KOWAN COLLEGE
CURRICULUM COMMITTEE

PROPOSAL TITLE: Mathematics for Engineering Analysis II 701.335

X UNDERGRADUATE ___GRADUATE 4 CREDIT HOURS

SPONSOR(S): Dr. Abera Abay, Dr. Thomas Osler and Dr. Marcus Wright

DEPARTMENT & TELEPHONE# Mathematics - 4844

CHECK ONE: X COURSE ___MINOR PROGRAM ___CONCENTRATION ___SPECIALIZATION

___ACHIEVEMENT CERTIFICATE ___CERTIFICATION PROGRAM ___MAJOR PROGRAM

STEP #1 (DEPARTMENT)

X APPROVED/DATE: 11/7/96

___NOT APPROVED/DATE:

Abera Abay
DEPT. CURRICULUM CHR.

X REVIEWED/DATE: 11/7/96

DEPT. CHR.

STEP #2 (RECEIPT)

SCC# 96-97-79

DATE RECEIVED: 11-7-96

SENATE CURRICULUM CHR.

STEP #3 (SCHOOL)

REVIEWED DATE: 11/26/96

X RECOMMEND TO APPROVE

___RECOMMEND NOT TO APPROVE

FORWARD FOR OPEN HEARING

X WITHOUT RESERVATIONS

___WITH RESERVATIONS

COMMENTS:

SCHOOL COMMITTEE CHR.

STEP #4 (ACADEMIC DEAN)

___RECOMMEND

___NOT RECOMMEND

___CONDITIONALLY RECOMMEND (SEE COMMENTS)

DATE & SIGNATURE, DEAN OF SCHOOL

COMMENTS:

RECEIVED
DEC 03 1996

STEP #5 (SENATE CURRICULUM COMMITTEE)

DATE OF OPEN HEARING

APPROVED BY SENATE CURRICULUM COMMITTEE (DATE) 1/24/97

___RETURNED TO SPONSOR(S) FOR THE FOLLOWING REASONS:

SENATE
DEC 4
RECEIVED

STEP #6 (SENATE)

PRESENTED TO SENATE

X APPROVED ___NOT APPROVED

NOTIFICATION TO EXECUTIVE VICE PRESIDENT/PROVOST (DATE)

SENATE CURRICULUM COMMITTEE CHAIR SIGNATURE/DATE Ronald J Zoltan 2/2/97

STEP #7 (EXECUTIVE VICE PRESIDENT/PROVOST)

DATE RECEIVED 3/7/97

APPROVED: ___YES ___NO

IF NO, REASONS ARE AS FOLLOWS:

STUDENT CREDIT HOURS 4

FACULTY LOAD HOURS 4

EQUALIZED CREDIT HOURS _____

OFFICIAL COPY & APPROVAL SHEET FILED (DATE) _____

SIGNATURE, EXECUTIVE VICE PRESIDENT/PROVOST _____

REGISTRAR

DATE APPROVED COURSE DESCRIPTION RECEIVED 19 March 97

HEGIS TAXONOMY AND COURSE NUMBER ASSIGNED 1701 335

DATE/SIGNATURE OF REGISTRAR _____

NOTIFICATION FORWARD:

___SENATE CURRICULUM COMMITTEE CHAIRPERSON

___DEPARTMENT CHAIRPERSON(S)

___ACADEMIC DEAN(S)

___REGISTRAR

___SPONSOR(S)

Rowan College of New Jersey
Department of Mathematics

Course Proposal

Mathematics for Engineering Analysis II

I. Details

a) Course Title: Mathematics for Engineering Analysis II

b) Sponsors: Dr. Abera Abay, Dr. Thomas Osler, and Dr. Marcus Wright, Department of Mathematics

c) Credit Hours: 4 credit hours

d) Course Level: Sophomore

e) Curricular Effect: Required course for all undergraduate students in the School of Engineering.

f) Prerequisites: Mathematics for Engineering Analysis I

g) Suggested Time & Implementation: This course will be offered every semester.

h) Resources: Faculty, equipment and library resources are adequate.

II. Rationale:

This course is a continuation of Mathematics for Engineering Analysis I, and is the last mathematics course required of undergraduate students in the School of Engineering.

Knowledge and techniques from many branches of mathematics are necessary to solve problems in engineering. This two semester sequence of courses represents an introduction to some of the most important branches of mathematics useful in engineering, such as Advanced Calculus, Ordinary and Partial Differential Equations, Vector Analysis, Complex Analysis, Linear Algebra, Numerical Analysis, Laplace Transforms, and Fourier Series.

The present course will build on the topics covered in Mathematics for Engineering Analysis I. By studying further methods for the solution of ordinary differential equations, a topic covered in Mathematics for Engineering Analysis I, continuity with that course will be maintained. A study of linear algebra, partial differential equations, and numerical analysis will round out the students' introduction to engineering mathematics.

III. Essence of the Course

a) Objectives in Relation to Student Outcomes:

Upon the successful completion of this course, students will:

1) Be able to use the areas of mathematics indicated in the topical outline below to solve problems related to engineering.

2) Recognize that to be confident users of mathematics they must be understanders and ongoing learners of mathematics.

b) Topical Outline:

1) Higher-order Differential Equations

Homogeneous equations with constant coefficients
Systems of Differential Equations
Series solution of Differential Equations

2) Laplace Transforms and O.D.E.'s

Definition and Basic Properties
Transforms of Elementary Functions
Inverse Laplace Transform
Uses for solving differential equations
Introduction to other transforms

3) Partial Differential Equations

Basic definitions and examples
Wave, Heat, and Laplace's equations
Uses of Fourier series in solving other equations arising in physical systems

4) Numerical Methods

Fixed point iteration
Numerical methods for linear algebra
Linearization of differential equations
Methods for first and second order ordinary differential equations
Methods for elliptic, parabolic and hyperbolic partial differential equations
Methods for systems of ordinary differential equations

c) Evaluation and Grading:

Students will be evaluated using grading of homework assignments and written tests. Homework assignments will sometimes involve usage of computer applications and/or programming.

IV. Consultation:

The content and nature of this course was discussed with the Chairpersons of the four Departments of Engineering.

V. Course Evaluation:

This proposal has been reviewed by the Curriculum Committee of the Department of Mathematics.

VI. Course Texts:

The following book may be used as text for the course.

a) Kreyszig, Erwin, "Advanced Engineering Mathematics", Seventh Edition, John Wiley & Sons, 1993

VII. Catalogue Description:

1703/242 Mathematics for Engineering Analysis II
(Prerequisite: Mathematics for Engineering Analysis I)

This course is a continuation of Mathematics for Engineering Analysis I. Further methods for the solution of ordinary differential equations are discussed, including the Laplace transform. Numerical methods for ordinary and partial differential equations, and for linear and nonlinear algebraic equations are studied.