

EN.595 (ENGINEERING MANAGEMENT)

Courses

EN.595.660. Planning and Managing Projects. 3 Credits.

This course concentrates on the general methodology of managing a technical project from concept to operational use, with emphasis on the functions, roles, and responsibilities of the project manager. Topics include career aspects of project management; business factors affecting the project and the manager; project organization, planning, execution, and communications; project life cycle; risk analysis; interface management; design review; design control assessment; reporting; and reaction to critical problems. Students are formed into groups, presented with a scenario that simulates the development of a high-technology system, and assigned to make decisions required of the project manager in the execution of the project. The project manager's decisions must then be effectively communicated (and perhaps defended) to a variety of audiences (represented by other students and faculty) that include top management, the customer, functional management, and members of the project team. Course Note(s): The format for this course is either online or a mixed online/live environment called Virtual Live. For the Virtual Live format, weekly lectures are provided either online or live (and recorded) on a predesignated day/time, with students/instructors joining in person or from any location via personal computer. Students can also choose to participate in person, in a classroom, at the predesignated day/time. Contact the instructors for additional information. (Formerly 595.660 Introduction to Project Management.)

EN.595.661. Technical Group Management. 3 Credits.

This course covers the general functions and responsibilities of a technical group supervisor. Topics include functions of a technical group in an R&D or engineering organization; primary responsibilities of a group supervisor; interactions with management, support organizations, and project organizations; organization of projects in group structure; development of work costs and schedules; progress monitoring and reporting; introduction to personnel management leadership, motivation, evaluation, and professional growth; reaction to critical problems; technical leadership; and planning for the future. Students assume the roles of technical group supervisors in a high-technology organization. They address typical problems in delegating responsibilities, staffing new projects, dealing with project managers, and handling conflicts and priorities.

EN.595.662. Technical Organization Management. 3 Credits.

This course introduces the technical manager to all aspects of business management within an organization, ranging from tactical project planning and control, and contract management to higher level corporate financial and legal topics. Students will be guided through weekly topics in the areas of planning a project, scheduling, tracking and the evaluation/assessment of a project. It will also cover contractual considerations for the technical manager. The course will move from managerial business management to financial accounting topics such as direct and indirect costs, revenues, and profits; indices to financial position; use of financial reports; return on investment, net present value; internal rate of return; and financial management (including cash and funds flow statements). Finally, this course will also use the management approaches and practices above and apply them to the world of contracting and legal analysis. Tactical contracting principles, including acquisition planning, contract award, performance, and termination will be covered. Basic legal principles that a senior technical leader will encounter in their career will also be presented. Course discussions cover corporations and partnerships, professional liability, risk management, intellectual property negotiations, and ethics are presented for students to recognize issues that are likely to arise in the engineering profession and introduces them to the complexities and vagaries of the legal profession.

Prerequisite(s): 595.660 Planning & Managing Projects

EN.595.663. Technical Personnel Management. 3 Credits.

This course reviews the problems of personnel management in a technical organization. Topics include environmental requirements for effective and innovative technical efforts, direction and motivation, leadership behavior, recruitment of technical staff, orientation and training programs, personnel placement and reassignment, assignment of work, salary administration, personnel evaluation and counseling, professional growth and promotion, technical obsolescence and retraining, equal opportunity programs, employee grievances, and handling of conflict situations. Students explore typical personnel management situations that arise in a technical organization.

EN.595.664. Project Planning and Control. 3 Credits.

This course concentrates on the exploration of the planning and control decisions required when developing a new hightechnology product. Students are formed into groups and presented with a scenario that requires the development of a plan that will guide their organization through entry into a new business area. When developing the new product-offering plan, students must consider a wide variety of questions that their top management will need to have answered prior to making a decision to either accept or reject the plan. Other topics include the role of planning and control in project management; processes for responding to a request for proposal (RFP); assignments to prepare a statement of work (SOW), a work breakdown structure (WBS), and a critical path network (CPN) for the new product development plan; earned value performance measurement; analysis of project performance measures; integrated project planning; new product development considerations; enterprise information systems applications; and risk management.

EN.595.665. Strategic Communications in Technical Organizations. 3 Credits.

This course covers problems and instruction in human communications within a technical organization. Topics include the nature of difficulties in human communications (perception and cognition, semantics, individual differences in processing information, and listening), techniques for effective oral and written communications and presentations, problems in communication between supervisors and subordinates, assignment of work, and reporting to management and sponsors. Students assume roles in various interpersonal situations, meetings, discussions, and conflicts calling for a supervisor to write letters and memoranda; they also deliver oral presentations and participate in group and one-on-one discussions. This course also includes writing winning proposals and developing a technical strategy aligned with the organization's business strategy.

Prerequisite(s): 595.660 Planning and Managing Projects

EN.595.666. Financial & Contract Management. 3 Credits.

