Area A -- Approved Course List

(For doctoral students - at least 6 credit hours of Area A course work must be earned in courses listed or cross-listed with the Math department.)

Course Title	Course #	Last offered
Advanced Theory of Finite Element Methods	CSE 393H, E M 394H	Spring 2019
Advanced Topics in Estimation Theory	ASE 381P.7	Spring 2020
Algebraic Topology	M 382C	Fall 2020
Analytical Methods I	ASE 380P.1, E M 386K	Fall 2020
Analytical Methods II	ASE 380P.2, E M 386L, CSE 386L	Spring 2020
Applied Probability	ORI 390R.1	Fall 2020
Bayesian Deep Learning†	STA 380	Fall 2019
Bayesian Statistical Methods†	SDS 384.7	Fall 2020
Calculus of Variations	M 391C*	Prior to Fall 2014
Coding Theory	M 390C*	Fall 2014
Combinatorics and Graph Theory	C S 388C	Fall 2019
Comp PDE-Constrnd Bayesian Inv	CSE 397*, E M 397*	Fall 2016
Complex Analysis	CSE 385S, M 381D	Spring 2020
Computational & Variational Methods for Inverse Problems	CSE 397*, GEO 391*	Fall 2019
Conservation Laws	CSE 393*	Prior to Fall 2014
Convex Optimization	E E 381K.18	Fall 2020
Design & Analysis of Experiments	CSE 384U, M 384E, SDS 384.6	Spring 2020
Differential Topology	M 382D	Spring 2020
Functional Analysis in Theoretical Mechanics	CSE 386M, E M 386M	Fall 2020
Graphical Models	C S 395T*	Fall 2015
Introduction to Applied Harmonic Analysis	CSE 396*, M 393C*	Fall 2016
Introduction to Compressive Sensing	M 393C*	Prior to Fall 2014
Introduction to Probability & Statistics†	SDS 382	Prior to Fall 2014
Introduction Theo/Cmpt Mth Mach Learn	CSE 392*	Fall 2020
Inverse Problems	CSE 396*	Prior to Fall 2014
Iterative Numerical Methods	M 397C*	Prior to Fall 2014
Kinetic Theory	CSE 396*	Prior to Fall 2014
Large Scale Optimization II	E E 381V*	Spring 2020
Linear Models	SDS 387	Fall 2020
Markov Chains & Mixing Time	M 393C*	Spring 2020
Math Statistics for Applics	STA 380.10*	Fall 2020
Mathematical Methods for Statistical Analysis†	SDS 381	Spring 2020
Mathematical Methods in Science & Engineering	CSE 386L, E M 386L, ASE 380P.2	Spring 2020
Mathematical Statistics	ORI 390R.2	Prior to Fall 2014
Mathematical Statistics I	CSE 384R, M 384C, SDS 384.2	Fall 2020
Mathematical Statistics II	CSE 384S, M 384D, SDS 384.3	Spring 2020
Mathematics in Deep Learning	M 393C*	Fall 2020
Methods of Applied Mathematics I	CSE 386C, M 383C	Fall 2020
Methods of Applied Mathematics II	CSE 386D, M 383D	Spring 2020
Methods of Mathematical Physics I	CSE 385M, PHY 381M	Fall 2020

** Indicates topics course number. Topic title must match.*

† Indicates course may be counted as listed/cross-listed with Math dept

Area A -- Approved Course List

(For doctoral students - at least 6 credit hours of Area A course work must be earned in courses listed or cross-listed with the Math department.)

Course Title	Course #	Last offered
Monte Carlo Methods in Statistics†	SDS 386D	Spring 2020
Multiscale Modeling & Computation	CSE 396*, M 393C*	Spring 2015
Nonlinear Partial Differential Equations	M 393C*	Prior to Fall 2014
Partial Differential Equations I	CSE 396*, M 393C*	Fall 2020
Partial Differential Equations II	CSE 396*, M 393C*	Spring 2018
Probability & Stochastic Processes I	E E 381J	Fall 2020
Randomized Algorithms	C S 388R	Fall 2019
Real Analysis	CSE 385R, M 381C	Fall 2020
Regression Analysis	CSE 384T, M 384G, SDS 384.4	Fall 2020
Statistical Estimation Theory	ASE 381P.6	Fall 2020
Statistical Methods I†	SDS 380C	Fall 2020
Statistical Methods II†	SDS 380D	Spring 2020
Statistical Modeling I†	SDS 383C	Fall 2020
Statistical Modeling II†	SDS 383D	Spring 2020
Statistical Models for Big Data†	SDS 385*	Fall 2020
Stochastic Analysis	CSE 394*	Prior to Fall 2014
Stochastic Processes I	CSE 394*, M 394C*	Fall 2020
Theoretical Statistics†	SDS 384.11	Spring 2020
Theory of Probability I	CSE 384K, M 385C	Fall 2020
Theory of Probability II	CSE 384L, M 385D	Spring 2020
Understanding Inversion & Machine Learning	CSE 397, E M 397	Fall 2018

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† Indicates course may be counted as listed/cross-listed with Math dept

Area B -- Approved Course List

Course name	Course #	Last offered
Advanced Theory of Finite Element Methods	CSE 393H, E M 394H	Spring 2019
Bayesian Methods: Machine Learning	STA 380*	Spring 2018
Bayesian Statistical Methods	SDS 384.7	Fall 2020
Bootstrap Statistics	NEU 384C	Spring 2020
Boundary Element Methods	C E 380P.4	Spring 2019
Comp PDE-Constrnd Bayesian Inv	CSE 397*, E M 397*	Fall 2018
Comp Stat Appl in Data Sci	C S 395T*	Spring 2020
Computational & Variational Methods for Inverse Problems	CSE 397*, GEO 391*	Fall 2019
Computer Graphics	CSE 382G, C S 384G	Spring 2017
Conservation Laws	CSE 393*	Prior to Fall 2014
Convex Optimization	E E 381K.18	Fall 2020
Convex Optimization Theory	E E 381V*	Fall 2015
Data Mining	E E 380L.10	Fall 2020
Data Mining: A Mathematical Perspective	C S 391D	Spring 2020
Fast Methods in Scientific Computing	M 393C*	Spring 2019
Finite Element Methods	CSE 393F, E M 394F, ASE 384P.4	Fall 2020
Geometric Foundations of Data Science	CSE 392*	Spring 2020
Geometric Modeling & Visualization	CSE 392*	Prior to Fall 2014
Geophysical Time Series Analysis	GEO 384R	Spring 2016
Grid Generation & Adaptive Grids	CSE 397*	Prior to Fall 2014
Grid Generation & Adaptive Grids	E M 397.4	Prior to Fall 2014
High-Performance Computing: Principles & Practice	CSE 392*	Prior to Fall 2014
Introduction Theo/Cmpt Mth Mach Learn	CSE 392*	Fall 2020
Introduction to Applied Harmonic Analysis	M 393C*	Fall 2016
Introduction: Quantification Modeling Uncertainty	CSE 394*	Prior to Fall 2014
Inverse Problems	CSE 396*	Prior to Fall 2014
Iterative Linear Algebra	CSE 393*	Prior to Fall 2014
Iterative Numerical Methods	M 397C*	Prior to Fall 2014
Large Scale Optimization II	E E 381V*	Spring 2020
Machine Learning	C S 391L	Fall 2020
Monte Carlo Methods in Statistics	SDS 386D	Spring 2020
Multicore Computing	E E 382C.12	Spring 2020
Multiscale Methods	CSE 396*	Prior to Fall 2014
Multiscale Modeling & Computation	M 393C*	Fall 2017
Neural Computation	C S 395T*	Spring 2020
Neural Networks	NEU 394P*, C S 394N	Fall 2019
Nonlin Stat/Dyn Fin Elem Anly	CSE 397*	Spring 2018
Nonlinear Programming	ORI 391Q.1	Spring 2016
Numerical Analysis: Differential Equations	CSE 383L , M 387D	Spring 2020
Numerical Analysis: Algebra & Approximation	CSE 383K , M 387C	Fall 2020
Numerical Analysis: Interpolation, Approx, Quadrature, & Diff Eq	CSE 383D	Prior to Fall 2014
Numerical Analysis: Linear Algebra	CSE 383C, C S 383C, M 383E	Fall 2020
Numerical Methods for Flow & Transport Problems	CSE 393N	Prior to Fall 2014
Numerical Optimization: Graphics/AI	C S 395T*	Fall 2019
Optimization Under Uncertainty	ORI 397*	Spring 2020
Optimization: Theory & Practice	CHE 385P	Spring 2020

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Area B -- Approved Course List

