## 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 2nd year students seriously consider taking this course.

Adams, Colin Conrad, The Knot Book: An Elementary Introduction to the Mathematical Theory of Knots (New York: W.H. Freeman, 1994)

'Ancestral Inference in Population Genetics' <https://link.springer.com/content/pdf/10.1007/978-3-540-39874-5 1.pdf>

Andrews, George E., Richard Askey, and Ranjan Roy, Special Functions (Cambridge: Cambridge University Press, 1999), Encyclopedia of mathematics and its applications <http://dx.doi.org/10.1017/CBO9781107325937>

Apostol, Tom M., Introduction to Analytic Number Theory (New York: Springer, 1976), Undergraduate texts in mathematics

Austin, Bill, Don Barry, and David Berman, 'The Lengthening Shadow: The Story of Related Rates', Mathematics Magazine, 73.1 (2000) < https://doi.org/10.2307/2691482>

Bhattacharya, Kaushik, Microstructure of Martensite: Why It Forms and How It Gives Rise to the Shape-Memory Effect (Oxford: Oxford University Press, 2003), Oxford series on materials modelling

Boaler, Jo, and Carol S. Dweck, Mathematical Mindsets: Unleashing Students' Potential through Creative Math, Inspiring Messages, and Innovative Teaching (San Francisco: lossey-Bass, 2016)

Brawner, James N., 'Dinner, Dancing, and Tennis, Anyone?', Mathematics Magazine, 73.1 (2000) <https://doi.org/10.2307/2691486>

Doyle, Peter G., 'Random Walks and Electric Networks', 2000 <https://arxiv.org/abs/math/0001057>

Durksen, Tracy L., Jennifer Way, Janette Bobis, Judy Anderson, Karen Skilling, and Andrew J. Martin, 'Motivation and Engagement in Mathematics: A Qualitative Framework for Teacher-Student Interactions', Mathematics Education Research Journal, 29.2 (2017), 163–81 <https://doi.org/10.1007/s13394-017-0199-1>

Falconer, K. J., Fractal Geometry: Mathematical Foundations and Applications, Third edition (Chichester, West Sussex: John Wiley & Sons Ltd, 2014) <a href="https://ebookcentral.proguest.com/lib/bristol/detail.action?docID=1557285">https://ebookcentral.proguest.com/lib/bristol/detail.action?docID=1557285</a>

Foulds, L. R., Combinatorial Optimization for Undergraduates (New York: Springer-Verlag, 1984), Undergraduate texts in mathematics

Gelbaum, Bernard, and John M. H. Olmstead, Counterexamples in Analysis (San Francisco: Holden-Day, 1964), The Mathesis Series

Graver, Jack E. and Mathematical Association of America, Counting on Frameworks: Mathematics to Aid the Design of Rigid Structures (Washington, D.C.: Mathematical Association of America, 2001), Dolciani mathematical expositions

Grimmett, Geoffrey, and David Stirzaker, Probability and Random Processes, 3rd ed (Oxford: Oxford University Press, 2001)

Horak, Matthew, 'Disentangling Topological Puzzles by Using Knot Theory', Mathematics Magazine, 79.5 (2006) <a href="https://doi.org/10.2307/27642974">https://doi.org/10.2307/27642974</a>

Houston, Kevin, How to Think like a Mathematician: A Companion to Undergraduate Mathematics (Cambridge: Cambridge University Press, 2009)

'How to Write Mathematics' <https://uob-my.sharepoint.com/personal/mancs\_bristol\_ac\_uk/Documents/htwm.pdf>

Joshua D. Laison and Michelle Schick, 'Seeing Dots: Visibility of Lattice Points', Mathematics Magazine, 80.4 (2007), 274–82 <http://www.jstor.org/stable/27643042?seq=1#page\_scan\_tab\_contents>

Ко

rner, T. W., Fourier Analysis (Cambridge: Cambridge University Press, 1988) <http://dx.doi.org/10.1017/CBO9781107049949>

Korte, B. H., and Jens Vygen, Combinatorial Optimization: Theory and Algorithms, 3rd ed (Berlin: Springer), xxi <https://doi.org/10.1007%2F3-540-29297-7>

MICHAEL A. JONES, 'The Geometry behind Paradoxes of Voting Power', Mathematics Magazine, 82.2 (2009), 103–16 <http://www.jstor.org/stable/27765883>

'Netflix Prize Problem Notes'

<https://uob-my.sharepoint.com/personal/mancs\_bristol\_ac\_uk/Documents/Netflix%20priz e%20problem.pdf?slrid=1f6a1b9e-b026-4000-7aa2-edb69d56df80>

Niven, Ivan, Irrational Numbers (Cambridge: Cambridge University Press, 2014) <http://dx.doi.org/10.5948/9781614440116> 'On Lexell's Theorem', The American Mathematical Monthly, 124.4 (2017) <a href="https://doi.org/10.4169/amer.math.monthly.124.4.337">https://doi.org/10.4169/amer.math.monthly.124.4.337</a>

Rousseau, Christiane, and Yvan Saint-Aubin, Mathematics and Technology (New York: Springer, 2008), Springer undergraduate texts in mathematics and technology <a href="https://doi.org/10.1007/978-0-387-69216-6">https://doi.org/10.1007/978-0-387-69216-6</a>

Sam C. Saunders, N. Chris Meyer and Dane W. Wu, 'Compounding Evidence from Multiple DNA-Tests', Mathematics Magazine, 72.1 (1999), 39–43 <a href="http://www.jstor.org/stable/2691312?seg=1#page">http://www.jstor.org/stable/2691312?seg=1#page</a> scan tab contents>

SIEHLER, JACOB, 'How Long Until a Random Sequence Decreases?', Mathematics Magazine , 83.5 (2010) <https://doi.org/10.4169/002557010x529798>

Silverman, Joseph H., and John T. Tate, Rational Points on Elliptic Curves, Second edition, enlarged and updated (Cham: Springer, 2015), Undergraduate texts in mathematics

Thomas J. Pfaff and Max M. Tran, 'Series That Probably Converge to One', Mathematics Magazine, 82.1 (2009), 42–49 <a href="http://www.jstor.org/stable/27643157?seq=1#page">http://www.jstor.org/stable/27643157?seq=1#page</a> scan tab contents>

Tufte, Edward R., Visual Explanations: Images and Quantities, Evidence and Narrative (Cheshire, Conn: Graphics Press, 1997)

Ware, Colin, Information Visualization: Perception for Design, 3rd ed (Waltham, MA: Morgan Kaufmann, 2013), The Morgan Kaufmann series in interactive technologies <a href="https://ebookcentral.proquest.com/lib/bristol/detail.action?docID=892223">https://ebookcentral.proquest.com/lib/bristol/detail.action?docID=892223</a>

Weiner, Paul A., 'The Abundancy Ratio, a Measure of Perfection', Mathematics Magazine, 73.4 (2000) <https://doi.org/10.2307/2690980>