LSC Use Only No:	LSC Action-Date:	UWUCC USE Only No.	UWUCC Action-Date:	Senate Action Date:
		09-24F	AP-10/20/09	App-12/1/09

Curriculum Proposal Cover Sheet - University-Wide Undergraduate Curriculum Committee

Contact Person	Email Address
John D. Baker	jdbaker@iup.edu
Proposing Department/Unit	**Phone**
Mathematics	724-357-3795

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)

_____New Course _____Course Prefix Change _____Course Deletion

__X__Course Revision __X__Course Number and/or Title Change __X__Catalog Description Change

Current Course prefix, number and full title	*Proposed* course prefix, number and full title, if changing
MATH 317 Probability and Statistics for Elementary and Middle School Teachers	MATH 317 Probability and Statistics for Elementary/Middle Level Teachers

2. Additional Course Designations: check if appropriate

_____ This course is also proposed as a Liberal Studies Course.

_____ This course is also proposed as an Honors College Course.

_____ Other: (e.g., Women's Studies, Pan-African)

3. Program Proposals

_____Catalog Description Change _____Program Revision

_____New Degree Program _____Program Title Change _____Other

_____New Minor Program _____New Track

Current program name	*Proposed* program name, if changing

4. Approvals		**Date**
Department Curriculum Committee Chair(s)	J D Baker	3.7.9
Department Chair(s)	Gary Howard	3-9-09
College Curriculum Committee Chair		03/16/09
College Dean	John D. Sell	3-16-09
Director of Liberal Studies *		
Director of Honors College *		
Provost *		
Additional signatures as appropriate: (include title)	Joseph Domaracki TECC	07-06-09
	Mary Ann Rafoth COE-ET Dean	07-06-09
UWUCC Co-Chairs	Gail Sechrist	10-23-09

* where applicable

Received
OCT 23 2009
Liberal Studies

Received
SEP 01 2009
Liberal Studies

1. New Syllabus of Record, etc.

I. Catalog Description

MATH 317 Probability and Statistics for Elementary/Middle Level Teachers (3c-0l-3cr)
Prerequisite: MATH 152

Introduces students to concepts of probability and statistics by exploring and discovering key ideas related to data analysis and making predictions. Appropriate technology is incorporated throughout the course. Explores curricular materials, resources, and activities relevant to teaching diverse groups at the Elementary/Middle Level.

II. Course Outcomes

Students will:

1. demonstrate an understanding of data analysis and its applications to the real world by collecting, organizing, analyzing, graphing, and interpreting data; *PDE Guideline II.B.4.a, II.B.4.b, II.B.4.c, II.B.4.d*
2. investigate real world phenomena, draw conclusions, and make decisions using elementary concepts of probability as tools; *PDE Guideline II.B.4.e, II.B.4.f*
3. explore and demonstrate appropriate uses of technology for investigating concepts in probability and statistics; *PDE Guideline II.B.6.f*
4. examine and investigate probability and statistics concepts, standards, resources and activities appropriate for diverse groups at the Elementary/Middle Level; *PDE Guideline II.B.4.a, II.B.4.c, II.B.4.d, II.B.4.g*
5. plan and implement a field experience at the Elementary/Middle Level around concepts of probability and statistics. *PDE Guideline I.F.2, I.F.5, II.B.4.g, II.B.4.c, II.B.4.d*

Course Outcomes	College Conceptual Framework / Danielson	INTASC Standard/ Principle	NCATE / NCTM Middle Level Mathematics Standards	Course Assessment Measuring Outcome
#1	1a	1	1, 2, 3, 4, 5, 14	Project, In-Class Activities, **Key Assessment: Final Exam**
#2	1a	1	1, 2, 3, 4, 5, 14	Projects, In-Class Activities, and Midterm &Final Exam
#3	1a, 1d	1, 4	6	Projects, In-Class Activities, and Midterm &Final Exam
#4	1a, 1d	1, 4	8	Projects, In-Class Activities, and Midterm &Final Exam
#5	1a, 1d, 1e 3a, 3c	1,2,3,4,7	8	In-Class Activities and Field Experience

III. Detailed Course Outline

A. Quantitative Literacy through Descriptive Statistics (*Outcomes 1, 3, 4)* 14 academic hours
   1. Statistical studies and connections to the real world
   2. Displaying data
      a. bar graphs, pie charts, and pictographs
      b. stemplots and histograms
      c. box plots
      d. scatter plots
   3. Describing data
      a. measures of central tendency
      b. measures of spread
   4. Two-variable statistics
      a. correlation
      b. linear regression
   5. Descriptive statistics activities for elementary and middle school students
   6. Standards, research, and other resources related to the teaching and learning of statistics
   7. Technology appropriate for analyzing data, including graphing calculators, spreadsheets, software, and applets

