

UBC CURRICULUM CHANGE FORM *rev. '94*

FACULTY: Science
DEPARTMENT: Mathematics
DATE: January, 1996

Type of Proposal:

- | | | |
|---|--|---|
| <input checked="" type="checkbox"/> CHANGE | <input type="checkbox"/> DELETE | <input type="checkbox"/> NEW |
| <input checked="" type="checkbox"/> Undergraduate | <input checked="" type="checkbox"/> Course | <input type="checkbox"/> Program |
| <input type="checkbox"/> Graduate | <input type="checkbox"/> Number | <input type="checkbox"/> Credits |
| <input type="checkbox"/> Diploma | <input checked="" type="checkbox"/> Title | <input checked="" type="checkbox"/> Description |
| | <input checked="" type="checkbox"/> Hours | <input type="checkbox"/> Prerequisite |
| | <input type="checkbox"/> Other | |

Present Calendar Entry (*page 447, column 2*):

152* (3) Linear Algebra and Differential Equations- Vectors and matrices; dot and cross product; complex numbers; determinants and eigenvalues; linear differential equations and applications. Corequisite: MATH 154. [3-0-0]

Proposed Calendar Entry:

152* (3) Linear Systems- 2D and 3D geometry, vectors and matrices, eigenvalues and vibration, physical applications. Laboratories demonstrate computer solutions of large systems. Corequisite: MATH 154. [3-1*-0]

Rationale:

This is part of a major revision to all of the courses taught in the Mathematics Department for Applied Science students. The general idea is to make the mathematics more relevant to engineering problems.

Course outline:

- (5) *2D and 3D geometry, coordinates, vectors, dot- and cross-products, equations of planes and line, orthogonal resolution, determinant formula for areas and volumes.*
- (4) *Solving general linear systems; matrices and row reduction.*
- (2) *Homogeneous systems; the linearity principle; fundamental solutions.*
- (3) *Applications to static physical systems.*
- (3) *Matrix inverses, matrix products.*
- (3) *Vibrations of physical systems, introduction to eigenvalues at least in 2D and 3D.*
- (3) *Determinants in general, singular matrices and determinants.*
- (1) *Complex numbers.*
- (3) *Eigenvectors. Symmetric matrices.*
- (3) *Linear transformations and Fourier series.*

Laboratories:

Laboratories will show students how to set up and analyze examples impossible to do by hand.

- (#1) Vector geometry.
- (#2) Solving large systems. Static physical systems.
- (#3) Complicated physical systems. Graphics.
- (#4) Eigenvalue problems.
- (#5) Vibrations of physical systems.
- (#6) Harmonic analysis.

Text:

D. Norman, *Introduction to Linear Algebra for scientists and engineers*, Addison-Wesley. The text will be supplemented by laboratory notes and notes extending Norman's discussion of applications.

The course is not so different from the existing MATH 152 as to create any new library or budget requirements. The computing laboratories can be accommodated by existing facilities.

Consultations:

Ian Gartshore Chair, Applied Science Curriculum Committee
Cyril Leung Electrical Engineering Curriculum Committee
Sheldon Duff Chemical Engineering Curriculum Committee

Library requirements:

- No change.
- As discussed above.

Name of library consultant: Bonny Stableford

Signature of library consultant: _____

Budget and space requirements:

- Information has been submitted in the Faculty budget to the President's Office.
- A Supplementary budget has been submitted.
- No budget or space implications.

Effective Date: May 1 September 1 Year: 1996

Faculty Curriculum Committee Chair _____

Dean or delegate _____