

<b>Fiscal Unit/Academic Org</b>	Mathematics - D0671
<b>Administering College/Academic Group</b>	Arts and Sciences
<b>Co-administering College/Academic Group</b>	
<b>Semester Conversion Designation</b>	New Program/Plan
<b>Proposed Program/Plan Name</b>	Integrated Degree in English and Mathematics
<b>Type of Program/Plan</b>	Undergraduate bachelors degree program or major
<b>Program/Plan Code Abbreviation</b>	IDEM
<b>Proposed Degree Title</b>	Bachelor of Science in English and Mathematics

## Credit Hour Explanation

Program credit hour requirements		A) Number of credit hours in current program (Quarter credit hours)	B) Calculated result for 2/3rds of current (Semester credit hours)	C) Number of credit hours required for proposed program (Semester credit hours)	D) Change in credit hours
Total minimum credit hours required for completion of program				121	
Required credit hours offered by the unit	Minimum			27	
	Maximum			41	
Required credit hours offered outside of the unit	Minimum			58	
	Maximum			72	
Required prerequisite credit hours not included above	Minimum			22	
	Maximum			22	

## Program Learning Goals

Note: these are required for all undergraduate degree programs and majors now, and will be required for all graduate and professional degree programs in 2012. Nonetheless, all programs are encouraged to complete these now.

### **Program Learning Goals**

- Students develop mathematical problem-solving skills in chosen track within the major.
- Students learn to communicate mathematical understanding effectively.
- Students learn to analyze texts of various kinds—e.g., film, literary, oral, digital.
- Students gain an understanding of the role of diversity in literature and culture.
- Students demonstrate high levels of proficiency in oral and written communication by developing the ability to write persuasively and elegantly using the skills of argumentation, rhetoric, and style in more than one context.
- Students successfully integrate the skills learned in Math and English.

## Assessment

Assessment plan includes student learning goals, how those goals are evaluated, and how the information collected is used to improve student learning. An assessment plan is required for undergraduate majors and degrees. Graduate and professional degree programs are encouraged to complete this now, but will not be required to do so until 2012.

**Is this a degree program (undergraduate, graduate, or professional) or major proposal? Yes**

**Does the degree program or major have an assessment plan on file with the university Office of Academic Affairs? No**

**DIRECT MEASURES (means of assessment that measure performance directly, are authentic and minimize mitigating or intervening factors)**

**Classroom assignments**

- Other classroom assessment methods (e.g., writing assignments, oral presentations, oral exams)

**Evaluation of a body of work produced by the student**

- Practicum, internship or research evaluation of student work
- Portfolio evaluation of student work
- Capstone course reports, papers, or presentations

**INDIRECT MEASURES (means of assessment that are related to direct measures but are steps removed from those measures)**

**Surveys and Interviews**

- Student survey
- Employer feedback or survey

**Additional types of indirect evidence**

- Job or post-baccalaureate education placement
- Grade review

**USE OF DATA (how the program uses or will use the evaluation data to make evidence-based improvements to the program periodically)**

- Analyze and discuss trends with the unit's faculty
- Analyze and report to college/school
- Periodically confirm that current curriculum and courses are facilitating student attainment of program goals

**Program Specializations/Sub-Plans**

If you do not specify a program specialization/sub-plan it will be assumed you are submitting this program for all program specializations/sub-plans.

<b>Program Specialization/Sub-Plan Name</b>	Financial/Actuarial Track
<b>Program Specialization/Sub-Plan Goals</b>	<ul style="list-style-type: none"> <li>• Students demonstrate strong computational skills highlighting statistics and probability, enhanced by strong writing, social awareness, and critical thinking skills.</li> </ul>
<b>Program Specialization/Sub-Plan Name</b>	Math Education Track
<b>Program Specialization/Sub-Plan Goals</b>	<ul style="list-style-type: none"> <li>• Students demonstrate the skills present in strong educators with exemplary content knowledge as well as the ability to analyze, decipher, and explain math in diverse ways.</li> </ul>
<b>Program Specialization/Sub-Plan Name</b>	Applied Math Track
<b>Program Specialization/Sub-Plan Goals</b>	<ul style="list-style-type: none"> <li>• Students exercise the skills that comprise a strong foundation in mathematics and its application to industrial and physical sciences, exhibiting excellent complementary skills in writing, research, and analysis.</li> </ul>
<b>Program Specialization/Sub-Plan Name</b>	Theoretical Math Track
<b>Program Specialization/Sub-Plan Goals</b>	<ul style="list-style-type: none"> <li>• Students are able to personalize the IDEM with a focus on "pure" mathematics, exploring the basic concepts and structure beneath math topics ranging from geometry to analysis, and articulating these topics to highlight particular fields of interest.</li> </ul>

**Pre-Major**

Does this Program have a Pre-Major? No

**Attachments**

- IDEM Proposal with Sample Syllabus.docx: Proposal with sample syllabus  
*(Program Proposal. Owner: Husen,William J)*
- ASC IDEM proposal Math.docx: Cover letter from Mathematics  
*(Letter from Program-offering Unit. Owner: Husen,William J)*

**Comments**

- The Department of English will submit a corresponding New Degree Program Proposal for the Integrated Degree in English and Mathematics (IDEM) to be considered in tandem with this proposal. *(by Husen,William J on 02/18/2016 02:37 PM)*

**Workflow Information**

Status	User(s)	Date/Time	Step
Submitted	Husen,William J	02/18/2016 03:54 PM	Submitted for Approval
Approved	Husen,William J	02/18/2016 03:54 PM	Unit Approval
Approved	Haddad,Deborah Moore	02/18/2016 05:10 PM	College Approval
Pending Approval	Nolen,Dawn Vankeerbergen,Bernadette Chantal Hanlin,Deborah Kay Jenkins,Mary Ellen Bigler Hogle,Danielle Nicole	02/18/2016 05:10 PM	ASCCAO Approval



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February 18, 2016

ASC Curriculum Committee

Dear Committee,

Please see the attached proposal for a new Integrated Major in English and Mathematics (IDEM). English will also be submitting this proposal. The Department of Mathematics and Department of English are excited by the possibilities presented by this new initiative. The departments of English and Math worked together to create an integrated program that would prepare students for careers by giving them the opportunity to develop skills in critical and humane thinking, data analysis, calculation and communication. A few other institutions are starting to develop integrated majors and we see this as a potential model for other integrated majors that have potential to increase highly qualified students' interest in the Colleges of Arts and Sciences. We have followed the guide for creating new majors and believe we have answered all questions, but if you require anything further, please do not hesitate to contact us.

Sincerely,

William J. Husen, Ph.D.  
Director of Undergraduate Instruction  
[husen.1@osu.edu](mailto:husen.1@osu.edu)

## **Proposal: New Integrated Undergraduate Degree in Mathematics and English**

### **Catalogue style description:**

The Integrated Degree in English and Mathematics (IDEM) is a joint venture between the two departments. It enables students to acquire expertise in both fields and concludes with a capstone course combining the integrated skills developed in coursework. English coursework is very flexible; Math coursework will follow one of four tracks: Applied Math; Education; Finance and Actuarial Science; and Theory.

### **1. General Information**

The **title** of the proposed new major is **Integrated Degree in English and Mathematics (IDEM)**. (Note: “idem” is Latin for “the same”: two fields, same student.)

**Degree Students completing the major will receive: B.S. (Bachelor of Science); they will pursue one of four concentrations: Actuarial/Finance, Applied, Math Education, and Theoretical**

**Proposed implementation date: Autumn 2017**

**Academic units responsible for administrating the major program: Mathematics and English**

### **2. Rationale**

#### **Overview**

The proposed Integrated Degree in English and Mathematics is a collaborative effort between the two departments. A few major universities (e.g., Stanford) are now offering similar undergraduate programs, and we believe that The Ohio State University has the resources to become a leader in an emergent field. The primary objective is to offer undergraduates the opportunity to develop a set of skills that will equip them not only for employment and graduate school, but for long-term career success. An integrated major offers a different experience from a dual major or a major with minor since it encourages participants to think of the two fields of study not as distinct but as complementary. Since IDEM requires only the credit hours of a single major, it should also be possible for students to complete the program within four years, which can be a challenge with a double major. We believe that the Integrated Degree has potential for recruiting high-achieving students to The Ohio State

University, where they will follow a curriculum in both departments and complete the program with an experiential capstone project integrating the skills acquired in each discipline.

### **Why Mathematics and English?**

Mathematics and English are two core subjects in the Colleges of Arts and Sciences. Both attract large numbers of majors (currently around 1200 Math majors and 600 English majors), and so identifying enough students to create an integrated program should not be difficult. We hope, though, that if this collaborative program proves successful it could serve as a pilot for other integrated majors.

In combination, English and Mathematics teach students complementary skills. Liberal Arts majors learn critical thinking and analytical skills. In addition, the English program's strong emphasis on reading and writing teaches the ability to empathize, to process information, and to communicate, skills that employers constantly claim they need and that Math majors are sometimes seen as lacking. Mathematics teaches precision in modeling and in analyzing real-world problems, and involves skills in calculation and numerical analysis that are not typically part of a liberal arts program.

At the same time, the integrated major would be an advantage to many students intending to continue on to graduate school or a professional program, including those interested in law, medicine, business, and of course education. Where possible, students would be assisted in completing a capstone experience appropriate to their long-term plans.

This major could also be a means of recruiting high-achieving students to the College of Arts and Sciences. Students with potential in both English and Math can readily be identified through the ACT and admissions process, and this program would be a valuable one for targeted recruiting. The program should be attractive both to ambitious students seeking a challenge and to parents of prospective students, who often express reservations about the long-term value of majors that do not seem to lead directly to employment.

Finally, this is the sort of program that is likely to attract support from employers and sponsors. It demonstrates that we are committed to teaching our students to think and communicate well, while ensuring that their education is helping to prepare them for the real world.

### **How assessment data has been used**

We are proposing this major in response to requests from students and their families, who have expressed a desire for the skills necessary for success on the job market and in their subsequent careers. The concept was also developed with the support of prospective employers, who when surveyed generally responded enthusiastically to the idea of a major integrating verbal and

numerical skills (see Appendices 3 and 4). It demonstrates that we are committed to teaching our students to think, while ensuring that their education is helping to prepare them for the real world. Their enthusiasm reflects trends reported recently in major media and research sources that employers are seeking college graduates who have both technical expertise and “soft skills” such as writing, communication, critical thinking, creativity, and sociability. For instance, *Forbes* recently noted that “People with balanced strengths in social and math skills earn about 10% more than their counterparts who are strong in only one area.”<sup>1</sup> Similarly, a 2013 survey by Hart Research Associates, conducted on behalf of the Association of American Colleges and Universities, found that most employers agree that “having both field-specific knowledge and skills and a broad range of skills and knowledge is most important for recent college graduates to achieve long-term career success. Few think that having field-specific knowledge and skills alone is what is most needed for individuals’ career success.”<sup>2</sup>

The integrated major in English and Math is thus one attempt to address multiple calls, locally and nationally, for college graduates whose knowledge base and skills sets combine aptitudes and expertise associated with both the STEM fields and the Humanities.

### **Appropriateness to Ohio State**

Ohio State has, we believe, the largest number of Mathematics and English majors of any institution in the state of Ohio; we have well-prepared undergraduates and highly qualified faculty with a broad range of expertise. We also have contacts with many prospective employers and/or sponsors for internships. Finally, the unification of the College of Arts and Sciences provides both opportunity and infrastructure (e.g., curricular, advising) for facilitating the development of an integrated major such as this within the College.

### **Benefits to Students**

First, we would suggest that students who complete this program including the final capstone experience/internship would immediately be ahead of most of job market candidates in the range of skills that they could offer an employer. Students from both Math and English often find first jobs in banks, insurance, marketing, consulting, non-profit organizations, and other fields that require both some mathematical awareness and strong communication skills. Skills

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<sup>1</sup> George Anders, “That ‘Useless’ Liberal Arts Degree Has Become Tech’s Hottest Ticket,” *Forbes* (29 July 2015): [http://www.forbes.com/sites/georgeanders/2015/07/29/liberal-arts-degree-tech/3/?utm\\_campaign=Forbes&utm\\_source=TWITTER&utm\\_medium=social&utm\\_channel=Technology&linkId=15925038](http://www.forbes.com/sites/georgeanders/2015/07/29/liberal-arts-degree-tech/3/?utm_campaign=Forbes&utm_source=TWITTER&utm_medium=social&utm_channel=Technology&linkId=15925038)

<sup>2</sup> Hart Research Associates, “It Takes More Than a Major: Employer Priorities for College Learning and Student Success” (10 April 2013): [http://www.aacu.org/sites/default/files/files/LEAP/2013\\_EmployerSurvey.pdf](http://www.aacu.org/sites/default/files/files/LEAP/2013_EmployerSurvey.pdf)

in analysis and communication become even more important for workers seeking promotion to management or supervisory positions.

Second, we see this program as a means of recruiting high-achieving students to the College of Arts and Sciences at The Ohio State University. Students with potential in both English and Math can readily be identified through the ACT and admissions process, and this program would be a valuable one for targeted recruiting. The program should be attractive both to ambitious students seeking a challenge and to parents of prospective students, who often express reservations about the long-term value of majors that do not seem to lead directly to employment.

### **Career Opportunities**

As noted above, the foremost goal of the program is to enhance career opportunities for our students. The integrated major would also be of advantage to students intending to continue on to graduate school and professional programs, including those interested in law, medicine, business, and middle-school education. Where possible, students would be assisted in completing a capstone experience appropriate to their long-term plans.

### **Licensure**

This program will not lead directly to licensure but would be compatible, assuming the student pursued the relevant concentration within the major, with successful completion of the Actuarial Science exams and with proficiency tests for middle school teachers.

## **3. Goals/Objectives and Evaluation of Program**

### **Assessment Plan**

#### **Goals/Objectives and Evaluation of Program**

1. Students develop mathematical problem-solving skills in chosen track within the major.
2. Students learn to communicate mathematical understanding effectively.
3. Students learn to analyze texts of various kinds—e.g., film, literary, oral, digital.
4. Students gain an understanding of the role of diversity in literature and culture.
5. Students demonstrate high levels of proficiency in oral and written communication by developing the ability to write persuasively and elegantly using the skills of argumentation, rhetoric, and style in more than one context.
6. Students successfully integrate the skills learned in Math and English.

#### **Direct Methods for measuring achievement of all five learning objectives:**



- (a) Measure success rate in passing courses in both fields with a C- or above.
- (b) Measure overall mean GPA and compare with that of single majors.
- (c) Complete a panel assessment of portfolios and oral presentations from the capstone class using a grading rubric.

#### **Indirect Methods for assessing the success of the program:**

- (a) Survey students about their experiences in the program.
- (b) Keep records of job placements for graduates for three years after graduation for the first three graduating cohorts.

#### **Criteria for evaluating successful student learning:**

- (a) The same or better passing rate in courses and average GPA as for single majors
- (b) The same passing rate as for single majors in professional examinations; in actuarial science this is 75% passing one exam and 60% passing two or more exams
- (c) 80% of students testing as above proficient (i.e. a B or above) in the Capstone class
- (d) Placement rate of 80% in related employment within three years.

#### **Assessment timeline:**

In year three of the program (first cohort's junior year): Review student success in courses and compare with that of single majors in the two fields; measure program retention.

In year four of the program (first cohort's senior year): Start collection of data on job and graduate school placement; continue with the next two cohorts.

#### **How information will be used:**

Data on student success will be shared with the Chairs, Directors of Undergraduate Studies, and advisors in each Department, who will share in any decisions as to modifications to the major

#### **Outline of Program**

1. Ideally, freshmen would enter Ohio State having already declared IDEM as their major. Students entering the program later than their first year could be accommodated but most likely they would not be able to complete all the requirements within four years.
2. Where practicable, students would be encouraged to take a designated section of English 2367 that would give them opportunities to apply numerical awareness to the U.S. experience (demographics, statistics, and similar).
3. Appendix 1 shows curricular maps for each of the four tracks for different Math emphases: Actuarial/Financial, Applied, Education, and Theoretical. The General Education requirements are based on the Bachelor of Science pattern, which would be the degree awarded. It should be noted that the "Education" track does not contain all

the State prerequisites for entering an M.Ed. program. An interested student could certainly complete these, but the result would most likely be a program of more than 122 hours. There is more variability in the English courses given that each student will work with an English adviser to select courses most appropriate to his/her goals. In general, the English courses will improve students' abilities in composition (including digital composition), critical thinking, interpretation, and research, and develop their empathy, social awareness, and historical understanding.

During the senior year, and normally during the final semester, students would complete a capstone requirement where they will gain real-life experience in using skills drawn from both Math and English, culminating in a portfolio project. The course might be team-taught by faculty from Math and English, assisted by the Buckeye Leadership Fellows Program sponsored by the Office of Student Life. The first unit of the course will require background reading assignments and participation in some of the professional leadership workshops provided by the Buckeye Leadership Fellows Program. This will be followed by a unit in which local companies pose real-life problems for students to solve. In the final unit the students will prepare a portfolio showing how they used their Math and English skills to approach the real-life problem, which they will then present to a panel.

#### **4. Relationship to Other Programs/Benchmarking**

- All four concentrations for IDEM are currently offered in the Department of Math. However, their disposition within IDEM will necessarily be less powerful because some of the depth of coursework will be cut to accommodate the English component of IDEM. Still, the courses within the four IDEM concentrations have been carefully assembled to ensure that students can meet standards expected for the careers for which those paths prepare them. As mentioned above, the Education track will not lead directly to high school credentialing, but is instead suited for Middle School teaching.

The Department of English administers six minors—English, Creative Writing, Professional Writing, Critical and Cultural Theory, Popular Culture, and Medical Humanities—any one of which might be a useful addition for a regular Math major. But the point of IDEM is to provide substantial coursework in both English and Math, with strategic opportunities (a specially designed English 2367 where practicable; and the capstone course, which is a graduation requirement) for integrating knowledge and skills developed in each area. IDEM will thus provide a carefully structured educational experience that will be different from double majoring or majoring and minoring in Math and English.

Although there are integrated majors that bring together the natural/mathematical sciences and the Humanities—for example, Computer Science and English, and

Computer Science and Music at Stanford—IDEM appears to be the first major to integrate the fields of Math and English.

- There are no known overlaps with any other programs or departments within the university.
- Eddie Pauline, Director of the Buckeye Leadership Fellows Program, has indicated his willingness to use that program to help deliver the capstone course for IDEM.
- There are no articulation arrangements that need to be made for the major.
- No consultants or advisory committees have been involved in the development of the major.
- This is the first time this major has been proposed.
- Students will be recruited through the regular admissions process, with informational materials about IDEM sent to admitted students interested in both English and Math and circulated at orientations. In addition, some current English and Math majors may decide to pursue the new major. It may also attract students who would have pursued another major.

## 5. Student Enrollment

Expected first-year enrollment: 20

Subsequent enrollment: 70-100 total (20-25 students/year)

Note: OSU records indicate that in the past 11 years, approximately four students per year have combined some kind of English and Math/Actuarial Science degree (e.g., an English Major with a Math minor, a double major in English and Math, a Math major with a Creative Writing minor). These numbers will not translate exactly into the number of students who might pursue IDEM given that the integrated major is a different type of collaboration of the two fields, but they at least indicate that there will be interest among students in a Math-English degree combination.

## 6. Curricular Requirements

- A **curricular advising map**, which includes required, GE, and elective course selections for all four concentrations, is provided in Appendix 2.
- All of the **courses for the proposed major** will be drawn from existing courses in English and Math. Students should fulfill their literature GE through an English course, preferably one of the historical surveys. A number of these will be variable depending on the student's needs as determined in consultation with an adviser. The following courses will be required, among them the only course that will need to be developed: a capstone course described below.
  - English 1110: First-Year English Composition (3)

Practice in the fundamentals of expository writing, as illustrated in the student's own writing & in the essays of professional writers.

- English 2367: Second-level writing course [various versions] (3)  
Extends & refines expository writing & analytical reading skills.
- English 2269: Digital Media Composing (3)  
A composition course in which students analyze and compose digital media texts while studying complex forms and practices of textual production.
- English 3398: Methods for the Study of Literature; OR 3379: Methods for the Study of Writing, Rhetoric, Literacy; OR 2270: Introduction to Folklore (methods courses) (3)  
[NOTE: although students will not complete one of the English concentrations, their choice of Methods course should match with their interests; for example, students planning to concentrate mainly on Literature, Film, or Creative Writing courses at the 4000 level should take 3398; those planning to take more courses in rhetoric and writing should take 3370].]
- Math 1295: Introductory Seminar (1)  
Seminar on mathematical topics for beginning math majors.
- Math 1151: Calculus I (5)  
Differential and integral calculus of one real variable.
- Math 1152: Calculus II (5)  
Integral calculus, sequences and series, parametric curves, polar coordinates, (optional: vectors)
- Math 2153: Calculus III (4)  
Multivariable differential and integral calculus.
- Math 2255: Differential Equations and their Applications (3)  
Ordinary differential equations, their series solutions, numerical methods, Laplace transforms, physical applications.
- Math 2568: Linear Algebra (3)  
Matrix algebra, vector spaces and linear maps, bases and dimension, eigenvalues and eigenvectors, applications.
- Math 3345: Foundations of Higher Mathematics (3)  
Introduction to logic, proof techniques, set theory, number theory, real numbers.
- Math 3607: Beginning Scientific Computing (3)  
Introduction to mathematical theory of algorithms used to solve problems that typically arise in sciences, engineering, and finance.
- Math 4504: History of Mathematics (3)  
Development of mathematics from primitive origins to present forms. Topics include development of arithmetic, algebra, geometry, trigonometry, and calculus.
- Math 4530: Probability (3)

- Combinatorial probability, random variables, independence, expectation, variance.
- Math 4547: Introductory Analysis I (3)  
Involves advanced calculus: sequences, limits, continuity, differentiation, Riemann integral, sequences and series of functions, Taylor series, improper integrals.
  - Math 4580: Abstract Algebra I (3)  
Topics in number theory, group theory, vector spaces and linear transformation, field theory, and field extensions.
  - Computer Science and Engineering 2111: Modeling and Problem Solving with Spreadsheets and Databases (3) Spreadsheet and database modeling/programming concepts and techniques to solve business related problems; efficient/effective data handling, computational analysis and decision support. Additional topics: computer concepts, networking, project integration.
  - Economics 2001: Principles of Microeconomics (3)  
Introduction to economic theory: supply and demand for goods, services, and factor inputs; market structure; international trade, the distribution of income.
  - Economics 2002: Principles of Macroeconomics (3)  
Introduction to the theory of national income determination; economic fluctuations; money; government policy; international economics.
  - Statistics 4201: Introduction to Mathematical Statistics I (4)  
Basic concepts in mathematical statistics, including probability, discrete and continuous distributions and densities, mathematical expectation, functions of random variables, transformation techniques, sampling distributions, order statistics.
  - Statistics 4202: Introduction to Mathematical Statistics II (4)  
Decision theory, point and interval estimation, Neyman-Pearson lemma, likelihood ratio tests, tests for means, variances, and proportions, nonparametric tests, regression, and ANOVA.
  - English 4000-level diversity course: 4577.01 Folklore I: Groups & Communities; 4586 Studies in American Indian Literature/Culture; 4592 Topics in Women in Literature and Culture; 4580 Topics in LGBTQ Literatures/Cultures; 4587 Studies in Asian American Literature/Culture; 4597.01 Disability Experience in the Contemporary World; 4581 Topics in U.S. Ethnic Literatures; 4588 Studies in Latino/a Literature/Culture; 4601 Language & the Black Experience; 4582 Topics in African-American Lit; 4589 Studying the Margins: Power, Language, & Culture (3)
  - Four additional English courses at the 3000-level or above (12)
  - **Capstone Course for IDEM: English/Math 4XXX (new course) (3)**

Students pursuing the Integrated Degree in English and Math (IDEM) will learn concepts, develop understanding of theories, and acquire techniques and skills in a variety of courses in math and English. If their schedules allow, they will also take a specially designed English 2367 that will allow them to explore content, concepts, and skills from both fields. In their senior year, IDEM majors will take a capstone course that will provide an opportunity to integrate and apply the full range of knowledge and skills they have acquired through their previous coursework to real-world practice.

This capstone course will combine both professional development and leadership seminars and a capstone project on a topic chosen from real-world challenges submitted to the IDEM program through our community and industry partners. The course will thus provide students with both a critical learning experience and an opportunity to synthesize and apply what they learned in IDEM in a real situation. Students who complete this capstone course will have a broader understanding of their own personal strengths and which jobs might require their particular set of skills, thus resulting in a student who is more prepared for entering the workforce.

The course will be team-taught by two faculty members, one from the English Department and one from the Math Department. It will rely on the infrastructure, experience, and business contacts from the Buckeye Leadership Fellows Program (Office of Student Life) and the actuarial science course in the Math Department, Math 3588.

- Curriculum Map

<b>Learning Objective</b>	<b>How fulfilled</b>
<b>Students develop mathematical problem-solving skills in chosen track within major</b>	3000-4000-level Math courses within track
<b>Students learn to communicate mathematical understanding effectively</b>	Data analysis GE; other Math courses and capstone
<b>Students learn to analyze texts of different kinds—e.g., film, literary, oral, digital.</b>	English Methods courses (3398, 3379, 2270) and English 2269
<b>Students gain an understanding of the role of diversity in literature and culture</b>	English 4000-level diversity course
<b>Students demonstrate high levels of proficiency in oral and written communication by developing the ability to write persuasively and elegantly using the skills of argumentation, rhetoric, and style in more than one context.</b>	English 2367; 3000-4000-level English courses within track
<b>Students successfully integrate the skills learned in Math and English</b>	Capstone course

- There are no prerequisites for declaring an English or Math major. Standard prerequisites for the majors are English 1110/2367; Math 1151/1152; and Econ 2001/2002.
- The minimum number of credits required for the completion of the major is 41.
- Students who enter as IDEM majors should be able to graduate in the standard 121 credit hours.
- See Appendix 1 for 4-year student plans in all four tracks.
- All courses toward the major will be in Math and English.
- A typical number of elective hours would be 12-15 upper-level credits.
- In addition to following course requirements, successful completion of the Capstone course with portfolio and presentation is a required part of the major.
- The major does not include accreditation, but students would be able to take professional examinations such as the actuarial science exam.
- **Impact of New Major on Facilities, Faculty, and Support Services**  
Because students would be taking the same courses as other Math and English majors, the only new course required would be the capstone course, and even this would draw on systems already in place such as the Actuarial Science capstone, Professional Writing internships, and the Buckeye Leadership Program. For the program to be successful, cooperation between major advisors and the support of course directors would certainly be necessary. In addition to a version of English 2367 (the second writing course) directed specifically to this population, it might be possible to tailor the syllabus for other multi-section English classes should the number of students justify it, but while this would entail some coordination it would not require the creation of new courses. Each Department will need a faculty liaison. Finally, the program will be dependent on active involvement in recruiting.

