

Course Bulletin

103583	Chemical Process Principles			
Subject: CHBE		Catalog Nbr: 0010		
2023 FALL		Primary	James Van Deventer	James.Van_Deventer@tufts.edu
2024 FALL		Primary	Derek Mess	Derek.Mess@tufts.edu
2024 FALL		Primary	Emmanouhl Tzanakakis	Emmanuel.Tzanakakis@tufts.edu
2024 FALL		Primary	Prashant Deshlahra	Prashant.Deshlahra@tufts.edu
2024 FALL		Primary	Nathaniel Eagan	Nathaniel.Eagan@tufts.edu
Introduction to chemical and biological process calculations emphasizing unit operations, process stoichiometry, material and energy balances, states of matter, and continuous steady state and transient processes. Introduction to computational tools for process engineering calculations.				

103643	Chemical Engineering Thermodynamics			
Subject: CHBE		Catalog Nbr: 0011		
2025 SPRG		Primary	Ayse Asatekin	Ayse.Asatekin@tufts.edu
Thermodynamic concepts - first and second laws, heat, work, energy, entropy, equilibrium, reversibility, equations of state - are introduced in process contexts. Phase equilibria, chemical potential, fugacity, and colligative properties are also discussed.				

103699	Transport Phenomena I			
Subject: CHBE		Catalog Nbr: 0021		
2025 SPRG		Primary	Matthew Panzer	Matthew.Panzer@tufts.edu
Fundamentals of fluid mechanics and their applications to the design and understanding of flow phenomena in industrial and biological processes. Enrollment requirement: CHEM 2, PHY 11, and MATH 51 (concurrent or completed)				

103757	Transport Phenomena II			
Subject: CHBE		Catalog Nbr: 0022		
2024 FALL		Primary	Derek Mess	Derek.Mess@tufts.edu
2024 FALL		Primary	Prashant Deshlahra	Prashant.Deshlahra@tufts.edu
Principles of heat and mass transfer. Steady-state conduction and diffusion processes. Convective transport of heat and mass in laminar and turbulent flows in conduits and over various surfaces. Applications to design of heat exchangers. Natural convection. Combined heat and mass transfer applications. Recommendations: CHBE 10, 11; MATH 42 (formerly MATH 13).				

103906	Applied Numerical Methods For Chemical & Biological Engineering			
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Subject:	Catalog Nbr:			
CHBE	0039			
2023 FALL	Primary	Emmanouhl Tzanakakis	Emmanuel.Tzanakakis@tufts.edu	
2024 FALL	Primary	Graham Leverick	Graham.Leverick@tufts.edu	
Numerical analysis methods and their implementation using commercially available software are reviewed. Scientific programming methodology. Application of commercial process simulation software to the analysis of chemical and biological process models.				

103945	Chemical And Biological Separations			
Subject:	Catalog Nbr:			
CHBE	0045			
2025 SPRG	Primary	Hyunmin Yi	Hyunmin.Yi@tufts.edu	
Design and analysis of separation processes. Equilibrium-stage processes, stagewise separation processes, mass transfer operations, and rate-controlled separations. Fundamental study of distillation, extraction, adsorption, membrane separation, and precipitation & crystallization processes. Pre-Requisite: CHBE 22				

103965	Chemical And Biological Engineering Laboratory			
Subject:	Catalog Nbr:			
CHBE	0051			
2024 FALL	Primary	Laura Place	Laura.Place@tufts.edu	
Laboratory experiments related to fundamental concepts characterizing chemical and biological systems and processes. Experience is gained in planning and executing the experiments and critically analyzing the collected data to achieve a deeper understanding of the underlying concepts. Oral presentations and written reports are an integral part of this laboratory course.				

103986	Chemical And Biological Engineering Laboratory			
Subject:	Catalog Nbr:			
CHBE	0052			
2025 SPRG	Primary	Derek Mess	Derek.Mess@tufts.edu	
Open-ended laboratory projects in an area of applied and industrial interest of chemical and biological engineering. Students work in groups and choose one project for the whole term. They are asked to not only analyze the results of a given experiment but also decide what are the important experiments to perform as part of their overall plan to bring their project to a successful conclusion Oral presentations and written reports are an integral part of this laboratory course.				

104016	Various Topics In Computer Science			
Subject:	Catalog Nbr:			
CS	0009			
Please see departmental website for detailed information.				

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Recommendations: A sincere interest in learning more about computer science and no prior programming experience.

104031	Product & Process Design			
Subject:		Catalog Nbr:		
CHBE		0060		
2024 SPRG		Primary	Rabeb Layouni	No Email on file.
2025 SPRG		Primary	Daniel Ryder	daniel.ryder@tufts.edu
This is a capstone design course covering the principles of design and economic evaluation through the preliminary design of a commercial project related to a product or a process. Working in groups on assigned or selected portions of the overall project , students are required to make integrated use of a wide variety of fundamentals and principles gained from previous courses. Computational laboratories are supplemented by lectures. Use of design software.				

104049	Molecular Biotechnology			
Subject:		Catalog Nbr:		
CHBE		0162		
2023 FALL	Primary	Monir Ejemel	Monir.Ejemel@tufts.edu	
2024 FALL	Primary	Yu-Ting Dingle	Yu-ting.Dingle@tufts.edu	
(Cross-listed as BME 162 and BIO 162.) Overview of key aspects of molecular biology and engineering aspects of biotechnology. Lecture topics include molecular biology, recombinant DNA techniques, immunology, cell biology, protein purification, fermentation, cell culture, combinatorial methods, bioethics, and bioinformatics with review and discussion of primary literature. Comprehensive technical paper on an emerging topic. Students may not receive credit for both BME/CHBE/BIO 162 and BME 33. Recommendations: CHEM 1, BIO 13 or permission of instructor.				

104066	Independent Study	
	Subject:	Catalog Nbr:
	CHBE	0093
Guided Individual study of an approved topic. Designed to develop self- teaching skills of the advanced undergraduate. Appraisal of the student's knowledge in the chosen topic based on written and and/ or oral examination. Please see departmental website for specific details. Recommendations: Permission of department .		

104086	Independent Study	
	Subject:	Catalog Nbr:
	CHBE	0094
Guided individual study of an approved topic. Designed to develop self-teaching skills of the advanced undergraduate. Appraisal of the student's knowledge in the chosen topic based on written and/or oral examination. Prerequisite: consent of the department. Please see departmental website for specific details.		

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104132		Undergraduate Research			
Subject: CHBE		Catalog Nbr: 0095			
	2024 SPRG	Primary	Christos Georgakis	Christos.Georgakis@tufts.edu	
	2025 SPRG	Primary	Daniel Ryder	daniel.ryder@tufts.edu	
	2025 SPRG	Primary	David Kaplan	david.kaplan@tufts.edu	
	2025 SPRG	Primary	Soha Hassoun	soha.hassoun@tufts.edu	
	2025 SPRG	Primary	Kyongbum Lee	Kyongbum.Lee@tufts.edu	
	2025 SPRG	Primary	Hyunmin Yi	Hyunmin.Yi@tufts.edu	
	2025 SPRG	Primary	Matthew Panzer	Matthew.Panzer@tufts.edu	
	2025 SPRG	Primary	Qiaobing Xu	Qiaobing.Xu@tufts.edu	
	2025 SPRG	Primary	Ayse Asatekin	Ayse.Asatekin@tufts.edu	
	2025 SPRG	Primary	Nikhil Nair	Nikhil.Nair@tufts.edu	
	2025 SPRG	Primary	Emmanouhl Tzanakakis	Emmanuel.Tzanakakis@tufts.edu	
	2025 SPRG	Primary	James Van Deventer	James.Van_Deventer@tufts.edu	
	2025 SPRG	Primary	Prashant Deshlahra	Prashant.Deshlahra@tufts.edu	
	2025 SPRG	Primary	Nathaniel Eagan	Nathaniel.Eagan@tufts.edu	
	2025 SPRG	Primary	Milo Koretsky	Milo.Koretsky@tufts.edu	
	2025 SPRG	Primary	Graham Leverick	Graham.Leverick@tufts.edu	
Preparation of a report based on personal research, design, or experiment. Please see departmental website for specific details.					

104192		Honors Thesis Research A			
Subject: CHBE		Catalog Nbr: 0096			
	2023 FALL	Primary	Christos Georgakis	Christos.Georgakis@tufts.edu	
	2024 FALL	Primary	Daniel Ryder	daniel.ryder@tufts.edu	
	2024 FALL	Primary	David Kaplan	david.kaplan@tufts.edu	
	2024 FALL	Primary	Kyongbum Lee	Kyongbum.Lee@tufts.edu	
	2024 FALL	Primary	Hyunmin Yi	Hyunmin.Yi@tufts.edu	
	2024 FALL	Primary	Matthew Panzer	Matthew.Panzer@tufts.edu	
	2024 FALL	Primary	Ayse Asatekin	Ayse.Asatekin@tufts.edu	
	2024 FALL	Primary	Nikhil Nair	Nikhil.Nair@tufts.edu	
	2024 FALL	Primary	Emmanouhl Tzanakakis	Emmanuel.Tzanakakis@tufts.edu	
	2024 FALL	Primary	James Van Deventer	James.Van_Deventer@tufts.edu	
	2024 FALL	Primary	Prashant Deshlahra	Prashant.Deshlahra@tufts.edu	
	2024 FALL	Primary	Nathaniel Eagan	Nathaniel.Eagan@tufts.edu	
	2024 FALL	Primary	Milo Koretsky	Milo.Koretsky@tufts.edu	
	2024 FALL	Primary	Graham Leverick	Graham.Leverick@tufts.edu	
Supervised research in chemical and biological engineering leading to the completion of the undergraduate					

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honors thesis. Please see the Departmental website for specific program details and qualification requirements.

104248		Internship In Chemical & Biological Engineering		
Subject: CHBE		Catalog Nbr: 0099		
2024 FALL	Primary	Derek Mess	Derek.Mess@tufts.edu	
2024 FALL	Primary	Nathaniel Eagan	Nathaniel.Eagan@tufts.edu	
2024 FALL	Primary	Graham Leverick	Graham.Leverick@tufts.edu	
2024 SUMR	Primary	Milo Koretsky	Milo.Koretsky@tufts.edu	
2025 SPRG	Primary	Daniel Ryder	daniel.ryder@tufts.edu	
2025 SPRG	Primary	David Kaplan	david.kaplan@tufts.edu	
2025 SPRG	Primary	Maria Flytzani-Stephanopoulos	No Email on file.	
2025 SPRG	Primary	Soha Hassoun	soha.hassoun@tufts.edu	
2025 SPRG	Primary	Kyongbum Lee	Kyongbum.Lee@tufts.edu	
2025 SPRG	Primary	Linda Abriola	Linda.Aabriola@tufts.edu	
2025 SPRG	Primary	Christos Georgakis	Christos.Georgakis@tufts.edu	
2025 SPRG	Primary	Hyunmin Yi	Hyunmin.Yi@tufts.edu	
2025 SPRG	Primary	Matthew Panzer	Matthew.Panzer@tufts.edu	
2025 SPRG	Primary	Qiaobing Xu	Qiaobing.Xu@tufts.edu	
2025 SPRG	Primary	Ayse Asatekin	Ayse.Asatekin@tufts.edu	
2025 SPRG	Primary	Nikhil Nair	Nikhil.Nair@tufts.edu	
2025 SPRG	Primary	Emmanouhl Tzanakakis	Emmanuel.Tzanakakis@tufts.edu	
2025 SPRG	Primary	James Van Deventer	James.Van_Deventer@tufts.edu	
2025 SPRG	Primary	Prashant Deshlahra	Prashant.Deshlahra@tufts.edu	
2025 SPRG	Primary	Nav Nidhi Rajput	No Email on file.	
A mentored professional experience in engineering at an off-site organization. The internship must conform to all the requirements of the School of Engineering Internship Program. The department will grant course credit for internships if all of the following conditions are met: 1) The project is approved in advance by the department, 2) a faculty mentor has supervisory and technical control of any work that receives credit, and 3) a written report is submitted that is evaluated by the faculty adviser and the outside institutional supervisor. Recommendations: Junior or senior standing.				

104290		Reactor Design			
Subject:		Catalog Nbr:			
CHBE		0102			
2024 SPRG		Primary	Nathaniel Eagan	Nathaniel.Eagan@tufts.edu	
2025 SPRG		Primary	Prashant Deshlahra	Prashant.Deshlahra@tufts.edu	
Treatment of chemical reaction equilibrium and kinetic fundamentals and application of them to the design of reactors. Topics include interpretation of reaction-rate data, establishment of reaction mechanism and rate-controlling steps, sizing, and optimization of reactors. Use of personal computer software is encouraged.					

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104334	Separation Processes
Subject: CHBE	Catalog Nbr: 0104
Material on mass-transfer separation processes beyond that covered by the undergraduate unit operations course. Computational techniques employing digital computers are emphasized. Recommendations: CHBE 45	

104353	Membrane Separation Processes
Subject: CHBE	Catalog Nbr: 0107
Fundamentals of liquid/solid, liquid mixture, and gas mixture separations using synthetic membranes. Processes include microfiltration, ultrafiltration, reverse osmosis, electrodialysis, and gas permeation, with applications to industrial process streams, bioprocessing, water purification, and hazardous waste control; also novel membrane reactors and membrane extraction. Emphasis on application of mass transfer and fluid flow principles; also process configuration selection, to design and scale-up. Recommendations: CHBE 45.	

104399	Process Dynamics And Control
Subject: CHBE	Catalog Nbr: 0109
2024 FALL	Primary Daniel Ryder daniel.ryder@tufts.edu
Mathematical modeling of chemical processes with ordinary differential equations. Feedback, feedforward, and environmental control. Block diagrams. Laplace transformation. Linearization techniques. Frequency response. Laboratory exposure to instrumentation.	

104420	Introduction Optimization
Subject: CHBE	Catalog Nbr: 0110
Intorduction to fundamental method of optimization with application to problems related to chemical and biological systems and processes; nature of optimization problem; one-dimensional and multivaribale unconstrained optimization; linear programming; non-linear programming with constraints; mixed-integer programming; selected applications.	

104459	Thermal-fluid Transport I
Subject: CHBE	Catalog Nbr: 0111
2024 FALL	Primary Marc Hodes Marc.Hodes@tufts.edu
(Cross-listed as ME 150). Advanced topics in fluid mechanics. Viscous and inviscid flows. Strain rate, vorticity	

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and streamline coordinates. Differential conservation laws for mass, momentum and energy. Dimensional analysis. Lubrication flows. Momentum and thermal laminar boundary layers. Laminar-turbulent transition. Reynolds stress and turbulence modeling. Turbulent boundary layers. Flow modeling.
Recommendations: ES 8 or ME 51 or graduate standing.

104481	Thermal-fluid Transport II			
Subject: CHBE		Catalog Nbr: 0112		
2025 SPRG		Primary	Erica Kemmerling	Erica.Kemmerling@tufts.edu
(Cross-listed as ME 151). Multi-dimensional conduction. Transient conduction including moving boundary problems. External forced and natural convection. Internal forced and natural convection. Developing flows and transition to turbulence. Condensation and boiling heat transfer. Radiation and conjugate heat transfer involving radiation. Temperature and heat flux measurements. Numerical techniques. Recommendations: ME 111 Thermal-Fluid Transport I or equivalent.				

104507	Introduction To Computer Science			
Subject: CS		Catalog Nbr: 0011		
2023 FALL		Primary	Megan Monroe	Megan.Monroe@tufts.edu
2023 SUMR		Primary	James Mattei	James.Mattei@tufts.edu
2023 SUMR		Primary	Di Zhou	Di.Zhou@tufts.edu
2024 SUMR		Primary	Owen Morrissey	Owen.Morrissey@tufts.edu
2024 SUMR		Primary	Carson Powers	Carson.Powers@tufts.edu
2025 SPRG		Primary	Richard Townsend	Richard.Townsend@tufts.edu
The study of computer science centers on two complementary aspects of the discipline. First, computer science is fundamentally concerned with the problem-solving methodologies it derives from its foundational fields: the design principles of engineering, mathematical theory, and scientific empirical study. Second, these methodologies are applied in the complex context of a modern day computing system. In this course we will address both of these important aspects. As a means for developing your design skills, we will discuss the fundamental features of a high level, general purpose programming language — namely C++ — and learn how to use it as a tool for problem solving. We will also consider the performance of solutions, and how to apply both analytical and empirical assessment techniques. Finally, we will explore the Unix operating system as a context for problem solving.				

104569	Principles Of Polymerization			
Subject: CHBE		Catalog Nbr: 0121		
2024 FALL		Primary	Ayse Asatekin	Ayse.Asatekin@tufts.edu
(Cross-listed with MSE 137) Synthesis of polymeric materials. Three major types of polymerization--step, chain, and ring-opening--are reviewed with emphasis on reaction mechanisms, kinetics, and thermodynamics of the reactions, and their relationships to molecular weight and molecular structures of macromolecules. Recommendations: Physical and organic chemistry				

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104592	Physical Chemistry Of Polymers			
Subject: CHBE		Catalog Nbr: 0122		
2023 FALL		Primary	Ayşe Asatekin	Ayşe.Asatekin@tufts.edu
(Cross-listed with MSE 138) Physicochemical properties of polymeric materials with emphasis on the relationship between molecular architecture and physical properties. Topics include polymer solution theories, thermal transitions, conformational analysis, polymer microstructure, crystallinity and morphology, the rubbery and glassy states, rheology, and statistical thermodynamics. Recommendations: CHBE 11				

104621	Data Structures			
Subject: CS		Catalog Nbr: 0015		
2023 FALL		Primary	Milod Kazerounian	Milod.Kazerounian@tufts.edu
2023 SUMR		Primary	Fabrizio Santini	Fabrizio.Santini@tufts.edu
2023 SUMR		Primary	Matthew Russell	Matthew.Russell613354@tufts.edu
2024 FALL		Primary	Mark Sheldon	Mark.Sheldon@tufts.edu
2024 SUMR		Primary	Shivam Goel	Shivam.Goel@tufts.edu
2024 SUMR		Primary	Mavis Murdock	Mavis.Murdock@tufts.edu
2025 SPRG		Primary	Martin Allen	Martin.Allen@tufts.edu
A second course in computer science. Data structures and algorithms are studied through major programming projects. Topics include linked lists, trees, graphs, dynamic storage allocation, and recursion. Enrollment priority given to freshmen or sophomores; computer science majors or minors; or majors or minors that list CS15 as a requirement or elective.				

104635	Air Pollution and Control	
	Subject:	Catalog Nbr:
	CHBE	0136
(Cross-listed as CHBE 136) A study of health and environmental effects from air pollution, dispersion modeling, air pollution laws and regulations, fate and transport of air pollution, and design of pollution control equipment and processes. Recommendations: (ES 8 & CEE 32) or CHBE 22		

104656	Hazardous Waste Treatment Technologies		
Subject:		Catalog Nbr:	
CHBE		0138	
(Cross-listed as CEE 138.) Hazardous waste treatment options based on physical, chemical, biological, and thermal processing technologies. Brief review of definitions and appropriate hazardous waste legislation. Introduction to pollution prevention. Traditional end-of-pipe treatment technologies. Applications to include			

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solvent recovery, chemical fixation, land disposal, biodegradation, and special wastes. Incineration and associated environmental discharges constitute a major portion of course. Emerging technologies and evaluation of technical/economic process viability.

Recommendations: Senior standing or consent of instructor.

104659	Web Programming			
Subject: CS		Catalog Nbr: 0020		
2025 SPRG		Primary	Lisa Diorio	Lisa.Diorio@tufts.edu
An introduction to techniques, principles, and practices of writing computer programs for the World Wide Web. Server and browser capabilities and limits. Media types, handlers, and limitations. Web programming languages and techniques. Web security, privacy, and commerce. Lectures augmented with programming projects illustrating concepts and current practice.				

104678	Surface And Colloid Chemistry		
	Subject:	Catalog Nbr:	
	CHBE	0140	
Emphasis on fundamental concepts: attractive and repulsive forces between particles in a dispersion; stabilization and flocculation of a dispersion, electrokinetic phenomena; surfactants; contact angle and wetting; phenomena at curved interfaces; capillarity; rheology of suspensions; drying of coatings; emulsions. For students in chemical engineering and other disciplines in which surface chemistry plays an important role. Prerequisites: CHBE 21 and CHEM 31			

104699	Biochemical Engineering			
Subject: CHBE		Catalog Nbr: 0160		
2024 FALL		Primary	Nikhil Nair	Nikhil.Nair@tufts.edu
Thermodynamics of biological reactions, principles of fermentation processes, and chemical engineering applications to bioreactor analysis are studied. Recommendations: CHBE 102.				

104720	Game Design			
Subject: CS		Catalog Nbr: 0023		
2025 SPRG		Primary	Jason Wiser	Jason.Wiser@tufts.edu
Processes, procedures, methodologies, and principles of game design. Managing teamwork, project scope and user experience. Paper and digital prototyping, including the use of software for programming, art, and audio production. Recommendations: CS 15				

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104760	Protein Purification
Subject: CHBE	Catalog Nbr: 0161
2025 SPRG	Primary Junjie Chen Junjie.Chen@tufts.edu
Methods of purifying proteins at a large scale for therapeutic or industrial uses. Focus on unit operations found in a typical process flowsheet including centrifugation, membrane filtration, most modes of chromatography, and lyophilization. Topics include introduction to protein chemistry and analytical methods, effects of production host choice, and protein stability. Process economics, GMP operations and validation, and case studies of biotechnology industry separations.	

104783	Molecular Biotechnology
Subject: CHBE	Catalog Nbr: 0262
(Cross-listed as BME 262 and BIO 264.) Overview of key aspects of molecular biology and engineering aspects of biotechnology. Lecture topics include molecular biology, recombinant DNA techniques, immunology, cell biology, protein purification, fermentation, cell culture, combinatorial methods, and bioinformatics. Includes a semester-long technical project and oral presentation. (Also offered as lower-level.)	

104806	Recombinant Dna Techniques
Subject: CHBE	Catalog Nbr: 0163
(Cross-listed as BIO 163 & BME 163) This lecture and laboratory course is designed to familiarize the student with methods employed to produce recombinant products. The lectures cover fundamental aspects of the recombinant DNA methodologies used in the laboratory as well as some commercial applications of the techniques. The laboratory provides hands-on experience with the key skills used in genetic engineering including DNA isolation, restriction enzyme mapping, cloning and selection, protein expression, gel electrophoresis, polymerase chain reaction, DNA sequencing, and related techniques. Students may not receive credit for both BME 163 and BME 33. Recommendations: CHEM 1, BIO 13, or permission of instructor.	

104831	Biomaterials and Regenerative Medicine
Subject: CHBE	Catalog Nbr: 0164
2024 FALL	Primary Yu-Ting Dingle Yu-ting.Dingle@tufts.edu
(Cross-listed as BME 153.) Fundamental concepts of biomaterials and regenerative medicine (biomaterial types, synthesis, properties, mechanisms of degradation, biological interfaces, inflammation and related issues). Specific focus on biomaterials related to regenerative medicine. Course independent of, but complementary to, BME 154. Recommendations: Junior standing, BIO13, CHEM 1, or consent of instructor	

104850	Cell/microbe Cultivation
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Subject:	Catalog Nbr:			
CHBE	0166			
2025 SPRG	Primary	Emmanouhl Tzanakakis	Emmanuel.Tzanakakis@tufts.edu	
In-depth examination of microbial and mammalian cell cultivation and concomitant production of commercially important products. Mechanism and methods of measurement and quantitative analysis of growth, product formation, and nutrient utilization kinetics in characterizing and optimizing for cell mass or product formation. Discussion of fundamental parameters controlling bioreactor design and scale-up. Systems studied include production of proteins in recombinant organisms, antibiotics, amino acids, and the cultivation of mammalian cells. Recommendations: Permission of Instructor				

104859	Machine Structure & Assembly-language Programming			
Subject:	Catalog Nbr:			
CS	0040			
2024 FALL	Primary	Megan Monroe	Megan.Monroe@tufts.edu	
2025 SPRG	Primary	Noah Mendelsohn	Noah.Mendelsohn@tufts.edu	
2025 SPRG	Primary	Mark Sheldon	Mark.Sheldon@tufts.edu	
Structure of machine-level data and code, including memory, cache, registers, machine arithmetic, and bitwise operations. Encapsulating machine functionality through interfaces and abstract data types. Structure of assembly code, relocatable object code, and binary machine code, and the translations between them. Applications of machine-level operations and code translations in programming projects. High demand (see "course notes" for signup procedure).				

104871	Metabolic&cellular Engin			
Subject:	Catalog Nbr:			
CHBE	0167			
2023 FALL	Primary	Gautham Sridharan	No Email on file.	
The goal is to present a framework for quantitative analysis of cellular functions, and introduce students to metabolic engineering. Metabolic engineering is a systems-oriented approach to the problem of remodeling and reconfiguring the many molecular components of the cell in order to achieve a desirable phenotype. Unlike molecule-centric approaches, which focus on only the final product-forming reaction, metabolic engineering emphasizes the metabolic pathway in its entirety. Course material analyzes cell-level processes as molecular systems. The processes to be discussed include: metabolism, protein synthesis, and regulation of gene expression. Analyses of these processes will emphasize an engineering, problem solving-oriented perspective, and will be integrated with discussions on core metabolic engineering methods: metabolic modeling, genetic engineering, and analytical biochemistry. Complementary disciplines very recently added to the metabolic engineering toolbox will also be discussed: �omics� technologies, computational systems biology, and synthetic biology. Selected metabolic engineering applications, including conversion of biomass into fuels, will be further explored through case studies and reviews of the current literature. Recommendations: Open to graduate students and seniors. Backgrounds in biochemistry, numerical methods, and chemical kinetics is highly recommended.				

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104914	Biotechnology Processing Projects Lab			
Subject:		Catalog Nbr:		
CHBE		0168		
2024 FALL		Primary	Hyunmin Yi	Hyunmin.Yi@tufts.edu
(Cross-listed as BME 168) Laboratory experience with techniques in biotechnology processing: fermentation of recombinant E. coli cells, hybridoma cell culture, purification of proteins and antibodies and related analytical procedures. Laboratories accompanied by lectures and relevant readings to cover the underlying principles. Counts as laboratory course for biology major.				

104940	Special Topics	
Subject:	Catalog Nbr:	
CS	0050	
Content and prerequisites to be announced. Please see departmental website for specific details.		

104955	Design And Analysis Of Experiments		
Subject:		Catalog Nbr:	
CHBE		0170	
The course starts with a brief introduction to applied statistics with emphasis to hypothesis testing and, in particular, the Analysis of Variance. It then examines how to design experiments and analyze the data they yield. Various designs are discussed and their respective differences, advantages, and disadvantages are noted. In particular, factorial, fractional factorial, response surface, and optimal designs are examined in detail.			

104978	Clean Energy Technologies And Policy Issues		
	Subject:	Catalog Nbr:	
	CHBE	0173	
(Cross-listed with Fletcher School.) This course considers current issues in power generation, identifying the technologies used to meet Clean Air Act regulations by the electric utilities and automobile manufacturers. Topics include the electric utility deregulation, distributed power sources, new energy markets, fuel efficiency, and global effects of fossil fuel use. Alternative fuels and engines will be examined from the point of view of technology readiness and global market penetration to curb air pollution and decrease carbon emissions. The costs of energy technologies and the global impacts of present policies in the U. S. and abroad will be evaluated.			

104981	Discrete Mathematics			
Subject:		Catalog Nbr:		
CS		0061		
2023 SUMR		Primary	Emmely Rogers	No Email on file.
2024 SUMR		Primary	Aleksandr Fedchin	Aleksandr.Fedchin@tufts.edu

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2024 SUMR	Primary	Patrick Feeney	Patrick.Feeney@tufts.edu
2024 SUMR	Primary	Michael Jahn	Michael.Jahn@tufts.edu
2025 SPRG	Primary	Karen Edwards	Karen.Edwards@tufts.edu
(Cross-listed as MATH 61). Sets, relations and functions, logic and methods of proof, combinatorics, graphs and digraphs. Recommendations: MATH 32 or COMP 11 or permission of instructor.			

104997	Drug Product Formulation		
Subject: CHBE	Catalog Nbr: 0185		
2025 SPRG	Primary	Lorin Polidora	Lorin.Polidora@tufts.edu
2025 SPRG	Primary	Bernardo Perez-Ramirez	Bernardo.Perez_Ramirez@tufts.edu
(Cross-listed as BME 185). Drug Product Formulation.			

105019	Special Topics		
Subject: CHBE	Catalog Nbr: 0193		
2023 FALL	Primary	Lorena Grundy	No Email on file.
Guided individual study of an approved topic to develop the art of self-teaching. Appraisal of the student's knowledge in the approved area will be based on a written and/or oral examination. Arrangements with a department member are required by the student prior to registration in the course. For master's degree candidates. Please see departmental website for specific details.			

105039	Special Topics		
Subject: CHBE	Catalog Nbr: 0194		
2024 SPRG	Primary	Gautham Sridharan	No Email on file.
2024 SPRG	Primary	Nathaniel Eagan	Nathaniel.Eagan@tufts.edu
Guided individual study of an approved topic to develop the art of self-teaching. Appraisal of the student's knowledge in the approved area will be based on a written and/or oral examination. Arrangements with a department member are required by the student prior to registration in the course. For master's degree candidates. Please see departmental website for specific details.			

105063	Programming Languages		
Subject: CS	Catalog Nbr: 0080		
An overview of language design and implementation, plus programming techniques for particular types of languages. Compilers and interpreters, binding, scope rules, formal semantic models, structure hiding, object-oriented programming, functional programming, and logic programming. Examples and problems from among Pascal, Algol, C++, Java, Scheme, Lisp, Prolog, and others. CS 80 and CS 105 cannot both be taken for			

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credit. Prerequisite: CS 15.

105101	Object-oriented Programming For Graphical User Interfaces			
Subject: CS		Catalog Nbr: 0086		
2024 FALL		Primary	Robert Jacob	jacob@cs.tufts.edu
Object-oriented programming and design, including object-oriented encapsulation, inheritance, and subtype polymorphism. Foundational concepts of graphical user interfaces, including events, callbacks, and widgets. Connections between objects and user interfaces, e.g., interface widgets as objects. Design and programming projects.				

105142		Directed Study		
Subject:		Catalog Nbr:		
CS		0093		
2025 SPRG	Primary	Robert Jacob	jacob@cs.tufts.edu	
2025 SPRG	Primary	Alva Couch	alva.couch@tufts.edu	
2025 SPRG	Primary	Soha Hassoun	soha.hassoun@tufts.edu	
2025 SPRG	Primary	Diane Souvaine	Diane.Souvaine@tufts.edu	
2025 SPRG	Primary	Megumi Ando	Megumi.Ando@tufts.edu	
2025 SPRG	Primary	Ming Chow	ming.chow@tufts.edu	
2025 SPRG	Primary	Lenore Cowen	lenore.cowen@tufts.edu	
2025 SPRG	Primary	Donna Slonim	Donna.Slonim@tufts.edu	
2025 SPRG	Primary	Remco Chang	Remco.Chang@tufts.edu	
2025 SPRG	Primary	Matthias Scheutz	Matthias.Scheutz@tufts.edu	
2025 SPRG	Primary	Noah Mendelsohn	Noah.Mendelsohn@tufts.edu	
2025 SPRG	Primary	Mark Sheldon	Mark.Sheldon@tufts.edu	
2025 SPRG	Primary	Fahad Dogar	Fahad.Dogar@tufts.edu	
2025 SPRG	Primary	Johannes De Ruiter	jp.deruiter@tufts.edu	
2025 SPRG	Primary	Megan Monroe	Megan.Monroe@tufts.edu	
2025 SPRG	Primary	Deborah Sunter	Deborah.Sunter@tufts.edu	
2025 SPRG	Primary	Liping Liu	Liping.Liu@tufts.edu	
2025 SPRG	Primary	Jivko Sinapov	Jivko.Sinapov@tufts.edu	
2025 SPRG	Primary	Susan Landau	Susan.Landau@tufts.edu	
2025 SPRG	Primary	Jeffrey Foster	Jeffrey.Foster@tufts.edu	
2025 SPRG	Primary	Michael Hughes	Michael.Hughes@tufts.edu	
2025 SPRG	Primary	Milod Kazerounian	Milod.Kazerounian@tufts.edu	
2025 SPRG	Primary	Elaine Short	Elaine.Short@tufts.edu	
2025 SPRG	Primary	Raja Sambasivan	Raja.Sambasivan@tufts.edu	
2025 SPRG	Primary	Martin Allen	Martin.Allen@tufts.edu	
2025 SPRG	Primary	Richard Townsend	Richard.Townsend@tufts.edu	
2025 SPRG	Primary	Abani Patra	Abani.Patra@tufts.edu	
2025 SPRG	Primary	Daniel Votipka	Daniel.Votipka@tufts.edu	
2025 SPRG	Primary	David Lillethun	David.Lillethun@tufts.edu	

Course Bulletin

2025 SPRG	Primary	Saeed Mehraban	Saeed.Mehraban@tufts.edu
2025 SPRG	Primary	Johes Bater	Johes.Bater@tufts.edu
2025 SPRG	Primary	Vladimir Podolskiy	Vladimir.Podolskii@tufts.edu
Guided study of an approved topic. Please see departmental website for specific details.			

105162	Mathematical Methods In Chemical Engineering		
Subject: CHBE	Catalog Nbr: 0201		
2024 FALL	Primary	Daniel Ryder	daniel.ryder@tufts.edu
Solution of algebraic equations, ordinary and partial differential equations, and sets of equations. Linear independence; basis vectors and functions; eigenvalues, eigenvector and eigenfunctions; initial and boundary value problems; generalized Fourier series; Sturm-Louisville problems; Green's function. Application examples in: chemical reaction engineering, and heat conduction and mass diffusion in one, two, or three dimensions at steady state or in transient mode. Emphasis is placed on linear problems but nonlinear ones are also discussed. Recommendations: Graduate Engineering Student and knowledge of MATLAB, or permission of instructor.			

105184	Advanced Kinetics and Reaction Engineering		
Subject: CHBE	Catalog Nbr: 0202		
2024 FALL	Primary	Nathaniel Eagan	Nathaniel.Eagan@tufts.edu
Applied chemical kinetics, reaction rate theories, complex kinetics, reactor stability and sensitivity to operating parameters. The interplay of diffusion and reaction in non-catalytic and catalytic reaction systems. Case studies in reactor design. Recommendations: Graduate Engineering Student and CHBE 102 or equivalent.			

105207	Advanced Thermodynamics		
Subject: CHBE	Catalog Nbr: 0203		
2025 SPRG	Primary	Milo Koretsky	Milo.Koretsky@tufts.edu
Thermodynamics as applied to chemical engineering. Attention is given to the derivation of thermodynamic functions from concepts of statistical mechanics, chemical equilibrium, availability, and computation of vapor-liquid equilibrium compositions. Recommendations: Graduate Engineering Student or Permission of Instructor			

105225	Directed Study		
Subject: CS	Catalog Nbr: 0094		
Guided study of an approved topic. Please see departmental website for specific details.			

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105227	Advanced Transport Phenomena			
Subject:	Catalog Nbr:			
CHBE	0204			
2025 SPRG	Primary	Prashant Deshlahra	Prashant.Deshlahra@tufts.edu	
Formulation, solution, and analysis of problems in momentum, energy and mass transport phenomena that occur in chemical and biological processes.				
Recommendations: Graduate Engineering Student, and CHBE 21 and CHBE 22 or equivalents.				

105244	Senior Capstone Project I			
Subject:	Catalog Nbr:			
CS	0097			
2024 FALL	Primary	David Lillethun	David.Lillethun@tufts.edu	
Requirements analysis and design of a senior capstone project. Requirements analysis and elicitation methods, and prototyping. Design principles and methods, including designing for usability, security, testability, performance, and scaling. Project management and planning, including cost and effort estimation. Writing effective documentation.				
Recommendations: CS 40 and Senior Standing.				

105248	Graduate Seminar			
Subject:	Catalog Nbr:			
CHBE	0291			
2023 FALL	Primary	Nathaniel Eagan	Nathaniel.Eagan@tufts.edu	
2024 FALL	Primary	Graham Leverick	Graham.Leverick@tufts.edu	
Presentaion of individual reports on basic topics to a seminar for discussion and criticism. Please see departmental website for specific details.				

105261	Senior Capstone Project II			
Subject:	Catalog Nbr:			
CS	0098			
2025 SPRG	Primary	David Lillethun	David.Lillethun@tufts.edu	
Implementation and testing of the project designed in CS 97. Implementation tools, strategies, and platforms. Testing and debugging methodologies. Maintenance and release management. Legal, ethical, and social impacts of computing.				
Recommendations: CS 97.				

105285	Graduate Seminar			
Subject:	Catalog Nbr:			
CHBE	0292			
2024 SPRG	Primary	Nathaniel Eagan	Nathaniel.Eagan@tufts.edu	

Course Bulletin

2025 SPRG	Primary	Graham Leverick	Graham.Leverick@tufts.edu
Presentaion of individual reports on basic topics to a seminar for discussion and criticism. Please see departmental website for specific details.			

105303	Disc Grp/do Not Register	
Subject:	Catalog Nbr:	
CS	0100	

105305	Special Topics	
Subject:	Catalog Nbr:	
CHBE	0293	
Guided individual study of an approved topic. Designed to develop the art of self-teaching. Appraisal of the student's knowledge in the approved area based on a written and/or oral examination. Arrangemnts with a department memeber required prior to registration for the course. For doctoral degree candidates. Please see departmental website for specific details.		

105327	Special Topics	
Subject:	Catalog Nbr:	
CHBE	0294	
Guided individual study of an approved topic. Designed to develop the art of self-teaching. Appraisal of the student's knowledge in the approved area based on a written and/or oral examination. Arrangemnts with a department memeber required prior to registration for the course. For doctoral degree candidates. Please see departmental website for specific details.		

105344	Programming Languages		
Subject:	Catalog Nbr:		
CS	0105		
2023 FALL	Primary	Richard Townsend	Richard.Townsend@tufts.edu
2025 SPRG	Primary	Milod Kazerounian	Milod.Kazerounian@tufts.edu
Principles and application of computer programming languages. Emphasizes ideas and techniques most relevant to practitioners, but includes foundations crucial for intellectual rigor: abstract syntax, lambda calculus, type systems, dynamic semantics. Case studies, reinforced by programming exercises. Grounding sufficient to read professional literature. CS 80 and CS 105 cannot both be taken for credit.			

105365	Master's Thesis Research		
Subject:	Catalog Nbr:		
CHBE	0295		
2024 FALL	Primary	Daniel Ryder	daniel.ryder@tufts.edu

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2024 FALL	Primary	David Kaplan	david.kaplan@tufts.edu
2024 FALL	Primary	Kyongbum Lee	Kyongbum.Lee@tufts.edu
2024 FALL	Primary	Hyunmin Yi	Hyunmin.Yi@tufts.edu
2024 FALL	Primary	Matthew Panzer	Matthew.Panzer@tufts.edu
2024 FALL	Primary	Qiaobing Xu	Qiaobing.Xu@tufts.edu
2024 FALL	Primary	Ayse Asatekin	Ayse.Asatekin@tufts.edu
2024 FALL	Primary	Nikhil Nair	Nikhil.Nair@tufts.edu
2024 FALL	Primary	Emmanouhl Tzanakakis	Emmanuel.Tzanakakis@tufts.edu
2024 FALL	Primary	James Van Deventer	James.Van_Deventer@tufts.edu
2024 FALL	Primary	Prashant Deshlahra	Prashant.Deshlahra@tufts.edu
2024 FALL	Primary	Milo Koretsky	Milo.Koretsky@tufts.edu
2024 FALL	Primary	Graham Leverick	Graham.Leverick@tufts.edu

Guided research on a topic suitable for a master's thesis. Please see departmental website for specific details.

105402	Master's Thesis Research			
	Subject: CHBE	Catalog Nbr: 0296		
	2025 SPRG	Primary	Daniel Ryder	daniel.ryder@tufts.edu
	2025 SPRG	Primary	Kyongbum Lee	Kyongbum.Lee@tufts.edu
	2025 SPRG	Primary	Christos Georgakis	Christos.Georgakis@tufts.edu
	2025 SPRG	Primary	Hyunmin Yi	Hyunmin.Yi@tufts.edu
	2025 SPRG	Primary	Matthew Panzer	Matthew.Panzer@tufts.edu
	2025 SPRG	Primary	Qiaobing Xu	Qiaobing.Xu@tufts.edu
	2025 SPRG	Primary	Ayse Asatekin	Ayse.Asatekin@tufts.edu
	2025 SPRG	Primary	Nikhil Nair	Nikhil.Nair@tufts.edu
	2025 SPRG	Primary	Emmanouhl Tzanakakis	Emmanuel.Tzanakakis@tufts.edu
	2025 SPRG	Primary	James Van Deventer	James.Van_Deventer@tufts.edu
	2025 SPRG	Primary	Prashant Deshlahra	Prashant.Deshlahra@tufts.edu
	2025 SPRG	Primary	Nathaniel Eagan	Nathaniel.Eagan@tufts.edu
	2025 SPRG	Primary	Milo Koretsky	Milo.Koretsky@tufts.edu
Guided research on a topic suitable for a master's thesis. Please see departmental website for specific details.				

Guided research on a topic suitable for a master's thesis. Please see departmental website for specific details.

105446	Doctoral Thesis Research			
Subject:	Catalog Nbr:			
CHBE	0297			
2023 FALL	Primary	Maria Flytzani-Stephanopoulos	No Email on file.	
2023 FALL	Primary	Christos Georgakis	Christos.Georgakis@tufts.edu	
2024 FALL	Primary	Daniel Ryder	daniel.ryder@tufts.edu	
2024 FALL	Primary	David Kaplan	david.kaplan@tufts.edu	
2024 FALL	Primary	Kyongbum Lee	Kyongbum.Lee@tufts.edu	

Course Bulletin

2024 FALL	Primary	Sameer Sonkusale	sameer@ece.tufts.edu
2024 FALL	Primary	Hyunmin Yi	Hyunmin.Yi@tufts.edu
2024 FALL	Primary	Matthew Panzer	Matthew.Panzer@tufts.edu
2024 FALL	Primary	Qiaobing Xu	Qiaobing.Xu@tufts.edu
2024 FALL	Primary	Ayse Asatekin	Ayse.Asatekin@tufts.edu
2024 FALL	Primary	Nikhil Nair	Nikhil.Nair@tufts.edu
2024 FALL	Primary	Emmanouhl Tzanakakis	Emmanuel.Tzanakakis@tufts.edu
2024 FALL	Primary	James Van Deventer	James.Van_Deventer@tufts.edu
2024 FALL	Primary	Prashant Deshlahra	Prashant.Deshlahra@tufts.edu
2024 FALL	Primary	Nathaniel Eagan	Nathaniel.Eagan@tufts.edu
2024 FALL	Primary	Milo Koretsky	Milo.Koretsky@tufts.edu
2024 FALL	Primary	Graham Leverick	Graham.Leverick@tufts.edu
Guided research on a topic suitable for a doctoral dissertation. Please see departmental website for specific details.			

105467	Doctoral Thesis Research			
	Subject: CHBE	Catalog Nbr: 0298		
	2024 SPRG	Primary	Christos Georgakis	Christos.Georgakis@tufts.edu
	2025 SPRG	Primary	Daniel Ryder	daniel.ryder@tufts.edu
	2025 SPRG	Primary	Kyongbum Lee	Kyongbum.Lee@tufts.edu
	2025 SPRG	Primary	Sameer Sonkusale	sameer@ece.tufts.edu
	2025 SPRG	Primary	Hyunmin Yi	Hyunmin.Yi@tufts.edu
	2025 SPRG	Primary	Matthew Panzer	Matthew.Panzer@tufts.edu
	2025 SPRG	Primary	Qiaobing Xu	Qiaobing.Xu@tufts.edu
	2025 SPRG	Primary	Ayse Asatekin	Ayse.Asatekin@tufts.edu
	2025 SPRG	Primary	Nikhil Nair	Nikhil.Nair@tufts.edu
	2025 SPRG	Primary	Emmanouhl Tzanakakis	Emmanuel.Tzanakakis@tufts.edu
	2025 SPRG	Primary	James Van Deventer	James.Van_Deventer@tufts.edu
	2025 SPRG	Primary	Prashant Deshlahra	Prashant.Deshlahra@tufts.edu
	2025 SPRG	Primary	Nathaniel Eagan	Nathaniel.Eagan@tufts.edu
	2025 SPRG	Primary	Milo Koretsky	Milo.Koretsky@tufts.edu
Guided research on a topic suitable for a doctoral dissertation. Please see departmental website for specific details.				

105468	Operating Systems			
Subject: CS		Catalog Nbr: 0111		
2024 SUMR		Primary	Hifza Khalid	Hifza.Khalid@tufts.edu
2025 SPRG		Primary	David Lillethun	David.Lillethun@tufts.edu
(Cross-listed as EE 128). Fundamental issues in operating system design. Concurrent processes:				

Course Bulletin

synchronization, sharing, deadlock, scheduling. Relevant hardware properties of uniprocessor and multiprocessor computer systems.

105487	Master's Project			
	Subject:	Catalog Nbr:		
	CHBE	0290		
	2024 FALL	Primary	Milo Koretsky	Milo.Koretsky@tufts.edu
	2024 FALL	Primary	Graham Leverick	Graham.Leverick@tufts.edu
	2025 SPRG	Primary	Daniel Ryder	daniel.ryder@tufts.edu
	2025 SPRG	Primary	David Kaplan	david.kaplan@tufts.edu
	2025 SPRG	Primary	Kyongbum Lee	Kyongbum.Lee@tufts.edu
	2025 SPRG	Primary	Christos Georgakis	Christos.Georgakis@tufts.edu
	2025 SPRG	Primary	Hyunmin Yi	Hyunmin.Yi@tufts.edu
	2025 SPRG	Primary	Matthew Panzer	Matthew.Panzer@tufts.edu
	2025 SPRG	Primary	Qiaobing Xu	Qiaobing.Xu@tufts.edu
	2025 SPRG	Primary	Ayse Asatekin	Ayse.Asatekin@tufts.edu
	2025 SPRG	Primary	Nikhil Nair	Nikhil.Nair@tufts.edu
	2025 SPRG	Primary	Emmanouhl Tzanakakis	Emmanuel.Tzanakakis@tufts.edu
	2025 SPRG	Primary	James Van Deventer	James.Van_Deventer@tufts.edu
	2025 SPRG	Primary	Prashant Deshlahra	Prashant.Deshlahra@tufts.edu
Master of Engineering Project. Please see departmental website for specific details.				

105488	Networks			
Subject: CS		Catalog Nbr: 0112		
2024 FALL		Primary	Fahad Dogar	Fahad.Dogar@tufts.edu
Computer Networks and Protocols. Design and implementation of computer communication networks, protocols, and applications, with an emphasis on the Internet protocol suite. Network architectures and programming interfaces. Data link, transport, and routing protocols. Congestion sources and remedies. Addressing and naming in local area and wide area networks. Network security and network management.				

105507		Non Major Credit	
Subject:		Catalog Nbr:	
CHBE		0310	

105525	Lower Level Elective Crd			
Subject: CHBE		Catalog Nbr: 0320		

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105547	Upper Level Elective Crd
Subject: CHBE	Catalog Nbr: 0330

105548	Database Systems
Subject: CS	Catalog Nbr: 0115
2024 FALL	Primary
2025 SPRG	Primary
Johes Bater	Johes.Bater@tufts.edu
Cody Doucette	Cody.Doucette@tufts.edu
Fundamental concepts of database systems, including conceptual design, relational and object-oriented data models, query languages (SQL, QBE), and implementation issues (indexing, transaction processing, concurrent control). The concepts and algorithms covered encompass many of those used in commercial and experimental database systems. Other topics include distributed databases and distributed query processing. Recommendations: CS 40	

105569	Introduction to Security
Subject: CS	Catalog Nbr: 0116
2025 SPRG	Primary
Ming Chow	ming.chow@tufts.edu
A holistic and broad perspective on cyber security. Attacking and defending networks, cryptography, vulnerabilities, reverse engineering, web security, static and dynamic analysis, malware, forensics. Principles illustrated through hands-on labs and projects, including Capture The Flag (CTF) games.	

105587	Web Programming and Engineering
Subject: CS	Catalog Nbr: 0120
2024 SUMR	Primary
Lisa Diorio	Lisa.Diorio@tufts.edu
Web applications as complex systems that deliver functionality to a large number of users, and exhibit unique behaviors and demands in terms of performance, scalability, usability, and security. How the web works, limitations of client-side and server-side technologies including frameworks and APIs, content optimization, and data persistence and storage. Projects will involve search, using the cloud infrastructure, location-based services, mobile web development, and using tools to assess the security and privacy of web applications.	

105588	Master's Degree Continuation - Part Time
Subject: CHBE	Catalog Nbr: 0401

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Part-time. Please see departmental website for specific details.

105631	Numerical Analysis
Subject: CS	Catalog Nbr: 0125
(Cross-listed as MATH 125.) Analysis of algorithms involving computation with real numbers. Interpolation, methods for solving linear and nonlinear systems of equations, numerical integration, methods for ordinary differential equations. Recommendations: MATH 51 and programming ability in a language such as C, C++, Fortran, Pascal, or Matlab.	

105652	Numerical Linear Algebra
Subject: CS	Catalog Nbr: 0126
2023 FALL	Primary Christoph Borgers christoph.borgers@tufts.edu
2024 FALL	Primary Misha Kilmer Misha.Kilmer@tufts.edu
(Cross-listed as MATH 126.) The two basic computational problems of linear algebra: solution of linear systems and computation of eigenvalues and eigenvectors. Recommendations: MATH 70 or 72 and CS 11.	

105667	Master's Degree Continuation - Full Time
Subject: CHBE	Catalog Nbr: 0402
Full-time. Please see departmental website for specific details.	

105668	Artificial Intelligence
Subject: CS	Catalog Nbr: 0131
2025 SPRG	Primary Fabrizio Santini Fabrizio.Santini@tufts.edu
History, theory, and computational methods of artificial intelligence. Basic concepts include representation of knowledge and computational methods for reasoning. One or two application areas will be studied, to be selected from expert systems, robotics, computer vision, natural language understanding, and planning.	

105687	Grad Teaching Assistant
Subject: CHBE	Catalog Nbr: 0405
2024 SPRG	Primary Christos Georgakis Christos.Georgakis@tufts.edu
2025 SPRG	Primary Daniel Ryder daniel.ryder@tufts.edu
2025 SPRG	Primary Kyongbum Lee Kyongbum.Lee@tufts.edu

Course Bulletin

2025 SPRG	Primary	Hyunmin Yi	Hyunmin.Yi@tufts.edu
2025 SPRG	Primary	Matthew Panzer	Matthew.Panzer@tufts.edu
2025 SPRG	Primary	Derek Mess	Derek.Mess@tufts.edu
2025 SPRG	Primary	Ayse Asatekin	Ayse.Asatekin@tufts.edu
2025 SPRG	Primary	Nikhil Nair	Nikhil.Nair@tufts.edu
2025 SPRG	Primary	Emmanouhl Tzanakakis	Emmanuel.Tzanakakis@tufts.edu
2025 SPRG	Primary	James Van Deventer	James.Van_Deventer@tufts.edu
2025 SPRG	Primary	Nathaniel Eagan	Nathaniel.Eagan@tufts.edu
2025 SPRG	Primary	Milo Koretsky	Milo.Koretsky@tufts.edu
2025 SPRG	Primary	Graham Leverick	Graham.Leverick@tufts.edu

105711	Grad Research Assistant			
Subject: CHBE		Catalog Nbr: 0406		
2024 FALL	Primary	Daniel Ryder	daniel.ryder@tufts.edu	
2024 FALL	Primary	Qiaobing Xu	Qiaobing.Xu@tufts.edu	
2024 FALL	Primary	Shelly Peyton	Shelly.Peyton@tufts.edu	
2024 SPRG	Primary	Christos Georgakis	Christos.Georgakis@tufts.edu	
2025 SPRG	Primary	David Kaplan	david.kaplan@tufts.edu	
2025 SPRG	Primary	Kyongbum Lee	Kyongbum.Lee@tufts.edu	
2025 SPRG	Primary	Sameer Sonkusale	sameer@ece.tufts.edu	
2025 SPRG	Primary	Hyunmin Yi	Hyunmin.Yi@tufts.edu	
2025 SPRG	Primary	Matthew Panzer	Matthew.Panzer@tufts.edu	
2025 SPRG	Primary	Ayse Asatekin	Ayse.Asatekin@tufts.edu	
2025 SPRG	Primary	Nikhil Nair	Nikhil.Nair@tufts.edu	
2025 SPRG	Primary	Emmanouhl Tzanakakis	Emmanuel.Tzanakakis@tufts.edu	
2025 SPRG	Primary	James Van Deventer	James.Van_Deventer@tufts.edu	
2025 SPRG	Primary	Prashant Deshlahra	Prashant.Deshlahra@tufts.edu	
2025 SPRG	Primary	Nathaniel Eagan	Nathaniel.Eagan@tufts.edu	
2025 SPRG	Primary	Milo Koretsky	Milo.Koretsky@tufts.edu	
2025 SPRG	Primary	Graham Leverick	Graham.Leverick@tufts.edu	

105750	Doctoral Continuation - PT	
Subject:	Catalog Nbr:	
CHBE	0501	
Part-time.Please see departmental website for specific details.		

Course Bulletin

105772	Introduction To Machine Learning And Data Mining			
Subject: CS		Catalog Nbr: 0135		
2023 FALL		Primary	Michael Hughes	Michael.Hughes@tufts.edu
2023 SUMR		Primary	Prasad Saripalli	No Email on file.
2024 FALL		Primary	Christopher Magnano	Christopher.Magnano@tufts.edu
2024 SUMR		Primary	Abdullah Bin Faisal	Abdullah_Bin.Faisal@tufts.edu
2025 SPRG		Primary	Liping Liu	Liping.Liu@tufts.edu
An overview of methods whereby computers can learn from data or experience and make decisions accordingly. Topics include supervised learning, unsupervised learning, reinforcement learning, and knowledge extraction from large databases with applications to science, engineering, and medicine. Recommendations: CS 160 is highly recommended.				

105795	Statistical Pattern Recognition			
Subject: CS		Catalog Nbr: 0136		
2025 SPRG		Primary	Michael Hughes	Michael.Hughes@tufts.edu
Statistical foundations and algorithms for machine learning with a focus on Bayesian modeling. Topics include: classification and regression problems, regularization, model selection, kernel methods, support vector machines, Gaussian processes, graphical models. Recommendations: MATH 70 or 72, EE 104 or MATH 165, and CS 40 or CS 105, or graduate standing				

105817	Doctoral Degree Continuation - Full Time	
Subject:	Catalog Nbr:	
CHBE	0502	
Full-time. Please see departmental website for specific details.		

105833	Advanced Topics In Computer Architecture	
	Subject:	Catalog Nbr:
	CS	0140
(Cross-listed w/ EE 156) Modern computer architecture, starting from basic 5-stage pipelines and progressing to out-of-order superscalar processors, multicore processors, and heterogeneous processors. Techniques to maximize single-thread performance within the constraints of memory technology, power consumption, and the inherent instruction-level parallelism of applications. Current and future challenges faced by computer architects and computer-system designers. Discussion of research papers. Recommendation: EE126/COMP146 or COMP40		

105871	Special Topics			
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Course Bulletin

Subject:	Catalog Nbr:			
CS	0150			
2023 FALL	Primary	Nicholas Rabb	No Email on file.	
2023 FALL	Primary	Meredith Hyde	Meredith.Hyde@tufts.edu	
2023 FALL	Primary	Saeed Mehraban	Saeed.Mehraban@tufts.edu	
2023 FALL	Primary	Roy Shilkrot	Roy.Shilkrot@tufts.edu	
2024 FALL	Primary	Matthias Scheutz	Matthias.Scheutz@tufts.edu	
2024 FALL	Primary	David Wittenberg	David.Wittenberg@tufts.edu	
2025 SPRG	Primary	Ming Chow	ming.chow@tufts.edu	
2025 SPRG	Primary	Gavin Finn	Gavin.Finn@tufts.edu	
2025 SPRG	Primary	Michael Jahn	Michael.Jahn@tufts.edu	
2025 SPRG	Primary	Vladimir Podolskiy	Vladimir.Podolskii@tufts.edu	
Content and prerequisites to be announced. Over the past three years, special topics courses have been offered in parallel computing, graph drawing, computational geometry, multimedia data compression, cryptography and security, digital network communication, spoken language systems, system and network administration, and machine learning. Please see departmental website for specific details.				

105893	Algorithms			
Subject:	Catalog Nbr:			
CS	0160			
2023 SUMR	Primary	Ambrose Laing	No Email on file.	
2024 FALL	Primary	Vladimir Podolskiy	Vladimir.Podolskii@tufts.edu	
2024 SUMR	Primary	Michael Jahn	Michael.Jahn@tufts.edu	
2025 SPRG	Primary	Diane Souvaine	Diane.Souvaine@tufts.edu	
2025 SPRG	Primary	Karen Edwards	Karen.Edwards@tufts.edu	
Introduction to the study of algorithms. Strategies such as divide-and-conquer, greedy methods, and dynamic programming. Graph algorithms, sorting, searching, integer arithmetic, hashing, and NP-complete problems. High demand (see "course notes" for signup procedure).				

105952	Computational Geometry			
Subject:	Catalog Nbr:			
CS	0163			
2023 FALL	Primary	Diane Souvaine	Diane.Souvaine@tufts.edu	
(Cross-listed as MATH 181.) Design and analysis of algorithms for geometric problems. Topics include proof of lower bounds, convex hulls, searching and point location, plane sweep and arrangements of lines, Voronoi diagrams, intersection problems, decomposition and partitioning, farthest-pairs and closest-pairs, rectilinear computational geometry. Recommendations: CS 160				

105973	Cryptography			
Subject:	Catalog Nbr:			
CS	0165			

Course Bulletin

A mathematical approach to how codes and ciphers work, and how they can be broken. Private key (symmetric) and public key (asymmetric) cryptography. Block and stream ciphers, protocols for key exchange, hashing, message authentication, digital signatures, secret sharing, and digital cash.
Recommendations: CS 15 and (CS/Math 61 or Math 65).

105995	Computational Biology			
Subject: CS		Catalog Nbr: 0167		
2025 SPRG		Primary	Donna Slonim	Donna.Slonim@tufts.edu
(Cross listed as BME 167) Computational challenges in molecular biology, including sequence alignment and comparison, genomic annotation, transcriptomic data analysis, and proteomics. Underlying computational techniques such as dynamic programming, hidden Markov models, statistical analyses, and search and optimization procedures.				

106079	Computation Theory				
Subject:		Catalog Nbr:			
CS		0170			
2023 FALL	Primary	Martin Allen	Martin.Allen@tufts.edu		
2023 SUMR	Primary	Ambrose Laing	No Email on file.		
2024 FALL	Primary	Megumi Ando	Megumi.Ando@tufts.edu		
2024 SUMR	Primary	Andrew Winslow	Andrew.Winslow@tufts.edu		
2025 SPRG	Primary	Megan Monroe	Megan.Monroe@tufts.edu		
(Cross-listed as MATH 191). Models of computation: Turing machines, pushdown automata, and finite automata. Grammars and formal languages, including context-free languages and regular sets. Important problems, including the halting problem and language equivalence theorems.					

106100	Human Computer Interaction			
Subject: CS		Catalog Nbr: 0171		
2025 SPRG		Primary	Robert Jacob	jacob@cs.tufts.edu
Introduction to human-computer interaction, or how computers communicate with people. Methodology for designing and testing user interfaces, interaction styles (command line, menus, graphical user interfaces, virtual reality), interaction techniques (voice, gesture, eye movement), design guidelines, and user-interface management system software. Students will design a small user interface, program a prototype, and test the result for usability.				
Recommendations: CS 15 or graduate standing				

106119	Computer Graphics		
Subject:	Catalog Nbr:		
CS	0175		

Course Bulletin

2024 FALL	Primary	Remco Chang	Remco.Chang@tufts.edu
The course provides the background to understand and build interactive graphics systems. Introduction to computer graphics from simple two-dimensional graphics through three-dimensional viewing and transforms. Interactive graphics programming, raster graphics, raster algorithms, geometrical transformations, viewing in three dimensions, modeling and hierarchical data structures, visual realism, virtual reality, interaction devices, tasks and techniques. Final project. Recommendations: MATH 42 or 44, and MATH 70 or 72, or graduate standing.			

