Applied Science and Technology (AST)

Courses

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AST C210 X-rays and Extreme Ultraviolet Radiation 3 Units
Terms offered: Spring 2022, Spring 2021, Fall 2019
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.

AST C225 Thin-Film Science and Technology 3 Units
Terms offered: Fall 2022, Fall 2021, Spring 2020

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.

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

AST C225 Thin-Film Science and Technology

Prerequisites: An upper division course in electromagnetics or fluid dynamics

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

Formerly known as: 239

Also listed as: EL ENG C239

Partially Ionized Plasmas: Read Less [-]

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

Also listed as: EL ENG C213

Thin-Film Science and Technology: Read Less [-]

X-rays and Extreme Ultraviolet Radiation: 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

Also listed as: MAT SCI C225

Thin-Film Science and Technology: Read Less [-]

X-rays and Extreme Ultraviolet Radiation: 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

Also listed as: EL ENG C213

Thin-Film Science and Technology: Read Less [-]

X-rays and Extreme Ultraviolet Radiation: Read More [+]

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

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: Summer 2023 8 Week Session, Summer 2023 First 6 Week Session, Spring 2023
Investigations of advanced problems in applied science and technology. Sponsored by Engineering Interdisciplinary Studies Center.

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.