Astronomy 191: Special Topics
"Radiative Processes in Astrophysics"

TENTATIVE COURSE AND READING SCHEDULE

Lecture 1	Wednesday	Sep. 4	Course introduction; fundamentals of radiative transfer I (energy flux, inverse square law, specific intensity, specific energy density, eq. of radiative transfer, optical depth, source function, mean free path, thermal radiation and its properties, blackbody temperature definitions).
Lecture 2	Monday	Sep. 9	Pressure Integral; fundamentals of radiative transfer II.
Lecture 3	Wednesday	Sep. 11	Fundamentals of radiative transfer III.
Lecture 4	Monday	Sep. 16	Properties of the Planck law (Rayleigh-Jeans and Wien laws, Wien displacement law, radiation constants).
Lecture 5	Wednesday	Sep. 18	Einstein coefficients, scattering.
Lecture 6	Monday	Sep. 23	Scattering (Ch. 1.7).
Lecture 7	Wednesday	Sep. 25	Radiative diffusion (Ch. 1.8).

HOMEWORK 1 DUE FRIDAY, SEP. 27TH

Lecture 8	Monday	Sep. 30	Maxwell's Eq., plane electromagnetic waves, radiation spectrum (Ch. 2.1, 2.2, 2.3).
Lecture 9	Wednesday	Oct. 2	Radiation spectrum, polarization, EM potentials (Ch. 2.3, 2.4, 2.5).
Lecture 10	Monday	Oct. 7	Review of HW1; atomic structure.
Lecture 11	Wednesday	Oct. 9	Atomic structure and spectroscopy.
	Monday	Oct. 14	NO CLASS: Indigenous Peoples' Day.
Lecture 12	Wednesday	Oct. 16	[JWST Cycle 4 deadline].
Lecture 13	Monday	Oct. 21	Atomic structure and spectroscopy.
Lecture 14	Wednesday	Oct. 23	Atomic structure and spectroscopy.

Lecture 15	Monday	Oct. 28	Moving charges (Ch. 3.1, 3.2, 3.3)
Lecture 16	Wednesday	Oct. 30	Thomson scattering (Ch. 3.4).
Lecture 17	Monday	Nov. 4	Bremsstrahlung (Ch. 5).
Lecture 18	Wednesday	Nov. 6	Bremsstrahlung (Ch. 5).
	Monday	Nov. 11	NO CLASS: Veterans Day
Lecture 19	Tuesday	Nov. 12	MONDAY's SCHEDULE; Bremsstrahlung (Ch. 5) and applications
Lecture 20	Wednesday	Nov. 13	Synchrotron (Ch. 6).
Lecture 21	Monday	Nov. 18	Synchrotron (Ch. 6).
Lecture 22	Wednesday	Nov. 20	Synchrotron (Ch. 6).
	Monday	Nov. 25	THANKSGIVING WEEK - NO CLASSES
	Wednesday	Nov. 27	THANKSGIVING WEEK - NO CLASSES
Lecture 23	Monday	Dec. 2	(Inverse) Compton (Ch. 7).
Lecture 24	Wednesday	Dec. 4	(Inverse) Compton (Ch. 7).
Lecture 25	Monday	Dec. 9	LAST CLASS; Applications.

FINAL EXAM: WEDNESDAY, DEC. 18, 2024, 12-2 PM

(CLASSROOM TBD)