B. Quantitative Literacy through Probability *(Outcomes 2, 3, 4)* 14 academic hours
   1. Theoretical and experimental probability and simulations
   2. Probability and connections to the real world
   3. Geometric probability
   4. Expected value
   5. Probability activities for elementary and middle school students
   6. Standards, research, and other resources related to the teaching and learning of probability
   7. Technology appropriate for teaching and learning probability, including graphing calculators, computer software, and applets

C. Quantitative Literacy through Inferential Statistics *(Outcomes 1, 3)* 6 academic hours
   1. Statistical significance, p-values and connections to the real world
   2. t-tests
   3. Chi-square test

D. Student Presentations *(Outcomes 4, 5)* 5 academic hours
   1. Use appropriate curriculum materials to plan a field experience related to probability and statistics
   2. Implement a field experience related to probability and statistics

This syllabus covers 39 academic hours, leaving 3 academic hours for testing and/or review. The final is an additional 2 academic hours.

IV. Evaluation Methods

20% In-Class Activities.
30% Projects/Presentations.
10% Field Experience.
40% Midterm and Final Exam. Exams provide a summative assessment of content topics covered. The final is the key assessment, comprising 20% of the course grade, and shall be required of all instructors of MATH 317. The midterm is 20% of the grade.

V. Grading Scale

A: 90%-100%
B: 80%-89%
C: 70%-79%
D: 60-69%
F: 0%-59%

VI. Undergraduate Course Attendance Policy

The course attendance policy is consistent with the University policy.

VII. Required Textbook

Moore, David (2009) The Basic Practice of Statistics. W. H. Freeman

VIII. Special Resource Requirements

An up to date graphing calculator.

IX. Bibliography

Abelson, R. (1995). Statistics as Principled Argument. Lawrence Erlbaum Assoc.

American Statistical Association (2005). Guidelines for Assessment and Instruction in Statistics Education. American Statistical Association.

American Statistical Association (1999). Guidelines for the Teaching of Statistics, K – 12. American Statistical Association.

Barbella, J. (1994). Exploring Measurements. Dale Seymour Pub.

Bolster, L. C., Bereska, C., Bolster, C. H., and Scheaffer, R. L. (1998, 1999). Exploring Statistics in the Elementary Grades (Volumes 1 and 2). Dale Seymour Pub.

De Veaux, R. D., Velleman, P. F., and Bock, D. E. (2006). Introductory Statistics. Addison Wesley.

Gnanadisikian, et. al. (1987). Quantitative Literacy Series (4 books). Dale Seymour Pub.

Lamberski, B. and Smith, A. (eds.) (1998). SEQuaL Facilitator's Guide. Indiana University of Pennsylvania.

Moore, D. and McCabe, G. (2009) Introduction to the Practice of Statistics. W. H. Freeman.

Moore, D. and Notz, W. (2009). Statistics: Concepts and Controversies. W. H. Freeman.

Moore, D. (2009). Stats Portal for the Basic Practice of Statistics. W. H. Freeman.

National Council of Teachers of Mathematics. (2000). Principles and Standards for School Mathematics. NCTM.

National Council of Teachers of Mathematics. (2004). Navigating Through Probability in Grades 6 - 8. NCTM.

National Council of Teachers of Mathematics. (2004). Navigating Through Probability in Grades 3 - 5. NCTM.

National Council of Teachers of Mathematics. (2003). Navigating Through Data Analysis in Grades 6 - 8. NCTM.

National Council of Teachers of Mathematics. (2003). Navigating Through Data Analysis in Grades 3 - 5. NCTM.

Russell, et. al. (1990). Used Numbers: Real Data in the Classroom (6 books). Dale Seymour Pub.

Tufte, E. R. (1997). Visual and Statistical Thinking: Displays of Evidence for Making Decisions. Cheshire, CT: Graphics Press.

Utts, J. (2005). Seeing Through Statistics. Duxbury Press.

2. Summary of the Revision

We propose to change the name and prerequisite for the course, and establish a current syllabus of record. We do not have a syllabus of record on file.

Current – MATH 317 Probability and Statistics for Elementary and Middle School Teachers
3c-0l-3cr

Prerequisites: MATH 152, Elementary Education concentrate.

Introduces students to elementary concepts of probability and statistics, enabling them to analyze data, make predictions, and determine which concepts may be used with children.

Proposed – MATH 317 Probability and Statistics for Elementary/Middle Level Teachers
3c-0l-3cr

Prerequisite: MATH 152

Introduces students to concepts of probability and statistics by exploring and discovering key ideas related to data analysis and making predictions. Appropriate technology is incorporated throughout the course. Students explore and discuss curricular materials, resources, and activities relevant to teaching diverse groups of elementary and middle school students.

3. Rationale for the Revision

Overview

The state of Pennsylvania has mandated changes to teacher training programs to support its new teacher licensing scheme. The current program for elementary grades K-6 is being replaced by new requirements for two training programs in: (1) Grades pre-K to 4 and (2) Grades 4-8.

