

Library Resource Form Required for New Courses

Submission Deadlines: Fall - October 11, 2005 Spring - February 14, 2006

TITLE Minor Changes in Calculus II

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

DEPARTMENT Math
College LAS

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

Math/Science

UNDERGRADUATE **GRADUATE**

Minor changes to existing General Education course
Request new or existing course receive the following description:
 Writing Intensive Literature
 Multicultural-Global Lab Science
 Changes to General Education requirements of a degree or program
New or Existing course to be placed in the General Education Bank:
 Fine/Performing Arts LAS: Humanities
 LAS: Social Behavior LAS: Math/Science
 Communication Studies

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

Department Chair: Samuel Aguirre Date: 2/13/06
Department CURRICULUM Chair: Abdul Hassen Date: 2/13/06
Academic DEAN: T. S. Hays Date: 2-7-06

COLLEGE CURRICULUM COMMITTEE: Open Hearing Date: NA
Approved: NA
Not Approved: NA

Signature: College Curriculum Chair NA

Signature: SENATE CURRICULUM CHAIR R MCL
Date: 5/19/06

Comments: _____

Signature: Executive Vice President/Provost: C. L. Hays
Date: 6/17/06
Approved:
Not Approved:

Signature: REGISTRAR W. J. Hays
Date: 6/14/06 Course Description Received & Approved
Hegis Taxonomy & Course # MATH 01.131

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

Handwritten initials and date

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: MATHEMATICS

Proposed by: ABDUL HASSEN

Date: 2/3/06

COURSE TITLE: CALCULUS II

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 Brust

Signature: Denise Brust

Minor Curricular Change Changes in Calculus II

I. Details

- a) **Change requested:** Changes to the content of Calculus II(see below)
- b) **Sponsor:** Dr. Abdulkadir Hassen, Department of Mathematics

II. Rationale

a) Statement of need for changes:

This proposal addresses the need to include some topics currently covered in Calculus III in Calculus II. In particular, we are proposing to move the Analytic Geometry portion of Calculus III to Calculus II.

Traditionally exponential and logarithmic functions were covered in Calculus II. However, we now cover these in Calculus I so that students required to take only Calculus I will have the opportunity to learn the application of these rather important functions. Since these topics were moved from Calculus II, there is enough time to allow covering the additional topics proposed.

Covering these topics here will allow us to cover more material in Calculus III. (This is outlined in a separate proposal.) It will also give us more time to cover additional topics in the two Engineering Mathematics courses currently offered by the department.

b) Statement of curricular effect:

The proposed changes will have the effect that Calculus II will now have more applicable materials (see details below) and will also free up a much needed time in other courses to cover more topics.

c) Changes in topics:

From: CATALOG DESCRIPTION:

1701.131 Calculus II
(Prerequisite: 1701.130 Calculus I)

4 s.h.

This course begins with applications of integration (such as volume of a solid of revolution work, arc length, area of a surface of revolution, center of mass) and derivatives of inverse trigonometric functions. Integration by parts, partial fractions and other more advanced integration techniques are introduced, along with a discussion of numerical integration, improper integrals, indeterminate form, sequences and infinite series. A graphing calculator is required for this course, and so is the use of a computer software, such as Mathematica.

OBJECTIVES:

Students will demonstrate the ability to (i) differentiate and integrate hyperbolic functions and the inverse trigonometric functions; (ii) perform integration by parts, partial fractions and various substitutions as well as with selected numerical techniques; (iii) recognize and evaluate in determinant forms and improper integrals; and (iv) determine convergence and divergence of infinite series and find Taylor Series and their interval of convergence.

CONTENTS:

1: Applications of Definite Integrals

A review of area between two curves. Differentiation of inverse trig. functions, and inverse hyperbolic functions are presented, as well as volume of a solid of revolution, the concept of work, arc length, area of a surface of revolution and fluid pressure.