Course name	Course #	Last offered
Parallel Algorithms	C S 388P	Fall 2016
Parallel Algorithms for Scientific Computing	CSE 392*	Spring 2019
Parallel Computing for Science & Engineering	SDS 394C	Spring 2020
Parallel Systems	C S 380P	Prior to Fall 2014
Predictive Computational Science Foundations	CSE 397*	Spring 2020
Programming for Performance	CSE 392*	Prior to Fall 2014
Randomized Algorithms	C S 388R	Fall 2019
Scalable Machine Learning	C S 395T*	Fall 2015
Scientific & Technical Computing	SDS 394	Fall 2020
Scientific Computing in Machine & Deep Learning	CSE 392*	Fall 2020
Special Topics in Machine Learning	E E 381V*	Fall 2019
Stabilility & Multiscale Methods in CFD	CSE 397*	Spring 2020
Statistical & Discrete Methods for Scientific Computing	CSE 383M	Spring 2020
Stochastic Sys, Estimation, and Control	M E 384Q.7	Spring 2020
The Finite Element Method	CSE 393*, C E 381R	Fall 2020
Tools & Techniques of Computational Science	CSE 380	Fall 2020
Understanding Inversion & Machine Learning	CSE 397*, E M 397*	Fall 2018
Validation & Uncertainty Quantification in Computational Models	CSE 397*	Spring 2020
Verif & Synthesis for Cyberphys Sys	C S 395T*, ASE 396*	Fall 2019

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Area C -- Approved Course List

Course name	Course #	Last offered
Acoustics I	M E 384N.1	Fall 2020
Acoustics II	M E 384N.2	Spring 2020
Advanced Combustion	M E 382R.5	Spring 2020
Advanced Dynamics	E M 381	Spring 2020
Advanced Petrophysics	PGE 381L	Fall 2020
Advanced Physical Chemistry	CH 382M	Spring 2020
Advanced Physical Chemistry: Intro to Quantum Mechanics	CH 382K	Fall 2020
Advanced Physical Chemistry: Statistical Mechanics	CH 382L	Fall 2020
Advanced Problems in Compressible Flow	ASE 382Q.7	Fall 2020
Advanced Reservoir Engineering	PGE 388	Fall 2020
Advanced Thermodynamics	CHE 387K	Fall 2020
Advanced Thermodynamics & Phase Behavior	PGE 384	Spring 2020
Algorithms for Computational Biology	C S 394C	Prior to Fall 2014
Applied Orbital Mechanics†	ASE 366L	Spring 2020
Applied Reservoir Characterization	PGE 383.58	Spring 2015
Applied Stochastic Processes	ORI 390R.5	Spring 2020
Astrophysical Gas Dynamics	AST 382C, PHY 396T*	Fall 2018
Bioinformatics	BCH 394P	Spring 2020
Biomed Imaging Signals & Systems	BME 381J.3, E E 385J.18	Fall 2019
Biostatistics, Study Design, & Research Methodology	BME 380J.5	Spring 2020
Brain Computer Interaction	E E 385V*	Fall 2020
Brain Connectivity	PSY 381D*	Spring 2019
Cell Biology	BIO 395H, CH 395H, MOL 395H	Spring 2020
Classical Mechanics	PHY 385K	Fall 2020
Climate System Modeling	GEO 387G	Fall 2020
Clinical Cardiology	CSE 397*	Fall 2018
Computational Bio & Bioinformatics	SDS 385*	Spring 2020
Computational Electromagnetics	E E 383V*	Spring 2015
Computational Methods for Biomedical Engineers	BME 383J.9	Fall 2019
Computational Modeling in Bioengr & Medicine	CSE 397*, BME 385J*	Spring 2019
Computational Modeling of the Cardiovascular System	CSE 397*	Fall 2020
Computational/Variational Methods Inverse Probs	CSE 397*	Fall 2019
Continuum Mechanics	E M 384K	Fall 2020
Convex Optimization and Engr Apps	ASE 396*	Fall 2015
Dynamics of Atmospheres & Oceans	GEO 387F	Spring 2020
Dynamics of Turbulent Flow	M E 381P.3	Spring 2020
Electromagnetic Field Theory	E E 383L	Spring 2020
Electromagnetic Theory I	PHY 387K	Fall 2020
Electromagnetics Metamaterials	E E 383V*	Prior to Fall 2014
Environmental Fluid Mechanics	C E 380S	Fall 2019
Financial Mathematics for Actuarial Applications	M 389W	Fall 2020
Financial Risk Management	FIN 397.4	Fall 2020
FMRI Brain Decoding	NEU 394P*	Spring 2018
Foundations of Fluid Mechanics	ASE 382Q.1	Fall 2020
Fracture Mechanics	E M 388F	Spring 2020
Fundamentals of Biomedical Optical Imaging	BME 381J.9	Fall 2020

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Area C -- Approved Course List

