

# MTDE - MULTIDISCIPLINARY ENGR

## MTDE 606 Law for Entrepreneurs in Engineering

**Credits 3. 3 Lecture Hours.** Survey of relevant legal rules with which entrepreneurs in engineering and would-be entrepreneurs in engineering should be familiar with. **Prerequisites:** Graduate classification.

## MTDE 608 Intellectual Property for Engineering

**Credits 3. 3 Lecture Hours.** Survey of federal and state laws that protect the products of human creativity, ingenuity, and dedication; examination of the various types of intellectual property protection available under United States law. **Prerequisites:** Graduate classification.

## MTDE 609 Patent Law for Engineers

**Credits 3. 3 Lecture Hours.** Exploration of how proprietary interests in technology are protected by patent law, with a focus on issues of patent validity, patent-eligible subject matter and the enforcement of patent rights. **Prerequisites:** Graduate classification.

## MTDE 611 Enterprise Basics for Technical Entrepreneurs

**Credits 3. 3 Lecture Hours.** Aspects of entrepreneurship for a technical enterprise; elements of a business including idea generation, startup financing, staffing, product design and production, marketing and selling a product; focus on the front end of the venture: product design and development, financing, identifying and attracting key personnel, and actually starting up company.

## MTDE 612 Sales, Operations, and Manufacturing for Technology Companies

**Credits 3. 3 Lecture Hours.** Challenges faced in a start-up entity with respect to product manufacturing, operations and supply chain management, product pricing strategies, and sales and marketing; focus on small start-up to young mid-size enterprises.

## MTDE 613 Engineer to Chief Executive Officer

**Credits 3. 3 Lecture Hours.** Exploration of fundamental skills, experience, and training necessary to one day serve in the Chief Executive Officer (CEO) role; study of what it means to be the CEO and to take on those responsibilities along with the personal and professional commitments associated with this important position; critical area of communications and effective ways to interface with the key stakeholder groups represented by shareholders, board of directors, executive management team, employees, customers, the media and communities where the company does business. **Prerequisite:** Completion of two summer internships, one summer internship and a co-op, or have been employed full-time.

## MTDE 614 Skills for Technology Leadership

**Credits 3. 3 Lecture Hours.** Insight into career paths for engineers and technologists; emerging technology learning and evaluation; technology talent evaluation and management; elements of technology strategy; technology management processes and frameworks; communicating complex technologies; technology leader's roles in various organizations. **Prerequisites:** Graduate classification.

## MTDE 615 Startup Fundamentals - Launching, Growing and Exiting a Startup Company

**Credits 3. 3 Lecture Hours.** Fundamental skills, experience, and training necessary to launch a startup company; techniques for growing the startup including branding, sales, transitioning from prototypes to production, human resources and organization design, and its operations; exit opportunities, such as understanding financials and company evaluations, developing negotiating skills, and exit options including, a strategic buyout, IPO, liquidation and bankruptcy. **Prerequisites:** Graduate classification in Engineering.

## MTDE 621 Technology Company Management, Leadership, and Corporate Culture

**Credits 3. 3 Lecture Hours.** Strategic challenges associated with enterprise management and leadership; establishing and maintaining a sustainable brand; developing an effective corporate culture; dealing with global competition; case studies in strategic thinking.

## MTDE 630 Fundamentals of Subsea Engineering

**Credits 3. 3 Lecture Hours.** Orientation to subsea engineering fundamentals; includes SURF (Subsea, Umbilicals/Controls, Risers, Flowlines) equipment and configurations; exposure to practical, industry focused problems; subsea equipment components; design considerations and design drivers; subsea production operations; integrity critical maintenance activities. **Prerequisites:** Graduate classification, enrollment in the College of Engineering or approval of instructor.

## MTDE 632 Subsea Project Implementation

**Credits 3. 3 Lecture Hours.** Overview of the realization of a subsea development project; includes all stages from discovery to pre-commissioning of the subsea infrastructure. **Prerequisite:** SSN 630 or concurrent enrollment.

## MTDE 633 Project Management for Engineers

**Credits 3. 3 Lecture Hours.** Basic project management for engineering; project development and economic justification; estimating; scheduling; network methods; critical path analysis; earned value management; project organizational structures; project risk assessment; resource allocation; ethics; characteristics of project managers.

## MTDE 651 Product Lean Launch for Engineers

**Credits 3. 2 Lecture Hours. 2 Lab Hours.** Exercises in the creation of an engineering-centric business using lean startup principles; incorporation of the engineering design process; customer and market validation; value proposition creation; product development process; customer value chain discovery; communication skill training; development of a business model canvas for a student-developed engineering product business idea.

