



OCT 01 2004

PROCESS A NON-GENERAL EDUCATION - CURRICULUM PROPOSAL
LIBERAL ARTS & SCIENCES DEPARTMENT RESOURCE FORM REQUIRED

SCC #04-05- 12.3

Deadlines

October 8, 2004 to be implemented Fall 2005 - February 11, 2005 to be implemented Spring 2006

PROPOSAL TITLE: Changes in Approved minor: Mathematics

Sponsor(s): Dr. Chris Simons E-Mail: Simons@rowan.edu Ext. x 3874
E-Mail: _____ Ext. _____

DEPARTMENT: Mathematics

COLLEGE: LAS

If Liberal Arts & Sciences CHECK: History/Humanities Math/Sciences Social/Behavioral Sciences
 UNDERGRADUATE GRADUATE

THE ATTACHED NON-GEN-ED PROPOSAL IS BEST DESCRIBED BY THE ITEM(S) CHECKED

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

THE FOLLOWING SIGNATURES REPRESENT APPROVAL

Department Chair: Ronald J. Goren Date: 9/28/04
 Department Curriculum Chair: Richard H. Hense Date: 9/28/04
 Academic Dean: [Signature] Date: 10/1/04

COLLEGE CURRICULUM COMMITTEE

OPEN HEARING Date: 10/11/2004 Approved Not Approved
 COLLEGE CURRICULUM CHAIR: [Signature]
 Senate Curriculum Chair Signature: [Signature] Date: Senate Announcement: 12/20/04
 Comments: _____

EXECUTIVE VICE PRESIDENT/PROVOST Signature: [Signature] Date: 1/3/05

Approved Not Approved

Date: 1/10/05 REGISTRAR
 Course Description Received & Approved - Reg's Taxonomy & Course # _____
 Registrar Signature: [Signature]

NOTIFICATION FORWARD

SCC Chair Academic Dean Department Chair Registrar IR CAP
 VP Student Affairs Others _____

Minor Curricular Change Changes in approved minor: Mathematics

I. Details

- a) **Change requested:** Changes to mathematics minor requirements (see below)
- b) **Sponsor:** Dr. Chris Simons, Department of Mathematics

II. Rationale

a) Statement of need for changes:

This proposal addresses two specific deficiencies in the existing requirements for the mathematics minor.

Currently students in the minor must complete a common core and then choose additional courses from one of two specializations: applied mathematics and theoretical math. These specializations will be eliminated in this proposal. We do not ask our regular majors to specialize and it is therefore more difficult for our minors to make such a choice. More significantly, in recent times the boundary between applied and theoretical mathematics has become less meaningful. For example the theory of numbers and modern algebra are currently listed as theoretical mathematics courses, however they are the most appropriate courses for student interested in computer cryptography and error-correcting coding applications that have developed in the last thirty years. Modern algebra (in particular group theory) also plays significant roles in physics and chemistry. Similarly real and complex analysis (currently designated theoretical) are invaluable for those applications requiring a substantial knowledge of complex functions. As such it seems artificial to divide these courses into two separate banks. This proposal eliminates these banks. This will be especially beneficial for engineering students (who are currently limited to the applied bank) since it will given them access to a greater range of applications.

The other change concerns only the engineering majors. It consists of removing linear algebra from their required core and instead requiring them to take two restricted electives. This will open up a wider range of mathematical applications to them. While exposure to linear algebra is essential, engineers already receive substantial exposure to many of its techniques in their required engineering analysis courses. The linear algebra course will still be allowed as a restrictive elective, so students who want the additional linear algebra theory will not experience any change. The sponsor has received numerous complaints from engineering students concerning the linear algebra requirement. The changes will address their concerns.

b) Statement of curricular effect:

The proposed changes will have the effect of changing the distribution of upper level mathematics courses taken by our mathematics minors. However most of these courses are generally not full, so no additional sections will be required. Any existing choice of

restricted electives will still be permitted, so this proposal will only broaden our student's options. It may make the mathematics minor more attractive to our students, so there could be a small increase in the number of mathematics minors.

c) Changes in minor:

From: Existing program:

Track I (not engineering)

Required courses (15 semester hours):

- 1701.130 Calculus I,
- 1701.131 Calculus II,
- 1701.230 Calculus III,
- 1701.210 Linear Algebra

Two courses from either the from one of the following options:

Applied math option:

- 1702.360 Intro to Probability and Statistics I,
- 1702.361 Intro to Probability and Statistics II,
- 1701.332 Intro to Numerical Analysis,
- 1701.231 Differential Equations,
- 1703.400 Applications of Mathematics,
- 1701.386 Introduction to Partial Differential Equations,
- 1703.411 Deterministic Models in Operations Research,
- 1703.412 Stochastic Models in Operations Research

Theoretical math option:

- 1701.310 College Geometry,
- 1701.330 Intro to Real Analysis I,
- 1701.331 Intro to Real Analysis II,
- 1701.340 Modern Algebra I,
- 1701.341 Modern Algebra II,
- 1701.352 Theory of Numbers,
- 1701.430 Introduction to Complex Analysis

Track II (engineering)

Required courses (19 credits):

- 1701.130 Calculus I,
- 1701.131 Calculus II,
- 1701.235 Math/Eng. Analysis I,
- 1701.236 Math/Eng. Analysis II,
- 1701.210 Linear Algebra

One course chosen from:

- 1702.360 Intro to Probability and Statistics I,
- 1702.361 Intro to Probability and Statistics II,
- 1701.332 Intro to Numerical Analysis,
- 1703.400 Applications of Mathematics,
- 1701.386 Introduction to Partial Differential Equations

To: Proposed program:

Track I (not engineering)

Required courses (15 semester hours):

- 1701.130 Calculus I,
- 1701.131 Calculus II,
- 1701.230 Calculus III,
- 1701.210 Linear Algebra

Two courses (at least 6 semester hours) from

- 1701.231 Differential Equations,
- 1701.310 College Geometry,
- 1701.330 Intro to Real Analysis I,
- 1701.331 Intro to Real Analysis II,
- 1701.332 Intro to Numerical Analysis,
- 1701.340 Modern Algebra I,
- 1701.341 Modern Algebra II,
- 1701.352 Theory of Numbers,
- 1701.354 Topology,
- 1702.360 Intro to Probability and Statistics I,
- 1702.361 Intro to Probability and Statistics II,
- 1701.386 Intro to Partial Differential Equations,
- 1703.400 Applications of Mathematics,
- 1703.411 Deterministic Models in Operations Research,
- 1703.412 Stochastic Models in Operations Research,
- 1701.430 Intro to Complex Analysis

Track 2 (engineering)

Required courses (16 credits):

- 1701.130 Calculus I,
- 1701.131 Calculus II,
- 1701.235 Math/Eng. Analysis I,
- 1701.236 Math/Eng. Analysis II

Two courses (at least 6 semester hours) chosen from:

- 1701.210 Linear Algebra,
- 1701.310 College Geometry,
- 1701.330 Intro to Real Analysis I,
- 1701.331 Intro to Real Analysis II,
- 1701.332 Intro to Numerical Analysis,
- 1701.340 Modern Algebra I,
- 1701.341 Modern Algebra II,
- 1701.352 Theory of Numbers,
- 1701.354 Topology,
- 1702.360 Intro to Probability and Statistics I,
- 1702.361 Intro to Probability and Statistics II,
- 1701.386 Introduction to Partial Differential Equations,
- 1703.400 Applications of Mathematics,
- 1703.411 Deterministic Models in Operations Research,
- 1703.412 Stochastic Models in Operations Research,
- 1701.430 Introduction to Complex Analysis

III. Letters of consultation:

Letters were requested from all departments with substantial numbers of mathematics minors.

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



Department of Physics and Astronomy

July 29, 2004

Curriculum Committee:

The Department of Physics and Astronomy supports the curricular change to the mathematics minor. The impact on students majoring in physics or physical science is modest but positive. Many of our students currently earn a minor in mathematics. Eliminating the artificial distinction between “applied” and “theoretical” courses adds flexibility to the coursework our students can use to fulfill the requirements of the mathematics minor.