This course is an introduction to financial and contract management for technical managers. Topics include financial and management accounting (including elementary accounting principles, assets, liabilities, and stockholders' equity); direct and indirect costs, revenues, and profits; indices to financial position; use of financial reports; return on investment, net present value; internal rate of return; and financial management (including cash and funds flow statements). An introduction to the principles of contract formation is presented highlighting the distinctive characteristics of contracting with the federal government as well as the team concept for effective contracting and the role of the program manager as a key team member. Subcontract management, competitive negotiation techniques, contract financing, and cost reimbursement are also included. Case studies supplement theoretical discussions.

EN.595.667. Agile Project Management. 3 Credits.**EN.595.676. Finance, Contracts, and Compliance for Technical Professionals. 3 Credits.**

This course introduces the technical manager to all aspects of business management within an organization, ranging from tactical project planning and control, and contract management to higher level corporate financial and legal topics. Students will be guided through weekly topics in the areas of planning a project, scheduling, tracking and the evaluation/assessment of a project. It will also cover contractual considerations for the technical manager. The course will move from managerial business management to financial accounting topics such as direct and indirect costs, revenues, and profits; indices to financial position; use of financial reports; return on investment, net present value; internal rate of return; and financial management (including cash and funds flow statements). Finally, this course will also use the management approaches and practices above and apply them to the world of contracting and legal analysis. Tactical contracting principles, including acquisition planning, contract award, performance, and termination will be covered. Basic legal principles that a senior technical leader will encounter in their career will also be presented. Course discussions cover corporations and partnerships, professional liability, risk management, intellectual property negotiations, and ethics are presented for students to recognize issues that are likely to arise in the engineering profession and introduces them to the complexities and vagaries of the legal profession.

Prerequisite(s): 595.660 Planning and Managing Projects

EN.595.727. Advanced Concepts in Agile Technical Management. 3 Credits.

How do highly skilled technical managers and system engineers like you address complex projects with high levels of uncertainty requiring continuous innovation and adaptation? This course will provide you the expertise needed to lead a highly skilled, cross-functional technical workforce capable of successfully executing these most demanding projects. You will participate using an experienced-based style of teambased learning implementing advanced leadership principles designed to deliver game-changing value to your customer. You will learn to apply a blend of agile, lean and design-thinking methods to technical leadership within a complex, evolving system engineering environment while still achieving a set of product requirements and design elements meeting schedule and budget allocations. You will gain critical insight into criteria necessary to assess the relevance of these advanced methods to specific projects and organizational culture. This course is offered through a virtual-live delivery environment where you attend biweekly online sessions in the Zoom application executing an unfolding project simulation from within an intact team cohort.

EN.595.731. Business Law for Technical Professionals. 3 Credits.

This course addresses legal issues commonly encountered by technical professionals, best practices in identifying and mitigating legal risks, and strategies to avoid costly legal errors and to recognize when professional legal advice is necessary. The course will acquaint students with various areas of the law that can interact to affect a single business transaction and will provide students with legal reasoning skills that can be applied in a technical business environment. Topics include the legal environment of business, contract basics, effective contract negotiations, breach of contract and remedies, intellectual property rights, licensing and technology transfer, protecting confidential and proprietary business information, employment law, Internet law, corporate policies, business ethics, export control regulations, and an overview of the American court system.

EN.595.740. Assuring Success of Aerospace Programs. 3 Credits.

Technical managers, systems engineers, lead engineers, and mission assurance professionals will benefit from this course, which focuses on the leadership of system safety and mission assurance activities throughout the life cycle of a project to achieve mission success. This advanced course provides crucial lessons learned and proven best practices that technical managers need to know to be successful. The integrated application of mission assurance and systems engineering principles and techniques is presented in the context of aerospace programs and is also applicable to other advanced technology research and development programs. Students discuss critical risk-based decision making required from system concept definition and degree auditing through design, procurement, manufacturing, integration and test, launch, and mission operations. Experiences shared by senior aerospace leaders and extensive case studies of actual mishaps explore quality management topics relevant to aircraft, missiles, launch vehicles, satellites, and space vehicles. The course addresses contemporary leadership themes, government policies, and aerospace industry trends in mission assurance requirements, organizational structure, knowledge sharing and communication, independent review, audit, and assessment. Mission assurance disciplines covered include risk management, system safety, reliability engineering, software assurance, supply chain management, parts and materials, configuration management, requirements verification and validation, non-conformance, and anomaly tracking and trending. Course Note(s): This course is cross-listed with EN.675.740

EN.595.742. Quality Management in Technical Organizations. 3 Credits.

This course addresses quality management topics and applications vital to steering leadership and business process approaches for various organizations. Course discussions range from the history and development of modern quality programs to the latest in quality and business management, strategic planning, productivity improvement tools, techniques, and the implementation of quality initiatives needed to be successful in today's highly dynamic and competitive global market. Advanced topics related to the principles and application of quality methodologies are presented such as the impact of leadership and corporate culture on quality and the importance of quality during the proposal and contract review process. Students will understand the elements and implementation strategies of quality assurance tools and systems, including benchmarking, process control, quality measurement, supplier quality management, and auditing. Current applications and strategies for implementing effective quality management are introduced including lean manufacturing philosophies, Deming's PDCA cycle, Kaizen continuous improvement processes, and risk management. The course also covers a comprehensive and practical understanding of the implementation of quality management systems such as ISO 9001. As a result of the significant impact that software and system safety now have on today's organizations, sessions dedicated to both topics are also included. Course Note(s): The format for this course is a mixed online/live environment called Virtual Live. Weekly lectures are provided live (and recorded) on a predesignated day/time, with students/instructors joining from any location via personal computer. Students can also choose to participate in person, in a classroom, at the predesignated day/time. Contact the instructors for additional information.

