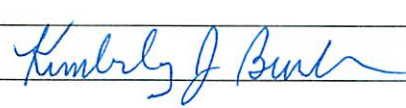
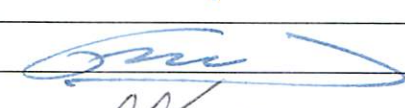

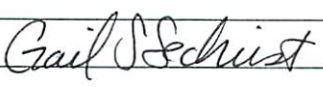


LSC Use Only No:	LSC Action-Date:	UWUCC USE Only No. 10-9a. 19-36a.	UWUCC Action-Date: App- 11/17/09	Senate Action Date:
------------------	------------------	---	-------------------------------------	---------------------

Curriculum Proposal Cover Sheet - University-Wide Undergraduate Curriculum Committee

Contact Person Francisco Alarcón	Email Address falarcon@iup.edu
Proposing Department/Unit Mathematics	Phone 724-357-2608

Check all appropriate lines and complete information as requested. Use a separate cover sheet for each course proposal and for each program proposal.

1. Course Proposals (check all that apply) <input type="checkbox"/> New Course <input type="checkbox"/> Course Prefix Change <input type="checkbox"/> Course Deletion <input type="checkbox"/> Course Revision <input type="checkbox"/> Course Number and/or Title Change <input type="checkbox"/> Catalog Description Change		
<i>Current Course prefix, number and full title</i>		<i>Proposed course prefix, number and full title, if changing</i>
2. Additional Course Designations: check if appropriate <input type="checkbox"/> This course is also proposed as a Liberal Studies Course. <input type="checkbox"/> Other: (e.g., Women's Studies, Pan-African) <input type="checkbox"/> This course is also proposed as an Honors College Course.		
3. Program Proposals <input checked="" type="checkbox"/> Catalog Description Change <input checked="" type="checkbox"/> Program Revision <input type="checkbox"/> New Degree Program <input type="checkbox"/> Program Title Change <input type="checkbox"/> Other <input type="checkbox"/> New Minor Program <input type="checkbox"/> New Track		
<i>Current program name</i>		<i>Proposed program name, if changing</i>
4. Approvals		Date
Department Curriculum Committee Chair(s)		4/22/09
Department Chair(s)		4/21/09
College Curriculum Committee Chair		10/16/09
College Dean		
Director of Liberal Studies *		
Director of Honors College *		
Provost *		
Additional signatures as appropriate: (include title)		
UWUCC Co-Chairs		11/17/09

* where applicable

Received

LIBERAL STUDIES 2009

Liberal Studies

II. Description of Curriculum Change

1. Revised Catalog Description

Bachelor of Science – Applied Mathematics

Liberal Studies: As outlined in Liberal Studies section With the following specifications: Mathematics: MATH 125 Liberal Studies Electives: 9cr, no courses with MATH prefix	53
Major:	42-51
Required Courses:	
MATH 126 Calculus II for Physics, Chemistry, and Mathematics	3cr
MATH 171 Introduction to Linear Algebra	3cr
MATH 216 Probability and Statistics for Natural Sciences	3cr
MATH 225 Calculus III for Physics, Chemistry, and Mathematics	3cr
MATH 241 Differential Equations	3cr
MATH 271 Introduction to Mathematical Proofs I	3cr
MATH 272 Introduction to Mathematical Proofs II	3cr
MATH 363 Mathematical Statistics I	3cr
MATH 447 Modeling and Simulation	3cr
MATH 450 Topics in Applied Computational Mathematics	3cr
Controlled Electives: (1)	
One course from the following: MATH 371, 421, 423, 427, 476	3cr
One course from the following: MATH 445 or 446	3cr
One course from the following: MATH 480 or 493	3-12cr
One more course from the following: 342, 364, 445, 446	3cr
Other Requirements:	21-27
Computer Science:	
COSC 110 Problem Solving and Structured Programming	3cr
COSC/MATH 250 Introduction to Numerical Methods	3cr
Foreign Language Intermediate Level (2)	0-6cr
Planned Program in Complementary Field (requires advisor approval) with at least 6cr in 300/400-level courses	15cr
Free Electives:	1-4
Total Degree Requirements:	120

(1) A student may select courses to fulfill requirements for specialized track.

Actuarial/Statistics: MATH 363, 364, 366, 371, 421, 446, 465

Math Analyst/Engineering: MATH 342/447, MATH 371, 423

Operations Research: MATH 371, 421, 445/446, 447

- (2) Intermediate-level Foreign Language may be included in Liberal studies electives.