106140	Software Engineering		
Subject: CS	Catalog Nbr: 0121		
2023 SUMR	Primary	Ronald Simmons	Ronald.Simmons@tufts.edu
2024 FALL	Primary	Jeffrey Foster	Jeffrey.Foster@tufts.edu
2024 SUMR	Primary	Perry Donham	Perry.Donham@tufts.edu
Core principles and ideas that enable development of large-scale software systems, with a focus on programming. Abstraction, modularity, design patterns, specification, testing, verification, and debugging.			

106184	Compilers		
Subject: CS	Catalog Nbr: 0107		
2023 FALL	Primary	Richard Townsend	Richard.Townsend@tufts.edu
Translation and implementation of programming languages. Parsing, code generation, and optimization. Compiler design projects for simple block-structured programming languages are used to illustrate the concepts and methods.			

106268	Directed Study		
Subject: CS	Catalog Nbr: 0193		
2024 FALL	Primary	Elyse Cornwall	Elyse.Cornwall@tufts.edu
2024 FALL	Primary	Christopher Magnano	Christopher.Magnano@tufts.edu
2024 FALL	Primary	Hari Sundar	Hari.Sundar@tufts.edu
2024 FALL	Primary	Reuth Mirsky	Reuth.Mirsky@tufts.edu
2024 FALL	Primary	Guannan Wei	Guannan.Wei@tufts.edu
2024 SUMR	Primary	Samuel Guyer	Samuel.Guyer@tufts.edu
2024 SUMR	Primary	Norman Ramsey	Norman.Ramsey@tufts.edu
2024 SUMR	Primary	Bert Huang	No Email on file.
2024 SUMR	Primary	Michael Jahn	Michael.Jahn@tufts.edu
2025 SPRG	Primary	Ethan Danahy	ethan.danahy@tufts.edu
2025 SPRG	Primary	Karen Panetta	Karen.Panetta@tufts.edu
2025 SPRG	Primary	Robert Jacob	jacob@cs.tufts.edu
2025 SPRG	Primary	Alva Couch	alva.couch@tufts.edu

Course Bulletin

2025 SPRG	Primary	Soha Hassoun	soha.hassoun@tufts.edu
2025 SPRG	Primary	Diane Souvaine	Diane.Souvaine@tufts.edu
2025 SPRG	Primary	Megumi Ando	Megumi.Ando@tufts.edu
2025 SPRG	Primary	Ming Chow	ming.chow@tufts.edu
2025 SPRG	Primary	Lenore Cowen	lenore.cowen@tufts.edu
2025 SPRG	Primary	Peter Love	Peter.Love@tufts.edu
2025 SPRG	Primary	Donna Slonim	Donna.Slonim@tufts.edu
2025 SPRG	Primary	Remco Chang	Remco.Chang@tufts.edu
2025 SPRG	Primary	Matthias Scheutz	Matthias.Scheutz@tufts.edu
2025 SPRG	Primary	Kathleen Fisher	Kathleen.Fisher@tufts.edu
2025 SPRG	Primary	Noah Mendelsohn	Noah.Mendelsohn@tufts.edu
2025 SPRG	Primary	Mark Sheldon	Mark.Sheldon@tufts.edu
2025 SPRG	Primary	Fahad Dogar	Fahad.Dogar@tufts.edu
2025 SPRG	Primary	Johannes De Ruiter	jp.deruiter@tufts.edu
2025 SPRG	Primary	Megan Monroe	Megan.Monroe@tufts.edu
2025 SPRG	Primary	Deborah Sunter	Deborah.Sunter@tufts.edu
2025 SPRG	Primary	Liping Liu	Liping.Liu@tufts.edu
2025 SPRG	Primary	Jivko Sinapov	Jivko.Sinapov@tufts.edu
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2025 SPRG	Primary	Daniel Votipka	Daniel.Votipka@tufts.edu
2025 SPRG	Primary	David Lillethun	David.Lillethun@tufts.edu
2025 SPRG	Primary	Saeed Mehraban	Saeed.Mehraban@tufts.edu
2025 SPRG	Primary	Johes Bater	Johes.Bater@tufts.edu
2025 SPRG	Primary	Vladimir Podolskiy	Vladimir.Podolskii@tufts.edu
Guided study of an approved topic. Please see departmental website for specific details.			

106309	Honors Thesis-computer Science A		
Subject:	Catalog Nbr:		
CS	0197		
2023 FALL	Primary	Samuel Guyer	Samuel.Guyer@tufts.edu
2023 FALL	Primary	Norman Ramsey	Norman.Ramsey@tufts.edu
2023 FALL	Primary	Bert Huang	No Email on file.
2023 FALL	Primary	Antonella Di Lillo	No Email on file.
2024 FALL	Primary	Robert Jacob	jacob@cs.tufts.edu
2024 FALL	Primary	Alva Couch	alva.couch@tufts.edu

Course Bulletin

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2024 FALL	Primary	Lenore Cowen	lenore.cowen@tufts.edu
2024 FALL	Primary	Donna Slonim	Donna.Slonim@tufts.edu
2024 FALL	Primary	Remco Chang	Remco.Chang@tufts.edu
2024 FALL	Primary	Matthias Scheutz	Matthias.Scheutz@tufts.edu
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2024 FALL	Primary	Hari Sundar	Hari.Sundar@tufts.edu
2024 FALL	Primary	Reuth Mirsky	Reuth.Mirsky@tufts.edu

Honors Thesis Computer Science. Please see departmental website for specific details.

106526	Computational Learning Theory
Subject: CS	Catalog Nbr: 0236
Probabilistic and adversarial models of machine learning. Development and analysis of machine learning principles and algorithms, their computational complexity, data complexity and convergence properties. Computational and cryptographic limitations on algorithms for machine learning.	

Course Bulletin

Recommendations: CS 160, EE 104 or MATH 162, or permission of instructor.

107336	Advanced Special Topics
Subject: CS	Catalog Nbr: 0250
Content and prerequisites to be announced. Please see departmental website for specific details.	

107376	Advanced Algorithms
Subject: CS	Catalog Nbr: 0260
(Cross-listed as MATH 221) Design and analysis of sequential, parallel, probabilistic, and approximation algorithms. Graph algorithms, sorting, searching, geometric algorithms, mathematical programming, lower bounds, and intractable problems. Recommendations: CS 160	

107398	Advanced Computational Geometry
Subject: CS	Catalog Nbr: 0263
(Cross-listed as MATH 281.) Design and analysis of sequential, parallel, probabilistic, and approximation algorithms for geometry problems. Geometric data structures, complexity, searching, computation, and applications. Selected advanced topics. Recommendations: CS 163 or permission of instructor.	

107416	Parallel Computation
Subject: CS	Catalog Nbr: 0265
Existing and proposed architectures for parallel computation. Fundamental synchronization and communication protocols. Algorithm development for distributed memory multicomputers. Recommendations: CS 15 and 160.	

107435	Theory Of Computation
Subject: CS	Catalog Nbr: 0270
Computability, undecidability, computational complexity. Recommendations: CS 170.	

107460	User-interface Software
Subject:	Catalog Nbr:

Course Bulletin

CS	0272
Emerging new non-WIMP (window icon menu pointer) user interface styles, such as virtual reality, lightweight, non-command, tangible, natural, continuous, and parallel interfaces. Techniques, languages, abstractions, and tools for building current and future user-computer interfaces. Project in designing, prototyping, and building a non-WIMP user interface, with class discussions and critiques. Recommendations: CS 15, plus a course related to human-computer interaction.	

107474	Advanced Computer Graphics
Subject: CS	Catalog Nbr: 0275
Advanced Topics in Computer Graphics. Emphasis will change from year to year and may include physics-based modeling (including particle systems, animation kinematics, deformation, fluid modeling), advanced rendering techniques, shape representation and modeling, and computer animation. Recommendations: CS 175 and a good working knowledge of the C programming language.	

107496	Data Visualization
Subject: CS	Catalog Nbr: 0277
Selected advanced topics on the visualization of abstract structures, user-interface design, scientific visualization, visual languages, and graph drawing. The course includes the study and design of applications to software visualization, digital libraries, and multimedia. The class format is seminar style with presentation of research papers. Final projects will use advanced visualization tools. Recommendations: CS 160 or permission of instructor.	

107687	Programming Project
Subject: CS	Catalog Nbr: 0290
Independent development of a complete computer program for an approved task, including design, implementation, and documentation. Please see departmental website for specific details.	

107993	Hydraulics
Subject: CEE	Catalog Nbr: 0012
2025 SPRG	Primary Greses Perez Greses.Perez@tufts.edu
The application of principles of fluid mechanics to problems of engineering design and practice. The equations of continuity, momentum, and energy are applied to problems in river engineering, dam design, hydromachinery, floodplain delineation, water-distribution systems, culverts, turbines, and other hydraulic structures. With laboratory.	

Course Bulletin

108013	Structural Analysis			
Subject: CEE		Catalog Nbr: 0022		
2024 FALL		Primary	Masoud Sanayei	masoud.sanayei@tufts.edu
A first course in the application of mechanics to the analysis of structures, with a major emphasis on structural forms important to civil engineering. Deflection calculations of beams and frames using differential equations and moment-area theorems. Deflection of trusses, beams, and frames using virtual work. Indeterminate structural analysis using flexibility and stiffness methods. Hands-on experience with industry-standard software and practical applications in structural engineering. With laboratory.				

108055	Steel Design			
Subject: CEE		Catalog Nbr: 0024		
2025 SPRG		Primary	Brian Brenner	brian.brenner@tufts.edu
Design of steel structural members. Determination of stresses and strains in structural members, the proportioning of members, and the design of connections for beams, girders, trusses, and frames. Work in structural representation.				

108061	Masters In Bioengineering Seminar I			
Subject:	Catalog Nbr:			
BIOE	0291			
2023 FALL	Primary	James Van Deventer	James.Van_Deventer@tufts.edu	
2024 FALL	Primary	Emmanouhl Tzanakakis	Emmanuel.Tzanakakis@tufts.edu	
A weekly seminar and discussion session led by members of the Bioengineering faculty and invited speakers to present topics in biotechnology research, bioethics, and biotechnology finance and entrepreneurship.				

108075	Reinforced Concrete Design			
Subject: CEE		Catalog Nbr: 0025		
2024 FALL		Primary	Brian Brenner	brian.brenner@tufts.edu
Analysis and design of reinforced concrete members. Working stress and ultimate strength theories are applied to beams, girders, slabs, columns, walls, and footings. Use of these elements in various structures is studied.				

108087	Masters In Bioengineering Seminar II			
Subject: BIOE		Catalog Nbr: 0292		
2025 SPRG		Primary	Nikhil Nair	Nikhil.Nair@tufts.edu
A weekly journal club seminar series where the current technical literature is reviewed and discussed.				

Course Bulletin

Student presentations of ongoing research activities.

108096	Pollutant Fate and Transport			
Subject: CEE		Catalog Nbr: 0034		
2024 FALL		Primary	John Durant	john.durant@tufts.edu
Basic principles of fate and transport related to environmental engineering. Thermodynamics, equilibrium, kinetics, mass balance, chemical partitioning, advection, dispersion and reactions for predicting behavior of pollutants in air, water, and soil. Techniques for measuring dissolved oxygen, biochemical oxygen demand, nutrients, sewage indicator bacteria, airborne particles and hydrocarbons, and other pollutants. Applications to environmental processes. With laboratory.				

108121	Engineering for a Sustainable and Resilient Society			
Subject: CEE		Catalog Nbr: 0032		
2024 FALL		Primary	Charles Ramsburg	Andrew.Ramsburg@tufts.edu
Quantitative description of natural and engineered processes affecting environmental sustainability at local, regional, and global scales. Principles of ecology, material and energy flows, environmental quality, climate change, and resiliency in a civil and environmental engineering context.				

108135	Master's Project			
Subject: CS		Catalog Nbr: 0293		
2023 FALL		Primary	Antonella Di Lillo	No Email on file.
2024 FALL		Primary	Karen Panetta	Karen.Panetta@tufts.edu
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2024 SUMR		Primary	Bert Huang	No Email on file.
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2025 SPRG	Primary	Fahad Dogar	Fahad.Dogar@tufts.edu
2025 SPRG	Primary	Johannes De Ruiter	jp.deruiter@tufts.edu
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2025 SPRG	Primary	Saeed Mehraban	Saeed.Mehraban@tufts.edu
2025 SPRG	Primary	Johes Bater	Johes.Bater@tufts.edu
Guided individual study of an approved topic suitable for a master's design project. Please see departmental website for specific details.			
Faculty consent required. Students sign up for a section that corresponds to a faculty member.			

108143	Introduction To Geotechnical Engineering		
Subject: CEE	Catalog Nbr: 0042		
2025 SPRG	Primary	Lucy Jen	Lucy.Jen@tufts.edu
2025 SPRG	Primary	John Germaine	John.Germaine@tufts.edu
The engineering properties of soils and the behavior of soil masses subjected to loads and fluid flow. Flow of water through and stress in soil. Investigation of permeability, compressibility, and strength of soil. With laboratory.			

108232	Masters Thesis		
Subject: CS	Catalog Nbr: 0295		
2024 FALL	Primary	Karen Panetta	Karen.Panetta@tufts.edu
2024 FALL	Primary	Gregory Crane	gregory.crane@tufts.edu

Course Bulletin

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2024 FALL	Primary	Reuth Mirsky	Reuth.Mirsky@tufts.edu
2024 SUMR	Primary	Milod Kazerounian	Milod.Kazerounian@tufts.edu

Guided individual study of an approved topic suitable for a master's design project. Please see departmental website for specific details.

Faculty consent required. Students sign up for a section that corresponds to a faculty member.

Course Bulletin

108235	Introduction To Hazardous Materials Management
Subject: CEE	Catalog Nbr: 0039
(Cross-listed as ENV 70.) A survey of technology, health, and policy issues in hazardous materials and hazardous waste management. Topics will be examined from a scientific and technological perspective and will include characteristics of hazardous materials; health effects; hazard, exposure, and risk assessment; regulatory framework; distribution of contaminants in the environment; and an overview of remedial technologies used to clean up hazardous waste. Recommendations: CHEM 1 or 16, ES 11 or BIO 13, and CEE 1 or CEE 32	

108250	Masters Thesis
Subject: CS	Catalog Nbr: 0296
2025 SPRG	Primary Karen Panetta Karen.Panetta@tufts.edu
2025 SPRG	Primary Gregory Crane gregory.crane@tufts.edu
2025 SPRG	Primary Robert Jacob jacob@cs.tufts.edu
2025 SPRG	Primary Alva Couch alva.couch@tufts.edu
2025 SPRG	Primary Soha Hassoun soha.hassoun@tufts.edu
2025 SPRG	Primary Diane Souvaine Diane.Souvaine@tufts.edu
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Guided individual study of an approved topic suitable for a master's design project. Please see departmental website for specific details.			

108269		Dissertation Research		
Subject: CS		Catalog Nbr: 0297		
2023 FALL	Primary	Norman Ramsey	Norman.Ramsey@tufts.edu	
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2025 SPRG	Primary	Soha Hassoun	soha.hassoun@tufts.edu	
2025 SPRG	Primary	Diane Souvaine	Diane.Souvaine@tufts.edu	
2025 SPRG	Primary	Lenore Cowen	lenore.cowen@tufts.edu	
2025 SPRG	Primary	Peter Love	Peter.Love@tufts.edu	
2025 SPRG	Primary	Donna Slonim	Donna.Slonim@tufts.edu	
2025 SPRG	Primary	Samuel Guyer	Samuel.Guyer@tufts.edu	
2025 SPRG	Primary	Remco Chang	Remco.Chang@tufts.edu	
2025 SPRG	Primary	Matthias Scheutz	Matthias.Scheutz@tufts.edu	
2025 SPRG	Primary	Shuchin Aeron	Shuchin.Aeron@tufts.edu	
2025 SPRG	Primary	Kathleen Fisher	Kathleen.Fisher@tufts.edu	
2025 SPRG	Primary	Fahad Dogar	Fahad.Dogar@tufts.edu	
2025 SPRG	Primary	Johannes De Ruiter	jp.deruiter@tufts.edu	
2025 SPRG	Primary	Deborah Sunter	Deborah.Sunter@tufts.edu	
2025 SPRG	Primary	Liping Liu	Liping.Liu@tufts.edu	
2025 SPRG	Primary	Jivko Sinapov	Jivko.Sinapov@tufts.edu	
2025 SPRG	Primary	Susan Landau	Susan.Landau@tufts.edu	
2025 SPRG	Primary	Jeffrey Foster	Jeffrey.Foster@tufts.edu	
2025 SPRG	Primary	Michael Hughes	Michael.Hughes@tufts.edu	
2025 SPRG	Primary	Elaine Short	Elaine.Short@tufts.edu	

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2025 SPRG	Primary	Raja Sambasivan	Raja.Sambasivan@tufts.edu
2025 SPRG	Primary	Abani Patra	Abani.Patra@tufts.edu
2025 SPRG	Primary	Daniel Votipka	Daniel.Votipka@tufts.edu
2025 SPRG	Primary	Saeed Mehraban	Saeed.Mehraban@tufts.edu
2025 SPRG	Primary	Johes Bater	Johes.Bater@tufts.edu
Guided research on a topic suitable for a doctoral dissertation. Please see departmental website for specific details.			
Prerequisites: Ph.D. student standing in Computer Science			

108280	Capstone Design		
Subject:	Catalog Nbr:		
CEE	0081		
2025 SPRG	Primary	Eric Hines	Eric.Hines@tufts.edu
2025 SPRG	Primary	Charles Ramsburg	Andrew.Ramsburg@tufts.edu
Integrated design and project management methods used in conceiving and developing one-of-a-kind civil and environmental engineering design projects. Teamwork; project planning and scheduling; conceptual and detail design elements; comparison of design alternatives based on tradeoffs in performance, life cycle costs, sustainability, and resiliency; considerations of risk and uncertainty; emphasis on visual, oral, and written communication.			

108304	Non Major Credit		
Subject:	Catalog Nbr:		
CS	0310		

108316	Scientific Reading, Writing, and Presentations		
Subject:	Catalog Nbr:		
BME	0006		
2025 SPRG	Primary	Nisha Iyer	Nisha.Iyer@tufts.edu
2025 SPRG	Primary	Angela Lai	Angela.Lai@tufts.edu
Technical and scientific literature databases, review of scientific manuscripts and proposals, professional preparation and delivery of technical/scientific presentations, and preparation of technical proposals based on proper technical writing.			

108330	Lower Level Elective Crd		
Subject:	Catalog Nbr:		
CS	0320		

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108346	Special Topics In Civil And Environmental Engineering A			
Subject:	CEE	Catalog Nbr:	0093	
Topical courses offered within civil and environmental engineering.				

108350	Upper Level Elective Crd			
Subject:	CS	Catalog Nbr:	0330	

108359	Biomedical Engineering Senior Design I			
Subject:	BME	Catalog Nbr:	0007	
	2025 SPRG	Primary	Angela Lai	Angela.Lai@tufts.edu
Critical thinking approaches in design and research. Planning, initiation, and evaluation of design and research projects, goals, and processes. Students will be required to regularly report on the status and progress of their design/research activities, and to formally and critically evaluate their projects.				
Enrollment Restriction: BME first major and senior standing				
Recommendation: BME 6				

108363	Independent Study			
Subject:	CEE	Catalog Nbr:	0094	
	2023 FALL	Primary	Babak Moaveni	Babak.Moaveni@tufts.edu
	2024 SPRG	Primary	Daniele Lantagne	Daniele.Lantagne@tufts.edu
Supervised, independent study of topics related to civil and environmental engineering. Departmental consent required.				

108393	Research Thesis A			
Subject:	CEE	Catalog Nbr:	0095	
	2024 FALL	Primary	Charles Ramsburg	Andrew.Ramsburg@tufts.edu
	2024 FALL	Primary	Daniele Lantagne	Daniele.Lantagne@tufts.edu
A course that permits the student to perform supervised research in a specialized field of civil and environmental engineering.				
Recommendations: Consent of instructor.				

108400	Biomedical Engineering Senior Design II			
Subject:		Catalog Nbr:		

Course Bulletin

BME	0008				
	2025 SPRG	Primary	Angela Lai		Angela.Lai@tufts.edu
Continuation of the design/research activities planned, initiated, and evaluated in BME 7. Students will be required to submit regular progress reports, a final written report, and make a course-end oral presentation. Prerequisites: BME 7, BME first major, and senior standing					

108412	Research Thesis B				
	Subject:	Catalog Nbr:			
	CEE	0096			
	2025 SPRG	Primary	Charles Ramsburg		Andrew.Ramsburg@tufts.edu
A course that permits the student to perform supervised research in a specialized field of civil and environmental engineering. Recommendations: Consent of instructor.					

108430	Biophysics				
	Subject:	Catalog Nbr:			
	BME	0025			
	2025 SPRG	Primary	Peggy Cebe		peggy.cebe@tufts.edu
(Cross-listed as BIO 119, PHY 25.) Presentation at an introductory level of selected topics in physics relevant to modern medicine and biology. Development of topics to the point of application to biomedical problems. Topics drawn from acoustics, physics of fluids, diffusion, laser physics, and other subjects varying from year to year. Offered alternate years. (Also offered as 100-level.) Recommendations: PHY 1, 2, or 11, 12 or permission of instructor. Corequisite: MATH 42 (formerly MATH 13).					

108431	Internship In Civil And Environmental Engineering				
	Subject:	Catalog Nbr:			
	CEE	0199			
	2024 FALL	Primary	Babak Moaveni		Babak.Moaveni@tufts.edu
	2024 SUMR	Primary	Lucy Jen		Lucy.Jen@tufts.edu
	2024 SUMR	Primary	Eric Hines		Eric.Hines@tufts.edu
	2024 SUMR	Primary	Luis Dorfmann		Luis.Dorfmann@tufts.edu
	2024 SUMR	Primary	John Germaine		John.Germaine@tufts.edu
Internship in a field related to Civil and Environmental Engineering practice. Application of knowledge and skills developed in the classroom in a professional situation having practical significance					

108451	Introduction To Biomedical Engineering				
	Subject:	Catalog Nbr:			
	BME	0050			

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(Cross-listed as EE 50.) An introduction to the interdisciplinary nature of biomedical engineering. The biological, chemical, electrical, and mechanical principles involved in the design and operation of medical devices. Biopotentials, electrodes, transducers, biocompatibility of materials, and patient safety. Recommendations: PHY 2 or PHY 12, or permission of instructor.

108473	Introduction To Biophotonics			
Subject: BME		Catalog Nbr: 0151		
2025 SPRG		Primary	Irene Georgakoudi	Irene.Georgakoudi@tufts.edu
(cross-listed as EE151 and MSE151) Basic concepts in electromagnetism and light matter interactions, including optical properties, absorption, near-infrared, light scattering and fluorescence spectroscopy, microscopy, optical coherence tomography and photodynamic therapy and their relevance to human disease diagnostic and therapeutic applications.				

108475	Finite Element Analysis			
Subject:		Catalog Nbr:		
CEE		0105		
2025 SPRG		Primary	Masoud Sanayei	masoud.sanayei@tufts.edu
(Cross-listed as ME 177 & MSE 161). Finite element analysis of problems important in structural engineering. Overview of direct stiffness method. Discretization of continuum to finite elements for approximate solution of complex engineering problems. Development of governing equations, stiffness and load matrices for deformation and stress analysis. Work and energy theorems. Hands-on experience with industry-standard software and practical applications in structural engineering. Recommendations: CEE 22 or ME 41 or consent of instructor				

108507	Structural Dynamics		
Subject:		Catalog Nbr:	
CEE		0106	
(Cross-listed as ME 0178) Fundamentals of vibration theory with applications important in structural engineering. Free, forced, and transient vibration analysis. Time and frequency domain analysis of single and multi-degree of freedom systems. Natural frequencies and normal modes of vibration. Vibration mitigation and base isolation. Understanding behavior of structures subjected to various dynamic loads such as wind, earthquake, machine vibration, and ambient vibration. Hands-on experience with industry-standard software and practical applications in structural engineering.			

108523	Biophotonics Laboratory			
Subject: BME		Catalog Nbr: 0156		
2023 FALL		Primary	Matthew Lindley	Matthew.Lindley@tufts.edu
(Cross-listed as BME 156) Biophotonic approaches used to characterize biological specimens including				

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standard microscopy (brightfield, phase contrast, fluorescence), depth-resolved microscopy (confocal fluorescence and reflectance, two-photon excited fluorescence and second harmonic generation), near infrared spectroscopy, and photoacoustic imaging.

108529	Hydrology of the Built Environment			
Subject:		Catalog Nbr:		
CEE		0111		
2024 FALL		Primary	James Limbrunner	James.Limbrunner@tufts.edu
(Cross-listed as ENV 112) Processes and land surface characteristics that affect stormwater flows, including land-use intensification influence on flooding, geomorphic stability, and nonpoint source pollution. Design of mitigation measures based on drainage and detention, as well as land-use planning, low impact development, best management practices, and green infrastructure.				

108544	Tufts Abroad Program				
Subject:		Catalog Nbr:			
CS		0340			
2023 FALL		Primary	Susan Sanchez-Casal	susan.sanchez_casal@tufts.edu	
2024 SPRG		Primary	Ute Link	Ute.Link@tufts.edu	
2024 SPRG		Primary	Meredith Hyde	Meredith.Hyde@tufts.edu	
2024 SPRG		Primary	Isabela Secanechia	Isabela.Secanechia@tufts.edu	
Subject:		Catalog Nbr:			
CS		0340			

108547	Quantitative Biomaterials Characterization Laboratory		
Subject: BME		Catalog Nbr: 0157	
(cross-listed as MSE 157) Methods used to characterize biomaterials including mass spectrometry, scanning electron microscopy, optical spectroscopy and flow cytometry.			

108548	Groundwater	
	Subject:	Catalog Nbr:
	CEE	0113
(Cross-listed as ENV 113 and ECS 131). he geology and hydrology of groundwater. Topics include: hydraulic properties of soils, sediments, and rocks; physics of groundwater flow; flow nets, modeling groundwater systems; geology of regional flow; aquifer exploration and water well construction methods; well hydraulics and aquifer testing; applications in the geosciences and in civil /geotechnical/environmental engineering. Recommendations: EOS 1 or 2, PHY 1 or 11, and MATH 32.		

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108564	Masters Degree Continuation
Subject: CS	Catalog Nbr: 0401
Part-time. Please see departmental website for specific details.	

108569	Field Methods In Hydrogeology
Subject: CEE	Catalog Nbr: 0114
(Cross-listed as EOS 133). Field aspects of hydrogeology, groundwater mapping and sampling, aquifer testing, well drilling, monitoring, and instrumentation of boreholes. Lecture and basic field methods to understand how monitoring and production wells are planned and drilled, and what types of geologic, geophysical, and geochemical data can be gathered for subsurface flow systems. A network of boreholes on the Tufts campus will be used as field sites to characterize subsurface parameters in the unsaturated and saturated zones, and study regional flow in an urban watershed. Field trips, quantitative analysis of hydrogeologic data. Recommendations: EOS 002 (formerly GEO 002) and PHY 011 or equivalent.	

108571	Introduction To Human Factors And Ergonomics
Subject: BME	Catalog Nbr: 0061
(Cross-listed as ENP 61.) A practical introduction to human performance and to designing for human use. Studies include human factors, ergonomics, work stations, and environmental and legal concerns that impact on design. Examples of good and bad designs illustrate course principles.	

108584	Masters Degree Continuation
Subject: CS	Catalog Nbr: 0402
2024 SUMR	Primary Diane Souvaine
Full-time. Please see departmental website for specific details.	
	Diane.Souvaine@tufts.edu

108591	Molecular Biotechnology
Subject: BME	Catalog Nbr: 0162
2024 FALL	Primary Yu-Ting Dingle
2024 SUMR	Primary Monir Ejemel
2025 SPRG	Primary Niall Lennon
(Cross-listed as CHBE 162 and BIO 162) Overview of key aspects of molecular biology and engineering aspects of biotechnology. Lecture topics include molecular biology, recombinant DNA techniques, immunology, cell biology, protein purification, fermentation, cell culture, combinatorial methods, bioethics, and bioinformatics with review and discussion of primary literature. Comprehensive technical paper on an emerging topic. Students may not receive credit for both BME/CHBE/BIO 162 and BME 33.	
	Yu-ting.Dingle@tufts.edu
	Monir.Ejemel@tufts.edu
	No Email on file.

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Recommendations: CHEM 1, BIO 13 or permission of instructor.

108606	Grad Teaching Assistant			
Subject: CS		Catalog Nbr: 0405		
2023 FALL	Primary	Norman Ramsey	Norman.Ramsey@tufts.edu	
2023 FALL	Primary	Bert Huang	No Email on file.	
2023 FALL	Primary	Antonella Di Lillo	No Email on file.	
2023 SUMR	Primary	Jennifer Mooney	No Email on file.	
2024 FALL	Primary	Ming Chow	ming.chow@tufts.edu	
2024 FALL	Primary	Elyse Cornwall	Elyse.Cornwall@tufts.edu	
2024 FALL	Primary	Ronald Simmons	Ronald.Simmons@tufts.edu	
2024 FALL	Primary	Vladimir Podolskiy	Vladimir.Podolskii@tufts.edu	
2024 FALL	Primary	Christopher Magnano	Christopher.Magnano@tufts.edu	
2024 FALL	Primary	Hari Sundar	Hari.Sundar@tufts.edu	
2024 FALL	Primary	Reuth Mirsky	Reuth.Mirsky@tufts.edu	
2024 SUMR	Primary	Andrew Winslow	Andrew.Winslow@tufts.edu	
2024 SUMR	Primary	Owen Morrissey	Owen.Morrissey@tufts.edu	
2024 SUMR	Primary	Abdullah Bin Faisal	Abdullah_Bin.Faisal@tufts.edu	
2024 SUMR	Primary	Sandra Schulenburg	Sandra.Schulenburg@tufts.edu	
2024 SUMR	Primary	Shivam Goel	Shivam.Goel@tufts.edu	
2024 SUMR	Primary	Patrick Feeney	Patrick.Feeney@tufts.edu	
2025 SPRG	Primary	Karen Panetta	Karen.Panetta@tufts.edu	
2025 SPRG	Primary	Robert Jacob	jacob@cs.tufts.edu	
2025 SPRG	Primary	Alva Couch	alva.couch@tufts.edu	
2025 SPRG	Primary	Soha Hassoun	soha.hassoun@tufts.edu	
2025 SPRG	Primary	Diane Souvaine	Diane.Souvaine@tufts.edu	
2025 SPRG	Primary	Megumi Ando	Megumi.Ando@tufts.edu	
2025 SPRG	Primary	Lenore Cowen	lenore.cowen@tufts.edu	
2025 SPRG	Primary	Peter Love	Peter.Love@tufts.edu	
2025 SPRG	Primary	Donna Slonim	Donna.Slonim@tufts.edu	
2025 SPRG	Primary	Remco Chang	Remco.Chang@tufts.edu	
2025 SPRG	Primary	Matthias Scheutz	Matthias.Scheutz@tufts.edu	
2025 SPRG	Primary	Shuchin Aeron	Shuchin.Aeron@tufts.edu	
2025 SPRG	Primary	Noah Mendelsohn	Noah.Mendelsohn@tufts.edu	
2025 SPRG	Primary	Mark Sheldon	Mark.Sheldon@tufts.edu	
2025 SPRG	Primary	Partha Biswas	Partha.Biswas@tufts.edu	
2025 SPRG	Primary	Fahad Dogar	Fahad.Dogar@tufts.edu	
2025 SPRG	Primary	Johannes De Ruiter	jp.deruiter@tufts.edu	
2025 SPRG	Primary	Megan Monroe	Megan.Monroe@tufts.edu	
2025 SPRG	Primary	Fabrizio Santini	Fabrizio.Santini@tufts.edu	
2025 SPRG	Primary	Deborah Sunter	Deborah.Sunter@tufts.edu	
2025 SPRG	Primary	Liping Liu	Liping.Liu@tufts.edu	

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2025 SPRG	Primary	Jivko Sinapov	Jivko.Sinapov@tufts.edu
2025 SPRG	Primary	Susan Landau	Susan.Landau@tufts.edu
2025 SPRG	Primary	Karen Edwards	Karen.Edwards@tufts.edu
2025 SPRG	Primary	Jeffrey Foster	Jeffrey.Foster@tufts.edu
2025 SPRG	Primary	Michael Hughes	Michael.Hughes@tufts.edu
2025 SPRG	Primary	Milod Kazerounian	Milod.Kazerounian@tufts.edu
2025 SPRG	Primary	Jitendra Singh	Jitendra.Singh@tufts.edu
2025 SPRG	Primary	Elaine Short	Elaine.Short@tufts.edu
2025 SPRG	Primary	Raja Sambasivan	Raja.Sambasivan@tufts.edu
2025 SPRG	Primary	Martin Allen	Martin.Allen@tufts.edu
2025 SPRG	Primary	Richard Townsend	Richard.Townsend@tufts.edu
2025 SPRG	Primary	Abani Patra	Abani.Patra@tufts.edu
2025 SPRG	Primary	Daniel Votipka	Daniel.Votipka@tufts.edu
2025 SPRG	Primary	David Lillethun	David.Lillethun@tufts.edu
2025 SPRG	Primary	Cody Doucette	Cody.Doucette@tufts.edu
2025 SPRG	Primary	Saeed Mehraban	Saeed.Mehraban@tufts.edu
2025 SPRG	Primary	Johes Bater	Johes.Bater@tufts.edu
2025 SPRG	Primary	Michael Jahn	Michael.Jahn@tufts.edu
2025 SPRG	Primary	Roy Shilkrot	Roy.Shilkrot@tufts.edu

108622	Solid Mechanics
Subject: CEE	Catalog Nbr: 0122
(Cross-listed as ME 120). Strain tensor, stress tensor, elastic stress analysis, isotropic and anisotropic materials, torsion problem, inelastic behavior of materials, elements of plasticity and creep. Recommendations: ES 9 Strength of Materials or equivalent.	

108627		Grad Research Assistant		
Subject: CS		Catalog Nbr: 0406		
2023 FALL	Primary	Norman Ramsey	Norman.Ramsey@tufts.edu	
2023 FALL	Primary	Bert Huang	No Email on file.	
2023 FALL	Primary	Antonella Di Lillo	No Email on file.	
2023 SUMR	Primary	Jennifer Mooney	No Email on file.	
2024 FALL	Primary	Ming Chow	ming.chow@tufts.edu	
2024 FALL	Primary	Noah Mendelsohn	Noah.Mendelsohn@tufts.edu	
2024 FALL	Primary	Mark Sheldon	Mark.Sheldon@tufts.edu	
2024 FALL	Primary	Megan Monroe	Megan.Monroe@tufts.edu	
2024 FALL	Primary	Elyse Cornwall	Elyse.Cornwall@tufts.edu	
2024 FALL	Primary	Karen Edwards	Karen.Edwards@tufts.edu	
2024 FALL	Primary	Martin Allen	Martin.Allen@tufts.edu	
2024 FALL	Primary	Richard Townsend	Richard.Townsend@tufts.edu	

Course Bulletin

2024 FALL	Primary	Vladimir Podolskiy	Vladimir.Podolskii@tufts.edu
2024 FALL	Primary	Christopher Magnano	Christopher.Magnano@tufts.edu
2024 FALL	Primary	Hari Sundar	Hari.Sundar@tufts.edu
2024 FALL	Primary	Reuth Mirsky	Reuth.Mirsky@tufts.edu
2024 SUMR	Primary	Megumi Ando	Megumi.Ando@tufts.edu
2024 SUMR	Primary	Vasanth Sarathy	Vasanth.Sarathy@tufts.edu
2024 SUMR	Primary	Sandra Schulenburg	Sandra.Schulenburg@tufts.edu
2025 SPRG	Primary	Karen Panetta	Karen.Panetta@tufts.edu
2025 SPRG	Primary	Robert Jacob	jacob@cs.tufts.edu
2025 SPRG	Primary	Alva Couch	alva.couch@tufts.edu
2025 SPRG	Primary	Soha Hassoun	soha.hassoun@tufts.edu
2025 SPRG	Primary	Diane Souvaine	Diane.Souvaine@tufts.edu
2025 SPRG	Primary	Lenore Cowen	lenore.cowen@tufts.edu
2025 SPRG	Primary	Peter Love	Peter.Love@tufts.edu
2025 SPRG	Primary	Donna Slonim	Donna.Slonim@tufts.edu
2025 SPRG	Primary	Remco Chang	Remco.Chang@tufts.edu
2025 SPRG	Primary	Matthias Scheutz	Matthias.Scheutz@tufts.edu
2025 SPRG	Primary	Shuchin Aeron	Shuchin.Aeron@tufts.edu
2025 SPRG	Primary	Fahad Dogar	Fahad.Dogar@tufts.edu
2025 SPRG	Primary	Johannes De Ruiter	jp.deruiter@tufts.edu
2025 SPRG	Primary	Deborah Sunter	Deborah.Sunter@tufts.edu
2025 SPRG	Primary	Liping Liu	Liping.Liu@tufts.edu
2025 SPRG	Primary	Jivko Sinapov	Jivko.Sinapov@tufts.edu
2025 SPRG	Primary	Susan Landau	Susan.Landau@tufts.edu
2025 SPRG	Primary	Jeffrey Foster	Jeffrey.Foster@tufts.edu
2025 SPRG	Primary	Michael Hughes	Michael.Hughes@tufts.edu
2025 SPRG	Primary	Milod Kazerounian	Milod.Kazerounian@tufts.edu
2025 SPRG	Primary	Elaine Short	Elaine.Short@tufts.edu
2025 SPRG	Primary	Raja Sambasivan	Raja.Sambasivan@tufts.edu
2025 SPRG	Primary	Abani Patra	Abani.Patra@tufts.edu
2025 SPRG	Primary	Daniel Votipka	Daniel.Votipka@tufts.edu
2025 SPRG	Primary	David Lillethun	David.Lillethun@tufts.edu
2025 SPRG	Primary	Saeed Mehraban	Saeed.Mehraban@tufts.edu
2025 SPRG	Primary	Johes Bater	Johes.Bater@tufts.edu

108640	Advanced Structural Systems Analysis			
Subject:	Catalog Nbr:			
CEE	0123			
2023 FALL	Primary	Po-Shang Chen	Po-Shang.Chen@tufts.edu	
2024 FALL	Primary	Eric Hines	Eric.Hines@tufts.edu	
The application of mechanics to the analysis of indeterminate structural forms important to civil and aeronautical engineering, with emphasis on modern structural types. The analysis of fundamental structural				

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forms, including curved beams, arches, rings, thin-walled cell-type structures, and members with variable inertia, for stress and deflection by the classical methods. Influence lines for indeterminate structures. Introduction to matrix analysis and vibration of structures.
Recommendations: CEE 22.

108650	Internship
Subject: BME	Catalog Nbr: 0087
2024 FALL	Primary Lorin Polidora
	Lorin.Polidora@tufts.edu
Supervised internships at suitable locations in industry and government. Internships are offered on basis of availability. Term paper required. Credit not given retroactively. Prior arrangements necessary.	

108651	Doctoral Degree Continuation
Subject: CS	Catalog Nbr: 0501
Part-time. Please see departmental website for specific details.	

108662	Advanced Steel Design
Subject: CEE	Catalog Nbr: 0124
2023 FALL	Primary Brian Brenner
	brian.brenner@tufts.edu
An advanced course in steel design using the Load Resistance Factor Design (LRFD). Component design, connections, composite and built-up sections are covered. Design problems involve braced and rigid structures subjected to gravity, wind, and seismic loads. Recommendations: CEE 24 and consent of instructor	

108667	Doctoral Degree Continuation
Subject: CS	Catalog Nbr: 0502
2024 SUMR	Primary Diane Souvaine
	Diane.Souvaine@tufts.edu
Full-time. Please see departmental website for specific details.	

108673	Internship
Subject: BME	Catalog Nbr: 0088
2025 SPRG	Primary Lorin Polidora
	Lorin.Polidora@tufts.edu
Internships at suitable locations in industry and government. Internships are offered on basis of availability. Term paper required. Credit not given retroactively. Prior arrangements necessary.	

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108679	Advanced Reinforced Concrete			
Subject:	Catalog Nbr:			
CEE	0125			
2025 SPRG	Primary	Daniel Kuchma	Dan.Kuchma@tufts.edu	
Further study of concrete design with emphasis on columns with biaxial bending, flat slab theory and design, torsion, and the analysis and design of prestressed concrete structural members.				
Recommendations: CEE 25				

108692	Honors Thesis A			
Subject:	Catalog Nbr:			
BME	0089			
2023 FALL	Primary	Irene Georgakoudi	Irene.Georgakoudi@tufts.edu	
2024 FALL	Primary	David Kaplan	david.kaplan@tufts.edu	
2024 FALL	Primary	Sergio Fantini	sergio.fantini@tufts.edu	
2024 FALL	Primary	Fiorenzo Omenetto	Fiorenzo.Omenetto@tufts.edu	
2024 FALL	Primary	Lauren Black III	Lauren.Black@tufts.edu	
2024 FALL	Primary	Qiaobing Xu	Qiaobing.Xu@tufts.edu	
2024 FALL	Primary	Brian Timko	Brian.Timko@tufts.edu	
2024 FALL	Primary	Madeleine Oudin	Madeleine.Oudin@tufts.edu	
2024 FALL	Primary	Srivalleesha Mallidi	Srivalleesha.Mallidi@tufts.edu	
2024 FALL	Primary	Juan Gnecco	Juan.Gnecco@tufts.edu	
2024 FALL	Primary	Nisha Iyer	Nisha.Iyer@tufts.edu	
2024 FALL	Primary	Angela Lai	Angela.Lai@tufts.edu	
2024 FALL	Primary	Shelly Peyton	Shelly.Peyton@tufts.edu	
Supervised research on a topic that has been approved as a suitable subject for an honors thesis. The work is performed over the fall and spring semesters of the senior year. Please see departmental website for specific details.				
Recommendations: Senior standing or permission of instructor.				

108699	Structural Stability	
Subject:	Catalog Nbr:	
CEE	0126	
Elastic buckling of columns, including the effects of initial crookedness and eccentricity. Large deflections of the Euler column. Tangent modulus and double modulus theory. Beam columns and the stability of frameworks and trusses. Torsional buckling of columns and lateral buckling of beams. Plate buckling with applications to flange buckling and web crippling of plate girders. Recommendations: ES 9 and CEE 22, or consent of instructor		

108712	Honors Thesis B			
Subject:	Catalog Nbr:			

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BME	0090			
2025 SPRG	Primary	David Kaplan	david.kaplan@tufts.edu	
2025 SPRG	Primary	Sergio Fantini	sergio.fantini@tufts.edu	
2025 SPRG	Primary	Irene Georgakoudi	Irene.Georgakoudi@tufts.edu	
2025 SPRG	Primary	Fiorenzo Omenetto	Fiorenzo.Omenetto@tufts.edu	
2025 SPRG	Primary	Lauren Black III	Lauren.Black@tufts.edu	
2025 SPRG	Primary	Qiaobing Xu	Qiaobing.Xu@tufts.edu	
2025 SPRG	Primary	Brian Timko	Brian.Timko@tufts.edu	
2025 SPRG	Primary	Madeleine Oudin	Madeleine.Oudin@tufts.edu	
2025 SPRG	Primary	Srivalleesha Mallidi	Srivalleesha.Mallidi@tufts.edu	
2025 SPRG	Primary	Juan Gnecco	Juan.Gnecco@tufts.edu	
2025 SPRG	Primary	Nisha Iyer	Nisha.Iyer@tufts.edu	
Supervised research on a topic that has been approved as a suitable subject for an honors thesis. The work is performed over the fall and spring semesters of the senior year. Please see departmental website for specific details.				
Recommendations: Senior standing or permission of instructor.				

108721	Nonlinear Analysis of Materials and Structures			
Subject:	Catalog Nbr:			
CEE	0128			
2023 FALL	Primary	Luis Dorfmann	Luis.Dorfmann@tufts.edu	
(Cross-listed as ME 175.) Nonlinear solid mechanics, nonlinear constitutive models and variational principles as essential prerequisites for nonlinear finite element formulations.				
Recommendations: ES 9.				

108734	Special Topics			
Subject:	Catalog Nbr:			
BME	0093			
Guided study of an approved topic in biomedical engineering.				

108745	Bridge Design And Rehabilitation			
Subject:	Catalog Nbr:			
CEE	0129			
A practical introduction to bridge engineering, exploring the design, behavior, maintenance and rehabilitation of bridges. Bridge systems, loadings, superstructures, substructures, details, and inspections will be discussed. The theory behind development of certain provisions in AASHTO code will be reviewed, with the purpose of developing an understanding of the code and its related commentary, and the objective of preparing students to use the criteria not as a "black box." Approximate analysis methods will be discussed. Design of elements including steel and pre-stressed concrete beams, abutments, piers, joints, and bearings using AASHTO code (LRFD) will be covered.				

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108762	Special Topics
Subject: BME	Catalog Nbr: 0094
Guided study of an approved topic in biomedical engineering.	

108768	River Hydraulics and Stream Restoration
Subject: CEE	Catalog Nbr: 0112
2025 SPRG	Primary James Limbrunner James.Limbrunner@tufts.edu
Design of rivers and stream channels including lined aqueducts, stilling basins, water surface elevation control, and sediment stability. Influence of engineered works on natural processes such as sediment transport, wildlife migration, and flood attenuation. Stream restoration methods including nature-like riverbed and riverbank design, and aquatic organism passage design.	

108812	Environmental Engineering Processes
Subject: CEE	Catalog Nbr: 0036
2025 SPRG	Primary Wayne Chudyk wayne.chudyk@tufts.edu
Fundamental environmental engineering processes with applications in all environmental media. Particle interaction and settling, filtration, disinfection, diffusion and dispersion, sorption, mass transfer, biotic and abiotic reactions, and kinetics. Extensions to engineering design. With laboratory.	

108840	Sustainable Water Engineering
Subject: CEE	Catalog Nbr: 0133
(Cross-listed with CHBE 133) Means of providing safe, reliable, and cost-effective potable water, sanitation, and water quality protection through municipal infrastructure. Methods of ensuring resilience and adaptation to changes in source quality and climate. Treatment and process design integrating considerations of cost and sustainability. Design projects using mandated standards.	

108855	Design Of Medical Instrumentation
Subject: BME	Catalog Nbr: 0100
2025 SPRG	Primary Srivalleesha Mallidi Srivalleesha.Mallidi@tufts.edu
(Cross-listed as EE 100.) An introduction to the design principles of medical instrumentation and simple biomedical signal analysis. Topics include analysis of the instrument and subject as a linear system, characteristics of various biological signals, design of transducers, modern implementation of A/D conversion, analog and digital filters, instrumentation amplifiers, patient isolation, and battery powered equipment.	

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108886	Air Pollution and Control			
Subject:	Catalog Nbr:			
CEE	0136			
2025 SPRG	Primary	John Durant		john.durant@tufts.edu
(Cross-listed as CHBE 136) A study of health and environmental effects from air pollution, dispersion modeling, air pollution laws and regulations, fate and transport of air pollution, and design of pollution control equipment and processes.				

108908	Public Health			
Subject:	Catalog Nbr:			
CEE	0057			
2024 FALL	Primary	David Gute		david.gute@tufts.edu
An introduction to the public health approach is provided. The epidemiological model of the disease process is used to study a variety of infectious and noninfectious diseases. The wide variety of nonmedical approaches to disease control is emphasized. The public health aspects of vital statistics, evaluation, and administrative decision making are introduced and applied to current problems in public health. Recommendations: Consent of instructor.				

108931	Hazardous Waste Treatment Technologies			
Subject:	Catalog Nbr:			
CEE	0138			
(Cross-listed as CHBE138.) Hazardous waste treatment options based on physical, chemical, biological, and thermal processing technologies. Brief review of definitions and appropriate hazardous waste legislation. Introduction to pollution prevention. Traditional end-of-pipe treatment technologies. Applications to include solvent recovery, chemical fixation, land disposal, biodegradation, and special wastes. Incineration and associated environmental discharges constitute a major portion of course. Emerging technologies and evaluation of technical/economic process viability. Recommendations: Senior standing or consent of instructor.				

108951	Bioremediation: Natural And Enhanced			
Subject:	Catalog Nbr:			
CEE	0139			
(Cross-listed as ENV 139). Biodegradation of organic contaminants is evaluated in natural settings and in treatment processes. Aerobic and anaerobic pathways, their prediction and control are examined. Water, soil, and vapor phase transformations are evaluated. Subject areas include kinetics, equilibria, sorption, gas transfer, and transformation products. Process design for treatment plants and in-situ applications applied to case studies. Recommendations: CEE 132.				

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108982	Geomechanics
Subject: CEE	Catalog Nbr: 0245
Introduction to the mechanics of solids focused on earth materials as porous, deformable media. Strain, stress, and equations of motion. Elasticity and seismic wave propagation. Failure, inelastic deformation, and plasticity. Role of pore fluid in deformation and failure. Consolidation. Fluid flow and Darcy's law; seepage forces and design considerations. Recommendations: ES-9, CEE-42	

109003	Site Remediation
Subject: CEE	Catalog Nbr: 0143
2024 FALL	Primary Paul Dombrowski Paul.Dombrowski@tufts.edu
(Cross-listed w/ CHBE 143). Conventional and innovative remediation technologies are examined under the remedial investigation/feasibility study (RI/FS) process. Knowledge of fundamental processes governing remedy implementation is integrated with an understanding of site characterization and applicable regulations to enable design of site-specific treatment systems for clean-up of the contaminated subsurface environment.	

109024	Computer Methods In Geotechnical Engineering
Subject: CEE	Catalog Nbr: 0145
Computer methods for processing subsurface information and for analyzing geotechnical/geoenvironmental engineering problems. Applications to be selected from settlement, deformation, bearing capacity, slope stability, pile driving, seepage, and soil amplification analyses. Finite element and finite difference applications. Recommendations: CEE 42	

109049	Foundation Engineering
Subject: CEE	Catalog Nbr: 0146
2024 FALL	Primary Lucy Jen Lucy.Jen@tufts.edu
Foundation engineering design, with emphasis on bearing capacity and settlement for shallow (footings) and deep (pile) foundations. Design of footings, rafts, piles, and piers subjected to axial and lateral loads; building code requirements for design; and evaluation and selection of foundation types and alternatives. Case studies.	

109068	Geotechnical Earthquake Engineering
Subject: CEE	Catalog Nbr: 0247
2025 SPRG	Primary Laurie Baise laurie.baise@tufts.edu

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2025 SPRG	Primary	Juan Pestana	Juan.Pestana@tufts.edu
Review of seismicity, fault-rupture mechanisms, vibration and wave propagation theory. Deterministic and probabilistic seismic hazard analysis including ground motion prediction equations. Dynamic behavior of soils, including soil amplification concepts, liquefaction, and ground response analysis. Application of soil dynamics in terms of design codes and design ground motions. Recommendations: CEE 42 and ES56.			

109086	Earth Support Systems		
Subject:	Catalog Nbr:		
CEE	0149		
2025 SPRG	Primary	Lucy Jen	Lucy.Jen@tufts.edu
Examination of earth pressure theories and design problems related to earth-retaining structures and tunnels. Analysis and design of braced and unbraced excavations; code requirements; strut-waler systems; tie backs; ground movement control; reinforced earth and slurry wall methods. Slope stability analysis related to excavations and retaining structures.			

109111	Principles Epidemiology		
Subject:	Catalog Nbr:		
CEE	0154		
2024 FALL	Primary	Shayesteh Jahanfar	Shayesteh.Jahanfar@tufts.edu
2025 SPRG	Primary	Mark Woodin	mark.woodin@tufts.edu
(Cross-listed as CH 0034.) Methods that quantify disease processes in human populations. Topics include study design, sources of inaccuracy in experimental and observational studies, the methodology of data collection, and an introduction to the statistical evaluation of epidemiological data. Cannot receive credit for both CEE 154 and CEE 54			

109134	Occupational And Environmental Health		
Subject:	Catalog Nbr:		
CEE	0158		
2025 SPRG	Primary	David Gute	david.gute@tufts.edu
(Cross-listed as ENV 158.) An examination of current topics in the area of occupational and environmental health, with particular emphasis on the types of materials that produce human health effects. Both clinical and epidemiologic data will be used to assess the public health importance of environmental pollutants and to evaluate the effectiveness of control strategies Recommendations: Senior standing or consent of instructor.			

109187	Epidemiological Methods		
Subject:	Catalog Nbr:		
CEE	0155		
(Continuation of CEE154.) Topics include the principles of data analysis, including hypothesis testing and estimation, options in study design, internal validity, screening programs, registries, and genetics. Both			

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theoretical and practical aspects of each topic will be discussed.

Recommendations: CEE 154 or CEE 54

109213	Environmental Toxicology
Subject: CEE 2025 SPRG	Catalog Nbr: 0157 Primary Anne Marie Desmarais annemarie.desmarais@tufts.edu
(Cross-listed as ENV 167.) This course is designed to present the basic scientific principles of toxicology and the relationship of toxicology to health-based risk assessment and hazardous materials management. The toxic effects of hazardous substances on specific organ systems are described, as well as the mechanisms of action of some frequently encountered environmental contaminants. Specialized topics related to the field of toxicology are also discussed, including animal to human extrapolation of data, mutagenicity/carcinogenicity, and teratogenesis. Recommendations: Senior standing or consent of instructor.	

109266	Quantitative Physiology II
Subject: BME 2025 SPRG	Catalog Nbr: 0122 Primary
(Cross-listed as EE 122). A laboratory course designed for students interested in advanced work in biomedical engineering. The course will involve labs covering nerve physiology, skeletal muscle physiology, and cardiopulmonary physiology, through the study of vital biological signals and their measurement. The course will be structured in modules, with labs in each module focused on 1) measurement and acquisition of the physiological data of interest and 2) computational modeling of acquired physiological data. Recommendations: BME/EE/ES 121 or BIO 115, BME/EE/ES 50, BIO 13 or ES 11, or Permission of instructor.	

109277	Health Effects And Risk Assessment
Subject: CEE 2025 SPRG	Catalog Nbr: 0153 Primary
A study of chronic and acute human health effects of exposure to hazardous materials. Principles of toxicology and pharmacokinetics of toxic substances. Standards for environmental quality, risk assessment methodologies, and risk communication strategies. Recommendations: CHEM 1 or 16, senior standing and consent of instructor	

109287	Biophysics
Subject: BME 2025 SPRG	Catalog Nbr: 0125 Primary Peggy Cebe peggy.cebe@tufts.edu
(Cross-listed as BIO 119, PHY 25 .) Presentation at an introductory level of selected topics in physics relevant to modern medicine and biology. Development of topics to the point of application to biomedical problems. Topics drawn from acoustics, physics of fluids, diffusion, laser physics, and other subjects varying from year to	

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year. Offered alternate years. (Also offered as lower-level.)

Recommendations: PHY 1, 2, or 11, 12 or permission of instructor. Corequisite: MATH 42 (formerly MATH 13).

109305	Principles Of Medical Imaging			
Subject:		Catalog Nbr:		
BME		0131		
2025 SPRG		Primary	Sergio Fantini	sergio.fantini@tufts.edu
(Cross-listed as EE 131 and BIO 131.) This interdisciplinary course presents the principles of medical imaging techniques such as diagnostic ultrasound, radiography, X-ray computed tomography (CT), and magnetic resonance imaging (MRI). For each imaging modality, topics include the physical principles, key aspects of instrumentation design, mathematical methods, and the anatomical/physiological information content of the images. Representative medical images will be discussed and interpreted. This course cannot be taken for basic science requirement for engineering students. Recommendations: MATH 32 (formerly MATH 11), PHY 2 or 12, or permission of instructor.				

109326	Analytical Tools For Biomedical Engineering			
Subject:	Catalog Nbr:			
BME	0141			
2024 FALL	Primary	Srivalleesha Mallidi	Srivalleesha.Mallidi@tufts.edu	
Statistical methods of data analysis with emphasis upon biomedical applications. Topics include Fourier analysis, probability, Bayes' theorem, interpretation of diagnostic tests (sensitivity, specificity, predictive values), random variables, covariance and correlation, normal distribution, samples, statistical tests, linear systems, spectral analysis, correlation, coherence, phase analysis, independent component analysis and principal component analysis. Data analysis will be performed with MATLAB. Recommendations: MATH 42, experience with MATLAB, or permission of instructor.				

109329	Legal Issues Of Engineering	
Subject:	Catalog Nbr:	
CEE	0185	
This course examines the legal principles applicable to engineering design, construction, and manufacturing. Topics covered include introduction to the legal system, sources of law, contract law principles, professional liability risks, risk management practices, contract administration, differing site conditions claims, professional registration, and ethical issues. Recommendations: Junior standing or consent of instructor		

109349	Geographical Information Systems			
Subject: CEE		Catalog Nbr: 0187		
2024 FALL		Primary	Laurie Baise	laurie.baise@tufts.edu
Spatial analysis with Geographic Information Systems (GIS), including their use for engineering applications.				

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GIS data structure and management, techniques for spatial analysis. Applications including seismic hazard, water resources, and environmental health. Laboratory exercises in GIS.

109370	Building Information Modeling
Subject: CEE	Catalog Nbr: 0188
Storage and organization of technical building information using Building Information Modeling (BIM). Use of geometric visualization, rendering, animation, walkthrough, and construction sequencing to gain efficiencies in 3D design review and construction management. Applications in constructability and coordination of civil structures. Laboratory experiences using industry standard software.	

109378	Biomechanics
Subject: BME	Catalog Nbr: 0149
(Cross-listed with MSE 150) Graduate-level seminar course designed for students who are interested in getting a broad overview of different research methods and analytical techniques in human factors/ergonomics research. Topics to be covered are related to the acquiring, recording, and analyzing of empirical data. Theory underlying these methods in human factors/ergonomics research is also studied.	

109421	Special Topics
Subject: CEE	Catalog Nbr: 0193
2024 FALL	Primary Laurie Baise laurie.baise@tufts.edu
2024 FALL	Primary Sauro Liberatore Sauro.Liberatore@tufts.edu
2024 FALL	Primary Farshid Vahedifard Farshid.Vahedifard@tufts.edu
2024 SPRG	Primary Greses Perez Greses.Perez@tufts.edu
Topical courses offered within civil and environmental engineering.	

109444	Embedded Systems
Subject: EE	Catalog Nbr: 0014
2025 SPRG	Primary Chornng Chang chornng.chang@tufts.edu
Embedded system hardware, basic concepts of embedded software, and interfacing concepts of an embedded microprocessor; embedded programming, memory management, memory allocation, efficient hardware-aware algorithms; registers and memory; mixing assembly and high level language; real-time deadlines and timers; interrupt hardware and software systems; input/output in an embedded system; embedded application software design and analysis Prerequisites: ES4 and COMP11, or permission of instructor	

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109495	Environmental Law			
Subject: CEE		Catalog Nbr: 0207		
2025 SPRG		Primary	Earl Phillips	Earl.Phillips@tufts.edu
(Cross-listed as UEP 207 and ENV 109) This survey course explores the evolution of environmental and natural resource law and examines if, where, and how it addresses climate change among several other pressing environmental threats. The course also reveals the challenges presented by the intersection of environmental issues and our political process and the critical role played by planners and policy makers. The course is designed for those considering careers in environmental science or engineering, environmental management, and those looking to participate (professionally or personally) in the political or regulatory process related to environment and climate issues.				

109516	Electromagnetic Fields And Waves W/lab			
Subject: EE		Catalog Nbr: 0018		
2024 FALL		Primary	Aseema Mohanty	Aseema.Mohanty@tufts.edu
Coordinate systems and transformations, base vectors, scalar and vector point functions, gradient, divergence, curl, Laplacian, divergence theorem, Stokes theorem, source-point and field-point notation, electrostatic and magnetostatic fields and laws, scalar and vector potential functions, continuity equation, Maxwell's equations in differential and integral form, boundary conditions, wave equation, time-harmonic fields, plane waves, electromagnetic radiation, dipole antenna, Poynting theorem, distributed circuits and transmission lines. Associated laboratory work.				
Recommendations: ES 3, PHYS 12, MATH 51 (formerly MATH 38).				

