

**ME 421: Thermal Systems Analysis and Design**  
**Fall Semester Only**

<b>Type (check one):</b>	Required: <input checked="" type="checkbox"/> Elective: <input type="checkbox"/>
<b>2005-2006 Catalog Data:</b>	ME 421. Thermal Systems Analysis and Design. An integrated treatment of the analysis and design of thermal systems. Primarily concerned with industrial thermal processes, cycles and associated equipment. Prerequisite: ME 306. Offered in the Fall semester. <i>One semester; three credits</i>
<b>Prerequisites:</b>	ME 306
<b>Co-Requisites:</b>	None
<b>Textbook:</b>	JANNA, <i>Design of Fluid Thermal Systems</i> , Second Edition, PWS Publishing, 1998.
<b>Other Required Materials:</b>	None
<b>Other References:</b>	None
<b>Instructor:</b>	Dr. Joseph M. Londino, Assistant Professor of Mechanical Engineering
<b>Course Objectives:</b>	1. Integrate thermodynamical, fluid mechanical, and heat transfer analyses and apply to the design of mechanical systems and components
<b>Prerequisites by Topics:</b>	1. Thermodynamics 2. Fluid mechanics 3. Heat transfer
<b>Topics:</b>	1. Piping systems: network analysis, design criteria 2. Heat exchangers: HX types, analysis techniques, NTU method, LMTD method, performance criteria 3. Turbomachinery: radial flow, dimensional analysis, performance maps, pumping system design 4. Design project
<b>Class Schedule:</b>	Three 50-minute sessions per week

**Prepared by:** Dr. Joseph M. Londino

**Date:** August 2005

**Professional Component:  
ME 421 – Thermal Systems Analysis and Design**

Category (check one)	<input type="checkbox"/> Math/Basic Science <input checked="" type="checkbox"/> Engineering <input type="checkbox"/> General Education <input type="checkbox"/> Other
Design (check one)	<input checked="" type="checkbox"/> Significant <input type="checkbox"/> Some <input type="checkbox"/> None
Realistic Constraints (check all that apply)	<input checked="" type="checkbox"/> Economic <input type="checkbox"/> Environmental <input type="checkbox"/> Sustainability <input type="checkbox"/> Manufacturability <input type="checkbox"/> Ethical <input type="checkbox"/> Health & Safety <input type="checkbox"/> Social <input type="checkbox"/> Political

**Relationship to Program Outcomes:**

Check all that apply:

- (a) an ability to apply knowledge of mathematics, science, and engineering
- (b) an ability to design and conduct experiments, as well as to analyze and interpret data
- (c) an ability to design a system, component, or process to meet desired needs
- (d) an ability to function on multi-disciplinary teams
- (e) an ability to identify, formulate, and solve engineering problems
- (f) an understanding of professional and ethical responsibility
- (g) an ability to communicate effectively
- (h) the broad education necessary to understand the impact of engineering solutions in a global and societal context
- (i) a recognition of the need for and an ability to engage in life-long learning
- (j) a knowledge of contemporary issues
- (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice