CURRICULUM PROPOSAL COVER SHEET
University-Wide Undergraduate Curriculum Committee

LSC Use Only	
Number	88-62
Action	W
Date	1-19-89

UWUCC Use Only	
Number	
Action	
Date	

I. TITLE/AUTHOR OF CHANGE
COURSE/PROGRAM TITLE MATH 417 STATISTICAL Applications
DEPARTMENT _____
CONTACT PERSON _____

II. THIS COURSE IS BEING PROPOSED FOR:
_____ Course Approval Only
_____ Course Approval and Liberal Studies Approval
_____ Liberal Studies Approval only (course previously has been approved by the University Senate)

III. APPROVALS

Department Curriculum Committee

Department Chairperson

College Curriculum Committee

College Dean*

Director of Liberal Studies
(where applicable)

Provost
(where applicable)

*College Dean must consult with Provost before approving curriculum changes. Approval by College Dean indicates that the proposed change is consistent with long range planning documents, that all requests for resources made as part of the proposal can be met, and that the proposal has the support of the university administration.

IV. TIMETABLE

Date Submitted
to LSC _____
to UWUCC _____

Semester/Year to be implemented _____

Date to be published in Catalog _____

Revised 5/88

[Attach remaining parts of proposal to this form.]

COURSE NUMBER: New - MA 417 Old - MA 462

COURSE TITLE: Statistical Applications

CREDITS: 3 Semester hours

PREREQUISITES: MA 214 or MA 217 (formerly MA 214 or MA 362)

CATALOG DESCRIPTION:

Using computer programs a wide array of statistical procedures for educational research workers will be explored. Basic concepts of statistical inference and prediction will be reviewed, including regression analysis and prediction, hypothesis testing, analysis of variance and covariance, and partial and multiple correlation. Emphasis is on use of computer and interpretation of computer print-outs, along with understanding techniques employed. No computer knowledge is necessary.

COURSE OUTLINE:

I. Extension of basic tests in hypothesis testing
Use of Ministat computer canned programs

A. Binomial test
B. Chi-square
C. Correlation
D. Multiple correlation
E. Partial correlation
F. Correlate significant difference from zero
G. t-ratio dependence
H. t-ratio

II. Analysis of variance

A. Basic F-ratio distribution
B. One-way ANOVA
C. Two-way and three-way ANOVA
D. Repeated measure analysis of variance

III. Analysis of covariance

A. Sample design of covariance
B. Preliminary test for homogeneity of the regression coefficients
C. Post-Hoc Analysis (Finney t-test)

IV. Multiple regression and predictions

A. Simple linear model
B. Multiple linear regression model
C. Correlation analysis
D. 1. Simple correlations
2. Multiple correlations
3. Parted correlations
4. Standard errors of estimate

V. Test analysis

A. Item analysis
B. Reliability

VI. Non-parametric tests

A. Chi-square
B. Contingency coefficient
C. Man Whitney U-test
D. Kendall coefficient of concordance
E. Friedman two-way analysis of variance

VII. Use of canned computer programs

All of the above statistical procedures are available at the IUP Computer Center as part of the Vanderbilt Statistics Package or the Binomial Statistics Package.

LIBERAL STUDIES COURSE APPROVAL FORM

About this form: Use this form only if you wish to have a course included for Liberal Studies credit. The form is intended to assist you in developing your course to meet the university's Criteria for Liberal Studies, and to arrange your proposal in a standard order for consideration by the LSC and the UWUCC. If you have questions, contact the Liberal Studies Office, 353 Sutton Hall; telephone, 357-5715.

Do not use this form for technical, professional, or pre-professional courses or for remedial courses, none of which is eligible for Liberal Studies. **Do not** use this form for sections of the synthesis course or for writing-intensive sections; different forms will be available for those.