Course name	Course #	Last offered
Fundamentals of Combustion	M E 382R.1	Fall 2020
Fundamentals of Enhanced Oil Recovery I	PGE 387K	Spring 2019
Fundamentals of Incompressible Flow	M E 381P.1	Fall 2020
Genetics	BIO 395F, CH 395F, MOL 395F	Spring 2020
Genomic Signal Proc & Data Science	E E 381V*	Fall 2018
Glaciology	GEO 391*	Prior to Fall 2014
Intro to Computational Oncology	CSE 397*	Spring 2020
Intro to Mathematical Modeling in Science & Engineering I	CSE 389C	Fall 2020
Intro to Mathematical Modeling in Science & Engineering II	CSE 389D	Spring 2020
Intro to Single Mol Chem & Phy	CH 393L*	Prior to Fall 2014
Intro: Quantif Modlg Uncertnty	CSE 394*	Prior to Fall 2014
Introduction to System Theory	E E 380K	Spring 2016
Introduction to Wave Physics	C E 381W	Prior to Fall 2014
Inverse Theory	GEO 384M	Spring 2020
Kinetic Theory	CSE 396*	Prior to Fall 2014
Kinetic Theory	M 393C*	Prior to Fall 2014
Linear Systems Analysis	ASE 381P.1	Fall 2020
Machine Learning	C S 391L	Fall 2020
Machine Learning: Large-Scale Data	E E 381V*	Spring 2016
Mathematics in Finance	R M 391*	Spring 2020
Methods in Computatnal Neurosci	NEU 394P*	Prior to Fall 2014
Methods in Orbit Determination	ASE 389P.4	Spring 2020
Micromechanics	E M 388M	Fall 2019
Mod Flow/Trans in Porous Media	GEO 391*	Fall 2018
Modeling & Simululation Cardiac Function	CSE 397*	Spring 2017
Molecular Gas Dynamics	ASE 382R.6	Fall 2020
Molecular Gas Dynamics II	ASE 382R*	Spring 2018
Morphodynam/Quant Stratigraphy	GEO 391*	Fall 2018
Multidimensional Data Analysis in Geosciences	GEO 384H	Fall 2020
Natural Language Processing	C S 388	Fall 2019
Neural Computation	C S 395T*	Spring 2020
Neural Networks	NEU 394P*, C S 394N	Fall 2020
Nonlin Fin El/Isogeo Anly Mths	CSE 397*	Spring 2014
Nonlin Stat/Dyn Fin Elem Anly	CSE 397*	Spring 2018
Nonlinear Acoustics	M E 384N.4	Spring 2020
Numerical Simulation of Reservoirs	PGE 392K	Fall 2020
Optimal Control Theory	ASE 381P.3	Spring 2020
Physical Climatology	GEO 387H	Fall 2020
Physical Simulation	C S 395T*	Spring 2020
Plasma Physics I	PHY 380L	Spring 2020
Predictive Computational Science Foundations	CSE 397*	Spring 2020
Quantum Field Theory I	PHY 396K	Fall 2020
Quantum Mechanics I	PHY 389K	Fall 2020
Reactive Flow in Porous Media	GEO 391*	Spring 2016
Relativity Theory I	PHY 387M	Spring 2020
Research in Computational Linguistics	LIN 389C	Fall 2020

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Area C -- Approved Course List

Course name	Course #	Last offered
Reservoir Geomechanics	PGE 383*	Prior to Fall 2014
Scalable Machine Learning	C S 395T*	Fall 2015
Seismic Data Processing	GEO 384S	Spring 2019
Seismology II	GEO 380F	Fall 2020
Seismology III	GEO 390D	Spring 2020
Semiconductor Nanostructures	E E 396V*	Fall 2014
Semiconductor Physics	E E 396K.2	Spring 2020
Solid Mechanics I	ASE 384P.1	Fall 2020
Solid Mechanics II	E M 388L, ASE 384P.2	Spring 2020
Solid-State Physics: Biophysics	PHY 392T*	Fall 2020
Spacecraft Dynamics†	ASE 366K	Fall 2020
Stability/Multiscale Methods in CFD	CSE 397*	Spring 2020
Statistical Mechanics	PHY 385L	Fall 2020
Stochastic Hydrology	C E 385S	Fall 2020
Structural Dynamics	E M 384L, ASE 384P.3	Prior to Fall 2014
Structured Models for NLP	C S 395T*	Fall 2017
Theory of Plasticity	E M 380	Spring 2020
Thermodynamics of Geologic Processes	GEO 390M	Prior to Fall 2014
Tissue/Scaffold Biomechanics	CSE 397*	Fall 2019
Transport Phenomena	PGE 381M	Fall 2020
Uncertainty Quantification	GEO 391*	Spring 2015
Underwater Acoustics	M E 384N.5	Fall 2020
Vision Systems	NEU 380E	Spring 2020
Wave Propagation I	E M 394V	Spring 2018

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