COURSE SPECIFICATION DOCUMENT

Academic School / Department: Science, Innovation & Technology

Programme: Year 1 Programme

***FHEQ* Level:** 3

Course Title: Fundamentals of Mathematics and Statistics

Course Code: MATH 3102

Total Hours: 160 (Lev 3-5) (4 US Credits)
Timetabled Hours: 45
Guided Learning Hours 15
Independent Learning Hours: 100

Credit 16 UK CATS credits
8 ECTS credits
4 US credits

Course Description:
This course is designed to be a foundation in mathematics and statistics that will provide students with the necessary knowledge for courses in probability and statistics, mathematics, and data analysis. The course will cover content from solving linear, quadratic, exponential and logarithmic equations, co-ordinate geometry analysis, function analysis, sequences and series to applied topics such as measures of central tendencies and measures of spread of data calculations with outliers, representations of data, probability calculations and discrete random variables.

Prerequisites:
None

Aims and Objectives:

- Provide the necessary foundations in mathematical skills for more advanced mathematics courses.
- Develop student's ability to distinguish different forms of mathematical problems and on how to solve them in a structured manner.
- Enable students to translate word problems into symbolic formulation and solve such problems.
- Develop students' ability to think critically, analyse mathematical problems and obtain solutions.

- Develop student's ability to analyse data sets and representations of these data sets.
- Develop student's ability to apply theoretical probability to statistical data gathered.
- Enhance student's ability to problem solve through geometry and visualization.

Programme Outcomes:
A3I, B3I

A detailed list of the programme outcomes are found in the Programme Specification. This is located at the archive maintained by Registry and found at:
https://www.richmond.ac.uk/programme-and-course-specifications/

Learning Outcomes:
By the end of this course, successful students should be able to:

- Apply numerical and algebraic techniques to solve equations, inequalities, and problems involving ratio and proportion.
- Solve and represent relationships using linear and quadratic equations, functions (including inverses), and their graphs.
- Interpret data using statistical measures and graphical methods to draw conclusions.
- Apply probability techniques, including probability trees, Venn diagrams, and discrete probability distributions, to calculate and interpret outcomes.

Indicative Content:
Mathematics Content

- Numerical Methods: Fraction manipulation, ratios and proportion
- Linear Equations: Expanding and factorizing expressions, solving linear equations, solving linear inequalities
- Quadratic Equations: Expanding and factorizing expressions, solving quadratic equations, solving quadratic inequalities.
- Indices, Exponentials and Logarithms: Simplifying and solving equations (including sketching exponent and logarithmic graphs)
- Functions: Domain and Range, Composite, Inverse
- Co-ordinate geometry: Straight Line equations, reciprocal graphs, intersection between equations
- Sequences and Series: Arithmetic and Geometric Sequences and Series.

Statistics Content

- Central Tendencies (mean, mode, median) of grouped and listed data

- Spread of data calculations (Standard Deviation and Variance) including outlier calculations
- Representation of data including box plots, cumulative frequency graphs and use of linear interpolation to estimate quartiles and percentiles
- Basic probability: Dependant, Independent, Mutually Exclusive, Conditional, Tree and Venn Diagrams
- Discrete Random Variables including Expectations (Mean and Variance).

Assessment:
This course conforms to the University Assessment Norms approved at Academic Board and located at: https://www.richmond.ac.uk/university-policies/

Teaching Methodology:
This course will be delivered face to face through a combination of lectures and interactive sessions. In addition to classroom activities, there are guided learning elements that are tutor led and presented through Blackboard. These activities can be asynchronous online sessions, flipped classrooms, weekly assignments, compulsory workshop sessions for example. Set activities are monitored by the instructor to ascertain student engagement. Students are encouraged to prepare for class and to play an active part, to raise questions, following-up ideas and interact with a wide range of provided material.

Indicative Text(s):

- Croft, A. and Davison, R. (2020). *Foundation Maths*. 7th Edition. Loughborough University, UK: Pearson Education.
- Illowsky, B. (2023*). Introductory Statistics*. 2nd Edition. Rice University: Independently Published.

Journals
N/A

Websites
N/A

See syllabus for complete reading list.

Change Log for this CSD:

Nature of Change	Date Approved & Approval Body (School or AB)	Change Actioned by Registry Services

Guided Learning Hours menu updated	October 2025	
Total Hours Updated	October 2025	