The only additional expense would be for faculty labor to teach the capstone course (3 hours). We will rotate this course between the two departments with one department providing the instructor one year, the other the next.

## Sample Syllabus

### English/Math 4420: IDEM Capstone

Rationale: Students pursuing the Integrated Degree in English and Math (IDEM) learn concepts, develop understanding of theories, and acquire techniques and skills in a variety of courses in math and English. This capstone course is designed for IDEM majors to take in their senior year; it provides an opportunity to integrate and apply the full range of knowledge and skills IDEM majors have acquired through their previous coursework to real-world practice.

This capstone course combines both professional development and leadership seminars and a final project on a topic chosen from real-world challenges submitted to the IDEM program through our community and industry partners. The course will thus provide students with both a critical learning experience and an opportunity to synthesize and apply what they learned in IDEM in a real situation. Students who complete this capstone course will have a broader understanding of their own personal strengths and which jobs might require their particular set of skills, thus resulting in a student which is more prepared for entering the workforce.

The course will be team-taught by two faculty members, one from the English Department and one from the Math Department. It will rely on the infrastructure, experience, leadership workshops, and business contacts from the Buckeye Leadership Fellows Program (Office of Student Life) and the actuarial science course in the Math Department, Math 3588.

#### Course Description:

The course consists of two parts.

Part I. Professional and leadership development (first seven weeks) under the guidance of the Buckeye Leadership Fellows Program, Office of Student Life. This component aims not only to help students find a fulfilling job after they graduate but also to be promoted into leadership positions. This element of the capstone course thus provides a comprehensive exploration of the study and practice of leadership. During these seven weeks, students will participate in some of the following workshops which have been successful through the two-year history of the Buckeye Leadership Fellows Leadership Challenge month program: (a) Executive Presence: Public Speaking, (b) Executive Presence: Interviewing and Etiquette, (c) Business Writing, Building Your Network, utilizing the Hecker Networking Method, (d) Making Meaningful Connections, (e) Networking and Etiquette, (f) Project Management, (g) Conflict Management, and (h) Elements of Effective Pitches and Presentations. <http://blf.osu.edu/>

Part II. Capstone Project (second seven weeks): Based on the track they have chosen in IDEM, students will identify a topic and select an industry mentor and an academic adviser. Each



capstone project will require a written component (a portfolio of materials prepared throughout the semester) and an oral component (a presentation). The development of the project will include:

Week 1: Identify a topic or a problem, select a mentor and an adviser.

Weeks 2-5: Work closely with the industry mentor and the academic adviser on the project. First draft of the portfolio and the presentation will be due at the end of the fifth week.

Week 6: Revise the portfolio and the presentation.

Week 7: Final version of the portfolio due, oral presentation made to the instructor, project adviser, industry mentor, and other students in the class.

Grading:

Based on the quality of the final portfolio and the presentation, the course will be graded on a scale of A through E. The grade will be jointly assigned by the instructor, the project adviser(s) and the industry mentor.

## Appendix 1: IDEM Concentrations: Curricular Maps

NOTE: Where appropriate to the concentration, 3000-level English courses can substitute for 4000-level courses

<b>IDEM: Financial/Actuarial Concentration</b>						
	Fall Courses	Credit Hours	Upper Division	Spring Courses	Credit Hours	Upper Division
Year 1	Writing GE: English 1110	3	0	Writing GE: English 2367 - Pre-req major	3	0
	Math/Logical Analy GE: Math 1151 - Pre-req major	5	0	Lit GE: English course at 2000-level+	3	0
	Foreign Language GE	4	0	Open Options GE: Math 1152 - Pre-req major	5	0
	Social Science GE: Econ 2001 or 2002 - Pre-req major	3	0	Math 1295: Introductory Seminar	1	0
	Art Sci Survey	1	0	Foreign Language GE	4	0
Year 2	Social Science GE: Econ 2001 or 2002 - Pre-req major	3	3	English Methods Course: 3398, 3379, or 2270	3	3
	Foreign Language GE	4	0	Math 3618 Interest Theory	3	3
	Open Options GE: Math 2153 Calculus III	4	4	Math 2568 Linear Algebra	3	3
	CSE 2111 Modeling and Problem Solving with Spreadsheets and Databases	3	3	Natural Science GE Lab Course	4	0
		0	0	Data Analysis GE	3	0
Year 3	English 4000-level diversity in literature and culture course	3	3	English 4000-level+ course	3	3
	Math 4530 or Stats 4201 Probability	4	4	Stat 4202 Statistics	4	4
	Cultures and Ideas or History GE (doubles as 1st Global Studies GE)	3	0	Natural Science GE Lab Course	4	0
	English 3000-level+ course	3	3	History GE (doubles as 2nd Global studies GE)	3	0
	Visual and Performing Arts GE: English 2269: Digital Media Composing	3	0		0	0
Year 4	English 4000-level+ course	3	3	English 4000-level+ course	3	3
	Math 5632 Math Methods in Financial Economics	3	3	Elective - upper division	3	3
	Natural Science GE	3	0	Elective course	3	0
	Elective course	3	0	Integrated Major Capstone course	3	3
	Elective - upper division	3	3	Elective course	2	0
	<b>Totals for Fall Terms</b>	<b>61</b>	<b>29</b>	<b>Totals for Spring Terms</b>	<b>60</b>	<b>25</b>
	<b>Total Credit Hours</b>	<b>121</b>				
	<b>Total Upper Division Hours</b>	<b>54</b>				

<b>IDEM: Math Ed Concentration</b>						
	Fall Courses	Credit Hours	Upper Division	Spring Courses	Credit Hours	Upper Division
Year 1	Writing GE: English 1110	3	0	Writing GE: English 2367 - Pre-req major	3	0
	Math/Logical Analy GE: Math 1151 - Pre-req major	5	0	Lit GE: English course at 2000-level+	3	0
	Foreign Language GE	4	0	Open Options GE: Math 1152 - Pre-req major	5	0
	Social Science GE: Econ 2001 or 2002 - Pre-req major	3	0	Math 1295: Introductory Seminar	1	0
	Art Sci Survey	1	0	Foreign Language GE	4	0
Year 2	Social Science GE: Econ 2001 or 2002 - Pre-req major	3	3	English Methods Course: 3398, 3379, or 2270	3	3
	Foreign Language GE	4	0	Math 2255 Differential Equations	3	3
	Open Options GE: Math 2153 Calculus III	4	4	Math 2568 Linear Algebra	3	3
	CSE 2111 Modeling and Problem Solving with Spreadsheets and Databases	3	3	Natural Science GE Lab Course	4	0
		0	0	Data Analysis GE	3	0
Year 3	English 4000-level diversity in literature and culture course	3	3	English 4000-level+ course	3	3
	Math 4530 or Stats 4201 Probability	4	4	Math 3345 Foundations of Higher Mathematics	3	3
	Cultures and Ideas or History GE (doubles as 1st Global Studies GE)	3	0	Natural Science GE Lab Course	4	0
	English 3000-level+ course	3	3	Elective course	3	0
	Visual and Performing Arts GE: English 2269: Digital Media Composing	3	0		0	0
Year 4	English 4000-level+ course	3	3	English 4000-level+ course	3	3
	Math 4504 History of Mathematics	3	3	Elective course - upper division	3	3
	Natural Science GE	3	0	Elective course	3	0
	Elective course	3	0	Integrated Major Capstone course	3	3
	Elective course - upper division	3	3	History GE (doubles as 2nd Global studies GE)	3	0
	<b>Totals for Fall Terms</b>	<b>61</b>	<b>29</b>	<b>Totals for Spring Terms</b>	<b>60</b>	<b>24</b>
	<b>Total Credit Hours</b>	<b>121</b>				
	<b>Total Upper Division Hours</b>	<b>53</b>				