109523	Chemical Principles In Environmental & Water Resources Engineering			
Subject:	Catalog Nbr:			
CEE	0212			
2024 FALL	Primary	Wayne Chudyk	wayne.chudyk@tufts.edu	
Basic principles of water chemistry related to environmental and water resources engineering. Thermodynamics, chemical equilibrium, acid-base reactions, alkalinity, complexation, precipitation, dissolution, sorption, and reduction-oxidation reactions. Quantitative problem solving. Fall. Recommendations: CHEM 1 or equivalent.				

109537	Introduction To Human Factors And Ergonomics		
Subject:		Catalog Nbr:	
BME		0160	
Same as BME 61, with additional requirements for graduate students. A practical introduction to human performance and to designing for human use. Studies include human factors, ergonomics, work stations, and environmental and legal concerns that impact on design. Examples of good and bad designs illustrate course principles. Includes a semester-long technical project and paper. (Also offered as lower-level.)			

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109542	Transport Principles In Environmental & Water Resources Engineering		
Subject:	Catalog Nbr:		
CEE	0213		
An examination of transport phenomena in the natural or engineered environment. Topics include: momentum transport, energy transport, mass transport, interphase mass transfer, and environmental applications of ideal and non-ideal reactor models. Students will enhance their ability to apply a first principles approach for analysis of complex environmental systems. Fall. Recommendations: MATH 51 (formerly MATH 38) and ES 8, or equivalents			

109562	Environmental And Water Resource Systems			
Subject:	Catalog Nbr:			
CEE	0214			
2023 FALL	Primary	Jonathan Lamontagne	Jonathan.Lamontagne@tufts.edu	
Mathematical models of water resource and environmental systems are presented in combination with optimization procedures, decision theory, and environmental applied statistics to generate an integrated approach to the planning, design, and management of complex water resources systems. Water resources systems applications are formulated as decision problems where an optimal solution is sought, yet cost, safety, environment, and technology appear as competing constraints. Applications include regional water quality management; siting treatment plants; reservoir system operations; and design, irrigation, flood control, and watershed planning.				

109563	Electronics I W/lab			
Subject:	Catalog Nbr:			
EE	0021			
2025 SPRG	Primary	Marco Donato	Marco.Donato@tufts.edu	
Complex numbers; sinusoidal steady-state circuits and phasors; impedances; frequency response of linear circuits and Bode plots; characteristics of the non-ideal operational amplifier; amplifiers and active filters using the operational amplifier; advanced topics in junction diodes; junction capacitance; diode small signal models; photodetectors and LEDs; analysis and design of diode circuits; MOSFET device operation and small-signal models; analysis and design of transistor amplifiers; basic MOS amplifier configurations. Associated laboratory work.				
Prerequisites: ES-0003 or EE-0020				

109571	Electronics II W/lab			
Subject:	Catalog Nbr:			
EE	0022			
2025 SPRG	Primary	Sameer Sonkusale	sameer@ece.tufts.edu	
Integrated circuit realizations of MOS transistor circuits, current mirrors, active loads; Bipolar Junction Transistors, (BJT), device operation, small signal model and analysis, elementary BJT amplifier configuration;				

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differential amplifiers, multi-stage amplifiers; frequency response of amplifiers; feedback and stability in analog circuits, nyquist stability criteria, frequency compensation; RC oscillators, LC oscillators, and waveform generators; output structures; power amplifiers; AM/FM circuits. Associated laboratory work. Students may not take both EE 22 and EE 12 for credit.

Recommendations: EE 21.

109581	Advanced Solid Mechanics
Subject: CEE	Catalog Nbr: 0221
(Cross-listed as ME 221). Mechanics of deformable bodies based on equilibrium, geometry of strain, and properties of materials. Theory of elasticity, plasticity, viscoelasticity and creep.	

109588	Linear Systems
Subject: EE	Catalog Nbr: 0023
2025 SPRG	Primary Brian Aull Brian.Aull@tufts.edu
Continuous and discrete signals including phasors; continuous and discrete systems and their realizations using differential and difference equations; continuous and discrete convolution and correlation; unilateral and bilateral Laplace transforms; continuous time Fourier transform; continuous time Fourier series; discrete time Fourier transform; sampling theory; unilateral and bilateral Z transform. Computational exercises focusing on problems in control and signal processing. Recommendations: EE 21, MATH 70, and MATH 51.	

109635	Recombinant DNA Techniques
Subject: BME	Catalog Nbr: 0163
2023 SUMR	Primary Onur Hasturk Onur.Hasturk@tufts.edu
2023 SUMR	Primary Xiaoli Zhang Xiaoli.Zhang@tufts.edu
2024 SUMR	Primary Laura Place Laura.Place@tufts.edu
(Cross-listed as BIO 163 and CHBE 163.) This lecture and laboratory course is designed to familiarize the student with methods employed to produce recombinant products. The lectures cover fundamental aspects of the recombinant DNA methodologies used in the laboratory as well as some commercial applications of the techniques. The laboratory provides hands-on experience with the key skills used in genetic engineering including DNA isolation, restriction enzyme mapping, cloning and selection, protein expression, gel electrophoresis, polymerase chain reaction, DNA sequencing, and related techniques. Students may not receive credit for both BME 163 and BME 33. Recommendations: CHEM 1, BIO 13, or permission of instructor.	

109650	Advanced Structural Dynamics
Subject: CEE	Catalog Nbr: 0225

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The design of structures and structural elements to resist dynamic loads. Applications of classical, numerical, and shock spectrum methods to problems in engineering seismology, blast resistance, shock and vibration isolation, and impact, including linear and nonlinear effects.

Recommendations: CEE 105 and 106.

109681	Advanced Structural Design
Subject: CEE	Catalog Nbr: 0228
Please see departmental website for detailed course description. Recommendations: Consent of instructor	

109688	Principles Of Controlled Release And Drug Delivery
Subject: BME	Catalog Nbr: 0165
2024 FALL	Primary Anthony Barry Anthony.Barry@tufts.edu
Fundamentals of drug product development and formulation with particular emphasis on novel and developing technologies for controlled release and drug delivery for biopharmaceuticals. Course includes coverage of formulation principles and discussion of the interplay between physiology, pathophysiology and dosage form development, pharmacokinetics, and novel materials used in controlled release. Recommendations: CHEM 1 or 16, BIO 13 or ES 11, ES 2, and MATH 34 (formerly MATH 12), or permission.	

109702	Digital Logic Systems W/lab
Subject: EE	Catalog Nbr: 0026
2023 FALL	Primary Chorng Chang chorng.chang@tufts.edu
Integrated circuit logic families and their characteristics. Review of combinatorial and sequential design using SSI devices. Arithmetic circuits, shift registers, and counters. Random access and read only memories. Design of memory systems. Waveshaping devices and display devices. Programmable logic arrays and their applications. Asynchronous and synchronous system design using MSI and LSI devices. Finite state machines and the specification of system controllers. Systematic approaches to controller realization. Associated laboratory work. Spring. Recommendations: ES 4 and EE 14, or permission.	

109704	Reactive Transport In Porous Media
Subject: CEE	Catalog Nbr: 0230
The fundamental processes governing component transported in porous media. Volume averaging, dispersion, reactive transport, non-linear and non-equilibrium sorption, anomalous transport, mass transfer, multiphase flow and transport. Theoretical foundation on which to base critical assessments of component transport in complex porous media. Spring (alternating years).	

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Recommendations: CEE 213 or consent of instructor.

109717	Junior Design Project			
Subject: EE		Catalog Nbr: 0031		
2025 SPRG		Primary	Brian Aull	Brian.Aull@tufts.edu
2025 SPRG		Primary	Emily Carlson	Emily.Carlson@tufts.edu
Junior level team project with ECE faculty direction and guidance. Introduction of the engineering method: concept, planning and analysis, design, test. Integration of theoretical concepts from circuit theory, digital and analog electronics, signal processing, engineering economics, and engineering design practices to deliver a working prototype. Use of microcontroller and peripherals, analog-to-digital converters, digital signal-processors, memory and computer aided design tools. Students are expected to provide schedules, schematics and specifications; build prototypes; present their projects orally; and deliver a working system. Pre-reqs: EE or Comp-Eng Majors. EE 14, EE 21, and EE 23 or permission of instructor				

109730	Biology of Water & Health			
Subject: CEE		Catalog Nbr: 0251		
2024 FALL		Primary	David Gute	david.gute@tufts.edu
(Cross-listed as CH 191)				

109743	Computer Interface Design			
Subject: BME		Catalog Nbr: 0166		
2025 SPRG		Primary	Dave Miller	Dave.Miller@tufts.edu
2025 SPRG		Primary	Ken Tango	Ken.Tango@tufts.edu
(Cross-listed as ENP 166.) This hands-on course challenges students to design computer-based products and systems that are easy to learn and use. Lectures cover the user interface-design process, basic design principles, and design evaluation methods. In-class exercises and projects reinforce the students' understanding of the lecture material and provide practical design experience. Students use computer-based prototyping tools to model and demonstrate their design solutions. Frequent guest lectures by user-interface design specialists from industry. Recommendations: EN 1, 2, and junior standing, or permission of instructor.				

109751	Laboratory And In-situ Measurement Of Soil Property			
Subject: CEE		Catalog Nbr: 0244		
2024 FALL		Primary	John Germaine	John.Germaine@tufts.edu
In-depth study of various laboratory and in-situ tests used to measure the shear strength, compressibility, and permeability of soils. Laboratory work includes index, consolidation, and triaxial tests. Field tests discussed				

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include SPT, cone, vane, pressuremeter, and dilatometer. Discussion of methods used to process laboratory and field data. Report writing and hands-on laboratory testing.
Recommendations: CEE 42.

109757	Introduction To Biomedical Engineering
Subject: EE	Catalog Nbr: 0050
(Cross-listed as BME 50.) An introduction to the interdisciplinary nature of biomedical engineering. The biological, chemical, electrical, and mechanical principles involved in the design and operation of medical devices. Biopotentials, electrodes, transducers, biocompatibility of materials, and patient safety. Fall. Recommendations: PHY 2 or PHY 12, or permission of instructor.	

109773	Biotechnology Processing Projects Lab
Subject: BME	Catalog Nbr: 0168
2024 FALL	Primary Hyunmin Yi Hyunmin.Yi@tufts.edu
(Cross-listed as CHBE 168) Laboratory experience with techniques in biotechnology processing: fermentation of recombinant E. coli cells, hybridoma cell culture, purification of protein and antibodies and related analytical procedures. Laboratories accompanied by lectures and relevant readings to cover the underlying principles.	

109782	Corporate Management Of Environmental Issues
Subject: CEE	Catalog Nbr: 0265
2025 SPRG	Primary Ariel Kraten Ariel.Kraten@tufts.edu
(Cross-listed as UEP 265 & ENV 265) Students in this course will explore the ways corporations interact with the environment, with the goal of understanding the processes, pitfalls, and tools for preventing/addressing environmental issues or disasters. Using case studies, students will critique the ways corporations have managed real environmental challenges, and discuss the alternatives that may have been available. Students will also be introduced to approaches used by companies to envision and prepare for environmental problems. They will also focus on the perspectives of various stakeholders who have an interest in corporate environmental management, including shareholders, boards, corporate leaders, community members, governments, and activists/NGOs, and unravel the tensions that often exist among these groups.	

109786	Seminar
Subject: EE	Catalog Nbr: 0092
An undergraduate course devoted to the study of the special problems in electrical engineering. Please see departmental website for specific details.	

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109799	Special Topics	
Subject:	Catalog Nbr:	
EE	0093	
Content and prerequisites to be announced. Please see departmental website for specific details.		

109812	Directed Study			
Subject:	Catalog Nbr:			
EE	0094			
2023 SUMR	Primary	Joel Grodstein	Joel.Grodstein@tufts.edu	
2024 FALL	Primary	Chorng Chang	chorng.chang@tufts.edu	
2025 SPRG	Primary	Sameer Sonkusale	sameer@ece.tufts.edu	
Guided independent study of an approved topic. Please see departmental website for specific details.				

109825	Tissue Engineering Research Laboratory			
Subject:	Catalog Nbr:			
BME	0175			
2025 SPRG	Primary	Ying Chen	Ying.Chen@tufts.edu	
To gain hands-on experience in the field of tissue engineering by preparing and characterizing scaffold biomaterials, expansion and handling human adult stem cell, preparation and use of bioreactors and assembling a functional system to grow a tissue. In addition, safety, ethical, and general laboratory protocol issues are covered.				
Students may not receive credit for both BME 175 and BME 34.				

109827	Subsurface Fluid Dynamics		
Subject:	Catalog Nbr:		
CEE	0287		
(Cross-listed as EOS 287). Advanced theory in groundwater hydrology. Topics include: hydrodynamics of groundwater flow; Darcy's Law in porous sediments and fractured rocks; fluid potential; flow nets and hodographs; vorticity of inhomogeneous fluids; physics of the unsaturated zone; two-phase flow in petroleum reservoirs and carbon sequestration; flow in deforming media; aqueous mass transport in reactive formations; fluid and heat transport in geothermal reservoirs. Recommendations: MATH 51 (formerly MATH 38) and ES 8, or equivalents			

109848	Introduction Biomedical Devices		
Subject:	Catalog Nbr:		
BME	0180		
An introduction to the principles and applications of biomedical microdevices, with emphasis on miniaturization and the integration of diverse, leading-edge technologies to produce devices and systems for medical diagnosis and therapy. Basic principles of optics, electronics, mechanics, and microfluidics are			

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explored as they apply to the development of new bioMEMS, fiberoptic, and electronic devices for sensing, data acquisition, and analysis. Discussions are to include micro-devices for hearing, endoscopy, imaging, and various clinical and diagnostic applications.

109857	Master's Seminar
Subject: CEE	Catalog Nbr: 0291
2025 SPRG	Primary Robert Viesca Robert.Viesca@tufts.edu
Weekly seminar series covering contemporary topics in civil and environmental engineering. Participation in the seminar discussions and preparation of individual reports. Please see departmental website for specifics. May not be used to satisfy doctoral degree requirements.	

109875	Drug Product Formulation
Subject: BME	Catalog Nbr: 0185
2025 SPRG	Primary Lorin Polidora Lorin.Polidora@tufts.edu
2025 SPRG	Primary Bernardo Perez-Ramirez Bernardo.Perez_Ramirez@tufts.edu
(Cross-listed as CHBE 185). Drug Product Formulation.	

109879	Graduate Seminar
Subject: CEE	Catalog Nbr: 0292
2025 SPRG	Primary Robert Viesca Robert.Viesca@tufts.edu
Weekly seminar series covering contemporary topics in civil and environmental engineering.	

109909	Senior Design Project
Subject: EE	Catalog Nbr: 0097
2024 FALL	Primary Brian Aull Brian.Aull@tufts.edu
2024 FALL	Primary Emily Carlson Emily.Carlson@tufts.edu
A comprehensive design project undertaken during the senior year, individually or as a team, under the guidance of a faculty supervisor. The work is spread over two terms. Please see departmental website for specific details. Pre Requisites: EE 31 or equivalent or permission of instructor.	

109926	Special Topics
Subject:	Catalog Nbr:

Course Bulletin

CEE	0293			
	2023 FALL	Primary	Jay Borkland	Jay.Borkland@tufts.edu
	2024 SPRG	Primary	Babak Moaveni	Babak.Moaveni@tufts.edu
	2024 SPRG	Primary	Magaly Koch	Magaly.Koch@tufts.edu
Topical courses offered within civil and environmental engineering.				

109965	Senior Design Project			
	Subject:	Catalog Nbr:		
	EE	0098		
	2025 SPRG	Primary	Brian Aull	Brian.Aull@tufts.edu
	2025 SPRG	Primary	Emily Carlson	Emily.Carson@tufts.edu
A comprehensive design project undertaken during the senior year, individually or as a team, under the guidance of a faculty supervisor. The work is spread over two terms. Please see departmental website for specific details.				
Recommendations: Senior standing and permission of instructor and EE 97.				

109970	Master's Thesis			
	Subject:	Catalog Nbr:		
	CEE	0295		
	2024 FALL	Primary	Greses Perez	Greses.Perez@tufts.edu
	2024 FALL	Primary	Farshid Vahedifard	Farshid.Vahedifard@tufts.edu
	2025 SPRG	Primary	Anne Marie Desmarais	annemarie.desmarais@tufts.edu
	2025 SPRG	Primary	Mark Woodin	mark.woodin@tufts.edu
	2025 SPRG	Primary	David Gute	david.gute@tufts.edu
	2025 SPRG	Primary	John Durant	john.durant@tufts.edu
	2025 SPRG	Primary	James Limbrunner	James.Limbrunner@tufts.edu
	2025 SPRG	Primary	Wayne Chudyk	wayne.chudyk@tufts.edu
	2025 SPRG	Primary	Christopher Swan	chris.swan@tufts.edu
	2025 SPRG	Primary	Masoud Sanayei	masoud.sanayei@tufts.edu
	2025 SPRG	Primary	Lucy Jen	Lucy.Jen@tufts.edu
	2025 SPRG	Primary	Brian Brenner	brian.brenner@tufts.edu
	2025 SPRG	Primary	Laurie Baise	laurie.baise@tufts.edu
	2025 SPRG	Primary	Eric Hines	Eric.Hines@tufts.edu
	2025 SPRG	Primary	Charles Ramsburg	Andrew.Ramsburg@tufts.edu
	2025 SPRG	Primary	Shafiqul Islam	Shafiqul.Islam@tufts.edu
	2025 SPRG	Primary	Luis Dorfmann	Luis.Dorfmann@tufts.edu
	2025 SPRG	Primary	Babak Moaveni	Babak.Moaveni@tufts.edu
	2025 SPRG	Primary	Robert Viesca	Robert.Viesca@tufts.edu
	2025 SPRG	Primary	Daniele Lantagne	Daniele.Lantagne@tufts.edu
	2025 SPRG	Primary	Daniel Kuchma	Dan.Kuchma@tufts.edu
	2025 SPRG	Primary	John Germaine	John.Germaine@tufts.edu
	2025 SPRG	Primary	Helen Suh	Helen.Suh@tufts.edu

Course Bulletin

2025 SPRG	Primary	Deborah Sunter	Deborah.Sunter@tufts.edu
2025 SPRG	Primary	Jonathan Lamontagne	Jonathan.Lamontagne@tufts.edu
Guided research on a topic that has been approved as a suitable subject for a master's thesis. Required: Consent of instructor.			

109987	Master's Thesis II			
	Subject: CEE	Catalog Nbr: 0296		
	2024 FALL	Primary	Farshid Vahedifard	Farshid.Vahedifard@tufts.edu
	2025 SPRG	Primary	Anne Marie Desmarais	annemarie.desmarais@tufts.edu
	2025 SPRG	Primary	Mark Woodin	mark.woodin@tufts.edu
	2025 SPRG	Primary	David Gute	david.gute@tufts.edu
	2025 SPRG	Primary	John Durant	john.durant@tufts.edu
	2025 SPRG	Primary	James Limbrunner	James.Limbrunner@tufts.edu
	2025 SPRG	Primary	Wayne Chudyk	wayne.chudyk@tufts.edu
	2025 SPRG	Primary	Christopher Swan	chris.swan@tufts.edu
	2025 SPRG	Primary	Masoud Sanayei	masoud.sanayei@tufts.edu
	2025 SPRG	Primary	Lucy Jen	Lucy.Jen@tufts.edu
	2025 SPRG	Primary	Brian Brenner	brian.brenner@tufts.edu
	2025 SPRG	Primary	Laurie Baise	laurie.baise@tufts.edu
	2025 SPRG	Primary	Eric Hines	Eric.Hines@tufts.edu
	2025 SPRG	Primary	Charles Ramsburg	Andrew.Ramsburg@tufts.edu
	2025 SPRG	Primary	Shafiqul Islam	Shafiqul.Islam@tufts.edu
	2025 SPRG	Primary	Luis Dorfmann	Luis.Dorfmann@tufts.edu
	2025 SPRG	Primary	Babak Moaveni	Babak.Moaveni@tufts.edu
	2025 SPRG	Primary	Robert Viesca	Robert.Viesca@tufts.edu
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	2025 SPRG	Primary	Daniel Kuchma	Dan.Kuchma@tufts.edu
	2025 SPRG	Primary	John Germaine	John.Germaine@tufts.edu
	2025 SPRG	Primary	Helen Suh	Helen.Suh@tufts.edu
	2025 SPRG	Primary	Deborah Sunter	Deborah.Sunter@tufts.edu
	2025 SPRG	Primary	Jonathan Lamontagne	Jonathan.Lamontagne@tufts.edu
	2025 SPRG	Primary	Greses Perez	Greses.Perez@tufts.edu
Guided research on a topic that has been approved as a suitable subject for a master's thesis. Required: CEE 295 and consent of instructor.				

110024		Doctoral Thesis II			
Subject:		Catalog Nbr:			
CEE		0298			
2024 FALL		Primary	Farshid Vahedifard	Farshid.Vahedifard@tufts.edu	
2024 FALL		Primary	Lauryn Spearing	Lauryn.Spearing@tufts.edu	

Course Bulletin

2025 SPRG	Primary	Anne Marie Desmarais	annemarie.desmarais@tufts.edu
2025 SPRG	Primary	Mark Woodin	mark.woodin@tufts.edu
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2025 SPRG	Primary	James Limbrunner	James.Limbrunner@tufts.edu
2025 SPRG	Primary	Wayne Chudyk	wayne.chudyk@tufts.edu
2025 SPRG	Primary	Christopher Swan	chris.swan@tufts.edu
2025 SPRG	Primary	Masoud Sanayei	masoud.sanayei@tufts.edu
2025 SPRG	Primary	Lucy Jen	Lucy.Jen@tufts.edu
2025 SPRG	Primary	Brian Brenner	brian.brenner@tufts.edu
2025 SPRG	Primary	Laurie Baise	laurie.baise@tufts.edu
2025 SPRG	Primary	Eric Hines	Eric.Hines@tufts.edu
2025 SPRG	Primary	Charles Ramsburg	Andrew.Ramsburg@tufts.edu
2025 SPRG	Primary	Shafiqul Islam	Shafiqul.Islam@tufts.edu
2025 SPRG	Primary	Luis Dorfmann	Luis.Dorfmann@tufts.edu
2025 SPRG	Primary	Babak Moaveni	Babak.Moaveni@tufts.edu
2025 SPRG	Primary	Robert Viesca	Robert.Viesca@tufts.edu
2025 SPRG	Primary	Daniele Lantagne	Daniele.Lantagne@tufts.edu
2025 SPRG	Primary	Daniel Kuchma	Dan.Kuchma@tufts.edu
2025 SPRG	Primary	John Germaine	John.Germaine@tufts.edu
2025 SPRG	Primary	Helen Suh	Helen.Suh@tufts.edu
2025 SPRG	Primary	Deborah Sunter	Deborah.Sunter@tufts.edu
2025 SPRG	Primary	Jonathan Lamontagne	Jonathan.Lamontagne@tufts.edu
2025 SPRG	Primary	Greses Perez	Greses.Perez@tufts.edu
Guided research on a topic suitable for a doctoral dissertation. Required: CEE 297 and consent of instructor.			

110039	Undergraduate Internship In Electrical Engineering		
Subject: EE	Catalog Nbr: 0099		
2023 FALL	Primary	Mohammed Afsar	No Email on file.
2023 SUMR	Primary	Ronald Lasser	Ron.Lasser@tufts.edu
2023 SUMR	Primary	Jeffrey Hopwood	Jeffrey.Hopwood@tufts.edu
2024 FALL	Primary	Yingjie Lao	Yingjie.Lao@tufts.edu
2024 SUMR	Primary	Brian Aull	Brian.Aull@tufts.edu
2024 SUMR	Primary	Joel Grodstein	Joel.Grodstein@tufts.edu
2025 SPRG	Primary	Karen Panetta	Karen.Panetta@tufts.edu
2025 SPRG	Primary	Chorng Chang	chorng.chang@tufts.edu
2025 SPRG	Primary	Mark Hempstead	Mark.Hempstead@tufts.edu
2025 SPRG	Primary	Sameer Sonkusale	sameer@ece.tufts.edu
2025 SPRG	Primary	Valencia Koomson	Valencia.Koomson@tufts.edu
2025 SPRG	Primary	Eric Miller	Eric.Miller@tufts.edu
2025 SPRG	Primary	Thomas Vandervelde	tvanderv@ece.tufts.edu
2025 SPRG	Primary	Aleksandar Stankovic	alex.stankovic@tufts.edu

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2025 SPRG	Primary	Usman Khan	Usman.Khan@tufts.edu
2025 SPRG	Primary	Shuchin Aeron	Shuchin.Aeron@tufts.edu
2025 SPRG	Primary	Mai Vu	Mai.Vu@tufts.edu
2025 SPRG	Primary	Steven Bell	Steven.Bell@tufts.edu
2025 SPRG	Primary	Aseema Mohanty	Aseema.Mohanty@tufts.edu
2025 SPRG	Primary	Marco Donato	Marco.Donato@tufts.edu
2025 SPRG	Primary	Paul Simmonds	Paul.Simmonds@tufts.edu
Supervised internships at suitable locations in industry and government. Jobs offered on basis of availability. Term paper required. Credit not given retroactively. Prior arrangements necessary.			

110042	Doctoral Thesis III		
Subject: CEE	Catalog Nbr: 0299		
2024 FALL	Primary	Farshid Vahedifard	Farshid.Vahedifard@tufts.edu
2024 FALL	Primary	Laurn Spearing	Laurn.Spearing@tufts.edu
2025 SPRG	Primary	Anne Marie Desmarais	annemarie.desmarais@tufts.edu
2025 SPRG	Primary	Mark Woodin	mark.woodin@tufts.edu
2025 SPRG	Primary	David Gute	david.gute@tufts.edu
2025 SPRG	Primary	John Durant	john.durant@tufts.edu
2025 SPRG	Primary	James Limbrunner	James.Limbrunner@tufts.edu
2025 SPRG	Primary	Wayne Chudyk	wayne.chudyk@tufts.edu
2025 SPRG	Primary	Christopher Swan	chris.swan@tufts.edu
2025 SPRG	Primary	Masoud Sanayei	masoud.sanayei@tufts.edu
2025 SPRG	Primary	Lucy Jen	Lucy.Jen@tufts.edu
2025 SPRG	Primary	Brian Brenner	brian.brenner@tufts.edu
2025 SPRG	Primary	Laurie Baise	laurie.baise@tufts.edu
2025 SPRG	Primary	Eric Hines	Eric.Hines@tufts.edu
2025 SPRG	Primary	Charles Ramsburg	Andrew.Ramsburg@tufts.edu
2025 SPRG	Primary	Shafiqul Islam	Shafiqul.Islam@tufts.edu
2025 SPRG	Primary	Luis Dorfmann	Luis.Dorfmann@tufts.edu
2025 SPRG	Primary	Babak Moaveni	Babak.Moaveni@tufts.edu
2025 SPRG	Primary	Robert Viesca	Robert.Viesca@tufts.edu
2025 SPRG	Primary	Daniele Lantagne	Daniele.Lantagne@tufts.edu
2025 SPRG	Primary	Daniel Kuchma	Dan.Kuchma@tufts.edu
2025 SPRG	Primary	John Germaine	John.Germaine@tufts.edu
2025 SPRG	Primary	Helen Suh	Helen.Suh@tufts.edu
2025 SPRG	Primary	Deborah Sunter	Deborah.Sunter@tufts.edu
2025 SPRG	Primary	Jonathan Lamontagne	Jonathan.Lamontagne@tufts.edu
2025 SPRG	Primary	Greses Perez	Greses.Perez@tufts.edu
Guided research on a topic suitable for a doctoral dissertation. Required: CEE 298 and consent of instructor.			

110067	Non Major Credit
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Course Bulletin

Subject: CEE	Catalog Nbr: 0310
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110073	Design Of Medical Instrumentation			
Subject: EE	Catalog Nbr: 0100			
2025 SPRG	Primary	Srivalleesha Mallidi	Srivalleesha.Mallidi@tufts.edu	
(Cross-listed as BME 100.) An introduction to the design principles of medical instrumentation and simple biomedical signal analysis. Topics include analysis of the instrument and subject as a linear system, characteristics of various biological signals, design of transducers, modern implementation of A/D conversion, analog and digital filters, instrumentation amplifiers, patient isolation, and battery powered equipment.				

110097	Lower Level Elective Crd			
Subject: CEE	Catalog Nbr: 0320			

110117	Special Topics			
Subject: BME	Catalog Nbr: 0193			
2023 FALL	Primary	Irene Georgakoudi	Irene.Georgakoudi@tufts.edu	
2023 FALL	Primary	Yu-Ting Dingle	Yu-ting.Dingle@tufts.edu	
2023 FALL	Primary	Joel Grodstein	Joel.Grodstein@tufts.edu	
2023 FALL	Primary	Jake Marko	No Email on file.	
2023 SUMR	Primary	Vincent Fitzpatrick	Vincent.Fitzpatrick@tufts.edu	
2024 FALL	Primary	David Kaplan	david.kaplan@tufts.edu	
2024 FALL	Primary	Sergio Fantini	sergio.fantini@tufts.edu	
2024 FALL	Primary	Lorin Polidora	Lorin.Polidora@tufts.edu	
2024 FALL	Primary	Fiorenzo Omenetto	Fiorenzo.Omenetto@tufts.edu	
2024 FALL	Primary	Lauren Black III	Lauren.Black@tufts.edu	
2024 FALL	Primary	Qiaobing Xu	Qiaobing.Xu@tufts.edu	
2024 FALL	Primary	Janet Krevolin	Janet.Krevolin@tufts.edu	
2024 FALL	Primary	Brian Timko	Brian.Timko@tufts.edu	
2024 FALL	Primary	Madeleine Oudin	Madeleine.Oudin@tufts.edu	
2024 FALL	Primary	Srivalleesha Mallidi	Srivalleesha.Mallidi@tufts.edu	
2024 FALL	Primary	Gili Naveh	Gili.Naveh@tufts.edu	
2024 FALL	Primary	Juan Gnecco	Juan.Gnecco@tufts.edu	
2024 FALL	Primary	Nisha Iyer	Nisha.Iyer@tufts.edu	
2024 FALL	Primary	Angela Lai	Angela.Lai@tufts.edu	

Course Bulletin

2024 FALL	Primary	Shelly Peyton	Shelly.Peyton@tufts.edu
Guided study of an approved topic.			

110120	Upper Level Crd
Subject: CEE	Catalog Nbr: 0330

110137	Special Topics			
	Subject: BME	Catalog Nbr: 0194		
	2024 SPRG	Primary	David Kaplan	david.kaplan@tufts.edu
	2024 SPRG	Primary	Sergio Fantini	sergio.fantini@tufts.edu
	2024 SPRG	Primary	Irene Georgakoudi	Irene.Georgakoudi@tufts.edu
	2024 SPRG	Primary	Lorin Polidora	Lorin.Polidora@tufts.edu
	2024 SPRG	Primary	Fiorenzo Omenetto	Fiorenzo.Omenetto@tufts.edu
	2024 SPRG	Primary	Amanda Baryshyan	Amanda.Baryshyan@tufts.edu
	2024 SPRG	Primary	Lauren Black III	Lauren.Black@tufts.edu
	2024 SPRG	Primary	Qiaobing Xu	Qiaobing.Xu@tufts.edu
	2024 SPRG	Primary	Brian Timko	Brian.Timko@tufts.edu
	2024 SPRG	Primary	Madeleine Oudin	Madeleine.Oudin@tufts.edu
	2024 SPRG	Primary	Srivalleesha Mallidi	Srivalleesha.Mallidi@tufts.edu
	2024 SPRG	Primary	Juan Gnecco	Juan.Gnecco@tufts.edu
	2024 SPRG	Primary	Nisha Iyer	Nisha.Iyer@tufts.edu
	2024 SPRG	Primary	Ugochukwu Ugwu	Ugochukwu.Ugwu@tufts.edu
Guided study of an approved topic. Please see departmental website for details.				

110141		Master's Degree Continuation-pt			
Subject:		Catalog Nbr:			
CEE		0401			
2024 FALL	Primary	Anne Marie Desmarais		annemarie.desmarais@tufts.edu	
2024 FALL	Primary	David Gute		david.gute@tufts.edu	
2024 FALL	Primary	John Durant		john.durant@tufts.edu	
2024 FALL	Primary	James Limbrunner		James.Limbrunner@tufts.edu	
2024 FALL	Primary	Wayne Chudyk		wayne.chudyk@tufts.edu	
2024 FALL	Primary	Christopher Swan		chris.swan@tufts.edu	
2024 FALL	Primary	Masoud Sanayei		masoud.sanayei@tufts.edu	
2024 FALL	Primary	Brian Brenner		brian.brenner@tufts.edu	
2024 FALL	Primary	Laurie Baise		laurie.baise@tufts.edu	
2024 FALL	Primary	Charles Ramsburg		Andrew.Ramsburg@tufts.edu	

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2024 FALL	Primary	Robert Viesca	Robert.Viesca@tufts.edu
2024 FALL	Primary	Daniele Lantagne	Daniele.Lantagne@tufts.edu
2024 FALL	Primary	Daniel Kuchma	Dan.Kuchma@tufts.edu
2024 FALL	Primary	John Germaine	John.Germaine@tufts.edu
2024 FALL	Primary	Helen Suh	Helen.Suh@tufts.edu
2024 FALL	Primary	Deborah Sunter	Deborah.Sunter@tufts.edu
2024 FALL	Primary	Jonathan Lamontagne	Jonathan.Lamontagne@tufts.edu
2024 FALL	Primary	Greses Perez	Greses.Perez@tufts.edu
2024 FALL	Primary	Farshid Vahedifard	Farshid.Vahedifard@tufts.edu
Part-time.Please see departmental website for specific details.			

110161	Optics And Wave Motion		
Subject: BME	Catalog Nbr: 0215		
2024 FALL	Primary	Cristian Staii	Cristian.Staii@tufts.edu
(Cross-listed as PHY 31). Propagation of electromagnetic waves; geometrical optics; polarization; optical properties of metals, insulators, and semiconductors; Fraunhofer and Fresnel diffraction; interference; Fourier optics. Lectures and laboratories. Recommendations: PHY 2 or 2N or 12 or 12N. Corequisite: MATH 42 (formerly MATH 13)			

110187	Master's Degree Continuation-ft		
Subject: CEE	Catalog Nbr: 0402		
2024 FALL	Primary	Anne Marie Desmarais	annemarie.desmarais@tufts.edu
2024 FALL	Primary	David Gute	david.gute@tufts.edu
2024 FALL	Primary	John Durant	john.durant@tufts.edu
2024 FALL	Primary	James Limbrunner	James.Limbrunner@tufts.edu
2024 FALL	Primary	Wayne Chudyk	wayne.chudyk@tufts.edu
2024 FALL	Primary	Christopher Swan	chris.swan@tufts.edu
2024 FALL	Primary	Masoud Sanayei	masoud.sanayei@tufts.edu
2024 FALL	Primary	Brian Brenner	brian.brenner@tufts.edu
2024 FALL	Primary	Laurie Baise	laurie.baise@tufts.edu
2024 FALL	Primary	Eric Hines	Eric.Hines@tufts.edu
2024 FALL	Primary	Charles Ramsburg	Andrew.Ramsburg@tufts.edu
2024 FALL	Primary	Shafiqul Islam	Shafiqul.Islam@tufts.edu
2024 FALL	Primary	Luis Dorfmann	Luis.Dorfmann@tufts.edu
2024 FALL	Primary	Babak Moaveni	Babak.Moaveni@tufts.edu
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Course Bulletin

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2024 FALL	Primary	Deborah Sunter	Deborah.Sunter@tufts.edu
2024 FALL	Primary	Jonathan Lamontagne	Jonathan.Lamontagne@tufts.edu
2024 FALL	Primary	Greses Perez	Greses.Perez@tufts.edu
2024 FALL	Primary	Farshid Vahedifard	Farshid.Vahedifard@tufts.edu
Full-time. Please see departmental website for specific details.			

110203	Principles Of Biomedical Engineering		
Subject: BME	Catalog Nbr: 0250		
2024 FALL	Primary	Qiaobing Xu	Qiaobing.Xu@tufts.edu
(Cross-listed as EE 250). The role of biomedical engineering in the diagnosis and treatment of various pathologies such as cardiovascular disease, cancer, diabetes, and neurological disorders. For each disease model, biomedical engineering principles are used to examine the function of the organ, mechanisms of the disease, diagnostic tools, and treatment approaches. Covered biomedical engineering areas include biomaterials, implantable devices, bioimaging techniques, gene therapy, and biosensors. Recommendations: ES 121 or equivalent, or permission of instructor.			

110221	Graduate Teaching Assistant		
Subject: CEE	Catalog Nbr: 0405		
2024 FALL	Primary	John Durant	john.durant@tufts.edu
2024 FALL	Primary	Masoud Sanayei	masoud.sanayei@tufts.edu
2024 FALL	Primary	Laurie Baise	laurie.baise@tufts.edu
2024 FALL	Primary	Charles Ramsburg	Andrew.Ramsburg@tufts.edu
2024 FALL	Primary	Babak Moaveni	Babak.Moaveni@tufts.edu
2024 FALL	Primary	Daniel Kuchma	Dan.Kuchma@tufts.edu
2024 FALL	Primary	Lauryn Spearing	Lauryn.Spearing@tufts.edu
2025 SPRG	Primary	Anne Marie Desmarais	annemarie.desmarais@tufts.edu
2025 SPRG	Primary	Wayne Chudyk	wayne.chudyk@tufts.edu
2025 SPRG	Primary	Lucy Jen	Lucy.Jen@tufts.edu
2025 SPRG	Primary	Luis Dorfmann	Luis.Dorfmann@tufts.edu
2025 SPRG	Primary	Ryan Marshall	Ryan.Marshall@tufts.edu
2025 SPRG	Primary	Robert Viesca	Robert.Viesca@tufts.edu
2025 SPRG	Primary	Helen Suh	Helen.Suh@tufts.edu
2025 SPRG	Primary	Jonathan Lamontagne	Jonathan.Lamontagne@tufts.edu
2025 SPRG	Primary	Greses Perez	Greses.Perez@tufts.edu
2025 SPRG	Primary	Farshid Vahedifard	Farshid.Vahedifard@tufts.edu
Please see departmental website for specific details.			

Course Bulletin

110242		Graduate Research Assistant			
Subject: CEE		Catalog Nbr: 0406			
2024 FALL	Primary	Anne Marie Desmarais	annemarie.desmarais@tufts.edu		
2024 FALL	Primary	David Gute	david.gute@tufts.edu		
2024 FALL	Primary	James Limbrunner	James.Limbrunner@tufts.edu		
2024 FALL	Primary	Wayne Chudyk	wayne.chudyk@tufts.edu		
2024 FALL	Primary	Christopher Swan	chris.swan@tufts.edu		
2024 FALL	Primary	Brian Brenner	brian.brenner@tufts.edu		
2024 FALL	Primary	Luis Dorfmann	Luis.Dorfmann@tufts.edu		
2024 FALL	Primary	Amy Pickering	No Email on file.		
2024 FALL	Primary	Lauryn Spearing	Lauryn.Spearing@tufts.edu		
2025 SPRG	Primary	Mark Woodin	mark.woodin@tufts.edu		
2025 SPRG	Primary	John Durant	john.durant@tufts.edu		
2025 SPRG	Primary	Masoud Sanayei	masoud.sanayei@tufts.edu		
2025 SPRG	Primary	Laurie Baise	laurie.baise@tufts.edu		
2025 SPRG	Primary	Eric Hines	Eric.Hines@tufts.edu		
2025 SPRG	Primary	Charles Ramsburg	Andrew.Ramsburg@tufts.edu		
2025 SPRG	Primary	Shafiqul Islam	Shafiqul.Islam@tufts.edu		
2025 SPRG	Primary	Babak Moaveni	Babak.Moaveni@tufts.edu		
2025 SPRG	Primary	Robert Viesca	Robert.Viesca@tufts.edu		
2025 SPRG	Primary	Daniele Lantagne	Daniele.Lantagne@tufts.edu		
2025 SPRG	Primary	Neelakshi Hudda	Neelakshi.Hudda@tufts.edu		
2025 SPRG	Primary	Daniel Kuchma	Dan.Kuchma@tufts.edu		
2025 SPRG	Primary	John Germaine	John.Germaine@tufts.edu		
2025 SPRG	Primary	Helen Suh	Helen.Suh@tufts.edu		
2025 SPRG	Primary	Deborah Sunter	Deborah.Sunter@tufts.edu		
2025 SPRG	Primary	Jonathan Lamontagne	Jonathan.Lamontagne@tufts.edu		
2025 SPRG	Primary	Greses Perez	Greses.Perez@tufts.edu		
2025 SPRG	Primary	Farshid Vahedifard	Farshid.Vahedifard@tufts.edu		
Please see departmental website for specific details.					

110292		Doctoral Degree Continuation-pt		
Subject: CEE		Catalog Nbr: 0501		
2024 FALL	Primary	Anne Marie Desmarais	annemarie.desmarais@tufts.edu	
2024 FALL	Primary	David Gute	david.gute@tufts.edu	
2024 FALL	Primary	John Durant	john.durant@tufts.edu	
2024 FALL	Primary	James Limbrunner	James.Limbrunner@tufts.edu	
2024 FALL	Primary	Wayne Chudyk	wayne.chudyk@tufts.edu	

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2024 FALL	Primary	Christopher Swan	chris.swan@tufts.edu
2024 FALL	Primary	Masoud Sanayei	masoud.sanayei@tufts.edu
2024 FALL	Primary	Brian Brenner	brian.brenner@tufts.edu
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2024 FALL	Primary	Eric Hines	Eric.Hines@tufts.edu
2024 FALL	Primary	Charles Ramsburg	Andrew.Ramsburg@tufts.edu
2024 FALL	Primary	Shafiqul Islam	Shafiqul.Islam@tufts.edu
2024 FALL	Primary	Luis Dorfmann	Luis.Dorfmann@tufts.edu
2024 FALL	Primary	Babak Moaveni	Babak.Moaveni@tufts.edu
2024 FALL	Primary	Robert Viesca	Robert.Viesca@tufts.edu
2024 FALL	Primary	Daniele Lantagne	Daniele.Lantagne@tufts.edu
2024 FALL	Primary	Daniel Kuchma	Dan.Kuchma@tufts.edu
2024 FALL	Primary	John Germaine	John.Germaine@tufts.edu
2024 FALL	Primary	Amy Pickering	No Email on file.
2024 FALL	Primary	Helen Suh	Helen.Suh@tufts.edu
2024 FALL	Primary	Deborah Sunter	Deborah.Sunter@tufts.edu
2024 FALL	Primary	Jonathan Lamontagne	Jonathan.Lamontagne@tufts.edu
2024 FALL	Primary	Greses Perez	Greses.Perez@tufts.edu
2024 FALL	Primary	Farshid Vahedifard	Farshid.Vahedifard@tufts.edu
Part-time.Please see departmental website for specific details.			

110334	Introduction To Vlsi Design			
Subject: EE	Catalog Nbr: 0103			
2023 FALL	Primary	Valencia Koomson	Valencia.Koomson@tufts.edu	
2024 FALL	Primary	Yingjie Lao	Yingjie.Lao@tufts.edu	
An introduction to CMOS VLSI design. Topics include the structure of the MOS transistor, theory of operation, fabrication methods, CMOS circuit design, subsystem design, the PLA and finite state machines, introduction to memory design, system timing techniques. Students will design a circuit of modest complexity. Recommendations: Senior standing or permission of instructor.				

110348	Doctoral Degree Continuation-ft			
Subject: CEE	Catalog Nbr: 0502			
2024 FALL	Primary	Anne Marie Desmarais	annemarie.desmarais@tufts.edu	
2024 FALL	Primary	David Gute	david.gute@tufts.edu	
2024 FALL	Primary	John Durant	john.durant@tufts.edu	
2024 FALL	Primary	James Limbrunner	James.Limbrunner@tufts.edu	
2024 FALL	Primary	Wayne Chudyk	wayne.chudyk@tufts.edu	
2024 FALL	Primary	Christopher Swan	chris.swan@tufts.edu	
2024 FALL	Primary	Masoud Sanayei	masoud.sanayei@tufts.edu	
2024 FALL	Primary	Steven Chapra	steven.chapra@tufts.edu	

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2024 FALL	Primary	Brian Brenner	brian.brenner@tufts.edu
2024 FALL	Primary	Laurie Baise	laurie.baise@tufts.edu
2024 FALL	Primary	Eric Hines	Eric.Hines@tufts.edu
2024 FALL	Primary	Charles Ramsburg	Andrew.Ramsburg@tufts.edu
2024 FALL	Primary	Shafiqul Islam	Shafiqul.Islam@tufts.edu
2024 FALL	Primary	Luis Dorfmann	Luis.Dorfmann@tufts.edu
2024 FALL	Primary	Babak Moaveni	Babak.Moaveni@tufts.edu
2024 FALL	Primary	Robert Viesca	Robert.Viesca@tufts.edu
2024 FALL	Primary	Daniele Lantagne	Daniele.Lantagne@tufts.edu
2024 FALL	Primary	Daniel Kuchma	Dan.Kuchma@tufts.edu
2024 FALL	Primary	John Germaine	John.Germaine@tufts.edu
2024 FALL	Primary	Amy Pickering	No Email on file.
2024 FALL	Primary	Helen Suh	Helen.Suh@tufts.edu
2024 FALL	Primary	Deborah Sunter	Deborah.Sunter@tufts.edu
2024 FALL	Primary	Jonathan Lamontagne	Jonathan.Lamontagne@tufts.edu
2024 FALL	Primary	Greses Perez	Greses.Perez@tufts.edu
2024 FALL	Primary	Farshid Vahedifard	Farshid.Vahedifard@tufts.edu
Full-time.Please see departmental website for specific details.			

110360	Graduate Seminar		
Subject: BME	Catalog Nbr: 0291		
2024 FALL	Primary	Lorin Polidora	Lorin.Polidora@tufts.edu
Biomedical engineering seminar series and presentation of individual reports to a seminar group for discussion.			

110369	Probabilistic Systems Analysis		
Subject: EE	Catalog Nbr: 0104		
2024 FALL	Primary	Brian Aull	Brian.Aull@tufts.edu
2024 SUMR	Primary	Khaled ElMahgoub	Khaled.ElMahgoub@tufts.edu
Advanced analysis in probabilistic systems with strong emphasis on theoretical methods. Development of analytical tools for the modeling and analysis of random phenomena with application to problems across a range of engineering and applied science disciplines. Probability theory, sample and event spaces, discrete and continuous random variables, conditional probability, expectations and conditional expectations, and derived distributions. Sums of random variables, moment generating functions, central limit theorem, laws of large numbers. Statistical analysis methods including hypothesis testing, confidence intervals and nonparametric methods. Undergraduates may not take both EE 0024 and EE 0104 for degree credit. Prerequisite: Math 0042 or equivalent. Recommendation: Senior or graduate standing or consent of instructor.			

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110409	Graduate Seminar
Subject: BME	Catalog Nbr: 0292
2025 SPRG	Primary Lorin Polidora
	Lorin.Polidora@tufts.edu
Biomedical engineering seminar series and presentation of individual reports to a seminar group for discussion.	

110437	Special Topics
Subject: BME	Catalog Nbr: 0293
2024 FALL	Primary Lorin Polidora
	Lorin.Polidora@tufts.edu
Guided individual study of an approved topic.	

110444	Feedback-control Systems
Subject: EE	Catalog Nbr: 0105
2023 FALL	Primary Usman Khan
2024 FALL	Primary Steven Bell
	Usman.Khan@tufts.edu Steven.Bell@tufts.edu
Modern control and fundamentals of state-feedback including matrix differential equations, controllability, state transformations, canonical forms, and control matrix design. Classical control and output-feedback with topics including transfer functions, s-plane analysis, stability criteria, PID controllers, root locus, controller design using op-amps, and compensation networks. Prerequisite: EE23 and Math 70; OR graduate standing	

110453	Special Topics
Subject: BME	Catalog Nbr: 0294
2024 SPRG	Primary Lorin Polidora
	Lorin.Polidora@tufts.edu
Guided individual study of an approved topic.	

110472	Master's Thesis
Subject: BME	Catalog Nbr: 0295
2024 FALL	Primary Lorin Polidora
	Lorin.Polidora@tufts.edu
Guided research on an approved topic suitable for a master's thesis.	

110493	Advanced Feedback-control Systems
Subject: EE	Catalog Nbr: 0106
A continuation of EE 105. Topics include an introduction to digital control systems, difference equations, the	

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Z-transform, implementation of the discrete filter, the W-transform, stability of sample-data systems, an introduction to state-space concepts and the control of multivariable systems. Spring.
Recommendations: EE 105.

110513	Master's Thesis			
Subject:		Catalog Nbr:		
BME		0296		
2025 SPRG		Primary	Lorin Polidora	Lorin.Polidora@tufts.edu
Guided research on an approved topic suitable for a master's thesis.				

110537	Doctoral Thesis			
Subject: BME		Catalog Nbr: 0297		
2024 FALL		Primary	Lorin Polidora	Lorin.Polidora@tufts.edu
Guided research on a topic suitable for a doctoral dissertation.				

110573	Doctoral Thesis				
Subject:		Catalog Nbr:			
BME		0298			
2025 SPRG		Primary	Lorin Polidora	Lorin.Polidora@tufts.edu	
Guided research on a topic suitable for a doctoral dissertation.					

110627	BME Original Research Proposal			
Subject: BME		Catalog Nbr: 0299		
2025 SPRG	Primary	Lorin Polidora	Lorin.Polidora@tufts.edu	
2025 SPRG	Primary	Srivalleesha Mallidi	Srivalleesha.Mallidi@tufts.edu	
Execution of an original research proposal under the guidance of a faculty adviser. Proposals must address a substantive engineering analysis or design problem. Students are required to submit a written report and make an oral presentation				
Recommendations: Enrollment is limited to and required for matriculated students in the master of engineering program.				

110652	Communications Systems			
Subject: EE		Catalog Nbr: 0107		
2024 FALL		Primary	Mai Vu	Mai.Vu@tufts.edu
Fundamentals of analog and digital communication systems. Analog and digital modulations, including				

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amplitude modulation, frequency modulation, pulse code modulation, pulse amplitude modulation, phase shift keying, and quadrature amplitude modulation techniques. Effects of noise and transmission medium on communication performance via the signal-to-noise ratio, bit error rate and inter-symbol interference. Concepts of bandwidth, data rate, channel capacity. Associated design project.

110660	Non Major Credit		
	Subject:	Catalog Nbr:	
	BME	0310	

110688	Wireless Communications		
	Subject:	Catalog Nbr:	
	EE	0108	
Wireless propagation characteristics, path loss, shadowing and fading; statistical channel models; wireless channel capacity; fading and diversity techniques, multiple antenna and MIMO techniques, multicarrier and OFDMA techniques; multiuser systems, cellular and ad hoc wireless networks. Prerequisites: EE107 or equivalent, EE104 or equivalent			

110710	Lower Level Elective Crd		
	Subject:	Catalog Nbr:	
	BME	0320	

110747	Upper Level Elective Crd		
	Subject:	Catalog Nbr:	
	BME	0330	

110815	Master's Continuation		
	Subject:	Catalog Nbr:	
	BME	0401	
	2025 SPRG	Primary	Lorin Polidora
Lorin.Polidora@tufts.edu			
Master's Continuation - Part Time			

110867	Master's Continuation		
	Subject:	Catalog Nbr:	
	BME	0402	
	2025 SPRG	Primary	Lorin Polidora
Lorin.Polidora@tufts.edu			

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Full-time.

110902	Grad Teaching Assistant			
Subject:	Catalog Nbr:			
BME	0405			
2025 SPRG	Primary	Lorin Polidora		Lorin.Polidora@tufts.edu

110929	Grad Research Assistant			
Subject:	Catalog Nbr:			
BME	0406			
2025 SPRG	Primary	Lorin Polidora		Lorin.Polidora@tufts.edu

110955	Doctoral Continuation - Part Time			
Subject:	Catalog Nbr:			
BME	0501			
2025 SPRG	Primary	Lorin Polidora		Lorin.Polidora@tufts.edu
Doctoral Continuation - Part Time				

110988	Doctoral Continuation - Full Time			
Subject:	Catalog Nbr:			
BME	0502			
2025 SPRG	Primary	Lorin Polidora		Lorin.Polidora@tufts.edu
Full-time doctoral continuation.				

111244	Semiconduct Device W/lab			
Subject:	Catalog Nbr:			
EE	0113			
2023 FALL	Primary	Dante DeMeo		Dante.DeMeo@tufts.edu
2024 FALL	Primary	Thomas Vandervelde		tvanderv@ece.tufts.edu
(Cross-listed w/ MSE 110) Introduction to semiconductor physics; quantum mechanics, equilibrium distribution; charge transport; P-N junction theory; diodes; bipolar junction transistors; field-effect devices; heterojunction devices; novel semiconductor devices such as carbon nanotubes. Recommendations: EE 21 and MATH 51 (formerly MATH 38).				

111296	Entrepreneurship And Business Planning			
Subject:	Catalog Nbr:			

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ENT	0101			
	2023 FALL	Primary	Elaine Chen	Elaine.Chen@tufts.edu
	2025 SPRG	Primary	Tina Weber	Tina.Weber@tufts.edu
	2025 SPRG	Primary	Timothy Buntel	Timothy.Buntel@tufts.edu
	2025 SPRG	Primary	Moneer Azzam	Moneer.Azzam@tufts.edu
This course focuses on investigating, understanding, and implementing the process of founding a start-up firm. Elements of searching out new venture opportunities, matching skills with a new venture, financing, competitive strategy, intellectual property, and operating a new venture will be explored. The focus of the course will be the development and presentation of a business plan created by teams of students with various academic backgrounds.				

111335	Entrepreneurial Finance			
Subject:	Catalog Nbr:			
ENT	0103			
	2025 SPRG	Primary	Frank Apeseche	Frank.Apeseche@tufts.edu
	2025 SPRG	Primary	Richard O'brien	andrew.obrien@tufts.edu
Financial statement construction and analysis for new ventures. Financial business plan development; evaluation of disparate commercial enterprises; business valuation. Utilization of modern financial tools to support investment decisions. Skills development to define and create pathways to fund and grow a business to optimize results and minimize risks.				

111371	Entrepreneurial Marketing			
Subject:	Catalog Nbr:			
ENT	0105			
	2025 SPRG	Primary	John Derby	Jack.Derby@tufts.edu
	2025 SPRG	Primary	Gavin Finn	Gavin.Finn@tufts.edu
This course focuses on institutional and product marketing methods used by start-up to medium-sized companies. After an overview of basic marketing principles, the course will cover the spectrum from day-to-day marketing activities of the entrepreneurial business to positioning and strategy. Students will learn to analyze, formulate, and implement marketing strategies, explore concepts for understanding customer behavior and creating entrepreneurial marketing strategy, and learn the fundamentals of market research, pricing, and reaching and selling to customers.				

111394	Entrepreneurial Leadership			
Subject:	Catalog Nbr:			
ENT	0107			
	2025 SPRG	Primary	Elizabeth McCarthy	Elizabeth.McCarthy@tufts.edu
This course is designed to help students develop the knowledge, confidence, skills, and self-image necessary to pursue entrepreneurial ventures in such domains as business, government, and public service. It provides a foundation in the fundamentals of entrepreneurial leadership, as well as a source of inspiration and energy in the art and science of taking visions and bringing them to reality.				

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111412	Introduction Microwaves
Subject: EE	Catalog Nbr: 0117
(Cross-listed w/ MSE 112) Transmission and reflection of guided waves. The Smith chart and matching. Scattering parameters and flow graphs. Biological effects. Laboratory measurement of power, frequency, attenuation, Q-factor, and time-domain reflectometry. Fall. Recommendations: EE 18, or 13 and permission of instructor.	

111425	Innovative Social Enterprises
Subject: ENT	Catalog Nbr: 0141
2025 SPRG	Primary Julianne Zimmerman Amir Hasson
2025 SPRG	Primary Amir Hasson
(Cross-listed as AMER 141, TCS 141, and CVS 187) Social entrepreneurs bring innovative, practical solutions to social problems. Entrepreneurs are opportunity oriented, resourceful, value-creating change agents. Social entrepreneurs are similar, but they focus on public problems. Students will consider the role of social enterprises in improving society, and learn to develop a business plan to create enduring social impact: Identify social impact model, plan needed activities and resources, conduct market research and create a marketing plan, build a team, prepare a financial model, and create a plan to attract the support the mission requires. Recommendations: Sophomore standing.	

111441	Special Topics
Subject: ENT	Catalog Nbr: 0193
2023 FALL	Primary Alexander Ocampo
2023 FALL	Primary Phillip Ellison
2023 FALL	Primary Katrin Kaeufer
2024 FALL	Primary Elaine Chen
2025 SPRG	Primary Stacy Lennon
2025 SPRG	Primary James Edgerton
2025 SPRG	Primary Joshua Wiesman
2025 SPRG	Primary Kathryn Weiler
Special Topics. Please see departmental website for specific details. Recommended: at least one core ENT class	

111448	Microwave Semiconductor Devices And Circuits
Subject: EE	Catalog Nbr: 0118
(Cross-listed with MSE 113) Varistor and varactor diodes, PIN diodes, microwave transistors, negative	

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resistance devices. Gallium arsenide properties and technology. Receiving mixers, transmitting modulators, amplifiers, oscillators, switches, limiters, duplexers, phase shifters, and harmonic generators. Laboratory characterization of devices and circuits, including noise measurements. Spring.

Recommendations: EE 117 or permission of instructor.

111461	Special Topics			
Subject:	Catalog Nbr:			
ENT	0194			
2025 SPRG	Primary	Carol Denning	Carol.Denning@tufts.edu	
2025 SPRG	Primary	Jill Parlee	Jill.Parlee@tufts.edu	
2025 SPRG	Primary	Elaine Chen	Elaine.Chen@tufts.edu	
Special Topics. Please see departmental website for specific details.				

111478	Entrepreneurial Fieldstudy			
Subject:	Catalog Nbr:			
ENT	0199			
2025 SPRG	Primary	Carol Denning	Carol.Denning@tufts.edu	
2025 SPRG	Primary	Jill Parlee	Jill.Parlee@tufts.edu	
2025 SPRG	Primary	Elaine Chen	Elaine.Chen@tufts.edu	
This course enables students to apply the learning and skills acquired by other courses on entrepreneurship. Students have the option of starting a new business based on an actual business plan or consulting in an actual start-up operation. Students who select the new business option will be expected to submit a project-scope paper that outlines the elements of the launch that could be accomplished within the term limits.				

111499	Non Major Credit	
Subject:	Catalog Nbr:	
ENT	0310	

111514	Lower Level Elective Crd	
Subject:	Catalog Nbr:	
ENT	0320	

111531	Upper Level Elective Crd	
Subject:	Catalog Nbr:	
ENT	0330	

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111575	Engineering Management			
Subject:	Catalog Nbr:			
EM	0051			
2024 FALL	Primary	John Jacobsen	John.Jacobsen@tufts.edu	
2025 SPRG	Primary	Monica Pheifer	No Email on file.	
2025 SPRG	Primary	Chimuanya Okoro	Chimuanya.Okoro@tufts.edu	
Organization of companies and engineering groups. Financial fluency, including time value of money, return on investment, income and cash flow statements, and balance sheets. Management of people and organizations. Project and program management techniques and tools. Management of research, development, and design. Operations management, including manufacturing operations and supply chains.				

111589	Technical & Managerial Communication			
Subject:	Catalog Nbr:			
EM	0052			
2025 SPRG	Primary	Amy Hirschfeld	amy.hirschfeld@tufts.edu	
Written and oral communications in the business setting. Written communications including technical reports and papers, memoranda, and electronic communications. Design and delivery of effective presentations. Informal communication styles and techniques. Communication across cultures.				

