## MATH20009: Perspectives in Mathematics

This unit will be comprised of three periods of activity, in each of which there will be a choice between a task which uses the students' maths background to develop communication or career skills, and one which gives scope for independent exploration of new mathematics.

The unit will also involve aspects of group work, peer review and support, peer assessment, as well as presenting work orally and in written form. As these skills are important in almost any career, whether professional or academic, it is suggested that all 2 nd year students seriously consider taking this course.
1.

Houston, K. How to think like a mathematician: a companion to undergraduate mathematics. (Cambridge University Press, 2009).
2.

How to Write Mathematics.

## 3.

Weiner, P. A. The Abundancy Ratio, a Measure of Perfection. Mathematics Magazine 73, (2000)

## 4.

Sam C. Saunders, N. Chris Meyer and Dane W. Wu. Compounding Evidence from Multiple DNA-Tests. Mathematics Magazine 72, 39-43 (1999).

Horak, M. Disentangling Topological Puzzles by Using Knot Theory. Mathematics Magazine 79, (2006).
6.

Austin, B., Barry, D. \& Berman, D. The Lengthening Shadow: The Story of Related Rates. Mathematics Magazine 73, (2000).
7.

Thomas J. Pfaff and Max M. Tran. Series That Probably Converge to One. Mathematics Magazine 82, 42-49 (2009).
8.

Brawner, J. N. Dinner, Dancing, and Tennis, Anyone? Mathematics Magazine 73, (2000).
9.

Joshua D. Laison and Michelle Schick. Seeing Dots: Visibility of Lattice Points. Mathematics Magazine 80, 274-282 (2007).
10.

MICHAEL A. JONES. The Geometry behind Paradoxes of Voting Power. Mathematics Magazine 82, 103-116 (2009).
11.

On Lexell's Theorem. The American Mathematical Monthly 124, (2017).
12.

SIEHLER, J. How Long Until a Random Sequence Decreases? Mathematics Magazine 83, (2010).
13.

Boaler, J. \& Dweck, C. S. Mathematical mindsets: unleashing students' potential through creative math, inspiring messages, and innovative teaching. (Jossey-Bass, 2016).
14.

Durksen, T. L. et al. Motivation and engagement in mathematics: a qualitative framework for teacher-student interactions. Mathematics Education Research Journal 29, 163-181 (2017).
15.

Ware, C. Information visualization: perception for design. vol. The Morgan Kaufmann series in interactive technologies (Morgan Kaufmann, 2013).
16.

Tufte, E. R. Visual explanations: images and quantities, evidence and narrative. (Graphics Press, 1997).

## 17.

Korte, B. H. \& Vygen, J. Combinatorial optimization: theory and algorithms. vol. 21 (Springer).

## 18.

Foulds, L. R. Combinatorial optimization for undergraduates. vol. Undergraduate texts in mathematics (Springer-Verlag, 1984).
19.

Falconer, K. J. Fractal geometry: mathematical foundations and applications. (John Wiley \& Sons Ltd, 2014).
20.

Netflix Prize problem notes.

Gelbaum, B. \& Olmstead, J. M. H. Counterexamples in analysis. vol. The Mathesis Series (Holden-Day, 1964).

## 22.

Andrews, G. E., Askey, R. \& Roy, R. Special Functions. vol. Encyclopedia of mathematics and its applications (Cambridge University Press, 1999).
23.

Ko
rner, T. W. Fourier Analysis. (Cambridge University Press, 1988).
24.

Bhattacharya, K. Microstructure of martensite: why it forms and how it gives rise to the shape-memory effect. vol. Oxford series on materials modelling (Oxford University Press, 2003).
25.

Adams, C. C. The knot book: an elementary introduction to the mathematical theory of knots. (W.H. Freeman, 1994).
26.

Graver, J. E. \& Mathematical Association of America. Counting on frameworks: mathematics to aid the design of rigid structures. vol. Dolciani mathematical expositions (Mathematical Association of America, 2001).
27.

Niven, I. Irrational Numbers. (Cambridge University Press, 2014).
28.

Apostol, T. M. Introduction to analytic number theory. vol. Undergraduate texts in mathematics (Springer, 1976).
29.

Silverman, J. H. \& Tate, J. T. Rational points on elliptic curves. vol. Undergraduate texts in mathematics (Springer, 2015).
30.

Grimmett, G. \& Stirzaker, D. Probability and random processes. (Oxford University Press, 2001).
31.

Ancestral Inference in Population Genetics.
32.

Rousseau, C. \& Saint-Aubin, Y. Mathematics and technology. vol. Springer undergraduate texts in mathematics and technology (Springer, 2008).
33.

Doyle, Peter G. Random Walks and Electric Networks. (2000).