**IDEM: Applied Math Concentration**

	Fall Courses	Credit Hours	Upper Division	Spring Courses	Credit Hours	Upper Division
Year 1	Writing GE: English 1110	3	0	Writing GE: English 2367 - Pre-req major	3	0
	Math/Logical Analy GE: Math 1151 - Pre-req major	5	0	Lit GE: English course at 2000-level+	3	0
	Foreign Language GE	4	0	Open Options GE: Math 1152 - Pre-req major	5	0
	Social Science GE: Econ 2001 or 2002 - Pre-req major	3	0	Math 1295: Introductory Seminar	1	0
	Art Sci Survey	1	0	Foreign Language GE	4	0
Year 2	Social Science GE: Econ 2001 or 2002 - Pre-req major	3	3	English Methods Course: 3398, 3379, or 2270	3	3
	Foreign Language GE	4	0	Math 2255 Differential Equations	3	3
	Open Options GE: Math 2153 Calculus III	4	4	Math 2568 Linear Algebra	3	3
	CSE 2111 Modeling and Problem Solving with Spreadsheets and Databases	3	3	Natural Science GE Lab Course	4	0
		0	0	Data Analysis GE	3	0
Year 3	English 4000-level diversity in literature and culture course	3	3	English 4000-level+ course	3	3
	Math 4530 or Stats 4201 Probability	4	4	Stat 4202 Statistics	4	4
	Cultures and Ideas or History GE (doubles as 1st Global Studies GE)	3	0	Natural Science GE Lab Course	4	0
	English 3000-level+ course	3	3	History GE (doubles as 2nd Global studies GE)	3	0
	Visual and Performing Arts GE: English 2269: Digital Media Composing	3	0		0	0
Year 4	English 4000-level+ course	3	3	English 4000-level+ course	3	3
	Math 3607 Beginning Scientific Computing	3	3	Elective course - upper division	3	3
	Natural Science GE	3	0	Elective course	3	0
	Elective course	3	0	Integrated Major Capstone course	3	3
	Elective course - upper division	3	3	Elective course	2	0
	Totals for Fall Terms	61	29	Totals for Spring Terms	60	25
	Total Credit Hours	121				
	Total Upper Division Hours	54				

**DEM: Theoretical Math Concentration**

	Fall Courses	Credit Hours	Upper Division	Spring Courses	Credit Hours	Upper Division
Year 1	Writing GE: English 1110	3	0	Writing GE: English 2367 - Pre-req major	3	0
	Math/Logical Analy GE: Math 1151 - Pre-req major	5	0	Lit GE: English course at 2000-level+	3	0
	Foreign Language GE	4	0	Open Options GE: Math 1152 - Pre-req major	5	0
	Social Science GE: Econ 2001 or 2002 - Pre-req major	3	0	Math 1295: Introductory Seminar	1	0
	Art Sci Survey	1	0	Foreign Language GE	4	0
Year 2	English Methods Course: 3398, 3379, or 2270	3	3	English 3000-level+ course	3	3
	Social Science GE: Econ 2001 or 2002 - Pre-req major	3	0	Math 2255 Differential Equations	3	3
	Open Options GE: Math 2153 Calculus III	4	4	Math 2568 Linear Algebra	3	3
	Foreign Language GE	4	0	Natural Science GE Lab Course	4	0
		0	0	Data Analysis GE	3	0
Year 3	English 4000-level diversity in literature and culture course	3	3	English 4000-level+ course	3	3
	Math 4530 or Stats 4201 Probability	4	4	Math 3345 Foundations of Higher Mathematics	3	3
	Cultures and Ideas or History GE (doubles as 1st Global Studies GE)	3	0	Natural Science GE Lab Course	4	0
	Minor course	3	0	History GE (doubles as 2nd Global studies GE)	3	0
	Visual and Performing Arts GE: English 2269: Digital Media	3	0	Elective course - upper division	3	3
Year 4	English 4000-level+ course	3	3	English 4000-level+ course	3	3
	Math 4580 Abstract Algebra I	3	3	Math 4547 Introductory Analysis I	3	3
	Natural Science GE	3	0	Elective course	3	0
	Elective course - upper division	3	3	Integrated Major Capstone Course	3	3
	Elective course	3	0		0	0
	Totals for Fall Terms	61	23	Totals for Spring Terms	60	27
	Total Credit Hours	121				
	Total Upper Division Hours	50				

## Appendix 2: IDEM Information Sheet

### Integrated Major in English and Math (IDEM)

In combination, English and Mathematics teach students an impressive range of skills. English courses teach critical thinking and analytical skills as well as the kind of communication and writing skills that are needed in a variety of careers and professional/graduate schools. Mathematics teaches precision in modeling and in analyzing real-world problems, and involves skills in calculation and numerical analysis. The Integrated Major in English and Math (IDEM, which means “the same” in Latin) is thus designed not only to develop these crucial skills sets but also to provide opportunities to integrate them in real-world work contexts.

Students interested in IDEM as a major generally have ACT Math, English, and Reading scores of at 25 and/or an SAT Math score of at least 570; and a verbal SAT score of at least 610. Interested students should contact a Mathematics advisor as well as an English advisor to map out an appropriate program of courses. Those who complete the major will graduate with a Bachelor of Science.

#### Career and Post-Baccalaureate Opportunities

Students who complete this major will be ahead of most college graduates in the range of skills that they can offer an employer. Depending on the concentration they pursue, students often find first jobs in banks, insurance, marketing, non-profit organizations, consulting, education, and other fields that require both some mathematical awareness and strong communication skills. Skills in analysis and communication become even more important for workers seeking promotion to management or supervisory positions. Some students pursuing this major may have the long-term goal of starting their own business. IDEM is also a path to advanced study in professional programs (such as Business-MBA, Medical, and Law School) and graduate school.

#### Requirements

IDEM majors pursue one of four concentrations—Theoretical Math, Math for Educators, Actuarial/Financial Math, or Applied Math—each of which includes a full complement of Math and English coursework. Each concentration concludes with a capstone course in which students receive extensive leadership training while they also work with a workplace partner to develop a project in which they use both the Math and English skills and expertise they have acquired through their coursework.

Each concentration is described below and is supported by a four-year curricular map. Each concentration includes room for a series of electives, which could be taken in the form of a minor chosen by the student.

**Applied Math:** Just as the name indicates, this track utilizes mathematics as it applies in real-life situations. By building a strong foundation in mathematics and its application to industrial and physical sciences and supporting that foundation with excellent skills in writing, research,

and analysis, students completing this track will be well prepared for a career or graduate-level study in engineering, computer science, physics, architecture and more.

### IDEM: Applied Math Concentration

	Fall Courses	Credit Hours	Upper Division	Spring Courses	Credit Hours	Upper Division
Year 1	Writing GE: English 1110	3	0	Writing GE: English 2367 - Pre-req major	3	0
	Math/Logical Analy GE: Math 1151 - Pre-req major	5	0	Lit GE: English course at 2000-level+	3	0
	Foreign Language GE	4	0	Open Options GE: Math 1152 - Pre-req major	5	0
	Social Science GE: Econ 2001 or 2002 - Pre-req major	3	0	Math 1295: Introductory Seminar	1	0
	Art Sci Survey	1	0	Foreign Language GE	4	0
Year 2	Social Science GE: Econ 2001 or 2002 - Pre-req major	3	3	English Methods Course: 3398, 3379, or 2270	3	3
	Foreign Language GE	4	0	Math 2255 Differential Equations	3	3
	Open Options GE: Math 2153 Calculus III	4	4	Math 2568 Linear Algebra	3	3
	CSE 2111 Modeling and Problem Solving with Spreadsheets and Databases	3	3	Natural Science GE Lab Course	4	0
		0	0	Data Analysis GE	3	0
Year 3	English 4000-level diversity in literature and culture course	3	3	English 4000-level+ course	3	3
	Math 4530 or Stats 4201 Probability	4	4	Stat 4202 Statistics	4	4
	Cultures and Ideas or History GE (doubles as 1st Global Studies GE)	3	0	Natural Science GE Lab Course	4	0
	English 3000-level+ course	3	3	History GE (doubles as 2nd Global studies GE)	3	0
	Visual and Performing Arts GE: English 2269: Digital Media Composing	3	0		0	0
Year 4	English 4000-level+ course	3	3	English 4000-level+ course	3	3
	Math 3607 Beginning Scientific Computing	3	3	Elective course - upper division	3	3
	Natural Science GE	3	0	Elective course	3	0
	Elective course	3	0	Integrated Major Capstone course	3	3
	Elective course - upper division	3	3	Elective course	2	0
	<b>Totals for Fall Terms</b>	<b>61</b>	<b>29</b>	<b>Totals for Spring Terms</b>	<b>60</b>	<b>25</b>
	<b>Total Credit Hours</b>	<b>121</b>				
	<b>Total Upper Division Hours</b>	<b>54</b>				

**Education:** By learning foundational logic within a wide scope of math topics from calculus to abstract algebra and combining this with the communication and analytical skills offered by English courses, this track helps to generate strong educators with exemplary content knowledge as well as the ability to analyze, decipher, and explain math in diverse ways. (Note: the "Education" track does not contain all the State prerequisites for entering an M.Ed. program. An interested student could certainly complete these but the result would most likely be a program of more than 122 hours. Middle school teaching is the more likely career path with this track.)