111606	Engineering Leadership			
Subject:	Catalog Nbr:			
EM	0054			
2025 SPRG	Primary	Jennifer Braggin	Jennifer.Braggin@tufts.edu	
2025 SPRG	Primary	David Medeiros	David.Medeiros@tufts.edu	
Development of knowledge, skills, and mindset essential for leading programs and teams in a business organization. Topics include understanding personalities of self and others, emotional intelligence, creating high performance teams, influencing without authority, managing conflict, fostering creativity, creating shared visions, and organizational change. Communicating to inspire. Cultural differences in leadership style. Ethical considerations.				

111626	Management Of Innovation			
Subject:	Catalog Nbr:			
EM	0153			
2025 SPRG	Primary	Eli Cushner	Eli.Cushner@tufts.edu	
Knowledge and skill development for students who aspire to lead and manage innovation initiatives in technology based companies. Technology strategy and its role in the overall business strategy of commercial firms. Role of innovation in entrepreneurial ventures and established firms. Skills to present new product development proposals to senior management and/or prospective investors.				

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111692	Computer Animation For Technical Communications		
Subject:	Catalog Nbr:		
EE	0120		
Create 2-D and 3-D animations to present and analyze complex scientific topics. Examples include NASA visualizations of atmospheric data and aerospace design mathematics of 3-D space, rotation, and displacement. Rendering algorithms including Phong, Garoud, and Ray Tracing. Hands-on experience in animation and graphic development, including manipulation of scanned images, storyboarding, video production, and CD-ROM technology. Computer-based lectures augmented with major animation and CD-ROM projects. Fall. Recommendations: COMP 11.			

111783	Physiology For Engineers I		
	Subject:	Catalog Nbr:	
	EE	0121	
(Cross-listed as BME 121). Coursework designed for students interested in advanced work in biomedical engineering. A quantitative approach to cell physiology, nerve/muscle interaction, the cardiovascular system, and the respiratory system, through the study of vital biological signals and their measurement. Anatomy and physiology of each organ system. Current engineering efforts in instrumentation and basic science to further study each system's physiology. Recommendations: BME/EE/ES 50, BIO 1 or BIO 13 or ES 11, or permission of instructor.			

111898	Quantitative Physiology II		
	Subject:	Catalog Nbr:	
	EE	0122	
(Cross-listed as EE 122). A laboratory course designed for students interested in advanced work in biomedical engineering. The course will involve labs covering nerve physiology, skeletal muscle physiology, and cardiopulmonary physiology, through the study of vital biological signals and their measurement. The course will be structured in modules, with labs in each module focused on 1) measurement and acquisition of the physiological data of interest and 2) computational modeling of acquired physiological data. Recommendations: BME/EE/ES 121 or BIO 115, BME/EE/ES 50, BIO 13 or ES 11, or Permission of instructor.			

111911	Capstone Leadership Project			
Subject: EM		Catalog Nbr: 0280		
2023 FALL		Primary	Abbott Weiss	Abbott.Weiss@tufts.edu
2023 SUMR		Primary	Samuel Liggero	Samuel.Liggero@tufts.edu
2023 SUMR		Primary	Jill Parlee	Jill.Parlee@tufts.edu
Student led 'real-life' engineering project to demonstrate business acumen and leadership skills. Project must be complex and involve risk with a 6-9 month duration, often done with the student's current employer.				

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111932	Non Major Credit			
	Subject:	Catalog Nbr:		
	EM	0310		

111951	Lower Level Elective Crd			
	Subject:	Catalog Nbr:		
	EM	0320		

111969	Upper Level Elective Crd			
	Subject:	Catalog Nbr:		
	EM	0330		

111990	Masters Continuation - Part Time			
	Subject:	Catalog Nbr:		
	EM	0401		
	2025 SPRG	Primary	Samuel Ligero	Samuel.Ligero@tufts.edu
Part-time.Please see departmental website for specific details.				

112032	Digital Signal Processing			
	Subject:	Catalog Nbr:		
	EE	0125		
	2023 FALL	Primary	Brian Tracey	brian.tracey@tufts.edu
	2024 FALL	Primary	Jordan Rosenthal	Jordan.Rosenthal@tufts.edu
(Cross-listed as ME 136) Discrete signals and systems, digital simulation of analog systems. Z transforms, recursion equations, finite-order systems. Fourier transforms, line spectra and Fourier series, discrete Fourier series and Fast Fourier Transforms (FFT). Sampling and interpolation, mean-square approximations. Nonrecursive and recursive filters. Selected topics on algorithms, design and applications of digital signal processing. Fall.				

112034	Masters Degree Continuation			
	Subject:	Catalog Nbr:		
	EM	0402		
	2025 SPRG	Primary	Samuel Ligero	Samuel.Ligero@tufts.edu
Full-time.Please see departmental website for specific details.				

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112076	Computer Engineering W/lab			
Subject:	Catalog Nbr:			
EE	0126			
2025 SPRG	Primary	Mark Hempstead	Mark.Hempstead@tufts.edu	
(Cross-listed w/ CS 146) Topics covered include computer abstractions, performance measurements, instruction set architectures, designing processor datapath and control, pipelining, memory hierarchy, I/O, multiprocessors. The associated lab consists of designing, implementing, and validating a simplified MIOS processor using Verilog, a hardware description language. Fall.				
Recommendations: EE 14.				

112117	Information Theory			
Subject:	Catalog Nbr:			
EE	0127			
2023 FALL	Primary	Shuchin Aeron	Shuchin.Aeron@tufts.edu	
(Cross-listed CS 149) as Information theory as a systematic framework to address fundamental laws and limits of data compression and digital communication. Source coding/data compression; information measures on discrete memory-less sources; practical schemes and algorithms for lossless data compression such as Huffman coding, arithmetic coding, Lempel-Ziv Coding; channel coding for reliable communication and rate distortion for lossy source compression. Advanced topics such as information theoretic cryptography. Recommendations: EE 104 or permission of instructor.				

112309	Operating Systems				
Subject:		Catalog Nbr:			
EE		0128			
2025 SPRG		Primary	David Lillethun	David.Lillethun@tufts.edu	
(Cross-listed as CS 111). Fundamental issues in operating system design. Concurrent processes: synchronization, sharing, deadlock, scheduling. Relevant hardware properties of uniprocessor and multiprocessor computer systems.					

112329	Introduction To Computing In Engineering			
Subject:	Catalog Nbr:			
ES	0002			
2025 SPRG	Primary	Ethan Danahy	ethan.danahy@tufts.edu	
2025 SPRG	Primary	Chelsea Andrews	Chelsea.Andrews@tufts.edu	
2025 SPRG	Primary	Emily Carlson	Emily.Carlson@tufts.edu	
2025 SPRG	Primary	Brian Timko	Brian.Timko@tufts.edu	
2025 SPRG	Primary	Jennifer Cross	Jennifer.Cross@tufts.edu	
2025 SPRG	Primary	Trevion Henderson	Trevion.Henderson@tufts.edu	
An introduction to engineering problem-solving with the aid of computational software. Scientific computing concepts will be introduced including number representation, arrays, structured programming techniques,				

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and good coding practices. Basic numerical and data analysis methods will be introduced including numerical differentiation and integration, matrix operations, descriptive statistics, curve fitting, and optimization. Examples drawn from a variety of engineering disciplines will give students extensive practice in coding solutions and applying them to data. Recommendation: MATH 32. Students may receive credit for either ES2 or CS10, but not both.

112452	Computer Communication Networks				
	Subject:	Catalog Nbr:			
	EE	0129			
	2025 SPRG	Primary	Chorng Chang	chorng.chang@tufts.edu	
Data communications concepts. Communications networking techniques: switching and broadcast networks, access protocols, local networks. Design issues, overview of current products. Computer communications architecture: hardware/software issues, protocols and architecture, layered approach and hierarchical approach. Prerequisite: senior or graduate electrical engineering degree candidate, or consent. Recommendations: Senior or graduate electrical engineering degree candidate, or permission of instructor.					

112629	Principles Of Medical Imaging				
Subject:	Catalog Nbr:				
EE	0131				
2025 SPRG	Primary	Sergio Fantini	sergio.fantini@tufts.edu		
(Cross-listed as BIO 131 and BME 131.) This interdisciplinary course presents the principles of medical imaging techniques such as diagnostic ultrasound, radiography, X-ray computed tomography (CT), and magnetic resonance imaging (MRI). For each imaging modality, topics include the physical principles, key aspects of instrumentation design, mathematical methods, and the anatomical/physiological information content of the images. Representative medical images will be discussed and interpreted. This course cannot be taken for basic science requirement for engineering students.					
Recommendations: MATH 32 (formerly MATH 11), PHY 2 or 12, or permission of instructor.					

112651	Digital Image Processing	
Subject:	Catalog Nbr:	
EE	0133	
Fundamentals and some practical applications of digital image processing. Topics include image formation, sampling, and quantization; distortions due to lens aberrations, image motion and detector noise; image enhancement and restoration by spatial filtering and maximum entropy; image coding for bandwidth compression by DPCM, transform coding, and entropy coding; and image understanding. Recommendations: EE 23 or permission of instructor.		

112656	Introduction To Electrical Systems W/ Lab			
Subject:	Catalog Nbr:			
ES	0003			

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Definitions of circuit elements, fundamental laws, selected network theorems, controlled sources, introduction to the oscilloscope, energy and power, natural response and complete response of first order circuits, steady state sinusoidal behavior, algebra of complex numbers, phasors, impedance, average and reactive power, introduction to analog and digital systems, frequency response and filters, measurements and instrumentation, introduction to computer applications for circuit analysis and design. Associated laboratory project work.

Recommendations: Must be preceded or accompanied by MATH 34 (formerly MATH 12).

112675	Advanced Electromagnetics			
Subject:	Catalog Nbr:			
EE	0135			
2024 FALL	Primary	Aseema Mohanty	Aseema.Mohanty@tufts.edu	
Stationary electric and magnetic fields. Differential and integral forms of Maxwell's equations. Time-harmonic fields and potential functions. Electromagnetics of circuits. Transmission line transients and coupling. Plane wave propagation. Guided wave propagation. Electromagnetic radiation. Electromagnetic properties of materials. Practical applications. Fall.				
Recommendations: EE 18 or equivalent.				

112721	Antennas For Radar, Avionics, And Communications		
Subject:	Catalog Nbr:		
EE	0136		
Definition of fields, radiation patterns, sources, linearity, and superposition. Antennae parameters: gain, effective aperture, beamwidth, sidelobes, impedance, polarization, and bandwidth. Radiation: electric dipole, multiple sources. Transmission lines and waveguides. Radiation from discontinuities, slots, and horns. Techniques of antenna measurements. Theory of antenna arrays. Spring. Recommendations: Senior or graduate standing in electrical engineering or physics.			

112747	Radar Engineering			
Subject:	Catalog Nbr:			
EE	0137			
2025 SPRG	Primary	Khaled ElMahgoub	Khaled.ElMahgoub@tufts.edu	
Physical principles and basic equations. Pulsed, continuous-wave, and pulsed-Doppler radars. Antenna systems; transmitters; detection theory. Waveform considerations, including pulse compression. Principles of synthetic aperture radar. Miscellaneous topics: propagation, clutter, and airborne radar. Fall.				
Recommendations: EE 18 or equivalent.				

112767	Introduction To Digital Logic Circuits W/ Lab			
Subject:	Catalog Nbr:			
ES	0004			
2024 FALL	Primary	Steven Bell	Steven.Bell@tufts.edu	

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An exploration of how microprocessors work. Topics include: Boolean algebra and logic gates; combinational logic; representing numbers and performing arithmetic with circuits; behavior and use of flip-flops; sequential circuits and state machines; instruction sets; and building blocks for constructing microprocessors. Associated lab exercises with FPGAs and modern design tools. Culminating design of a substantial digital system.

112912	Advanced Digital Signal Processing		
Subject: EE		Catalog Nbr: 0145	
Discrete time signals in time and frequency domains. Advanced topics in digital processing of continuous-time signals. Digital filter structures, design, implementation, finite wordlength effects. Multirate signal processing. Applications. Associated laboratory work. Recommendations: EE 125 or permission of instructor.			

112960	Analog And Mixed Signal Mos Integrated Circuit Design			
Subject: EE		Catalog Nbr: 0147		
2025 SPRG		Primary	Sameer Sonkusale	sameer@ece.tufts.edu
Practical and theoretical aspects of analog and mixed-signal MOS IC design. Basic building blocks including current sources, gain stages, and two-stage opamps. Opamp circuit feedback and noise modeling. Switched capacitor (SC) circuits from Z-transform, sample hold circuit, SC filters, and SC gain circuit. Noise and nonlinear effects in SC circuits. Component matching, layout of analog building blocks. Fundamentals of data converters.				

112982	Silicon Radio Frequency Ic Design	
Subject:	Catalog Nbr:	
EE	0148	
An overview of Silicon Germanium BICMOS semiconductor process (SiGe) and technology. Bipolar and CMOS transistor models, resistor, capacitor and inductor models, process variation of devices, corner, statistical simulation techniques for the process, voltage and temperature variation, and device matching. Voltage gain, power gain and their conversions. Class A and B amplifiers, output power compression, and inter-modulation and IP3 from two tone analyses. Noise classification of bipolar transistor, noise figure definition and analysis. S-parameters and smith-charts. Applications including low-noise, cascade, differential, and various-gain amplifiers, as well as practical bias circuits for current and voltage reference (band-gap voltage). Associated laboratories utilizing Electronic Design Automation (EDA) tools.\ Recommendations: EE 11 and 12.		

113042	Introduction To Mechanics- Statics And Dynamics			
Subject: ES		Catalog Nbr: 0005		
2023 FALL		Primary	Masoud Sanayei	masoud.sanayei@tufts.edu
2024 FALL		Primary	Daniel Kuchma	Dan.Kuchma@tufts.edu

Course Bulletin

Introduction to analysis and problem solving in statics and dynamics. Equilibrium of particles and rigid bodies in two and three dimensions. Vector and matrix analysis. Force-moment balance equations. Applications include trusses, frames, machines, beams, and friction problems. Kinematics and kinetics of particles and rigid bodies. Newton's equation, impulse-momentum, work and energy, Centroids and moments of inertia.

113161	Thermodynamics			
Subject: ES		Catalog Nbr: 0007		
2025 SPRG		Primary	Robert Viesca	Robert.Viesca@tufts.edu
A course stressing the concepts and the laws of classical thermodynamics. Thermodynamics functions, first law, second law, properties of pure substances, availability and irreversibility. Emphasis is placed on applying the thermodynamic mode of reasoning.				

113270		Fluid Mechanics			
Subject:		Catalog Nbr:			
ES		0008			
2024 FALL		Primary	Robert Viesca		Robert.Viesca@tufts.edu
An introduction to fluids at rest and in motion. Fluid properties. Pressure and velocity variations in flows. Mass, momentum, and energy conservation in a flowing fluid. Bernoulli's equation and inviscid flows. An introduction to viscous flows. Dimensional analysis. Drag and lift of moving objects. Fall.					

113357	Computer-aided Design Of Microwave Circuits	
Subject:	Catalog Nbr:	
EE	0160	
Microwave network representation, scattering matrix, constant gain circles, stability and gain concepts, microwave amplifier design. Modeling of circuit elements: coaxial lines, striplines, microstriplines, coplanar lines, coupled lines, lumped elements. Sensitivities and measurement techniques. Constant noise circles and low-noise broad-band amplifier design. Microwave circuit analysis and gradient techniques, multiband and multimode optimization of filters, phase shifters, and switches. Extensive laboratory and project work using state-of-the-art CAD software. Recommendations: EE 117		

113425	Microwave Integrated Circuits	
	Subject: EE	Catalog Nbr: 0161
(Cross-listed with MSE 114) Review of CAD techniques for microwave circuits. Substrate, conductor, dielectric, and resistive film materials for integrated circuits. Mask layout, mask layout tools, and mask fabrication. Hybrid microwave integrated circuits, monolithic integrated circuits, foundry requirements, hybrid versus monolithic circuits, performance and testing. Extensive laboratory work. Recommendations: EE 160.		

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113468	Applied Mechanics (strength Of Materials)				
Subject:		Catalog Nbr:			
ES		0009			
2025 SPRG		Primary	Luis Dorfmann	Luis.Dorfmann@tufts.edu	
Analysis of stress and strain. Behavior of isotropic materials, theories of failure. Behavior of members subjected to axial, torsional, and flexural loadings, combined stress, Mohr's circle, compression members and columns.					

113601	Introduction To Materials Science			
Subject:	Catalog Nbr:			
ES	0010			
2025 SPRG	Primary	Derek Mess	Derek.Mess@tufts.edu	
Structure of materials; chemical composition; phase transformations; properties of metals, ceramics, polymers, biopolymers, and related materials. Material selection in chemical and biological engineering applications.				
Recommendations: MATH 34 (formerly MATH 12), CHEM 1 or 16.				

113663	Fundamentals Of Biological Systems			
Subject:	Catalog Nbr:			
ES	0011			
2023 FALL	Primary	Gili Naveh	Gili.Naveh@tufts.edu	
Fundamentals of biology in the context of engineering disciplines. Chemical and physical mechanisms underlying biological functions in complex environments. Case studies of relevance in various engineering disciplines, with a focus on cellular and physiological functions. May not be counted toward the Biology major.				

113762	Electrical Engineering Seminar			
Subject:	Catalog Nbr:			
EE	0191			
2023 FALL	Primary	Marco Donato	Marco.Donato@tufts.edu	
2024 FALL	Primary	Aseema Mohanty	Aseema.Mohanty@tufts.edu	
A course devoted to the study of special problems in electrical engineering. Please see departmental website for specific details.				

113778	Electrical Engineering Seminar			
Subject:	Catalog Nbr:			
EE	0192			
2025 SPRG	Primary	Aseema Mohanty	Aseema.Mohanty@tufts.edu	
2025 SPRG	Primary	Marco Donato	Marco.Donato@tufts.edu	

Course Bulletin

A course devoted to the study of special problems in electrical engineering. Please see departmental website for specific details.

113810		Special Topics			
Subject: EE		Catalog Nbr: 0193			
2023 FALL	Primary	Ronald Lasser	Ron.Lasser@tufts.edu		
2023 FALL	Primary	Emily Carlson	Emily.Carlson@tufts.edu		
2023 FALL	Primary	Paul Simmonds	Paul.Simmonds@tufts.edu		
2024 FALL	Primary	Eric Hines	Eric.Hines@tufts.edu		
2024 FALL	Primary	Shuchin Aeron	Shuchin.Aeron@tufts.edu		
2024 FALL	Primary	Joel Grodstein	Joel.Grodstein@tufts.edu		
2025 SPRG	Primary	Sameer Sonkusale	sameer@ece.tufts.edu		
2025 SPRG	Primary	Chirag Sthalekar	Chirag.Sthalekar@tufts.edu		
2025 SPRG	Primary	Richard Preston	Richard.Preston@tufts.edu		
2025 SPRG	Primary	Khaled ElMahgoub	Khaled.ElMahgoub@tufts.edu		
2025 SPRG	Primary	Steven Bell	Steven.Bell@tufts.edu		
2025 SPRG	Primary	Yingjie Lao	Yingjie.Lao@tufts.edu		
2025 SPRG	Primary	Ugochukwu Ugwu	Ugochukwu.Ugwu@tufts.edu		
Content and prerequisites to be announced. Please see departmental website for specific details.					

113825		Directed Study			
Subject: EE		Catalog Nbr: 0194			
2023 FALL	Primary	Thomas Vandervelde	tvanderv@ece.tufts.edu		
2023 SUMR	Primary	Eric Miller	Eric.Miller@tufts.edu		
2024 SUMR	Primary	Usman Khan	Usman.Khan@tufts.edu		
2025 SPRG	Primary	Karen Panetta	Karen.Panetta@tufts.edu		
2025 SPRG	Primary	Mark Hempstead	Mark.Hempstead@tufts.edu		
2025 SPRG	Primary	Sameer Sonkusale	sameer@ece.tufts.edu		
2025 SPRG	Primary	Aseema Mohanty	Aseema.Mohanty@tufts.edu		
Guided independent study of an approved topic at an intermediate level.					

113886	Honors Thesis	
	Subject: EE	Catalog Nbr: 0197
Honors Thesis. Please see departmental website for specific details.		

113925	Internship			
Subject:		Catalog Nbr:		

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EE	0199			
	2023 FALL	Primary	Mohammed Afsar	No Email on file.
	2023 SUMR	Primary	Jeffrey Hopwood	Jeffrey.Hopwood@tufts.edu
	2023 SUMR	Primary	Brian Tracey	brian.tracey@tufts.edu
	2024 FALL	Primary	Yingjie Lao	Yingjie.Lao@tufts.edu
	2024 SUMR	Primary	Brian Aull	Brian.Aull@tufts.edu
	2025 SPRG	Primary	Karen Panetta	Karen.Panetta@tufts.edu
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	2025 SPRG	Primary	Mark Hempstead	Mark.Hempstead@tufts.edu
	2025 SPRG	Primary	Sameer Sonkusale	sameer@ece.tufts.edu
	2025 SPRG	Primary	Valencia Koomson	Valencia.Koomson@tufts.edu
	2025 SPRG	Primary	Eric Miller	Eric.Miller@tufts.edu
	2025 SPRG	Primary	Thomas Vandervelde	tvanderv@ece.tufts.edu
	2025 SPRG	Primary	Aleksandar Stankovic	alex.stankovic@tufts.edu
	2025 SPRG	Primary	Usman Khan	Usman.Khan@tufts.edu
	2025 SPRG	Primary	Shuchin Aeron	Shuchin.Aeron@tufts.edu
	2025 SPRG	Primary	Mai Vu	Mai.Vu@tufts.edu
	2025 SPRG	Primary	Joel Grodstein	Joel.Grodstein@tufts.edu
	2025 SPRG	Primary	Steven Bell	Steven.Bell@tufts.edu
	2025 SPRG	Primary	Aseema Mohanty	Aseema.Mohanty@tufts.edu
	2025 SPRG	Primary	Marco Donato	Marco.Donato@tufts.edu
	2025 SPRG	Primary	Paul Simmonds	Paul.Simmonds@tufts.edu
Supervised internships at suitable locations in industry and government. Jobs offered on basis of availability. Term paper required. Credit not given retroactively. Prior arrangements necessary. Please see departmental website for specific details.				

113948	Digital Systems Design For Testability			
	Subject:	Catalog Nbr:		
	EE	0202		
Fault modeling and simulation using VHDL. Test generation algorithms for combinational and sequential circuits. Testability techniques including ad hoc methods, scan design, and built-in self-test. Logic synthesis and testability, testability analysis and random pattern testability. Linear feedback shift registers, error-detecting codes, and self-checking codes. Requires a major design project and applications for industrial partners. Spring. Recommendations: EE 26.				

113998	Environment And Technology			
	Subject:	Catalog Nbr:		
	ES	0025		
	2024 FALL	Primary	Anne Marie Desmarais	annemarie.desmarais@tufts.edu
(Cross-listed as ENV 25.) The impact and interaction of technology and the environment will be evaluated using historical examples. Environmental problems and their solutions will be evaluated from an engineering				

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viewpoint. This course is a core requirement of the Environmental Studies program.
Recommendations: CHEM 1 or 16 and sophomore standing

114014	Advanced Topics In Computer Architecture
Subject: EE	Catalog Nbr: 0156
(Cross-listed w/ CS 140) Modern computer architecture, starting from basic 5-stage pipelines and progressing to out-of-order superscalar processors, multicore processors, and heterogeneous processors. Techniques to maximize single-thread performance within the constraints of memory technology, power consumption, and the inherent instruction-level parallelism of applications. Current and future challenges faced by computer architects and computer-system designers. Discussion of research papers. Recommendation: EE126/COMP146 or COMP40	

114097	Detection And Estimation Theory
Subject: EE	Catalog Nbr: 0229
A systematic development of optimal detection and estimation theory, including Bayesian, Maximum Likelihood (MLE), Maximum A Posteriori (MAP), and minimum mean squared error (MMSE) techniques. The Karhunen-Loeve expansion for non-white noise is studied. Applications to digital and analog communications, and radar problems are included. Nonparametric approaches, spectral estimation, and spread spectrum systems are examined. Recommendations: EE 108 or equivalent.	

114115	Advanced Analog & Mixed Signal Ic Design
Subject: EE	Catalog Nbr: 0247
Advanced topics in analog VLSI design, switched capacitor filters, continuous time filters, principles of nyquist rate analog to digital converters and digital to analog converters, oversampled delta sigma analog to digital converter design. Design and implementation of phase locked loops, frequency synthesizer and related building blocks for communication systems. Novel concepts in analog and mixed signal circuit design from current literature. Recommendations: EE 147.	

114138	Devices & Circuits For Optical Communications
Subject: EE	Catalog Nbr: 0249
Underlying principles and integrated circuit design techniques for optical communication systems (fiber-based and free-space). Optoelectronic device operation, receiver circuit fundamentals, noise analysis, transimpedance amplifiers, lasers and modulators, driver circuits, and clock/data recovery circuit blocks.	

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Opto-electronic integration methods, modulation schemes, system-level simulation, and applications to problems in broadband communication and frequency-domain optical imaging are also presented. Projects employing VLSI CAD software.

Recommendations: EE 103 or consent of instructor. Corequisite: EE 147.

114161	Biomedical Engineering			
Subject:	Catalog Nbr:			
EE	0250			
2024 FALL	Primary	Qiaobing Xu	Qiaobing.Xu@tufts.edu	
An introduction to the interdisciplinary nature of biomedical engineering. The biological, chemical, electrical, and mechanical principles involved in the design and operation of medical devices. Biopotentials, electrodes, transducers, biocompatibility of materials, and patient safety.				

114174	Public Health Engineering			
Subject:	Catalog Nbr:			
CEE	0052			
2025 SPRG	Primary	Ana Fernandes	Ana.Fernandes@tufts.edu	
(Cross-listed as ENV 27 and CH 10). An introduction to public health engineering. Elements of waterborne disease control, hazardous materials management, occupational health and safety, and environmental interventions. Applications to environmental engineering and environmental engineering science.				

114205	Plasma Engineering	
Subject:	Catalog Nbr:	
EE	0251	
Engineering applications and physics of gaseous plasmas. Plasma applications include integrated circuit fabrication; plasma displays; ion thrusters; plasma science coverage of Boltzmann equation; energy distribution functions; ion and electron transport; electromagnetic interaction with plasma; plasma sheath; collision statistics; mass and energy balance; analytical and numerical modeling. Recommendations: EE 117 or equivalent, EE 104 or equivalent.		

114449	Master's Project			
Subject: EE	Catalog Nbr: 0293			
2023 FALL	Primary	Mohammed Afsar	No Email on file.	
2024 FALL	Primary	Karen Panetta	Karen.Panetta@tufts.edu	
2024 FALL	Primary	Chorng Chang	chorng.chang@tufts.edu	
2024 FALL	Primary	Mark Hempstead	Mark.Hempstead@tufts.edu	
2024 FALL	Primary	Sameer Sonkusale	sameer@ece.tufts.edu	
2024 FALL	Primary	Valencia Koomson	Valencia.Koomson@tufts.edu	
2024 FALL	Primary	Eric Miller	Eric.Miller@tufts.edu	

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2024 FALL	Primary	Thomas Vandervelde	tvanderv@ece.tufts.edu
2024 FALL	Primary	Aleksandar Stankovic	alex.stankovic@tufts.edu
2024 FALL	Primary	Usman Khan	Usman.Khan@tufts.edu
2024 FALL	Primary	Shuchin Aeron	Shuchin.Aeron@tufts.edu
2024 FALL	Primary	Mai Vu	Mai.Vu@tufts.edu
2024 FALL	Primary	Khaled ElMahgoub	Khaled.ElMahgoub@tufts.edu
2024 FALL	Primary	Aseema Mohanty	Aseema.Mohanty@tufts.edu
2024 FALL	Primary	Marco Donato	Marco.Donato@tufts.edu
2024 FALL	Primary	Yingjie Lao	Yingjie.Lao@tufts.edu
2024 FALL	Primary	Paul Simmonds	Paul.Simmonds@tufts.edu
Guided individual study of an approved topic suitable for a master's design project. Please see departmental website for specific details.			

114505		Non Major Credit	
Subject:		Catalog Nbr:	
EN		0310	

114523	Lower Level Elective Crd	
Subject:	Catalog Nbr:	
EN	0320	

114541	Upper Level Elective Crd	
Subject:	Catalog Nbr:	
EN	0330	

114553	Master's Project		
Subject:	Catalog Nbr:		
EE	0294		
2025 SPRG	Primary	Karen Panetta	Karen.Panetta@tufts.edu
2025 SPRG	Primary	Chorng Chang	chorng.chang@tufts.edu
2025 SPRG	Primary	Mark Hempstead	Mark.Hempstead@tufts.edu
2025 SPRG	Primary	Sameer Sonkusale	sameer@ece.tufts.edu
2025 SPRG	Primary	Valencia Koomson	Valencia.Koomson@tufts.edu
2025 SPRG	Primary	Eric Miller	Eric.Miller@tufts.edu
2025 SPRG	Primary	Thomas Vandervelde	tvanderv@ece.tufts.edu
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2025 SPRG	Primary	Usman Khan	Usman.Khan@tufts.edu

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2025 SPRG	Primary	Shuchin Aeron	Shuchin.Aeron@tufts.edu
2025 SPRG	Primary	Mai Vu	Mai.Vu@tufts.edu
2025 SPRG	Primary	Khaled ElMahgoub	Khaled.ElMahgoub@tufts.edu
2025 SPRG	Primary	Steven Bell	Steven.Bell@tufts.edu
2025 SPRG	Primary	Aseema Mohanty	Aseema.Mohanty@tufts.edu
2025 SPRG	Primary	Marco Donato	Marco.Donato@tufts.edu
2025 SPRG	Primary	Paul Simmonds	Paul.Simmonds@tufts.edu
Guided individual study of an approved topic suitable for a master's design project. Please see departmental website for specific details.			

114616	Numerical Methods		
Subject: ES	Catalog Nbr: 0055		
2023 FALL	Primary	Babak Moaveni	Babak.Moaveni@tufts.edu
2025 SPRG	Primary	Luis Dorfmann	Luis.Dorfmann@tufts.edu
Introduction to using computers to solve engineering-oriented mathematical problems. Topics include mathematical modeling, round-off and truncation error, root location, linear algebraic equations, optimization, regression, interpolation, numerical differentiation and integration, ordinary and partial differential equations. Applications using software and programming languages.			

114618	Master's Thesis		
Subject: EE	Catalog Nbr: 0295		
2023 FALL	Primary	Mohammed Afsar	No Email on file.
2024 FALL	Primary	Karen Panetta	Karen.Panetta@tufts.edu
2024 FALL	Primary	Chorng Chang	chorng.chang@tufts.edu
2024 FALL	Primary	Mark Hempstead	Mark.Hempstead@tufts.edu
2024 FALL	Primary	Sameer Sonkusale	sameer@ece.tufts.edu
2024 FALL	Primary	Valencia Koomson	Valencia.Koomson@tufts.edu
2024 FALL	Primary	Eric Miller	Eric.Miller@tufts.edu
2024 FALL	Primary	Thomas Vandervelde	tvanderv@ece.tufts.edu
2024 FALL	Primary	Aleksandar Stankovic	alex.stankovic@tufts.edu
2024 FALL	Primary	Usman Khan	Usman.Khan@tufts.edu
2024 FALL	Primary	Shuchin Aeron	Shuchin.Aeron@tufts.edu
2024 FALL	Primary	Mai Vu	Mai.Vu@tufts.edu
2024 FALL	Primary	Aseema Mohanty	Aseema.Mohanty@tufts.edu
2024 FALL	Primary	Marco Donato	Marco.Donato@tufts.edu
2024 FALL	Primary	Yingjie Lao	Yingjie.Lao@tufts.edu
2024 FALL	Primary	Paul Simmonds	Paul.Simmonds@tufts.edu
Guided research on a topic that has been approved as a suitable subject for a master's thesis. Please see departmental website for specific details.			

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114655	Probability And Statistics			
Subject: ES		Catalog Nbr: 0056		
2025 SPRG		Primary	Anne Marie Desmarais	annemarie.desmarais@tufts.edu
2025 SPRG		Primary	Wayne Chudyk	wayne.chudyk@tufts.edu
Application of the concepts of probability and statistics to problem solving in engineering systems. Topics include data reduction techniques, probability, probability distribution functions, error propagation, sampling distributions, estimation, hypothesis testing, simple comparative experiments, and linear regression. Examples are drawn from a variety of disciplines, including the environment, materials, manufacturing, computing, and process design.				

114664	Master's Thesis			
Subject: EE		Catalog Nbr: 0296		
2025 SPRG		Primary	Karen Panetta	Karen.Panetta@tufts.edu
2025 SPRG		Primary	Chorng Chang	chorng.chang@tufts.edu
2025 SPRG		Primary	Mark Hempstead	Mark.Hempstead@tufts.edu
2025 SPRG		Primary	Sameer Sonkusale	sameer@ece.tufts.edu
2025 SPRG		Primary	Valencia Koomson	Valencia.Koomson@tufts.edu
2025 SPRG		Primary	Eric Miller	Eric.Miller@tufts.edu
2025 SPRG		Primary	Thomas Vandervelde	tvanderv@ece.tufts.edu
2025 SPRG		Primary	Aleksandar Stankovic	alex.stankovic@tufts.edu
2025 SPRG		Primary	Usman Khan	Usman.Khan@tufts.edu
2025 SPRG		Primary	Shuchin Aeron	Shuchin.Aeron@tufts.edu
2025 SPRG		Primary	Mai Vu	Mai.Vu@tufts.edu
2025 SPRG		Primary	Steven Bell	Steven.Bell@tufts.edu
2025 SPRG		Primary	Aseema Mohanty	Aseema.Mohanty@tufts.edu
2025 SPRG		Primary	Marco Donato	Marco.Donato@tufts.edu
2025 SPRG		Primary	Paul Simmonds	Paul.Simmonds@tufts.edu
Guided research on a topic that has been approved as a suitable subject for a master's thesis. Please see departmental website for specific details.				

114719	Doctoral Thesis			
Subject: EE		Catalog Nbr: 0297		
2023 FALL		Primary	Mohammed Afsar	No Email on file.
2024 FALL		Primary	Karen Panetta	Karen.Panetta@tufts.edu
2024 FALL		Primary	Chorng Chang	chorng.chang@tufts.edu
2024 FALL		Primary	Mark Hempstead	Mark.Hempstead@tufts.edu
2024 FALL		Primary	Sameer Sonkusale	sameer@ece.tufts.edu
2024 FALL		Primary	Valencia Koomson	Valencia.Koomson@tufts.edu
2024 FALL		Primary	Eric Miller	Eric.Miller@tufts.edu

Course Bulletin

2024 FALL	Primary	Thomas Vandervelde	tvanderv@ece.tufts.edu
2024 FALL	Primary	Aleksandar Stankovic	alex.stankovic@tufts.edu
2024 FALL	Primary	Usman Khan	Usman.Khan@tufts.edu
2024 FALL	Primary	Shuchin Aeron	Shuchin.Aeron@tufts.edu
2024 FALL	Primary	Mai Vu	Mai.Vu@tufts.edu
2024 FALL	Primary	Aseema Mohanty	Aseema.Mohanty@tufts.edu
2024 FALL	Primary	Marco Donato	Marco.Donato@tufts.edu
2024 FALL	Primary	Yingjie Lao	Yingjie.Lao@tufts.edu
2024 FALL	Primary	Paul Simmonds	Paul.Simmonds@tufts.edu
Guided research on a topic suitable for a doctoral dissertation. Please see departmental website for specific details.			

114755	Appropriate Technology In Sustainable Engineering		
Subject:	Catalog Nbr:		
ES	0060		
Selection of culturally appropriate technology and attainment of economic sustainability. Topics include community needs assessment, green manufacturing, societal issues, and sustainable implementation strategies. Emphasis on interdisciplinary approach at the intersection of community resource allocation, engineering technology, and government policy.			

114809	Doctoral Thesis		
Subject: EE	Catalog Nbr: 0298		
2025 SPRG	Primary	Karen Panetta	Karen.Panetta@tufts.edu
2025 SPRG	Primary	Chorng Chang	chorng.chang@tufts.edu
2025 SPRG	Primary	Mark Hempstead	Mark.Hempstead@tufts.edu
2025 SPRG	Primary	Sameer Sonkusale	sameer@ece.tufts.edu
2025 SPRG	Primary	Valencia Koomson	Valencia.Koomson@tufts.edu
2025 SPRG	Primary	Eric Miller	Eric.Miller@tufts.edu
2025 SPRG	Primary	Thomas Vandervelde	tvanderv@ece.tufts.edu
2025 SPRG	Primary	Aleksandar Stankovic	alex.stankovic@tufts.edu
2025 SPRG	Primary	Usman Khan	Usman.Khan@tufts.edu
2025 SPRG	Primary	Shuchin Aeron	Shuchin.Aeron@tufts.edu
2025 SPRG	Primary	Mai Vu	Mai.Vu@tufts.edu
2025 SPRG	Primary	Steven Bell	Steven.Bell@tufts.edu
2025 SPRG	Primary	Aseema Mohanty	Aseema.Mohanty@tufts.edu
2025 SPRG	Primary	Marco Donato	Marco.Donato@tufts.edu
2025 SPRG	Primary	Yingjie Lao	Yingjie.Lao@tufts.edu
2025 SPRG	Primary	Paul Simmonds	Paul.Simmonds@tufts.edu
Guided research on a topic suitable for a doctoral dissertation. Please see departmental website for specific details.			

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114828	Non Major Credit		
	Subject:	Catalog Nbr:	
	EE	0310	

114862	Lower Level Elective Crd		
	Subject:	Catalog Nbr:	
	EE	0320	

114869	Musical Instrument Design And Manufacture		
	Subject:	Catalog Nbr:	
	ES	0073	
(Cross-listed as ME 45) Review of the underlying engineering and the basic fabrication of musical instruments, including an introduction to musical acoustics, computer-based simulation tools, laboratory measurement, and manufacturing. The bulk of the class is dedicated to designing, simulating, building, and testing of an instrument.			

114874	Upper Level Elective Crd		
	Subject:	Catalog Nbr:	
	EE	0330	

114891	Masters Degree Continuation			
	Subject:	Catalog Nbr:		
	EE	0401		
	2023 FALL	Primary	Mohammed Afsar	No Email on file.
	2024 FALL	Primary	Yingjie Lao	Yingjie.Lao@tufts.edu
	2025 SPRG	Primary	Karen Panetta	Karen.Panetta@tufts.edu
	2025 SPRG	Primary	Chorng Chang	chorng.chang@tufts.edu
	2025 SPRG	Primary	Mark Hempstead	Mark.Hempstead@tufts.edu
	2025 SPRG	Primary	Sameer Sonkusale	sameer@ece.tufts.edu
	2025 SPRG	Primary	Valencia Koomson	Valencia.Koomson@tufts.edu
	2025 SPRG	Primary	Eric Miller	Eric.Miller@tufts.edu
	2025 SPRG	Primary	Thomas Vandervelde	tvanderv@ece.tufts.edu
	2025 SPRG	Primary	Aleksandar Stankovic	alex.stankovic@tufts.edu
	2025 SPRG	Primary	Usman Khan	Usman.Khan@tufts.edu
	2025 SPRG	Primary	Shuchin Aeron	Shuchin.Aeron@tufts.edu
	2025 SPRG	Primary	Mai Vu	Mai.Vu@tufts.edu
	2025 SPRG	Primary	Steven Bell	Steven.Bell@tufts.edu

Course Bulletin

2025 SPRG	Primary	Aseema Mohanty	Aseema.Mohanty@tufts.edu
2025 SPRG	Primary	Marco Donato	Marco.Donato@tufts.edu
2025 SPRG	Primary	Paul Simmonds	Paul.Simmonds@tufts.edu
Part-time.Please see departmental website for specific details.			

114927		Masters Degree Continuation		
Subject:	Catalog Nbr:			
EE	0402			
2023 FALL	Primary	Mohammed Afsar	No Email on file.	
2024 FALL	Primary	Yingjie Lao	Yingjie.Lao@tufts.edu	
2025 SPRG	Primary	Karen Panetta	Karen.Panetta@tufts.edu	
2025 SPRG	Primary	Chorng Chang	chorng.chang@tufts.edu	
2025 SPRG	Primary	Mark Hempstead	Mark.Hempstead@tufts.edu	
2025 SPRG	Primary	Sameer Sonkusale	sameer@ece.tufts.edu	
2025 SPRG	Primary	Valencia Koomson	Valencia.Koomson@tufts.edu	
2025 SPRG	Primary	Eric Miller	Eric.Miller@tufts.edu	
2025 SPRG	Primary	Thomas Vandervelde	tvanderv@ece.tufts.edu	
2025 SPRG	Primary	Aleksandar Stankovic	alex.stankovic@tufts.edu	
2025 SPRG	Primary	Usman Khan	Usman.Khan@tufts.edu	
2025 SPRG	Primary	Shuchin Aeron	Shuchin.Aeron@tufts.edu	
2025 SPRG	Primary	Mai Vu	Mai.Vu@tufts.edu	
2025 SPRG	Primary	Steven Bell	Steven.Bell@tufts.edu	
2025 SPRG	Primary	Aseema Mohanty	Aseema.Mohanty@tufts.edu	
2025 SPRG	Primary	Marco Donato	Marco.Donato@tufts.edu	
2025 SPRG	Primary	Paul Simmonds	Paul.Simmonds@tufts.edu	
Full-time.Please see departmental website for specific details.				

114966		Grad Teaching Assistant			
Subject: EE		Catalog Nbr: 0405			
2025 SPRG		Primary	Thomas Vandervelde		tvanderv@ece.tufts.edu

114981		Grad Research Assistant			
Subject:		Catalog Nbr:			
EE		0406			
2023 FALL	Primary	Mohammed Afsar	No Email on file.		
2024 FALL	Primary	Chorng Chang	chorng.chang@tufts.edu		
2025 SPRG	Primary	Karen Panetta	Karen.Panetta@tufts.edu		
2025 SPRG	Primary	Mark Hempstead	Mark.Hempstead@tufts.edu		
2025 SPRG	Primary	Sameer Sonkusale	sameer@ece.tufts.edu		
2025 SPRG	Primary	Valencia Koomson	Valencia.Koomson@tufts.edu		

Course Bulletin

2025 SPRG	Primary	Eric Miller	Eric.Miller@tufts.edu
2025 SPRG	Primary	Thomas Vandervelde	tvanderv@ece.tufts.edu
2025 SPRG	Primary	Aleksandar Stankovic	alex.stankovic@tufts.edu
2025 SPRG	Primary	Usman Khan	Usman.Khan@tufts.edu
2025 SPRG	Primary	Shuchin Aeron	Shuchin.Aeron@tufts.edu
2025 SPRG	Primary	Mai Vu	Mai.Vu@tufts.edu
2025 SPRG	Primary	Aseema Mohanty	Aseema.Mohanty@tufts.edu
2025 SPRG	Primary	Marco Donato	Marco.Donato@tufts.edu
2025 SPRG	Primary	Yingjie Lao	Yingjie.Lao@tufts.edu
2025 SPRG	Primary	Paul Simmonds	Paul.Simmonds@tufts.edu

114989	Special Topics In Engineering		
Subject: ES		Catalog Nbr: 0093	
Guided study of chosen topics in Engineering and Engineering Science. Please see the School of Engineering Website for further details. Recommendations: Permission of instructor.			

114999	Doctoral Degree Continuation		
Subject: EE		Catalog Nbr: 0501	
2023 FALL	Primary	Mohammed Afsar	No Email on file.
2025 SPRG	Primary	Karen Panetta	Karen.Panetta@tufts.edu
2025 SPRG	Primary	Chorng Chang	chorng.chang@tufts.edu
2025 SPRG	Primary	Mark Hempstead	Mark.Hempstead@tufts.edu
2025 SPRG	Primary	Sameer Sonkusale	sameer@ece.tufts.edu
2025 SPRG	Primary	Valencia Koomson	Valencia.Koomson@tufts.edu
2025 SPRG	Primary	Eric Miller	Eric.Miller@tufts.edu
2025 SPRG	Primary	Thomas Vandervelde	tvanderv@ece.tufts.edu
2025 SPRG	Primary	Aleksandar Stankovic	alex.stankovic@tufts.edu
2025 SPRG	Primary	Usman Khan	Usman.Khan@tufts.edu
2025 SPRG	Primary	Shuchin Aeron	Shuchin.Aeron@tufts.edu
2025 SPRG	Primary	Mai Vu	Mai.Vu@tufts.edu
2025 SPRG	Primary	Steven Bell	Steven.Bell@tufts.edu
2025 SPRG	Primary	Aseema Mohanty	Aseema.Mohanty@tufts.edu
2025 SPRG	Primary	Marco Donato	Marco.Donato@tufts.edu
2025 SPRG	Primary	Yingjie Lao	Yingjie.Lao@tufts.edu
2025 SPRG	Primary	Paul Simmonds	Paul.Simmonds@tufts.edu
Part-time.Please see departmental website for specific details.			

115032	Doctoral Degree Continuation		
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Course Bulletin

Subject:	Catalog Nbr:			
EE	0502			
2023 FALL	Primary	Mohammed Afsar	No Email on file.	
2025 SPRG	Primary	Karen Panetta	Karen.Panetta@tufts.edu	
2025 SPRG	Primary	Chorng Chang	chorng.chang@tufts.edu	
2025 SPRG	Primary	Mark Hempstead	Mark.Hempstead@tufts.edu	
2025 SPRG	Primary	Sameer Sonkusale	sameer@ece.tufts.edu	
2025 SPRG	Primary	Valencia Koomson	Valencia.Koomson@tufts.edu	
2025 SPRG	Primary	Eric Miller	Eric.Miller@tufts.edu	
2025 SPRG	Primary	Thomas Vandervelde	tvanderv@ece.tufts.edu	
2025 SPRG	Primary	Aleksandar Stankovic	alex.stankovic@tufts.edu	
2025 SPRG	Primary	Usman Khan	Usman.Khan@tufts.edu	
2025 SPRG	Primary	Shuchin Aeron	Shuchin.Aeron@tufts.edu	
2025 SPRG	Primary	Mai Vu	Mai.Vu@tufts.edu	
2025 SPRG	Primary	Aseema Mohanty	Aseema.Mohanty@tufts.edu	
2025 SPRG	Primary	Marco Donato	Marco.Donato@tufts.edu	
2025 SPRG	Primary	Yingjie Lao	Yingjie.Lao@tufts.edu	
2025 SPRG	Primary	Paul Simmonds	Paul.Simmonds@tufts.edu	
Full-time. Please see departmental website for specific details.				

115273	Electronic Musical Instrument Design			
Subject:	Catalog Nbr:			
ES	0095			
2024 FALL	Primary	Paul Lehrman	paul.lehrman@tufts.edu	
(Cross-listed as MUS 141). Non-standard electronic musical instruments or "controllers," incorporating sensors that respond to touch, position, movement, finger pressure, wind pressure, and other human factors, and their translation to Musical Instrument Digital Interface (MIDI) data. Designing and building original systems using common materials and object-oriented music-specific programming languages and software-based synthesis. Students will complete several creative projects using music hardware and software. Recommendations: Experience in one or more of the following--electronic music, electronic prototyping, mechanical engineering, computer programming.				

115411	Numerical Methods			
Subject:	Catalog Nbr:			
ES	0101			
2025 SPRG	Primary	Igor Sokolov	Igor.Sokolov@tufts.edu	
Numerical methods are studied and applied to the solution of problems in applied science and engineering. Interpolation, approximation, numerical linear algebra, including system solution and eigenvalue problems, solution of nonlinear equations, numerical differentiation and integration, ordinary differential equation algorithms, and finite-difference solution of partial differential equations. Applications using calculative software. Recommendations: MATH 51 (formerly MATH 38) and the ability to implement computer solutions.				

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115714	Engineering Systems: Stochastic Models
Subject: ES	Catalog Nbr: 0152
An introduction to network models in the study/design of engineering, economic, environmental, and social systems with an emphasis on systems exhibiting probabilistic behavior. Topics include network models, Markov chains, queuing theory, reliability analysis, and genetic algorithms (GAs). Practical treatment is stressed; applications and projects are chosen from several areas, including civil and environmental engineering. Recommendations: Junior Standing or consent of instructor	

115942	Engineering Psychology
Subject: ENP	Catalog Nbr: 0053
(Cross-listed as PSY 53). Survey of the applied areas of psychology that have proven useful in the design of equipment for human use and in the design of human-machine systems. Emphasis on how humans process information and how psychological science can further inform each stage of information processing.	

115987	Non Major Credit
Subject: ES	Catalog Nbr: 0310

115999	Lower Level Elective Crd
Subject: ES	Catalog Nbr: 0320

116016	Upper Level Elective Crd
Subject: ES	Catalog Nbr: 0330

116022	Introduction To Human Factors And Ergonomics
Subject: ENP	Catalog Nbr: 0061
(Cross-listed as BME 61.) A practical introduction to human performance and to designing for human use. Studies include human factors, ergonomics, work stations, and environmental and legal concerns that impact	

Course Bulletin

on design. Examples of good and bad designs illustrate course principles.

116048	Internship In Engineering Psychology			
Subject: ENP		Catalog Nbr: 0099		
	2025 SPRG	Primary	Chris Rogers	chris.rogers@tufts.edu
	2025 SPRG	Primary	Daniel Hannon	Dan.Hannon@tufts.edu
	2025 SPRG	Primary	Gary Leisk	Gary.LEISK@tufts.edu
	2025 SPRG	Primary	Jason Rife	Jason.Rife@tufts.edu
	2025 SPRG	Primary	James Intriligator	James.Intriligator@tufts.edu
	2025 SPRG	Primary	Hoda Koushyar	Hoda.Koushyar@tufts.edu
	2025 SPRG	Primary	Felix Huang	Felix.Huang@tufts.edu
	2025 SPRG	Primary	Dave Miller	Dave.Miller@tufts.edu
A mentored preprofessional experience in engineering psychology at an off-site organization. The internship must conform to all the requirements of the School of Engineering internship programs. The engineering psychology program will grant course credit for internships if the following conditions are met: 1) The student has junior or senior standing and has declared a major in engineering psychology. 2) The student has submitted a written internship proposal that has been approved prior to the semester in which the internship will be performed. No internships with course credit will be approved once the semester of the internship has started. 3) A faculty mentor in engineering psychology holds supervisory and technical control of any work that receives credit. 4) The student submits a written report that is to be evaluated by the faculty adviser and the outside institutional supervisor. Work of a proprietary nature cannot be used as a basis for the granting of course credit. Recommendations: Junior or Senior standing or permission of instructor.				

116058		Tufts Program Abroad	
Subject:		Catalog Nbr:	
ES		0340	

116068	Assistive Technology Foundations			
Subject: ENP		Catalog Nbr: 0105		
	2024 FALL	Primary	Jennifer Buxton	Jennifer.Buxton@tufts.edu
	2024 FALL	Primary	Loren McMahon	Loren.McMahon@tufts.edu
(Cross-listed as OTS 105). Examination of problems in designing and providing assistive devices to individuals with disabilities, to assist mobility, communication, positioning, and environmental control and daily living. Processes discussed include needs assessment, search for available devices, resources available, and creative problem solving. Students work with materials commonly used to create individualized devices, in cross-disciplinary teams on a design for a specific user or group. Problems of funding and delivery of devices also explored. For students in occupational therapy and engineering, and for educators, speech/language pathologists, and rehabilitation personnel.				

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116201	Seminar In Engineering Psychology		
Subject:	Catalog Nbr:		
ENP	0149		
Graduate-level seminar course designed for students who are interested in getting a broad overview of different research methods and analytical techniques in human factors/ergonomics research. Topics to be covered are related to the acquiring, recording, and analyzing of empirical data. Theory underlying these methods in human factors/ergonomics research also studied. Three term assignments. Fall.			

116409	Human Factor Product Design				
Subject:		Catalog Nbr:			
ENP		0161			
2025 SPRG		Primary	James Intriligator	James.Intriligator@tufts.edu	
Material relevant in consumer product design, biomedical engineering, architectural design, and machine design. Topics include design methodologies, user feedback techniques, performance measurements, sensory evaluation techniques, creative design, and prototyping. Extensive individual and group project design work. Emphasis on designing and creativity.					
Recommendations: ENP 53, ENP 64 and junior standing					

116464	Human-machine System Design			
Subject:	Catalog Nbr:			
ENP	0162			
2023 SUMR	Primary	James Intriligator	James.Intriligator@tufts.edu	
2024 FALL	Primary	Daniel Hannon	Dan.Hannon@tufts.edu	
Techniques for man-machine system designs in which cognitive and dynamic aspects are of major importance. Applications to computer-interface design, auto/semiautomated systems, biomedical systems, and others. Topics include information processing, decision making, reaction times, and signal detection theory. Individual and group projects, laboratory demonstrations.				
Recommendations: ENP 64 and senior standing, or graduate standing.				

116481	Analytical Methods In Human Factors Engineering				
Subject:	Catalog Nbr:				
ENP	0163				
2025 SPRG	Primary	Alexandria Carlson	Alexandria.Carlson@tufts.edu		
Quantitative and qualitative analysis methods applied in human factors engineering. Longitudinal data analysis, root cause analysis, inter-rater reliability analysis, utility analysis, usability analysis, heuristic review, and applications of machine learning to human factors.					
Recommendations: ENP 162 or graduate standing.					

Course Bulletin

116557	Computer Interface Design			
Subject: ENP		Catalog Nbr: 0166		
2024 FALL		Primary	Chaiwoo Lee	Chaiwoo.Lee@tufts.edu
2025 SPRG		Primary	Dave Miller	Dave.Miller@tufts.edu
2025 SPRG		Primary	Ken Tango	Ken.Tango@tufts.edu
(Cross-listed as BME 166.) This hands-on course challenges students to design computer-based products and systems that are easy to learn and use. Lectures cover the user interface-design process, basic design principles, and design evaluation methods. In-class exercises and projects reinforce the students' understanding of the lecture material and provide practical design experience. Students use computer-based prototyping tools to model and demonstrate their design solutions. Frequent guest lectures by user-interface design specialists from industry. Recommendations: EN 1, 2, and junior standing, or permission of instructor.				

116608	Special Topics			
Subject: ENP		Catalog Nbr: 0193		
2023 SUMR		Secondary	Katherine Darveau	Katherine.Darveau@tufts.edu
2025 SPRG		Primary	Daniel Hannon	Dan.Hannon@tufts.edu
2025 SPRG		Primary	James Intriligator	James.Intriligator@tufts.edu
Guided individual study of an approved topic. Please see departmental website for specific details.				

116649	Human Factors In Medical Systems	
Subject:	Catalog Nbr:	
ENP	0210	
Advanced topics in medical error analysis, user-centered medical technology design, product development and testing, FDA requirements, patenting, simulation, displays and controls, computerization, system implementation and maintenance, and product usability and accessibility.		
Recommendations: ENP 163		

116670	Interface Design In Complex Systems		
Subject:	Catalog Nbr:		
ENP	0215		
Computer-based interfaces, complex human-machine systems (e.g., power plant control room and emergency response dispatch centers), ecological approach, work environment analysis, information representation. Recommendations: ENP 161 or equivalent.			

116694	Special Topics			
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Course Bulletin

Subject:	Catalog Nbr:
ENP	0293
Guided individual study on an approved topic. Please see departmental website for specific details.	

116734	Thesis			
Subject:	Catalog Nbr:			
ENP	0296			
2024 FALL	Primary	Michael Wiklund	michael.wiklund@tufts.edu	
2025 SPRG	Primary	Chris Rogers	chris.rogers@tufts.edu	
2025 SPRG	Primary	Daniel Hannon	Dan.Hannon@tufts.edu	
2025 SPRG	Primary	Jason Rife	Jason.Rife@tufts.edu	
2025 SPRG	Primary	James Intriligator	James.Intriligator@tufts.edu	
2025 SPRG	Primary	Hoda Koushyar	Hoda.Koushyar@tufts.edu	
2025 SPRG	Primary	Felix Huang	Felix.Huang@tufts.edu	
2025 SPRG	Primary	Dave Miller	Dave.Miller@tufts.edu	
Guided research on a topic that has been approved as a suitable subject for a master's thesis.Please see departmental website for specific details.				

116762	Graduate Research
Subject:	Catalog Nbr:
ENP	0298
Guided research on a topic suitable for a doctoral dissertation. Please see departmental website for specific details.	

116782	Non Major Credit
Subject:	Catalog Nbr:
ENP	0310

116801	Lower Level Elective Crd
Subject:	Catalog Nbr:
ENP	0320

116819	Upper Level Elective Crd
Subject:	Catalog Nbr:
ENP	0330

Course Bulletin

121501	Applied Mathematics For Engineers			
Subject:	Catalog Nbr:			
ME	0100			
2023 FALL	Primary	Mark Kachanov		mark.kachanov@tufts.edu
Review of ordinary differential equations and oscillatory phenomena. Fourier series and applications. Orthogonal functions, Bessel functions. Partial differential equations and their applications to fluid mechanics, heat transfer, vibration and wave propagation. In no case may both ME 100 and MATH 151 be taken for credit. Recommendations: MATH 51 (formerly MATH 38) or equivalent.				

121513	Biomechanics			
Subject:	Catalog Nbr:			
ME	0123			
2023 FALL	Primary	Hoda Koushyar		Hoda.Koushyar@tufts.edu
(Cross-listed as BME 152) Mechanical properties of muscle and bone, activation of muscles, kinematics and dynamics of joints, forces and energy in movement, movement data recording and analysis. Classroom presentations and research projects. Recommendations: ME 21 or graduate standing				

121726	Wind Engineering			
Subject:	Catalog Nbr:			
ME	0179			
Structure interaction with atmospheric boundary layers. Characterization of wind data, wind variation with height, and variation with local topography. Boundary layer turbulence and connection to meteorological events. Wind forces on basic shapes, mean loading, and wind tunnel techniques. Dynamic effects including vortex oscillations, response of rigid and flexible structures and suppression. Building geometries and special cases such as masts, towers, bridges, and special structures. Wind turbine aerodynamics and wind turbine design. Recommendations: ES 8 or ME 51.				

122006	Digital Control Of Dynamic Systems			
Subject:	Catalog Nbr:			
ME	0130			
2024 FALL	Primary	Felix Huang		Felix.Huang@tufts.edu
Fundamental concepts and modern techniques for the modeling and control of dynamic systems with multiple inputs and outputs. Formal modeling methods and linear closed-loop control principles. State-space techniques for continuous and discrete time controller design.. Analysis of system properties and performance. Related mathematical methods, computational software tools, and controller hardware. Recommendations: ME 31 or graduate standing.				

Course Bulletin

122016	Advanced Dynamics			
Subject:	Catalog Nbr:			
ME	0121			
2025 SPRG	Primary	Steven Langel	Steven.Langel@tufts.edu	
Kinematics and dynamics of rigid bodies in three dimensions. Lagrange's equations for the derivation of system equations of motion. Numerical solution of nonlinear ordinary differential equations. Computer tools. Recommendations: ME 31, ME 130 or consent.				

122068	Robotics			
Subject:	Catalog Nbr:			
ME	0134			
2024 FALL	Primary	Matthew Woodward	Matthew.Woodward@tufts.edu	
Broad review of theoretical and applied aspects of robotic manipulators and mobile robots. Statics, kinematics, dynamics, actuation, sensing, sensor fusion, trajectory planning and control with hands-on applications. Pre-requisites: ME 0035 or graduate standing or permission of instructor.				

122154	Special Topics			
Subject:	Catalog Nbr:			
ME	0193			
2023 FALL	Primary	Igor Sokolov	Igor.Sokolov@tufts.edu	
2023 FALL	Primary	Joel Grodstein	Joel.Grodstein@tufts.edu	
2023 FALL	Primary	Trevion Henderson	Trevion.Henderson@tufts.edu	
2024 FALL	Primary	Bradley Duncan	Bradley.Duncan@tufts.edu	
2024 FALL	Primary	Markus Nemitz	Markus.Nemitz@tufts.edu	
2025 SPRG	Primary	Mark Kachanov	mark.kachanov@tufts.edu	
2025 SPRG	Primary	Chris Rogers	chris.rogers@tufts.edu	
2025 SPRG	Primary	Erica Kemmerling	Erica.Kemmerling@tufts.edu	
2025 SPRG	Primary	Greses Perez	Greses.Perez@tufts.edu	
Guided study of an approved topic. Please see departmental website for specific details.				