PART I. BASIC INFORMATION

A. For which category(ies) are you proposing the course? Check all that apply.

LEARNING SKILLS

____ First English Composition Course
____ Second English Composition Course
____ Mathematics

KNOWLEDGE AREAS

____ Humanities: History
____ Humanities: Philosophy/Religious Studies
____ Humanities: Literature
____ Fine Arts
____ Natural Sciences: Laboratory Course
____ Natural Sciences: Non-laboratory Course
____ Social Sciences
____ Health and Wellness
____ Non-Western Cultures
__✓__ Liberal Studies Elective

B. Are you requesting regular or provisional approval for this course?

____ **Regular** ____ **Provisional** (limitations apply, see instructions)

New course

C. During the transition from General Education to Liberal Studies, should this course be listed as an approved substitute for a current General Education course, thus allowing it to meet any remaining General Education needs? ____ **yes** ____ **no**

If so, which General Education course(s)? _____

PART II. WHICH LIBERAL STUDIES GOALS WILL YOUR COURSE MEET? Check all that apply and attach an explanation.

All Liberal Studies courses must contribute to at least one of these goals; most will meet more than one. As you check them off, please indicate whether you consider them to be primary or secondary goals of the course. [For example, a history course might assume "historical consciousness" and "acquiring a body of knowledge" as its primary goals, but it might also enhance inquiry skills or literacy or library skills.] Keep in mind that no single course is expected to shoulder all by itself the responsibility for meeting these goals; our work is supported and enhanced by that of our colleagues teaching other courses.

	Primary	Secondary
A. Intellectual Skills and Modes of Thinking:		
1. Inquiry, abstract logical thinking, critical analysis, synthesis, decision making, and other aspects of the critical process.	_____	_____
2. Literacy--writing, reading, speaking, listening	_____	_____
3. Understanding numerical data	_____	_____
4. Historical consciousness	_____	_____
5. Scientific inquiry	_____	_____
6. Values (ethical mode of thinking or application of ethical perception)	_____	_____
7. Aesthetic mode of thinking	_____	_____
B. Acquiring a Body of Knowledge or Understanding Essential to an Educated Person	_____	_____
C. Understanding the Physical Nature of Human Beings	_____	_____
D. Certain Collateral Skills:		
1. Use of the library	_____	_____
2. Use of computing technology	_____	_____

PART III. DOES YOUR COURSE MEET THE GENERAL CRITERIA FOR LIBERAL STUDIES? Please attach answers to these questions.

A. If this is a multiple-section, multiple-instructor course, there should be a basic equivalency (though not necessarily uniformity) among the sections in such things as objectives, content, assignments, and evaluation. Note: this should not be interpreted to mean that all professors must make the same assignments or teach the same way; departments are encouraged to develop their courses to allow the flexibility which contributes to imaginative, committed teaching and capitalizes on the streangths of individual faculty.

What are the strategies that your department will use to assure that basic equivalency exists? Examples might be the establishment of departmental guidelines, assignment of repsonsibility to a coordinating committee, exchange and discussion of individual instructor syllabi, periodic meetings among instructors, etc.

B. Liberal Studies courses must include the perspectives and contributions of ethnic and racial minorities and of women wherever appropriate to the subject matter. **If your attached syllabus does not make explicit that the course meets this criterion, please append an explanation of how it will.**

C. Liberal Studies courses must require the reading and use by students of at least one, but preferably more, substantial works of fiction or nonfiction (as distinguished from textbooks, anthologies, workbooks, or manuals). **Your attached syllabus must make explicit that the course meets this criterion.**

[The only exception is for courses whose primary purpose is the development of higher level quantitative skills; such courses are encouraged to include such reading, but are not expected to do so at the expense of other course objectives. **If you are exercising this exception, please justify here.**]

D. If this is an introductory course intended for a general student audience, it should be designed to reflect the reality that it may well be the only formal college instruction these students will have in that discipline, instead of being designed as the first course in a major sequence. That is, it should introduce the discipline to students rather than introduce students into the discipline. **If this is such an introductory course, how is it different from what is provided for beginning majors?**

E. The Liberal Studies Criteria indicate six ways in which all courses should contribute to students' abilities. **To which of the six will your course contribute? Check all that apply and attach an explanation.**

_____ 1. Confront the major ethical issues which pertain to the subject matter; realize that although "suspended judgment" is a necessity of intellectual inquiry, one cannot live forever in suspension; and make ethical choices and take responsibility for them.

