

MATH 35803 – Foundations of Applied Mathematics

Fall 2026 Course and Assessment Schedule

MWF 10:45–11:35 AM | CHPN 421 | Aug. 17–Dec. 11, 2026

Week	Dates	Material and Learning Focus	Homework	Quiz / Exam
1	Aug. 17–21	Dimensional analysis: units, dimensional homogeneity, Buckingham II, similarity, and nondimensionalization.	HW 1: Dimensional Analysis; <i>due Mon. Aug. 24</i>	Quiz 1: Dimensional Analysis
2	Aug. 24–28	Perturbation methods: regular and singular expansions, dominant balance, boundary layers, and why later models use asymptotics.	HW 2: Perturbation Methods; <i>due Mon. Aug. 31</i>	Quiz 2: Perturbation Methods
3	Aug. 31–Sep. 4	Kinetics: mass action, equilibria, linear stability, nullclines, phase-plane dynamics, and bifurcation ideas.	HW 3: Perturbation and Kinetics; <i>due Wed. Sep. 9</i>	Quiz 3: Kinetics
4	Sep. 7–11	Traffic flow: conservation laws, characteristics, nonlinear flux, shocks, Rankine–Hugoniot condition, and rarefaction fans. <i>No class Sep. 7 (Labor Day).</i>	HW 4: Traffic Flow; <i>due Mon. Sep. 14</i>	Quiz 4: Traffic Flow
5	Sep. 14–18	Traffic-flow completion. Exam coverage: dimensional analysis, perturbation, kinetics, and traffic flow.	None	Exam 1: Sep. 16; no quiz
6	Sep. 21–25	Continuum mechanics in 1D: material and spatial descriptions, motion and velocity, balance laws, deformation, strain, stress, and elastic bars.	HW 5: Continuum Mechanics; <i>due Fri. Oct. 9</i>	Quiz 5: Continuum (1D)
7	Sep. 28–Oct. 2	Continuum mechanics in 3D: deformation gradient, strain tensors, Cauchy stress, traction, constitutive laws, and elastic versus viscoelastic response.	HW 5 continued; <i>due Fri. Oct. 9</i>	Quiz 6: Continuum (3D)
8	Oct. 5–9	Newtonian fluids: velocity and stress, mass and momentum balance, Newtonian constitutive law, Navier–Stokes equations, Reynolds number, and Poiseuille flow.	HW 6: Newtonian Fluids; <i>due Wed. Oct. 14</i>	Quiz 7: Newtonian Fluids
9	Oct. 12–16	Continuum/fluid synthesis and review. Exam coverage: continuum mechanics and Newtonian fluids.	None	Exam 2: Oct. 16; no quiz
10	Oct. 19–23	Diffusion: random walks, master equations, balance and Fick’s law, heat kernels, boundary conditions, Fourier methods, and Langevin connections. <i>Fall Break Oct. 19–20; no class Oct. 19.</i>	HW 7: Stability and Diffusion; <i>due Mon. Oct. 26</i>	Quiz 8: Diffusion
11	Oct. 26–30	Probability bridge: discrete random walks, conditional probability, expectation and variance, Brownian motion, and the diffusion limit.	HW 8: Brownian Motion and Langevin Dynamics; <i>due Mon. Nov. 2</i>	Quiz 9: Random Walk and Brownian Motion
12	Nov. 2–6	Binomial asset-pricing model: portfolios, replication, no-arbitrage, risk-neutral probability, and multi-period pricing.	HW 9: Binomial Model; <i>due Mon. Nov. 9</i>	Quiz 10: Binomial Model
13	Nov. 9–13	American options in discrete time: early exercise, backward induction, continuation value, and optimal stopping.	HW 10: American Options; <i>due Mon. Nov. 16</i>	Quiz 11: American Options
14	Nov. 16–20	From random walks to Black–Scholes: continuous limit, geometric Brownian motion, hedging, the pricing PDE, and European options.	HW 11: Black–Scholes; <i>due Mon. Nov. 23</i>	Quiz 12: Black–Scholes
15	Nov. 23–27	Optional option-theory material and independent review. <i>No class Nov. 25–27 (Thanksgiving Break).</i>	None	None
16	Nov. 30–Dec. 4	Black–Scholes completion and cumulative review. Exam coverage: diffusion, probability/Brownian motion, and financial mathematics. <i>Last class Dec. 3; Reading Day Dec. 4.</i>	None	Exam 3: Dec. 3; no quiz

Assessment key: **Homework** is assigned with the listed topic; **quizzes** are short topic checks; **exams** use the dates in the official syllabus. Homework is normally due the following Monday; the HW 5 and HW 6 deadlines are adjusted around Exam 2. Exact quiz deadlines are posted in Blackboard. Homework 5 spans the two continuum-mechanics weeks. The schedule is subject to announced changes.