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.
Grading System: Letter Grades with option of Plus/Minus

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.
Grading System: Letter Grades with option of Plus/Minus

ESM F492   Engineering Mgt Seminar
1 Credit
Lecture + Lab + Other: 0 + 0 + 0
Grading System: Letter Grades with option of Plus/Minus
Repeateable for Credit: May be taken unlimited times for up to 99 credits

ESM F492P  Engineering Mgt Seminar
1 Credit
Lecture + Lab + Other: 0 + 0 + 0
Grading System: Pass/Fail Grades
Repeateable for Credit: May be taken unlimited times for up to 99 credits

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.
Grading System: Letter Grades with option of Plus/Minus

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.
Grading System: Letter Grades with option of Plus/Minus

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.
Grading System: Letter Grades with option of Plus/Minus

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.
Grading System: Letter Grades with option of Plus/Minus

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.
Grading System: Letter Grades with option of Plus/Minus

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 and utility theory. A class project and paper are required.
Recommended: Calculus through MATH F302.
Grading System: Letter Grades with option of Plus/Minus

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.
Grading System: Letter Grades with option of Plus/Minus
ESM F692    Engineering Mgt Seminar
1 Credit
Lecture + Lab + Other: 0 + 0 + 0
Grading System: Letter Grades with option of Plus/Minus
Repeatable for Credit: May be taken unlimited times for up to 99 credits

ESM F698    Non-thesis Research/Project
1-6 Credits
Lecture + Lab + Other: 0 + 0 + 0
Grading System: Pass/Fail Grades
Repeatable for Credit: May be taken unlimited times for up to 99 credits

ESM F699    Thesis
1-9 Credits
Lecture + Lab + Other: 0 + 0 + 0
Grading System: Pass/Fail Grades
Repeatable for Credit: May be taken 98 times for up to unlimited credits