: 9 Problem Sets will be distributed via the course Web site. Lowest score will be dropped. 1 week to complete each assignment. Submit in hard-copy or via jump drive at the beginning of due date class period. No course assignments will be accepted via e-mail, drop-off, mail, or other mechanism.

All missed assignments will receive a score of “0”. No make-up assignments will be granted, and no late assignments will be accepted.

Course Projects: 4 group projects assigned at one-month intervals. 25 points each. Details given when each project is introduced.

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Course Jump Drive:

For digital assignment submission, students must buy a portable flash drive; at least 2 GB storage capacity for exclusive use in MEEN 2250. For digital assignments, submit jump drive at the *beginning* of the class period on the due date. Drives returned the next class period.

Files must be in the top directory, easy to find, and named for clear identification. Student must assure files can be opened without errors on the Instructor's computer. If the instructor cannot locate or open the submitted file easily, the assignment will receive a score of "0".

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Coursework Portfolio: All MEEN 2250 hard-copy assignments must be compiled into a course portfolio and submitted to the instructor at final exam period: May 11, 2009.

Grading Policy: 80 points from HW, 100 points from group projects, 6 points for surveys, 5 points for course portfolio, and 9 points for participation. 200 total points. Straight scale grading:

200 – 170: A, 169 – 140: B, 139 – 110: C, 109 – 0: F

No rounding, an 169.99 is a “B”.

Review MEEN 2250 Syllabus

Grade Correction Policy: Grade disputes handled outside of class only during Office Hours. Student must forfeit the assignment to Dr. Traum for a detailed re-grade of the entire assignment.

Withdrawals: After February 27, students wishing to drop will receive a “WF” which counts permanently in the GPA as an “F”.

Review MEEN 2250 Syllabus

Academic Dishonesty: According to the UNT Faculty Handbook, “academic dishonesty refers to the use of any unauthorized assistance, the acquisition (without permission) of academic material belonging to a faculty member, dual submission or resubmission of a paper or project without permission of the professor, and knowingly or negligently using paraphrase or direct quotation without full and clear acknowledgement. Misconduct for which students and/or groups are subject to discipline also includes knowingly furnishing false or misleading information to any university official (including faculty).” If academic dishonesty is discovered, the student(s) involved will receive an automatic “F” in MEEN 2250.

Review MEEN 2250 Syllabus

Collaboration: Students are encouraged to collaborate with each other on course assignments, except where collaboration is strictly prohibited. All collaborators must be specifically listed on the cover page of all assignments.

Each student must submit a unique and original version of all individual homework assignments. Academic sanctions will be brought against students who submit unoriginal work.

Citations: Students must list all technical reference sources for any information or knowledge they did not generate on their own. Wikipedia, blogs, and personal Web pages may not be cited. References must have an identifiable author and editor.

Review MEEN 2250 Syllabus

Plagiarism and Copying:

According to dictionary.com (last accessed 5/15/2008), plagiarism is “the unauthorized use or close imitation of the language and thoughts of another author and the representation of them as one’s own original work.” Plagiarism is a form of academic dishonesty. Also, copying large sections of another author’s work, even with proper attribution, is not acceptable. Students may not copy, paste, and quote their way through assignments; all content submitted in MEEN 2250 must be the student’s original work.

Review MEEN 2250 Syllabus

Technology, Recording, and Computer Use Policy: During skills practice parts of class, students may use any technology appropriate to execute the course deliverables. During lecture portions of the class, students may take notes using the computer stations in front of them. However, computers or any other electronic device may not be used for dilatory activities. Audio or visual recording during any portion of the class is prohibited.

Disability Accommodation Policy: See Syllabus

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12-Step Quantitative Problem Solving Method

1. Write the goals that are being solved for.
2. Write what is known about the problem from the problem statement.
3. Sketch the problem in a diagram or schematic.
4. Select a sign convention.
5. Define the closed system, control volume, or region of interest in the diagram.
6. List all engineering assumptions and idealizations.
7. Write out complete equations for the applicable phenomenological laws and relationships that will be applied to the region of interest.