Sincerely,

A handwritten signature in black ink, appearing to read "Jeff Hettinger", with a long, sweeping horizontal stroke extending to the right.

Jeff Hettinger
Chair

From: "Stephen J. Hartley" <hartley@elvis.rowan.edu>
To: <simons@rowan.edu>
Date: 9/8/04 2:29PM
Subject: change in the math minor

TO: Mathematics Department
FROM: Computer Science Department
SUBJECT: Consultation on Mathematics Minor Requirements Change
DATE: September 8, 2004

The Computer Science Department supports your change to the mathematics minor that eliminates the two specializations and, as a result, broadens a math minor's options.

CC: <kay@elvis.rowan.edu>

From: R Newland <newland@rowan.edu>
To: Christopher Smyth Simons <simons@rowan.edu>
Date: 7/29/04 1:11PM
Subject: Re: Greetings,

We fully support the added flexibility in the proposed changes to the Minor in Mathematics.

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: "Christopher Smyth Simons" <simons@rowan.edu>
> Date: Thu, 29 Jul 2004 11:49:53 -0400
> To: <flores@rowan.edu>, <kay@rowan.edu>, <newland@rowan.edu>
> Subject: Greetings,
>
> Greetings,
>
> I am requesting letters of consultation from the chemistry &
> biochemistry, computer science, and physics & astronomy departments
> regarding changes proposed for the existing math minor, since
> substantial numbers of your students choose to minor in math (the other
> departments to be consulted are the engineering departments). I am
> hoping that this can be done quickly via email as I would like to
> forward it to the college / senate committees by their early October
> deadline.
>
> To get a math minor, must complete Calculus I, Calculus II, Calculus
> II, and Linear algebra, as well as two restrictive math electives.
> Currently the two electives must both be from the so-called applied list
> or both from the so-called theoretical list. This proposal will merge
> the two list giving students increased flexibility. The reasoning
> behind this is that many of the so-called theoretical courses are in
> fact particular well suited to modern applications. For example
> cryptography and coding theory are well served by number theory and
> modern algebra, crystallography by modern algebra and geometry,
> theoretical physics by modern algebra, real & complex analysis. No
> existing choices have been removed.
>
> I have attached the proposal.
>
> Sincerely,
>
> css
>
> Christopher S. Simons, Ph.D.
> Mathematics Department, Rowan University, Glassboro NJ 08028
> Email: simons@rowan.edu
>
>



Electrical and Computer Engineering

September 26, 2004

Professor Chris Simons
Department of Mathematics
Rowan University
Glassboro, NJ 08028

Re: Changes in approved minor: Mathematics

Dear Professor Simons:

The Electrical & Computer Engineering department has received your minor curriculum change proposal entitled "Changes in approved minor: Mathematics." We have reviewed the rationale and curricular effect and are pleased to support this proposal for minor curriculum change.

Best wishes,

Shreekanth Mandayam, Ph.D.
Associate Professor
ECE Curriculum Committee Chair

Cc: Dr. Ronald Czocho, Chair, Mathematics
Dr. John Schmalzel, Chair, ECE

Chris,
The ChE Dept Chair is Robert Hesketh . I think that this is a good minor change and would have positive benefit to the chemical engineering majors. Based on the discussions that have occurred in the Chemical Engineering Department, this would be supportive of this change.

C. Stewart Slater, Ph.D.
Professor
Rowan University
Department of Chemical Engineering
201 Mullica Hill Road
Glassboro, NJ 08028
Tel: (856) 256-5312/5310
Fax: (856) 256-5242
E-mail: slater@rowan.edu
Del: 336 Henry Rowan Hall

-----Original Message-----

From: Christopher Smyth Simons [<mailto:simons@rowan.edu>]
Sent: Tuesday, September 21, 2004 10:59 AM
To: Schmalzel, John L.; Slater, C. Stewart
Subject: math minor consultation

Greetings,

I am writing this email as a final reminder of my request for a letter of consultation from your departments concerning a changes to the mathematics minor. Your letter must reach my hands by Oct. 6 it is to make the senate curriculum committee deadline.