122720	Flow-real Viscous Fluids			
Subject:	Catalog Nbr:			
ME	0253			
Stress tensor in viscous fluids, incompressible boundary-layer equations, Blasius equation, Karman-Polhausen method, semiempirical and statistical theories of turbulence.				

122817	Graduate Seminar			
Subject:	Catalog Nbr:			
ME	0291			

Course Bulletin

2023 FALL	Primary	Trevion Henderson	Trevion.Henderson@tufts.edu
2024 FALL	Primary	Daniel Hannon	Dan.Hannon@tufts.edu
2024 FALL	Primary	Igor Sokolov	Igor.Sokolov@tufts.edu
2024 FALL	Primary	Jivko Sinapov	Jivko.Sinapov@tufts.edu
Presentation of individual reports on basic topics to a seminar group for discussion and criticism. Please see departmental website for specific details.			

122898	Special Topics	
Subject:	Catalog Nbr:	
ME	0293	
Guided individual study of an approved topic. Please see departmental website for specific details.		

122996	Master's Thesis		
Subject: ME	Catalog Nbr: 0296		
2024 FALL	Primary	Behrouz Abedian	behrouz.abedian@tufts.edu
2024 FALL	Primary	Jianmin Qu	Jianmin.Qu@tufts.edu
2024 FALL	Primary	Dave Miller	Dave.Miller@tufts.edu
2024 FALL	Primary	Markus Nemitz	Markus.Nemitz@tufts.edu
2025 SPRG	Primary	Michael Zimmerman	Michael.Zimmerman@tufts.edu
2025 SPRG	Primary	Michael Wiklund	michael.wiklund@tufts.edu
2025 SPRG	Primary	Mark Kachanov	mark.kachanov@tufts.edu
2025 SPRG	Primary	Anil Saigal	anil.saigal@tufts.edu
2025 SPRG	Primary	Chris Rogers	chris.rogers@tufts.edu
2025 SPRG	Primary	Daniel Hannon	Dan.Hannon@tufts.edu
2025 SPRG	Primary	Douglas Matson	Douglas.Matson@tufts.edu
2025 SPRG	Primary	Gary Leisk	Gary.LEISK@tufts.edu
2025 SPRG	Primary	Robert White	R.White@tufts.edu
2025 SPRG	Primary	Kristen Wendell	Kristen.Wendell@tufts.edu
2025 SPRG	Primary	Jason Rife	Jason.Rife@tufts.edu
2025 SPRG	Primary	Marc Hodes	Marc.Hodes@tufts.edu
2025 SPRG	Primary	Luisa Chiesa	Luisa.Chiesa@tufts.edu
2025 SPRG	Primary	Pratap Misra	Pratap.Misra@tufts.edu
2025 SPRG	Primary	Briana Bouchard	Briana.Bouchard@tufts.edu
2025 SPRG	Primary	Igor Sokolov	Igor.Sokolov@tufts.edu
2025 SPRG	Primary	Jeffrey Guasto	Jeffrey.Guasto@tufts.edu
2025 SPRG	Primary	Erica Kemmerling	Erica.Kemmerling@tufts.edu
2025 SPRG	Primary	James Intriligator	James.Intriligator@tufts.edu
2025 SPRG	Primary	Deborah Sunter	Deborah.Sunter@tufts.edu
2025 SPRG	Primary	Hoda Koushyar	Hoda.Koushyar@tufts.edu
2025 SPRG	Primary	Matthew Woodward	Matthew.Woodward@tufts.edu
2025 SPRG	Primary	Felix Huang	Felix.Huang@tufts.edu

Course Bulletin

2025 SPRG	Primary	Trevion Henderson	Trevion.Henderson@tufts.edu
Guided research on an approved topic suitable for a master's thesis. Please see departmental website for specific details.			

123035		Doctoral Thesis		
Subject: ME		Catalog Nbr: 0298		
2024 FALL	Primary	Behrouz Abedian	behrouz.abedian@tufts.edu	
2024 FALL	Primary	Gary Leisk	Gary.LEISK@tufts.edu	
2024 FALL	Primary	James Intriligator	James.Intriligator@tufts.edu	
2024 FALL	Primary	Jivko Sinapov	Jivko.Sinapov@tufts.edu	
2024 FALL	Primary	Elaine Short	Elaine.Short@tufts.edu	
2024 FALL	Primary	Greses Perez	Greses.Perez@tufts.edu	
2024 FALL	Primary	Markus Nemitz	Markus.Nemitz@tufts.edu	
2025 SPRG	Primary	Karen Panetta	Karen.Panetta@tufts.edu	
2025 SPRG	Primary	Mark Kachanov	mark.kachanov@tufts.edu	
2025 SPRG	Primary	Anil Saigal	anil.saigal@tufts.edu	
2025 SPRG	Primary	Chris Rogers	chris.rogers@tufts.edu	
2025 SPRG	Primary	Daniel Hannon	Dan.Hannon@tufts.edu	
2025 SPRG	Primary	Douglas Matson	Douglas.Matson@tufts.edu	
2025 SPRG	Primary	Robert White	R.White@tufts.edu	
2025 SPRG	Primary	Kristen Wendell	Kristen.Wendell@tufts.edu	
2025 SPRG	Primary	Jason Rife	Jason.Rife@tufts.edu	
2025 SPRG	Primary	Marc Hodes	Marc.Hodes@tufts.edu	
2025 SPRG	Primary	Luisa Chiesa	Luisa.Chiesa@tufts.edu	
2025 SPRG	Primary	Igor Sokolov	Igor.Sokolov@tufts.edu	
2025 SPRG	Primary	Jeffrey Guasto	Jeffrey.Guasto@tufts.edu	
2025 SPRG	Primary	Jianmin Qu	Jianmin.Qu@tufts.edu	
2025 SPRG	Primary	Erica Kemmerling	Erica.Kemmerling@tufts.edu	
2025 SPRG	Primary	Deborah Sunter	Deborah.Sunter@tufts.edu	
2025 SPRG	Primary	Matthew Woodward	Matthew.Woodward@tufts.edu	
2025 SPRG	Primary	Abani Patra	Abani.Patra@tufts.edu	
2025 SPRG	Primary	Trevion Henderson	Trevion.Henderson@tufts.edu	
Guided research on a topic suitable for a doctoral dissertation. Please see departmental website for specific details.				

123213	Master's Project			
Subject: ME		Catalog Nbr: 0294		
2024 FALL	Primary	Jianmin Qu	Jianmin.Qu@tufts.edu	
2024 FALL	Primary	Iryna Zenyuk	No Email on file.	
2024 FALL	Primary	Markus Nemitz	Markus.Nemitz@tufts.edu	

Course Bulletin

2025 SPRG	Primary	Michael Zimmerman	Michael.Zimmerman@tufts.edu
2025 SPRG	Primary	Karen Panetta	Karen.Panetta@tufts.edu
2025 SPRG	Primary	Michael Wiklund	michael.wiklund@tufts.edu
2025 SPRG	Primary	Mark Kachanov	mark.kachanov@tufts.edu
2025 SPRG	Primary	Anil Saigal	anil.saigal@tufts.edu
2025 SPRG	Primary	Chris Rogers	chris.rogers@tufts.edu
2025 SPRG	Primary	Daniel Hannon	Dan.Hannon@tufts.edu
2025 SPRG	Primary	Douglas Matson	Douglas.Matson@tufts.edu
2025 SPRG	Primary	Gary Leisk	Gary.LEISK@tufts.edu
2025 SPRG	Primary	Robert White	R.White@tufts.edu
2025 SPRG	Primary	Kristen Wendell	Kristen.Wendell@tufts.edu
2025 SPRG	Primary	Jason Rife	Jason.Rife@tufts.edu
2025 SPRG	Primary	Marc Hodes	Marc.Hodes@tufts.edu
2025 SPRG	Primary	Luisa Chiesa	Luisa.Chiesa@tufts.edu
2025 SPRG	Primary	Pratap Misra	Pratap.Misra@tufts.edu
2025 SPRG	Primary	Briana Bouchard	Briana.Bouchard@tufts.edu
2025 SPRG	Primary	Igor Sokolov	Igor.Sokolov@tufts.edu
2025 SPRG	Primary	Jeffrey Guasto	Jeffrey.Guasto@tufts.edu
2025 SPRG	Primary	Erica Kemmerling	Erica.Kemmerling@tufts.edu
2025 SPRG	Primary	James Intriligator	James.Intriligator@tufts.edu
2025 SPRG	Primary	Deborah Sunter	Deborah.Sunter@tufts.edu
2025 SPRG	Primary	Hoda Koushyar	Hoda.Koushyar@tufts.edu
2025 SPRG	Primary	Matthew Woodward	Matthew.Woodward@tufts.edu
2025 SPRG	Primary	Elaine Short	Elaine.Short@tufts.edu
2025 SPRG	Primary	Felix Huang	Felix.Huang@tufts.edu
2025 SPRG	Primary	Trevion Henderson	Trevion.Henderson@tufts.edu
2025 SPRG	Primary	Dave Miller	Dave.Miller@tufts.edu
Execution of a project under the guidance of a faculty advisor. Proposal must be approved by faculty advisor and graduate director. Each project must address a substantive engineering problem. Students are required to make an oral presentation of their project work. Enrollment is limited to matriculated students in the Master of Science program.			

123233	Non Major Credit
Subject: ME	Catalog Nbr: 0310

123260	Lower Level Elective Crd
Subject: ME	Catalog Nbr: 0320

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123283	Upper Level Elective Crd	
Subject:	Catalog Nbr:	
ME	0330	

123330	Tufts Abroad Program			
Subject:	Catalog Nbr:			
ME	0340			
2024 SPRG	Primary	Meredith Hyde	Meredith.Hyde@tufts.edu	
2024 SPRG	Primary	Isabela Secanechia	Isabela.Secanechia@tufts.edu	

123490	Master's Degree Continuation				
Subject: ME		Catalog Nbr: 0401			
2025 SPRG		Primary	Marc Hodes	Marc.Hodes@tufts.edu	
Part-time. Please see departmental website for specific details.					

123543	Master's Degree Continuation				
Subject: ME		Catalog Nbr: 0402			
2025 SPRG		Primary	Marc Hodes	Marc.Hodes@tufts.edu	
Full-time.Please see departmental website for specific details.					

123584	Grad Teaching Assistant			
Subject: ME		Catalog Nbr: 0405		
2025 SPRG		Primary	Marc Hodes	Marc.Hodes@tufts.edu

123607	Grad Research Assistant			
Subject:	Catalog Nbr:			
ME	0406			
2025 SPRG	Primary	Chris Rogers	chris.rogers@tufts.edu	
2025 SPRG	Primary	Marc Hodes	Marc.Hodes@tufts.edu	

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123772	Doctoral Degree Continuation			
Subject:	Catalog Nbr:			
ME	0501			
2025 SPRG	Primary	Marc Hodes		Marc.Hodes@tufts.edu
Part-time. Please see departmental website for specific details.				

123827	Doctoral Degree Continuation			
Subject:	Catalog Nbr:			
ME	0502			
2025 SPRG	Primary	Marc Hodes		Marc.Hodes@tufts.edu
Full-time. Please see departmental website for specific details.				

127097	Mechanical Design And Fabrication			
Subject:	Catalog Nbr:			
ME	0001			
Fabrication techniques focusing on manual and CNC machines. Engineering drawings. Fundamentals of machine design. Elastic and plastic deformation, theories of failure, impact, and fatigue of machine elements. The design of machines is approached through selected design problems that are integrated throughout the course. Recommendations: ES 5 (Statics and Dynamics)				

127281	Heat Transfer			
Subject:	Catalog Nbr:			
ME	0016			
A first course in thermal analysis. Steady-state and transient conduction in solids; numerical solution of conduction problems; radiative heat transfer; forced and natural convection. Introduction to boiling and condensation heat transfer. Heat exchanger analysis. A mandatory weekly lab session designated as ME 16L (no credit) must be taken concurrently. These scheduled laboratory periods involve either experiments from ME 16 or 37, demonstrations both experimental and computational, and problem-solving recitations. Recommendations: ES 7 and 8, MATH 51 (formerly MATH 38).				

127439	Instruments And Experiments			
Subject:	Catalog Nbr:			
ME	0070			
2023 FALL	Primary	Meredith Hyde		Meredith.Hyde@tufts.edu
2025 SPRG	Primary	Felix Huang		Felix.Huang@tufts.edu
Design, execution, and analysis of experiments in different fields of mechanical engineering, such as fluid mechanics, heat transfer, dynamics, and materials. Specific topics include sensors, software-based data acquisition, instrument control, data reduction, report writing, and statistical analysis.				

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127673	Materials Science and Engineering	
Subject:	Catalog Nbr:	
ME	0025	
A study of the structure-property relationships of engineering materials. It covers the internal structure of both perfect and imperfect materials and the principles and techniques by which this structure can be controlled. The relationship of mechanical properties to structure is studied, and the influence of these properties on actual production processes is covered.		

127791	Dynamics And Vibration	
Subject:	Catalog Nbr:	
ME	0037	
Kinematics and kinetics of particles and of rigid bodies in plane motion. Free and forced vibration of damped and undamped single-degree of freedom systems. Recommendations: ES 9 and MATH 51 (formerly MATH 38).		

128033	Machine Design	
Subject:	Catalog Nbr:	
ME	0042	
Design and selection of individual machine elements, including gears, bearings, springs, fasteners, brakes, motors, fluid actuators etc. Design projects that relate to these topics are assigned with emphasis placed on the application of fundamental engineering concepts as well as establishing the validity and practicality of the solution. Recommendations: ME 1 (Mechanical Design and Fabrication) and ES 9 (Strength of Materials)		

128322	Senior Design Project			
Subject:		Catalog Nbr:		
ME		0074		
2024 FALL		Primary	Jason Rife	Jason.Rife@tufts.edu
2024 FALL		Primary	Briana Bouchard	Briana.Bouchard@tufts.edu
Team-based mechanical engineering design projects under the supervision of a department faculty member. The design must be open-ended and make use of the elements of design, as well as use the student's knowledge of engineering science. Recommendations: ME 40 and senior standing				

128706	System Dynamics & Controls		
Subject:		Catalog Nbr:	
ME		0080	
Fundamental design concepts in modeling and control of dynamic electromechanical systems. Differential			

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mathematical models of continuous system physics. Behavior in the time and frequency domains. Performance tuning using feedback control, proportional-integral-derivative controllers, sensors, actuators, root locus methods, and frequency response methods. Computer tools for design and measurement. Recommendations: ME 37.

128724	Introductory Robotics And Mechatronics			
Subject:	Catalog Nbr:			
ME	0035			
2024 FALL	Primary	Chris Rogers	chris.rogers@tufts.edu	
2025 SPRG	Primary	Briana Bouchard	Briana.Bouchard@tufts.edu	
Introduction to controls, image processing, sensor development, filtering, and state machines through weekly robotic projects culminating in a final project. Basic concepts from circuit theory, artificial intelligence, microprocessor control and physical design used to solve practical problems.				

128830	Special Topics			
Subject:	Catalog Nbr:			
ME	0093			
2024 FALL	Primary	Kelsey Rogers	Kelsey.Rogers@tufts.edu	
2024 FALL	Primary	Daniel Fox	Daniel.Fox@tufts.edu	
2024 SPRG	Primary	Meredith Hyde	Meredith.Hyde@tufts.edu	
2024 SPRG	Primary	Isabela Secanechia	Isabela.Secanechia@tufts.edu	
2025 SPRG	Primary	Daniela Faas	No Email on file.	
Supervised study in some specialized field of mechanical engineering. Please see departmental website for specific details.				
Recommendations: Permission of instructor and department chair.				

128868	Undergraduate Research			
Subject:	Catalog Nbr:			
ME	0094			
2024 FALL	Primary	Jianmin Qu	Jianmin.Qu@tufts.edu	
2024 FALL	Primary	Markus Nemitz	Markus.Nemitz@tufts.edu	
2025 SPRG	Primary	Michael Zimmerman	Michael.Zimmerman@tufts.edu	
2025 SPRG	Primary	Michael Wiklund	michael.wiklund@tufts.edu	
2025 SPRG	Primary	Mark Kachanov	mark.kachanov@tufts.edu	
2025 SPRG	Primary	Anil Saigal	anil.saigal@tufts.edu	
2025 SPRG	Primary	Chris Rogers	chris.rogers@tufts.edu	
2025 SPRG	Primary	Paul Lehrman	paul.lehrman@tufts.edu	
2025 SPRG	Primary	Daniel Hannon	Dan.Hannon@tufts.edu	
2025 SPRG	Primary	Douglas Matson	Douglas.Matson@tufts.edu	
2025 SPRG	Primary	Gary Leisk	Gary.LEISK@tufts.edu	
2025 SPRG	Primary	Robert White	R.White@tufts.edu	

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2025 SPRG	Primary	Kristen Wendell	Kristen.Wendell@tufts.edu
2025 SPRG	Primary	Jason Rife	Jason.Rife@tufts.edu
2025 SPRG	Primary	Marc Hodes	Marc.Hodes@tufts.edu
2025 SPRG	Primary	Luisa Chiesa	Luisa.Chiesa@tufts.edu
2025 SPRG	Primary	Pratap Misra	Pratap.Misra@tufts.edu
2025 SPRG	Primary	Briana Bouchard	Briana.Bouchard@tufts.edu
2025 SPRG	Primary	Igor Sokolov	Igor.Sokolov@tufts.edu
2025 SPRG	Primary	Jeffrey Guasto	Jeffrey.Guasto@tufts.edu
2025 SPRG	Primary	Erica Kemmerling	Erica.Kemmerling@tufts.edu
2025 SPRG	Primary	Brandon Stafford	Brandon.Stafford@tufts.edu
2025 SPRG	Primary	James Intriligator	James.Intriligator@tufts.edu
2025 SPRG	Primary	Deborah Sunter	Deborah.Sunter@tufts.edu
2025 SPRG	Primary	Jivko Sinapov	Jivko.Sinapov@tufts.edu
2025 SPRG	Primary	Hoda Koushyar	Hoda.Koushyar@tufts.edu
2025 SPRG	Primary	Matthew Woodward	Matthew.Woodward@tufts.edu
2025 SPRG	Primary	Felix Huang	Felix.Huang@tufts.edu
2025 SPRG	Primary	Trevion Henderson	Trevion.Henderson@tufts.edu
2025 SPRG	Primary	Dave Miller	Dave.Miller@tufts.edu
Independent undergraduate research in the field of mechanical engineering. Please see departmental website for specific details. Course may not be repeated for credit.			
Recommendations: Permission of instructor and Department Chair.			

128897	Thesis		
Subject: ME	Catalog Nbr: 0096		
2024 FALL	Primary	Jianmin Qu	Jianmin.Qu@tufts.edu
2024 FALL	Primary	Markus Nemitz	Markus.Nemitz@tufts.edu
2025 SPRG	Primary	Michael Zimmerman	Michael.Zimmerman@tufts.edu
2025 SPRG	Primary	Michael Wiklund	michael.wiklund@tufts.edu
2025 SPRG	Primary	Mark Kachanov	mark.kachanov@tufts.edu
2025 SPRG	Primary	Anil Saigal	anil.saigal@tufts.edu
2025 SPRG	Primary	Chris Rogers	chris.rogers@tufts.edu
2025 SPRG	Primary	Daniel Hannon	Dan.Hannon@tufts.edu
2025 SPRG	Primary	Douglas Matson	Douglas.Matson@tufts.edu
2025 SPRG	Primary	Gary Leisk	Gary.LEISK@tufts.edu
2025 SPRG	Primary	Robert White	R.White@tufts.edu
2025 SPRG	Primary	Kristen Wendell	Kristen.Wendell@tufts.edu
2025 SPRG	Primary	Jason Rife	Jason.Rife@tufts.edu
2025 SPRG	Primary	Marc Hodes	Marc.Hodes@tufts.edu
2025 SPRG	Primary	Luisa Chiesa	Luisa.Chiesa@tufts.edu
2025 SPRG	Primary	Pratap Misra	Pratap.Misra@tufts.edu
2025 SPRG	Primary	Briana Bouchard	Briana.Bouchard@tufts.edu

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2025 SPRG	Primary	Igor Sokolov	Igor.Sokolov@tufts.edu
2025 SPRG	Primary	Jeffrey Guasto	Jeffrey.Guasto@tufts.edu
2025 SPRG	Primary	Erica Kemmerling	Erica.Kemmerling@tufts.edu
2025 SPRG	Primary	James Intriligator	James.Intriligator@tufts.edu
2025 SPRG	Primary	Deborah Sunter	Deborah.Sunter@tufts.edu
2025 SPRG	Primary	Hoda Koushyar	Hoda.Koushyar@tufts.edu
2025 SPRG	Primary	Matthew Woodward	Matthew.Woodward@tufts.edu
2025 SPRG	Primary	Felix Huang	Felix.Huang@tufts.edu
2025 SPRG	Primary	Trevion Henderson	Trevion.Henderson@tufts.edu
2025 SPRG	Primary	Dave Miller	Dave.Miller@tufts.edu
Supervised research in some specialized field of mechanical engineering. Please see departmental website for specific details.			
Recommendations: Permission of instructor and Department Chair.			

128929	Internship In Mechanical Engineering		
Subject: ME	Catalog Nbr: 0099		
2024 FALL	Primary	Jianmin Qu	Jianmin.Qu@tufts.edu
2024 FALL	Primary	Markus Nemitz	Markus.Nemitz@tufts.edu
2025 SPRG	Primary	Michael Zimmerman	Michael.Zimmerman@tufts.edu
2025 SPRG	Primary	Michael Wiklund	michael.wiklund@tufts.edu
2025 SPRG	Primary	Mark Kachanov	mark.kachanov@tufts.edu
2025 SPRG	Primary	Anil Saigal	anil.saigal@tufts.edu
2025 SPRG	Primary	Chris Rogers	chris.rogers@tufts.edu
2025 SPRG	Primary	Daniel Hannon	Dan.Hannon@tufts.edu
2025 SPRG	Primary	Douglas Matson	Douglas.Matson@tufts.edu
2025 SPRG	Primary	Gary Leisk	Gary.LEISK@tufts.edu
2025 SPRG	Primary	Robert White	R.White@tufts.edu
2025 SPRG	Primary	Kristen Wendell	Kristen.Wendell@tufts.edu
2025 SPRG	Primary	Jason Rife	Jason.Rife@tufts.edu
2025 SPRG	Primary	Marc Hodes	Marc.Hodes@tufts.edu
2025 SPRG	Primary	Luisa Chiesa	Luisa.Chiesa@tufts.edu
2025 SPRG	Primary	Pratap Misra	Pratap.Misra@tufts.edu
2025 SPRG	Primary	Briana Bouchard	Briana.Bouchard@tufts.edu
2025 SPRG	Primary	William Messner	No Email on file.
2025 SPRG	Primary	Igor Sokolov	Igor.Sokolov@tufts.edu
2025 SPRG	Primary	Jeffrey Guasto	Jeffrey.Guasto@tufts.edu
2025 SPRG	Primary	Erica Kemmerling	Erica.Kemmerling@tufts.edu
2025 SPRG	Primary	James Intriligator	James.Intriligator@tufts.edu
2025 SPRG	Primary	Deborah Sunter	Deborah.Sunter@tufts.edu
2025 SPRG	Primary	Hoda Koushyar	Hoda.Koushyar@tufts.edu
2025 SPRG	Primary	Matthew Woodward	Matthew.Woodward@tufts.edu
2025 SPRG	Primary	Felix Huang	Felix.Huang@tufts.edu

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2025 SPRG	Primary	Trevion Henderson	Trevion.Henderson@tufts.edu
A mentored preprofessional experience in mechanical engineering at an off-site organization. The internship must conform to all the requirements of the School of Engineering Internship Program. The department will grant course credit for internships if the following conditions are met: 1) The student submits a written internship proposal that is approved by the department prior to the semester in which the internship will be performed (no internships with course credit will be approved once the semester of the internship has started), 2) a faculty mentor has supervisory control of any work that receives credit, and 3) a written report is submitted that will be evaluated by the faculty adviser and the outside institutional supervisor. Recommendations: Junior or senior standing. Permission of Instructor.			

128952	Inventive Design		
Subject:	Catalog Nbr:		
ME	0140		
2023 FALL	Primary	Trevion Henderson	Trevion.Henderson@tufts.edu
2024 FALL	Primary	Gary Leisk	Gary.LEISK@tufts.edu
2024 FALL	Primary	Ryan Wexler	Ryan.Wexler@tufts.edu
The invention, design, and development of new products. The identification of product opportunities from marketing, manufacturing, and consumers' viewpoints. The organization of new product effort within a corporation. Primary assignments are design projects that are presented before a jury of professionals in the field. Recommendations: Senior Standing.			

128969	Micro-fabrication And Design		
Subject:	Catalog Nbr:		
ME	0146		
2024 FALL	Primary	Robert White	R.White@tufts.edu
(Cross-listed as MSE 178) An introduction to Micro-Electro-Mechanical Systems (MEMS). Topics include fabrication, design, and applications of MEMS devices. Introduction to computer-aided design techniques and tools. Recommendations: Senior Standing.			

129074	Statistical Quality Control		
Subject:	Catalog Nbr:		
ME	0102		
2024 FALL	Primary	Anil Saigal	anil.saigal@tufts.edu
This course deals with principle, role, management, and history of quality control in modern manufacturing and servicing organizations. Topics covered include statistical process control, probability and statistics, Pareto diagrams, statistical design of experiments, Taguchi methods, acceptance sampling, and cost of quality. Recommendations: Senior standing or permission of instructor.			

Course Bulletin

129137	Thermal Management Of Electronics			
Subject: ME		Catalog Nbr: 0158		
2025 SPRG		Primary	Marc Hodes	Marc.Hodes@tufts.edu
Design of hardware to control temperature of electronic and photonic components. Thermal management challenges from component-to-data center scales and dependence of reliability on temperature. Fundamentals of heat transfer review. Design and analysis of key technologies: thermal interface materials, heat pipes, heat sinks, thermoelectric modules. Selected emerging technologies. Energy efficient solutions. Recommendations: ME 51 or permission of instructor.				

129155	Thermal-fluid Transport I			
Subject: ME		Catalog Nbr: 0150		
2024 FALL		Primary	Marc Hodes	Marc.Hodes@tufts.edu
(Cross-listed as CHBE 111). Advanced topics in fluid mechanics. Viscous and inviscid flows. Strain rate, vorticity and streamline coordinates. Differential conservation laws for mass, momentum and energy. Dimensional analysis. Lubrication flows. Momentum and thermal laminar boundary layers. Laminar-turbulent transition. Reynolds stress and turbulence modeling. Turbulent boundary layers. Flow modeling.				
Recommendations: ES 8 or ME 51 or graduate standing.				

129219	Thermal-fluid Transport II			
Subject: ME		Catalog Nbr: 0151		
2025 SPRG		Primary	Erica Kemmerling	Erica.Kemmerling@tufts.edu
(Cross-listed as CHBE 112). Multi-dimensional conduction. Transient conduction including moving boundary problems. External forced and natural convection. Internal forced and natural convection. Developing flows and transition to turbulence. Condensation and boiling heat transfer. Radiation and conjugate heat transfer involving radiation. Temperature and heat flux measurements. Numerical techniques. Recommendations: ME 150 Thermal-Fluid Transport I or equivalent.				

129270	Advanced Thermodynamics			
Subject: ME		Catalog Nbr: 0156		
2025 SPRG		Primary	Douglas Matson	Douglas.Matson@tufts.edu
Classical thermodynamics; chemical thermodynamics and statistical thermodynamics. Applications to materials engineering and processes. Recommendations: MATH 51.				

129309	Mass Transfer And Phase Transformations In Materials Processing
Subject:	Catalog Nbr:

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ME	0157
(Cross-listed as MSE 179) The course is designed for students interested in thermal, fluid, and mass transport aspects of materials processing. Topics include heat treatment, continuum diffusion, atomistics of diffusion, oxidation, evaporation, and solidification. A wide range of practical examples and applications is drawn on, and class work and readings are supplemented by in-class presentations, guest lectures, and small projects. Recommendations: ME 51 or permission of instructor.	

129432	Advanced Experimentation
Subject: ME	Catalog Nbr: 0171
Laboratory techniques relevant to mechanical engineering experimentation with a focus on data processing. Overview of experimentation hardware, experimental design and construction, 1D signals and signal processing in the time/space and frequency domains, image processing, uncertainty analysis, and data visualization and presentation. Prerequisite: ME70, graduate standing, or consent of instructor.	

129549	Biomaterials
Subject: ME	Catalog Nbr: 0117
2023 FALL	Primary Kenneth James ken.james@tufts.edu
(Cross-listed with MSE 173) This course presents the following topics: elementary solid mechanics; aspects of material science applied to metals, polymers, ceramics, and biological tissues; tissue reactions to artificial materials; pathohistology; and inflammatory and immune responses. The course is completed by a survey of artificial materials and devices in clinical use, emphasizing vascular and orthopedic prostheses. A literature review and oral presentation covering a current device is assigned. Recommendations: ME 11 or senior standing or permission of instructor	

129642	Solid Mechanics
Subject: ME	Catalog Nbr: 0120
2025 SPRG	Primary Mark Kachanov mark.kachanov@tufts.edu
(Cross-listed as CEE 122 and MSE 174). Strain tensor, stress tensor, elastic stress analysis, isotropic and anisotropic materials, torsion problem, inelastic behavior of materials, elements of plasticity and creep. Recommendations: ES 9 or ME 20 or equivalent.	

129680	Composite Materials
Subject: ME	Catalog Nbr: 0116
2025 SPRG	Primary Michael Zimmerman Michael.Zimmerman@tufts.edu

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(Cross-listed w/ CHBE 116 & MSE 172) Fundamentals of design, manufacture, and analysis of composite materials. Fiber materials such as glass, kevlar and carbon fibers along with state-of-the-art thermoplastic and thermoset matrix materials. Rules of mixtures (ROM) to calculate transverse isotropic properties in laminae. Classical Lamination Theory (CLT) and Finite Element Analysis (FEA) to calculate stress and strains in laminates. Case studies in aerospace. Hands-on experiences, such as vacuum bagging to manufacture and test composites. Team project.

129749	Manufacturing Processes And Materials Technology			
Subject: ME		Catalog Nbr: 0110		
2024 FALL	Primary	Anil Saigal	anil.saigal@tufts.edu	
(Cross-listed w/ MSE 170) A study of traditional and nontraditional manufacturing processes related to processing of metals, ceramics, and polymers, including computer-aided manufacturing. Topics include properties and behavior of materials, selection of materials and processes subject to surface finish, tolerance, design, and economic constraints. Recommendations: ME 11.				

129829	Computer-integrated Engineering		
	Subject:	Catalog Nbr:	
	ME	0113	
This is a project-oriented course that introduces students to the concept of integrated engineering consisting of design, analysis, optimization, and manufacturing. Microcomputer-based commercial software packages will be used to design and optimize a mechanical component or an assembly. Engineering constraints such as costs, material selection, and manufacturing techniques will be discussed. The students will then use a CNC Machining Center to produce their optimized design. Recommendations: Senior standing or permission of instructor.			

129898	Theory And Applications Of Polymer Materials And Processing			
Subject: ME		Catalog Nbr: 0114		
2024 FALL	Primary	Michael Zimmerman	Michael.Zimmerman@tufts.edu	
(Cross-listed w/ CHBE 114 and MSE 171) Fundamental of polymer materials, including organic chemistry, polymerization, and molecular structure of thermoplastic and thermoset polymers. Four modes of mechanical deformation of polymers: glassy, viscoelastic, rubbery, viscous. Properties of polymers different than ceramics and metals, including behavior above and below glass transition temperature and time dependent properties (creep/stress relaxation). Polymer processing techniques, including injection molding, blow molding, thermoforming. Hands-on lab techniques to measure properties; design projects using data to inform material selection.				
Recommendation: ME 11				

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129926	Nonlinear Analysis of Materials and Structures
Subject: ME	Catalog Nbr: 0175
(Cross-listed as CEE 128.) Nonlinear solid mechanics, nonlinear constitutive models and variational principles as essential prerequisites for nonlinear finite element formulations. Recommendations: ES 9.	

129977	Finite Element Analysis
Subject: ME	Catalog Nbr: 0177
2025 SPRG	Primary Masoud Sanayei masoud.sanayei@tufts.edu
(Cross-listed as CEE 105 & MSE 161). Finite element analysis of problems important in structural engineering. Overview of direct stiffness method. Discretization of continuum to finite elements for approximate solution of complex engineering problems. Development of governing equations, stiffness and load matrices for deformation and stress analysis. Work and energy theorems. Hands-on experience with industry-standard software and practical applications in structural engineering. Recommendations: CEE 22 or ME 41 or consent of instructor	

130089	Advanced Vibrations
Subject: ME	Catalog Nbr: 0122
Extension and generalization of single- and two-degree-of-freedom systems to discrete systems with many degrees of freedom, using Lagrange's equations and matrix theory. Numerical integration methods with computer applications. Introduction to continuous systems and random vibration. Recommendations: MATH 51 or graduate standing.	

130187	Acoustics
Subject: ME	Catalog Nbr: 0126
2025 SPRG	Primary Robert White R.White@tufts.edu
Wave propagation in fluids and solid structures; sound sources and sound radiation by vibrating structures; fluid-structure interaction; sound transmission and attenuation; laboratory and field measurements; design criteria and methods. Prerequisite: MATH 51 or graduate standing.	

130256	Power Generation Systems
Subject: ME	Catalog Nbr: 0159
Design and engineering of electric power production systems. Thermal-mechanical principles of electrical energy conversion, cogeneration, and storage using fossil fuel, geothermal, hydroelectric, nuclear, ocean,	

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solar thermal, and wind power sources. Direct generation using fuel cells and photovoltaics. Economic and environmental sustainability aspects.

Recommendations: Senior standing. ME 50 and ME 51 or equivalent thermal-fluids background with permission of instructor

138656		Honors Thesis B			
Subject:		Catalog Nbr:			
CS		0197			
2025 SPRG	Primary	Robert Jacob	jacob@cs.tufts.edu		
2025 SPRG	Primary	Alva Couch	alva.couch@tufts.edu		
2025 SPRG	Primary	Soha Hassoun	soha.hassoun@tufts.edu		
2025 SPRG	Primary	Diane Souvaine	Diane.Souvaine@tufts.edu		
2025 SPRG	Primary	Ming Chow	ming.chow@tufts.edu		
2025 SPRG	Primary	Lenore Cowen	lenore.cowen@tufts.edu		
2025 SPRG	Primary	Donna Slonim	Donna.Slonim@tufts.edu		
2025 SPRG	Primary	Remco Chang	Remco.Chang@tufts.edu		
2025 SPRG	Primary	Matthias Scheutz	Matthias.Scheutz@tufts.edu		
2025 SPRG	Primary	Kathleen Fisher	Kathleen.Fisher@tufts.edu		
2025 SPRG	Primary	Noah Mendelsohn	Noah.Mendelsohn@tufts.edu		
2025 SPRG	Primary	Mark Sheldon	Mark.Sheldon@tufts.edu		
2025 SPRG	Primary	Fahad Dogar	Fahad.Dogar@tufts.edu		
2025 SPRG	Primary	Johannes De Ruiter	jp.deruiter@tufts.edu		
2025 SPRG	Primary	Megan Monroe	Megan.Monroe@tufts.edu		
2025 SPRG	Primary	Liping Liu	Liping.Liu@tufts.edu		
2025 SPRG	Primary	Jivko Sinapov	Jivko.Sinapov@tufts.edu		
2025 SPRG	Primary	Susan Landau	Susan.Landau@tufts.edu		
2025 SPRG	Primary	Karen Edwards	Karen.Edwards@tufts.edu		
2025 SPRG	Primary	Jeffrey Foster	Jeffrey.Foster@tufts.edu		
2025 SPRG	Primary	Michael Hughes	Michael.Hughes@tufts.edu		
2025 SPRG	Primary	Milod Kazerounian	Milod.Kazerounian@tufts.edu		
2025 SPRG	Primary	Elaine Short	Elaine.Short@tufts.edu		
2025 SPRG	Primary	Raja Sambasivan	Raja.Sambasivan@tufts.edu		
2025 SPRG	Primary	Martin Allen	Martin.Allen@tufts.edu		
2025 SPRG	Primary	Richard Townsend	Richard.Townsend@tufts.edu		
2025 SPRG	Primary	Abani Patra	Abani.Patra@tufts.edu		
2025 SPRG	Primary	Daniel Votipka	Daniel.Votipka@tufts.edu		
2025 SPRG	Primary	David Lillethun	David.Lillethun@tufts.edu		
2025 SPRG	Primary	Saeed Mehraban	Saeed.Mehraban@tufts.edu		
2025 SPRG	Primary	Johes Bater	Johes.Bater@tufts.edu		
Honors Thesis Computer Science.Please see departmental website for specific details.					

138675		Tufts Programs Abroad		
Subject:		Catalog Nbr:		

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EE	0340			
	2024 SPRG	Primary	Meredith Hyde	Meredith.Hyde@tufts.edu
	2024 SPRG	Primary	Isabela Secanechia	Isabela.Secanechia@tufts.edu
Tufts Programs Abroad				

138860	Honors Thesis Research B			
Subject: CHBE		Catalog Nbr: 0096		
	2024 SPRG	Primary	Christos Georgakis	Christos.Georgakis@tufts.edu
	2025 SPRG	Primary	Daniel Ryder	daniel.ryder@tufts.edu
	2025 SPRG	Primary	David Kaplan	david.kaplan@tufts.edu
	2025 SPRG	Primary	Soha Hassoun	soha.hassoun@tufts.edu
	2025 SPRG	Primary	Kyongbum Lee	Kyongbum.Lee@tufts.edu
	2025 SPRG	Primary	Hyunmin Yi	Hyunmin.Yi@tufts.edu
	2025 SPRG	Primary	Matthew Panzer	Matthew.Panzer@tufts.edu
	2025 SPRG	Primary	Qiaobing Xu	Qiaobing.Xu@tufts.edu
	2025 SPRG	Primary	Ayse Asatekin	Ayse.Asatekin@tufts.edu
	2025 SPRG	Primary	Nikhil Nair	Nikhil.Nair@tufts.edu
	2025 SPRG	Primary	Emmanouhl Tzanakakis	Emmanuel.Tzanakakis@tufts.edu
	2025 SPRG	Primary	James Van Deventer	James.Van_Deventer@tufts.edu
	2025 SPRG	Primary	Prashant Deshlahra	Prashant.Deshlahra@tufts.edu
	2025 SPRG	Primary	Nathaniel Eagan	Nathaniel.Eagan@tufts.edu
	2025 SPRG	Primary	Milo Koretsky	Milo.Koretsky@tufts.edu
Supervised research in chemical and biological engineering leading to the completion of the undergraduate honors thesis. Please see the Departmental website for specific program details and qualification requirements.				

139046	Computer Aided Design w/ Lab			
Subject: ES		Catalog Nbr: 0018		
	2025 SPRG	Primary	Ryan Marshall	Ryan.Marshall@tufts.edu
Computer Aided Design (CAD) software typically used by infrastructure professionals for drafting, modeling, and visualization. Use of Autodesk programs for 2D and 3D geometry construction, engineering drawings, Building Information Modeling (BIM), and visualization renderings and animations. Includes mandatory laboratory. Students may not receive credit for both ES18 and ES19.				

139047	Biological Systems Analysis			
Subject: BME		Catalog Nbr: 0143		
	2024 FALL	Primary	Bree Aldridge	Bree.Aldridge@tufts.edu

Course Bulletin

Mathematical and computational methods of biological systems at molecular and cell levels including regression, logic, statistics, kinetics, dynamical systems, pharmacodynamics, and agent-based modeling. Biological questions coordinated with appropriate mathematical modeling approach.
Recommendations: Junior standing, CHEM 2, BIO 13, MATH 42, or permission of instructor

139048	Biomaterials and Regenerative Medicine			
Subject: Catalog Nbr:				
BME 0153				
2024 FALL		Primary	Yu-Ting Dingle	Yu-ting.Dingle@tufts.edu
(Cross-listed as CHBE 164 and MSE 151). Fundamental concepts of biomaterials and regenerative medicine (biomaterial types, synthesis, properties, mechanisms of degradation, biological interfaces, inflammation and related issues). Specific focus on biomaterials related to regenerative medicine. Course independent of, but complementary to, BME 154. Recommendations: Junior standing, BIO13, CHEM 1, or consent of instructor				

139050	Tissue Engineering and Regenerative Medicine			
Subject: Catalog Nbr:				
BME 0154				
2025 SPRG		Primary	Qiaobing Xu	Qiaobing.Xu@tufts.edu
(Cross-listed with MSE 152) Fundamental concepts of tissue engineering and regenerative medicine (scaffolds, stem cells and bioreactors); progress with specific tissue systems; applications for tissue engineering; and current state-of-the art of tissue regeneration. Additional topics: transport phenomena and mechanical regulation of stem cell function, with focus on mechanisms of mechanotransduction. Course independent of, but complementary to, BME 153. Recommendations: Junior standing, BIO 13, CHEM 51, PHYS 11, ES 9, or consent of instructor.				

139051	Electronic Devices for Energy Applications	
	Subject:	Catalog Nbr:
	CHBE	0175
(Cross-listed with MSE 139) Design and operating principles of a variety of thin-film devices related to electrical energy generation, storage, or conversion. An overview of optical and electronic processes in a variety of materials (metals, insulators, semiconductors), thin film deposition and characterization techniques, as well as photovoltaics (solar cells), electrochemical capacitors, batteries, field-effect transistors, colloidal quantum dot devices, and light-emitting diodes (LEDs). Recent research advances in the field of novel optoelectronic devices for energy applications. Prerequisites: Chem 0002 Recommendations: junior standing.		

139053	Research			
Subject: Catalog Nbr:				

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CS	0191			
	2024 FALL	Primary	Mai Vu	Mai.Vu@tufts.edu
	2024 FALL	Primary	Elyse Cornwall	Elyse.Cornwall@tufts.edu
	2024 FALL	Primary	Christopher Magnano	Christopher.Magnano@tufts.edu
	2024 FALL	Primary	Hari Sundar	Hari.Sundar@tufts.edu
	2024 FALL	Primary	Reuth Mirsky	Reuth.Mirsky@tufts.edu
	2024 SUMR	Primary	Samuel Guyer	Samuel.Guyer@tufts.edu
	2024 SUMR	Primary	Norman Ramsey	Norman.Ramsey@tufts.edu
	2024 SUMR	Primary	Bert Huang	No Email on file.
	2025 SPRG	Primary	Ethan Danahy	ethan.danahy@tufts.edu
	2025 SPRG	Primary	Karen Panetta	Karen.Panetta@tufts.edu
	2025 SPRG	Primary	Robert Jacob	jacob@cs.tufts.edu
	2025 SPRG	Primary	Alva Couch	alva.couch@tufts.edu
	2025 SPRG	Primary	Soha Hassoun	soha.hassoun@tufts.edu
	2025 SPRG	Primary	Diane Souvaine	Diane.Souvaine@tufts.edu
	2025 SPRG	Primary	Megumi Ando	Megumi.Ando@tufts.edu
	2025 SPRG	Primary	Ming Chow	ming.chow@tufts.edu
	2025 SPRG	Primary	Lenore Cowen	lenore.cowen@tufts.edu
	2025 SPRG	Primary	Peter Love	Peter.Love@tufts.edu
	2025 SPRG	Primary	Donna Slonim	Donna.Slonim@tufts.edu
	2025 SPRG	Primary	Remco Chang	Remco.Chang@tufts.edu
	2025 SPRG	Primary	Matthias Scheutz	Matthias.Scheutz@tufts.edu
	2025 SPRG	Primary	Noah Mendelsohn	Noah.Mendelsohn@tufts.edu
	2025 SPRG	Primary	Mark Sheldon	Mark.Sheldon@tufts.edu
	2025 SPRG	Primary	Fahad Dogar	Fahad.Dogar@tufts.edu
	2025 SPRG	Primary	Johannes De Ruiter	jp.deruiter@tufts.edu
	2025 SPRG	Primary	Megan Monroe	Megan.Monroe@tufts.edu
	2025 SPRG	Primary	Deborah Sunter	Deborah.Sunter@tufts.edu
	2025 SPRG	Primary	Liping Liu	Liping.Liu@tufts.edu
	2025 SPRG	Primary	Jivko Sinapov	Jivko.Sinapov@tufts.edu
	2025 SPRG	Primary	Susan Landau	Susan.Landau@tufts.edu
	2025 SPRG	Primary	Karen Edwards	Karen.Edwards@tufts.edu
	2025 SPRG	Primary	Jeffrey Foster	Jeffrey.Foster@tufts.edu
	2025 SPRG	Primary	Michael Hughes	Michael.Hughes@tufts.edu
	2025 SPRG	Primary	Milod Kazerounian	Milod.Kazerounian@tufts.edu
	2025 SPRG	Primary	Elaine Short	Elaine.Short@tufts.edu
	2025 SPRG	Primary	Raja Sambasivan	Raja.Sambasivan@tufts.edu
	2025 SPRG	Primary	Martin Allen	Martin.Allen@tufts.edu
	2025 SPRG	Primary	Richard Townsend	Richard.Townsend@tufts.edu
	2025 SPRG	Primary	Abani Patra	Abani.Patra@tufts.edu
	2025 SPRG	Primary	Daniel Votipka	Daniel.Votipka@tufts.edu
	2025 SPRG	Primary	David Lillethun	David.Lillethun@tufts.edu
	2025 SPRG	Primary	Saeed Mehraban	Saeed.Mehraban@tufts.edu
	2025 SPRG	Primary	Johes Bater	Johes.Bater@tufts.edu
	2025 SPRG	Primary	Vladimir Podolskiy	Vladimir.Podolskii@tufts.edu

Course Bulletin

Research on a topic in Computer Science or a related discipline, culminating in a final paper describing accomplishments, with the goal of advancing the state of the art. Topic is proposed by a faculty sponsor in Computer Science.

Faculty consent required. Students sign up for a section that corresponds to a faculty member.

139054	Physics of Solar Cells			
Subject: EE		Catalog Nbr: 0114		
2025 SPRG		Primary	Paul Simmonds	Paul.Simmonds@tufts.edu
(Cross-listed w/ MSE 111) Physics of photovoltaic cells including physics of semiconductors in photovoltaic devices, physical models of solar cell operation, characteristics and design of common types of solar cells, and approaches to increasing solar cell efficiency. Recommendations: MATH 42, MATH 51, EE 18, PHYS 42/43, or instructor permission				

139055	Distributed Machine Learning and Control	
Subject:	Catalog Nbr:	
EE	0130	
(Cross-listed as CS 143) Design and analysis of distributed machine learning and stochastic optimization methods from the perspective of dynamical systems that comes from signal processing and control theory. Topics include: state-space models, state transformations, canonical forms, graph theory, fixed-point theorems, Perron Frobenius theorem, contraction maps, convex and nonconvex functions, stochastic optimization, first and second order methods, accelerated first order methods including heavy-ball and Nesterov momentum, and variance reduction techniques. Python-based programming for machine learning tasks using real datasets including deep learning problems. Pre-requisites: MATH 51, MATH 70, COMP11, and (EE24, MATH165 or ES56) or graduate standing Recommended: EE 105		

139056	Power Systems			
Subject: EE		Catalog Nbr: 0170		
2024 FALL		Primary	Per-Anders Lof	Per-Anders.Lof@tufts.edu
Analysis and design of AC transmission and distribution systems, transmission lines, transformers and generators. Understanding, modeling, operating and controlling such systems; basics of voltage control and power flows in electricity networks. Graduate students are expected to complete and present an additional class project. Recommendations: EE 22 or graduate student standing				

139057	Power Electronics			
Subject: EE		Catalog Nbr: 0171		

Course Bulletin

Analysis and design of energy conversion circuits that contain electronic switching devices. Emphasis on understanding and modeling, and providing engineering background to evaluate power converters. Also covers dynamics and control of this class of systems. Graduate students are expected to complete and present an additional class project.

Recommendations: EE 22 or graduate student standing.

139058	Optoelectronic Characterization
Subject: EE	Catalog Nbr: 0214
(Cross-listed with MSE 201) Tools and techniques used to characterize optoelectronic materials and devices. Photoluminescence, ellipsometry, scanning probe microscopy, electron microscopy, and AC/DC electrical characterization. Theoretical underpinning of and practical experience with the measurement techniques. Laboratory.	

139066	Bioinformatics
Subject: CS	Catalog Nbr: 0007
(Cross-listed with BIO 0040) Bioinformatics for students with little or no computer science background. Basic programming skills for data manipulation and analysis. Methods and applications of online tools for sequence alignment, molecular phylogeny, gene expression data analysis, and linking molecular variation to disease. Recommendations: Biology 41 or BME 62 or equivalent.	

139213	Human Factors in Medical Technology
Subject: ENP	Catalog Nbr: 0110
2024 FALL	Primary Michael Wiklund michael.wiklund@tufts.edu
Techniques for ensuring the safety and efficacy of medical technology ranging from over-the-counter devices to complex diagnostic and therapeutic workstations to clinical information systems. Global standards and regulations, usability engineering program planning, function and task analysis, user interface requirements, applied user interface design, user interface simulation, design verification, and design validation via usability testing. Pre-requisites: senior or graduate standing or permission of instructor.	

139374	Master's Degree Continuation
Subject: ENP	Catalog Nbr: 0401
2025 SPRG	Primary Marc Hodes Marc.Hodes@tufts.edu
Part-time. Please see departmental website for specific details.	

139375	Master's Degree Continuation
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Course Bulletin

Subject:	Catalog Nbr:			
ENP	0402			
2025 SPRG	Primary	Marc Hodes		Marc.Hodes@tufts.edu
Full-time. Please see departmental website for specific details.				

139447	Special Topics in Engineering Management			
Subject:	Catalog Nbr:			
EM	0293			
2024 FALL	Primary	Christopher Di Fronzo		Christopher.Di_Fronzo@tufts.edu
2025 SPRG	Primary	Samuel Liggero		Samuel.Liggero@tufts.edu
Special topics in engineering management.				

139449	Financial Management for High Technology Firms			
Subject:	Catalog Nbr:			
EM	0155			
Concepts in accounting and finance. Review and discussion of business cases. Course project to create a financial plan for a new product or service.				
Pre-requisites: Available to Juniors, Seniors & Graduate students.				

139522	Project Study In Human Systems			
Subject:	Catalog Nbr:			
ENP	0074			
2025 SPRG	Primary	Linda Borghesani		Linda.Borghesani@tufts.edu
2025 SPRG	Primary	Nicholas Katis		Nick.Katis@tufts.edu
(Cross-listed as BME 120 and PSY 120.) A senior-level project design (capstone course), led by faculty from engineering and psychology as well as outside lecturers. Students participate in team fashion in human-factors design problems set by industry sponsors. Professional-level work is required, including report preparation and presentations. Timely lectures supplement the projects.				

139523	Project Study In Human Systems			
Subject:	Catalog Nbr:			
BME	0120			
2025 SPRG	Primary	Linda Borghesani		Linda.Borghesani@tufts.edu
2025 SPRG	Primary	Nicholas Katis		Nick.Katis@tufts.edu
(Cross-listed as ENP 74 and PSY 120) A senior-level project design (capstone course), led by faculty from engineering and psychology as well as outside lecturers. Students participate in team fashion in human-factors design problems set by industry sponsors. Professional-level work is required, including report preparation and presentations. Timely lectures supplement the projects.				

Course Bulletin

140067	Microwave System Engineering
Subject: EE	Catalog Nbr: 0119
Planning and deploying microwave systems and networks. Design and construction of system components. Design and management of microwave networks. Cellular systems Best network topologies and paths for lowest possible operations and maintenance costs. System components: oscillators, attenuators, phase shifters, modulators, mixers, filters, amplifiers, and antennas, A to D and D to A converters. Transmitter and receiver characteristics, Transceiver Design, System Gain, Satellite Communications, Radio Thermal Noise, signal to noise ratio SIN, receiver sensitivity, modulation and SIN, design principles, antenna system considerations. Prerequisite: EE117 and EE107	

140069	Project Management and Software Methodologies
Subject: EM	Catalog Nbr: 0231
Development of knowledge and skills to plan and execute engineering projects. Topics include creating work break down structures, schedules, critical path determination, and risk assessment and mitigation. Methodologies also include iterative techniques (agile and scrum) often used in software development. Prerequisite: Undergraduate degree.	

140071	Conflict Resolution
Subject: EM	Catalog Nbr: 0262
2025 SPRG	Primary Stacy Lennon Stacy.Lennon@tufts.edu
Introduces conceptual frameworks, tools, and skills to effectively manage conflict and negotiate win/win solutions in the workplace. Course will involve lectures, cases, and role plays to simulate real on the job conflicts. Prerequisite: Undergraduate degree.	

140282	Lean Six Sigma
Subject: TML	Catalog Nbr: 0211
2024 SUMR	Primary Kishore Pochampally Kishore.Pochampally@tufts.edu
Provides principles and methods for process improvement by eliminating non-value added work and by reducing output variability. Tools include the define-measure-analyze-improve-control problem solving methodology, statistical process control, statistically designed experiments and risk identification and mitigation strategies. Prerequisite: Undergraduate degree	

140391	Tufts Abroad Program
Subject:	Catalog Nbr:

Course Bulletin

CEE	0340				
	2024 SPRG	Primary	Meredith Hyde	Meredith.Hyde@tufts.edu	
	2024 SPRG	Primary	Isabela Secanechia	Isabela.Secanechia@tufts.edu	

140782	Probabilistic Systems Analysis				
	Subject:	Catalog Nbr:			
	EE	0024			
	2025 SPRG	Primary	Shuchin Aeron	Shuchin.Aeron@tufts.edu	
Development of analytical tools for the modeling and analysis of random phenomena with application to problems across a range of engineering and applied science disciplines. Probability theory, sample and event spaces, discrete and continuous random variables, conditional probability, expectations and conditional expectations, and derived distributions. Sums of random variables, moment generating functions, central limit theorem, laws of large numbers. Statistical analysis methods including hypothesis testing, confidence intervals and nonparametric methods. Undergraduates may not take both EE 0024 and EE 0104 for degree credit. Prerequisite: Math 0042 or equivalent					

140783	Stochastic Processes, Detection, and Estimation				
	Subject:	Catalog Nbr:			
	EE	0140			
Random vectors including second order characterization; Detection including binary, M-ary, Neyman-Pearson methods; Estimation including Bayes least squares, maximum a posteriori, and maximum likelihood methods; Random processes including notions of stationarity, wide sense stationarity, and independent increments; Bernoulli process, Poisson process, Markov processes including Markov chains, Weiner processes; Wide sense stationary processes and linear systems including power spectral density, spectral factorization, noncausal and causal Weiner filters; Mean square stochastic calculus including Karhunen-Loeve decompositions. Prerequisite: EE-0023, EE-0024 or EE-0104, Math 72 or consent of instructor.					

140784	New Product Innovation				
	Subject:	Catalog Nbr:			
	EM	0221			
	2024 FALL	Primary	Kevin Oye	Kevin.Oye@tufts.edu	
Treatment of both business and technical aspects of new product development. Topics include voice of the customer, concept generation and evaluation, marketing, supply chain, intellectual property and usability. Course enrollment limited to graduate students in the Master of Science in Innovation and Leadership program.					

140786	Innovation and Technology Strategy				
	Subject:	Catalog Nbr:			
	EM	0253			

Course Bulletin

2025 SPRG	Primary	Kevin Oye	Kevin.Oye@tufts.edu
Knowledge and skills to lead and manage innovation initiatives in technology based companies. Topics include understanding technology strategy and its role in the overall business strategy of commercial firms, the role of innovation in entrepreneurial ventures as well as in established firms, and developing skills to present new product development proposals to senior management and/or prospective investors.			

140787	Financial Management in Technology Firms		
Subject: EM	Catalog Nbr: 0255		
2024 FALL	Primary	Frank Apeseche	Frank.Apeseche@tufts.edu
Concepts in accounting and finance. Review and discussion of business cases. Course project to create a financial plan for a new product or service. Enrollment limited to graduate students in the Master of Science in Innovation and Leadership program.			

140788	Capstone Innovation and Leadership Project		
Subject: EM	Catalog Nbr: 0281		
2024 SUMR	Primary	Kevin Oye	Kevin.Oye@tufts.edu
Engineering project that demonstrate business acumen and leadership skills. Projects taken from employer for which student interns or works full time. Enrollment limited to graduate students in the Master of Science in Innovation and Leadership program.			

140789	Applications in Engineering		
Subject: EN	Catalog Nbr: 0001		
2023 FALL	Primary	Mark Kachanov	mark.kachanov@tufts.edu
2023 FALL	Primary	Soha Hassoun	soha.hassoun@tufts.edu
2023 FALL	Primary	Steven Bell	Steven.Bell@tufts.edu
2023 FALL	Primary	Felix Huang	Felix.Huang@tufts.edu
2024 FALL	Primary	Ethan Danahy	ethan.danahy@tufts.edu
2024 FALL	Primary	Harold Miller-Jacobs	harold.miller-jacobs@tufts.edu
2024 FALL	Primary	Diane Souvaine	Diane.Souvaine@tufts.edu
2024 FALL	Primary	Kyongbum Lee	Kyongbum.Lee@tufts.edu
2024 FALL	Primary	Matthew Panzer	Matthew.Panzer@tufts.edu
2024 FALL	Primary	Chelsea Andrews	Chelsea.Andrews@tufts.edu
2024 FALL	Primary	Eli Cushner	Eli.Cushner@tufts.edu
2024 FALL	Primary	Elizabeth Kirtland	Elizabeth.Kirtland@tufts.edu
2024 FALL	Primary	Daniel Kuchma	Dan.Kuchma@tufts.edu
2024 FALL	Primary	Emily Carlson	Emily.Carlson@tufts.edu
2024 FALL	Primary	James Intriligator	James.Intriligator@tufts.edu
2024 FALL	Primary	Greses Perez	Greses.Perez@tufts.edu

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2024 FALL	Primary	Juan Gnecco	Juan.Gnecco@tufts.edu
2024 FALL	Primary	Nisha Iyer	Nisha.Iyer@tufts.edu
2024 FALL	Primary	Paul Simmonds	Paul.Simmonds@tufts.edu
2025 SPRG	Primary	Christopher Swan	chris.swan@tufts.edu
2025 SPRG	Primary	Thomas Vandervelde	tvanderv@ece.tufts.edu
Introduction of various concepts in engineering. Emphasis on project work, engineering ethics, and engineering design process. Discipline topic areas vary each term. Limited to first-year students.			

140795	Engineering and Science for Elementary School Educators I		
Subject: ENE	Catalog Nbr: 0110		
Introduction to engineering for those with limited STEM background. Topics include fundamentals of engineering in society, basics of the engineering design process, introduction to programming (sense-think-act), and the integration of a selection of simple machines with engineering.			

140797	Engineering and Science for Elementary School Educators II		
Subject: ENE	Catalog Nbr: 0111		
2023 SUMR	Primary	Merredith Portsmore	merredith.portsmore@tufts.edu
Exploring client-centered engineering design for novices. Topics will include techniques for defining design requirements and constraints, approaches to testing prototypes and interpreting results and engineering connections to science topics in circuits.			

140798	Teaching and Learning in Engineering I		
Subject: ENE	Catalog Nbr: 0130		
2025 SPRG	Primary	Merredith Portsmore	merredith.portsmore@tufts.edu
Practices for understanding of K-12 students' engineering thinking and teaching practices that support innovative K-12 engineering education curricula. Additional topics include issues of access, equity and social justice in the engineering classroom as well as instructional strategies that support students' engagement with open-ended engineering design challenges. Design an engineering lesson is required.			

140799	Teaching and Learning in Engineering II		
Subject: ENE	Catalog Nbr: 0131		
2024 FALL	Primary	Merredith Portsmore	merredith.portsmore@tufts.edu
Structures for responsive teaching as well as assessment of students' competencies in engineering. Additional topics include foundational knowledge of current policy and research in K-12 engineering education. Design of a curriculum unit is required.			