**IDEM: Math Ed Concentration**

	Fall Courses	Credit Hours	Upper Division	Spring Courses	Credit Hours	Upper Division
Year 1	Writing GE: English 1110	3	0	Writing GE: English 2367 - Pre-req major	3	0
	Math/Logical Analy GE: Math 1151 - Pre-req major	5	0	Lit GE: English course at 2000-level+	3	0
	Foreign Language GE	4	0	Open Options GE: Math 1152 - Pre-req major	5	0
	Social Science GE: Econ 2001 or 2002 - Pre-req major	3	0	Math 1295: Introductory Seminar	1	0
	Art Sci Survey	1	0	Foreign Language GE	4	0
Year 2	Social Science GE: Econ 2001 or 2002 - Pre-req major	3	3	English Methods Course: 3398, 3379, or 2270	3	3
	Foreign Language GE	4	0	Math 2255 Differential Equations	3	3
	Open Options GE: Math 2153 Calculus III	4	4	Math 2568 Linear Algebra	3	3
	CSE 2111 Modeling and Problem Solving with Spreadsheets and Databases	3	3	Natural Science GE Lab Course	4	0
		0	0	Data Analysis GE	3	0
Year 3	English 4000-level diversity in literature and culture course	3	3	English 4000-level+ course	3	3
	Math 4530 or Stats 4201 Probability	4	4	Math 3345 Foundations of Higher Mathematics	3	3
	Cultures and Ideas or History GE (doubles as 1st Global Studies GE)	3	0	Natural Science GE Lab Course	4	0
	English 3000-level+ course	3	3	Elective course	3	0
	Visual and Performing Arts GE: English 2269: Digital Media Composing	3	0		0	0
Year 4	English 4000-level+ course	3	3	English 4000-level+ course	3	3
	Math 4504 History of Mathematics	3	3	Elective course - upper division	3	3
	Natural Science GE	3	0	Elective course	3	0
	Elective course	3	0	Integrated Major Capstone course	3	3
	Elective course - upper division	3	3	History GE (doubles as 2nd Global studies GE)	3	0
	<b>Totals for Fall Terms</b>	<b>61</b>	<b>29</b>	<b>Totals for Spring Terms</b>	<b>60</b>	<b>24</b>
	<b>Total Credit Hours</b>	<b>121</b>				
	<b>Total Upper Division Hours</b>	<b>53</b>				

**Financial and Actuarial Science:** The financial and insurance industries are among the most prominent and complex industries in the world today. With a strong computational background highlighting statistics and probability enhanced by strong writing, social awareness, and critical thinking skills, students in this track will be competitive candidates in any corporate or commercial based career within the insurance, finance, investment, real estate, actuarial consulting, or banking industry.

<b>IDEM: Financial/Actuarial Concentration</b>						
	Fall Courses	Credit Hours	Upper Division	Spring Courses	Credit Hours	Upper Division
Year 1	Writing GE: English 1110	3	0	Writing GE: English 2367 - Pre-req major	3	0
	Math/Logical Analy GE: Math 1151 - Pre-req major	5	0	Lit GE: English course at 2000-level+	3	0
	Foreign Language GE	4	0	Open Options GE: Math 1152 - Pre-req major	5	0
	Social Science GE: Econ 2001 or 2002 - Pre-req major	3	0	Math 1295: Introductory Seminar	1	0
	Art Sci Survey	1	0	Foreign Language GE	4	0
Year 2	Social Science GE: Econ 2001 or 2002 - Pre-req major	3	3	English Methods Course: 3398, 3379, or 2270	3	3
	Foreign Language GE	4	0	Math 3618 Interest Theory	3	3
	Open Options GE: Math 2153 Calculus III	4	4	Math 2568 Linear Algebra	3	3
	CSE 2111 Modeling and Problem Solving with Spreadsheets and Databases	3	3	Natural Science GE Lab Course	4	0
		0	0	Data Analysis GE	3	0
Year 3	English 4000-level diversity in literature and culture course	3	3	English 4000-level+ course	3	3
	Math 4530 or Stats 4201 Probability	4	4	Stat 4202 Statistics	4	4
	Cultures and Ideas or History GE (doubles as 1st Global Studies GE)	3	0	Natural Science GE Lab Course	4	0
	English 3000-level+ course	3	3	History GE (doubles as 2nd Global studies GE)	3	0
	Visual and Performing Arts GE: English 2269: Digital Media Composing	3	0		0	0
Year 4	English 4000-level+ course	3	3	English 4000-level+ course	3	3
	Math 5632 Math Methods in Financial Economics	3	3	Elective - upper division	3	3
	Natural Science GE	3	0	Elective course	3	0
	Elective course	3	0	Integrated Major Capstone course	3	3
	Elective - upper division	3	3	Elective course	2	0
	<b>Totals for Fall Terms</b>	<b>61</b>	<b>29</b>	<b>Totals for Spring Terms</b>	<b>60</b>	<b>25</b>
	<b>Total Credit Hours</b>	<b>121</b>				
	<b>Total Upper Division Hours</b>	<b>54</b>				

## Theoretical

Also known as “pure” mathematics, theoretical mathematics explores the basic concepts and structure beneath many math topics ranging from geometry to analysis. With elective options constructed as part of this track along with communication, writing, and critical thinking skills provided through English coursework, students are able to personalize the major to meet the needs of their future career/academic goals or to highlight particular fields of interest.

### IDEM: Theoretical Math Concentration

	Fall Courses	Credit Hours	Upper Division	Spring Courses	Credit Hours	Upper Division
Year 1	Writing GE: English 1110	3	0	Writing GE: English 2367 - Pre-req major	3	0
	Math/Logical Analy GE: Math 1151 - Pre-req major	5	0	Lit GE: English course at 2000-level+	3	0
	Foreign Language GE	4	0	Open Options GE: Math 1152 - Pre-req major	5	0
	Social Science GE: Econ 2001 or 2002 - Pre-req major	3	0	Math 1295: Introductory Seminar	1	0
	Art Sci Survey	1	0	Foreign Language GE	4	0
Year 2	English Methods Course: 3398, 3379, or 2270	3	3	English 3000-level+ course	3	3
	Social Science GE: Econ 2001 or 2002 - Pre-req major	3	0	Math 2255 Differential Equations	3	3
	Open Options GE: Math 2153 Calculus III	4	4	Math 2568 Linear Algebra	3	3
	Foreign Language GE	4	0	Natural Science GE Lab Course	4	0
	---	0	0	Data Analysis GE	3	0
Year 3	English 4000-level diversity in literature and culture course	3	3	English 4000-level+ course	3	3
	Math 4530 or Stats 4201 Probability	4	4	Math 3345 Foundations of Higher Mathematics	3	3
	Cultures and Ideas or History GE (doubles as 1st Global Studies GE)	3	0	Natural Science GE Lab Course	4	0
	Minor course	3	0	History GE (doubles as 2nd Global studies GE)	3	0
	Visual and Performing Arts GE: English 2269: Digital Media	3	0	Elective course - upper division	3	3
Year 4	English 4000-level+ course	3	3	English 4000-level+ course	3	3
	Math 4580 Abstract Algebra I	3	3	Math 4547 Introductory Analysis I	3	3
	Natural Science GE	3	0	Elective course	3	0
	Elective course - upper division	3	3	Integrated Major Capstone Course	3	3
	Elective course	3	0		0	0
	<b>Totals for Fall Terms</b>	<b>61</b>	<b>23</b>	<b>Totals for Spring Terms</b>	<b>60</b>	<b>27</b>
	<b>Total Credit Hours</b>	<b>121</b>				
	<b>Total Upper Division Hours</b>	<b>50</b>				

## Capstone Course

Students pursuing the Integrated Degree in English and Math (IDEM) will learn concepts, develop understanding of theories, and acquire techniques and skills in a variety of courses in Math and English. If their schedules allow, they will also take a specially designed English 2367 that will allow them to explore content, concepts, and skills from both fields. In their senior year, IDEM majors will take a capstone course that will provide an opportunity to integrate and apply the full range of knowledge and skills they have acquired through their previous coursework to real-world practice.

This capstone course will combine both professional development and leadership seminars and a capstone project on a topic chosen from real-world challenges submitted to the IDEM program through our community and industry partners. The course will thus provide students with both a critical learning experience and an opportunity to synthesize and apply what they learned in IDEM in a real situation. Students who complete this capstone course will have a broader understanding of their own personal

strengths and which jobs might require their particular set of skills, thus resulting in a student which is more prepared for entering the workforce.

### **Contacts**

Department of English: [english.osu.edu](http://english.osu.edu)

English Advising: Pablo Tanguay, Undergraduate Program Manager: [tanguay.1@osu.edu](mailto:tanguay.1@osu.edu); 614-292-6065

Department of Mathematics: [math.osu.edu](http://math.osu.edu)

Mathematics Advising: [mathadvisors@math.osu.edu](mailto:mathadvisors@math.osu.edu)



**Appendix 3: Feedback from Insurance and Finance Companies that Recruit OSU Students Regarding Their Level of Interest in an Integrated Major in English and Math**

Collected by Chunsheng Ban, Professor of Math, OSU

RE: Integrated Major at OSU  
 Martin Molloy [martin.molloy@aonhewitt.com]  
 Sent: Wednesday, September 30, 2015 5:40 PM  
 To: Ban, Chunsheng

As someone who majored in Actuarial Science with a minor in English, I find this very appealing.

