MATH1050/1058 Books and other learning resources

A. 'Survival guide' on undergraduate studies in mathematics.

The book below offers valuable general advice on how to get used to abstract and 'proof-type' mathematics courses:

* L. Alcock, *How to Study for a Mathematics Degree*, Oxford University Press.

B. Transition to abstract mathematics and proofs.

These books below (and many others) cover to various extent much (but not necessarily all) of the course material, with a special emphasis on doing mathematical proofs, and may serve as general reference.

1. B. Bajnok, *An Invitation to Abstract Mathematics*, Springer-Verlag.
2. M. Beck, R. Geoghegan, *The Art of Proof: basic training for deeper mathematics*, Springer-Verlag.
3. K. G. Binmore, *Foundations of Analysis: a straightforward introduction (Book 1 Logic, Sets and Numbers)*, Cambridge University Press.
4. E. D. Bloch, *Proofs and Fundamentals: a first course in abstract mathematics*, (First or Second Edition), Birkhäuser/Springer-Verlag.
5. G. Chartrand, A. D. Polimeni, P. Zhang, *Mathematical Proofs: A Transition to Advanced Mathematics*, Addison-Wesley.
6. D. W. Cunningham, *A Logical Introduction to Proof*, Springer-Verlag.
7. U. Daepp, P. Gorkin, *Reading, Writing, and Proving: a closer look at mathematics* (Second Edition), Springer-Verlag.
8. L. J. Gerstein, *Introduction to Mathematical Structures and Proofs* (Second Edition), Springer-Verlag.
9. K. Houston, *How to Think like a Mathematician*, Cambridge University Press.
10. K. T. Leung, P. H. Cheung, *Fundamental Concepts of Mathematics*, Hong Kong University Press.
11. I. Stewart, D. Tall, *Foundation of Mathematics* (Second Edition), Oxford University Press.
12. D. J. Velleman, *How to prove it: a structured approach*, (Second Edition), Cambridge University Press.

Most of them are available in electronic version from the University Library and/or in public website.

C. Set theory.

For a deeper discussion on set language (and set theory), you may consult these books:

1. P. R. Halmos, *Naïve Set Theory*, Springer-Verlag.
2. K. T. Leung, D. L. C. Chan, *Elementary Set Theory*, Hong Kong University Press.
3. C. Schumacher, *Chapter Zero* (Second Edition), Addison-Wesley.
4. D. Goldrei, *Classic Set Theory: For Guided Independent Study*, CRC Press.

Be aware that these books are at various levels, and assume different backgrounds.

D. Overview in mathematics.

To put the material in this course in the context of the rest of mathematics, you may refer to these books:

1. R. Courant, H. Robbins, I. Stewart, *What is mathematics: an elementary approach to ideas and methods* (Second Edition), Oxford University Press.
2. H. Eves, *Foundations and Fundamental Concepts of Mathematics* (Third Edition), Dover.
3. I. Stewart, *Concepts of Modern Mathematics*, Dover.

E. Basic/school mathematics.

Any textbook for HKCEE Mathematics, HKCEE Additional Mathematics, HKHLE General Mathematics, HKHLE Higher Mathematics, HKALE Pure Mathematics can serve as a reference in this area. The older ones are usually the better ones in terms of depth. The more recent ones usually contain more (worked) examples. Many of these books can be found in the 'school textbook' collection in the Chung-Chi Library.

At a similar level as HKALE Pure Mathematics are resources related to the *STEP* examination offered by the University of Cambridge.