12-Step Quantitative Problem Solving Method

8. Write out the complete equations for all constitutive relationships governing the region of interest.

9. Apply engineering assumptions and information known about the problem to simplify the equations for phenomenological laws and constitutive relationships.

10. Solve the resulting equations to achieve the goals.

11. Apply engineering intuition to the solution to assure the result “makes sense”. Check the units of the solution – are they the same as the goals’ units?

12. Repeat Steps 1 – 11 if the answer in Step 10 seems unsatisfactory per the analysis in Step 11.

Demonstrating 12-Step Quantitative Method

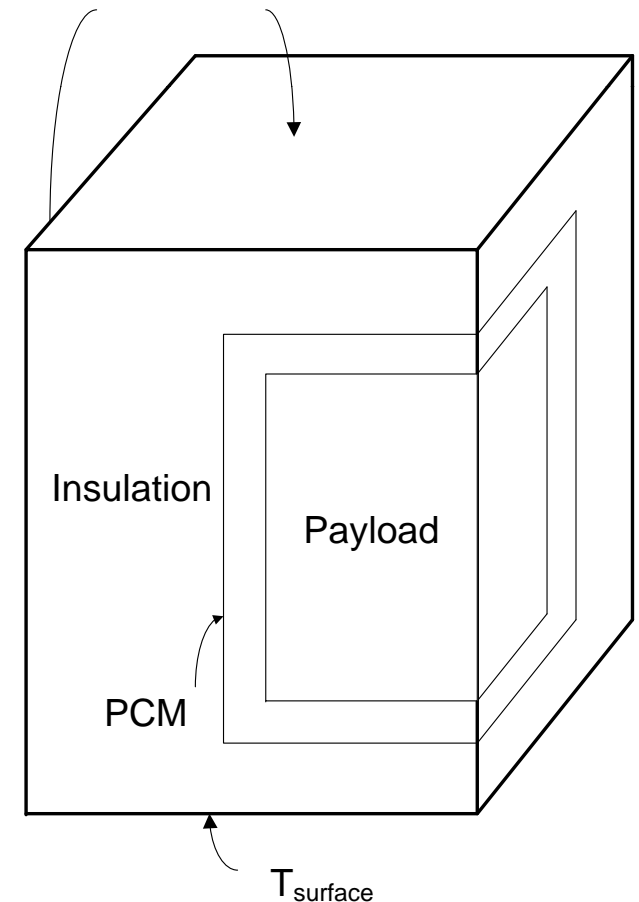
Cross-section of the Passive Temperature Control Container

$$Q = hA(T_{\text{surf}} - T_{\infty}), \quad Q = \text{HEAT}$$

To Solve Complete Problem, One Needs:

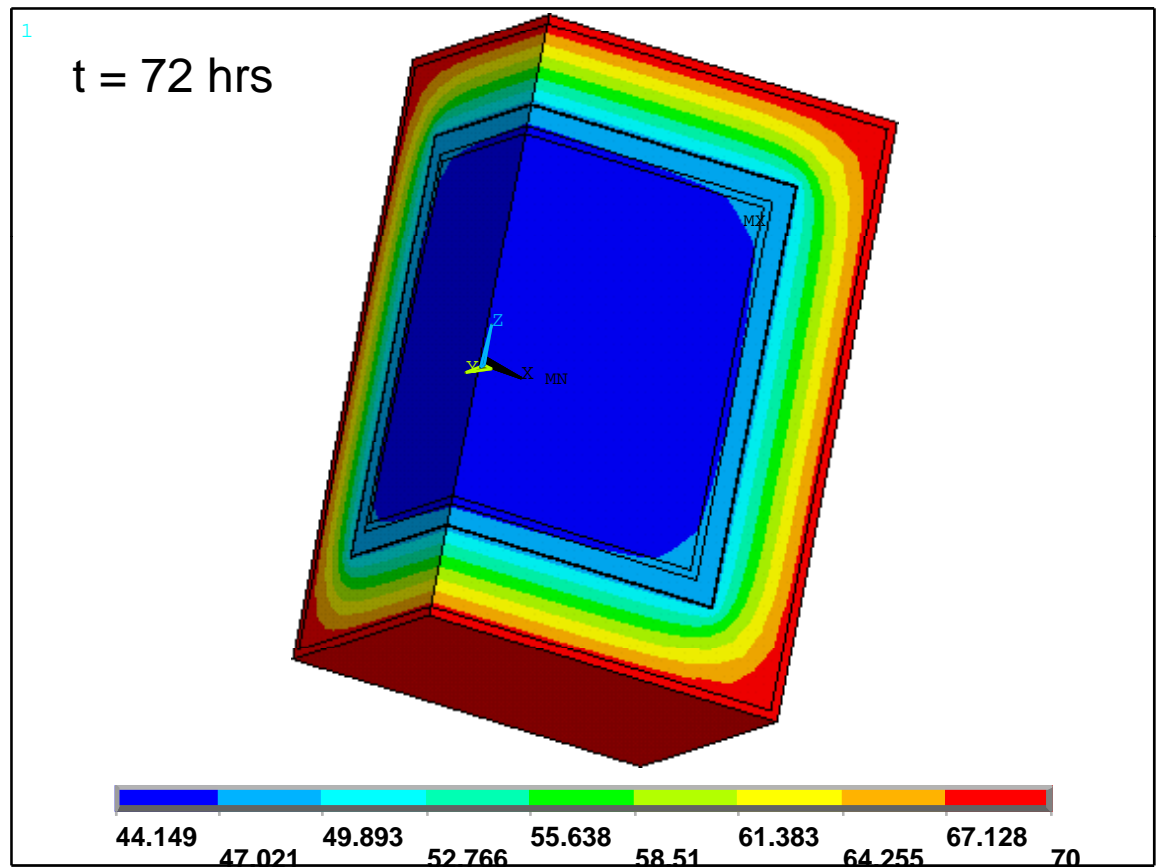
Heat transfer coefficient h and T_{∞}

- Model and geometry
 - Outside dimensions 9.25" x 8.25" x 8"
- Material properties
 - Density, heat capacity, conductivity
 - *PCM – latent heat and melting temperature (modeling as a solid)
- Boundary conditions and initial conditions
- Run solution in ANSYS for heat conduction – get temperature distributions as a function of time