I will circulate to others here to get their opinions. We can talk on Thursday about how much value this adds.

Martin E. Molloy, E.A., F.S.A. | Associate Partner  
 Aon Hewitt | Retirement and Investment  
 445 Hutchinson Ave. | Suite 900 | Columbus, OH 43235  
 t 614 825-9412 | f 614 436-7988  
 martin.molloy@aonhewitt.com | aonhewitt.com | retirementandinvestmentblog.aon.com

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 RE: Integrated Major at OSU  
 Stang, Doug [Doug\_Stang@CINFIN.com]  
 Sent: Thursday, October 01, 2015 2:14 PM  
 To: Ban, Chunsheng

Professor Ban,

I would be very interested in students with this major, and I think several of my Cincinnati colleagues would be interested in students with this major as well.

A persistent problem I encounter with actuaries, as a group, is a large portion of them do not like to write or they do not write well. Employers, as well as evolving actuarial standards of practice, continually call for more detailed, clearly written reports, analyses, and summaries of actuarial work. Meeting those demands has proven challenging, at times, because of the written-communication shortcomings of a significant portion of our actuaries.

The written-presentation skills (e.g., table, chart, and slide design) of a surprising number of our actuaries are also wanting.

I think employers would find students with this major attractive, were they to successfully combine the strong technical skills of the typical actuary with similarly strong written communication skills.

Thanks,

Doug

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RE: Integrated Major at OSU  
Ellwood, Cathy [Cathy.Ellwood@StateAuto.com]  
Sent: Thursday, October 01, 2015 4:32 PM  
To: Ban, Chunsheng  
Cc: Schmidt, Leora [Leora.Schmidt@StateAuto.com]

Dr. Ban -

Absolutely! The students who stand out when we interview for summer intern opportunities or full-time jobs are those who have solid academics/healthy GPAs (3.0+), have passed at least one exam (required for full-time employment, but not internships), and are articulate in conversation and when discussing business topics. These are the types of students/candidates who can explain the technical analysis to business partners in layman's terms and who are able to take the results of the analysis and relay it in ways that their business partners can put into action. This is truly where "the rubber meets the road."

The combined major would further emphasize the importance of these two skill sets and how they relate to career success.

If you'd like to discuss further, don't hesitate to let me know.

You take care, and thanks for the opportunity to weigh in.

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RE: Integrated Major at OSU  
Fu, Luyang [Luyang\_Fu@CINFIN.com]  
Sent: Friday, October 02, 2015 8:26 AM  
To: Ban, Chunsheng

Professor Ban,

My team have very unique demands. Personally, I do not care much about the additional English major. Most of my hires are experienced modelers at FCAS/ACAS level. My occasional entry-level hires are fresh Ph.Ds. Ph.Ds can usually communicate well (good written skills after the pain of writing a dissertation and good speaking skills from TA experience).

Having said that, communication is very important for actuaries. When making the hiring decisions, I evaluate candidates from three perspectives: know the business (insurance and actuarial stuff); know the technics (statistics such as regression, multivariate analysis, econometrics); know how to communicate. English major should help students to improve both written and oral communication skills.

Hope that my answers help.

Luyang

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RE: Integrated Major at OSU  
 Lin, Ken [LinK@Grangeinsurance.com]  
 Sent: Friday, October 02, 2015 12:52 PM  
 To: Ban, Chunsheng

Hi Chunsheng,

I think the integrated Math/Actuarial Science and English major is a great idea. Often we come across candidates that are strong analytically but weak on communication, and it seems to me that this major would address that situation directly. So, 2 thumbs up from me - good luck and nice to see you again at the reception!

Best,  
 Ken

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RE: Integrated Major at OSU  
 Steven Diamond [Steven.Diamond@safeauto.com]  
 Sent: Monday, October 05, 2015 8:07 AM  
 To: Ban, Chunsheng

Dear Chunsheng,

My corporate recruiter, Allison Thomas, and I enjoyed the ActSci reception you held on campus. We met many bright, young students who might be ideal candidates for our summer intern program.

Evan McKee, SVP of Product Management and I will be attending the CAS Seminar on the 20th. We look forward to participating in the evening's festivities. Evan will be on the panel to talk about SafeAuto.

In comment to your Math/ActSci and English program; I think communication skills are a critical component in today's workforce that is sometimes overlooked. It's a coincidence you mention this in your email. While I was speaking to a group of freshman students at the reception, I enlightened them on the importance of communication skills as a key competence when applying for an internship/job. I shared with them that when it comes time to finding employment, many candidates will have the same, if not better set of skills than them but what can separate them from the others is personality; the ability to communicate. So I definitely like integrating the two together.

I look forward to seeing you and the students again in a few weeks.

Kind regards,

Steve

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RE: Integrated Major at OSU  
Lacker, Kimberly E. [Kimberly.Lacker@cna.com]  
Sent: Monday, October 05, 2015 9:30 AM  
To: Ban, Chunsheng

Hi Professor Ban,

Thank you for having us at the reception! It was great to meet so many faculty and students, and we had a slate of really talented candidates interview the following day. We have several coming into our home office for the next round of interviews as well.

I spoke with the English professor who is involved in this initiative at the reception (her name is escaping me at the moment [Clare Simmons, Professor of English and Director of Undergraduate Studies]). In general, I think the integrated major is a great idea for students who are interested in both Actuarial Science and English. We look for well-rounded students and this degree combination would likely offer a strong background for students looking to enter the profession. We often interview students with dual degrees and I see this as somewhat similar.

I will say that commitment to exams helps open the door for many students, so I would want to make sure this is not de-emphasized. Employers do want to see commitment to the profession but it sounds like the goal of this degree is still to produce a strong actuarial background, just with more focus on the communication and critical thinking side.

I would be curious to see course requirements for the major!

Best wishes and let me know if there is anything I can do to help.

Kim Lacker  
(312) 822-6545

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From: Stan Gozur [stan.gozur.m8p1@statefarm.com]  
Sent: Thursday, October 08, 2015 10:36 AM  
To: Ban, Chunsheng  
Subject: RE: Integrated Major at OSU

Thanks for reaching out to us, Dr. Ban. As always, we had a pleasant visit to campus and enjoyed getting to meet your current crop of students.

From my perspective, the quality of your sophomore group is quite impressive. I was surprised how many underclassmen were concentrating on exam prep. Great job! I didn't get the chance to interact as much with your upperclassmen. Although our P&C area has decided not to bring anyone in for onsite interviews, we plan to keep an eye on your sophomores for next year.

Like I mentioned in our presentation to the club, keep encouraging your students to pursue leadership roles and similar opportunities that help round out their development. Along with internships, we place great consideration on students with leadership experiences, with the expectation that they continue to develop these skills upon hire. Active participation in leadership roles have helped us identify students with high initiative and often correlates with above-average communication and relationship building skills. Also, from a prior student's perspective, I encourage your students (especially the younger ones new to interviewing) to explore the resources available at the campus career center (e.g. mock interviews, resume writing, etc.). As you know, the more practice, the better your performance will be in an interview, just as with exams.

I reached out to my department leadership regarding your question on the Math/English dual major. What I gather is that it won't necessarily change our campus recruitment efforts. We strive to recruit from a variety of majors, although most come from the traditional backgrounds of math, actuarial science and statistics. Just as important to major is the preferred qualifications such as GPA, exams passed, prior work experiences, etc.

Assuming a student can achieve the proposed dual major, we would still be interested mostly in their exam success and actuarial depth. The dual major itself wouldn't necessarily help or hurt your students' standing among peers in our eyes. Considering what I mentioned above about placing importance in a candidate's ability to communicate effectively and demonstrate leadership qualities, then I can see the dual major option being of value to students who may be looking to improve in those areas. As an interviewer, though, I personally would be interested to not just see in transcripts that they've taken these courses, but rather hear from them during the interview the benefits they've gained and how they've implemented the soft skills they've acquired.

One other thought from an interviewer's perspective: How committed to the actuarial profession and exam track are those with dual majors? This is a tough trait to gauge during an interview, and students can benefit by directly asserting their future intentions. It's tricky for us. On one hand, we strive for well-rounded students and want to see their expansive educational background; on the other hand, when we interview a student who has more than one major (often those with significantly different majors), we question if being a career actuary is their long-term goal. For those students with dual degrees who have a hard time clarifying their career intent, it can create a degree of uncertainty when comparing to equally-qualified candidates. It's not the dual degree that raises the flag, but rather any undecidedness an individual with a dual degree has regarding the direction of their career.

If you have other thoughts or questions, don't hesitate to reach back out to me. I'll do the same. Thanks again for your hospitality last week, we greatly appreciate it! Hope the remainder of the year goes smoothly!

