TITLE: Minor Changes in Calculus III

Sponsor(s): Dr. Abdulkadir Hassen 3888  e-mail: hassen@rowan.edu

DEPARTMENT: Mathematics
College: LAS

If LAS - check: History/Humanities Social/Behavioral Sciences

X Math/Science

X UNDERGRADUATE GRADUATE

New non gen-ed  Major
Short-Term non gen-ed
X Minor curricular changes (fewer than three) to:
Existing non gen-ed course
Non gen-ed degree requirements
Major
Minor, specialization, concentration, track, certificate program

Signatures Required: representing approval before submission to Office of the Senate

Department Chair:  
Department CURRICULUM Chair:  
Academic DEAN:  

Date: 2/3/06

COLLEGE CURRICULUM COMMITTEE: Open Hearing Date: 3/8/06
Approved
Not Approved

Signature: College Curriculum Chair

Signature: SENATE CURRICULUM CHAIR
Date: 3/23/06

Comments:

Signature: Executive Vice President/Provost:  
Date: 4/11/06  
Approved:  
Not Approved:

Signature: REGISTRAR,
Date: 5/30/06
Course Description Received & Approved
Hegis Taxonomy & Course

# MATH 01.230

Notification Forward:
SCC CHAIR Academic Dean
IR Department Chair
CAP VP/Student Affairs
Registrar Other-
Rowan University

Curriculum Proposal- LIBRARY RESOURCE FORM

THIS FORM MUST BE COMPLETED FOR ALL CURRICULUM PROPOSALS
The purpose of this form is to provide a channel of communication between the Campbell Library staff and faculty when changing and designing new courses/programs. The information will be used to assess the resources available in the library, and to identify resources the library should acquire to support the course/program. The information will also provide the rationale for institutional support for library acquisitions. This form should be completed in a coordinated effort between the course sponsor(s) and the academic department liaison librarian.

Note: Sponsor(s) complete parts A & B
If assistance is required to complete, please notify the librarian liaison.
Forward this form to the librarian who will complete parts C, D & E

When form is completed, attach to the original curriculum proposal before submitting to the Senate office.

A. College: LAS  Department: MATH

Proposed by: A. Hasson  Date: 2/3/06

COURSE TITLE: Calculus III

Anticipated Date for Course/Program Offering:

B. List specific resources that should be acquired to support this course.

NONE

C. Describe the resources available in the library to support this course/program, including reference, monographic, electronic databases, audio-visual materials, etc. A summary statement is sufficient.

Calculus reference books. We mostly use self-contained texts.

D. List key periodicals available in the library to support this course/program.

NONE

E. Librarian comments & recommendations:

No additional resources are required.

LIBRARIAN LIAISON: Denise Brush  Signature: Denise Brush
Rowan University
Department of Mathematics

Minor Curricular Change
Changes in Calculus III

I. Details

a) Change requested: Changes to the content of Calculus III (see below)

b) Sponsor: Dr. Abdulkadir Hassen, Department of Mathematics

II. Rationale

a) Statement of need for changes:

This proposal addresses the need to add some topics from vector calculus (currently covered as “optional” or as “if time permits”). Vector Calculus contains some of the most important and applicable topics of higher mathematics. Calculus III is the most appropriate place for covering these topics in detail. In a separate proposal, we have proposed that topics of Analytic Geometry be covered in Calculus II. This will allow us to cover vector calculus in detail as proposed.

b) Statement of curricular effect:
The proposed changes will have the effect that Calculus III will now have more applicable materials and helps students to see some of the most applicable and fascinating topics of higher mathematics.

c) Changes in topics:

From:

CATALOG DESCRIPTION:

1701.230 Calculus III 4 s.h.
(Prerequisite: 1701.131 Calculus II)

This course includes: polar coordinates and parametric equations, vectors, vector functions, velocity, acceleration, partial differentiation, directional derivatives, and multiple integration. The student is expected to use a computer software system, such as Mathematica, in addition to a graphing calculator.

OBJECTIVES:

Students will demonstrate the ability to: (i) graph and find areas in polar coordinates; (ii) calculate dot and cross products; (iii) identify and find equations for lines, planes and quadric surfaces, (iv) compute partial derivatives; and (v) evaluate double and triple
integrals and find area and volumes with them.

CONTENTS:

1: Analytic Geometry

Polar coordinates are introduced and used for graphing and to find areas. Also, conic sections are studied.

2: Three-Dimensional Space; Vectors

The definition of a vector is introduced, then dot and cross products are defined. Other topics covered are lines and planes in space, quadric surfaces, cylindrical and spherical coordinates.

3: Vector Valued Functions

An introduction to and calculus of vector valued functions.

4: Partial Derivatives

Functions of several variables are defined. Other topics covered include partial derivatives and consideration of conditions for differentiability, the chain rule, extreme, directional derivatives and gradients, and Lagrange multipliers.

5: Multiple Integrals

Topics covered include double and triple integrals, surface area and volumes, and centers of mass.

6: Topics in vector calculus (if time permits)

Line integrals, Green's Theorem, and Stokes Theorem.

