Syllabus[3] for Math 25b, Spring 2025

Date	Due	Math Topics
Mon 01/27		Real number system, sequences, convergence and completeness
Wed 01/29		Cauchy sequences, cluster points, lim inf and lim sup
Fri 01/31		Topology of metric spaces: open and closed sets, interior, accumulation points
Mon 02/03		Topology of metric spaces: closure, boundary, sequences and completeness
Wed 02/05	PS01	Infinite series and convergence tests
Fri 02/07		Compact sets, Bolzano-Weierstrass Theorem, Heine-Borel Theorem
Mon 02/10		Nested set property, path-connected and connected sets
Wed 02/12	PS02	Limits and continuity, operations on continuous mappings
Fri 02/14		Images of compact and connected sets, Extreme Value Theorem
Wed 02/19		Intermediate Value Theorem, uniform continuity
Fri 02/21	PS03	Differentiation of functions of one variable
Mon 02/24		Riemann integration of functions of one variable, FTC
Wed 02/26	PS04	Review
Thu 02/27	**Exam 1**	**7:00pm–9:00pm in Room TBD**
Fri 02/28		Pointwise and uniform convergence, Weierstrass M test
Mon 03/03		Termwise differentiation and integration of series
Wed 03/05	PS05	Construction of elementary functions
Fri 03/07		Space of continuous functions, equicontinuity, Arzela-Ascoli Theorem
Mon 03/10		Contraction Mapping Principle, applications to differential/integral equations
Wed 03/12	PS06	Stone-Weierstrass Theorem
Fri 03/14		Differentiable maps from $\mathbb{R}^n \to \mathbb{R}^m$, Jacobian matrix
Mon 03/24		Differentiable curves, directional derivatives
Wed 03/26	PS07	Chain rule, product rule, and gradients
Fri 03/28		Mean Value Theorem, higher derivatives and Clairaut's Theorem
Mon 03/31		Taylor's Theorem, real analytic functions
Wed 04/02	PS08	Maxima and Minima
Fri 04/04		Inverse and implicit function theorems
Mon 04/07		Implicit function theorem and domain-straightening theorem
Wed 04/09	PS09	Review
Thu 04/10	**Exam 2**	**7:00pm-9:00pm in Room TBD**
Fri 04/11		Integration revisited, theorems of Riemann and Darboux
Mon 04/14		Fubini's Theorem, change of variables, other coordinate systems
Wed 04/16	PS10	Contour integrals, fundamental theorem of line integrals
Fri 04/18		Surface integrals, flux integrals
Mon 04/21		Gauss' divergence theorem, Stokes Theorem
Wed 04/23	PS11	The Hilbert space L^2, orthogonal families of functions
Fri 04/25		Fourier series, Bessel's inequality, Parseval's Theorem, approximation
Mon 04/28		Completeness and convergence theorems for Fourier series
Wed 04/30	PS12	Computation of Fourier series
05/01–05/07		Reading period
TBD	**Final Exam**	**Date, time and location TBD**

[3]The dates listed here are approximate, so don't worry if there are times when we're a bit ahead/behind what the syllabus indicates.