__✓__ 2. Define and analyze problems, frame questions, evaluate available solutions, and make choices

_____ 3. Communicate knowledge and exchange ideas by various forms of expression, in most cases writing and speaking.

_____ 4. Recognize creativity and engage in creative thinking.

_____ 5. Continue learning even after the completion of their formal education.

_____ 6. Recognize relationships between what is being studied and current issues, thoughts, institutions, and/or events.

PART IV. DOES YOUR COURSE MEET THE CRITERIA FOR THE CURRICULUM CATEGORY IN WHICH IT IS TO BE LISTED?

Each curriculum category has its own set of specific criteria in addition to those generally applicable. The LSC provides copies of these criteria arranged in a convenient, check-list format which you can mark off appropriately and include with your proposal. **The attached syllabus should indicate how your course meets each criterion you check. If it does not do so explicitly, please attach an explanation.**

PART III (MA 417)

A. There will be a common syllabi of topics that should be covered by each instructor teaching this course. Such common syllabi should include but not be limited to topics which introduce the student to deductive reasoning, develop in the student problem solving skills, and enable the student not only to understand the underlying principles of formulae but also to have the ability to use and interpret numerical data.

B. Whenever appropriate, information will be introduced into the classroom discussion which will reflect the contributions made to mathematics by women and by racial minorities.

C. The Statistics Curriculum Committee of the Mathematics Department will provide a minimum reading list for this course. Instructors will be encouraged to supplement this reading list with appropriate magazine/journal/etc. articles pertinent to the mathematics material discussed in this course. Additionally, instructors could require the students to report in writing on articles they have discovered through their reading which pertain to mathematics and/or applications of mathematics.

D. The thrust of MA 417 is to introduce the study of probability theory and statistics to mainly non-mathematics majors; in particular for educational research workers. An additional goal is to develop in the student an awareness of and an appreciation for the power and usefulness of mathematics and its important role in a technological society. In particular, it should prepare the student for the further application of probability and statistical concepts in other courses. A partial list of topics that would be appropriate for this course would include extension of basic tests in hypothesis testing including thenn use of computer programs for statistics; analysis of variance; analysis of covariance; multiple regression and predictions; test analysis; non-parametric tests; and the use of other statistical computer programs. These topics provide the course with a suitable mathematical strata that will improve the mathematical maturity of students to the point where they will be prepared to apply the topics studied in MA 417 to their research. Additionally, this course would enable the student to develop confidence in handling numerical problems, would present the student with an opportunity to develop an appreciation for mathematics, and would allow the introduction to students of hand held calculators and possibly computers.

E. #2.- The very nature of mathematical study requires that problems be clearly analyzed and defined, that solutions be generated for such problems, and that an interpretation be assigned to each possible solution in order that a correct choice may be made.

#4.- Mathematics is exactly the art of creative thinking. One moves from the collection of data to the definition of the problem to the abstract generalization in which a solution or solutions are constructed to the interpretation of the solution or solutions to the application of the solution(s). This process requires one to recognize creativity and to engage in creative thinking.

#5.- One is constantly exposed to information which needs the

principles of mathematics for proper interpretation. Skills mastered in this course can last one a life time.

CHECK LIST -- MATHEMATICS
(Learning Skills Area)

Mathematics Criteria which the Course must meet:

____ Introduce students to deductive reasoning

____ Develop in the student problem solving techniques appropriate for the course.

____ Enable the student to understand the underlying principles of formulas.

____ Enable the student to use and interpret numerical information.

Courses appropriate to the Mathematics Learning Skills Area must be either:

____ A. Mathematics courses that develop signficant mathematical skills required by a major discipline.

____ B. Mathematics courses designed for Liberal Studies.

Additional criteria which courses in Category B must meet:

____ Develop the student's confidence in handling numerical problems and data.

____ Be sensitive to the diverse background characteristics of the student.

____ Include elements on the history or appreciation of mathematics.

____ Introduce the hand-held calculator or the computer as a tool.