REMARKS: We will continue our study of the history of calculus through the study of biographies of the great mathematicians who helped create this subject. Also, we continue our work with Mathematica as a tool in solving problems.
To:

**CATALOG DESCRIPTION:**

1701.230 Calculus III  
(Prerequisite: 1701.131 Calculus II) 4 s.h.

This course includes: vectors, vector functions, velocity, acceleration, partial differentiation, directional derivatives, multiple integration, and vector calculus. The student is expected to use a computer algebra system, such as Mathematica, in addition to a graphing calculator.

**OBJECTIVES:**

Students will demonstrate the ability to: (i) graph and find areas in polar coordinates; (ii) calculate dot and cross products; (iii) identify and find equations for lines, planes and quadric surfaces, (iv) compute partial derivatives; (v) evaluate double and triple integrals and find area and volumes with them, and (vi) compute and apply line integrals, Green's Theorem, and Stokes Theorem.

**CONTENTS:**

1: Three-Dimensional Space; Vectors

The definition of a vector is introduced, then dot and cross products are defined. Other topics covered are lines and planes in space, quadric surfaces, cylindrical and spherical coordinates.

2: Vector Valued Functions

An introduction to and calculus of vector valued functions.

3: Partial Derivatives

Functions of several variables are defined. Other topics covered include partial derivatives and consideration of conditions for differentiability, the chain rule, extreme, directional derivatives and gradients, and Lagrange multipliers.

4: Multiple Integrals

Topics covered include double and triple integrals, surface area and volumes, and centers of mass.

5: Topics in Vector Calculus

Line integrals, Green's Theorem, and Stokes Theorem.
**REMARKS:** We will continue our study of the history of calculus through the study of biographies of the great mathematicians who helped create this subject. Also, we continue our work with Mathematica as a tool in solving problems.

III. **Letters of consultation:**

Letters were requested from all departments that require Calculus III.

a) Physics & Astronomy  
b) Chemistry & Biochemistry
CATALOG DESCRIPTION:

1701.230 Calculus III 4 s.h.
(Prerequisite: 1701.131 Calculus II)

This course includes: vectors, vector functions, velocity, acceleration, partial differentiation, directional derivatives, multiple integration, and vector calculus. The student is expected to use a computer algebra system, such as Mathematica, in addition to a graphing calculator.
Hassen, Abdulkadir

From: Newland, Robert
Sent: Thursday, January 19, 2006 10:30 AM
To: Hassen, Abdulkadir
Subject: Re: Letter of Consultation for Minor Changes in Calculus III

We fully support the changes to calculus III.

Robert Newland, Ph.D.
Chair, Chemistry & Biochemistry
Rowan University
201 Mullica Hill Rd.
Glassboro, NJ 08028
(856) 256-4502
FAX (856) 256-4478
newland@rowan.edu

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From: "Hassen, Abdulkadir" <Hassen@rowan.edu>
Date: Wed, 18 Jan 2006 12:23:15 -0500
To: "Newland, Robert" <Newland@rowan.edu>, "Hettinger, Jeffrey D." <Hettinger@rowan.edu>
Conversation: Letter of Consultation for Minor Changes in Calculus III
Subject: Letter of Consultation for Minor Changes in Calculus III

Hi Again
I sent you a request for letter of consultation for minor change in Calculus II a short time ago. Now I am requesting another one. (It is the beginning of a semester and rumor has it that department chairs need more work!)

The attached file contains the minor change we are proposing for Calculus III. We are removing the parametric and polar equation (moved to Calculus II) and cover vector analysis (line integral, Green’s and Divergence Theorems, divergence and curl of vector fields, etc), which is currently list as “if time permits”. I believe that these changes are beneficial to your students as well as ours.

Hoping to hear from you at your earliest, I wish you the best and smooth semester.

Abdul Hassen
Date: January 23, 2006
To: Dr. Abdulkadir Hassen, Department of Mathematics
From: Jeff Hettinger, Chair, Department of Physics and Astronomy
Re: Curriculum Proposals-Changes to Calculus II and III

The Department of Physics and Astronomy strongly supports the changes to Calculus II and III proposed by the Department of Mathematics.

The proposed modification is to cover two additional topics--Parametric Equations and Polar Coordinates--in Calculus II instead of Calculus III. Calculus III will cover more vector analysis including line integrals. Exponential and logarithmic functions have already been moved to Calculus I. Overall, these modifications do not represent a substantial increase in content but a reorganization which allows covering applications benefiting our Physics majors. We feel this is a very positive change for our students.

Regarding Physics courses, these changes will not impact the sequence of topics in our introductory courses but will likely simplify the teaching of applications in these classes.
ROWAN UNIVERSITY SENATE
COLLEGE CURRICULUM COMMITTEE WORKSHEET

PART I: INFORMATION

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PART II: COMMON PROBLEMS REVIEWED

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PART III: COMMITTEE DECISION

_X_ Pass with NO CHANGES

____ Passed – Return to Sponsor for MINOR CHANGES

_____ Tabled w/SUGGESTED MINOR CHANGES

____ NOT APPROVED

HEARING SUMMARY:

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