Unit Choice Supplement for Studies in Probability

We outline a pathway for unit choices for students interested in a more detailed understanding of probability theory and stochastic processes. This document serves as a supplement to the document "Guide to making Your Unit Choices for 2016-17". The purpose of this document is to give perspective to students on how their unit choices may work together throughout their studies. **Please always consult the "Prerequisite Flowcharts" and other available information as well, this document is not intended as a replacement to any of those.**

We also list supplementary courses (mostly from analysis) which we think are essential for a solid foundation. Completing this pathway will make anyone familiar with the basic concepts and techniques that are in the heart of the theory of probability and stochastic processes. Today this area forms an essential part of pure mathematics, and therefore this pathway is a valuable step towards frontier-line research in pure mathematics as well as applied probability.

Units typed in <u>red</u> are essential and indispensable. In particular, the earlier ones (like *Metric Spaces* and *Measure Theory and Integration*) contain fundamental prerequisites without which later, more advanced units cannot be efficiently followed.

Units typed in **green** are still very important in this pathway. We suggest these ones as further optional – but still strongly recommended – choices. Some units which are available both on levels H/6 and M/7 are featured twice in our list. A few of these are green in H/6 and red in M/7 meaning that we think it essential and indispensable by Year 4, but can already be taken at an earlier level.

LEVEL I/5, 1ST TEACHING BLOCK

<u>Metric Spaces (20cp)</u> Statistics 2 (20cp) Ordinary Differential Equations (20cp) Multivariable Calculus (10cp)

LEVEL I/5, 2ND TEACHING BLOCK <u>Applied Probability 2 (20cp)</u> Combinatorics (20cp)

LEVEL H/6, 1ST TEACHING BLOCK <u>Measure Theory and Integration (20cp)</u> <u>Dynamical Systems and Ergodic Theory (20cp)</u> Martingale Theory with Applications (10cp) Complex Networks (20cp) Complex Function Theory (20cp) Introduction to Queuing Networks (10cp)

LEVEL H/6, 2ND TEACHING BLOCK

Further Topics in Probability (20cp) Random Matrix Theory (10cp) Functional Analysis (20cp) Financial Mathematics (20cp)

LEVEL M/7, 1ST TEACHING BLOCK

Martingale Theory with Applications (10cp) Stochastic Processes (10cp) Complex Networks (20cp) Complex Function Theory (20cp) Introduction to Queuing Networks (10cp)

LEVEL M/7, 2ND TEACHING BLOCK Financial Mathematics (20cp)

Functional Analysis (20cp)