Results after 72 Hours

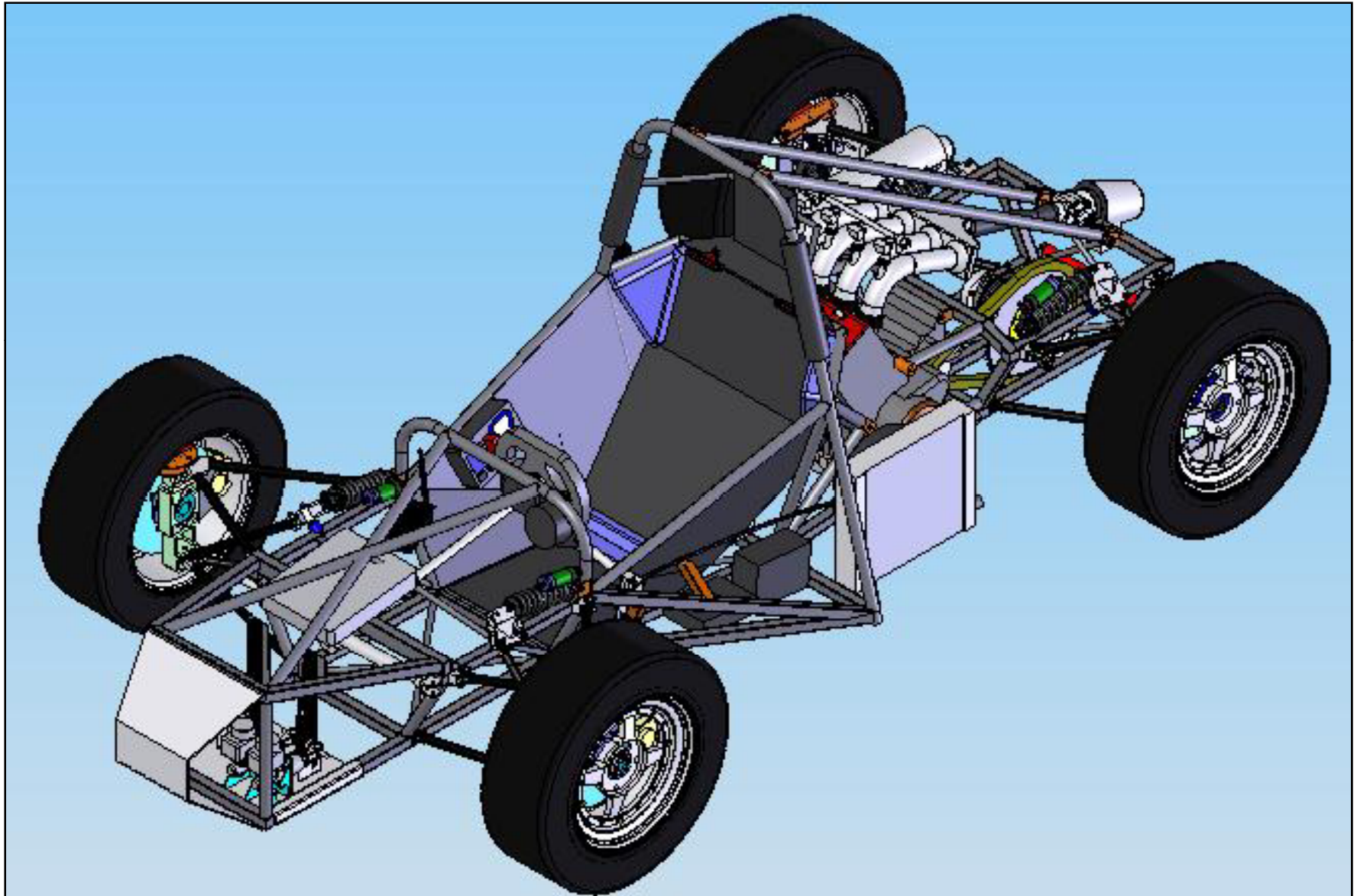
- $T_{\text{initial}} = 32\text{ }^{\circ}\text{F}$
- $T_{\text{surface}} = 70\text{ }^{\circ}\text{F}$
- $T_{\text{air}} = 70\text{ }^{\circ}\text{F}$
- Heat transfer coefficient chosen to model normal indoor air ($h = 12\text{ w/m}^2\text{-K}$)



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Preview of Project 01



National University of Singapore, Formula SAE Site: <http://serve.me.nus.edu.sg/fsae/oldsite/index.htm> (last accessed 1/15/2009)

Project 01 Team Assignments

Team A: Aguh, Applegate, Davis, Demay, Docherty

Team B: Dunlap, Fair, Fallwell, Farris, Fiorentine

Team C: Frey, Garcia, Garrett, J. Gray, R. Gray

Team D: Johnson, Lombard, Londono, McAdam, McKeethen

Team E: Mustafa, Obu, O'Leary, O'Neal, Reynolds

Team F: Richardson, Robinson, Rogers, Roper-Foo, Russell,
Speed

Team G: Toland, Weir, Wicaksono, Willcocks, Wright, Zemler

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