COURSE OUTLINE

Course Number	Course Title	Credits
MAT108	Topics in Mathematics	3

Hours: Lecture/Lab/Other	Co- or Pre-requisite	Implementation sem/year
3 Lecture	MAT037 (formerly MAT034) or MAT 037A AND MAT037B with a minimum C grade or better or equivalent placement score on the College Level Math Placement Test	Fall 2008

Catalog description (2006-2009 Catalog):

A course in which three topics in mathematics, which are frequently encountered in everyday readings, are surveyed. The course is designed to give liberal arts majors and other non-scientific/non-technical majors an overview and basic working knowledge of math problem solving, probability, data analysis, and consumer math.

Is the course New, Revised or Modified? No

Required texts/other materials

1. Text: Survey of Mathematics with Applications, Expanded 8th edition by Angel
   Publisher: Pearson Prentice-Hall
2. Calculator: A scientific calculator is required.

Revision date: Fall 2008

Course coordinator:
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Information resources:

- The college library has many books, CDs and videos available.
- The Library Computer Lab has Internet access and Minitab installed for student use.
- The Learning Center has tutoring and help available to the students.

Course Competencies/Goals:

Students will be able to demonstrate the ability to:

A. find the probability (likelihood) of an event and the odds for or against the event.
B. explain the difference between empirical or theoretical probability.
C. apply the rules of probability.
D. state and apply the rules of counting to find the number of possibilities of an event.
E. analyze one-variable data or the relationship between two-variables data.
F. use Minitab Statistical software to analyze the data.
G. understand and apply formulae for interest, mortgage payment, investment and installment buying.
H. utilize the Internet to get payment and investment schedules.
I. solve word problems (or models) involving consumer mathematics.

Course-specific General Education Knowledge Goals and Core Skills:

General Education Knowledge Goals:

Goal 1. Communication. Students will communicate effectively in both speech and writing.
Goal 2. Mathematics. Students will use appropriate mathematical and statistical concepts and operations to interpret data and to solve problems.
Goal 4. Technology. Students will use computer systems or other appropriate forms of technology to achieve educational and personal goals.

MCCC Core Skills:

Goal A. Written and Oral Communication in English. Students will communicate effectively in speech and writing, and demonstrate proficiency in reading.
Goal B. Critical Thinking and Problem-solving. Students will use critical thinking and problem solving skills in analyzing information.
Goal E. **Computer Literacy.** Students will use computers to access, analyze, or present information, solve problems, and communicate with others.

In the following **Units of Study in Detail** Course Competencies/Goals will be denoted CG, **General Education Knowledge Goals** will be denoted GE, and **MCCC Core Skills** will be denoted CS.

Units of Study in Detail:

Unit I Probability and Counting Methods 6 weeks

The student will be able to:

1. know that empirical probability is based on what is observed. (CG B; GE1; CS A)
2. state and use the law of large numbers. (CG B; GE1; CS A)
3. find the sample space, *S*, of a given situation. (CG A,C,I; GE AB; CS B)
4. find the event, *A*, from the sample space. (CG A,C,I; GE AB; CS B)
5. find the probability of an event. (CG A,C,I; GE AB; CS B)
6. interpret the calculated probability. (CG A,C; GE AB; CS B)
7. find the odds in favor of or against an event. (CG A,C,I; GE AB; CS B)
8. calculate the expected value given *x*-values and associated probabilities. (CG A,C; GE AB; CS B)
9. apply the formulae: (CG A,C; GE AB; CS B)
   a. Complement Rule P(not A) = 1 – P(A)
   b. Addition Rule P(A or B) = P(A) + P(B) – P(A and B)
   c. Conditional Rule $P(A \mid B) = \frac{P(A \text{ and } B)}{P(B)}$
10. find all possibilities by constructing a tree diagram given a sequence of trials. (CG A,C; GE AB; CS B)
11. apply the counting rules of permutations, combinations, and the fundamental principle of counting and use a calculator to find combinations and permutations. (CG A,C; GE AB; CS B)

Unit II Data Analysis 5 weeks

The student will be able to:

1. use a calculator in statistics mode for data entry. (CG E,F; GE 1,2,4; CS A,B,E)
2. summarize the calculations. (CG E,F,I; GE 1,2,4; CS A,B,E)
3. use Minitab statistical software to do data entry to calculate statistics and plot or graph variable(s). (CG E,F; GE 1,2,4; CS A,B,E)
4. know and explain the difference between a quantitative variable and a categorical variable since the analysis for each type of variable is different. (CG E,F; GE 1,2,4; CS A,B,E)
5. know sampling designs (simple random, stratified, cluster and systematic) in collecting a sample from a population. (CG E,F; GE 1,2,4; CS A,B,E)
6 plot the data and interpret graphs for Categorical Data (pie chart, bar chart) and Quantitative Data (histogram, stem and leaf, and box plot). (CG E,F; GE2,4; CS A,B,E)
7. calculate measures of center (mean, weighted mean, median, mid-range and mode). (CG E,F; GE 1,2,4; CS B,E)
8. calculate measures of spread (variance, standard deviation and range). (CG E,F; GE 2,4; CS B,E)

9. calculate measures of position (percentiles, deciles, quartiles, and Z-score). (CG E,F; GE 2,4; CS B,E)
10. recognize and interpret a graph as being skewed left, right or symmetric. (CG E,F; GE 1,2,4; CS A,B,E)
11. calculate intervals of occurrence of outliers. (CG E,F; GE 2,4; CS B,E)
12. find the probability of an interval on which an event may occur given a normal distribution with mean and standard deviation. (CG E,F; GE 2,4; CS B,E)
13. recognize from a graph comparing two variables a positive or a negative correlation along with its strength. (CG E,F,I; GE 1,2,4; CS A,B,E)
14. construct a least squares line from data and use that line to make predictions. (CG E,F; GE 1,2,4; CS A,B,E)

Unit III Consumer Mathematics 4 weeks

The student should be able to:

1. find simple interest and the amount using the simple interest formula and explain that it grows in a linear fashion. (CG G,I; GE 1,2; CS B)
2. find compound interest and the amount using the compound interest formula and explains that it grows exponentially. (CG G,I; GE 1,2; CS B)
3. find the principle necessary to yield a specific amount in the future using the present value formula. (CG G,I; GE 1,2; CS B)
4. apply the interest formulae for installment buying to find the monthly payment when given the annual percentage rate (APR). (CG G,I; GE 1,2; CS B)
5. apply the interest formulae for installment buying to find the annual percentage rate (APR) when given the monthly payment. (CG G; GE 1,2; CS B)
6. use a computerized mortgage calculator to construct an amortization schedule and interpret the results. (CG G,H,I; GE 1,2,4; CS B,E)

Evaluation of student learning:

Tests, quizzes, homework assignments and projects may be used in evaluating the students' progress throughout the course depending on the individual instructor. There are four tests. Data analysis and consumer math are assessed by written reports.

A possible plan for determining the students' final grades is as follows:

Unit tests	75%
Reports	25%

Academic Integrity Statement:

Under no circumstance should students knowingly represent the work of another as one's own. Students may not use any unauthorized assistance to complete assignments or exams, including but not limited to cheat-sheets, cell phones, text messaging, and copying from another student. Violations should be reported to the Academic Integrity Committee and will be penalized. Please refer to the Student Handbook for more details.