# COURSE SPECIFICATION FORM
*for new course proposals and course amendments*

| DEPARTMENT OF MATHEMATICS | | | | Academic Session: 2017-18 | |
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| **Course Code:** | MT2300 | **Course Value:** | 0.5 | **Status:** | Mandatory for G1G3, G1L1, G1N2, LG11; optional for others |
| **Course Title:** | Statistical Methods | | | **Availability:** *(state which teaching terms)* | Term 1 |
| **Prerequisites:** | MT1300 | | | **Recommended:** | None |
| **Co-ordinator:** | | | | | |
| **Course Staff:** | | | | | |
| **Aims:** | To study important aspects of statistical modelling in an integrated way and develop some expertise both in the theory and applications of linear models. | | | | |
| **Learning Outcomes:** | On completion of the course, students should be able to <br>• demonstrate familiarity with the main methods based on linear models; <br>• apply these methods to analyse data and interpret the results from such analysis; <br>• understand and apply non-parametric methods; <br>• use MINITAB effectively in the analysis of relevant data. | | | | |
| **Course Content:** | **Principles of statistical modelling and terminology:** Systematic and random components, types of variables. <br>**Simple and multiple linear regression:** Matrix notation, fitting the model, inferences about individual regression parameters, prediction, assessing the regression. <br>**Some special cases:** Polynomial models, models that incorporate factors. <br>**Model building:** Testing significance of specified subsets of variables, examining all subsets. <br>**Model validation and comparison of regressions:** Examination of residuals, influential observations, some possible problems and remedial actions, dummy variables. <br>**Qualitative explanatory variables - analysis of variance:** One-way and two-way ANOVA, point estimation, linear contrasts, a general approach via multiple regression. <br>**Some non-parametric methods:** The sign test, the Wilcoxon test, the Kolmogorov-Smirnov goodness-of-fit test. | | | | |
| **Teaching & Learning Methods:** | 25 hours of lectures and examples classes, 8 hours of practical classes on MINITAB. <br>106 hours of private study, including work on problem sheets and examination preparation. This may include discussions with the course leader if the student wishes. | | | | |
| **Key Bibliography:** | Introduction to Statistical Modelling – W J Krzanowski (Arnold) *Library Ref. 518.3 KRZ* <br>Applied Regression Analysis and Other Multivariable Methods – D G Kleinbaum, L L Kupper and K E Muller (Duxbury Press 1998) *Library Ref. 518.3 KLE* <br>A Second Course in Statistics: Regression Analysis – W Mendenhall and T Sincich (Prentice Hall 2003) *Library Ref. 518.3 MEN* <br>John E Freund's Mathematical Statistics – I Miller and M Miller (Prentice Hall 1999) *Library Ref. 518.3 FRE* | | | | |
| **Formative Assessment & Feedback:** | Formative assignments in the form of 8 problem sheets. The students will receive feedback as written comments on their attempts. | | | | |
| **Summative Assessment:** | **Exam** (%) A two-hour paper: 80% <br><br>**Coursework** (%) Miniproject: 20% <br><br>**Deadlines:** Last Thursday of Term 1 | | | | |

The information contained in this course outline is correct at the time of publication, but may be subject to change as part of the Department's policy of continuous improvement and development. Every effort will be made to notify you of any such changes.