

Contents

Part I Preliminaries

1	Linear algebra	3
2	Metric and topological spaces	8
3	Complete metric spaces	13
4	Compactness	19

Part II Banach spaces and metric linear spaces

5	Normed spaces	31
6	Dual spaces and the Hahn–Banach theorem	44
7	Bidual and reflexivity	52
8	Consequences of Baire’s theorem	59
9	Dual maps	67
10	Projections	72
11	Hilbert spaces	81
12	Orthonormal systems	91
13	The Banach spaces $L_p(X, \mu)$ and $C(X)'$	101
14	Fourier transformation and Sobolev spaces	117

Part III Spectral of theory linear operators

15	Compact operators	139
16	Compact operators in Hilbert spaces	148
17	Banach algebras	179
18	The spectral theorem for normal operators	197
19	Unbounded operators between Hilbert spaces	211
20	The spectral theorem for unbounded self-adjoint operators	219
21	Self-adjoint extensions	236

Part IV Fréchet spaces and their dual spaces

22	Locally convex vector spaces	249
23	Duality theory of locally convex spaces	261
24	Projective and inductive topologies	276
25	Fréchet spaces and (DF)-spaces	294
26	Short exact sequences	306
27	Sequences spaces	326
28	Nuclear spaces	344
29	Power series spaces	357
30	A splitting theorem	378
31	Subspaces and quotients of s	391
Appendix Integration theory		404
Notes		423
Bibliography		425
Index of symbols		429
Index		433