EN.595.762. Leading Technical Organizations. 3 Credits.

The course reviews challenges in the management of hightechnology organizations at the senior technical management level. Using organizational behavior theories and practices in conjunction with critical thinking, the student will explore topics that include: senior technical manager roles and responsibilities in relation to ethics, leadership style, motivation, and performance of top management teams. The student will also evaluate leading change, communications and organizational relationships, and the potential effects organizational design and processes play in influencing individual behaviors by themselves or within a group. The student will assume the role of a senior technical manager dealing with typical organizational behavior problems in rapidly changing environments.

Prerequisite(s): 595.662 Technical Organization Management (or 595.661 Technical Group Management or 595.663 Technical Personnel Management)

EN.595.766. Advanced Technology. 3 Credits.

This course emphasizes the impact of recent technological advances on new products, processes, and needs, as well as the role of the technical manager in rapidly evolving technologies. Subject areas and lecture content track current topics of interest, such as trends and developments in microelectronics, communications, computers, intelligent machines, and expert systems. Advanced technologies in application areas such as transportation, space, manufacturing, and biomedicine are also discussed. Students are encouraged to explore new technology areas and share information with each other. The seminar format encourages student participation and culminates in a term paper on a new or emerging technology area. Course Note(s): The format for this course is a mixed online/live environment called Virtual Live. Weekly lectures are provided live (and recorded) on a predesignated day/time, with students/instructors joining from any location via personal computer. Contact the instructors for additional information.

EN.595.781. Executive Technical Leadership. 3 Credits.

This Capstone course explores the roles and responsibilities of technical executive leaders (VPs of Engineering, Manufacturing, CTO, CIO) in the context of a strategic framework. Topics relevant to technical executives are explored, from leading technical strategy development to tactical operations. The concepts in the course are reinforced using case studies, a team project, and fortified by interviews with practicing/retired technical executives who discuss practical career experiences. The format of this course is very different from other Engineering Management courses. Lectures are provided asynchronously online. Required weekly online seminar-type discussions guide the incremental development of a technical strategy, and include a mid-course team presentation. The semester ends with a Capstone presentation, and an executive roundtable discussion. Students will be evaluated on their application of the principles presented in the course, critical thinking applied to the issues posed in the case study, and teamwork as assessed by both the instructors and peer students. Course Note(s): In the Virtual Live format, weekly lectures are provided asynchronously online for students to view in advance of the weekly seminar sessions. The weekly seminar sessions are held at a predesignated day/time, with students/instructors joining live via web-conference using a personal device. The course also includes one Saturday Capstone session in the Baltimore, MD area at the end of the semester. In-person participation with your team is encouraged. Students unable to attend in person will be able to participate online. The Saturday session consists of student teams presenting their capstone technical strategic plan, issues, actions, and execution plans built around an evolving case study. A roundtable discussion will also be held where students have the opportunity to ask probing questions of visiting executives as part of the Capstone Day experience.

Prerequisite(s): 595.660 Planning and Managing Projects, 595.662 Technical Organization Management (or 595.661 Technical Group Management or 595.663 Technical Personnel Management), 595.676 Finance, Contracts, and Compliance for Technical Organizations (or 595.664 Project Planning and Control or 595.666 Financial and Contract Management), 595.665 Strategy and Communication in Technical Organizations

EN.595.793. Applied Innovation for Technical Professionals. 3 Credits.

"Fail fast", "crowdfunding", "agile", "open innovation"—the nature of innovation is radically changing in the 21st century. How can technical professionals thrive amidst the new models, tools and processes that are creating faster cycles of disruption? This course will address challenges faced by technical managers in creating and sustaining innovation across a wide range of organizations and environments: from government labs to Fortune 1,000 companies to small businesses and startups. Students will learn the many issues involved in turning creative ideas into a product or service and how to gain support for projects, demonstrate value of the innovation, scale to a profitable venture, and sustain the innovation through successive competitive life cycles. Students will also learn about the challenges and techniques for sustaining innovative cultures in large organizations and how to foster "intrepreneurship"—the concept of creating innovations within the processes and cultures of an already established organization. Case studies and interviews with experienced senior managers will provide students with the latest real-world insights. Prerequisite(s): 595.660 Planning and Managing Projects. Course Note(s): The weekly seminar-type presentations/discussions are attended via web meeting. Please refer to the course schedule for updated information.

EN.595.802. Directed Studies in Technical Management. 3 Credits.

In this course qualified students are permitted to investigate possible research fields or to pursue problems of interest through reading or nonlaboratory study under the direction of faculty members.

Prerequisite(s): The Independent Study/Project Form (ep.jhu.edu/student-forms) must be completed and approved prior to registration.

Course Note(s): This course is open only to candidates in the Master of Science in Technical Management program.