

1. EM320 Applied Thermodynamics

2. Credit Hours (3) / Contact Hours (4)

3. Course Director: Ralph J. Volino

4. Fundamentals of Engineering Thermodynamics, 9th Edi., by M.J. Moran, H.N. Shapiro, D.D. Boettner and M.B. Bailey; John Wiley, 2018 – ISBN 978-1-119-39138-8

5. Specific course information

- a. Laboratory equipment which operates on principles of thermodynamics and fluid mechanics is used to reinforce analyses and design of gas and vapor power cycles, refrigeration and air conditioning, ship and aircraft propulsion systems, combustion, energy conversion and compressible flow.
- b. Prerequisite: EM319 or equivalent**
- c. Required for Mechanical Engineering Program**

6. Educational objectives for the course

- a. Analyze and design steam power plants including systems with reheat and regeneration.
- b. Analyze gas power cycles including those applicable to gas turbine and internal combustion engines.
- c. Use compressible flow tables and relations to solve problems involving compressible flow in a nozzle.
- d. Analyze and design vapor and gas refrigeration systems.
- e. Use the psychrometric chart and computer software to compute properties in air-water vapor mixtures, and use this information for analysis and design of air conditioning systems.
- f. Write and balance chemical reactions and compute energy transfer associated with combustion problems.
- g. Evaluate, compute and report experimental uncertainty.
- h. Use computer software to perform parametric and optimization studies for the evaluation of thermodynamic designs.
- i. Use engineering economics to determine present and annual worth, and use these principles in the evaluation and comparison of engineering designs.
- j. Write technical reports to present designs and report experimental results.

7. Specific program outcomes address by this course

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Reinforced	X	X	X			X	
Mastered							

8. Brief list of topics to be covered

- a. Engineering Economics
- b. Vapor Power Cycles
- c. Gas Mixtures and Combustion
- d. Gas Power Cycles
- e. Compressible Flow
- f. Refrigeration Cycles
- g. Psychrometrics and Air Conditioning