Stan Gozur | P&C Actuarial  
State Farm Insurance Companies  
309.763.8151

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From: GINNANS@nationwide.com [GINNANS@nationwide.com]  
Sent: Thursday, October 08, 2015 3:05 PM  
To: Ban, Chunsheng  
Subject: RE: Integrated Major at OSU

As promised, here is a memo responding to your request. Please let me know if you have any questions or would like to have a follow-up conversation.

Take care,  
Steve

October 8, 2015  
From: Steve Ginnan, VP Chief Actuary

To: Dr. Chunsheng Ban  
Re: Math/Actuarial Science and English Integrated Major at OSU

Hello,

Attached are the comments related to the questions you posed: "What do you think of the idea of this integrated major? Will you be interested in students from this major?"

I like the concept of integrating STEM with Humanities. We are always looking for candidates with coursework (and/or other experiences) beyond just the standard math needed to do actuarial work. OSU has certainly called out the right skills: quantitative, analytical thinking, critical thinking, and communication.

However for the humanities side of this, I don't exactly know how you are determining that English was the best fit to achieve your plan. I do like the idea of this well rounded major but feel "English" does not make me think the skills mentioned above will be adequately developed.

I solicited comments and suggestions from both the P&C and Life Actuarial leadership team here at Nationwide. They feel that the most successful associates are those who have strong soft skills in addition to strong analytical skills. Everyone (8 total) that gave responses feels this type of background would be beneficial particularly an integrated major that directly focuses on communication.

If you can't communicate the results of your analysis in a way that engenders trust and confidence, it doesn't really matter how good the analysis is. Explaining technical concepts to non-technical people in an easily understood manner and the ability to create simple pictures of the complex is a highly effective and productive competency. Communication encompasses both written and oral competencies. We routinely send associates to seminars where they are video taped giving an oral presentation in order to provide coaching and constructive feedback. Finally, a technical writing class such as you may find in an engineering school as well as how to compose a presentation for an executive committee would be very helpful.

Actuaries must have a strong command of such competencies as being a business advisor, influencing others, working across the organization, motivating, managing, strategic thinking, as well as being an Actuary!

It is not obvious that an integrated degree of English with Actuarial Science will assure that written and oral communication of the candidate will be superb, but it certainly is a step in a good direction. And to be fair, I do not have the anticipated course offering list to know which classes from the English major would be applicable.

In all, my associates like what you are trying to do although they feel English as a description is not very informative and as a math student coming out of high school it would have had limited appeal. English brings the connotation of writing papers on books or may seem like it is geared towards the international community where English is a second language. Neither of these would be of the same value as what is described in this memo.

Considering all of this, from a resume perspective, I would likely give extra consideration to a candidate with this integrated major more than just a normal actuarial science major. Thanks again for the opportunity to provide feedback.

Warm Regards,  
Steve

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From: Springer, Lorna (Cleveland) [lorna.springer@towerswatson.com]  
Sent: Monday, October 26, 2015 7:03 AM  
To: Ban, Chunsheng  
Subject: RE: Integrated Major at OSU

Hello!

My apologies for the lateness of this email. I was going through to make sure I didn't miss anything and sure enough, I missed this!

I think that the stress on critical thinking and communication skills, in addition to the strong math background would be very beneficial to those students considering a consulting career. We do sometimes find students who are very bright and incredibly technical but perhaps aren't the best at explaining things or engaging in collaborative conversations, and it seems as if the additional focus would help with that. In addition, the English/communication skills focus could further prepare some of the international students who will eventually be taking the FAP modules.

As someone who was formerly heavily involved in recruiting, I would recommend developing some sort of notice or blast to the larger employers letting them know what the major is when they start to see it on resumes. I assume it will have "math" in the name, which is usually enough to catch our eye!

As I'm sure you know, this is only my personal opinion and not the overall Towers Watson opinion. I'd be happy to answer any other specific questions you have!

I hope all is well.

Lorna

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From: Fazio, John (Cleveland) [john.fazio@towerswatson.com]  
Sent: Thursday, November 05, 2015 1:01 PM  
To: Ban, Chunsheng  
Cc: Morrison, George (Cincinnati)  
Subject: RE: Integrated Major at OSU



Dr. Ban:

Pardon the delay in my response. George Morrison circulated this among the senior actuary network, and the response was positive. Although most agreed technical skills were critical, most commented that there is a need to have good communications skills to be an actuary, especially if English is not the student's native language. That said, the focus of responses were on communications skills, so this may not be just course work from an English curriculum, but may also include Business Communications coursework.

Let us know if you have any questions.

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From: Mrozek, Matt [Matt.Mrozek@StateAuto.com]  
 Sent: Thursday, November 05, 2015 4:01 PM  
 To: Ban, Chunsheng  
 Subject: RE: Integrated Major at OSU

Dr. Ban,  
 Sorry for the delay in getting back to you. I reached out to several actuarial managers who hire for entry level positions. While there was unanimous agreement that communication skills are highly valued, there was some concern that a new major might be perceived as less technical. From your description the new major sounds like solid actuarial preparation. But that may be difficult for hiring managers to fully appreciate at the point they are reviewing resumes.

An alternative suggested by several folks would be to have focus areas or concentrations within the existing major. Focus areas could center around communication, analytical thinking, critical thinking, English language, leadership, statistics, business, risk management/insurance, etc., or some combination of elements. I think the suggestion is aiming at basically the same outcome - produce well-rounded students who can think and communicate. It's really more a matter of

marketing to highlight the additional education (beyond pure actuarial) and minimize perception that there is any less technical preparation.

Hopefully this is useful and not too late. If there is anything else we can provide, please let us know. We very much appreciate the opportunity.

I hope the semester is going well for you. It's hard to believe that it's coming to an end already. Best of luck during these last few weeks.

Best regards,  
Matt

**Appendix 4: Survey of Local Businesses – surveys sent out by Eddie Pauline, Director of Buckeye Leadership Fellows Program in Fall 2015**

**My Report**

Last Modified: 10/10/2015

**1. Think of a job in your company for which it's a plus to have knowledge and experience in the field of the job, but it's not absolutely necessary. Two recent college graduates have emerged as finalists for this position. Which candidate would you be most likely to hire:**

#	Answer	Response	%
<u>1</u>	<u>Candidate A, who has a college degree and has completed an internship in the field in which you are hiring, but has mediocre writing, oral communication, and critical thinking skills.</u>	<u>1</u>	<u>14%</u>
<u>2</u>	<u>Candidate B, who has a degree in a Humanities field (such as History, English, a foreign language, or Philosophy) and has excellent writing, critical thinking, and oral communication skills.</u>	<u>6</u>	<u>86%</u>
	<u>Total</u>	<u>7</u>	<u>100%</u>

Statistic	Value
Min Value	<u>1</u>
Max Value	<u>2</u>
Mean	<u>1.86</u>
Variance	<u>0.14</u>
Standard Deviation	<u>0.38</u>
Total Responses	<u>7</u>

**2. Ohio State is considering the development of an integrated major in English and Math. The goal of the major would be to provide students with a well-rounded background in both Math and English, with students choosing one of four tracks (actuarial/financial, applied, theoretical, education). No matter which track they choose, students would do in-depth study in both Math and English. Their plan of study would culminate in a capstone experience in which they would work on an industry, non-profit, or business project requiring the integration of quantitative, analytical thinking, critical thinking, and communication skills. All other things being equal, how would you rate your interest in interviewing a recent college graduate with this degree:**

#	Answer	Response	%
<u>1</u>	I would be more likely to interview this candidate than others because of the degree.	<u>3</u>	<u>43%</u>
<u>2</u>	I would not be more interested in this candidate than others simply because of the degree.	<u>4</u>	<u>57%</u>
	Total	<u>7</u>	<u>100%</u>

Statistic	Value
Min Value	1
Max Value	2
Mean	1.57
Variance	0.29
Standard Deviation	0.53
Total Responses	7

### 3. If you were to make one recommendation to colleges and universities about how they might better prepare graduates for jobs in your company, what would it be?

#### Text Response

Require internship and co-ops to be part of the main course work. Students need more exposure to the workforce. I think colleges and universities could also help more students understand how to translate and articulate their skills from the academic world to the working world.

Teach relevant things

mandate an internship, co op, or job shadow

I would suggest training in the areas of company analysis and research (how-to perform these actions), offer etiquette/business communications, and any type of training that would help students identify what type of working environment best fits their personality and desires. Not only is our company seeking candidates who meet our requirements and expectations, but we are looking for candidates who have a strong sense of where they see themselves in the workforce and future. Communication skills must be high. The business environment is a collaborative one today and team work is critical. The foundation is listening and working together across diverse skill sets.

Basic competency skills like communication, collaboration, etc. are very important to us, however, no particular major means that a student as these skills. Because of this, we typically start with a major or academic path that aligns with what we are looking for and narrow it down from there based on the soft competences we look for.

Statistic	Value
Total Responses	6