

McMaster University
Detailed Math 1LS3 and Math 1LT3 Course Outlines

Math 1LS3 course covers the same topics as the first term of the calculus for science Math 1A3 (functions, limits, derivatives, integrals); see below for a detailed list of topics. Math 1LT3 course covers most topics as the second term of the calculus for science Math 1AA3 (differential equations, functions of several variables); see below for a detailed list of topics. However, applications and material that we cover in Math 1LS3/1LT3 (such as dissolution of drugs in bloodstream, various allometric relationships (heart mass vs body mass), population models, models of spread of infectious diseases, basics of probability, chance and statistical reasoning and so on) make the courses much more relevant to anyone in life sciences (and many other disciplines that need calculus) than Math 1A3/1AA3.

Textbooks used:

for 1LS3: Chapters 1-7 from "[Calculus for the Life Sciences: Modelling the Dynamics of Life](#)", by F. R. Adler and M. Lovric, Second Canadian Edition, published by Nelson Education, 2015.

for 1LT3: Chapter 8 of "[Calculus for the Life Sciences: Modelling the Dynamics of Life](#)", by F. R. Adler and M. Lovric, Second Canadian Edition, published by Nelson Education, 2015 and selected topics from the books M. Lovric: "Functions of Several Variables" and M. Lovric: "Probability and Statistics," published by Nelson Education, 2015.

Material covered in Math 1LS3

Introduction to Models and Functions

- 1.1 Why Mathematics Matters
- 1.2 Models in Life Sciences
- 1.3 Variables, Parameters, and Functions
- 1.4 Working with Functions
- 1.5 Logical Reasoning and Language in Math and Life Sciences

Modelling Using Elementary Functions

- 2.1 Elementary Models
- 2.2 Exponential and Logarithmic Functions
- 2.3 Trigonometric and Inverse Trigonometric Functions

Discrete-Time Dynamical Systems

- 3.1 Introduction to Discrete-Time Dynamical Systems
- 3.2 Analysis of Discrete-Time Dynamical Systems
- 3.3 Modelling with Discrete-Time Dynamical Systems

Limits, Continuity and Derivatives

- 4.1 Investigating Change
- 4.2 Limit of a Function
- 4.3 Infinite Limits and Limits at Infinity
- 4.4 Continuity
- 4.5 Derivatives and Differentiability

Working With Derivatives

- 5.1 Derivatives of Powers, Polynomials, and Exponential Functions
- 5.2 Derivatives of Products and Quotients
- 5.3 The Chain Rule and the Derivatives of Logarithmic Functions
- 5.4 Derivatives of Trigonometric and Inverse Trigonometric Functions
- 5.5 Implicit Differentiation, Logarithmic Differentiation and Related Rates
- 5.6 The Second Derivative, Curvature, and Concavity