Course Bulletin

140800	Engineering and Science for Middle and High School Educators	
Subject:	Catalog Nbr:	
ENE	0150	
Understanding of the relationship between science and engineering, and techniques and knowledge that support the formative modeling of design ideas and summative testing of prototypes. Topics will include the following: techniques for analysis of design ideas (vibrations and controls), instrumentation, and computer programming		

140802	Robotics for Educators	
Subject:	Catalog Nbr:	
ENE	0152	
Fundamental robotics knowledge in the domains of mechanical and electrical engineering as well as computer science-- include understanding actuators, microprocessors and sensors, controls, and human-robotics interfaces. Uses robotics kits and a graphical programming environment.		

140803	Engineering and Science for Middle and High School Educators II				
Subject:	Catalog Nbr:				
ENE	0151				
2023 SUMR	Primary	Merredith Portsmore		merredith.portsmore@tufts.edu	
The role of product design, manufacturing and human factors elements of engineering in design process. Additional topics will include fundamental human factors techniques and theories and tools for prototyping and modeling (CAD, 3-D printing).					

141009	Information Theory				
	Subject:	Catalog Nbr:			
	CS	0149			
	2023 FALL	Primary	Shuchin Aeron	Shuchin.Aeron@tufts.edu	
(Cross-listed as EE 127). Information theory as a systematic framework to address fundamental laws and limits of data compression and digital communication. Source coding/data compression; information measures on discrete memory-less sources; practical schemes and algorithms for lossless data compression such as Huffman coding, arithmetic coding, Lempel-Ziv Coding; channel coding for reliable communication and rate distortion for lossy source compression. Advanced topics such as information theoretic cryptography. Recommendations: EE 104 or permission of instructor.					

141134	Mechanics of Materials at the Micro & Nano Scale		
Subject:	Catalog Nbr:		
ME	0125		
(Cross-listed with MSE 176) Mechanics of materials, in particular, soft materials when studied at the micro and			

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nanoscale. Classical approaches to mechanics of materials, both static and dynamic properties. Extension of classical knowledge to the micro and nanoscale, with methods to measure the material mechanics at those scales. Practical examples of biological tissues, cells, and polymers in different environments.

Recommendations: ME 21 and MATH 42, or Senior standing.

141135	Mechanics of Materials at the Micro & Nano Scale	
	Subject:	Catalog Nbr:
	ME	0225
Mechanics of materials, in particular, soft materials when studied at the micro and nanoscale. Classical approaches to mechanics of materials, both static and dynamic properties. Extension of classical knowledge to the micro and nanoscale, with methods to measure the material mechanics at those scales. Practical examples of biological tissues, cells, and polymers in different environments. Assignments identical to ME130 with additional project paper.		

141384	Music Recording and Production with Audio Electronics			
Subject: ES		Catalog Nbr: 0065		
2024 FALL		Primary	Paul Lehrman	paul.lehrman@tufts.edu
2024 FALL		Secondary	Daniel Fox	Daniel.Fox@tufts.edu
Theory and techniques for recording, editing, and producing acoustic music, and principles of audio system design. Topics include acoustics, audio perception, physics and electronics of transducers, analog and digital audio principles, stereo and multitrack recording, mixing, virtual instruments, and synchronization. Additional material in circuit design, signal flow, and analog and digital audio theory. Develop technical and listening skills to understand and evaluate the aesthetics of recorded sound, and an understanding of how circuits and components influence the sound of a recording. Students may not receive credit for both Music 140 and 142. Music 142 is required for the Recording & Production emphasis of the Music Engineering minor. Recommendations: Ability to play an instrument, musical literacy, MATH 30 or 32 or equivalent, PHY 1 and 2 or equivalent, and one of the following: ES 3, EE21, ME 93-01, EN 1-02. Permission of instructor required.				

141451	Computer Engineering W/lab			
Subject: CS		Catalog Nbr: 0146		
2025 SPRG		Primary	Mark Hempstead	Mark.Hempstead@tufts.edu
(Cross-listed w/ EE 126) Topics covered include computer abstractions, performance measurements, instruction set architectures, designing processor datapath and control, pipelining, memory hierarchy, I/O, multiprocessors. The associated lab consists of designing, implementing, and validating a simplified MIOS processor using Verilog, a hardware description language. Fall. Recommendations: EE 14.				

141475	Tufts Abroad Program			
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Subject:	Catalog Nbr:			
EN	0340			
2025 SPRG	Primary	Meredith Hyde	Meredith.Hyde@tufts.edu	
2025 SPRG	Primary	Isabela Secanechia	Isabela.Secanechia@tufts.edu	
Tufts Abroad Program				

141488	Internet-scale Distributed Systems			
Subject:	Catalog Nbr:			
CS	0117			
2024 FALL	Primary	Noah Mendelsohn	Noah.Mendelsohn@tufts.edu	
Principles and practices in designing large-scale distributed software systems on the Internet and beyond, including core principles of the design of the World-Wide Web. Key issues and fundamental principles are explored, e.g. global uniform naming, location independence, Metcalfe's law and network effects, function placement and the End-to-End principle, extensibility and evolution of distributed systems including Postel's law, leaky abstractions, etc. Comparison with more traditional distributed system designs, e.g. distributed objects, client/server, publish/subscribe, reliable queuing, and remote procedure calls.				

141489	Cloud Computing			
Subject:	Catalog Nbr:			
CS	0118			
2024 FALL	Primary	Raja Sambasivan	Raja.Sambasivan@tufts.edu	
Cloud computing fundamentals, including cloud architecture, scalability, elasticity, and metrics of cloud performance including service-level objectives (SLOs) and service-level agreements (SLAs). Cloud programming models and abstractions including Map/Reduce. Persistent storage mechanisms, including key/value stores and cold storage. Geo-distributed cloud systems. Cloud networking, including data center architecture, software defined networking, and middleboxes. Cloud security.				

141490	Visualization			
Subject:	Catalog Nbr:			
CS	0177			
Visualization as a tool for data analysis, recall, inference, and decision-making. Tools for visual description and presentation. Principles of effective visualization, including data-visual mapping, interaction techniques, color theory, cognitive and perceptual psychology, and human factors of visual depictions of data.				

141491	Optimal Control and State Estimation			
Subject:	Catalog Nbr:			
ME	0234			
State-space methods for multi-input, multi-output controller and observer design. LQR control. Bayesian estimation techniques including least-squares estimation, Kalman filters, unscented Kalman filters, and particle filters. Effects of process noise and sensor noise. Emphasis on applications through student projects.				

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Recommendations: ME130, EE105, or permission of instructor.

141564	Internship In Computer Science			
Subject: CS		Catalog Nbr: 0299		
2025 SPRG		Primary	Ming Chow	ming.chow@tufts.edu
Study of approved topics in Computer Science in concert with an internship in computing or a related field outside the University.				
Prerequisites: Permission of instructor				

141592	Engineering Education Design			
Subject:		Catalog Nbr:		
ME		0145		
2025 SPRG		Primary	Kristen Wendell	Kristen.Wendell@tufts.edu
Research-based approaches to the design of complex engineering learning experiences. Methodologies from the learning sciences. Characterization of engineering cognition, problem-solving, epistemologies, and identities. Considerations of diversity and inclusion in engineering education. Focus is on engineering education at the postsecondary level. Emphasis on applications through student projects.				

141648	Internship Computer Science			
Subject: CS		Catalog Nbr: 0099		
2025 SPRG		Primary	Ming Chow	ming.chow@tufts.edu
Study of approved topics in Computer Science in concert with an internship in computing or a related field. Prerequisites: Permission of instructor.				

141729	Bringing Products to Market			
Subject: ENT		Catalog Nbr: 0162		
2025 SPRG		Primary	Luke Fraser	Luke.Fraser@tufts.edu
User-centered approach to the creative product design process from ideation to pre-production. Identification and evaluation of a problem (opportunity), creation, development, testing (with consumers), and selection of prototyping strategies. Basic project and risk management, engineering, and analysis skills to deliver a robust working product on time and on budget. Content assumes competence in basic problem-solving skills. Prerequisite: Sophomore Standing				

141730	Societal Aspects of Design: Integration, Innovation, and Impact		
Subject:	Catalog Nbr:		
ENT	0109		

Course Bulletin

2025 SPRG	Primary	Ronald Lasser	Ron.Lasser@tufts.edu
(Cross-listed as CVS 149 and EE 159) Multi-disciplinary perspective of innovative technology-based design process for societal, community influence, and civic engagement. Elements and principles of design from product development process and societal value systems thinking, thought and emotion, ethics and responsibility. Experiments to explore bias, failure, and iteration, reflection for self-discovery and innovation. Articulation and expression via written, oral and pre-recorded audio and video presentations showing measurable impact of solutions as societal benefits.			

141815	Applied Data Science		
Subject: EM	Catalog Nbr: 0212		
2025 SPRG	Primary	Kyle Monahan	Kyle.Monahan@tufts.edu
Foundational skills for data science practice in business. Using data and systematic methods to generate business value. Shaping data practices within organizations.			

141816	MSIM Graduate Seminar		
Subject: EM	Catalog Nbr: 0292		
2024 FALL	Primary	Christopher Di Fronzo	Christopher.Di_Fronzo@tufts.edu
2025 SPRG	Primary	Jane Seminara	Jane.Seminara@tufts.edu
Contemporary innovation issues and topics via presentations, workshops, and discussion. Pre-reading, post-seminar writing, or other project assignments. See department website for specific details.			

141817	Special Topics in Innovation and Management		
Subject: EM	Catalog Nbr: 0294		
2024 FALL	Primary	Kevin Oye	Kevin.Oye@tufts.edu
2025 SPRG	Primary	Gerald Brown	Gerald.Brown@tufts.edu
2025 SPRG	Primary	Gavin Finn	Gavin.Finn@tufts.edu
Special topics course within the field of innovation and management. Please see department website for specific details on focus of the course.			

141853	Special Topics for non-majors		
Subject: CS	Catalog Nbr: 0005		
2023 FALL	Primary	Micah Saxton	Micah.Saxton@tufts.edu
Content and prerequisites to be announced. Please see department website for specific details.			

141854	Convex Optimization		
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Course Bulletin

Subject: EE	Catalog Nbr: 0109			
2025 SPRG	Primary	Mai Vu	Mai.Vu@tufts.edu	
(Crosslisted as CS 168) Convex optimization theory and algorithms. Convex sets, convex functions and convex optimization problems; duality theory and optimality conditions; algorithms for solving convex problems including descent, gradient descent, Newton and interior point methods. Examples of applications taken from communications, signal processing, machine learning and other fields. Students may receive credit for only one of the following courses: EE109, EE159, or CS168				

142322	Undergraduate research			
Subject: BME	Catalog Nbr: 0091			
2023 FALL	Primary	Irene Georgakoudi	Irene.Georgakoudi@tufts.edu	
2024 FALL	Primary	David Kaplan	david.kaplan@tufts.edu	
2024 FALL	Primary	Sergio Fantini	sergio.fantini@tufts.edu	
2024 FALL	Primary	Lorin Polidora	Lorin.Polidora@tufts.edu	
2024 FALL	Primary	Lauren Black III	Lauren.Black@tufts.edu	
2024 FALL	Primary	Qiaobing Xu	Qiaobing.Xu@tufts.edu	
2024 FALL	Primary	Brian Timko	Brian.Timko@tufts.edu	
2024 FALL	Primary	Madeleine Oudin	Madeleine.Oudin@tufts.edu	
2024 FALL	Primary	Srivalleesha Mallidi	Srivalleesha.Mallidi@tufts.edu	
2024 FALL	Primary	Juan Gnecco	Juan.Gnecco@tufts.edu	
2024 FALL	Primary	Nisha Iyer	Nisha.Iyer@tufts.edu	
2024 FALL	Primary	Shelly Peyton	Shelly.Peyton@tufts.edu	
2025 SPRG	Primary	Fiorenzo Omenetto	Fiorenzo.Omenetto@tufts.edu	
Independent undergraduate research in the field of biomedical engineering. Term paper required. Credit not given retroactively. Prior arrangements necessary. Prerequisite: Permission of instructor.				

142323	Undergraduate research			
Subject: BME	Catalog Nbr: 0092			
2025 SPRG	Primary	David Kaplan	david.kaplan@tufts.edu	
2025 SPRG	Primary	Sergio Fantini	sergio.fantini@tufts.edu	
2025 SPRG	Primary	Irene Georgakoudi	Irene.Georgakoudi@tufts.edu	
2025 SPRG	Primary	Lorin Polidora	Lorin.Polidora@tufts.edu	
2025 SPRG	Primary	Fiorenzo Omenetto	Fiorenzo.Omenetto@tufts.edu	
2025 SPRG	Primary	Lauren Black III	Lauren.Black@tufts.edu	
2025 SPRG	Primary	Qiaobing Xu	Qiaobing.Xu@tufts.edu	
2025 SPRG	Primary	Brian Timko	Brian.Timko@tufts.edu	
2025 SPRG	Primary	Madeleine Oudin	Madeleine.Oudin@tufts.edu	
2025 SPRG	Primary	Srivalleesha Mallidi	Srivalleesha.Mallidi@tufts.edu	
2025 SPRG	Primary	Juan Gnecco	Juan.Gnecco@tufts.edu	

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2025 SPRG	Primary	Nisha Iyer	Nisha.Iyer@tufts.edu
Independent undergraduate research in the field of biomedical engineering. Term paper required. Credit not given retroactively. Prior arrangements necessary. Prerequisite: Permission of instructor.			

142324	Field Methods for Global Health		
Subject:	Catalog Nbr:		
CEE	0150		
Hands-on approach to evaluating global health projects. Research question and study design, human subjects research ethics, survey tool development, sampling techniques (water quality/anthropometrics), data collection and analysis, and information dissemination. Emphasis on applying topics to develop a full evaluation protocol for a self-selected project.			

142325	Biostatistics		
Subject: CEE	Catalog Nbr: 0156		
2025 SPRG	Primary	Helen Suh	Helen.Suh@tufts.edu
Statistical methods for analysis and interpretation of data generated by biomedical, environmental health, and public health studies. Descriptive statistics for continuous and categorical data, probability, hypothesis testing, correlation, analysis of variance, linear and logistic regression, multivariable regression, and non-parametric methods. Foundations of probability and statistical theory, and how to apply concepts by analyzing data.			

142326	Cataldo Scholar Research		
Subject: CEE	Catalog Nbr: 0090		
2024 FALL	Primary	Masoud Sanayei	masoud.sanayei@tufts.edu
2024 FALL	Primary	Brian Brenner	brian.brenner@tufts.edu
2024 FALL	Primary	Eric Hines	Eric.Hines@tufts.edu
2024 FALL	Primary	Babak Moaveni	Babak.Moaveni@tufts.edu
2024 FALL	Primary	Daniele Lantagne	Daniele.Lantagne@tufts.edu
2024 FALL	Primary	Daniel Kuchma	Dan.Kuchma@tufts.edu
2024 FALL	Primary	John Germaine	John.Germaine@tufts.edu
2024 FALL	Primary	Deborah Sunter	Deborah.Sunter@tufts.edu
2024 FALL	Primary	Farshid Vahedifard	Farshid.Vahedifard@tufts.edu
2025 SPRG	Primary	John Durant	john.durant@tufts.edu
2025 SPRG	Primary	Charles Ramsburg	Andrew.Ramsburg@tufts.edu
2025 SPRG	Primary	Luis Dorfmann	Luis.Dorfmann@tufts.edu
2025 SPRG	Primary	Paul Dombrowski	Paul.Dombrowski@tufts.edu
2025 SPRG	Primary	Neelakshi Hudda	Neelakshi.Hudda@tufts.edu
2025 SPRG	Primary	Jonathan Lamontagne	Jonathan.Lamontagne@tufts.edu
Supervised research through the Cataldo Scholars Program within Civil and Environmental Engineering.			

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Department consent and Senior standing required

142327		Doctoral Thesis I		
Subject: CEE	Catalog Nbr:			
	0297			
	2024 FALL	Primary	Soha Hassoun	soha.hassoun@tufts.edu
	2024 FALL	Primary	Farshid Vahedifard	Farshid.Vahedifard@tufts.edu
	2024 FALL	Primary	Lauryn Spearing	Lauryn.Spearing@tufts.edu
	2025 SPRG	Primary	Anne Marie Desmarais	annemarie.desmarais@tufts.edu
	2025 SPRG	Primary	Mark Woodin	mark.woodin@tufts.edu
	2025 SPRG	Primary	David Gute	david.gute@tufts.edu
	2025 SPRG	Primary	John Durant	john.durant@tufts.edu
	2025 SPRG	Primary	James Limbrunner	James.Limbrunner@tufts.edu
	2025 SPRG	Primary	Wayne Chudyk	wayne.chudyk@tufts.edu
	2025 SPRG	Primary	Christopher Swan	chris.swan@tufts.edu
	2025 SPRG	Primary	Masoud Sanayei	masoud.sanayei@tufts.edu
	2025 SPRG	Primary	Lucy Jen	Lucy.Jen@tufts.edu
	2025 SPRG	Primary	Brian Brenner	brian.brenner@tufts.edu
	2025 SPRG	Primary	Laurie Baise	laurie.baise@tufts.edu
	2025 SPRG	Primary	Eric Hines	Eric.Hines@tufts.edu
	2025 SPRG	Primary	Charles Ramsburg	Andrew.Ramsburg@tufts.edu
	2025 SPRG	Primary	Shafiqul Islam	Shafiqul.Islam@tufts.edu
	2025 SPRG	Primary	Luis Dorfmann	Luis.Dorfmann@tufts.edu
	2025 SPRG	Primary	Babak Moaveni	Babak.Moaveni@tufts.edu
	2025 SPRG	Primary	Robert Viesca	Robert.Viesca@tufts.edu
	2025 SPRG	Primary	Daniele Lantagne	Daniele.Lantagne@tufts.edu
	2025 SPRG	Primary	Daniel Kuchma	Dan.Kuchma@tufts.edu
	2025 SPRG	Primary	John Germaine	John.Germaine@tufts.edu
	2025 SPRG	Primary	Helen Suh	Helen.Suh@tufts.edu
	2025 SPRG	Primary	Deborah Sunter	Deborah.Sunter@tufts.edu
2025 SPRG	Primary	Jonathan Lamontagne	Jonathan.Lamontagne@tufts.edu	
2025 SPRG	Primary	Greses Perez	Greses.Perez@tufts.edu	
Guided research on a topic suitable for a doctoral dissertation. Required: Consent of instructor.				

142328	Independent Study			
Subject: CEE	Catalog Nbr:			
	0294			
2024 FALL	Primary	Beth Rosenberg	beth.rosenberg@tufts.edu	
2024 FALL	Primary	Jonathan Lamontagne	Jonathan.Lamontagne@tufts.edu	
2025 SPRG	Primary	David Gute	david.gute@tufts.edu	
2025 SPRG	Primary	Eric Hines	Eric.Hines@tufts.edu	

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Supervised, independent study of topics related to civil and environmental engineering. Departmental consent required

142345	Master's Project			
Subject:		Catalog Nbr:		
CEE		0290		
2024 FALL		Primary	John Durant	john.durant@tufts.edu
A project under the guidance of a faculty adviser that addresses an engineering topic related to the student's program of study. Students who are practicing engineers are encouraged to consider projects relevant to their own work. Topic, scope and SHUs must be approved by department. See departmental website for details.				

142502	Engineering Design Process			
Subject:		Catalog Nbr:		
BME		0066		
2025 SPRG		Primary	Angela Lai	Angela.Lai@tufts.edu
Principles of design within the context of the medical device industry. Practical experience with design and product development. Converting a product from concept through design and deployment. Identifying unmet needs, inventing a new device, and implementing within the framework of medical-device design controls. Fabrication methods and version control.				
Prerequisites: ES 2 or COMP 11				
Recommendations: PHY12 and (BME11, ES9, or ME20)				

142503	Marketing: Branding and Digital Communications			
Subject: EM		Catalog Nbr: 0242		
2024 FALL		Primary	Marci Sapers	Marci.Sapers@tufts.edu
Institutional and product marketing methods used by businesses launching new ventures. Overview of basic marketing principles, from day-to-day marketing activities to positioning and strategy. Analysis, formulation, and implementation of marketing strategies; concepts for understanding customer behavior and creating marketing strategy; fundamentals of market research, pricing, and reaching and selling to customers. Generating and delivering written and oral communications with clarity and precision, for different stakeholders and audiences. Course enrollment limited to Master of Science in Innovation and Management (MSIM) students.				

142504	Leading for Impact			
Subject: EM		Catalog Nbr: 0263		
2024 FALL		Primary	Stacy Lennon	Stacy.Lennon@tufts.edu
Development of self-awareness and skills necessary for leadership. 360 degree assessment tools and				

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extensive experiential learning. Oral communication, systems thinking, high performance teams, fostering creativity, team decision making, leading change, influence without authority. Conceptual frameworks, tools, and skills to effectively manage conflict and negotiate win/win solutions in the workplace. Cases and role plays to simulate real on the job conflicts. Course enrollment limited to Master of Science in Innovation and Management (MSIM) students.

142505	Integrating Engineering and Literacy in Elementary and Middle School			
Subject:		Catalog Nbr:		
ENE		0120		
2025 SPRG		Primary	Elissa Milto	elissa.milto@tufts.edu
Introduction to the theory, curricula and practices of teaching integrated engineering and literacy. Topics include disciplinary engineering practices, connecting literacy to engineering, analysis of example implementations, and literacy practices. Required implementation of sample curricular units in educational settings.				

142506	Forces at Nanoscale	
Subject:	Catalog Nbr:	
ME	0124	
(Cross-listed as MSE 175) Interaction between basic components of matter: atoms, molecules, nano- and micro particles. Forces that occur between surfaces/particles at the nanoscale including Van der Waals, dipole, electric, electric double layer, hydrogen, ionic, and adhesion forces. Modern achievements in studying these forces with the help of the force apparatus and atomic force microscopy. DLVO theory, Derjaguin approximation. Analysis of experimental data to extract the force parameters. Prerequisites: Senior or graduate standing		

142507	Forces at Nanoscale	
Subject:	Catalog Nbr:	
ME	0224	
Interaction between basic components of matter: atoms, molecules, nano- and micro particles. Forces that occur between surfaces/particles at the nanoscale including Van der Waals, dipole, electric, electric double layer, hydrogen, ionic, and adhesion forces. Modern achievements in studying these forces with the help of the force apparatus and atomic force microscopy. DLVO theory, Derjaguin approximation. Analysis of experimental data to extract the force parameters. A project related to graduate research is required.		

142811	Introduction to Remote Sensing			
Subject: CEE		Catalog Nbr: 0189		
2023 FALL		Primary	Aggeliki Barberopoulou	Aggeliki.Barberopoulou@tufts.edu
(Cross-listed with UEP 189) Satellite remote sensing technology and its applications to a variety of fields including urban and land use planning, natural resources monitoring and management, and environmental				

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sciences. Physical processes in remote sensing; optical, thermal and microwave based sensors; image analysis to derive desired information, and applications for geo-environmental studies. Laboratory exercises in remote sensing.

142812	Environmental Systems Modeling
Subject: CEE	Catalog Nbr: 0215
Numerical computer modeling for environmental and water-resources simulation. Mass and energy balances, reaction kinetics, transport, and numerical solution techniques. Pollutants including pathogens, toxic substances, organic carbon/oxygen, heat, eutrophication, and pH in rivers, lakes and estuaries. Recommendations: Math 51 and CEE1, or equivalents.	

142820	Capstone Leadership Project
Subject: EM	Catalog Nbr: 0282
2023 SUMR	Primary Jill Parlee Jill.Parlee@tufts.edu
2025 SPRG	Primary Mary Viola Mary.Viola@tufts.edu
2025 SPRG	Primary Partha Ghosh Partha.Ghosh@tufts.edu
2025 SPRG	Primary Samuel Liggero Samuel.Liggero@tufts.edu
2025 SPRG	Primary Gerald Brown Gerald.Brown@tufts.edu
2025 SPRG	Primary James Nash James.Nash@tufts.edu
2025 SPRG	Primary Abbott Weiss Abbott.Weiss@tufts.edu
2025 SPRG	Primary Frank Apeseche Frank.Apeseche@tufts.edu
2025 SPRG	Primary Mark Bamford Mark.Bamford@tufts.edu
(Cross-listed as TML 282) Student led three-month project to demonstrate business acumen and leadership skills. Project must be complex and involve risk. Projects are often completed with the students' current employer.	

142824	Experience Design
Subject: EM	Catalog Nbr: 0220
2025 SPRG	Primary Debra Reich Debra.Reich@tufts.edu
Experience research and design as applied to the process of user-centered product development. In-depth study of users leading to innovative product concepts. Use of personas, data collection methods, journey maps, and storytelling in hands-on projects related to product development.	

142831	Fundamentals of Economics
Subject: EM	Catalog Nbr: 0240C
Overview of macro and microeconomics in preparation for the Globalization and	

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Multinational Strategies module. Topics include: (i) global economic issues related to trade balance, government budgets, unemployment, competitiveness of innovation and manufacturing processes; (ii) fiscal and monetary discipline impacts on economic growth and social & political stability; (iii) economic philosophies impact on individual and collective behaviors; (iv) market behaviors; and, (v) basics of game theory.

142832	Globalization and Multinational Strategy			
Subject: EM		Catalog Nbr: 0240D		
2025 SPRG	Primary	Partha Ghosh	Partha.Ghosh@tufts.edu	
A study of globalization and the evolution of multinational companies from different regions of world. Topics include: strategic, organizational and operational implications of working and leading in the global environment; implications of globalization on large multinational organizations as well as startups; and how globalization models work across various industries.				

143209	Senior Capstone Project in Data Science I			
Subject: DS	Catalog Nbr: 0097			
2023 FALL	Primary	Fabrizio Santini	Fabrizio.Santini@tufts.edu	
2024 FALL	Primary	Alva Couch	alva.couch@tufts.edu	
Application of data science and analytic principles to the solution of a real-world problem in a group setting. Requirements analysis, review of available data sources, and proposal of a solution strategy to the problem.				

143210	Senior Capstone Project in Data Science II			
Subject:	Catalog Nbr:			
DS	0098			
2025 SPRG	Primary	Fabrizio Santini	Fabrizio.Santini@tufts.edu	
A continuation of DS 97. Analysis of the problem proposed in DS 97 is completed and a final paper summarizes data gathered, analytic results, lessons learned, and opportunities for future study.				

143211	Special Topics in Data Infrastructure and Systems		
Subject:	Catalog Nbr:		
CS	0051		
A special topics course in data infrastructures and systems, suitable for fulfilling requirements of the Bachelor of Science in Data Science.			

143212	Special Topics in Data Infrastructure and Systems			
Subject:	Catalog Nbr:			

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CS	0151			
	2024 FALL	Primary	Ming Chow	ming.chow@tufts.edu
	2024 FALL	Primary	Ronald Simmons	Ronald.Simmons@tufts.edu
	2024 FALL	Primary	Hari Sundar	Hari.Sundar@tufts.edu
	2025 SPRG	Primary	Megumi Ando	Megumi.Ando@tufts.edu
	2025 SPRG	Primary	Raja Sambasivan	Raja.Sambasivan@tufts.edu
	2025 SPRG	Primary	Laurin Weissinger	Laurin.Weissinger@tufts.edu
	2025 SPRG	Primary	Saeed Mehraban	Saeed.Mehraban@tufts.edu
	2025 SPRG	Primary	Johes Bater	Johes.Bater@tufts.edu
A special topics course in data infrastructures and systems, suitable for fulfilling requirements of the Bachelor of Science in Data Science.				

143213	Special Topics in Data Analysis and Interfaces			
	Subject:	Catalog Nbr:		
	CS	0052		
A special topics course in data analysis and interfaces, suitable for fulfilling requirements of the Bachelor of Science in Data Science.				

143214	Special Topics in Data Analysis and Interfaces			
	Subject:	Catalog Nbr:		
	CS	0152		
	2023 FALL	Primary	Josephine Wolff	Josephine.Wolff@tufts.edu
	2023 FALL	Primary	Daniel Votipka	Daniel.Votipka@tufts.edu
	2024 FALL	Primary	Michael Hughes	Michael.Hughes@tufts.edu
	2024 FALL	Primary	Qitong Cao	Qitong.Cao@tufts.edu
	2024 FALL	Primary	Reuth Mirsky	Reuth.Mirsky@tufts.edu
	2025 SPRG	Primary	Megan Monroe	Megan.Monroe@tufts.edu
	2025 SPRG	Primary	Roy Shilkrot	Roy.Shilkrot@tufts.edu
A special topics course in data analysis and interfaces, suitable for fulfilling requirements of the Bachelor of Science in Data Science.				

143215	Special topics in Computational and Theoretical Aspects of Data Science.			
	Subject:	Catalog Nbr:		
	DS	0153		
	2024 FALL	Primary	Matthias Scheutz	Matthias.Scheutz@tufts.edu
	2024 FALL	Primary	David Wittenberg	David.Wittenberg@tufts.edu
	2025 SPRG	Primary	Roy Shilkrot	Roy.Shilkrot@tufts.edu
A special topics course in computational and theoretical aspects of data science, suitable for fulfilling requirements of the Bachelor of Science in Data Science.				

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143216	Special topics in Computational and Theoretical Aspects of Data Science		
Subject:	Catalog Nbr:		
DS	0053		
A special topics course in computational and theoretical aspects of data science, suitable for fulfilling requirements of the Bachelor of Science in Data Science.			

143234	Musical Instrument Design And Manufacture				
	Subject:	Catalog Nbr:			
	ME	0045			
	2025 SPRG	Primary	Chris Rogers	chris.rogers@tufts.edu	
(Cross-listed as ES 73) Review of the underlying engineering and the basic fabrication of musical instruments, including an introduction to musical acoustics, computer-based simulation tools, laboratory measurement, and manufacturing. The bulk of the class is dedicated to designing, simulating, building, and testing of an instrument.					

143282	Fundamentals of Biostatistics			
Subject:	Catalog Nbr:			
CEE	0006			
2024 FALL	Primary	Qiang Fu	John.Fu@tufts.edu	
2025 SPRG	Primary	Mark Woodin	mark.woodin@tufts.edu	
2025 SPRG	Primary	David Tybor	DJ.Tybor@tufts.edu	
(Cross listed as CH 36) Examination of statistical methods used in biomedical and public health studies. Descriptive statistics, probability, basic hypothesis testing, ANOVA, linear regression, logistic regression, and an introduction to survival analysis. Instruction in the use of statistical software will be provided throughout the course. CEE 6 and CEE 156 cannot both be taken for credit				

143283	Integrated Planning and Management of Civil Infrastructure Systems				
Subject: CEE		Catalog Nbr: 0080			
2025 SPRG		Primary	Jonathan Lamontagne	Jonathan.Lamontagne@tufts.edu	
Decision making for integrated, complex and adaptive civil infrastructure systems. Rigorous exploration of economic efficiency, robustness, and resilience of infrastructure design and management. Simulation and optimization. Explicit consideration of technical, environmental, societal, and climate risks and uncertainties.					

143284	Structural Health Monitoring			
Subject:	Catalog Nbr:			
CEE	0127			
2023 FALL	Primary	Babak Moaveni	Babak.Moaveni@tufts.edu	
(Cross-listed as ME 176) Vibration-based structural health monitoring including system identification of linear systems. Data acquisition, signal processing, modal identification, parameter estimation, and optimization.				

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143285	Advanced Soil Mechanics			
Subject:	Catalog Nbr:			
CEE	0242			
2023 FALL	Primary	Juan Pestana		Juan.Pestana@tufts.edu
Soil composition, index properties, classification. Mohr circles and stress paths. Consolidation behavior; consolidation theory including radial and 3-D solutions; secondary compression. Shear strength of soils; effects of soil composition, stress history, drainage conditions, and rate of loading. Recommendation: CEE 42 or equivalent				

143286	Parallel Computing			
Subject:	Catalog Nbr:			
EE	0155			
2025 SPRG	Primary	Joel Grodstein		Joel.Grodstein@tufts.edu
(Cross-listed as CS 122) Programming modern parallel computer architectures, especially GPUs and multi-core CPUs. Rationale for modern multi-core CPUs. Challenges of multi-threaded programming. High-performance software taking advantage of hardware caches, cache coherency, memory systems and parallel computation. Recommendations: EE 25 or CS 40.				

143301	Professional Preparation for Cooperative Education			
Subject:	Catalog Nbr:			
ES	0085			
2025 SPRG	Primary	Anil Saigal		anil.saigal@tufts.edu
2025 SPRG	Primary	Robin Kahan		robin.kahan@tufts.edu
2025 SPRG	Primary	Qiaobing Xu		Qiaobing.Xu@tufts.edu
Introduction to work-based learning, strategies to optimize work experience and learn skills and habits to best transition into a professional work environment. Writing an effective resume, strategic interviewing, professional networking strategies, and developing a list of goals to achieve and skills to develop in a professional environment. Effective approaches to oral and written communications.				

143347	Computer Science for All			
Subject:	Catalog Nbr:			
CS	0010			
2024 FALL	Primary	Elyse Cornwall		Elyse.Cornwall@tufts.edu
2025 SPRG	Primary	Johannes De Ruiter		jp.deruiter@tufts.edu
Fundamental concepts of computer science and computer programming for students with no prior programming experience but who are interested in taking CS11. Data structures and algorithms, text and data manipulation, simulation using random numbers. Students may only receive credit for CS10 if it is completed prior to CS11 and CS15. Students may receive credit for either CS10 or ES2, but not both. Recommendation: high school algebra.				

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143348	A Machine-Centric Approach to Programming, Data Structures and Algorithms			
Subject:	Catalog Nbr:			
EE	0200			
2024 FALL	Primary	Steven Bell		Steven.Bell@tufts.edu
Programming in C and C++ with coverage of data structures (linked lists, binary trees, hash tables, graphs), abstract data types (stacks, queues, maps, sets) and algorithms (sorting, graph search, minimal spanning tree). Efficiency of these structures and algorithms is compared via Big-O analysis. Brief coverage of concurrent (multi-threaded) programming. Object-oriented design: inheritance, templates and virtual methods. Embedded, high-performance and close-to-hardware applications. Defensive coding and use of standard UNIX development tools. Requirements: graduate standing				

143349	Fundamentals of Computer Systems and Engineering			
Subject:	Catalog Nbr:			
EE	0201			
2025 SPRG	Primary	Steven Bell		Steven.Bell@tufts.edu
Fundamentals of digital systems and computer architecture for graduate students whose undergraduate background did not cover this material. Topics covered include digital logic, assembly programming, computer architecture, memory hierarchies and technologies, and microprocessor I/O. Associated exercises to build a functional microprocessor using hardware description languages and an FPGA.				

143350	Methods for Human Factors Engineering			
Subject:	Catalog Nbr:			
ENP	0064			
2024 FALL	Primary	James Intriligator		James.Intriligator@tufts.edu
2025 SPRG	Primary	Dave Miller		Dave.Miller@tufts.edu
Qualitative and quantitative methods and techniques used in human factors engineering research. Usability testing, structured observation, questionnaire design, focus group design, psychophysical methods, signal detection theory, and field studies. Examples of good and bad methods/techniques. Recommendations: PSY53				

143398	Synthetic Biology			
Subject:	Catalog Nbr:			
CHBE	0159			
2024 FALL	Primary	Nikhil Nair		Nikhil.Nair@tufts.edu
Overview of Synthetic biology. Origin, techniques, current status, and applications to chemical, pharmaceutical, energy, environmental, and agriculture industries. Recommendation: Bio 41 or equivalent,				

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and Bio 152/Chem 171 or equivalent

143423	Medical Technology Development			
Subject:		Catalog Nbr:		
ENP		0109		
2025 SPRG		Primary	Michael Wiklund	michael.wiklund@tufts.edu
Medical technology development and healthcare delivery. Human anatomy, medical conditions, roles of clinicians, and effect of medical care environments on medical care quality. User interfaces of diagnostic, therapeutic, and monitoring technologies. Design of medical devices to optimize medical care, user satisfaction, and patient safety. Visits to clinical care environments. Guest lectures by clinicians. Individual and group projects structured around real world problems.				
Recommendations: Junior Standing				

143424	Engineering Forensics				
Subject:		Catalog Nbr:			
ENP		0112			
2023 FALL		Primary	Mary Stearns	Mary.Stearns@tufts.edu	
2023 FALL		Primary	Divya Chandra	D.Chandra@tufts.edu	
Prevention of recurrence for high-profile accidents in transportation and related industries. Accident-investigation methods, discovery of system-safety faults, and identification of user-interface design errors. Case studies with emphasis on individual analysis and presentation. Site visits and guest lectures. Recommendations: PSY 53, ENP 64 and junior standing.					

143425	Ergonomic in Design			
Subject:		Catalog Nbr:		
ENP		0114		
2023 FALL	Primary	Gary Leisk	Gary.LEISK@tufts.edu	
2024 FALL	Primary	Nicholas Katis	Nick.Katis@tufts.edu	
Topics related to the domain of physical ergonomics with emphasis on the quality of fit between humans and the things they interact with on a job site, in sports, or at home. Applications drawn from aspects of human-made environments and designed products. Extensive in-class activities, group work, and collaborative discussion. Project experiences involving analysis of real-life scenarios. Anthropometry, functional anatomy, ergonomics, body mechanics, and human factors research methods. Guest lectures with local industry and professionals. Recommendations: Junior, Senior or Graduate Standing				

143426	Industrial Design			
Subject: ENP		Catalog Nbr: 0165		
2025 SPRG		Primary	Maxwell Bischoff	Maxwell.Bischoff@tufts.edu
History and current state of industrial design, the industrial design process, and industrial design principles.				

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Application of industrial design for user needs and expectations. Product safety, efficacy and consumer satisfaction. Recommendations: Junior standing

143427	GPS & Satellite Navigation			
Subject:		Catalog Nbr:		
ME		0133		
2023 FALL		Primary	Pratap Misra	Pratap.Misra@tufts.edu
Positioning by trilateration; satellite-based, global radio-navigation systems; requisite technologies including global coordinate frames, ultra-stable clocks; GPS satellite constellation and orbits; GPS Time; WGS 84 coordinate frame; signal theory including spread spectrum signals, code division multiple access (CDMA); GPS system theory including receiver algorithms for acquisition and tracking of GPS signals; estimation of position, velocity and time from measurements of pseudoranges including least-squares and Gauss-Newton method; hands-on data collection with a GPS receiver. Recommendation: Senior standing				

143428	Global Climate Change and Human Health		
Subject:	Catalog Nbr:		
CEE	0151		
Human health implications of global climate change, including extreme weather events and air pollution. Climate change effects on infectious disease transmission, vector distribution, agricultural productivity, and ecological systems. Use of risk assessment, statistical modeling, and data visualization tools to identify and predict current and future health impacts resulting from climate change. Recommendation: ES55 and (ES56 or CEE156)			

143429	Environmental Health Data-Lab			
Subject: CEE		Catalog Nbr: 0152		
2024 FALL		Primary	Mark Woodin	mark.woodin@tufts.edu
Use of publicly available environmental and health data for in-depth analysis of environmental health topics such as air pollution, exposure disparities, water quality, and contaminant source contributions, with knowledge of contaminant fate and transport, statistics, and data visualization.				

143430	Water, Sanitation, and Hygiene (WASH) Design			
Subject: CEE		Catalog Nbr: 0159		
2024 FALL		Primary	Ana Fernandes	Ana.Fernandes@tufts.edu
User-centered design of WASH systems for low-cost, community- and household-level treatment. Topics include technologies, health impacts, societal contexts, and monitoring for achieving sustainability. Emphasis on applying topics to develop a WASH design for a self-selected project.				

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143431	Special Topics in Social Context of Computing		
Subject:	Catalog Nbr:		
CS	0055		
Study of various topics in the social and ethical context of computing. Content and prerequisites to be announced. Please see departmental website for specific details.			

143432	Special Topics in Social Context of Computing	
Subject:	Catalog Nbr:	
CS	0155	
ABET CAC requires us to include more social context in our curriculum, and this course provides a vehicle for such interaction, by allowing us to cross-list specific courses in A&S and Fletcher as satisfying that requirement via this number. Thus, this number can be used to change the description of the BSCS to include social context courses as required by ABET. We desire both undergraduate-only and undergraduate/graduate numbers for this option, depending upon course level.		

143433	Big Data			
Subject:	Catalog Nbr:			
CS	0119			
2023 FALL	Primary	Andrew Winslow	Andrew.Winslow@tufts.edu	
2025 SPRG	Primary	Jitendra Singh	Jitendra.Singh@tufts.edu	
Collecting, processing, analyzing and acting on data at Internet scale with speed and complexity. Techniques and infrastructures developed for big data including parallel and distributed database systems, map-reduce infrastructures, scalable platforms for complex data types, stream processing systems, and cloud-based computing. Course blends theory, algorithms and practical (hands on) work.				

143434	Special Topics in the Practice of Data Science			
Subject:	Catalog Nbr:			
DS	0154			
2023 FALL	Primary	Donna Slonim	Donna.Slonim@tufts.edu	
2023 FALL	Primary	Josephine Wolff	Josephine.Wolff@tufts.edu	
2024 FALL	Primary	Qitong Cao	Qitong.Cao@tufts.edu	
Study of various topics in the practice of Data Science, suitable for fulfilling requirements of the Master of Science in Data Science. Content and prerequisites to be announced. Please see departmental website for specific details. Prerequisite: Graduate standing				

143435	Masters Project in Data Science			
Subject:	Catalog Nbr:			
DS	0293			
2023 FALL	Primary	Antonella Di Lillo	No Email on file.	
2024 FALL	Primary	Karen Panetta	Karen.Panetta@tufts.edu	

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2024 FALL	Primary	Megumi Ando	Megumi.Ando@tufts.edu
2024 FALL	Primary	Peter Love	Peter.Love@tufts.edu
2024 FALL	Primary	Elyse Cornwall	Elyse.Cornwall@tufts.edu
2024 FALL	Primary	Milod Kazerounian	Milod.Kazerounian@tufts.edu
2024 FALL	Primary	Vladimir Podolskiy	Vladimir.Podolskii@tufts.edu
2024 FALL	Primary	Christopher Magnano	Christopher.Magnano@tufts.edu
2024 FALL	Primary	Hari Sundar	Hari.Sundar@tufts.edu
2024 FALL	Primary	Reuth Mirsky	Reuth.Mirsky@tufts.edu
2024 SUMR	Primary	Samuel Guyer	Samuel.Guyer@tufts.edu
2024 SUMR	Primary	Bert Huang	No Email on file.
2025 SPRG	Primary	Robert Jacob	jacob@cs.tufts.edu
2025 SPRG	Primary	Alva Couch	alva.couch@tufts.edu
2025 SPRG	Primary	Soha Hassoun	soha.hassoun@tufts.edu
2025 SPRG	Primary	Diane Souvaine	Diane.Souvaine@tufts.edu
2025 SPRG	Primary	Ming Chow	ming.chow@tufts.edu
2025 SPRG	Primary	Lenore Cowen	lenore.cowen@tufts.edu
2025 SPRG	Primary	Donna Slonim	Donna.Slonim@tufts.edu
2025 SPRG	Primary	Norman Ramsey	Norman.Ramsey@tufts.edu
2025 SPRG	Primary	Remco Chang	Remco.Chang@tufts.edu
2025 SPRG	Primary	Matthias Scheutz	Matthias.Scheutz@tufts.edu
2025 SPRG	Primary	Kathleen Fisher	Kathleen.Fisher@tufts.edu
2025 SPRG	Primary	Noah Mendelsohn	Noah.Mendelsohn@tufts.edu
2025 SPRG	Primary	Mark Sheldon	Mark.Sheldon@tufts.edu
2025 SPRG	Primary	Fahad Dogar	Fahad.Dogar@tufts.edu
2025 SPRG	Primary	Johannes De Ruiter	jp.deruiter@tufts.edu
2025 SPRG	Primary	Megan Monroe	Megan.Monroe@tufts.edu
2025 SPRG	Primary	Deborah Sunter	Deborah.Sunter@tufts.edu
2025 SPRG	Primary	Liping Liu	Liping.Liu@tufts.edu
2025 SPRG	Primary	Jivko Sinapov	Jivko.Sinapov@tufts.edu
2025 SPRG	Primary	Susan Landau	Susan.Landau@tufts.edu
2025 SPRG	Primary	Jeffrey Foster	Jeffrey.Foster@tufts.edu
2025 SPRG	Primary	Michael Hughes	Michael.Hughes@tufts.edu
2025 SPRG	Primary	Elaine Short	Elaine.Short@tufts.edu
2025 SPRG	Primary	Raja Sambasivan	Raja.Sambasivan@tufts.edu
2025 SPRG	Primary	Martin Allen	Martin.Allen@tufts.edu
2025 SPRG	Primary	Richard Townsend	Richard.Townsend@tufts.edu
2025 SPRG	Primary	Abani Patra	Abani.Patra@tufts.edu
2025 SPRG	Primary	Daniel Votipka	Daniel.Votipka@tufts.edu
2025 SPRG	Primary	David Lillethun	David.Lillethun@tufts.edu
2025 SPRG	Primary	Saeed Mehraban	Saeed.Mehraban@tufts.edu
2025 SPRG	Primary	Johes Bater	Johes.Bater@tufts.edu

Guided individual study of an approved topic suitable for a master's project in Data Science. Please see departmental website for specific details.

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143474	Computational Biology
Subject: BME	Catalog Nbr: 0167
2025 SPRG	Primary Donna Slonim Donna.Slonim@tufts.edu
(Cross listed as CS 167) Computational challenges in molecular biology, including sequence alignment and comparison, genomic annotation, transcriptomic data analysis, and proteomics. Underlying computational techniques such as dynamic programming, hidden Markov models, statistical analyses, and search and optimization procedures.	

143563	Advanced Engineering Psychology
Subject: ENP	Catalog Nbr: 0130
(Cross-listed as PSY 130) Seminar on the various functions that humans perform in complex modern human-machine systems. Examination of psychological and engineering theories and models as they relate to these functions. Recommendations: Three courses in psychology, including PSY 53, or graduate standing.	

143647	Parallel Computing
Subject: CS	Catalog Nbr: 0122
2025 SPRG	Primary Joel Grodstein Joel.Grodstein@tufts.edu
(Cross-listed as EE 155) Programming modern parallel computer architectures, especially GPUs and multi-core CPUs. Rationale for modern multi-core CPUs. Challenges of multi-threaded programming. High-performance software taking advantage of hardware caches, cache coherency, memory systems and parallel computation. Recommendations: EE 25 or CS 40.	

143715	Biomechanics
Subject: BME	Catalog Nbr: 0152
(Cross-listed as ME 123) Mechanical properties of muscle and bone, activation of muscles, kinematics and dynamics of joints, forces and energy in movement, movement data recording and analysis. Classroom presentations and research projects. Recommendations: ES 9 Applied Mechanics (Strength of Materials) or equivalent.	

143783	The Engineering Method of Technical Writing
Subject: CS	Catalog Nbr: 0179
Principles of writing papers and theses on Computer Science topics. Editing principles for technical papers, including word choice, word placement, paragraph design, and section structure. Working practices for manuscript production: active waiting, prewriting, drafting, and editing. Analysis of student work and	

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published papers. Experimental study of effective practices. Prerequisites: Enrollment by permission of instructor only. Preference given to students writing or planning to write a doctoral, master's, or bachelor's thesis.

143784	Principles of Data Science in Python		
	Subject:	Catalog Nbr:	
	DS	0205	
Fundamentals of python programming for data analysis. Common python data structures and algorithms. Design of python programs. Coding standards and practices. Use and creation of software libraries. Examples drawn from data preparation and transformation, statistical data analysis, machine learning, deep learning, and deep data science including recommendation systems and trend analysis. Labs utilizing iPython and the Jupyter data analysis workflow framework.			

143805	Applied Behavioral Statistics for Engineering			
Subject: ENP		Catalog Nbr: 0164		
2025 SPRG		Primary	Daniel Hannon	Dan.Hannon@tufts.edu
Behavioral statistics for human factors and applied behavioral research. Parametric, nonparametric, descriptive and inferential concepts. Small n and case study designs, factor analysis and power analysis. Use of modern statistical software package(s). Applications to product design and development, human performance, and survey methods.				

143806	Masters Capstone			
Subject: ENP		Catalog Nbr: 0220		
2025 SPRG		Primary	Jason Ryan	Jason.Ryan@tufts.edu
Individual projects in human factors. Design problems set by industry sponsors, employers, faculty members and other sources. Written research proposal, weekly progress reports, and written semester report.				

143854	Micro/Nanofabrication in Practice	
Subject:	Catalog Nbr:	
ME	0144	
Hands on instruction in fundamental micro/nano fabrication processes. Contact lithography, positive and negative photoresists, multi-layer registration. Physical vapor deposition, sputtering, thermal evaporation. Atomic layer deposition. Wet and dry etching. Microfluidics. Electron beam lithography. Introduction to micro/nano device design. Prerequisites : ME 70 or graduate standing		

143855	Microfluidics			
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Subject:	Catalog Nbr:			
ME	0155			
2023 FALL	Primary	Jeffrey Guasto		Jeffrey.Guasto@tufts.edu
Microscale fluid mechanics and mass transport. Microfluidic device design, fabrication, and experimental characterization. Hydraulic circuit analysis, electrokinetic flow, capillary effects, and multiphase flow. Brownian motion, diffusion, and dispersion. Applications including mixing and separations, cell sorting and chemotaxis, droplets and emulsions, and pumps and valves. Laboratory component including micro particle image velocimetry. Meets with ME 217. In no case may a student receive credit for both ME 155 and ME 217. Prerequisites: ME 51 or ME 150 or graduate standing				

143856	Microfluidics
Subject:	Catalog Nbr:
ME	0255
Introduction to microscale fluid mechanics and mass transport. Microfluidic device design, fabrication, and experimental characterization. Hydraulic circuit analysis, electrokinetic flow, capillary effects, and multiphase flow. Brownian motion, diffusion, and dispersion. Applications including mixing and separations, cell sorting and chemotaxis, droplets and emulsions, and pumps and valves. Laboratory component including micro-PIV. Meets with ME117. Students enrolled in ME217 are assigned additional independent readings and a final project. In no case may a student receive credit for both ME117 and ME217. Prerequisites: ME 150 and graduate standing.	

143857	The Emerging Global Health Crisis			
Subject:		Catalog Nbr:		
CEE		0059		
2024 SUMR	Primary	David Gute	david.gute@tufts.edu	
The principal focus of CEE 59 in the summer of 2020 will be on an examination of the global reach of COVID-19. The course will place it within a context of other emerging and re-emerging diseases such as HIV/AIDS, SARS, measles, avian flu and review how they are transmitted and distributed. Find out why the control of this unfolding pandemic requires not only solid science but also effective public health policy. The social and structural inequities exacerbated by the spread of COVID-19 will also be explored.				

143858	The Energy Transition			
	Subject:	Catalog Nbr:		
	CEE	0101		
	2024 FALL	Primary	Eric Hines	Eric.Hines@tufts.edu
(Cross-listed as STS 101, ME 174 & ENV 161) Consideration of engineering concepts relevant to the global transition from fossil fuels to renewable sources of energy. Interface between policy and technology in the energy sector and its relevance to decision making. Offshore wind energy is used as an example to illustrate the convergence of technology, infrastructure, policy, and markets that is necessary to achieve a just and equitable energy transition. Course is open to juniors, seniors, and graduate students from across the university.				

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143859	Human-Robot Interaction			
Subject:	Catalog Nbr:			
CS	0133			
2024 FALL	Primary	Elaine Short		Elaine.Short@tufts.edu
Human-robot interaction (HRI) at the intersection of psychology, human factors engineering, computer science, and robotics. Case studies of developing robots for various societal tasks, from flexible and adaptive robots for industrial manufacturing, to socially assistive robots for elder care. Discussion of key papers in HRI. Short student presentations on HRI studies and designs; work in interdisciplinary groups on a term project to design and conduct an HRI study. Recommendations: At least one course beyond Math 34, including Math 42, 44, 61, 70, or 72				

143860	Ethics for AI, Robotics, and Human Robot Interaction			
Subject:	Catalog Nbr:			
CS	0139			
2023 FALL	Primary	Matthias Scheutz		Matthias.Scheutz@tufts.edu
Ethical problems and challenges prompted by current and future technological advances in AI, robotics, and human-robot interaction. Philosophical foundations of the main ethical theories and links between these and algorithmic approaches in artificial agents. Functional tradeoffs and implications for autonomous robots and AI systems, explicating and contrasting the assumptions underlying each algorithmic approach. Moral psychology and human-robot/human-technology interaction, including the societal implications of AI and robot technology. Social, economic, legal, and military ramifications. Prerequisites: senior standing, or permission of instructor. Recommendations: CS/MATH 61 and CS 15.				

144098	Materials & Manufacturing I			
Subject:	Catalog Nbr:			
ME	0010			
2024 FALL	Primary	Gary Leisk		Gary.LEISK@tufts.edu
2024 FALL	Primary	Luisa Chiesa		Luisa.Chiesa@tufts.edu
2024 FALL	Primary	Hoda Koushyar		Hoda.Koushyar@tufts.edu
Product teardown, component and sub-assembly identification, CAD modeling of parts and assembly. Materials identification and selection for engineering applications, Ashby charts. Basic principles and advantages/disadvantages of manufacturing processes, hands on component manufacturing. Recommendations: Sophomore standing				

144099	Materials & Manufacturing II			
Subject:	Catalog Nbr:			
ME	0011			

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2025 SPRG	Primary	Anil Saigal	anil.saigal@tufts.edu
Phase diagrams, microstructures of materials, methods of structural material modification. Material classification and basic structures, material properties, property characterization and testing methods. Dislocations, twinning, diffusion and strengthening mechanisms. Recommendations: ME-0020 Pre-requisites: ME-0010, CHEM-0001			

144100	Mechanics I			
Subject: ME	Catalog Nbr: 0020			
2023 FALL	Primary	Robert White	R.White@tufts.edu	
2024 FALL	Primary	Hoda Koushyar	Hoda.Koushyar@tufts.edu	
2024 FALL	Primary	Felix Huang	Felix.Huang@tufts.edu	
2024 FALL	Primary	Golriz Kermani	Golriz.Kermani@tufts.edu	
Analysis and problem solving in statics. Vector and matrix analysis. Force-moment balance equations. Analysis of stress and strain. Behavior of isotropic materials. Area moments of inertia. Behavior of members subjected to axial, torsional, and flexural loadings, combined stress, compression members and columns. Recommendations: Sophomore standing Pre-requisites: PHY-0011 and MATH-0034				

144101	Mechanics II			
Subject: ME	Catalog Nbr: 0021			
2025 SPRG	Primary	Hoda Koushyar	Hoda.Koushyar@tufts.edu	
Equilibrium of particles and rigid bodies in two and three dimensions. Kinematics and kinetics of particles and of rigid bodies in plane motion. Mass moments of inertia of solid bodies. Momentum and impulse methods. Energy methods. Single degree of freedom vibrations. Derivation and solution of differential equations of motion. Recommendations: MATH-0051 Pre-requisites: ME-0020				

144102	Electronics & Controls I			
Subject: ME	Catalog Nbr: 0030			
2023 FALL	Primary	Meredith Hyde	Meredith.Hyde@tufts.edu	
2024 FALL	Primary	Kristen Wendell	Kristen.Wendell@tufts.edu	
2024 FALL	Primary	Brandon Stafford	Brandon.Stafford@tufts.edu	
2024 FALL	Secondary	Kristen Wendell	Kristen.Wendell@tufts.edu	
2024 FALL	Secondary	Brandon Stafford	Brandon.Stafford@tufts.edu	

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Analysis and design of circuits using ideal voltage and current sources, resistors, capacitors, and inductors. Actuators such as electric motors, solenoids, and heaters. Amplifiers. Microcontrollers. Sampling sensors and driving actuators. Applications of proportional-integral-derivative control. Hardware implementation. Use of oscilloscopes to test and debug circuits. Printed circuit board (PCB) design. Students may not receive credit for both ME30 and EE31.

144103		Electronics & Controls II		
Subject: ME		Catalog Nbr: 0031		
2024 SPRG		Primary	Meredith Hyde	Meredith.Hyde@tufts.edu
2024 SPRG		Primary	Isabela Secanechia	Isabela.Secanechia@tufts.edu
2025 SPRG		Primary	Jason Rife	Jason.Rife@tufts.edu
2025 SPRG		Primary	Matthew Woodward	Matthew.Woodward@tufts.edu
Modeling and control of dynamic electromechanical systems. Transfer functions and other methods for continuous linear system analysis. Time-domain response, frequency response. Performance of feedback controllers, including proportional-integral-derivative controllers. Computer tools for design and measurement. Sensors, actuators, hardware implementation.				
Pre-requisites: ME-0030, PHY-0011				

144104		Engineering Design I		
Subject: ME		Catalog Nbr: 0040		
2025 SPRG		Primary	Gary Leisk	Gary.LEISK@tufts.edu
2025 SPRG		Primary	Kristen Wendell	Kristen.Wendell@tufts.edu
2025 SPRG		Primary	Briana Bouchard	Briana.Bouchard@tufts.edu
User-centric design process, project planning, framing the design challenge. Intellectual property, market research. Task analysis, identification of user needs and engineering requirements, user profiles and persona, need ranking. Ideation techniques, decision making based on design criteria, detailed design. Working with vendors and communicating designs, usability testing, design iteration, engineering drawings in CAD, prototype fabrication.				
Pre-requisites: Sophomore standing				

144105		Engineering Design II		
Subject: ME		Catalog Nbr: 0041		
2024 FALL		Primary	Douglas Matson	Douglas.Matson@tufts.edu
2024 FALL		Primary	Jannatun Nawer	Jannatun.Nawer@tufts.edu
Machine applications, component analysis, load analysis, free body diagrams. Analytical modeling, finite element analysis, failure modes, stress concentrations, failure theories. Machine design component selection,				

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applications, materials, loading conditions.

Recommendations: ME-0020

Pre-requisites: ME-0040

144106	Thermal Fluid Systems I			
Subject: ME		Catalog Nbr: 0050		
2025 SPRG		Primary	Douglas Matson	Douglas.Matson@tufts.edu
2025 SPRG		Primary	Jeffrey Guasto	Jeffrey.Guasto@tufts.edu
2025 SPRG		Primary	Jannatun Nawer	Jannatun.Nawer@tufts.edu
Classical thermodynamics and energy balances. Thermophysical properties of matter, first and second law of thermodynamics in closed and open systems, entropy, and thermodynamic cycles. Dimensional analysis. One-dimensional steady state and transient conduction, and radiative heat transfer. Emphasis on application of thermodynamic reasoning to system design.				

144107	Thermal Fluid Systems II			
Subject: ME		Catalog Nbr: 0051		
2024 FALL		Primary	Jeffrey Guasto	Jeffrey.Guasto@tufts.edu
2024 FALL		Primary	Erica Kemmerling	Erica.Kemmerling@tufts.edu
Fluid mechanics and convective heat transfer for internal and external flows. Properties of fluids, pressure, hydrostatic forces. Control volume and differential analysis. Conservation of mass, momentum, and energy. Bernoulli and Navier-Stokes equations. Introduction to turbulent flows. Momentum and thermal boundary layers. Forced and free heat convection, and heat exchangers. Emphasis on combined heat transfer and fluid flow in thermodynamic systems. Pre-requisites: ME-0050 and MATH-0051				

144108	Structural Dynamics	
	Subject:	Catalog Nbr:
	ME	0178
(Cross-listed as CEE 106) Fundamentals of vibration theory with applications important in structural engineering. Free, forced, and transient vibration analysis. Time and frequency domain analysis of single and multi-degree of freedom systems. Natural frequencies and normal modes of vibration. Vibration mitigation and base isolation. Understanding behavior of structures subjected to various dynamic loads such as wind, earthquake, machine vibration, and ambient vibration. Hands-on experience with industry-standard software and practical applications in structural engineering. Recommendations: CEE 22 or ME 41, or consent of instructor		

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144127	Convex Optimization			
Subject: CS		Catalog Nbr: 0168		
2025 SPRG		Primary	Mai Vu	Mai.Vu@tufts.edu
(Cross-listed with EE 109) Convex optimization theory and algorithms. Convex sets, convex functions and convex optimization problems; duality theory and optimality conditions; algorithms for solving convex problems including descent, gradient descent, Newton and interior point methods. Examples of applications taken from communications, signal processing, machine learning and other fields. Students may receive credit for only one of the following courses: EE109, EE159, or CS169				

144141	Structural Health Monitoring	
Subject:	Catalog Nbr:	
ME	0176	
(Cross-listed as CEE 176) Vibration-based structural health monitoring including system identification of linear systems. Data acquisition, signal processing, modal identification, parameter estimation, and optimization. Recommendations: ES55 and ES56, or consent		

144208	Special Topics in Engineering Education				
	Subject:	Catalog Nbr:			
	ENE	0193			
	2025 SPRG	Primary	Ethan Danahy	ethan.danahy@tufts.edu	
	2025 SPRG	Primary	Merredith Portsmore	merredith.portsmore@tufts.edu	
	2025 SPRG	Primary	Chelsea Andrews	Chelsea.Andrews@tufts.edu	
	2025 SPRG	Primary	William Church	William.Church@tufts.edu	
Special topics in K-12 Engineering Education for practicing educators. See Tufts Engineering Education Program website (teep.tufts.edu) for specific details.					

