

## MATHEMATICS 331 "MULTIVARIATE CALCULUS"

**Calendar Description: H(3-1T)**

Systems of ordinary differential equations. Calculus of functions of several variables. Introduction to vector analysis, theorems of Green, Gauss and Stokes.

**Prerequisite:** Mathematics 253, 263 or Applied Mathematics 219; and Mathematics 221 or both Mathematics 211 and 013.

**Note:** This course is not a member of the list of courses constituting the fields of Actuarial Science, Applied Mathematics, Pure Mathematics, or Statistics, and cannot normally be substituted for Mathematics 353 in degree programmes in any of those fields.

**Note:** Credit for more than one of Mathematics 331, Pure Mathematics 331, Applied Mathematics 309, and Mathematics 353 will not be allowed.

### *Syllabus*

| <u>Topics</u>   | <u>Number of Hours</u> |
|---|------------------------|
| Systems of linear Ordinary Differential Equations   | 8                      |
| Functions of several variables, graphs and level curves, partial derivatives, differentiability and gradient, repeated partial derivatives<br>The chain rule, the tangent plane, directional derivatives, example of Partial Differential Equations | 9                      |
| Double integrals, repeated integrals, polar coordinates, standard version of Green's theorem, line integrals  | 6                      |
| Triple integrals, cylindrical and spherical coordinates   | 7                      |
| Vector fields, Gauss Theorem, Stokes theorem  | 6                      |
| <b>TOTAL HOURS</b>  | <b>36</b>              |

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