I have attached the proposal.

Thank you,

css

Christopher S. Simons, Ph.D.
Mathematics Department, Rowan University, Glassboro NJ 08028
Email: simons@rowan.edu

Christopher S. Simons, Ph.D.
Mathematics Department, Rowan University, Glassboro NJ 08028
Email: simons@rowan.edu



College of Engineering
Department of Mechanical Engineering

201 Mullica Hill Road
Glassboro, NJ 08028-1701

Tel: 856-256-5345
Fax: 856-256-5241
Email: jchen@rowan.edu

July 29, 2004

Dr. Christopher S. Simons
Department of Mathematics
Rowan University

Dear Dr. Simons:

Upon review of your proposed changes to the Mathematics minor, especially as it affects engineering students, I fully support your proposal and commend you on the student-centered approach you and your department have taken to address our students' needs. It is clear to me that you have listened to our students' desires and wishes for a more integrated and streamlined approach to obtaining a minor in mathematics, and I believe the proposed changes will benefit both of our departments.

If you have further questions or concerns, please contact me.

Sincerely,

John C. Chen
Associate Professor and Chairperson

>>> "Chen, John C." <jchen@rowan.edu> 09/27/04 03:46PM >>>
Chris,

This message is to confirm that my letter of consultation regarding the Math Minor revision is on behalf of the Mechanical Engineering Department.

I hope this satisfies the Curriculum Committee requirements.

Best of luck!

--john.

John C. Chen
tel: 856.256.5345 fax: 856.256.5241
url: <http://engineering.rowan.edu/~jchen>



Civil and Environmental Engineering

August 3, 2004

Christopher S. Simons, Ph.D.
Mathematics Department
Rowan University
Glassboro, NJ 08028

Dear Professor Simons:

I very strongly endorse your proposed changes to the requirements for undergraduate engineering students to receive a minor in mathematics. These changes will greatly increase the number of options available to engineering students who wish to obtain their minor in mathematics.

By taking Calculus I and II, Math for Engineering Analysis I and II, Probability and Statistics I (in place of Statistics I), and a sixth mathematics course as their technical elective, students in the Civil and Environmental Engineering Program will be able to complete the requirements for a minor in mathematics with no additional courses required for graduation.

Therefore, I very strongly support your proposal for changing the requirements for the minor in mathematics.

Sincerely,

Ralph Alan Dusseau, Ph.D., P.E.
DRBA Professor and Founding Chair

RAD:amd

>>> "Dusseau, Ralph A." <dusseau@rowan.edu> 09/27/04 01:48PM >>>
Dear Christopher:

The letter of consultation that I sent to you on August 3, 2004 regarding the proposed revisions to the math minor was written on behalf of all of the faculty in the Civil and Environmental Engineering Program. If you need a revised version of this letter, please let me know.

Sincerely,

Ralph Alan Dusseau, Ph.D., P.E.
DRBA Professor and Founding Chair
Civil and Environmental Engineering
Rowan University
201 Mullica Hill Road
Glassboro, NJ 08028-1701
TEL: 856-256-5322
FAX: 856-256-5242
email: dusseau@rowan.edu

Rowan University
**CURRICULUM PROPOSAL
 LIBRARY RESOURCE FORM**

The purpose of this form is to provide a channel of communication between the library and faculty 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 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. **THIS FORM MUST BE COMPLETED FOR ALL CURRICULUM PROPOSALS.**

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

This form must be completed and attached to the original curriculum proposal before being approved by the Senate Curriculum Committee

A. College LAS Department Mathematics
 Proposed by Dr. Chris Simon's Date Sept 13, 2004
 Course Title: changes to math minor
 Anticipated Date for Course/Program Offering: Fall 2005

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

Since this proposal does not change any courses, no changes in library resources are required.

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.

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

E. Librarian comments and recommendations:

The library has adequate book and journal resources to support this program.

Name LIBRARIAN LIAISON *M. Sun*
Marg - SUN LI (Math)

Librarian Signature: *[Signature]*
Arthur Sean, Librarian