144209	Cyber for Future Policymakers			
Subject: CS		Catalog Nbr: 0012		
2024 FALL		Primary	David Lillethun	David.Lillethun@tufts.edu
Relevance of computer technologies to policy development. Internet architecture and basic networking, the Web, cloud architectures, cryptography, security and privacy, AI and machine learning, and open-source systems. Developing technologies, including quantum computing and post-quantum cryptography. Recommendations: CS 10 or CS 11.				

144210		How Systems Work			
Subject:		Catalog Nbr:			
CS		0013			
2023 FALL		Primary	Jared Chandler	Jared.Chandler@tufts.edu	

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2024 FALL	Primary	Mark Sheldon	Mark.Sheldon@tufts.edu
How computing systems work: bits, bytes, the representation of information, the CPU, assembly language, programming languages. Networking: including peering, packets, and the Internet. Algorithms and the fundamental limitations of computing. Recommendations: CS 10 or CS 11.			

144211	How Systems Fail		
Subject:	Catalog Nbr:		
CS	0027		
2025 SPRG	Primary	David Lillethun	David.Lillethun@tufts.edu
Failure of computer systems within the larger context of complex systems, including the power grid and aviation. Failures of algorithms and protocols, engineering and implementation, systems and applications, people and culture. Attacks, attack recovery, security, privacy, and attribution. Case studies of failures and attacks, including distributed denial of service, Meltdown, Spectre, and spear-phishing attacks.			

144256	Computational Models in Cognitive Science		
Subject:	Catalog Nbr:		
CS	0134		
2024 FALL	Primary	Johannes De Ruiter	jp.deruiter@tufts.edu
(Cross-listed w/ PSY 141) Scientific logic of using computational models for testing theories in cognitive science. Connectionist and Bayesian models; agent-based simulation. Emphasis upon using models in combination with empirical data to test theories. Appropriate use and critical evaluation of computational modeling as found in scientific publications. Recommendations: CS 10, 11, or equivalent programming experience in any computer language. An introductory course in statistics.			

144257	Deep Neural Networks		
Subject:	Catalog Nbr:		
CS	0137		
2023 FALL	Primary	Liping Liu	Liping.Liu@tufts.edu
Deep neural networks and their applications including computer vision and natural language processing. Feed-forward, convolutional, and recurrent neural networks. Techniques for training deep neural networks, including optimization, regularization, and usage of related software. Recommendations: CS 135, MATH 42, and MATH 70.			

144258	Reinforcement Learning		
Subject:	Catalog Nbr:		
CS	0138		
2023 FALL	Primary	Jivko Sinapov	Jivko.Sinapov@tufts.edu
Agents that learn, plan, and act in complex, uncertain environments. Varying topics that may include practical successes and challenges of reinforcement learning; common software libraries and packages used to implement and test reinforcement learning algorithms, and advanced topics such as transfer learning and			

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deep reinforcement learning. Recommendations: CS 131 and/or CS 135. Proficiency in one of C++, Java, or Python.

144259	Special Topics in the Practice of Software Development		
Subject:	Catalog Nbr:		
CS	0156		
Special topics in the practice of software development. Please see departmental website for specific details and prerequisites.			

144264	Concurrent Programming			
Subject: CS		Catalog Nbr: 0021		
2025 SPRG		Primary	Mark Sheldon	Mark.Sheldon@tufts.edu
Shared memory concurrency including threads, locks, mutexes, semaphores, Deadlock, livelock, shared mutable state. Native concurrency including communicating processes, message send/receive, synchronous and asynchronous communication, isolated mutable state. Team project using students' choice of paradigm and topic. Recommendations: Two programming courses past CS 15.				

144461	Biothermodynamics			
Subject: BME		Catalog Nbr: 0012		
2025 SPRG		Primary	Zheng Zhang	jonathan.zhang@tufts.edu
Fundamental concepts and principles of classical thermodynamics including the first law, the second law, enthalpy, entropy, free energy, equilibrium, and phase transitions. Applications of thermodynamics concepts to biologically important systems and processes such as chemical equilibrium, biomolecular binding, protein folding, oxygen transport, and enzyme kinetics.				
Recommendations: MATH 32, CHEM 2 or 12, or permission of instructor.				

144462	Bio-surfaces and Interfaces			
Subject: BME		Catalog Nbr: 0155		
2024 FALL		Primary	Zheng Zhang	jonathan.zhang@tufts.edu
Physical chemistry of biological surfaces and bio-synthetic interfaces including surface tension, surface free energy, adsorption, diffusion, bio-molecular interactions, chemical/mechanical/electrical aspects of cellular interfaces. Applications to biomedical engineering such as biosensing, immunostaining, drug design, tissue engineering, bioMEMS, and electrophysiology.				
Recommendations: BME 12, or permission of instructor.				

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144464	Visual Programming for Biomedical Data Acquisition and Control	
Subject:	Catalog Nbr:	
BME	0164	
Use of computers and microprocessors to acquire data and control biomedical instruments. The focus of the course is on graphical programming using LabVIEW, MATLAB, GUIDE and Simulink. Elements of programming style. Data acquisition systems. Analog electronics for signal conditioning. Design of feedback control systems. Course project. Prerequisite: ES2 or COMP 11		

144481	Biomechanics: Solids and Fluids			
Subject:	Catalog Nbr:			
BME	0011			
2024 FALL	Primary	Brian Timko	Brian.Timko@tufts.edu	
Solid and fluid mechanics as related to biological systems. Stress, strain, motion and constitutive relations; force, mass, and momentum balances; equilibrium, universal solutions and inflation; extension and torsion, beam bending and column buckling; nonlinear solid biomechanics methods; exact solutions for biologically relevant fluid flow; coupled solid-fluid problems. With demonstrations of methods for measuring mechanical properties of biological systems. Prerequisite: PHY11; Co-requisite: MATH 42				

144482	Biomedical Concepts at the Molecular, Protein and Cellular Scales I			
Subject:	Catalog Nbr:			
BME	0033			
2023 FALL	Primary	Ying Luo	Ying.Luo@tufts.edu	
2024 FALL	Primary	Yu-Ting Dingle	Yu-ting.Dingle@tufts.edu	
2024 FALL	Primary	Madeleine Oudin	Madeleine.Oudin@tufts.edu	
First course of a two-course sequence on biomedical concepts at the molecular, protein and cellular level scales: nucleic acid structure and function, recombinant DNA techniques, genome sequencing, CRISPR gene editing, protein structure and function, regulation of protein expression, signal transduction, cellular receptors. Mix of didactic lectures, case studies, experimental/computational labs, and clinical/industrial presentations/visits. Students may not receive credit for BME 33 and BIO 13, BME 162, or BME 163 Prerequisites or co-requisites: Chem 1 or Phy 11				

144483	Biomedical Concepts at the Molecular, Protein and Cellular Scales II			
Subject: BME	Catalog Nbr: 0034			
2025 SPRG	Primary	Laura Place	Laura.Place@tufts.edu	
2025 SPRG	Primary	Juan Gnecco	Juan.Gnecco@tufts.edu	

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Second course of a two-course sequence on biomedical concepts at the molecular, protein and cellular level scales: enzyme machinery and metabolism in cells, phage display, enzyme engineering, cellular structure and physiology, transport across membranes, cells acting alone and together in systems, stem cells, extracellular matrix, integrating cells into tissues, organs, and the body. Mix of didactic lectures, case studies, experimental/computational labs, and clinical/industrial presentations/visits.

Students may not receive credit for both BME 34 and BME 175.

Prerequisites: BME 33

144499		Modern Optics and Photonics			
Subject:		Catalog Nbr:			
ES		0015			
2024 FALL		Primary		Giulia Guidetti	
		Giulia.Guidetti@tufts.edu			
An introduction to the world of optics and the use of light today. Application of the underlying physics behind light propagation, processing, and detection to practical technological/engineering applications. Concepts include imaging, LEDs, lasers, microscopy, optical coding, fiber optics,information transfer, nanotechnology, and nano-optics.					
Prerequisites or co-requisites: PHY 12, or permission of instructor					

144604		Biomedical Concepts at the Tissue, Organ and Systems Scales I			
Subject:		Catalog Nbr:			
BME		0044			
2025 SPRG		Primary	Lauren Black III	Lauren.Black@tufts.edu	
2025 SPRG		Primary	Laura Place	Laura.Place@tufts.edu	
skin; feedback loops and controllers as applied to physiological homeostasis and control of cellular biochemical pathways; thermodynamics of chemical reactions and reaction kinetics as applied to enzymes; and sensor design & optimization as applied to skin sensors and the central nervous system. Applications to physiological homeostasis, modes of cell and tissue communication, the integumentary system, the immune system and the central nervous system. Instruction using a mix of didactic lectures, case studies, experimental/computational labs and clinical/industrial presentations/visits.					
Prerequisites: BME 33 or BIO 13					

144605		Biomedical Concepts at the Tissue, Organ and Systems Scales II			
Subject:		Catalog Nbr:			
BME		0045			
2023 FALL		Primary	Ying Luo	Ying.Luo@tufts.edu	
2024 FALL		Primary	Lauren Black III	Lauren.Black@tufts.edu	
2024 FALL		Primary	Yu-Ting Dingle	Yu-ting.Dingle@tufts.edu	
Mechanics of solids, lever systems and moments as applied to bones, joints and muscles; linear and nonlinear circuit theory as applied to computational models of the respiratory and cardiovascular systems; mechanics of fluid flow through pipes as applied to vessels and airways; work and thermodynamic cycles as applied to pressure-volume systems of the heart and lungs; and basic control systems theory as applied to regulation of					

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mean arterial pressure in the cardiovascular system. Applications to the musculoskeletal system, motor neurons, the cardiovascular system, the respiratory system, the lymphatic system, metabolism, the renal system and the digestive system. Instruction using a mix of didactic lectures, case studies, experimental/computational labs and clinical/industrial presentations and visits.

Prerequisites: BME 44

144695	Graduate Internship in Chemical & Biological Engineering			
Subject: CHBE		Catalog Nbr: 0299		
2024 FALL		Primary	Ayse Asatekin	Ayse.Asatekin@tufts.edu
2024 SUMR		Primary	Matthew Panzer	Matthew.Panzer@tufts.edu
2025 SPRG		Primary	Nikhil Nair	Nikhil.Nair@tufts.edu
Study of approved topics in Chemical & Biological Engineering in concert with an internship in engineering outside the University. Requires department approval.				

144696	Nano Course			
Subject: ME		Catalog Nbr: 0090		
2024 SUMR		Primary	Jason Rife	Jason.Rife@tufts.edu
Focused study of a selected engineering topic such as an engineering skill, method, or software package. Cannot be counted toward the BSME Major Requirement.				

144697	Biomolecular Engineering and Design			
Subject: CHBE		Catalog Nbr: 0165		
2025 SPRG		Primary	James Van Deventer	James.Van_Deventer@tufts.edu
Protein and nucleic acid engineering and design for applications in basic research, diagnostic and therapeutic development, and sustainable chemical production. Methods and theory including directed evolution, high throughput screening, antibody engineering, genetic code manipulation, nucleic acid nanotechnology, and computational strategies.				

144897	Essentials of Technology Strategy			
Subject: EM		Catalog Nbr: 0201		
2024 FALL		Primary	Samuel Ligero	Samuel.Ligero@tufts.edu
(Cross-listed as TML 201) Elements of technology strategy including portfolio management, development of product/technology roadmaps, product lifecycles, new product development stage gate processes, and intellectual property. Focus on disruptive, incremental, sustaining and breakthrough innovations.				

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144898	Leadership: Personal Development				
Subject:		Catalog Nbr:			
EM		0202			
2024 FALL		Primary	Jerome Brightman	Jerome.Brightman@tufts.edu	
(Cross-listed as TML 202) Individual leadership development to lead effective teams and organizations. Focus on techniques for developing ethical and empathetic leaders.					

144899	Building Financial Intelligence				
Subject:		Catalog Nbr:			
EM		0203			
2024 FALL		Primary	Frank Apeseche	Frank.Apeseche@tufts.edu	
(Cross-listed as TML 203) Development, analysis, and communication of financial aspects of a company’s product or service and the impact on the health and competitiveness of the firm.					

144900	Customer Discovery and Solution Design			
Subject:	Catalog Nbr:			
EM	0204			
2024 FALL	Primary	Debra Reich	Debra.Reich@tufts.edu	
2024 FALL	Primary	Hannah Lippe	Hannah.Lippe@tufts.edu	
2024 FALL	Primary	Bennett Baldwin	Bennett.Baldwin@tufts.edu	
(Cross-listed as TML 204) Identification of target customers and discovery of solutions to unmet needs. The use of tools to systematically generate and sort diverse options to create products and solve customers' needs.				

144901	Milestone Project: New Product & Service Development				
Subject:		Catalog Nbr:			
EM		0205			
2024 SUMR		Primary	Paul Klein	Paul.Klein@tufts.edu	
(Cross-listed as TML 205) Team project to develop business plan for a new product or service.					

144902	Introduction to Data Analytics			
Subject:	Catalog Nbr:			
EM	0206			
2024 FALL	Primary	Kishore Pochampally	Kishore.Pochampally@tufts.edu	
(Cross-listed as TML 206) Data identification, analysis and interpretation to drive strategic and operational success in technology-based companies. Data-based decisions with uncertain or ambiguous conditions, and development of models for decision-making in a business setting.				

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144903	Solving Complex Problems through Systems Thinking			
Subject:	Catalog Nbr:			
EM	0207			
2024 FALL	Primary	James Nash	James.Nash@tufts.edu	
(Cross-listed as TML 207) Interconnected complex systems considering human, political, community, resource, environmental, and social processes. Application of insights from structural influences to maximize impact and solve problems.				

144904	Program and Project Management			
Subject:	Catalog Nbr:			
EM	0208			
2024 FALL	Primary	Gerald Brown	Gerald.Brown@tufts.edu	
2024 FALL	Primary	Kishore Pochampally	Kishore.Pochampally@tufts.edu	
(Cross-listed as TML 208) Methodologies, tools, and strategies for managing projects and portfolios of projects (programs).				

144906	Teaching Computer Science			
Subject:	Catalog Nbr:			
CS	0004			
2025 SPRG	Primary	Megan Monroe	Megan.Monroe@tufts.edu	
Mechanics of teaching, reviewing, and evaluating computer science coursework. Constructive question answering, grading with consistency, and creating an inclusive and welcoming environment. Enrolled students must be undergraduate teaching assistants for Computer Science classes.				

144907	Cyber-Security and Cyber-Warfare				
Subject:	Catalog Nbr:				
CS	0028				
2025 SPRG	Primary	Jeffrey Taliaferro	jeff.taliaferro@tufts.edu		
2025 SPRG	Primary	Ming Chow	ming.chow@tufts.edu		
An interdisciplinary analysis of cybersecurity and cyberwar in the United States and other countries. Policymaking and intelligence aspects of cybersecurity and political science and the technical constraints of computer networks and software. Exploit methods including packet analysis, password cracking, social engineering, reconnaissance, and malware analysis. State-backed and non-state actors engaged in cyber-espionage, counterintelligence, deterrence, and offensive cyber-operations. Prerequisites: Political Science 61 or Computer Science 11.					

144908	Probabilistic Robotics for Human-Robot Interaction			
Subject:	Catalog Nbr:			
CS	0141			
2025 SPRG	Primary	Jivko Sinapov	Jivko.Sinapov@tufts.edu	

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Techniques for probabilistic state estimation and their application to problems such as robot localization, mapping, perception, and planning in the context of Human-Robot Interaction. Machine learning and computer vision techniques commonly used by robots interacting with humans.

Recommendations: Proficiency in C/C++ or Python

144909	Computational Systems Biology			
Subject:		Catalog Nbr:		
CS		0166		
2025 SPRG		Primary	Soha Hassoun	soha.hassoun@tufts.edu
Computational modeling of complex biological systems to analyze their emergent properties and understand or predict system behavior. Molecular and protein modeling in the context of biochemical networks. Application of these models across a select set of applications such as metabolomics, gut microbiome analysis, modularity analysis, flux balance analysis, and biological discovery. Introductions to machine learning, linear systems, and statistical concepts that are commonly used in systems biology.				

144944	Actionable Engineering Diplomacy			
Subject: ES		Catalog Nbr: 0100		
2024 FALL		Primary	Shafiqul Islam	Shafiqul.Islam@tufts.edu
Approaches that leverage tools and techniques from complexity science with negotiation theory for use in solving practical problems with societal relevance. Systems thinking, policy relevance and effective implementation within the context of nonlinearity, uncertainty, and unpredictability associated with coupled natural, engineered, and human systems. Integration of numbers and narratives to create actionable technological solutions with a problem-driven strategy. Prerequisite: MATH 34 or graduate standing Recommendations: ES 2 or COMP11, Probability and Statistics				

144945	Bioelectricity			
Subject:		Catalog Nbr:		
EE		0123		
2024 FALL		Primary	Joel Grodstein	Joel.Grodstein@tufts.edu
(Cross-listed with BME 123) Fundamental physical basis of bioelectricity; understanding its role in various living organisms. Action-potential creation and transmission in the nervous system. Analysis of the heart as a distributed, highly fault-tolerant electrical system. Potential bioelectrical role in morphogenesis (creation of bodily shape). Application of engineering concepts to understand molecular processes associated with bioelectricity.				
Prerequisites: MATH 42 and (PHY 12 or ES 3), or graduate standing				

144946	Digital Design Verification			
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Subject:	Catalog Nbr:			
EE	0165			
2023 FALL	Primary	Joel Grodstein		Joel.Grodstein@tufts.edu
(Cross-listed as CS 147) Verification of digital hardware designs at the Register-Transfer Level (RTL) using System Verilog. Types of verification: formal vs. simulation-based; random vs. targeted; full-chip vs. unit-level; pre-silicon vs. post-silicon. Standardized frameworks: Universal Verification Methodology (UVM). Assertion-based checking, equivalence checking. Prerequisites: EE 25 or EE 126 or graduate standing.				

144947	Digital IC Design using FPGAs			
Subject:	Catalog Nbr:			
EE	0166			
2023 FALL	Primary	Marco Donato		Marco.Donato@tufts.edu
Complete design of a digital integrated circuit. Register-transfer-level design, presilicon verification and timing analysis, test/debug logic insertion, fabrication (via Field-Programmable Gate Array) and post-silicon verification of a full digital design. Prerequisites: EE 25 or EE 126 or graduate standing				

144952	Directed Study			
Subject:	Catalog Nbr:			
DS	0093			
2024 FALL	Primary	Robert Jacob		jacob@cs.tufts.edu
2024 FALL	Primary	Megumi Ando		Megumi.Ando@tufts.edu
2024 FALL	Primary	Michael Hughes		Michael.Hughes@tufts.edu
2024 FALL	Primary	Milod Kazerounian		Milod.Kazerounian@tufts.edu
2025 SPRG	Primary	Alva Couch		alva.couch@tufts.edu
2025 SPRG	Primary	Soha Hassoun		soha.hassoun@tufts.edu
2025 SPRG	Primary	Diane Souvaine		Diane.Souvaine@tufts.edu
2025 SPRG	Primary	Ming Chow		ming.chow@tufts.edu
2025 SPRG	Primary	Lenore Cowen		lenore.cowen@tufts.edu
2025 SPRG	Primary	Donna Slonim		Donna.Slonim@tufts.edu
2025 SPRG	Primary	Remco Chang		Remco.Chang@tufts.edu
2025 SPRG	Primary	Matthias Scheutz		Matthias.Scheutz@tufts.edu
2025 SPRG	Primary	Noah Mendelsohn		Noah.Mendelsohn@tufts.edu
2025 SPRG	Primary	Mark Sheldon		Mark.Sheldon@tufts.edu
2025 SPRG	Primary	Fahad Dogar		Fahad.Dogar@tufts.edu
2025 SPRG	Primary	Johannes De Ruiter		jp.deruiter@tufts.edu
2025 SPRG	Primary	Megan Monroe		Megan.Monroe@tufts.edu
2025 SPRG	Primary	Deborah Sunter		Deborah.Sunter@tufts.edu
2025 SPRG	Primary	Liping Liu		Liping.Liu@tufts.edu
2025 SPRG	Primary	Jivko Sinapov		Jivko.Sinapov@tufts.edu
2025 SPRG	Primary	Susan Landau		Susan.Landau@tufts.edu

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2025 SPRG	Primary	Jeffrey Foster	Jeffrey.Foster@tufts.edu
2025 SPRG	Primary	Elaine Short	Elaine.Short@tufts.edu
2025 SPRG	Primary	Raja Sambasivan	Raja.Sambasivan@tufts.edu
2025 SPRG	Primary	Martin Allen	Martin.Allen@tufts.edu
2025 SPRG	Primary	Richard Townsend	Richard.Townsend@tufts.edu
2025 SPRG	Primary	Abani Patra	Abani.Patra@tufts.edu
2025 SPRG	Primary	Daniel Votipka	Daniel.Votipka@tufts.edu
2025 SPRG	Primary	David Lillethun	David.Lillethun@tufts.edu
2025 SPRG	Primary	Saeed Mehraban	Saeed.Mehraban@tufts.edu
2025 SPRG	Primary	Johes Bater	Johes.Bater@tufts.edu
Guided study of an approved topic. Please see departmental website for specific details.			

144953	Internship in Data Science		
Subject: DS	Catalog Nbr: 0099		
2024 SUMR	Primary	Alva Couch	alva.couch@tufts.edu
2024 SUMR	Primary	Ming Chow	ming.chow@tufts.edu
Study of approved topics in Data Science in concert with an internship in computing or a related field. Prerequisites: Permission of instructor.			

144954	Directed Study		
Subject: DS	Catalog Nbr: 0193		
2023 FALL	Primary	Kathleen Fisher	Kathleen.Fisher@tufts.edu
2024 FALL	Primary	Robert Jacob	jacob@cs.tufts.edu
2024 FALL	Primary	Megumi Ando	Megumi.Ando@tufts.edu
2024 FALL	Primary	Peter Love	Peter.Love@tufts.edu
2024 FALL	Primary	Elyse Cornwall	Elyse.Cornwall@tufts.edu
2024 FALL	Primary	Michael Hughes	Michael.Hughes@tufts.edu
2024 FALL	Primary	Milod Kazerounian	Milod.Kazerounian@tufts.edu
2024 FALL	Primary	Vladimir Podolskiy	Vladimir.Podolskii@tufts.edu
2024 FALL	Primary	Christopher Magnano	Christopher.Magnano@tufts.edu
2024 FALL	Primary	Hari Sundar	Hari.Sundar@tufts.edu
2024 FALL	Primary	Reuth Mirsky	Reuth.Mirsky@tufts.edu
2025 SPRG	Primary	Ethan Danahy	ethan.danahy@tufts.edu
2025 SPRG	Primary	Alva Couch	alva.couch@tufts.edu
2025 SPRG	Primary	Soha Hassoun	soha.hassoun@tufts.edu
2025 SPRG	Primary	Diane Souvaine	Diane.Souvaine@tufts.edu
2025 SPRG	Primary	Ming Chow	ming.chow@tufts.edu
2025 SPRG	Primary	Lenore Cowen	lenore.cowen@tufts.edu
2025 SPRG	Primary	Donna Slonim	Donna.Slonim@tufts.edu
2025 SPRG	Primary	Remco Chang	Remco.Chang@tufts.edu

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2025 SPRG	Primary	Matthias Scheutz	Matthias.Scheutz@tufts.edu
2025 SPRG	Primary	Noah Mendelsohn	Noah.Mendelsohn@tufts.edu
2025 SPRG	Primary	Mark Sheldon	Mark.Sheldon@tufts.edu
2025 SPRG	Primary	Fahad Dogar	Fahad.Dogar@tufts.edu
2025 SPRG	Primary	Johannes De Ruiter	jp.deruiter@tufts.edu
2025 SPRG	Primary	Megan Monroe	Megan.Monroe@tufts.edu
2025 SPRG	Primary	Deborah Sunter	Deborah.Sunter@tufts.edu
2025 SPRG	Primary	Liping Liu	Liping.Liu@tufts.edu
2025 SPRG	Primary	Jivko Sinapov	Jivko.Sinapov@tufts.edu
2025 SPRG	Primary	Susan Landau	Susan.Landau@tufts.edu
2025 SPRG	Primary	Karen Edwards	Karen.Edwards@tufts.edu
2025 SPRG	Primary	Jeffrey Foster	Jeffrey.Foster@tufts.edu
2025 SPRG	Primary	Elaine Short	Elaine.Short@tufts.edu
2025 SPRG	Primary	Raja Sambasivan	Raja.Sambasivan@tufts.edu
2025 SPRG	Primary	Martin Allen	Martin.Allen@tufts.edu
2025 SPRG	Primary	Richard Townsend	Richard.Townsend@tufts.edu
2025 SPRG	Primary	Abani Patra	Abani.Patra@tufts.edu
2025 SPRG	Primary	Daniel Votipka	Daniel.Votipka@tufts.edu
2025 SPRG	Primary	David Lillethun	David.Lillethun@tufts.edu
2025 SPRG	Primary	Saeed Mehraban	Saeed.Mehraban@tufts.edu
2025 SPRG	Primary	Johes Bater	Johes.Bater@tufts.edu
Guided study of an approved topic. Please see departmental website for specific details.			

144955	Internship In Data Science		
Subject:	Catalog Nbr:		
DS	0299		
2025 SPRG	Primary	Alva Couch	alva.couch@tufts.edu
Study of approved topics in Computer Science in concert with an internship in computing or a related field outside the University.			
Prerequisites: Permission of instructor			

145048	Structural Reliability		
Subject:	Catalog Nbr:		
CEE	0227		
Methods of structural reliability analysis based on the theory of probability. Probability of failure of a limit-state function for a structural system at a given performance level.			
Recommendation: ES56 or equivalent			

145049	Network Science		
Subject:	Catalog Nbr:		
CS	0142		

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Methods for analyzing massive graphs and networks that arise from social networks and biological networks. Scalable methods for classification, clustering, centrality, and inference on real-world example datasets. Specialized methods for social networks including link prediction, spread of influence, and emergent communities. Page rank in networks of web pages. Term project to identify a network science problem and test solutions on a real-world dataset.

Recommendations: MATH 70 or 72 or CS 135 or 160.

145050	Seminar in Computer Science			
Subject: CS		Catalog Nbr: 0291		
	2024 FALL	Primary	John Redmond	John.Redmond@tufts.edu
	2025 SPRG	Primary	Diane Souvaine	Diane.Souvaine@tufts.edu
	2025 SPRG	Primary	Jivko Sinapov	Jivko.Sinapov@tufts.edu
	2025 SPRG	Primary	Sandra Schulenburg	Sandra.Schulenburg@tufts.edu
	2025 SPRG	Primary	Margaret Mcculloch	No Email on file.
A weekly seminar with guest speakers discussing research challenges and recent advances in Computer Science. Pass/fail only. Satisfactory completion requires students attend and provide feedback for at least 50% of the seminars.				

145051	Introduction to Circuits and Electronics			
Subject: EE		Catalog Nbr: 0020		
	2023 FALL	Primary	Meredith Hyde	Meredith.Hyde@tufts.edu
	2023 FALL	Primary	Isabela Secanechia	Isabela.Secanechia@tufts.edu
	2024 FALL	Primary	Sameer Sonkusale	sameer@ece.tufts.edu
Definitions of circuit elements, fundamental laws, selected network theorems, controlled sources, energy and power, response of first order circuits, operational amplifiers, semiconductor materials and doping, diodes, MOS field effect transistors, MOS logic circuits, oscilloscope, measurements and instrumentation, computer-aided circuit analysis and design. Associated laboratory project work. Recommendations: MATH 34				

145052	Computer Organization			
Subject: EE		Catalog Nbr: 0025		
	2024 FALL	Primary	Mark Hempstead	Mark.Hempstead@tufts.edu
(Cross-listed w/ CS 45) Computer organization including performance measurement, instruction set architectures, digital arithmetic, processor datapath, control, pipelining, memory hierarchy, caches and input/output. Prerequisite: ES 4				

145080	Non Major Credit			
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Subject:	Catalog Nbr:
DS	0310

145081	Lower Level Elective Crd
Subject:	Catalog Nbr:
DS	0320

145082	Upper Level Elective Crd
Subject:	Catalog Nbr:
DS	0330

145083	Tufts Abroad Program
Subject:	Catalog Nbr:
DS	0340

145084	Masters Degree Cont.
Subject:	Catalog Nbr:
DS	0401
Part-time.Please see departmental website for specific details.	

145085	Masters Degree Continuation
Subject:	Catalog Nbr:
DS	0402
Full-time.Please see departmental website for specific details.	

145087	Grad Teaching Assistant
Subject:	Catalog Nbr:
DS	0405

145088	Grad Research Assistant
Subject:	Catalog Nbr:
DS	0406

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145155	BME Graduate Project			
Subject: BME		Catalog Nbr: 0290		
2025 SPRG	Primary	David Kaplan	david.kaplan@tufts.edu	
2025 SPRG	Primary	Sergio Fantini	sergio.fantini@tufts.edu	
2025 SPRG	Primary	Irene Georgakoudi	Irene.Georgakoudi@tufts.edu	
2025 SPRG	Primary	Lorin Polidora	Lorin.Polidora@tufts.edu	
2025 SPRG	Primary	Fiorenzo Omenetto	Fiorenzo.Omenetto@tufts.edu	
2025 SPRG	Primary	Lauren Black III	Lauren.Black@tufts.edu	
2025 SPRG	Primary	Qiaobing Xu	Qiaobing.Xu@tufts.edu	
2025 SPRG	Primary	Brian Timko	Brian.Timko@tufts.edu	
2025 SPRG	Primary	Madeleine Oudin	Madeleine.Oudin@tufts.edu	
2025 SPRG	Primary	Srivalleesha Mallidi	Srivalleesha.Mallidi@tufts.edu	
2025 SPRG	Primary	Juan Gnecco	Juan.Gnecco@tufts.edu	
2025 SPRG	Primary	Nisha Iyer	Nisha.Iyer@tufts.edu	
Execution of a major, graduate project under the guidance of a faculty adviser. Each project must address a substantive engineering analysis or design problem. Students are required to submit a written report and make an oral presentation of their project work. Students are expected to enroll in this course in the last term of their degree program.				

145184	Data Science for Sustainability			
Subject: CEE		Catalog Nbr: 0132		
2024 FALL	Primary	Deborah Sunter	Deborah.Sunter@tufts.edu	
(Cross-listed w/ DS 143 and ME 173). Emerging topics in data science and statistical learning with applications to the three pillars of sustainability (environmental, economic, and social). Building, estimating and interpreting models used in energy and environmental decision-making with emphasis on social justice. Development of critical consumers and responsible producers of data-driven analysis through: learning a suite of data-driven modeling and prediction tools; building the programming and computing expertise to use those tools; and, developing the ability to formulate analyses to answer questions pertaining to sustainability.				

145246	Data Science for Sustainability			
Subject: DS		Catalog Nbr: 0143		
2024 FALL	Primary	Deborah Sunter	Deborah.Sunter@tufts.edu	
(Cross-listed w/ CEE 0132 and ME 173). Emerging topics in data science and statistical learning with applications to the three pillars of sustainability (environmental, economic, and social). Building, estimating and interpreting models used in energy and environmental decision-making with emphasis on social justice. Development of critical consumers and responsible producers of data-driven analysis through: learning a suite				

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of data-driven modeling and prediction tools; building the programming and computing expertise to use those tools; and, developing the ability to formulate analyses to answer questions pertaining to sustainability.

145247	Data Science for Sustainability			
Subject:	Catalog Nbr:			
ME	0173			
2024 FALL	Primary	Deborah Sunter		Deborah.Sunter@tufts.edu
(Cross-listed w/ CEE 0132 and DS 143). Emerging topics in data science and statistical learning with applications to the three pillars of sustainability (environmental, economic, and social). Building, estimating and interpreting models used in energy and environmental decision-making with emphasis on social justice. Development of critical consumers and responsible producers of data-driven analysis through: learning a suite of data-driven modeling and prediction tools; building the programming and computing expertise to use those tools; and, developing the ability to formulate analyses to answer questions pertaining to sustainability.				

145287	Programming for Data Science			
Subject:	Catalog Nbr:			
CS	0030			
2023 FALL	Primary	Benjamin Stubbs		Benjamin.Stubbs@tufts.edu
2024 FALL	Primary	Alva Couch		alva.couch@tufts.edu
Fundamentals of programming for data-intensive science. Data structures and algorithms for data manipulation, cleaning, and preparation. Design of data manipulation programs. Coding standards and practices. Use and creation of software libraries. Techniques for improving program performance. Examples drawn from data preparation and transformation, statistical data analysis, machine learning, deep learning, and deep data science including recommendation systems and trend analysis.				

145288	Cyber for Future Policymakers			
Subject:	Catalog Nbr:			
CS	0201			
2024 FALL	Primary	David Lillethun		David.Lillethun@tufts.edu
(Cross-listed w/ DHP D291) Graduate version of CS 12. Relevance of computer technologies to policy development. Internet architecture and basic networking, the Web, cloud architectures, cryptography, security and privacy, artificial intelligence and machine learning, and open-source systems. Developing technologies, including quantum computing and post-quantum cryptography. Prerequisites: Graduate standing in a discipline other than Computer Science, Data Science, Bioinformatics, Cognitive Science, or Human-Robot Interaction. Recommendation: An introductory course in computer science including programming in any language, roughly equivalent to CS 10 or 11.				

145289	How Systems Work			
Subject:	Catalog Nbr:			

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CS	0202			
	2023 FALL	Primary	Jared Chandler	Jared.Chandler@tufts.edu
	2024 FALL	Primary	Mark Sheldon	Mark.Sheldon@tufts.edu
(Cross-listed w/ DHP D292) Graduate version of CS 13. How computing systems work: bits, bytes, the representation of information, the CPU, assembly language, programming languages. Networking: including peering, packets, and the Internet. Algorithms and the fundamental limitations of computing. Recommendations: An introductory course in computer science including programming in any language, roughly equivalent to CS 10 or 11.				

145290	How Systems Fail			
	Subject:	Catalog Nbr:		
	CS	0203		
	2025 SPRG	Primary	David Lillethun	David.Lillethun@tufts.edu
(Cross-listed w/ DHP D293) Graduate version of CS 27. Failure of computer systems within the larger context of complex systems, including the power grid and aviation. Failures of algorithms and protocols, engineering and implementation, systems and applications, people and culture. Attacks, attack recovery, security, privacy, and attribution. Case studies of failures and attacks, including distributed denial of service, Meltdown, Spectre, and spear-phishing attacks.				

145292	Graduate Internship in Mechanical Engineering			
	Subject:	Catalog Nbr:		
	ME	0299		
	2024 FALL	Primary	Behrouz Abedian	behrouz.abedian@tufts.edu
	2024 FALL	Primary	Deborah Sunter	Deborah.Sunter@tufts.edu
	2024 FALL	Primary	Jivko Sinapov	Jivko.Sinapov@tufts.edu
	2024 FALL	Primary	Elaine Short	Elaine.Short@tufts.edu
	2024 FALL	Primary	Abani Patra	Abani.Patra@tufts.edu
	2024 FALL	Primary	Greses Perez	Greses.Perez@tufts.edu
	2024 FALL	Primary	Markus Nemitz	Markus.Nemitz@tufts.edu
	2025 SPRG	Primary	Michael Zimmerman	Michael.Zimmerman@tufts.edu
	2025 SPRG	Primary	Michael Wiklund	michael.wiklund@tufts.edu
	2025 SPRG	Primary	Mark Kachanov	mark.kachanov@tufts.edu
	2025 SPRG	Primary	Anil Saigal	anil.saigal@tufts.edu
	2025 SPRG	Primary	Chris Rogers	chris.rogers@tufts.edu
	2025 SPRG	Primary	Daniel Hannon	Dan.Hannon@tufts.edu
	2025 SPRG	Primary	Douglas Matson	Douglas.Matson@tufts.edu
	2025 SPRG	Primary	Gary Leisk	Gary.LEISK@tufts.edu
	2025 SPRG	Primary	Robert White	R.White@tufts.edu
	2025 SPRG	Primary	Kristen Wendell	Kristen.Wendell@tufts.edu
	2025 SPRG	Primary	Jason Rife	Jason.Rife@tufts.edu
	2025 SPRG	Primary	Marc Hodes	Marc.Hodes@tufts.edu
	2025 SPRG	Primary	Luisa Chiesa	Luisa.Chiesa@tufts.edu

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2025 SPRG	Primary	Pratap Misra	Pratap.Misra@tufts.edu
2025 SPRG	Primary	Briana Bouchard	Briana.Bouchard@tufts.edu
2025 SPRG	Primary	Igor Sokolov	Igor.Sokolov@tufts.edu
2025 SPRG	Primary	Jeffrey Guasto	Jeffrey.Guasto@tufts.edu
2025 SPRG	Primary	Erica Kemmerling	Erica.Kemmerling@tufts.edu
2025 SPRG	Primary	James Intriligator	James.Intriligator@tufts.edu
2025 SPRG	Primary	Hoda Koushyar	Hoda.Koushyar@tufts.edu
2025 SPRG	Primary	Matthew Woodward	Matthew.Woodward@tufts.edu
2025 SPRG	Primary	Felix Huang	Felix.Huang@tufts.edu
2025 SPRG	Primary	Trevion Henderson	Trevion.Henderson@tufts.edu
2025 SPRG	Primary	Dave Miller	Dave.Miller@tufts.edu

A mentored preprofessional experience in mechanical engineering at an off-site organization. The department will grant course credit for internships if the following conditions are met: 1) The student submits a written internship proposal that is approved by the department prior to the semester in which the internship will be performed (no internships with course credit will be approved once the semester of the internship has started), 2) a faculty mentor has supervisory control of any work that receives credit, and 3) a written report is submitted that will be evaluated by the faculty adviser and the outside institutional supervisor.
Prerequisite: Graduate Standing and Permission of Department.

145297	Privacy in the Digital Age		
Subject:	Catalog Nbr:		
CS	0183		
2025 SPRG	Primary	David O'Brien	David.O_brien658468@tufts.edu
(Cross-listed with DHP P237) This module will provide an introduction to the threats to and protections for privacy in the digital age, examining public and private sector threats, and looking at issues from an international point of view. Topics to be covered include privacy threat models, location tracking and first and third party collection by private parties, government threats to privacy, and privacy protective technologies. No programming background needed, but a willingness and interest to play with digital tools is required.			

145371	Bioelectricity		
Subject:	Catalog Nbr:		
BME	0123		
2024 FALL	Primary	Joel Grodstein	Joel.Grodstein@tufts.edu
(Cross-listed with EE 123) Fundamental physical basis of bioelectricity; understanding its role in various living organisms. Action-potential creation and transmission in the nervous system. Analysis of the heart as a distributed, highly fault-tolerant electrical system. Potential bioelectrical role in morphogenesis (creation of bodily shape). Application of engineering concepts to understand molecular processes associated with bioelectricity. Prerequisites: MATH 42 and (PHY 12 or ES 3), or graduate standing			

145373	Introduction To Biophotonics		
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Subject:	Catalog Nbr:
EE	0151
(cross-listed as BME 151 and MSE151) Basic concepts in electromagnetism and light matter interactions, including optical properties, absorption, near-infrared, light scattering and fluorescence spectroscopy, microscopy, optical coherence tomography and photodynamic therapy and their relevance to human disease diagnostic and therapeutic applications.	

145374	Graduate Introduction To Biophotonics
Subject:	Catalog Nbr:
EE	0253
(Cross-listed w/ BME 251 & EE 253) A graduate-level version of BME 51. Additional homework problems and a term paper are required for graduate level credit. Recommendations: PHY 31, or BME 215, or permission of instructor. Graduate students only.	

145380	Tufts Transformative Leadership Community
Subject:	Catalog Nbr:
UCW	0030
2023 FALL	Primary Monica Pheifer No Email on file.
The workshops described below are offered as part of Tufts Transformative Leadership Community, a go-to resource for learning, advice and thought-provoking experiences that support your growth as a leader throughout your career.	

145436	Introduction to Music Engineering
Subject:	Catalog Nbr:
ES	0062
2024 FALL	Primary Kelsey Rogers Kelsey.Rogers@tufts.edu
2024 FALL	Primary Daniel Fox Daniel.Fox@tufts.edu
Interdisciplinary course in the science, engineering and technology of music - from creation, to propagation, to reception. Demonstrations, discussion, and interactive projects. Physics of sound. Acoustic and electronic musical instrument design. Room acoustics. Sound production and recording. Human perception of sound.	

145437	Special Topics in Engineering Management
Subject:	Catalog Nbr:
EM	0193
2024 FALL	Primary Ronald Lasser Ron.Lasser@tufts.edu
Special Topics in Engineering Management	

145438	Advanced Topics in Data Analytics
Subject:	Catalog Nbr:

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EM	0213				
	2023 FALL	Primary	Kishore Pochampally	Kishore.Pochampally@tufts.edu	
Use of established software frameworks to support applied projects in data science. Topics include: PyMC3, PySpark, NLP tools, PyTorch, TensorFlow, Keras, Flask and Docker.					
Pre-requisite EM206 or instructor consent.					

145439	Modern Product Management				
	Subject:	Catalog Nbr:			
	TML	0222			
	2024 SUMR	Primary	Warren Hilton	Warren.Hilton@tufts.edu	
Basic product management processes from ideation through launch. Topics include stakeholder mapping, standard taxonomy, customer workflows, business stage and strategy evaluation, metrics and evaluation of a product, and communication skills for product managers.					

145440	Advanced Topics In Product Management				
	Subject:	Catalog Nbr:			
	TML	0223			
	2024 SPRG	Primary	Warren Hilton	Warren.Hilton@tufts.edu	
Pressing topics in the product process including pricing, go-to market acceleration, building and ecosystem and lifecycle management.					

145441	Discovering Your Leadership Creativity				
	Subject:	Catalog Nbr:			
	TML	0124			
	2024 SUMR	Primary	Jerome Brightman	Jerome.Brightman@tufts.edu	
Foundations for creativity and innovation that can be used in a variety of business and technical roles. Topics include: self-awareness, mental models, influence of organizational culture on creativity and innovation, and systems thinking for creativity.					

145442	Supply Chain and Operations Management				
	Subject:	Catalog Nbr:			
	EM	0232			
	2025 SPRG	Primary	Gerald Brown	Gerald.Brown@tufts.edu	
Basic supply chain and operations functions such as sourcing, materials management, operations planning, distribution, logistics, retail, demand forecasting, and order fulfillment.					

145443	Marketing: Branding and Strategy				
	Subject:	Catalog Nbr:			

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EM	0243				
	2023 FALL	Primary	Marci Sapers	Marci.Sapers@tufts.edu	
Overview of what makes brands successful including proven “Brand Building Frameworks”. Development of key elements needed to write strong brand positioning statements and pragmatic skills to market products and/or services in corporate environments.					

145444	Introduction to Management Consulting				
	Subject:	Catalog Nbr:			
	EM	0244			
	2024 FALL	Primary	Partha Ghosh	Partha.Ghosh@tufts.edu	
Problem-solving frameworks and analytical techniques used to make strategic choices between business models and technologies with different risk profiles. Topics include: strategies for analyzing complex problems, strategic management of corporate and business units, effective communication and storytelling.					

145457	Network Security				
	Subject:	Catalog Nbr:			
	CS	0114			
	2025 SPRG	Primary	Daniel Votipka	Daniel.Votipka@tufts.edu	
Vulnerabilities, attacks, and mitigations at all layers of the network stack. Public and private key cryptography, confidentiality and authentication protocols, botnets, firewalls, intrusion detection systems, and communication privacy and anonymity. Recommendations: CS 40.					

145458	Visual Analytics				
	Subject:	Catalog Nbr:			
	CS	0178			
The science of combining interactive visual interfaces with data science, machine learning, and AI algorithms to support analytical reasoning. Principles, approaches, and tools for deriving insight from large, dynamic, ambiguous, and often conflicting data, and communicating findings effectively to aid in decision-making. Theoretical foundations illustrated via applying and developing visual analytics tools, as well as evaluating the effectiveness of these tools. Recommendations: CS 20 or 120.					

145460	Master of Science Capstone Project II				
	Subject:	Catalog Nbr:			
	CS	0289			
	2023 FALL	Primary	Ming Chow	ming.chow@tufts.edu	
	2025 SPRG	Primary	Martin Allen	Martin.Allen@tufts.edu	
Part two of a two-course, hands-on, project-based culmination experience for the Master of Science in					

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Computer Science Online program. Implementation of the project defined in part one, including use of principles, tools, and strategies for implementation, debugging, testing, documentation, maintenance, and release management. Presentation of final project results and documentation. To be taken in the last term of the Master of Science in Computer Science Online degree. Not available to students outside that program. Prerequisites: CS 288, and enrollment in the Master of Science in Computer Science Online program.

145465	Cyberlaw and Cyberpolicy			
Subject:	Catalog Nbr:			
CS	0184			
2024 FALL	Primary	Susan Landau		Susan.Landau@tufts.edu
(Cross-listed w/ ILO 184) The complex legal issues of cyberspace, including the effect of the Digital Revolution on existing laws concerning wiretapping, copyright, and espionage; influence of the Digital Revolution on First, Fourth, and Fifth Amendment law; failure and solutions of copyright in the Digital Age; failures and limitations of the Computer Fraud and Abuse Act, and function of the Law of Armed Conflict. Focus is placed on U.S. law and jurisprudence, with some consideration of international perspectives.				
Recommendations: familiarity with Internet systems and/or law and policy				

145487	Cyber in the Civilian Sector: Threats and Upheavals			
Subject:	Catalog Nbr:			
CS	0182			
2024 FALL	Primary	Josephine Wolff		Josephine.Wolff@tufts.edu
(Cross-listed w/ DHP P236) There is a myth that the Internet erases borders. But as Internet companies' ability to place localized ads show, that's false. What's more accurate is that the Internet complicates a nation's ability to control of the flow of information within its borders. (This is not a new challenge for sovereign nations; consider the telegraph.) This fluidity has created great economic opportunity and simplified trans-border access, the latter potentially threatening security and other basic state functions. With bits increasingly controlling the world around us, the Digital Revolution poses a highly disruptive threat. In this course, we'll explore cyber clashes in the civilian sector: from jurisdictional issues and the challenges posed by new technologies to criminal activities and impacts on civil infrastructures. While several of the topics are also covered in International Cyber Conflict: An Introduction to Power and Conflict in Cyberspace, DHP P249, the intersection between the two courses will be relatively minimal. Cyber in the Civilian Sector will have a greater focus on technology and, naturally enough, on the civilian, as opposed to national security, side of the house.				

145497	Cellular Agriculture & Biofabricated Foods			
Subject:	Catalog Nbr:			
BME	0173			
2023 FALL	Primary	David Kaplan		david.kaplan@tufts.edu
2024 FALL	Primary	Matthew McNulty		Matthew.McNulty@tufts.edu
(Cross-listed as NUTR 253) Introduction to the concepts of cellular agriculture, food science and the use of biotechnology in food production. Laboratory experience in cell culture and biomaterials processing from cell				

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isolation to generation of in vitro meat using tissue engineering techniques. Course culminates in a scientific, creative proposal based on student interests.

145498	Cellular Agriculture & Cultured Meat Lab			
Subject:		Catalog Nbr:		
BME		0174		
2024 FALL	Primary	Jordan Jones	Jordan.Jones@tufts.edu	
2025 SPRG	Primary	Lorin Polidora	Lorin.Polidora@tufts.edu	
2025 SPRG	Primary	Jake Marko	No Email on file.	
Scientific process of producing meat from cell culture (termed "cultured meat"). Cell isolations and cell culture, cell analysis (such as immunostaining), and various food science analyses (of texture, flavor, etc.). Distinctions between biomedical engineering for food and biomedical engineering for medicine, demonstration of key areas of research that are needed to advance the field of cellular agriculture. Recommendation: BME 0173				

145499	BME Entrepreneurship & Strategy			
Subject:	Catalog Nbr:			
BME	0184			
2025 SPRG	Primary	Janet Krevolin	Janet.Krevolin@tufts.edu	
Translational research, strategic business planning, and inter-functional leadership critical to the successful development of biomedical innovation. Conceptual development through commercialization of a med-tech product. Establishes a foundation upon which one can evaluate opportunities, formulate a business plan, identify executable steps towards a commercialization goal.				
Recommendations: Junior, Senior, Graduate standing				

145500	Applied Probability Theory			
Subject:		Catalog Nbr:		
CEE		0201		
2024 FALL		Primary	Shafiqul Islam	Shafiqul.Islam@tufts.edu
Foundational treatment of probability theory with a focus on science and engineering applications. Elements of probability theory, random variables and their properties, probability distributions: discrete and continuous, conditional probability, joint distributions, derived distributions, laws of large numbers and reality of small numbers, properties of estimators, and estimation of confidence intervals. Emphasis on analysis and implications of small data, data from skewed and fat-tail distributions commonly used in risk analysis and engineering decision making.				
Recommendation: Undergraduate Level Probability & Statistics and Coding Experience				

145501	Data Analysis and Statistical Methods		
Subject:		Catalog Nbr:	

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CEE	0202				
	2024 FALL	Primary	Shafiqul Islam	Shafiqul.Islam@tufts.edu	
Exploratory data analysis, descriptive statistics, representativeness of samples, inferential statistics, statistical estimation, sampling distributions of estimators, residual analysis, and confidence intervals.					
Recommendation: CEE201					

145502	Statistical Inferences and Prediction				
	Subject:	Catalog Nbr:			
	CEE	0203			
	2025 SPRG	Primary	Jonathan Lamontagne	Jonathan.Lamontagne@tufts.edu	
Foundational treatment of statistical inference and prediction methods with a focus on science and engineering applications. Frequentist and Bayesian statistical tests and inference, linear and multi-linear regression, logistic regression, regression versus classification, and clustering. Emphasis on analysis and implications of using small, incomplete and missing data sets.					
Recommendation: CEE201 and CEE 202					

145503	Hypothesis Testing and Uncertainty Analysis				
	Subject:	Catalog Nbr:			
	CEE	0204			
	2025 SPRG	Primary	Jonathan Lamontagne	Jonathan.Lamontagne@tufts.edu	
Formulation of hypotheses, and design of tests to accept or reject hypotheses. Examination of the role of uncertainty, statistical significance and societal relevance by connecting numbers and narratives for various data driven decision making applications. Focus is placed on understanding and explaining what can or cannot be inferred from a given set of data.					
Recommendation: CEE201 and CEE 202 or permission from instructor					

145504	Problem Focused Immersion for Making Data Driven Decisions				
	Subject:	Catalog Nbr:			
	CEE	0209			
	2024 FALL	Primary	Shafiqul Islam	Shafiqul.Islam@tufts.edu	
	2025 SPRG	Primary	Jonathan Lamontagne	Jonathan.Lamontagne@tufts.edu	
Year-long interdisciplinary immersion into identifying and solving problems that lead to effective data-driven decision making. Focused feedback provided to foster and clarify research development. Must be taken in sequential terms beginning in the fall term.					

145505	Physical Hydrology				
	Subject:	Catalog Nbr:			
	CEE	0211			
	2025 SPRG	Primary	Shafiqul Islam	Shafiqul.Islam@tufts.edu	

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Water science related precipitation, evapotranspiration, infiltration and streamflow. Application of data and models to describe aspects of the hydrologic cycle and address a range of applied problems in water resources engineering. Emphasis on uncertainties, scales, and societal impact.

145506	Off Shore Wind Structures			
Subject:		Catalog Nbr:		
CEE		0220		
2025 SPRG		Primary	Daniel Kuchma	Dan.Kuchma@tufts.edu
Design and analysis of structures that support wind turbines. Topics include steady state & turbulent winds, drag & inertial effects from waves, turbine rotor induced loadings, aerodynamics, hydrodynamics, turbine control, dynamic response, metocean conditions, and seabed properties. Focus placed on a hand-based process for the selection, design, and assessment of offshore wind turbine support structures. Validation of designs using computational models.				

145507	Virtual Machines and Language Translation		
	Subject:	Catalog Nbr:	
	CS	0106	
Translation of high-level, functional programming languages to virtual-machine code. Design and implementation of register-based virtual machines and instruction sets. Bytecode interpretation. Function calls including optimized tail calls. Virtual assembly language, virtual object code, and code loading. Automated memory management (garbage collection). Functional-programming techniques for translation. Composition of translation passes using an error monad. Parsing and unparsing. Parsing combinators. Translation of higher-order functions via closure conversion. Naive register allocation by reduction to K-normal form. Code generation from K-normal form to virtual assembly language. Lightweight benchmarking.			

145508	Computing for Developing Regions			
Subject:		Catalog Nbr:		
CS		0185		
2025 SPRG		Primary	Fahad Dogar	Fahad.Dogar@tufts.edu
An interdisciplinary approach to the role of computing technologies in developing regions. Low-cost communication infrastructure; socially relevant technologies for education, healthcare, and governance; and the use of technology by underserved communities and populations in developing regions. Problems and existing solutions covered through case studies. Group projects on designing, implementing, and evaluating a solution.				
Recommendations: CS10 or CS11 or some background in computer science and/or technology.				

145509	Master's Thesis in Data Science	
Subject:	Catalog Nbr:	
DS	0295	
Guided individual study of an approved topic suitable for a master's thesis in Data Science. Please see		

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departmental website for additional information.

145511	Engineering Education Field Experience				
	Subject:	Catalog Nbr:			
	ENE	0090			
	2024 FALL	Primary	Merredith Portsmore	merredith.portsmore@tufts.edu	
	2025 SPRG	Primary	Chelsea Andrews	Chelsea.Andrews@tufts.edu	
Work and study in programs with a focus on Engineering Education in pre-K through university settings. Placements include CEEO's STOMP program, CSD's STEM Ambassadors, Learning Assistants, Equity Learning Assistants, and Teaching Assistant positions that include teaching responsibilities.					
Prerequisite: Departmental Consent					

145512	Special Topics in Engineering Education			
Subject:	Catalog Nbr:			
ENE	0093			
2025 SPRG	Primary	Chelsea Andrews	Chelsea.Andrews@tufts.edu	
Special topics in Engineering Education.				

145513	Creativity, Innovation and Entrepreneurial Thinking			
Subject:	Catalog Nbr:			
ENT	0100			
2023 FALL	Primary	Luke Fraser	Luke.Fraser@tufts.edu	
2025 SPRG	Primary	Elizabeth Goodrich	Elizabeth.Goodrich@tufts.edu	
Tools and techniques to promote creativity and innovation with application to everyday problem solving, launching new ventures, and working in businesses and non-profit organizations. Rapid ideation workshops for novel solutions and innovations. Tools to stimulate brainstorming and creativity. This class is designed for undergraduate students, particularly Freshmen and Sophomores, who have not taken an ENT core course and are interested in learning more about innovation and entrepreneurship. Restrictions on Enrollment: No previous ENT credit Recommendation: Students with significant design thinking, innovation or entrepreneurship experience should not take this introductory class.				

145514	Entrepreneurship for Computer Scientists			
Subject:	Catalog Nbr:			
ENT	0151			
Overview of entrepreneurship, development of an entrepreneurial perspective, framework for learning the fundamentals of the essential elements of entrepreneurial ventures. Focus on software-related industries and products. Develop technical ideas into potential business opportunities, evaluate likelihood of becoming a				

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viable business. Market research, go-to-market strategies, value propositions and differentiation of products or services from competitors.

Restrictions on Enrollment: Computer science or data science majors and minors with junior or senior standing, or CS or DS graduate students

145515	Entrepreneurial Business Law			
Subject:		Catalog Nbr:		
ENT		0163		
2024 FALL		Primary	Josef Volman	Josef.Volman@tufts.edu
Legal issues and considerations common to the business life cycle. Formation, seed and venture capital financing, mergers and acquisitions, initial public offerings, securities law, employment and intellectual property, and governance considerations. Negotiation of various financing and other transactions. Speakers from the private equity, venture capital, and investment banking worlds as well as executives who have exited through a public offering or sale of their company.				
Enrollment Restriction: Sophomore standing				

145593	Deconstructing Engineering Design		
Subject:		Catalog Nbr:	
ENE		0010	
Exploration of the engineering design process. Engineering methodology is examined with respect to history, society, and culture. Culminates in a complete engineering design project. No prior coursework or experience is necessary.			

145594	Engineering for Future Changemakers		
Subject:		Catalog Nbr:	
ENE		0011	
Overview of key topics in engineering for individuals interested in careers in policy, government, and other systems-level change structures. Topics include artificial intelligence and robotics, sustainable cities, and tools for application of science. Hands on experience with aspects of engineering projects including scope, constraints, and evaluation.			

145666	Business Communications: Written Skills		
Subject: EM		Catalog Nbr: 0252A	
Apply principles of effective, inclusive written communication for different purposes and different audiences in the workplace. Strategies and methodologies to improve tone, focus, clarity, and organization in both day-to-day and formal writing.			

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145667	Business Communications: Presentation Skills			
Subject: EM		Catalog Nbr: 0252B		
2025 SPRG		Primary	Amy Hirschfeld	amy.hirschfeld@tufts.edu
Planning and delivering effective business presentations for diverse audiences, including creating clear, engaging slides and data graphics. Gain confidence in public speaking for in-person and virtual formats.				

145668	Data Visualization and Communication			
Subject: EM		Catalog Nbr: 0251		
2024 FALL		Primary	Kyle Monahan	Kyle.Monahan@tufts.edu
Concepts of visual analytics such as visual reports and dashboards with a hands-on tutorial using leading self-service business intelligence and data visualization tools. Hands-on exercises to identify datasets, explore, analyze, filter and structure data to communicate via visualizations.				

145669	Leadership in the Age of Technology			
Subject:		Catalog Nbr:		
TML		0121		
2024 FALL		Primary	Will Trevor	Will.Trevor@tufts.edu
Theory and practice of leadership in the Age of Technology. Necessity for leaders to confront change and embrace the technologies in a world that is increasingly volatile, uncertain, complex, and ambiguous. Human-centered soft skills to lead teams that are increasingly remote and global. Hard skills to plan and organize. Navigatation of ethical and moral dilemmas inherent in balancing the needs of people, planet, and profit.				

145670	Essentials of Strategic Management			
Subject: EM		Catalog Nbr: 0209		
2025 SPRG		Primary	Partha Ghosh	Partha.Ghosh@tufts.edu
(Cross-listed as TML 209) Use of analytics driven insight and imaginative reasoning in making strategic decisions. Integration of the emerging geo-economic, environmental, geo-political, technological and demographic trends with analytical techniques including game & option(s) theories.				

145671	Prescriptive Analytics			
Subject: EM		Catalog Nbr: 0257		
2025 SPRG		Primary	Kishore Pochampally	Kishore.Pochampally@tufts.edu
Quantitative models for effective and efficient decision-making. Applications in fields such as operations, supply chain, marketing, human resource, and finance. Identification of decision variables, the objective function, and the constraints. Modeling skills and efficient solution methods with a proper selection of				

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software. Sensitivity analysis. Excel Solver® and Python will be used.

145672	Industry Consulting Project – Online Team Practicum				
Subject:		Catalog Nbr:			
EM		0271			
2024 SUMR		Primary	Gerald Brown	Gerald.Brown@tufts.edu	
Problem solving /consulting skills through work with a company. Student teams act as consultants and make recommendations to a company by solving specific strategic and operational problems or developing new opportunities, through analytics driven insights and imaginative reasoning.					