These mandates from the state require revisions to existing courses and the addition of new courses. For Grades pre-K to 4, the new IUP teacher training program includes two courses in methods of teaching. The two new methods courses are revisions of existing methods courses for early childhood and elementary education.

For Grades 4 to 8, the new IUP teacher training program must provide coursework for prospective teachers to teach all subjects, but with a specialty in one subject area. The new program has four subject area tracks with mathematics being one track. The Mathematics Department, which supports the current K-6 program through a math concentrate for elementary education majors, will have a greater role in the math-track program.

The new math-track program will consist of nine mathematics content and one methods of teaching courses. The existing math concentrate courses (of which MATH 317 is one) need approval for revisions to fit the requirements of the new math-track program. Three new courses also need approval. The three other tracks will include three math content courses and one methods of teaching course drawn from the Mathematics Department's math-track courses.

1. Catalog Name Change

Rationale: This change makes the name of the course consistent with the course name designations in new state guidelines.

2. Prerequisite Change

Rationale: The reference to a concentrate was eliminated. Under the new state mandates for teacher preparation programs, the concentrate for elementary education majors will no longer exist.

3. Course Revision - Syllabus of Record

Rationale: A syllabus of record could not be located and this revision is consistent with the content prescribed in the new state guidelines. As requested by TECC, the syllabus below is from a prior teaching of the course.

4. Old Syllabus

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I. Catalog Description

MATH 317 Probability and Statistics for Elementary and Middle School Teachers

3 credits
3 lecture hours
(3c-01-3sh)

Prerequisites: MATH 152, Elementary Education Concentration

Introduces students to elementary concepts of probability and statistics, which will enable them to analyze data, make predictions, and determine which concepts may be used with children.

II. Course Objectives

The student will:

A. Demonstrate understanding of data analysis using quantitative literacy statistical tools.

B. Use elementary concepts of probability as tools for decision-making.

C. Investigate probability and statistics concepts and activities appropriate for K-8 students.

D. Explore technology in probability and statistics.

III. Course Outline

A. Quantitative Literacy Descriptive Statistics Activities	15 hours total
1. Statistical Studies	3 hours
2. Graphing Techniques	3 hours
3. Measures of Central Tendency	2 hours
4. Measures of Dispersion	2 hours
5. Two-Variable Statistics	2 hours
6. Descriptive Statistics Activities for K-8 students	3 hours
B. Quantitative Literacy Probability Activities	11 hours total
1. Theoretical and Experimental Probability through experiments	3 hours
2. Geometric Probability	3 hours
3. Expected Value	2 hours
4. Probability Activities for K-8 students	3 hours
C. Technology for Probability and Statistics	4 hours total
1. Graphing Calculator	2 hours
2. Spreadsheet	1 hours
3. Software and Web Resources	1 hours
D. Quantitative Literacy Inferential Statistics Activities	6 hours total
1. Statistical Significance and p-values	2 hours
2. T-Test	2 hours

3. Chi-square test 2 hours

E. Student presentations and testing 6 hours total

IV. Evaluation Methods

The final grade for the course will be determined as follows:

Quizzes and Homework	20%
Projects	40%
Midterm Exam	20%
Final Exam	20%

A: 90% - 100%
B: 80% - 89%
C: 70% - 79%
D: 60% - 69%
F: 0% - 59%

Attendance policy will conform to university guidelines.

V. Required Texts

Utts, Jessica (2005). Seeing Through Statistics. Belmont, CA: Duxbury Press.

Tufte, Edward R. (1997). Visual and Statistical Thinking: Displays of Evidence for Making Decisions. Cheshire, CT: Graphics Press.

VI. Special Resource Requirements

None

VII. Bibliography

Abelson, Robert (1995). Statistics as Principled Argument. Lawrence Erlbaum Assoc.

Barbella, J. (1994). Exploring Measurements. Dale Seymour Pub.

Bolster, L. Carey, Carolyn Bereska, Cyrilla H Bolster, and Richard L Scheaffer (1998, 1999) Exploring Statistics in the Elementary Grades (Volumes 1 and 2) Dale Seymour Pub.

De Veaux, Richard D., Paul F. Velleman, and David E. Bock (2006) Intro Stats Addison Wesley

Gnanadisikian, et. al. (1987) Quantitative Literacy Series (4 books). Dale Seymour Pub.

Lamberski, Barbara and Anita Smith (eds.) (1998) SEQuaL Facilitator's Guide. IUP.

Moore, David (2006) The Basic Practice of Statistics. W. H. Freeman

Moore, David and George McCabe (2005) Introduction to the Practice of Statistics. W. H. Freeman

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Russell, et. al. (1990). Used Numbers: Real Data in the Classroom (6 books) NY: Dale Seymour Pub.