2a. Summary of Changes: Underlined items will be changed; **bold** items will be added.

Current				Proposed			
Bachelor of Science – Applied Mathematics				Bachelor of Science – Applied Mathematics			
Liberal Studies: As outlined in Liberal		53		Liberal Studies: As outlined in Liberal		53	
Studies section with the following specifications:				Studies section with the following specifications:			
Mathematics: MATH 125				Mathematics: MATH 125			
Liberal Studies Electives: 9cr, no courses with MATH prefix				Liberal Studies Electives: 9cr, no courses with MATH prefix			
Major: 37-38				Major: 42-51			
Required Courses:				Required Courses:			
MATH 126	Calculus II for Physics, Chemistry, and Mathematics	3cr		MATH 126	Calculus II for Physics, Chemistry, and Mathematics	3cr	
MATH 171	Introduction to Linear Algebra	3cr		MATH 171	Introduction to Linear Algebra	3cr	
MATH 216	Probability and Statistics for Natural Sciences	3cr		MATH 216	Probability and Statistics for Natural Sciences	3cr	
MATH 225	Calculus III for Physics, Chemistry, and Mathematics	3cr		MATH 225	Calculus III for Physics, Chemistry, and Mathematics	3cr	
MATH 241	Differential Equations	3cr		MATH 241	Differential Equations	3cr	
MATH 271	Introduction to Mathematical Proofs I	3cr		MATH 271	Introduction to Mathematical Proofs I	3cr	
MATH 272	Introduction to Mathematical Proofs II	3cr		MATH 272	Introduction to Mathematical Proofs II	3cr	
				MATH 363	Mathematical Statistics	3cr	
				MATH 447	Modeling and Simulation	3cr	
				MATH 450	Topics in Applied Computational Mathematics	3cr	
MATH 480	<u>Senior Seminar</u>	<u>1cr</u>					
Controlled Electives: (1)				Controlled Electives: (1)			
<u>Two courses from the following:</u>		<u>6cr</u>		One course from the following:		3cr	
MATH 371, 421, 422, 423, 427, 476, 477				MATH 371, 421, 423, 427, 476			
<u>One of the following two-course sequences:</u>		<u>6-7 cr</u>		One course from the following:		3cr	
<u>MATH 342/447 or COSC 451/MATH 451; MATH 363/364; MATH 445/446</u>				MATH 445, 446			

			One course from the following: MATH 480, 493	3- 12cr	
			One more course from the following: MATH 342, 364, 445 or 446	3cr	
<u>A minimum of 3 additional cr from the list of controlled electives above or the following:</u>					
MATH 353, 465, 481		3cr			
Other Requirements:		6-12	Other Requirements:		21-27
Computer Science:			Computer Science:		
COSC 110	Problem Solving and Structured Programming	3cr	COSC 110	Problem Solving and Structured Programming	3cr
COSC 250	Introduction to Numerical Methods	3cr	COSC 250	Introduction to Numerical Methods	3cr
Foreign Language Intermediate Level (2)		0-6 cr	Foreign Language Intermediate Level (2)	0-6 cr	
			Planned Program in Complementary Field (requires advisor approval) with at least 6cr in 300/400-level courses	15cr	
Free Electives:		17-24	Free Electives:		0-4
Total Degree Requirements		120	Total Degree Requirements		120
(1) A student may select courses to fulfill requirements for a specialized track.			(1) A student may select courses to fulfill requirements for a specialized track.		
Actuarial/Statistics: MATH 363, 364, 366, 371, 421, 446, 465			Actuarial/Statistics: MATH 363, 364, 366, 371, 421, 446, 465		
Math Analyst/Engineering: MATH 342/447, COSC 451, MATH 371, 423, 447, 451			Math Analyst/Engineering: MATH 342/447, COSC 451, MATH 371, 423, 451		
Operations Research: MATH 371, 421, 445/446, 447			Operations Research: MATH 371, 421, 445/446, 447		
(2) Intermediate-level Foreign Language may be included in Liberal Studies electives.			(2) Intermediate-level Foreign Language may be included in Liberal Studies electives.		

