

Graduate course Structure for PhD Students

Fluid Mechanics

Introductory courses	MAE 210A,B	Fluid Mechanics I, II
Advanced courses	MAE 212	Introductory Compressible Flow
	MAE 214A	Introduction to Turbulence and Turbulent Mixing
	MAE 214B	Ocean Turbulence and Mixing
	MAE 215	Hydrodynamic Stability
	MAE 222A,B,C	Advanced Fluid Mechanics
	MAE 223	Computational Fluid Dynamics
	MAE 224	Environmental Fluid Dynamics
	MAE 256	Rheology of Fluids

Combustion (Thermal sciences)

Introductory courses	MAE 211	Introduction to Combustion
	MAE 212	Introductory Compressible Flow
Advanced courses	MAE 213	Mechanics of Propulsion
	MAE 220A,B,C	Physics of Gases; Physical Gasdynamics; Nonequilibrium Gasdynamics

Solid Mechanics

Introductory courses	MAE 231A,B	Foundations of Solid Mechanics; Elasticity
Advanced courses	MAE 231C	Anelasticity
	or	
	SE 273	Theory of Plasticity and Viscoelasticity
	MAE 232A,B,C	Finite Element Methods in Solid Mechanics I, II, III
	MAE 233A,B,C	Fracture Mechanics; Micromechanics; Advanced Mechanics of Composite Materials
	MAE 235A	Theory of Shells
	MAE 238	Stress Waves in Solids
	MAE 270	Mechanics of Powder Processing

Environmental Engineering

Introductory courses	MAE 210B	Fluid Mechanics II
	MAE 224	Environmental Fluid Dynamics
Advanced courses	MAE 214A,B	Introduction to Turbulence and Turbulent Mixing; Ocean Turbulence and Mixing
	MAE 221A,B,C	Heat Transfer; Mass Transfer;???
	MAE 222A,B,C	Advanced Fluid Mechanics

Chemical Engineering

Introductory courses	CENG 210A, MAE 210B	Fluid Mechanics I (cross-listed with MAE 210A) Fluid Mechanics II
Advanced courses	CENG 221A,B	Heat Transfer (cross-listed with MAE 221A)
	CENG 221B	Mass Transfer (cross-listed with MAE 221B)
	CENG 251	Thermodynamics
	CENG 252	Chemical Reaction Engineering
	CENG 253	Heterogeneous Catalysis
	CENG 254	Biochemical Engineering
	CENG 255	Electrochemical Engineering

Design

Introductory courses	MAE 291 MAE 292	Design and Mechanics in Computer technology Computer-Aided Design and Analysis
Advanced courses	MAE 293 MAE 232A,B,C.	Advanced Computer Graphics for Engineers and Scientists Finite Element Methods in Solid Mechanics I, II, III

Linear and Optimal Control

Introductory courses	MAE 280A, B	Linear Systems Theory; Linear Control Design
Advanced courses	MAE 284 MAE 285 MAE 287	Robust and Multi-Variable Control Optimal Control and Estimation Control of Distributed Parameter Systems

Adaptive Systems and Dynamic Modeling

Introductory courses	MAE 281A, B	Nonlinear Systems; Nonlinear Control
Advanced courses	MAE 282 MAE 283A MAE 283B MAE 286	Adaptive Control Parametric Identification, Theory & Methods Approximate Identification & Control Optimization and Control of Fluid-Mechanical Systems

Materials Sciences

Introductory courses	MATS 201A/MAE 271A MATS 201B/MAE 271B	Thermodynamics of Solids Solid State Diffusion & Reaction Kinetics
Advanced courses	MATS 201C/MAE 271C MATS 205A/MAE 272 MATS 211/MAE 229A MATS 218/MAE 250 MATS 227/MAE 251 MATS 213A,B MATS 233A,/MAE 252A,B MATS 236/MAE 253 MATS 251/MAE265	Phase Transformations Imperfections in Solids Mechanical Properties Fatigue, Fracture, and Failure Structure and Bonding of Solids Dynamic Behavior of Materials I & II Processing & Synthesis of Advanced Materials Ceramic & Glass Technology Structure & Properties of Electronic, Magnetic, Photonic Materials

Applied Plasma Physics

Introductory courses	MAE 217 MAE 218A	Introduction to Plasma Equilibria, Waves, and Instabilities Physics of Gas Discharge Plasmas and Applications
Advanced courses	MAE 227A MAE 227B PHYS 218A,B,C PHYS 234 PHYS 235	Fundamentals of Fusion Plasma Physics Fundamentals of Modern Plasma Physics Plasma Physics Nonneutral Plasmas Nonlinear Plasma Theory

Mathematics

	MAE 294A,B,C MAE 290A,B	Methods in Applied Mechanics I, II, III Numerical Methods in Science and Engineering; Numerical Methods for Differential Equations
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MATH 210A,B,C	Mathematical Methods in Physics and Engineering
MATH 211	Fourier Analysis on Finite Groups
MATH 212A	Introduction to the Mathematics of Systems and Control
MATH 220A,B,C	Complex Analysis
MATH 221A,B,C	Topics in Several Complex Variables
MATH 227A,B,C	Topics In Complex Analysis
MATH 231A,B,C	Partial Differential Equations
MATH 233	Singular Perturbation Theory for Differential Equations
MATH 240A,B,C	Real Analysis
MATH 241A,B,C	Functional Analysis
MATH 247A	Topics in Real Analysis
MATH 250A,B,C	Differential Geometry
MATH 270A,B,C	Numerical Mathematics
MATH 271A,B,C	Numerical Optimization
MATH 272A,B,C	Numerical Partial Differential Equations
MATH 273A,B,C	Scientific Computation
MATH 274A	Topics in Real Analysis
MATH 280A,B,C	Probability Theory
MATH 285A, B	Stochastic Processes
MATH 286	Stochastic Differential Equations
MATH 287A,B,C	Time Series Analysis; Multivariate Analysis;
	Nonparametric Analysis
MATH 290A,B,C	Topology

Basic Science

CHEM 213	Chemistry of Macromolecules
CHEM 214	Molecular and Cellular Biochemistry
ECE 220	Space Plasma Physics
ECE 222	Applied Electromagnetic Theory
ECE 253A	Digital Image Analysis
ECE 270A, B	Neurocomputing
PHYS 200A,B	Theoretical Mechanics
PHYS 201	Mathematical Physics
PHYS 203A,B	Advanced Classical Electrodynamics
PHYS 211A,B	Solid-State Physics
SIO 203A,B,C	Methods of Applied Analysis