2: Techniques of Integration

General techniques of integration, including integration by parts, partial fractions, substitutions, and numerical integration are presented. Numerical integration, L'Hopital's Rule and improper integrals are also covered.

3: Infinite Series

Sequences and infinite series are introduced. Standard tests for convergence and absolute convergence are presented. Finally, power series are defined which leads to all the important topics of Taylor series.

REMARKS: We will continue studying briefly the history of calculus through the study of biographies of the great mathematicians who helped create this subject. In addition, we will continue our work using Mathematica as a tool in solving problems.

To: CATALOG DESCRIPTION:

1701.131 Calculus II
(Prerequisite: 1701.130 Calculus I)

4 s.h.

This course begins with applications of integration (such as volume of a solid of revolution work, arc length, area of a surface of revolution, center of mass) and derivatives of inverse trigonometric functions. Integration by parts, partial fractions and

other more advanced integration techniques are introduced, along with a discussion of numerical integration, improper integrals, indeterminate form, sequences and infinite series. Polar coordinates and parametric equations will also be discussed. A graphing calculator is required for this course, and so is the use of a computer algebra system, such as Mathematica.

OBJECTIVES:

Students will demonstrate the ability to (i) differentiate and integrate hyperbolic functions and the inverse trigonometric functions; (ii) perform integration by parts, partial fractions and various substitutions as well as with selected numerical techniques; (iii) recognize and evaluate indeterminate forms and improper integrals; (iv) determine convergence and divergence of infinite series and find Taylor Series and their interval of convergence, and (v) find area and arc length in polar coordinates and parametric equations.

CONTENTS:

1: Applications of Definite Integrals

A review of area between two curves. Differentiation of inverse trig. functions, and inverse hyperbolic functions are presented, as well as volume of a solid of revolution, the concept of work, arc length, area of a surface of revolution and fluid pressure.

2: Techniques of Integration

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3: Infinite Series

Sequences and infinite series are introduced. Standard tests for convergence and absolute convergence are presented. Finally, power series are defined which leads to all the important topics of Taylor series.

4: Analytic Geometry

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

REMARKS: We will continue studying briefly the history of calculus through the study of biographies of the great mathematicians who helped create this subject. In addition,

we will continue our work using Mathematica as a tool in solving problems.

III. Letters of consultation:

Letters were requested from all departments requiring Calculus II

- a) Computer Science ✓
- b) Physics & Astronomy ✓
- c) Chemistry & Biochemistry ✓
- d) Electrical and Computer Engineering
- e) Chemical Engineering ✓
- f) Mechanical Engineering ✓
- g) Civil and Environmental Engineering ✓

CATALOG DESCRIPTION:

1701.131 Calculus II

4 s.h.

(Prerequisite: 1701.130 Calculus I)

This course begins with applications of integration (such as volume of a solid of revolution work, arc length, area of a surface of revolution, center of mass) and derivatives of inverse trigonometric functions. Integration by parts, partial fractions and other more advanced integration techniques are introduced, along with a discussion of numerical integration, improper integrals, indeterminate form, sequences and infinite series. Polar coordinates and parametric equations will also be discussed. A graphing calculator is required for this course, and so is the use of a computer algebra system, such as Mathematica.

Hassen, Abdulkadir

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

We fully support the proposed changes in Calculus II which adds some additional topics.

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

From: "Hassen, Abdulkadir" <Hassen@rowan.edu>
Date: Wed, 18 Jan 2006 12:10:44 -0500
To: "Hesketh, Robert Paul" <Hesketh@rowan.edu>, "Dusseau, Ralph A." <Dusseau@rowan.edu>, "Chen, John C." <jchen@rowan.edu>, "Hettinger, Jeffrey D." <Hettinger@rowan.edu>, "Newland, Robert" <Newland@rowan.edu>, "Kay, Jennifer S." <kay@rowan.edu>, "Schmalzel, John L." <Schmalzel@rowan.edu>
Conversation: Letter of Consultation for Minor Change in Calculus II
Subject: Letter of Consultation for Minor Change in Calculus II

Greetings;

I am sponsoring a minor change in Calculus II and would like to have letter of consultation from you. (Please see the attached file.)

