• 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.