

# Master of Engineering (MENG)

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## **MENG 400. Engineering Law. 3 or 4 hours.**

Overview of the legal system. Legal principles affecting the engineering profession. Professional ethics in engineering. Intellectual property law. Basic contract and tort principles. Environmental law. Course Information: Same as ENGR 400. 3 undergraduate hours. 4 graduate hours. Extensive computer use required. This is an online web-based course. Prerequisite(s): Senior standing or above.

## **MENG 401. Engineering Management. 3 or 4 hours.**

Theory, strategy, and tactics of the use of project management including project planning, matrix management concept, and team meetings. Course Information: Same as ENGR 401. 3 undergraduate hours. 4 graduate hours. Extensive computer use required. This is an online web-based course. Prerequisite(s): Senior standing or above.

## **MENG 402. Intellectual Property Law. 3 or 4 hours.**

Patent, copyright, trade secret, mask work, and cyber-squatting legal and procedural principles; protection for novel software, biotech inventions, and business methods; and trademark protection for domain names. Course Information: Same as ENGR 402. 3 undergraduate hours. 4 graduate hours. Extensive computer use required. This is an online web-based course. Prerequisite(s): Senior standing or above.

## **MENG 403. Reliability Engineering. 3 or 4 hours.**

Probability overview; statistics overview; system reliability modeling and prediction-static methods; system reliability modeling and prediction-dynamic methods; maintainability and availability; reliability optimization; and risk analysis. Course Information: Same as ENGR 403. 3 undergraduate hours. 4 graduate hours. Extensive computer use required. This is an online web-based course. Prerequisite(s): Senior standing or above.

## **MENG 404. Math Fundamentals for AI Engineers and Data Scientists. 4 hours.**

Concise refresher on the basics of the mathematical tools underpinning modern machine learning and artificial intelligence. Course Information: Extensive computer use required. Recommended Background: BS degree in a STEM discipline.

## **MENG 405. Foundations of Emergency Management. 4 hours.**

Introduces the principles of emergency management including the history of EM in the United States; the roles of federal, state, and local EM agencies; national response concepts; and preparedness, recovery, and mitigation strategies. Course Information: Extensive computer use required. Online web-based course.

## **MENG 406. Critical Infrastructure. 4 hours.**

Designed to enable students to formulate policies and strategies aiming to protect the leading critical infrastructure sectors in the U.S. (e.g. energy, water, telecommunications, internet, etc.). Course Information: Extensive computer use required. Online web-based course.

## **MENG 407. Innovation Tools and Methods. 4 hours.**

Introduction to tools and methods used for innovation in the development of products, systems, and services, including an introduction to the design thinking methodology.

## **MENG 411. Non-Newtonian Fluids. 3 or 4 hours.**

Fluid mechanics and transport processes involving non-Newtonian fluids. Purely viscous and viscoelastic behavior. Viscometric functions and rheometry. Heat and mass transfer in non-Newtonian fluids. Course Information: Same as CHE 440. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): CHE 410 or MENG 410 or consent of the instructor.

## **MENG 412. Computational Molecular Modeling. 3 or 4 hours.**

Provide students with a fundamental understanding of the methods, capabilities and limitations of molecular simulations. Course Information: Same as CHE 438. 3 undergraduate hours. 4 graduate hours. Extensive computer use required. Prerequisite(s): CHE 301. Recommended background: Engineering/Science.

## **MENG 413. Fundamentals and Design of Microelectronics Processes. 3 or 4 hours.**

Design and practical aspects of the most advanced state of micro- and nano-electronics processing with emphasis on thin film deposition, substrate passivation, lithography and etching with thermodynamics, kinetics, reactor design, and optimization. Course Information: Same as CHE 456. 3 undergraduate hours. 4 graduate hours. Extensive computer use required. Prerequisite(s): Graduate standing or consent of the instructor. Recommended background: Engineering/Science.

## **MENG 421. Quasi-Static Electric and Magnetic Fields. 4 hours.**

Quasi-static approximations to Maxwell's equations. Scalar potential; capacitance; conduction; polarization; mixing formulas. Magnetization; vector potential; Biot-Savart law. Forces, energy and power. Poynting's theorem. Course Information: Previously listed as ECE 401. Extensive computer use required. Prerequisite(s): Graduate or professional standing; and consent of the instructor. Recommended background: Calculus through Differential Equations. College Physics.

## **MENG 423. Foundations of Electromagnetic Compatibility. 4 hours.**

EMC requirements for electronic systems; non-ideal behavior of components; radiated and conducted emissions; susceptibility; coupling and shielding; electrostatic discharge; system design for EMS; Projects required. Course Information: Extensive computer use required. Prerequisite(s): Graduate or professional standing; and consent of the instructor. Recommended background: Undergraduate background in Electromagnetic Fields.

## **MENG 425. Transmission Lines for Communication and Power. 4 hours.**

Two-conductor lines. Impedance matching. Wideband systems. Scattering matrix. Three-phase systems. Course Information: Extensive computer use required. Prerequisite(s): MENG 421 or consent of instructor. Recommended background: Undergraduate knowledge of electricity and magnetism.

## **MENG 426. Antennas and Arrays. 4 hours.**

Antenna definitions and parameters. Linear antennas; self and mutual impedances. Arrays. Microstrip, broadband, and reflector antennas. Course Information: Extensive computer use required. Prerequisite(s): Graduate or professional standing and MENG 421, or consent of instructor. Recommended background: Undergraduate knowledge of electromagnetic fields.

## **MENG 435. Wireless Communication Networks. 4 hours.**

Radio technology fundamentals; channel and propagation models; channel multiple access technologies; wireless mobile communication fundamentals; generic wireless mobile network; cellular/PCS wireless mobile network standards. Course Information: Extensive computer use required. Prerequisite(s): Graduate or professional standing; and consent of the instructor.

**MENG 436. Wireless Data. 3 or 4 hours.**

Data communications, existing Wireless Data Networks, planning, topology, performance, and operation. Course Information: Same as ENGR 436. 3 undergraduate hours. 4 graduate hours. Extensive computer use required. This is an online web-based course.

Prerequisite(s): Senior standing or above and a course in digital communications and an introductory course in wireless communications.

**MENG 480. Introductory Bioinformatics. 4 hours.**

Practical analysis of genomic sequences and other high throughput data. Basics of sequence alignment, biological database search, protein motif search, gene expression analysis, and structural bioinformatics. Course Information: Extensive computer use required. Prerequisite(s): Graduate or professional standing; and consent of the instructor. Recommended background: Background in Computer Science and Biology.

**MENG 481. Introduction to Biostatistics. 4 hours.**

Introduce basics about statistical treatment, model estimation, and parameter inference from observed biological data. Provide practical skills for summarizing and inference of experimental data. Course Information: Extensive computer use required. Prerequisite(s): Graduate or professional standing; and consent of the instructor. Recommended background: Calculus III and R programming language.

**MENG 483. Bioinformatics Approach to Molecular Modeling. 4 hours.**

Protein structure prediction and comparison. Monte Carlo and molecular dynamics simulations. Course Information: Course Information: Extensive computer use required. Prerequisite(s): Graduate or professional standing; and consent of the instructor. Recommended background: Background in Computer Science and Biology.