COURSE NUMBER	**ME 432**
COURSE TITLE	**Principles of Air Conditioning and Refrigeration**
COURSE STRUCTURE	(3-0-3) (lecture hr/wk - lab hr/wk – course credits)
COURSE COORDINATOR	C. Zhu
COURSE DESCRIPTION	This course introduces the fundamentals of air conditioning and refrigeration. Focus topics include the refrigeration cycles, psychometric processes and cycles, air quality requirement and control, human comfort conditions, building heat transfers, solar radiation, exfiltration and infiltration, cooling load calculations, and bin-method for energy analysis. An individual project (with oral presentation) is also required to demonstrate the course-learned ability for the design/analysis of a HVAC system.
PREREQUISITE(S)	ME 312 – Thermodynamics
COREQUISITE(S)	ME 304 – Fluid Mechanics; ME 407 – Heat Transfer
REQUIRED, ELECTIVE OR SELECTED ELECTIVE	Elective
REQUIRED MATERIALS	McQuiston, Parker and Spitler, Heating Ventitalting, and Air Conditioning: Analysis and Design, 6th Ed., John Wiley & Sons, Inc., 2005.
Other supplemental materials (not Required)	McQuiston, Parker and Spitler, Heating Ventitalting, and Air Conditioning: Analysis and Design, 4th Ed., John Wiley & Sons, Inc., 1994.
COMPUTER USAGE	power-point presentation and/or project report writing

COURSE LEARNING OUTCOMES/ EXPECTED PERFORMANCE CRITERIA:	Course Learning Outcomes SOs* Expected Performance Criteria 1 **perform** analysis of reverse thermodynamics cycles of cooling and refrigeration 1 **Exam Question** (80% of the students will earn a grade of 70% or better on this question) 2. **perform** analysis of psychrometric processes and cycles of air conditioning systems 1 **Exam Question** (80% of the students will earn a grade of 70% or better on this question) 3. **perform** analysis of air quality control via dilution and/or filtration. 1 **Exam Question** (80% of the students will earn a grade of 70% or better on this question) 4. **calculate** various heat loads, particularly from solar radiation 1 **Exam Question** (80% of the students will earn a grade of 70% or better on this question) 5. **estimate** the energy and equipment requirements of simple air conditioning applications 1, 2 **Exam Question** (80% of the students will earn a grade of 70% or better on this question) 6. **demonstrate** an ability to apply the HVAC theory to design or analyze a HVAC system. 1, 2, 4, 7 **Exam Question** (80% of the students will earn a grade of 70% or better on this question) 7. **prepare** an effective engineering report 1, 6 **Exam Question** (80% of the students will earn a grade of 70% or better on this question) 8. **make** an oral presentation of the HVAC design project 1, 2, 4, 6 **Exam Question** (80% of the students will earn a grade of 70% or better on this question)
CLASS TOPICS	1. General Air Conditioning Systems and Applications. 2. Cooling and Refrigeration Cycles. 3. Psychometrics and Air Conditioning Processes. 4. Indoor Air Quality and Air Recirculation. 5. Heat Transmission in Building Structure. 6. Solar Radiation. 7. Infiltration and Exfiltration. 8. Cooling and Heat Load Calculation. 9. Energy Calculation 10. Design Project of a HVAC System.
STUDENT OUTCOMES (SCALE: 1-3)	1 2 3 4 5 6 7 3 3 2 2 2 3 – Strongly supported 2 – Supported 1 – Minimally supported

* Student Outcomes