3. Rationale for Change

The Mathematics Department is proposing a revision to the major in applied mathematics to differentiate it from the major in mathematics, which places more emphasis on pure mathematics. We introduce a new course in Topics in Applied Computational Mathematics (MATH 450) and increase the credit hours for MATH 480 to serve as a capstone course. We also propose changing MATH 363, 445 or 446, 447, and 450 to required courses in the major. This requires removing MATH 363 and 447 from the list of Controlled Electives. Additionally, an approved program in a complementary field must be completed. We also require either an internship experience or MATH 480 as a capstone course. We eliminate the 3 credit requirement of MATH 353, 465, 481.

The new program will provide substantial background in Applied Mathematics. The existing program depends too heavily upon courses in pure mathematics and therefore students don't gain sufficient knowledge in the field of applied mathematics.

Requiring MATH 363, MATH 447, one of MATH 445 or MATH 446, and MATH 450 will provide students a foundation in various areas of applied mathematics. With the additional course from MATH 342, 364, 445 or 446, students will gain a deeper understanding in a particular area of applied mathematics or statistics. Furthermore, by requiring an approved minor or program in a complementary field, we believe our students will enhance their knowledge in an application area of their interest. Finally in MATH 480, students will work as an applied mathematician to investigate, research, solve, and present a complex application of their choice. With this sequence of courses we believe our Applied Math program graduates will be more employable in business or industry as well as ready for advanced professional degrees in applied math or related areas.

MATH 450 is the only new course for this program revision. The rationale is to strengthen students' ability in using computational methods and mathematical/statistical software. Currently, COSC 450 is the only related course but it is rarely offered due to low student demand. Also, the course content of COSC 450 does not meet our objectives for MATH 450.

MATH 480 is extended to a 3-credit capstone course which will focus on synthesizing mathematics skills while researching, developing, and presenting a mathematical topic.

III. Implementation

1. How will the proposed revision affect students already in the existing program?

We will implement this beginning with the Fall 2010 entering class. MATH 480 will remain a 1 credit course until the new students become juniors. All courses remain in the same rotation.

2. Are faculty resources adequate?

Faculty resources are adequate. MATH 450 will be offered every other spring semester which has one undetermined advanced math course scheduled in our current rotation. MATH 480 is currently offered every spring semester and will remain the same. We can accommodate the extra two credits by carefully scheduling our remaining 4 credit classes.

3. Are other resources adequate?

Resources are adequate.

4. Do you expect an increase or decrease in the number of students as a result of these revisions? If so, how will the department adjust?

We expect a slow increase in the Applied Math program after a couple of years. If this program is very successful, it will still take years to go beyond what the Department can handle.

IV. Periodic Assessment

1. The Mathematics Department evaluates this program as part of the course MATH 480 Senior Seminar. Students participate in discussions of the program, complete surveys, and take the Educational Testing Service (ETS) Mathematics subject test.
2. MATH 480 is offered every spring semester.
3. The Mathematics Department is its own evaluating entity, along with ETS. There is no accrediting body for mathematics programs.
4. The Mathematics assessment plan is attached.

Program Outcome	Assessment Sources	Person Responsible	Frequency of Assessment	Findings	Feedback	Action Plan	Follow-up
Learn/retain concepts and skills in calculus, linear algebra, and probability and statistics	Comprehensive Exam	MATH 272 Instructor, Math/Applied Math Committee	Completion of core (except MATH 216)				
	core course grades	Instructors	Each semester				
	ETS Major Field Test	MATH 480 instructor	Senior year				
Develop a fundamental understanding of several major ideas of mathematics	major course grades	Instructors	Each semester				
	ETS Major Field Test	MATH 480 instructor	Senior year				
Ability to write a mathematical proof a. direct proof b. indirect proof c. mathematical induction	Comprehensive Exam	MATH 272 Instructor, Math/Applied Math Committee	Completion of core (except MATH 216)				
	271/272 grades	271/272 instructors	After 271/272				
	major course grades	instructors	Each semester				

Ability to Effectively Communicate Mathematics	Oral Presentation	Various major course instructors	Depends on class/instructor				
		Research Day					
	Mathematics Paper, Reaction papers, Process papers	Various major course instructors	Depends on class/instructor				
	Reading/Research Assignments	Various major course instructors	Depends on class/instructor				
Ability to apply mathematics to analyze/model/solve real life applications	major course grades	Instructors	Each semester				
	Possible internship						
Ability to use mathematical/statistical packages appropriately to analyze/solve mathematical/statistical problems							
	major course grades	Various major course instructors					
	Survey	MATH 480 Instructor	MATH 480				
	Exit Interview	Chairperson	Final semester				
	Alumni Survey	Alumni Relations Committee					