

Engineering and Science Management (ESM)

College of Engineering and Mines

Department of Civil, Geological, and Environmental Engineering (<https://www.uaf.edu/cem/>)
907-474-7241

ESM F422 Engineering Decisions

3 Credits

Offered Spring

Risk and uncertainty in engineering decisions. Basic applied probability and statistics, data analysis, regression analysis and time series. Practical applications of decision tools: linear programming, inventory analysis, queuing, network models and utility theory. Engineering judgment and uncertainty. Public safety and ethics.

Recommended: Calculus through MATH F302.

Stacked with ESM F622.

Lecture + Lab + Other: 3 + 0 + 0

ESM F450 Economic Analysis and Operations

3 Credits

Offered Fall and Summer

Fundamentals of engineering economy, project scheduling, estimating, legal principles, professional ethics and human relations. Prepares students for the engineering economics section of the Fundamentals of Engineering licensing exam. May not be used as credit toward the M.S. degree in Engineering Management or Science Management.

Prerequisites: WRTG F111X; WRTG F211X, WRTG F212X, WRTG F213X or WRTG F214X; senior standing in engineering.

Special Notes: Undergraduate engineering students taking graduate ESM courses as technical electives should have completed or be concurrently enrolled in ESM F450.

Lecture + Lab + Other: 3 + 0 + 0

ESM F492 Engineering Mgt Seminar

1 Credit

Lecture + Lab + Other: 0 + 0 + 0

ESM F492P Engineering Mgt Seminar

1 Credit

Lecture + Lab + Other: 0 + 0 + 0

ESM F601 Managing and Leading Engineering Organizations

3 Credits

Offered As Demand Warrants

Leadership knowledge and skills as applied to motivation, direction and communication within engineering and technical organizations, and their relations with other organizations and the public. Leadership training activities include organizational structures, planning, monitoring, directing and controlling. Review of management tools including management theory, communications and conflict resolution.

Recommended: BS degree in engineering or physical science.

Lecture + Lab + Other: 3 + 0 + 0

ESM F605 Engineering Economic Analysis

3 Credits

Offered As Demand Warrants

The economic basis of engineering decisions: capital investment analysis techniques, including present worth, annual cash flow and rate of return. Applications to replacement problems, benefits/cost analysis and capital budgeting. Consideration of impacts of depreciation accounting, income taxes and inflation. Risk and uncertainty in economic decisions.

Recommended: Graduate standing.

Lecture + Lab + Other: 3 + 0 + 0

ESM F608 Legal Principles for Engineering Management

3 Credits

Offered As Demand Warrants

Those aspects of law specifically related to technical management. Contracts, sales, real property, business organization, labor, patents and insurance.

Recommended: Graduate standing.

Lecture + Lab + Other: 3 + 0 + 0

ESM F609 Project Management

3 Credits

Offered As Demand Warrants

Organizing, planning, scheduling and controlling projects. Use of CPM and PERT; computer applications. Case studies of project management problems and solutions.

Recommended: Graduate standing.

Lecture + Lab + Other: 3 + 0 + 0

ESM F621 Operations Research

3 Credits

Offered As Demand Warrants

Mathematical techniques for aiding technical managers in decision making. Linear programming, transportation problem, assignment problem, network models, PERT/CPM, inventory models, waiting line models, computer simulation, dynamic programming. Emphasis on use of techniques in actual technical management situations. Computer applications.

Recommended: MATH F253X; STAT F200X.

Lecture + Lab + Other: 3 + 0 + 0

ESM F622 Engineering Decisions

3 Credits

Offered As Demand Warrants

Risk and uncertainty in engineering decisions. Basic applied probability and statistics, data analysis, regression analysis and time series. Practical applications of decision tools: linear programming, inventory analysis, queuing, network models, utility theory. A class project and paper are required.

Recommended: Calculus through MATH F302.

Lecture + Lab + Other: 3 + 0 + 0

ESM F684 Engineering Management Project

3 Credits

Offered As Demand Warrants

Comprehensive study of an actual engineering management problem resulting in reports and presentations which include recommendations for action.

Prerequisites: Graduate standing in Engineering Science Management.

Lecture + Lab + Other: 3 + 0 + 0

ESM F692 Engineering Mgt Seminar

1 Credit

Lecture + Lab + Other: 0 + 0 + 0

ESM F698 Non-thesis Research/Project

1-6 Credits

Lecture + Lab + Other: 0 + 0 + 0

ESM F699 Thesis

1-9 Credits

Lecture + Lab + Other: 0 + 0 + 0