Basic concepts of topology of metric spaces: open and closed sets, connectedness, compactness, completeness.

Normed spaces and inner product spaces. All norms on $\mathbb{R}^n$ are equivalent.

Theorem on existence of a unique fixed point for a contraction mapping on a complete metric space.


Open mapping theorem and implicit function theorem. Lagrange multipliers. Maxima and minima problems.


Fubini theorem. Jacobian and the change of variables formula.

Path integrals. Closed and exact forms. Green’s theorem.

Time permitting, surface integrals, Stokes’s theorem, Gauss’ theorem