The main change we are making in Calculus II is to cover two additional topics: Parametric Equations and Polar Coordinates. These topics are currently covered either in Calculus III or Mathematics for Engineering Analysis I. Since we have moved exponential and logarithmic functions to Calculus I (we are you using early transcendental approach to calculus), we have time to cover these additional topics here. As a result, we will have time to cover vector analysis (Line Integrals and related topics) in Calculus III and some other topics and more applications in the engineering mathematics courses.

Hope to hear from you at your earliest convenience and with best wishes for the semester,

Abdul Hassen

PS I am hoping to submit the minor change by February 14, 2006 to the University curriculum committee.



January 27, 2006

Professor Abdulkadir Hassen
Math Department
Rowan University
201 Mullica Hill Road
Glassboro, NJ 08028

Dear Dr. Hassen:

The Civil and Environmental Engineering Program very strongly endorses your proposed minor changes in Calculus II. We believe that these changes, couple with other changes in Calculus I and Math for Engineering Analysis I and II will lead to a much more balanced sequence of four math courses for the engineering programs.

Thank you very much.

Sincerely,

Ralph Alan Dusseau, Ph.D., P.E.
DRBA Professor and Founding Chair
Civil and Environmental Engineering Program

RAD:amd

College of Engineering
Civil and Environmental Engineering
Rowan University
201 Mullica Hill Road
Glassboro, NJ 08028-1701

856-256-5320
856-256-5242 fax



Department of Physics and Astronomy

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.



Memorandum

Mechanical Engineering

To: Dr. Abdul Hassen, Department of Mathematics
From: John Chen, Associate Professor and Chairperson
Date: 30 January 2006
Re: Letter of consultation for minor change in Calculus II

Dr. Hassen,

We have reviewed your proposal for a minor change in the curriculum for Calculus II and are supportive of it. We feel that you and your colleagues in the Department of Mathematics are the content experts in this field, and we trust your judgment that the proposed change will improve the course and challenge our students to achieve more.

Thank you for your efforts and your dedication to Rowan Engineering.

Please contact me if there are further questions or concerns. Thank you.

Hassen, Abdulkadir

From: Hesketh, Robert Paul
Sent: Tuesday, February 07, 2006 4:55 PM
To: Hassen, Abdulkadir
Subject: RE: Letter of Consultation for Minor Change in Calculus II

I have discussed this change with the faculty in chemical engineering and we believe that it is a good idea. Having Calculus II cover two additional topics (Parametric Equations and Polar Coordinates) that are currently covered in Mathematics for Engineering Analysis I will be good for the students. This change will allow new topics to be covered in the engineering mathematics courses.

Robert P. Hesketh
Professor and Chair
Chemical Engineering
Rowan University
201 Mullica Hill Rd.
Glassboro, NJ 08028-1701

Phone: (856) 256-5313
Fax: (856) 256-5242
email: hesketh@rowan.edu
<http://users.rowan.edu/~hesketh>

From: Hassen, Abdulkadir
Sent: Friday, February 03, 2006 2:37 PM
To: Hesketh, Robert Paul; Kay, Jennifer S.; Schmalzel, John L.
Subject: Letter of Consultation for Minor Change in Calculus II

Hi
Would it be possible to get a letter of consultation regarding minor change in Calculus II?
Regards,
Abdul

Hassen, Abdulkadir

From: Nancy Tinkham [nlt@elvis.rowan.edu]
ent: Saturday, February 04, 2006 3:52 PM
fo: Hassen, Abdulkadir
Cc: Kay; Schmidt, Nancy
Subject: Consultation: Minor curriculum change to Calculus II

The Computer Science Department supports your proposed curriculum changes to Calculus II.

Nancy Tinkham
Computer Science, Rowan University
nlt@elvis.rowan.edu