

Course Schedule & Important Dates

ASTR 201: Astronomy for Science Majors (Spring 2026)

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How to read this schedule

This course repeats one story all semester:

Measure → Infer → Balance → Evolve

Reading labels:

- **Required:** expected reading from the *Fundamentals of Astrophysics* () textbook and the lecture readings posted in the **Module** landing pages.
- **Recommended:** optional material from the textbook that we will “skim.”
- **Optional practice:** end-of-chapter *Questions & Exercises* (only assigned when stated)

Page totals are estimates from the Table of Contents page ranges.

Important dates

- **First class:** Tue Jan 20, 2026
- **Exam 1 (in class):** Thu Mar 5, 2026
- **Exam 2 (in class):** Thu Apr 16, 2026
- **Spring Break (no class):** Tue Mar 31 & Thu Apr 2
- **Last class (synthesis + optional review):** Tue May 5
- **Final Exam:** Thu May 7 10:30 am - 12:30 pm | **Room:** LH 249

Course schedule

Module 1 — Foundations (Weeks 1–3)

The physics toolkit: laws of motion, gravity, and radiation.

Week	Dates	Topics (in class)	Required Reading	Recommended
1	Jan 20 & 22	Spoiler Alerts: course overview + the inference framework Tools of the Trade: scaling, units, dimensional analysis	FoA Ch. 1	
2	Jan 27 & 29	Gravity I: Kepler → Newton (empirical vs physical laws) Gravity II: orbits, energy & angular momentum, virial theorem	Ch. 7 (pp. 43–46)	4
3	Feb 3 & 5	Radiation I: EM spectrum, light–matter interactions, blackbody radiation Radiation II: Wien’s law, spectral lines, Doppler, telescopes	Ch. 4.1–4.3 (pp. 25–27) + Ch. 5 (p. 32)	4

Module 2 — Discovering the HR Diagram (Weeks 4–6)

Module 1 gave us the laws; now we **use** them. Each lecture answers one question about stars — *How far? How hot and how big? What’s it made of? How fast? How heavy?* — and contributes one measurable axis. The module culminates with the **Hertzsprung–Russell diagram**, which emerges as a synthesis of every inference tool we’ve built.

Week	Dates	Lec	Topics (in class)	Required Reading	Core pp
4	Feb 10 & 12	7	Distance & Parallax — <i>How far?</i> Spherical geometry (source at origin, observer at radius r); angular size & small-angle approximation; parallax → parsec → Gaia; inverse-square law derived (geometric + scaling); flux + distance → luminosity	Ch. 2 (pp. 10–17) + Ch. 3.1 (pp. 18–19)	9
		8	Surface Flux & Colors of Stars — <i>How hot, how big?</i> Emitted / surface flux; Stefan–Boltzmann law ($L = 4\pi R^2 \sigma T^4$); Wien’s law applied: color → temperature; inferring stellar radii from L and T	Ch. 3.2 (pp. 19–21) + Ch. 4.4 (p. 28)	4
5	Feb 17 & 19	9	Spectra & Composition — <i>What’s it made of, and how is it moving?</i> Spectral lines in context (absorption/emission); OBAFGKM as a temperature sequence; Doppler effect → radial velocity	Ch. 5 (p. 32) + Ch. 6 (pp. 35–40)	7
		10	Masses from Motion — <i>How heavy?</i> Binary stars (visual, spectroscopic, eclipsing); radial velocity curves; Kepler’s 3rd law revisited → stellar masses; the mass–luminosity relation	Ch. 9 (pp. 54–56) + Ch. 10.1–10.3 (pp. 59–63)	8

Week	Dates	Lec	Topics (in class)	Required Reading	Core pp
6	Feb 24 & 26	11	Magnitudes & the Distance Modulus — <i>The astronomer's brightness scale</i> Logarithms in astronomy; apparent vs absolute magnitude; distance modulus ($m - M = 5 \log_{10}(d/10 \text{ pc})$); standard candles preview	Ch. 3.3 (pp. 21–22)	2
		12	Building the HR Diagram — <i>Putting it all together</i> L vs T plane; main sequence as a mass sequence; luminosity classes & giant/dwarf distinction; lines of constant R from Stefan–Boltzmann	Ch. 6 (synthesis)	—

Module 3 — Stellar structure, evolution, and the stellar graveyard (Weeks 7–12)

This module includes hydrostatic equilibrium, transport, fusion, scaling relations, and **stellar endpoints** (white dwarfs / neutron stars / black holes). We also cover **minimum and maximum stellar masses**, including a short Quantum Mechanics/de Broglie motivation for the minimum mass.

Note: The first Module 3 lecture (Week 7 Tue) is delivered *before* Exam 1 but is **not** covered on it — this gives you study time for Modules 1–2.

Week	Dates	Topics (in class)	Required reading (Core)	Core pages
7	Mar 3 & 5	Ages & lifetimes; timescale reasoning Thu: EXAM 1 (covers Modules 1–2)	Ch. 8 (pp. 49–51)	3
8	Mar 10 & 12	Hydrostatic equilibrium + virial temperature (thermal lens) Radiation transport: diffusion, radiation pressure	Ch. 15 (pp. 101–104) + Ch. 16 (pp. 107–110)	8

Week	Dates	Topics (in class)	Required reading (Core)	Core pages
9	Mar 17 & 19	Radiative vs convective envelopes Fusion ignition + main-sequence scalings	Ch. 17 (pp. 112–116) + Ch. 18 (pp. 120–122)	7
10	Mar 24 & 26	Min/max masses: brown dwarfs (QM + de Broglie) & Eddington limit Low-mass evolution → white dwarfs	Ch. 18 (pp. 122–124) + Ch. 19 (pp. 128–131)	6
Spring Break	Mar 31 & Apr 2	— No class —	—	—
11	Apr 7 & 9	Degeneracy pressure + Chandrasekhar limit (conceptual QM/stat-phys) High-mass evolution → core-collapse supernovae	Ch. 19 (pp. 131–134) + Ch. 20.1–20.3 (pp. 137–140)	7
12	Apr 14 & 16	Neutron stars + black holes; where GR matters (conceptual) Thu: EXAM 2	Ch. 20.4–20.5 (pp. 140–143)	4

Module 4 — Galaxies & cosmology (includes ISM + star formation) (Weeks 13–15)

Week	Dates	Topics (in class)	Required reading (Core)	Core pages
13	Apr 21 & 23	ISM phases; heating vs cooling (thermal balance) Star formation: Jeans criterion; IMF; angular momentum → disks Extinction/reddening (here)	Ch 21 (pp. 155–163) + Ch 22 (pp. 166–171) + Ch 12.3 (pp. 77–78)	17
14	Apr 28 & 30	Milky Way: rotation curve → dark matter External galaxies + Hubble law; large-scale structure + lensing	Ch 26 (pp. 201–210) + Ch 27.1–27.3 (pp. 213–217) + Ch 29 (pp. 232–238)	22
15	May 5	Cosmology capstone: expansion dynamics → CMB → early eras Synthesis + optional review	Ch 30 (pp. 243–248) + Ch 32.2–32.4 (pp. 261–264)	10