

Franklin W. Olin College of Engineering
ENGR 3310: Transport Phenomena

Class Topics/Literature Review Project

Assigned: 11/11/04
Due: 12/8/04, 12/9/04

Fall 2004

Option 1: Topics in Transport Phenomena

Choose a topic related to Transport Phenomena that we have not covered in class, and develop a 15 minute presentation to present in class. You may choose from one of the subjects listed in the Appendix, or you may propose your own, as long as it is related to Transport Phenomena. The objective is to explain to an audience of your peers a new concept that they would then feel comfortable describing in words.

Your presentation should be sufficiently rigorous for a class of students who have taken a semester of Transport Phenomena. The following guidelines are given to assist you in preparing your lecture. Depending on your topic, some of these may or may not be applicable. You are not bound by these - they are just a starting point.

1. Give definitions of new terms and nomenclature not already used in class.
2. Review the important physical mechanisms in a qualitative way.
3. Show the important governing relations and briefly explain how where they came from or how they were derived. State all assumptions that were used.
4. Provide a context for the topic (ie, historical references and perspective, examples of interesting applications)
5. Demonstrations, video clips, photos, and figures are all encouraged.
6. Class participation is also encouraged.

Deliverables:

1. A copy of lecture notes, powerpoint file, or any other materials used in the presentation.
2. A short paper (1 – 2 pages) that includes:
 - a. A description of the field, topic, or phenomena you studied and how it fits into the field of Transport Phenomena.
 - b. Related historical notes and/or examples of applications.
 - c. A qualitative description of the physical mechanisms, trends, methods, and approaches relating to your topic.

Option 2: Published Research in Transport Phenomena

Search the literature for a paper that interests you and has some bearing on the material covered in class. Prepare a 15 minute presentation to inform and educate the class on the content of the paper. Your presentation should answer the following questions:

1. Explain the context of the research and its importance to the field.

2. Clearly describe the approach and major findings.
3. Identify underlying assumptions and limitations of the research.

Please also refer to the guidelines provided for Option 1 (above) in planning and giving your presentation.

Deliverables:

1. A copy of any materials used in the presentation.
2. A short paper (1 – 2 pages) answering the three questions above. One to two paragraphs to answer each question is sufficient.

General Comments on both Options

Feel free to make an appointment to see me if you would like help in choosing a topic or paper, or if you would like some assistance on where to find resources appropriate for your topic. A good point of reference for your presentation is the short presentation I did on the best fin shape for optimal cooling and minimal weight.

The presentations will take place on December 8 and 9 during class.

Appendix

Possible list of topics for Option 1:

(Note: This list is merely a smattering of the possible topics.)

Non-Newtonian fluids
Non-isentropic compressible flow
2-D Conduction Heat Transfer
Pressure and flow measurement devices
Plane potential flows
Turbulent flows
Thin airfoil theory (aerodynamics)
Geophysical flows (large scale atmospheric fluid dynamics)
Vorticity
Open channel flows
Turbomachinery
Micro-scale fluid dynamics
Micro-scale heat transfer
Mass diffusion/mass transport

Resources for finding papers for Option 2:

There are lists of references (books and papers) at the end of each chapter in your Fluids and Heat Transfer books.

Full-text versions of many papers can be found through the Olin Library Portal. I like using Elsevier Science Direct. They have many journals on fluids and heat transfer. Browse the latest editions or search for a specific topic that you are interested in.

The Rohsenow Symposium on Heat Transfer – a number of papers on heat transfer
<http://web.mit.edu/hmtl/www/rohsenowsymposium.html>

A few papers that I found interesting:

Paper on the fluid dynamics of percutaneous intervention
<http://www.emedicine.com/radio/topic867.htm>

A paper on heat transfer on planetary scales – located in the Stufac directory, under Transport Phenomena