145673	Immersive Experience: Innovation				
Subject:	Catalog Nbr:				
EM	0275				
2024 SUMR	Primary	Samuel Liggero		Samuel.Liggero@tufts.edu	
Immersive synchronous experience occurring over one weekend. Innovation across multiple disciplines and industries with an emphasis on future trends in technology. Team-building and networking activities including business case analysis, role-playing, scenario planning and other group work.					

145775	Electrical Circuits and Biomedical Applications			
Subject:	Catalog Nbr:			
BME	0010			
2024 FALL	Primary	Giles Blaney	Giles.Blaney@tufts.edu	
Fundamentals of electrical circuits, resistors, basic laws, methods of analysis, and network theorems. Capacitors, inductors, and impedance. Transient and steady-state sinusoidal analysis of electrical circuits. Laplace and Fourier analysis. Frequency response of circuits and transfer function. Basic concepts of amplifiers and operational amplifiers. Biomedical applications of electrical circuit concepts and methods.				
Prerequisite: MATH 34				

145818	Advanced Research Methods in Human Factors Eng			
Subject:	Catalog Nbr:			
ENP	0264			
2024 FALL	Primary	David Aurelio	David.Aurelio@tufts.edu	
Human factors methods to propel product development. Literature review methodology, contextual inquiry, morphological ordering, affinity diagrams, journey maps, data visualization, traceability matrix, expert reviews, mental model development, psychophysics (differences, preferences, acceptability), psychomotor, and psychometrics. Advanced research planning, design, execution, analysis and impact. Applications, possibly including driver distraction, human performance and fatigue, video game testing, and addictive UI design.				

145819	Immersive Experience: Leadership			
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Subject:	Catalog Nbr:			
EM	0276			
2025 SPRG	Primary	Samuel Ligero	Samuel.Ligero@tufts.edu	
Immersive synchronous experience held over one weekend comprising a series of lectures, discussions and workshops with overarching themes across multiple disciplines and industries. Emphasis on future trends in technology. Networking and social engagement opportunities for students, faculty and staff. Team-Building activities including business case analysis, role-playing, scenario planning and other group work.				

145820	The Science of Sales			
Subject:	Catalog Nbr:			
ENT	0106			
2025 SPRG	Primary	John Derby	Jack.Derby@tufts.edu	
Process, tools, technology, metrics and most importantly, the people that are required to sell, close orders and bring in revenue. Enrollment Restriction: sophomore standing				

145821	Consumer Product Ventures			
Subject:	Catalog Nbr:			
ENT	0161			
2024 FALL	Primary	Joshua Wiesman	Joshua.Wiesman@tufts.edu	
2024 FALL	Primary	Kathryn Weiler	Kathryn.Weiler@tufts.edu	
The entrepreneurial process from conception to commercialization or launch of a new venture focused on a consumer product. Enrollment Requirement: Sophomore Standing				

145822	Climate Change Science and Engineering			
Subject:	Catalog Nbr:			
CEE	0103			
2023 FALL	Primary	John Durant	john.durant@tufts.edu	
Broad exposure to the interdisciplinary nature of responses to climate change. Sources and behavior of greenhouse gases in the atmosphere; mitigation strategies to reduce greenhouse gas emissions; adaptation strategies for reducing climate change impacts on humans and the environment. Low carbon fuels, sea-level rise planning and management, geo-engineering, economic and policy considerations. Emphasis on local examples and on project-based learning. Course is open to juniors, seniors, and graduate students. Recommendations: CHEM1 or CHEM11 Enrollment Requirement: Junior Standing				

145823	Nano Course			
Subject:	Catalog Nbr:			
CEE	0092			

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2024 FALL	Primary	James Limbrunner	James.Limbrunner@tufts.edu
Focused study of a selected engineering topic such as an engineering skill, method, or software package. Cannot be counted toward the Major Requirement for BSCE, BSEvE, BSE-EH or BSE-Arch.			

145873	Theory And Applications Of Polymer Materials And Processing		
Subject: CHBE	Catalog Nbr: 0114		
2024 FALL	Primary	Michael Zimmerman	Michael.Zimmerman@tufts.edu
(Cross-listed w/ ME 114 & MSE 171). Fundamental of polymer materials, including organic chemistry, polymerization, and molecular structure of thermoplastic and thermoset polymers. Four modes of mechanical deformation of polymers: glassy, viscoelastic, rubbery, viscous. Properties of polymers different than ceramics and metals, including behavior above and below glass transition temperature and time dependent properties (creep/stress relaxation). Polymer processing techniques, including injection molding, blow molding, thermoforming. Hands-on lab techniques to measure properties; design projects using data to inform material selection. Recommendation: ME 11			

145880	Site Remediation Tech		
Subject: CHBE	Catalog Nbr: 0143		
2024 FALL	Primary	Paul Dombrowski	Paul.Dombrowski@tufts.edu
(Cross-listed w/ CEE 143). Conventional and innovative remediation technologies are examined under the remedial investigation/feasibility study (RI/FS) process. Knowledge of fundamental processes governing remedy implementation is integrated with an understanding of site characterization and applicable regulations to enable design of site-specific treatment systems for clean-up of the contaminated subsurface environment. Recommendations: CEE 12 and CEE 32, or consent of instructor			

145893	Collaborative Introduction to Computer Science		
Subject: CS	Catalog Nbr: 0001		
An optional preparatory course for students with no prior programming experience and limited experience in college-level STEM classes. Basics of programming including variables, control flow, subroutines, and problem solving in a hands-on, collaborative environment. The class will meet over the latter half of the semester, and prepare students to enter CS11 with prior exposure to topics that CS 11 discusses in depth. Pass/fail grading. Recommendations: high school algebra.			

145904	Digital Marketing: Strategy and Applications		
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Subject:	Catalog Nbr:				
TML	0123				
2024 SPRG	Primary	Will Trevor		Will.Trevor@tufts.edu	
Introduction to the dynamic world of digital marketing. Email marketing; search engine optimization (SEO); social media and content marketing; online advertising and metrics; conversions. Development of a strategic approach to digital marketing. Application of digital marketing across different contexts.					

145905	Immersive Experience: Business Analytics				
Subject:	Catalog Nbr:				
EM	0277				
Immersive synchronous experience held over one weekend comprising a series of lectures, discussions and workshops with overarching themes across multiple disciplines and industries. Emphasis on best practice and next practice in Data and Business Analytics. Networking and social engagement opportunities for students, faculty and staff. Team-Building activities including business case analysis, roleplaying, scenario planning and other group work.					

145906	Sustainable Water Engineering				
Subject:	Catalog Nbr:				
CHBE	0133				
(Cross-listed with CEE 133) Means of providing safe, reliable, and cost-effective potable water, sanitation, and water quality protection through municipal infrastructure. Methods of ensuring resilience and adaptation to changes in source quality and climate. Treatment and process design integrating considerations of cost and sustainability. Design projects using mandated standards. Recommendations: CEE 32 or consent of instructor					

145931	Computer Organization				
Subject:	Catalog Nbr:				
CS	0045				
2024 FALL	Primary	Mark Hempstead		Mark.Hempstead@tufts.edu	
(Cross-listed w/ EE 25) Computer organization including performance measurement, instruction set architectures, digital arithmetic, processor datapath, control, pipelining, memory hierarchy, caches and input/output. Prerequisite: ES 4					

145939	Programming for Data Science				
Subject:	Catalog Nbr:				
CS	0204				
2024 FALL	Primary	Alva Couch		alva.couch@tufts.edu	
algorithms for data manipulation, cleaning, and preparation. Design of data					

Course Bulletin

manipulation programs. Coding standards and practices. Use and creation of software libraries. Techniques for improving program performance. Examples drawn from data preparation and transformation, statistical data analysis, machine learning, deep learning, and deep data science including recommendation systems and trend analysis. Co-located with CS 30. Students enrolled in CS 204 are expected to meet requirements for CS 30, along with an additional term project.

Recommendations: a course in data structures that is roughly equivalent to CS 15, and a course in linear algebra roughly equivalent to Math 70.

145940	Practice of Ethical Leadership			
Subject: EM		Catalog Nbr: 0210		
2025 SPRG		Primary	Jane Seminara	Jane.Seminara@tufts.edu
(Cross-listed as TML 210) Examination of leadership, and the role of future engineering leaders. Formulation of leadership messages, translation of leadership messages into action and real world demonstration of those actions. Topics include: giving voice to values, taking a stand, exercising authority, and emergent leadership.				

145941	Preparing New and Aspiring Leaders			
Subject: TML		Catalog Nbr: 0010		
2024 FALL		Primary	Jayne Nucete	Jayne.Nucete@tufts.edu
(Cross-listed as ENT 10) Theory and practice of leadership. Development and application of leadership skills across a range of contexts including startups, corporations, and nonprofits. Focus placed on developing self-awareness in preparation for the initial leadership position.				

145942	Mastering Money: Developing Financial Literacy			
Subject:	Catalog Nbr:			
TML	0011			
2024 FALL	Primary	George Blount	George.Blount@tufts.edu	
(Cross-listed as ENT 11) Introduction to sound money management in personal and professional finance. Creation of greater financial awareness, and development of financial vocabulary. Financial requirements across life stages including student finances, purchasing the first home planning, and investing for life events and a comfortable retirement. Basic business finances, such as budgeting, accounting statements, and taxation.				

145943	Communication Skills			
Subject: TML		Catalog Nbr: 0112		
2024 FALL		Primary	Holly Tarnower	Holly.Tarnower@tufts.edu

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(Cross-listed as ENT 112) Development of effective communications skills across a range of personal and professional scenarios, interpersonal communication, networking, and best practices in both verbal and non-verbal communications. Written communication skills for developing formal reports, drafting emails, and using social media.

145944	Essentials of Marketing			
Subject: TML		Catalog Nbr: 0013		
2024 FALL		Primary	Michelle Tempesta	Michelle.Tempesta@tufts.edu
(Cross-listed as ENT 13) Practical exploration of business-to-business and business-to-consumer marketing. Consumer behavior, market research, branding, audience targeting, developing value propositions, positioning, advertising, and media. Real-world cases and hands-on activities. Examination of global brands and application of marketing concepts and strategy to personal brands and companies.				

145945	Planning Your Career Pathway			
Subject: TML		Catalog Nbr: 0014		
2023 FALL		Primary	Malakia Silcott	Malakia.Silcott@tufts.edu
2024 FALL		Primary	Sheryl Rosenberg	Sheryl.Rosenberg@tufts.edu
(Cross-listed as ENT 14) Exploring the skills and knowledge needed across an individual's career. Planning for internships and placements, preparing for a job search and gaining the skills and confidence for interviewing and starting a job. Students will develop the skills and knowledge needed to plan for a successful and fulfilling career.				

145946	Living a Life with Purpose			
Subject: TML		Catalog Nbr: 0015		
2024 FALL		Primary	Jane Seminara	Jane.Seminara@tufts.edu
(Cross-listed as ENT 15) Holistic view of a human life. Work-life balance, mindfulness, personal ethics, physical and mental health, setting achievable and meaningful goals, and developing the skills of personal effectiveness. How to contribute to global society with an ethical mindset and cultural sensitivity.				

145947	Introduction to Making		
Subject:		Catalog Nbr:	
TGI		0116	
How to make physical things, make them work, and integrate them with electronics/software. Common fabrication techniques including foamboard, 3D printing, laser cutting, electronics, Arduino programming. Demonstration of hands-on skills in an individual final project.			

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145959	Semiconduct Device W/lab			
Subject:	Catalog Nbr:			
MSE	0110			
2023 FALL	Primary	Dante DeMeo		Dante.DeMeo@tufts.edu
2024 FALL	Primary	Thomas Vandervelde		tvanderv@ece.tufts.edu
(Cross-listed w/ EE 113) Introduction to semiconductor physics; quantum mechanics, equilibrium distribution; charge transport; P-N junction theory; diodes; bipolar junction transistors; field-effect devices; heterojunction devices; novel semiconductor devices such as carbon nanotubes. Recommendations: EE 21 and MATH 51 (formerly MATH 38).				

145960	Physics of Solar Cells			
Subject:	Catalog Nbr:			
MSE	0111			
2025 SPRG	Primary	Paul Simmonds		Paul.Simmonds@tufts.edu
(Cross-listed w/ EE 114) Physics of photovoltaic cells including physics of semiconductors in photovoltaic devices, physical models of solar cell operation, characteristics and design of common types of solar cells, and approaches to increasing solar cell efficiency. Recommendations: MATH 42, MATH 51, EE 18, PHYS 42/43, or instructor permission				

145961	Introduction Microwaves			
Subject:	Catalog Nbr:			
MSE	0112			
(Cross-listed w/ EE 117) Transmission and reflection of guided waves. The Smith chart and matching. Scattering parameters and flow graphs. Biological effects. Laboratory measurement of power, frequency, attenuation, Q-factor, and time-domain reflectometry. Fall. Recommendations: EE 18, or 13 and permission of instructor.				

145962	Microwave Semiconductor Devices And Circuits			
Subject:	Catalog Nbr:			
MSE	0113			
(Cross-listed with EE 118) Varistor and varactor diodes, PIN diodes, microwave transistors, negative resistance devices. Gallium arsenide properties and technology. Receiving mixers, transmitting modulators, amplifiers, oscillators, switches, limiters, duplexers, phase shifters, and harmonic generators. Laboratory characterization of devices and circuits, including noise measurements. Spring. Recommendations: EE 117 or permission of instructor.				

145963	Microwave Integrated Circuits			
Subject:	Catalog Nbr:			
MSE	0114			
(Cross-listed with EE 161) Review of CAD techniques for microwave circuits. Substrate, conductor, dielectric,				

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and resistive film materials for integrated circuits. Mask layout, mask layout tools, and mask fabrication. Hybrid microwave integrated circuits, monolithic integrated circuits, foundry requirements, hybrid versus monolithic circuits, performance and testing. Extensive laboratory work.
Recommendations: EE 160.

145966	Optoelectronic Characterization
Subject: MSE	Catalog Nbr: 0201
(Cross-listed with EE 214) Tools and techniques used to characterize optoelectronic materials and devices. Photoluminescence, ellipsometry, scanning probe microscopy, electron microscopy, and AC/DC electrical characterization. Theoretical underpinning of and practical experience with the measurement techniques. Laboratory.	

145979	Principles Of Polymerization
Subject: MSE	Catalog Nbr: 0137
(Cross-listed with CHBE 121) Synthesis of polymeric materials. Three major types of polymerization--step, chain, and ring-opening--are reviewed with emphasis on reaction mechanisms, kinetics, and thermodynamics of the reactions, and their relationships to molecular weight and molecular structures of macromolecules. Recommendations: Physical and organic chemistry	

145980	Physical Chemistry Of Polymers
Subject: MSE	Catalog Nbr: 0138
(Cross-listed with CHBE 122) Physicochemical properties of polymeric materials with emphasis on the relationship between molecular architecture and physical properties. Topics include polymer solution theories, thermal transitions, conformational analysis, polymer microstructure, crystallinity and morphology, the rubbery and glassy states, rheology, and statistical thermodynamics. Recommendations: CHBE 11	

145981	Electronic Devices for Energy Applications
Subject: MSE	Catalog Nbr: 0139
(Cross-listed with CHBE 175) Design and operating principles of a variety of thin-film devices related to electrical energy generation, storage, or conversion. An overview of optical and electronic processes in a variety of materials (metals, insulators, semiconductors), thin film deposition and characterization techniques, as well as photovoltaics (solar cells), electrochemical capacitors, batteries, field-effect transistors, colloidal quantum dot devices, and light-emitting diodes (LEDs). Recent research advances in the field of novel optoelectronic devices for energy applications. Prerequisites: Chem 0002	

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Recommendations: junior standing.

145984	Biomechanics
Subject: MSE	Catalog Nbr: 0150
(Cross-listed with BME 149) Graduate-level seminar course designed for students who are interested in getting a broad overview of different research methods and analytical techniques in human factors/ergonomics research. Topics to be covered are related to the acquiring, recording, and analyzing of empirical data. Theory underlying these methods in human factors/ergonomics research is also studied.	

145985	Biomaterials and Regenerative Medicine
Subject: MSE	Catalog Nbr: 0151
2024 FALL	Primary Yu-Ting Dingle Yu-ting.Dingle@tufts.edu
(Cross-listed as CHBE 164 and BME 153). Fundamental concepts of biomaterials and regenerative medicine (biomaterial types, synthesis, properties, mechanisms of degradation, biological interfaces, inflammation and related issues). Specific focus on biomaterials related to regenerative medicine. Course independent of, but complementary to, BME 154. Recommendations: Junior standing, BIO13, CHEM 1, or consent of instructor	

145986	Tissue Engineering and Regenerative Medicine
Subject: MSE	Catalog Nbr: 0152
2025 SPRG	Primary Qiaobing Xu Qiaobing.Xu@tufts.edu
(Cross-listed with BME 154) Fundamental concepts of tissue engineering and regenerative medicine (scaffolds, stem cells and bioreactors); progress with specific tissue systems; applications for tissue engineering; and current state-of-the art of tissue regeneration. Additional topics: transport phenomena and mechanical regulation of stem cell function, with focus on mechanisms of mechanotransduction. Course independent of, but complementary to, BME 153. Recommendations: Junior standing, BIO 13, CHEM 51, PHYS 11, ES 9, or consent of instructor.	

145987	Graduate Introduction To Biophotonics
Subject: MSE	Catalog Nbr: 0251
(Cross-listed w/ EE 253 and BME 251) A graduate-level version of BME/EE 51. Additional homework problems and a term paper are required for graduate level credit. Recommendations: PHY 31, or BME 215, or permission of instructor. Graduate students only.	

145988	Biophotonics Laboratory
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Subject:	Catalog Nbr:
MSE	0156
(Cross-listed as/ BME 156) Biophotonic approaches used to characterize biological specimens including standard microscopy (brightfield, phase contrast, fluorescence), depth-resolved microscopy (confocal fluorescence and reflectance, two-photon excited fluorescence and second harmonic generation), near infrared spectroscopy, and photoacoustic imaging.	

145989	Quantitative Biomaterials Characterization Laboratory
Subject:	Catalog Nbr:
MSE	0157
(cross-listed as BME 157) Methods used to characterize biomaterials including mass spectrometry, scanning electron microscopy, optical spectroscopy and flow cytometry.	

145990	Nonlinear Analysis of Materials and Structures
Subject:	Catalog Nbr:
MSE	0160
(Cross-listed as ME 175 and CEE 128) Nonlinear solid mechanics, nonlinear constitutive models and variational principles as essential prerequisites for nonlinear finite element formulations. Recommendations: ES 9.	

145991	Finite Element Analysis
Subject:	Catalog Nbr:
MSE	0161
2025 SPRG	Primary Masoud Sanayei masoud.sanayei@tufts.edu
(Cross-listed as ME 177 & CEE 105). Finite element analysis of problems important in structural engineering. Overview of direct stiffness method. Discretization of continuum to finite elements for approximate solution of complex engineering problems. Development of governing equations, stiffness and load matrices for deformation and stress analysis. Work and energy theorems. Hands-on experience with industry-standard software and practical applications in structural engineering. Recommendations: CEE 22 or ME 41 or consent of instructor	

145992	Manufacturing Processes And Materials Technology
Subject:	Catalog Nbr:
MSE	0170
(Cross-listed w/ ME 110) A study of traditional and nontraditional manufacturing processes related to processing of metals, ceramics, and polymers, including computer-aided manufacturing. Topics include properties and behavior of materials, selection of materials and processes subject to surface finish, tolerance, design, and economic constraints. Recommendations: ME 11.	

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145993	Theory And Applications Of Polymer Materials And Processing			
Subject: MSE		Catalog Nbr: 0171		
2024 FALL		Primary	Michael Zimmerman	Michael.Zimmerman@tufts.edu
(Cross-listed w/ CHBE 114 and ME 114) Fundamental of polymer materials, including organic chemistry, polymerization, and molecular structure of thermoplastic and thermoset polymers. Four modes of mechanical deformation of polymers: glassy, viscoelastic, rubbery, viscous. Properties of polymers different than ceramics and metals, including behavior above and below glass transition temperature and time dependent properties (creep/stress relaxation). Polymer processing techniques, including injection molding, blow molding, thermoforming. Hands-on lab techniques to measure properties; design projects using data to inform material selection.				
Recommendation: ME 11				

145994	Composite Materials			
Subject:	Catalog Nbr:			
MSE	0172			
2025 SPRG	Primary	Michael Zimmerman	Michael.Zimmerman@tufts.edu	
(Cross-listed as ME 116 & CHBE 116) Fundamentals of design, manufacture, and analysis of composite materials. Fiber materials such as glass, kevlar and carbon fibers along with state-of-the-art thermoplastic and thermoset matrix materials. Rules of mixtures (ROM) to calculate transverse isotropic properties in laminae. Classical Lamination Theory (CLT) and Finite Element Analysis (FEA) to calculate stress and strains in laminates. Case studies in aerospace. Hands-on experiences, such as vacuum bagging to manufacture and test composites. Team project.				

145995	Biomaterials			
Subject: MSE		Catalog Nbr: 0173		
2023 FALL		Primary	Kenneth James	ken.james@tufts.edu
(Cross-listed with ME 117) This course presents the following topics: elementary solid mechanics; aspects of material science applied to metals, polymers, ceramics, and biological tissues; tissue reactions to artificial materials; pathohistology; and inflammatory and immune responses. The course is completed by a survey of artificial materials and devices in clinical use, emphasizing vascular and orthopedic prostheses. A literature review and oral presentation covering a current device is assigned.				
Recommendations: ME 11 or senior standing or permission of instructor				

145996	Solid Mechanics	
Subject:	Catalog Nbr:	
MSE	0174	
(Cross-listed as CEE 122 and MSE 174). Strain tensor, stress tensor, elastic stress analysis, isotropic and		

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anisotropic materials, torsion problem, inelastic behavior of materials, elements of plasticity and creep.
Recommendations: ES 9 or ME 20 or equivalent.

145997	Forces at Nanoscale
Subject: MSE	Catalog Nbr: 0175
(Cross-listed as ME 124) Interaction between basic components of matter: atoms, molecules, nano- and micro particles. Forces that occur between surfaces/particles at the nanoscale including Van der Waals, dipole, electric, electric double layer, hydrogen, ionic, and adhesion forces. Modern achievements in studying these forces with the help of the force apparatus and atomic force microscopy. DLVO theory, Derjaguin approximation. Analysis of experimental data to extract the force parameters. Prerequisites: Senior or graduate standing	

145998	Mechanics of Materials at the Micro & Nano Scale
Subject: MSE	Catalog Nbr: 0176
(Cross-listed with ME 125) Mechanics of materials, in particular, soft materials when studied at the micro and nanoscale. Classical approaches to mechanics of materials, both static and dynamic properties. Extension of classical knowledge to the micro and nanoscale, with methods to measure the material mechanics at those scales. Practical examples of biological tissues, cells, and polymers in different environments. Recommendations: ME 37, ME42, or Senior standing.	

145999	Micro-fabrication And Design
Subject: MSE	Catalog Nbr: 0178
(Cross-listed as ME 146) An introduction to Micro-Electro-Mechanical Systems (MEMS). Topics include fabrication, design, and applications of MEMS devices. Introduction to computer-aided design techniques and tools. Recommendations: Senior Standing.	

146000	Mass Transfer And Phase Transformations In Materials Processing
Subject: MSE	Catalog Nbr: 0179
(Cross-listed as ME 157) The course is designed for students interested in thermal, fluid, and mass transport aspects of materials processing. Topics include heat treatment, continuum diffusion, atomistics of diffusion, oxidation, evaporation, and solidification. A wide range of practical examples and applications is drawn on, and class work and readings are supplemented by in-class presentations, guest lectures, and small projects. Recommendations: ME 51 or permission of instructor.	

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146003	BEST Seminar				
	Subject:	Catalog Nbr:			
	ACL	0015			
	2024 FALL	Primary	Sehba Hasan		Sehba.Hasan@tufts.edu

146008	Non Major Credit				
	Subject:	Catalog Nbr:			
	TGI	0310			

146009	Lower Level Elective Crd				
	Subject:	Catalog Nbr:			
	TGI	0320			

146010	Upper Level Elective Crd				
	Subject:	Catalog Nbr:			
	TGI	0330			
	2023 FALL	Primary	Meredith Hyde		Meredith.Hyde@tufts.edu

146015	Composite Materials				
	Subject:	Catalog Nbr:			
	CHBE	0116			
(Cross-listed w/ ME 116 & MSE 172) Fundamentals of design, manufacture, and analysis of composite materials. Fiber materials such as glass, kevlar and carbon fibers along with state-of-the-art thermoplastic and thermoset matrix materials. Rules of mixtures (ROM) to calculate transverse isotropic properties in laminae. Classical Lamination Theory (CLT) and Finite Element Analysis (FEA) to calculate stress and strains in laminates. Case studies in aerospace. Hands-on experiences, such as vacuum bagging to manufacture and test composites. Team project.					

146063	Nanophotonics				
	Subject:	Catalog Nbr:			
	EE	0115			
	2025 SPRG	Primary	Aseema Mohanty		Aseema.Mohanty@tufts.edu
(Cross-listed as BME115). Engineering, physics, and applications of nanophotonic structures. Wave propagation through optical waveguides, waveguide systems, and nanostructures. Optical mode theory and numerical modeling. Coupled mode theory. Design and analysis of optical modulators, resonators,					

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interferometers, switching networks, and phased arrays. Research paper discussions about state-of-the-art nanophotonic devices and applications in telecommunications, biomedical devices, modern computing, and quantum information systems.

Recommendations: EE18 or ES15 or PHY42

146064	Nanophotonics
Subject: BME	Catalog Nbr: 0115
(Cross-listed as BME115). Engineering, physics, and applications of nanophotonic structures. Wave propagation through optical waveguides, waveguide systems, and nanostructures. Optical mode theory and numerical modeling. Coupled mode theory. Design and analysis of optical modulators, resonators, interferometers, switching networks, and phased arrays. Research paper discussions about state-of-the-art nanophotonic devices and applications in telecommunications, biomedical devices, modern computing, and quantum information systems. Recommendations: EE18 or ES15 or PHY42	

146065	Emerging Memory Systems
Subject: EE	Catalog Nbr: 0157
Semiconductor memories and non-volatile memory (NVM) devices. Memory hierarchy, coherence models for heterogeneous systems, persistent memories. Embedded memory architectures for deep neural network hardware, data types and compression. Non-von Neumann architectures, neuromorphic computing, NVM based synapse and neuron implementations. Additional topics on security, NVM implementations of physically unclonable functions and camouflaged logic, random number generators, probabilistic computing. Emerging storage media. Discussion of research papers on relevant topics. Recommendation: EE21 and EE25	

146066	The Human Side of Systems Thinking
Subject: TML	Catalog Nbr: 0125
2024 SPRG	Primary Jerome Brightman Jerome.Brightman@tufts.edu
Systems thinking helps leaders observe the interconnectedness of organizational variables to permanently solve chronic issues. Application of the analytical tools of systems thinking (loops, links, delays, and archetypes) in combination with innovative human-centered design. Focus placed on a humanistic approach to complexity with recognition of emerging technologies as tools created by people for people	

146103	3D Printing the Human Body
Subject: BME	Catalog Nbr: 0176

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2025 SPRG	Primary	Vincent Fitzpatrick	Vincent.Fitzpatrick@tufts.edu
2025 SPRG	Primary	Xiao Kuang	Xiao.Kuang@tufts.edu
Current and emerging applications of three-dimensional (3D) printing in the field of biomedical engineering. Assessment of advantages, challenges, and limitations of 3D printing as a manufacturing process. Exploration of emerging technologies and the future potential of 3D printing for medicine. Extraction of relevant information from patient data, generation of a printable model, and successful printing of an anatomical structure or medical device. Recommendations: BIO 13 or BME 33			

146120	Architectural Acoustics	
Subject:	Catalog Nbr:	
ME	0127	
Acoustical design of rooms for music performance and speech. Fundamentals of sound waves and human hearing. Room acoustics measurement, design, and simulation, with case studies from professional practice. Group projects and class field trips. Final project in which students auralize a space under different design conditions. Recommendation: ES 62		

146185	Statistical Bioinformatics		
Subject:	Catalog Nbr:		
CS	0169		
2024 FALL	Primary	Donna Slonim	Donna.Slonim@tufts.edu
Computational methods and analyses in the context of bioinformatics and biomedical data. Statistical methods in bioinformatics and biomedicine, including the heterogeneous high-dimensional data that tends to arise in this context. Assessment of hypotheses and data quality, visualization, and identification of patterns, outliers, and artifacts of bioinformatics data. Probability estimation through simulation. Presentation of statistical results to specific audiences. Recommendations: CS 11 and (CS/Math 61 or Math 65), or graduate standing.			

146187	Master of Science Capstone Project II		
Subject:	Catalog Nbr:		
DS	0289		
2024 FALL	Primary	Martin Allen	Martin.Allen@tufts.edu
Part two of a two-course, hands-on, and project-based culmination to the Master of Science in Data Science Online program. A continuation of the work started in DS 288, culminating in a complete analysis of the problem chosen in DS 288 as well as a final paper describing the analytic process and decisions and/or recommendations indicated by the data. To be taken in the last term of the Master of Science in Data Science Online degree.			

146190	Probability for Machine Learning		
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Subject:	Catalog Nbr:
ES	0201
(Cross-listed as UC DIS201) A foundational understanding of important concepts in probability as they relate to machine learning. Random variables, probability densities, expectation, variance, covariance, bias, Bayes' theorem, regularization, entropy, and applications in practical approaches to regression, classification, and clustering.	

146191	Matrix Methods for Machine Learning
Subject:	Catalog Nbr:
ES	0202
(Cross-listed as UC DIS202) Basic linear algebra operations and their use in approximations underlying machine learning, with applications to solving regression, classification, and clustering problems.	

146192	Introduction to Bayesian Modeling
Subject:	Catalog Nbr:
ES	0211
(Cross-listed as UC DIS211) Concepts and practices of Bayesian modeling. Models with conjugate priors, illustrating with the Beta-Binomial and Gamma-Poisson models. Markov Chain Monte Carlo (MCMC) and variational inference (VI) methods for Bayesian inference. Semi-conjugate models, including Bayesian linear regression, Bayesian mixture models, and Bayesian hidden Markov models. Models for which there are not conjugate priors, such as Bayesian logistic regression, Bayesian multiclass regression, a racially polarized voting model, and Bayesian deep learning.	

146193	Deep Learning in PyTorch
Subject:	Catalog Nbr:
ES	0212
(Cross-listed as UC DIS212) An introduction to the PyTorch deep learning software library, from implementing basic machine learning models to implementing cutting-edge deep learning methods. Training various deep learning architectures, including image classifiers. Using PyTorch data management tools. Best practices for writing maintainable and reusable PyTorch code.	

146254	Introduction To Biophotonics
Subject:	Catalog Nbr:
MSE	0151
(cross-listed as EE 151 and BME 151) Basic concepts in electromagnetism and light matter interactions, including optical properties, absorption, near-infrared, light scattering and fluorescence spectroscopy, microscopy, optical coherence tomography and photodynamic therapy and their relevance to human disease diagnostic and therapeutic applications.	

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146255	Entrepreneurial Internship			
Subject: ENT		Catalog Nbr: 0198		
2025 SPRG		Primary	Carol Denning	Carol.Denning@tufts.edu
2025 SPRG		Primary	Jill Parlee	Jill.Parlee@tufts.edu
2025 SPRG		Primary	Elaine Chen	Elaine.Chen@tufts.edu
Under the guidance of a faculty member, students apply concepts learned in the classroom and acquire new skills as they address real life challenges while working as an intern at a company. Internships typically involve students serving in a functional role with an entrepreneurial focus, such as product management, entrepreneurial marketing and sales.				

146256	Nonprofits, Philanthropy, and Impact			
Subject: ENT		Catalog Nbr: 0142		
2024 FALL		Primary	Usha Pasi	Usha.Pasi@tufts.edu
(Cross-listed as CVS 180) Nonprofits are a valued engine for community engagement and innovation across the country. This complex sector is built on the desire to do good through scalable, sustainable organizational strategies that deliver impact. Study of successful nonprofits and the connection between nonprofits, philanthropy, and impact. Grantmaking strategy and award.				

146257	Computer Aided Product Design			
Subject: ES		Catalog Nbr: 0019		
2025 SPRG		Primary	Gian Calise	Gian.Calise@tufts.edu
2025 SPRG		Primary	Golriz Kermani	Golriz.Kermani@tufts.edu
Introduction to 3D Computer Aided Design (CAD) software with emphasis on the fundamentals of engineering design. Mechanical parts, assemblies, and product design. Reading and creating engineering drawings, including orthographic and isometric views. Dimensioning. Additive manufacturing. Applications in mechanical engineering and human factors engineering. Students may not receive for both ES18 and ES19.				

146258	Iterative Methods for Machine Learning			
Subject: EE		Catalog Nbr: 0143		
2025 SPRG		Primary	Usman Khan	Usman.Khan@tufts.edu
(Cross-listed as CS 144) Design and analysis of modern machine learning methods with emphasis on convex and nonconvex problems, and centralized, federated, and distributed computational architectures. Topics include convergence, complexities, contractions, fixed point theorems, and perturbation techniques; gradient descent and stochastic gradient descent in addition to accelerated methods including Polyak and Nesterov momentum, minibatching, and variance reduction. State of the practice methods will be covered including Adagrad, Autogard, Adam, sgdm with applications in image classification and document clustering.				

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Recommendations: MATH 70 and CS 11

146296	Planning Your Career Pathway			
Subject:	Catalog Nbr:			
ENT	0014			
2023 FALL	Primary	Malakia Silcott	Malakia.Silcott@tufts.edu	
2024 FALL	Primary	Sheryl Rosenberg	Sheryl.Rosenberg@tufts.edu	
(Cross-listed as TML 14) Exploring the skills and knowledge needed across an individual's career. Planning for internships and placements, preparing for a job search and gaining the skills and confidence for interviewing and starting a job. Students will develop the skills and knowledge needed to plan for a successful and fulfilling career.				

146297	Graduate Engineering Co-op			
Subject: EE	Catalog Nbr: 0404			
2024 FALL	Primary	Alicia Abdulrazzaq	Alicia.Abdulrazzaq@tufts.edu	
2025 SPRG	Primary	Karen Panetta	Karen.Panetta@tufts.edu	

146358	Societal Aspects of Design: Integration, Innovation, and Impact			
Subject:	Catalog Nbr:			
EE	0185			
2025 SPRG	Primary	Ronald Lasser	Ron.Lasser@tufts.edu	
(Cross-listed as CVS 149 and ENT 109) Multi-disciplinary perspective of innovative technology-based design process for societal, community influence, and civic engagement. Elements and principles of design from product development process and societal value systems thinking, thought and emotion, ethics and responsibility. Experiments to explore bias, failure, and iteration, reflection for self-discovery and innovation. Articulation and expression via written, oral and pre-recorded audio and video presentations showing measurable impact of solutions as societal benefits.				

146359	Use-Related Risk Management			
Subject:		Catalog Nbr:		
ENP		0111		
2025 SPRG		Primary	Sami Durrani	Sami.Durrani@tufts.edu
Analysis of potential harm caused by user interaction of technology in various domains including medical, consumer, industrial products. Fundamentals of use error (human error). Identifying opportunities for use error and their likelihood and potential to cause serious harm or death. Methods for identifying root causes of use errors. Residual risk analysis. Rationales for product design acceptance in view of residual risk and societal tolerance for risk. Applications to human factors engineering, biomedical engineering, mechanical engineering, software development, and industrial design. Governmental expectations and industrial				

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standards on risk management. Focus placed on medical technology. Prior coursework in human factors engineering preferred but not necessary.

146360	Transition to Competence for Technology Leadership		
Subject:	Catalog Nbr:		
TGI	0220		
Leadership responsibility in the dynamic and changing world of the tech-sector. Confidence and mindset needed to transition from individual contributor to leader with responsibility for the development and well-being of the team.			

146361	Introduction to Making			
Subject: ENT		Catalog Nbr: 0164		
2025 SPRG		Primary	Elaine Chen	Elaine.Chen@tufts.edu
2025 SPRG		Primary	Thomas Van de Velde	Thomas.Van_De_Velde@tufts.edu
Exploratory course for beginners that teaches practical, hands-on skills to make working prototypes of your products. Make physical things, make them work, and integrate them with electronics/software. Common fabrication techniques including foamboard, 3D printing, laser cutting, electronics, and Arduino programming. Demonstration of hands-on skills and entrepreneurial spirit in an individual final project.				

146392	Mastering Money: Developing Financial Literacy			
Subject: ENT		Catalog Nbr: 0011		
2025 SPRG		Primary	George Blount	George.Blount@tufts.edu
(Cross-listed as TML 11) Introduction to sound money management in personal and professional finance. Creation of greater financial awareness, and development of financial vocabulary. Financial requirements across life stages including student finances, purchasing the first home planning, and investing for life events and a comfortable retirement. Basic business finances, such as budgeting, accounting statements, and taxation.				

146393	Communication Skills			
Subject: ENT		Catalog Nbr: 0112		
2025 SPRG		Primary	Holly Tarnower	Holly.Tarnower@tufts.edu
(Cross-listed as TML 112) Development of effective communications skills across a range of personal and professional scenarios, interpersonal communication, networking, and best practices in both verbal and non-verbal communications. Written communication skills for developing formal reports, drafting emails, and using social media.				

Course Bulletin

146394	Essentials of Marketing			
Subject: ENT	Catalog Nbr: 0013	2025 SPRG	Primary	Michelle Tempesta Michelle.Tempesta@tufts.edu
(Cross-listed as TML 13) Practical exploration of business-to-business and business-to-consumer marketing. Consumer behavior, market research, branding, audience targeting, developing value propositions, positioning, advertising, and media. Real-world cases and hands-on activities. Examination of global brands and application of marketing concepts and strategy to personal brands and companies.				

146395	Living a Life with Purpose			
Subject: ENT	Catalog Nbr: 0015	2025 SPRG	Primary	Jane Seminara Jane.Seminara@tufts.edu
(Cross-listed as TML 15) Holistic view of a human life. Work-life balance, mindfulness, personal ethics, physical and mental health, setting achievable and meaningful goals, and developing the skills of personal effectiveness. How to contribute to global society with an ethical mindset and cultural sensitivity.				

146396	Preparing New and Aspiring Leaders			
Subject: ENT	Catalog Nbr: 0010	2025 SPRG	Primary	Jayne Nucete Jayne.Nucete@tufts.edu
(Cross-listed as TML 10) Theory and practice of leadership. Development and application of leadership skills across a range of contexts including startups, corporations, and nonprofits. Focus placed on developing self-awareness in preparation for the initial leadership position.				

146407	Developing Leaders in a Civic Context			
Subject: ENT	Catalog Nbr: 0170	2024 FALL	Primary	Diane Ryan Diane.Ryan@tufts.edu
(Cross-listed as CSHD 180 & CVS 170) Integrates and applies concepts from adult development and learning, leader(ship) development, and organizational behavior to build capacity for social change. Creating effective strategies to develop individuals, teams, and organizations to address complex challenges. Pre-requisites: CSHD 1 or PSY 1 or Junior standing or instructor permission.				

146411	Software Engineering for Regulated Industries			
Subject: EE	Catalog Nbr: 0150	2024 FALL	Primary	Khaled ElMahgoub Khaled.ElMahgoub@tufts.edu
Fundamentals of software engineering for regulated industries. Identifying user needs, mapping user needs to				

Course Bulletin

requirements, processing software design, coding, verification, and validation. Emphasis on quality and documentation to meet regulatory standards. Hands-on experience with tools used in developing high-quality software products.

Recommendation: CS 15 or CS 40

146412	Digital Signal Processing			
Subject: ME		Catalog Nbr: 0136		
2023 FALL		Primary	Brian Tracey	brian.tracey@tufts.edu
2024 FALL		Primary	Jordan Rosenthal	Jordan.Rosenthal@tufts.edu
(Cross-listed as EE 125 Discrete signals and systems, digital simulation of analog systems. Z transforms, recursion equations, finite-order systems. Fourier transforms, line spectra and Fourier series, discrete Fourier series and Fast Fourier Transforms (FFT). Sampling and interpolation, mean-square approximations. Nonrecursive and recursive filters. Selected topics on algorithms, design and applications of digital signal processing. Fall.				

146427	Digital Design Verification			
Subject: CS		Catalog Nbr: 0147		
2023 FALL		Primary	Joel Grodstein	Joel.Grodstein@tufts.edu
(Cross-listed as EE 165) Verification of digital hardware designs at the Register-Transfer Level (RTL) using System Verilog. Types of verification: formal vs. simulation-based; random vs. targeted; full-chip vs. unit-level; pre-silicon vs. post-silicon. Standardized frameworks: Universal Verification Methodology (UVM). Assertion-based checking, equivalence checking. Prerequisites: EE 25 or EE 126 or graduate standing.				

146428	Distributed Machine Learning and Control	
	Subject:	Catalog Nbr:
	CS	0143
(Cross-listed as EE 130) Design and analysis of distributed machine learning and stochastic optimization methods from the perspective of dynamical systems that comes from signal processing and control theory. Topics include: state-space models, state transformations, canonical forms, graph theory, fixed-point theorems, Perron Frobenius theorem, contraction maps, convex and nonconvex functions, stochastic optimization, first and second order methods, accelerated first order methods including heavy-ball and Nesterov momentum, and variance reduction techniques. Python-based programming for machine learning tasks using real datasets including deep learning problems. Pre-requisites: MATH 51, MATH 70, COMP11, and (EE24, MATH165 or ES56) or graduate standing Recommended: EE 105		

146437	Ethics for AI, Robotics, and Human-Robot Interaction			
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Subject:	Catalog Nbr:			
CS	0239			
2025 SPRG	Primary	Matthias Scheutz	Matthias.Scheutz@tufts.edu	
Technical challenges of endowing autonomous artificial agents with normative principles that will allow them to operate successfully in human societies. Algorithmic approaches in artificial agents (rule-based, utility-based, behavior-based, etc.) and their links to philosophical foundations of the main ethical theories (virtue ethics, deontology, utilitarianism). Conceptual and mathematical analysis of assumptions underlying each algorithmic approach as well as implementation in agent-based simulations. Functional and performance tradeoffs of the algorithms and their implications for autonomous robots and AI systems. Mathematical and computational challenges of the different proposals for "implicit" and "explicit" ethical agents, including inverse reinforcement learning, verification-based approaches, and model checking.				

146438	Immersive Experience: Product Managment			
Subject:	Catalog Nbr:			
EM	0278			
2023 FALL	Primary	Samuel Ligero	Samuel.Ligero@tufts.edu	
This one credit elective course is an immersive synchronous experience that will be held over one weekend. The course will consist of a series of lectures, discussions and workshops with an overarching theme of Product Management across multiple disciplines and industries with an emphasis on future trends in Technology. This deep-dive educational experience will also offer networking and social engagement opportunities for students, faculty and staff. There will be Team-Building activities including business case analysis, role-playing, scenario planning and other group work.				

146439	Engineering Head Start			
Subject:	Catalog Nbr:			
EN	0005			
2024 SUMR	Primary	Nicole Batrouny	No Email on file.	
Preparation for mathematics and natural sciences required in Engineering. Algebraic manipulation. Trigonometric, exponential, and logarithmic functions. Function composition and manipulation. Plotting. Vectors and vector operations. Units and unit analysis. Requires consent of the instructor Credit may not be applied toward any Major Requirement in the School of Engineering.				

146440	Tufts Abroad Program			
Subject:	Catalog Nbr:			
ENT	0340			

146609	Assistive Design			
Subject:	Catalog Nbr:			
ME	0141			

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2025 SPRG	Primary	Daniel Hannon	Dan.Hannon@tufts.edu
2025 SPRG	Primary	Gary Leisk	Gary.LEISK@tufts.edu
Application of user-centric design tools, knowledge elicitation, client interviews and measurements, ideation, fabrication of physical artifacts, user testing of solutions with individual clients having a disability. Classroom presentations, feedback sessions with expert panel, thorough documentation of design tools/process used.			

146650	Iterative Mthd Machine Learnng		
Subject:	Catalog Nbr:		
CS	0144		
2025 SPRG	Primary	Usman Khan	Usman.Khan@tufts.edu
(Cross-listed as EE 143) Design and analysis of modern machine learning methods with emphasis on convex and nonconvex problems, and centralized, federated, and distributed computational architectures. Topics include convergence, complexities, contractions, fixed point theorems, and perturbation techniques; gradient descent and stochastic gradient descent in addition to accelerated methods including Polyak and Nesterov momentum, minibatching, and variance reduction. State of the practice methods will be covered including Adagrad, Autogard, Adam, sgdm with applications in image classification and document clustering. Recommendations: MATH 70 and CS 11			

146732	BME Senior Design Project		
Subject:	Catalog Nbr:		
BME	0009		
Planning and conducting an engineering design project that includes consideration of industry standards, needs and design requirements, verification and validation, and iterative improvement of a prototype. Students will be required to regularly report on the status and progress of their design activities, to critically evaluate their projects, and to present their results in a written report and a demo day session at the end-of-semester. Students receiving credit for BME 9 may not also receive credit for BME 7 or BME 8.			

146733	Immersive Experience: Marketing		
Subject:	Catalog Nbr:		
EM	0279		
2024 FALL	Primary	Samuel Ligero	Samuel.Ligero@tufts.edu
Immersive synchronous experience held over one weekend comprising a series of lectures, discussions and workshops with overarching themes across multiple disciplines and industries. Emphasis on best practice and next practice in Marketing. Networking and social engagement opportunities for students, faculty and staff. Team-Building activities including business case analysis, roleplaying, scenario planning and other group work.			

146734	Computational Catalysis		
Subject:	Catalog Nbr:		

Course Bulletin

CHBE	0147
Methods for calculating electronic structures of molecules, solids, and surfaces with applications to materials and catalysts design. Hands on experience with computational chemistry and materials modeling programs. Topics include electronic structure theories, energy minimization, geometry optimization, potential energy surfaces, vibrational analysis, rate theories, electron distributions and atomic charges, band structures in solids, kinetic modeling, periodic trends, scaling relations and volcano plots for rational catalyst design.	

146735	Human Factors in Security and Privacy			
Subject:		Catalog Nbr:		
CS		0113		
2024 FALL		Primary	Daniel Votipka	Daniel.Votipka@tufts.edu
Usability and human-computer interaction (HCI) problems of privacy and security. Common HCI methods that can be used to measure usability issues in security and privacy mechanisms. Practical experience understanding and designing studies which evaluate usability issues in security and privacy systems. Course instruction assumes students are familiar with introductory concepts in programing.				

146740	Computer Vision			
Subject: CS		Catalog Nbr: 0132		
2024 FALL	Primary	Roy Shilkrot	Roy.Shilkrot@tufts.edu	
Introduction to low and intermediate levels of classic and modern Computer Vision. How to design algorithms that process visual scenes to automatically extract information. Fundamental principles and important applications of computer vision, including image formation, processing, detection and matching features, image segmentation, and multiple views. Basics of machine learning and deep learning for computer vision. Recommendations: CS 160 and Math 165				

146741	Product Design and Innovation			
Subject: EE		Catalog Nbr: 0181		
2024 FALL		Primary	Ronald Lasser	Ron.Lasser@tufts.edu
Product design & development, marketing, operations, sales, quality assurance, field service, and customer support to make an impact with customers and society. Iterative design approach—observe, think, plan, do, test, and demo. Critique and reflection on failure assessment for customer, product, and technology adoption insights to structure and accomplish design problem definition, implementation, and success criteria. Influence of imagination and creativity across a design team. Interdisciplinary collaboration with focus on project management, time to profit, market product penetration, organization, and the challenges and obstacles of getting a product into the marketplace.				

146752	Masters Continuation - Full Time			
Subject:		Catalog Nbr:		

Course Bulletin

TML	0402
Full-time. Please see departmental website for specific details.	

146753	Essentials of Technology Strategy				
Subject:		Catalog Nbr:			
TML		0201			
2024 FALL		Primary	Samuel Liggero	Samuel.Liggero@tufts.edu	
(Cross-listed as EM 201) Elements of technology strategy including portfolio management, development of product/technology roadmaps, product lifecycles, new product development stage gate processes, and intellectual property. Focus on disruptive, incremental, sustaining and breakthrough innovations.					

146754	Leadership: Personal Development			
Subject:	Catalog Nbr:			
TML	0202			
2024 FALL	Primary	Jerome Brightman	Jerome.Brightman@tufts.edu	
(Cross-listed as EM 202) Individual leadership development to lead effective teams and organizations. Focus on techniques for developing ethical and empathetic leaders.				

146755	Building Financial Intelligence			
Subject:	Catalog Nbr:			
TML	0203			
2024 FALL	Primary	Frank Apeseche	Frank.Apeseche@tufts.edu	
(Cross-listed as EM 203) Development, analysis, and communication of financial aspects of a company's product or service and the impact on the health and competitiveness of the firm.				

146756	Customer Discovery and Solution Design			
Subject:	Catalog Nbr:			
TML	0204			
2024 FALL	Primary	Debra Reich	Debra.Reich@tufts.edu	
2024 FALL	Primary	Hannah Lippe	Hannah.Lippe@tufts.edu	
2024 FALL	Primary	Bennett Baldwin	Bennett.Baldwin@tufts.edu	
(Cross-listed as EM 204) Identification of target customers and discovery of solutions to unmet needs. The use of tools to systematically generate and sort diverse options to create products and solve customers' needs.				

146757	Milestone Project: New Product & Service Development	
Subject:	Catalog Nbr:	
EM	0205	
(Cross-listed as EM 205) Team project to develop business plan for a new product or service.		

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146758	Introduction to Data Analytics			
Subject:	Catalog Nbr:			
TML	0206			
2024 FALL	Primary	Kishore Pochampally	Kishore.Pochampally@tufts.edu	
(Cross-listed as EM 206) Data identification, analysis and interpretation to drive strategic and operational success in technology-based companies. Data-based decisions with uncertain or ambiguous conditions, and development of models for decision-making in a business setting.				

146759	Solving Complex Problems through Systems Thinking			
Subject:	Catalog Nbr:			
TML	0207			
2024 FALL	Primary	James Nash	James.Nash@tufts.edu	
(Cross-listed as EM 207) Interconnected complex systems considering human, political, community, resource, environmental, and social processes. Application of insights from structural influences to maximize impact and solve problems.				

146760	Program and Project Management			
Subject:	Catalog Nbr:			
TML	0208			
2024 FALL	Primary	Gerald Brown	Gerald.Brown@tufts.edu	
2024 FALL	Primary	Kishore Pochampally	Kishore.Pochampally@tufts.edu	
(Cross-listed as EM 208) Methodologies, tools, and strategies for managing projects and portfolios of projects (programs).				

146761	Non Major Credit			
Subject: TML	Catalog Nbr: 0310			

146762	Lower Level Elective Crd			
Subject: TML	Catalog Nbr: 0320			

146763	Upper Level Elective Crd			
Subject: TML	Catalog Nbr: 0330			

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146764	Tufts Abroad Program
Subject: TML	Catalog Nbr: 0340

146805	OSW Ports and Supply Chain
Subject: CEE	Catalog Nbr: 0260
2024 FALL	Primary Jay Borkland Jay.Borkland@tufts.edu
Consideration of engineering, permitting, policy, and market concepts relevant to the development of a U.S. offshore wind energy supply chain. Case studies include ports, vessels, and manufacturing facilities for both fixed and floating offshore wind turbines.	

146806	OSW Workforce Safety and Equity
Subject: CEE	Catalog Nbr: 0261
Consideration of policy and engineering concepts relevant to the development of a safe, inclusive, and equitable U.S. offshore wind energy workforce. Historical review of worker safety and organized labor. Discussion of ethical and philosophical concepts relevant to 21st century workforce development for the energy transition with specific focus on the offshore wind industry.	

146808	Real-Time Embedded Systems
Subject: EE	Catalog Nbr: 0152
Hardware and software considerations for fast, predictable response time in embedded systems. Real-time operating systems and multi-threaded programming for managing multiple time-sensitive tasks. Comparison of industrial-grade versus hobbyist-grade embedded-system infrastructures. Examples are drawn largely from medical equipment (e.g., electrocardiography and electromyography) Recommendation: some experience working with embedded processors (e.g., equivalent of EE14 or ME30, or experience with Arduino programming).	

146809	Networked Embedded Systems
Subject: EE	Catalog Nbr: 0153
A practical introduction to building and deploying robust embedded systems for the Internet of Things. Topics include: selecting a microcontroller, interfacing with sensors, wireless protocols for IoT, printed circuit board design, managing power consumption, software design patterns for low-power devices, and remote	

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management of IoT devices. Semester-long team project to build a substantial embedded system and test it in the field.

Recommendations: experience programming in C or C++, circuit analysis and design (e.g., EE 20, ME 30, BME 10).

146810	MSEM/MSTML Graduate Seminar			
Subject: EM		Catalog Nbr: 0295		
2024 FALL		Primary	Partha Ghosh	Partha.Ghosh@tufts.edu
Contemporary issues and topics via presentations, workshops, and discussion. See department website for specific details.				

146811	Paths to Entrepreneurship			
Subject: ENT		Catalog Nbr: 0090		
2024 FALL		Primary	Alexander Ocampo	Alexander.Ocampo@tufts.edu
2024 FALL		Primary	Philip Ellison	Phillip.Ellison@tufts.edu
Build knowledge about the many paths, skill sets, and strategies to early-stage entrepreneurship. Learn and unlearn what it means to be an entrepreneur while exploring different industries. Hear from experts in the field in a traditional corporate job, a startup, a social enterprise, or people running a side hustle and more. Engage in discussions and workshops to understand entrepreneurial narratives and envision an entrepreneurial future.				

146812	Team and Talent Management	
Subject:	Catalog Nbr:	
ENT	0171	
Team building and talent management, from building high-performing teams, recruiting, hiring, and onboarding new employees, to the overall personnel management of an organization (from startups to small businesses and existing enterprises). Strategic planning processes surrounding building the organizational structure, tactics around goal setting, hiring and firing, compensation structures and reviews, and employee development.		

146813	Managing Tech-Based Organizations in the 21st Century		
Subject:		Catalog Nbr:	
TML		0122	
Challenges and opportunities for technology company leaders as they consider the dynamic external and internal environments emerging in modern companies and society. Topics include: the future of work, artificial intelligence and the evolution of automation, climate change and sustainability, and geopolitical dynamics.			

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146814	Special Topics	
Subject:	Catalog Nbr:	
TML	0193	
Special Topics. Please see departmental website for specific details.		

146815	Special Topics	
Subject:	Catalog Nbr:	
TML	0293	
Special Topics. Please see departmental website for specific details.		

146816	MSEM/MSTML Graduate Seminar				
Subject:		Catalog Nbr:			
TML		0295			
2024 FALL		Primary	Partha Ghosh	Partha.Ghosh@tufts.edu	
Contemporary issues and topics via presentations, workshops, and discussion. See department website for specific details.					

146832	Capstone Leadership Project			
Subject:	Catalog Nbr:			
TML	0282			
2024 FALL	Primary	Partha Ghosh	Partha.Ghosh@tufts.edu	
2024 FALL	Primary	Samuel Liggero	Samuel.Liggero@tufts.edu	
2024 FALL	Primary	Gerald Brown	Gerald.Brown@tufts.edu	
2024 FALL	Primary	James Nash	James.Nash@tufts.edu	
2024 FALL	Primary	Abbott Weiss	Abbott.Weiss@tufts.edu	
2024 FALL	Primary	Frank Apeseche	Frank.Apeseche@tufts.edu	
2024 FALL	Primary	Mark Bamford	Mark.Bamford@tufts.edu	
(Cross-listed as EM 282) Student led three-month project to demonstrate business acumen and leadership skills. Project must be complex and involve risk. Projects are often completed with the students' current employer.				

146834	Essentials of Strategic Management				
Subject:		Catalog Nbr:			
TML		0209			
2024 FALL		Primary	Partha Ghosh	Partha.Ghosh@tufts.edu	
(Cross-listed as EM 209) Use of analytics driven insight and imaginative reasoning in making strategic decisions. Integration of the emerging geo-economic, environmental, geo-political, technological and demographic trends with analytical techniques including game & option(s) theories.					

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146835	Practice of Ethical Leadership			
Subject:	Catalog Nbr:			
TML	0210			
2024 FALL	Primary	Jane Seminara		Jane.Seminara@tufts.edu
(Cross-listed as EM 210) Examination of leadership, and the role of future engineering leaders. Formulation of leadership messages, translation of leadership messages into action and real world demonstration of those actions. Topics include: giving voice to values, taking a stand, exercising authority, and emergent leadership.				

146842	The Energy Transition			
Subject:	Catalog Nbr:			
ENV	0161			
2024 FALL	Primary	Eric Hines		Eric.Hines@tufts.edu
(Cross-listed as STS 101, ME 174 & CEE 101) Consideration of engineering concepts relevant to the global transition from fossil fuels to renewable sources of energy. Interface between policy and technology in the energy sector and its relevance to decision making. Offshore wind energy is used as an example to illustrate the convergence of technology, infrastructure, policy, and markets that is necessary to achieve a just and equitable energy transition. Course is open to juniors, seniors, and graduate students from across the university.				

146843	The Energy Transition			
Subject:	Catalog Nbr:			
ME	0174			
2024 FALL	Primary	Eric Hines		Eric.Hines@tufts.edu
(Cross-listed as STS 101, CEE 101 & ENV 161) Consideration of engineering concepts relevant to the global transition from fossil fuels to renewable sources of energy. Interface between policy and technology in the energy sector and its relevance to decision making. Offshore wind energy is used as an example to illustrate the convergence of technology, infrastructure, policy, and markets that is necessary to achieve a just and equitable energy transition. Course is open to juniors, seniors, and graduate students from across the university.				

146846	Graduate Engineering Co-op			
Subject:	Catalog Nbr:			
ME	0404			
2024 FALL	Primary	Alicia Abdulrazzaq		Alicia.Abdulrazzaq@tufts.edu

146847	Graduate Engineering Co-op			
Subject:	Catalog Nbr:			
BME	0404			

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2024 FALL	Primary	Alicia Abdulrazzaq	Alicia.Abdulrazzaq@tufts.edu
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146848	Graduate Engineering Co-op		
Subject:	Catalog Nbr:		
CHBE	0404		
2024 FALL	Primary	Alicia Abdulrazzaq	Alicia.Abdulrazzaq@tufts.edu

146849	Graduate Engineering Co-op		
Subject:	Catalog Nbr:		
CS	0404		
2024 FALL	Primary	Alicia Abdulrazzaq	Alicia.Abdulrazzaq@tufts.edu

146850	Graduate Engineering Co-op		
Subject:	Catalog Nbr:		
DS	0404		
2024 FALL	Primary	Alicia Abdulrazzaq	Alicia.Abdulrazzaq@tufts.edu

146851	Graduate Engineering Co-op		
Subject:	Catalog Nbr:		
CEE	0404		
2024 FALL	Primary	Alicia Abdulrazzaq	Alicia.Abdulrazzaq@tufts.edu

146868	Graduate Engineering Co-op		
Subject:	Catalog Nbr:		
EM	0404		
2024 FALL	Primary	Alicia Abdulrazzaq	Alicia.Abdulrazzaq@tufts.edu

146929	High Reynolds Number Flow		
Subject:	Catalog Nbr:		
ME	0152		
Fundamentals of compressible flow and turbulence. Propagation of sound waves. Isentropic flow, Fanno flow, and Rayleigh flow. Normal and oblique shocks. Origins of turbulence and fundamentals of turbulent boundary			

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layers. Governing equations of turbulent flow. Reynolds averaging. Basic turbulence modeling and experimental methods used to study turbulence.

146930	Aerodynamics
Subject: ME	Catalog Nbr: 0154
Theoretical and applied perspectives of aerodynamics. Fundamentals of fluid dynamics from conservation principles, aerodynamics for vehicles in flight, stable equilibrium analysis, numerical simulation of flight dynamics, and analysis of computational fluid dynamics (CFD) simulations. Engineering design practices for vehicles in flight, through case studies, simulation virtual laboratory, and team design projects.	