## MTDE 652 Engineering Entrepreneurship Hour

**Credit 1. 1 Lecture Hour.** Engagement with successful technology entrepreneurs from technical sectors across engineering and the nation; exploration of challenges faced by and characteristics of successful entrepreneurs and their strategies in launching and sustaining businesses on technology innovation; practice in networking with highly successful entrepreneurs and developing relations valuable to professional careers; development of speaking and presentation skills; practice in networking with industry professionals in support of entrepreneurship.

## MTDE 660 Leadership for Transportation Professionals

**Credits 3. 3 Lecture Hours.** Overview of theories and best practices of leadership at all levels of an organization; five core practices of exemplary leadership - model the way, inspire a shared vision, challenge the process, enable others to act and encourage the heart; adoption of an outward mindset to improve performance, spark collaboration and accelerate innovation. **Prerequisite:** Approval of instructor.

## MTDE 661 Transportation Organizational Management

**Credits 3. 3 Lecture Hours.** Current practice and practical tools for leaders and aspirational leaders of transportation organizations; practices and processes for mission critical areas; managing flow of work products and projects; decision making processes; interdisciplinary interaction with planners, property owners, developers and government agencies; project development and execution; organizational performance metrics and transportation system performance. **Prerequisite:** Approval of instructor.

## MTDE 662 Transportation and the Economy

**Credits 3. 3 Lecture Hours.** Relationship between transportation modes and local, regional, national and international economic systems; history of the relationship between economic growth and development and the transportation system; role of different modes and intermodal facilities and transportation development; vulnerabilities in transportation and economic systems; trends in financing transportation systems; application of block chain and other technologies to the movement of goods. **Prerequisite:** Approval of instructor.

## MTDE 663 Communication for Transportation Professionals

**Credits 3. 3 Lecture Hours.** Exploration of effective communication fundamentals; the concepts of strategic thinking and storytelling; use of verbal, printed and electronic media in communicating transportation information; the set of modern professional behavior for excelling in the workforce among peers and clients. **Prerequisite:** Approval of instructor.

## MTDE 664 Selection and Adoption of New Transportation Technologies

**Credits 3. 3 Lecture Hours.** Innovative transportation solutions and societal impacts; connected and automated vehicles; demise of the internal combustion engine and rise of electrification; communications with travelers and vehicles; intelligent roadway infrastructure; smart sensor data fusion with artificial intelligence; cybersecurity and communications spectrum; tools for public agencies building transportation's future. **Prerequisite:** Approval of instructor.

## MTDE 665 Sustainable Transportation and the Environment

**Credits 3. 3 Lecture Hours.** Sustainable transportation as the nexus of transportation and the environment; human environment and socioeconomic issues relevant to transportation and the natural environment of ecological issues relevant to transportation; environmental legislation affecting the transportation infrastructure development process; emerging environmental topics such as resilience and public health. **Prerequisite:** Approval of instructor.

## MTDE 666 Transportation Policy

**Credits 3. 3 Lecture Hours.** Fundamentals of policy tools in transportation; strategic policy development; transportation governance, laws and regulation; transportation policy in relation to economics, funding, finance and modal usage; linkages between urban development, transportation systems and policy levers; policy issues associated with the relationship between transportation and global drivers of change; role of the transportation leader in strategic policy development. **Prerequisite:** Approval of instructor.

## MTDE 667 Regulatory and Legal Topics in Transportation

**Credits 3. 3 Lecture Hours.** Legal and regulatory matters relevant to planning, developing, constructing and maintaining transportation facilities; local, state and federal transportation laws and regulations; legal matters, types of unforeseen questions and dispute resolution options arising in the life cycle of a transportation project; role of counsel and effective interactions with counsel. **Prerequisite:** Approval of instructor.

## MTDE 668 Innovation in Transportation Funding and Finance

**Credits 3. 3 Lecture Hours.** Transportation funding and finance at the federal and state levels for all modes of transportation; funding process, financing strategies, innovative funding options and associated risks; role of funding in project planning and prioritization; measuring return on transportation investment; role of various governmental agencies in the funding process; shifting policies and issues that impact funding. **Prerequisite:** Approval of instructor.

## MTDE 669 Transportation Capstone I

**Credits 2. 1 Lecture Hour. 2 Lab Hours.** Project selection and development of problem statement; review of literature relevant to problem; proposal to address problem including analysis methodology and data collection plan; mid-project presentation at end of semester; first semester course in two semester capstone project sequence.

**Prerequisite:** Approval of instructor.

## MTDE 670 Transportation Capstone II

**Credit 1. 0 Lecture Hours. 2 Lab Hours.** Continuation of project started in first semester; project scoping; data analysis; development of options, recommendations and implementation approaches; formal presentation of final results to stakeholder audience at end of semester; second semester course in two semester capstone project sequence.

**Prerequisite:** MTDE 669.