

COURSE NUMBER: ME 5101, 4 credits	COURSE TITLE: Vapor Cycle Systems
TERMS OFFERED: Alternate years Spring semester	PREREQUISITES: ME 3331, Thermal Sciences I, IT upper division or Grad student.
TEXTBOOKS/REQUIRED MATERIAL: Text: "Thermal Environmental Engineering" ^{3rd} Edition, By T. H. Kuehn, J. W. Ramsey and J. L. Threlkeld, Prentice Hall 1998 "Power Plant Technology," by M. M. El-Wakil, McGraw-Hill, 2002	PREPARED BY: Thomas Kuehn DATE OF PREPARATION: 3/14/2007
COURSE LEADER(S): T. H. Kuehn and D. B. Kittelson	CLASS/LABORATORY SCHEDULE: Four 50 minute sessions per week. CONTRIBUTION OF COURSE TO MEETING PROFESSIONAL OBJECTIVES: 100 % Engineering Topics
CATALOG DESCRIPTION: Vapor compression and absorption refrigeration systems; heat pumps, vapor power cycle analysis, regeneration, reheat, compound cycle modifications, combined gas turbine – vapor cycle systems.	COURSE TOPICS: 1. Vapor compression refrigeration. 2. Absorption refrigeration cycles. 3. Heat pumps. 4. Vapor power cycles. 5. Compound cycle modifications. 6. Combined gas turbine - vapor cycles.

COURSE OBJECTIVES	<ol style="list-style-type: none"> 1. Teach the principles of operation of vapor compression refrigeration systems. 2. Study the performance of components such as compressors, refrigerants, expansion devices, heat exchangers and controls. 3. Teach the principles of absorption refrigeration cycles. 4. Study the use of heat pumps to provide energy transfer and space heating. 5. Teach the principles of vapor power cycles. 6. Study cycle modifications such as regeneration, reheat and compound cycles. 7. Explore interactions such as between a gas turbine and a vapor cycle system.
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<p>COURSE OUTCOMES</p>	<p>(Letters shown in brackets are linked to program outcomes a-k)</p> <ol style="list-style-type: none"> 1. The understanding of the construction, operation and performance of typical vapor compression refrigeration systems. [a, c, j] 2. The understanding of the basic principles of the absorption refrigeration cycle. [a, c] 3. Evaluate when an absorption system would be preferable to a vapor compression refrigeration system. [c, e] 4. To understand and be able to evaluate the performance of heat pumps and modes of operation such as defrosting. [a, c, e] 5. To understand and be able to evaluate the basic principles of vapor power cycles. [a, c, j] 6. Ability to make comparisons between a simple cycle and a more complex cycle that may include reheat and regeneration. [c, e] 7. To understand and evaluate the interactions between a vapor cycle system and another power cycle such as a gas turbine. [c, e, k]
<p>ASSESSMENT TOOLS:</p>	<ol style="list-style-type: none"> 1. Homework and/or weekly quizzes. 2. Four exams during the semester. 3. Final exam.

ME 5101

Nature of Changes:

1. *The course replaced the ASHRAE handbooks with the required text “Power Plant Technology,” by M. M. El-Wakil, McGraw-Hill, 2002.*
2. *Cogeneration systems are no longer listed in the catalog description, course topics, course objectives, or course outcomes.*
3. *There are now 4, instead of 2 exams.*