

Contents

Preface	v
Chapter 1. A Beginning for Knot Theory	1
Exercises	13
Chapter 2. Seifert Surfaces and Knot Factorisation	15
Exercises	21
Chapter 3. The Jones Polynomial	23
Exercises	30
Chapter 4. Geometry of Alternating Links	32
Exercises	40
Chapter 5. The Jones Polynomial of an Alternating Link	41
Exercises	48
Chapter 6. The Alexander Polynomial	49
Exercises	64
Chapter 7. Covering Spaces	66
Exercises	78
Chapter 8. The Conway Polynomial, Signatures and Slice Knots	79
Exercises	91
Chapter 9. Cyclic Branched Covers and the Goeritz Matrix	93
Exercises	102
Chapter 10. The Arf Invariant and the Jones Polynomial	103
Exercises	108

Chapter 11. The Fundamental Group	110
Exercises	121
Chapter 12. Obtaining 3-Manifolds by Surgery on S^3	123
Exercises	132
Chapter 13. 3-Manifold Invariants From The Jones Polynomial	133
Exercises	144
Chapter 14. Methods for Calculating Quantum Invariants	146
Exercises	164
Chapter 15. Generalisations of the Jones Polynomial	166
Exercises	177
Chapter 16. Exploring the HOMFLY and Kauffman Polynomials	179
Exercises	191
References	193
Index	199