Applied Science and Technology (AST)

Courses
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AST C210 X-rays and Extreme Ultraviolet Radiation 3 Units
Terms offered: Fall 2019, Fall 2017, Fall 2016
This course explores modern developments in the physics and applications of x-rays and extreme ultraviolet (EUV) radiation. It begins with a review of electromagnetic radiation at short wavelengths including dipole radiation, scattering and refractive index, using a semi-classical atomic model. Subject matter includes the generation of x-rays with synchrotron radiation, high harmonic generation, x-ray free electron lasers, laser-plasma sources. Spatial and temporal coherence concepts are explained. Optics appropriate for this spectral region are described. Applications include nanoscale and astrophysical imaging, femtosecond and attosecond probing of electron dynamics in molecules and solids, EUV lithography, and materials characteristics. X-rays and Extreme Ultraviolet Radiation: Read More [+]

Rules & Requirements
Prerequisites: Physics 110, 137, and Mathematics 53, 54 or equivalent

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details
Subject/Course Level: Applied Science and Technology/Graduate
Grading: Letter grade.
Instructor: Attwood
Also listed as: EL ENG C213
X-rays and Extreme Ultraviolet Radiation: Read Less [-]

AST C225 Thin-Film Science and Technology 3 Units
Terms offered: Spring 2020, Spring 2019, Spring 2018, Spring 2017
Thin-film nucleation and growth, microstructural evolution and reactions. Comparison of thin-film deposition techniques. Characterization techniques. Processing of thin films by ion implantation and rapid annealing. Processing-microstructure-property-performance relationships in the context of applications in information storage, ICs, micro-electromechanical systems and optoelectronics. Thin-Film Science and Technology: Read More [+]

Rules & Requirements
Prerequisites: Graduate standing in engineering, physics, chemistry, or chemical engineering

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details
Subject/Course Level: Applied Science and Technology/Graduate
Grading: Letter grade.
Instructors: Wu, Dubon
Also listed as: MAT SCI C225
Thin-Film Science and Technology: Read Less [-]

AST C239 Partially Ionized Plasmas 3 Units
Terms offered: Spring 2010, Spring 2009, Spring 2007
Introduction to partially ionized, chemically reactive plasmas, including collisional processes, diffusion, sources, sheaths, boundaries, and diagnostics. DC, RF, and microwave discharges. Applications to plasma-assisted materials processing and to plasma wall interactions. Partially Ionized Plasmas: Read More [+]

Rules & Requirements
Prerequisites: An upper division course in electromagnetics or fluid dynamics

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details
Subject/Course Level: Applied Science and Technology/Graduate
Grading: Letter grade.
Formerly known as: 239
Also listed as: EL ENG C239
Partially Ionized Plasmas: Read Less [-]
AST C295R Applied Spectroscopy 3 Units  
Terms offered: Spring 2009, Spring 2007, Spring 2002  
After a brief review of quantum mechanics and semi-classical theories for the interaction of radiation with matter, this course will survey the various spectroscopies associated with the electromagnetic spectrum, from gamma rays to radio waves. Special emphasis is placed on application to research problems in applied and engineering sciences. Graduate researchers interested in systematic in situ process characterization, analysis, or discovery are best served by this course.  
Applied Spectroscopy: Read More [+]

Rules & Requirements

Prerequisites: Graduate standing in engineering, physics, chemistry, or chemical engineering; courses: quantum mechanics, linear vector space theory

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Applied Science and Technology/Graduate

Grading: Letter grade.

Instructor: Reimer

Also listed as: CHM ENG C295R

AST 299 Individual Study or Research 1 - 12 Units  
Terms offered: Fall 2020, Summer 2020 8 Week Session, Spring 2020  
Investigations of advanced problems in applied science and technology. Sponsored by Engineering Interdisciplinary Studies Center.  
Individual Study or Research: Read More [+]

Rules & Requirements

Prerequisites: Consent of instructor; graduate standing

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 1-12 hours of independent study per week

Summer:
3 weeks - 5-60 hours of independent study per week
8 weeks - 1-12 hours of independent study per week

Additional Details

Subject/Course Level: Applied Science and Technology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.  
Individual Study or Research: Read Less [-]