ENGINEERING MANAGEMENT

EM  500  Master’s Thesis (1-15)
SEC.  001 CRN 28484  Simonton
003 CRN 29962  Yu

Grading Restriction: P/NP only.
Repeatability: May be repeated.
Credit Level Restriction: Graduate credit only.
Registration Restriction(s): Minimum student level – graduate.

EM  501  Capstone Project (3-6)
SEC.  001 CRN 22221  Simonton
003 CRN 29963  Yu

Application-oriented project to show competence in major academic area.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 6 hours.
Comment(s): Requires enrollment in engineering management.
Credit Level Restriction: Graduate credit only.
Registration Restriction(s): Minimum student level – graduate.

EM  502  Registration for Use of Facilities (1-15)
SEC.  001 CRN 22222  Simonton
002 CRN 31001  Yu

Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated.
Credit Restriction: May not be used toward degree requirements.
Credit Level Restriction: Graduate credit only.
Registration Restriction(s): Minimum student level – graduate.

EM  533  Theory and Practice of Engineering Management (3)
SEC.  001 CRN 22223  Students participating at Tullahoma classrooms
002 CRN 22224  Students participating by distance ed.
003 CRN 22225  Students participating at Knoxville DE classrooms

TIME: Wednesday 4:00 – 6:35  E-113
PROF: Dr. David Dietrich

Principles of engineering management, including: business and organization design, culture, leadership, marketing and competition in global economy, motivation and performance management, empowerment,
organizational behavior, and diversity. Systems thinking, learning organizations, and systems dynamics modeling. Principle application to work settings and case studies.

**EM 534 Financial Management for Engineering Managers (3)**

**SEC. 001 CRN 22227**  Students participating at Tullahoma classrooms  
**SEC. 002 CRN 22228**  Students participating by distance ed.  
**SEC. 003 CRN 22229**  Students participating at Knoxville DE classrooms  

**TIME:** Tuesday 4:00 – 6:35 E-113  
**PROF:** Dr. Andrew Yu  

Financial and managerial accounting in engineering and technology management. Transaction recording, financial statements, ratios and analysis, activity-based accounting, and standard practices for costing, budgeting, assessment, and control.

**EM 538 New Venture Formation (3)**

**SEC. 001 CRN 28493**  Students participating at Tullahoma classrooms  
**SEC. 002 CRN 28494**  Students participating by distance ed.  
**SEC. 003 CRN 28495**  Students participating at Knoxville DE classrooms  

**TIME:** Thursday 4:00 – 6:35 E-113  
**PROF:** Dr. James Simonton  

Factors other than mechanical or chemical which enter into successful establishment of manufacturing or service enterprise. Organizational and financial planning and evaluation. Cost and location studies and market analysis to determine commercial feasibility of new ventures.  

*Recommended Background: Graduate standing in Engineering or Business.*

**EM 541 Managing Change and Improvement in Technical Organizations (3)**

**SEC. 001 CRN 22231**  Pre-recorded  


**TIME:** Monday 4:00 – 6:35 E-113  
**PROF:** Dr. Janice Tolk  


*Recommended Background: Graduate standing in Engineering or Business.*

**EM 600 Doctoral Research/Dissertation (3-15)**

**SEC. 001 CRN 25777**  Simonton  
**SEC. 004 CRN 30285**  Yu  

*Grading Restriction: P/NP only.*  
*Repeatability: May be repeated.*  
*Registration Restriction(s): Minimum student level – graduate.*
Course is divided into two major components. First half of the course will focus on introducing the students to the concepts of reliability and maintainability and the impact of lean on the reliability of complex systems. The concepts of reliability engineering are utilized to address lean system failures, including equipment failures, human failures, material failures and scheduling failures. Will develop the ability to design systems that are both lean and reliable. The second half of the course will introduce students to specific case studies of systems failures and ask student to develop solutions by considering different dimensions including financial, technical feasibility, risk, safety, security and others. Multi criteria decision making methodologies will be presented to allow students to make decisions when different criteria lead to conflicting solutions.

(RE) Prerequisite(s): 516.

Recommended Background: Background in lean and reliability.

Application of engineering economic analysis in complex decision situations. Inflation and price changes; uncertainty evaluation using non-probabilistic techniques; capital financing and project allocation; evaluations involving equipment replacement, investor-owned utilities, and public works projects; probabilistic risk analysis including computer simulation and decision trees; multi-attribute decision analysis; and other advanced topics.

(RE) Prerequisite(s): 405

Recommended Background: Statistics 251.

Classical optimization applied to constrained and unconstrained, non-linear, multi-variable functions; search techniques; decision making under uncertainty; game theory; and dynamic programming.

Recommended Background: Linear Algebra.
Fundamental concepts of linear algebra to problems in engineering systems: steady state and dynamic systems. Geometric and physical interpretations of relevant concepts: least square problems, LU, QR, and SVD decompositions of system matrix, eigenvalue problems, and similarity transformations in solving difference and differential equations; numerical stability aspects of various algorithms; application of linear algebra concepts in control and optimization studies; introduction to linear programming. Computer projects.


Cross-listed: (Same as Chemical and Biomolecular Engineering 529; Civil Engineering 529; Electrical and Computer Engineering 529; Environmental Engineering 529; Materials Science and Engineering 529; Mechanical Engineering 529; Nuclear Engineering 529).

Comment(s): Graduate standing or consent of instructor required.

Seminar provides an opportunity for Master’s and Doctoral students to acquaint themselves with research being conducted by both faculty and graduate students in the Industrial and Information Engineering Department, as well as select campus-wide and off-campus researchers from both academia and industry. Research work and relevant results are presented in a professional environment that promotes continued interaction among interested parties. Presentations are not restricted to thesis and dissertation work.

Grading Restriction: Satisfactory/No Credit grading only.

Kuhn-Tucker theory in nonlinear programming, solution procedures for constrained and unconstrained nonlinear programs, search techniques, quadratic programming, duality and sensitivity analysis.

Cross-listed: (See Management Science 651.)

RE) Prerequisite(s): Management Science 531 or equivalent and proficiency in computer language.
IE 607 Stochastic Processes
SEC. 001 CRN 30063 UTK students participating in Knoxville classroom
002 CRN 30064 UTK students participating by distance ed.
003 CRN 30065 UTSI students participating by distance ed.

TEXT: TBD
PROF: TBA

Basic models and algorithms in stochastic processes and their Engineering application: the renewal theory, discrete-time and continuous-time Markov Chains, Queuing theory, and Markovian Decision Processes. *(DE) Prerequisite(s): 516.*

Recommended Background: Probability

IE 609 Stochastic Programming
SEC. 001 CRN 30950 UTK students participating in Knoxville classroom
002 CRN 30951 UTK students participating by distance ed.
003 CRN 30952 UTSI students participating by distance ed.

TEXT: TBD
PROF: Dr. Oleg Shylo

Topics include modeling of uncertainty, two-stage stochastic programs, the value of information, Benders decomposition, L-shaped method, stochastic integer programs and multistage stochastic programs. *Recommended Background: Linear Programming and Probability.*

IE 610 Heuristics in Optimization
SEC. 001 CRN 30066 UTK students participating in Knoxville classroom
002 CRN 30067 UTK students participating by distance ed.
003 CRN 30068 UTSI students participating by distance ed.

TEXT: TBD
PROF: TBA

Heuristic methods and their applications to optimization problems, including neighborhood search and major meta-heuristics methods. *Recommended Background: Linear Programming*