SPECIAL COURSES – MATHEMATICAL SCIENCES – FALL 2006

MAT 3531 (3 credit hour) • Financial Math • Brian Felkel • MWF 12:00-12:50 in 314 Walker

- **Prerequisites:** MAT 1120 or by permission of the instructor
- **Purpose of the course:** The objective of this course is to help students learn about the theory of interest as covered on the Casualty Actuarial Society (CAS)/Society of Actuaries (SOA) Course 2 examination. Topics include mathematical theory of compound interest, force of interest, annuities, equations of value, yield rates, amortization, sinking funds, bonds, depreciation, and other topics in finance. The concepts and models that will be discussed are a key part of modern actuarial science.
- For more information contact Prof. Felkel at 262-2859 or felkelbh@appstate.edu.

MAT 3532 (3 credit hour) • Social Network Theory • Mary Beth Searcy • MWF 10:00-10:50 in 303A Walker

- **Prerequisites:** MAT 1120 and STT 2810, or by permission of the instructor
- **Purpose of the course:** This course will explore Social Network Analysis (SNA), a relatively new method of studying the relationships between information-processing entities (such as people, groups, animals, computers, etc), that draws from a wide variety of mathematics areas. Some examples of recent SNA studies are the analysis of the Cornell University Facebook Community, the spread of disease in farm animals, networks of characters in a fiction work, and book-selling patterns for future marketing purposes. During this course, there will be opportunities to get a deeper understanding of such mathematical topics as matrices, metric spaces, and several ideas from both graph theory and statistics.
- For more information contact Prof. Searcy at 262-2383 or searcyme@appstate.edu.

MAT 4010-101 (3 credit hour) • Statistical Concepts and Applications • Gary Kader • MWF 9:00-9:50 in 210 Walker

- **Prerequisites:** MAT 1110
- **Purpose of the course:** This course introduces students at the post-calculus level to statistical concepts, applications, and theory. Topics include: Comparisons with categorical and numerical data, statistical significance, sampling and sampling distributions, and randomized experiments. Statistical concepts will be developed through simulations and applications will focus on statistical problem solving. The course will introduce prospective teachers to the content and pedagogy recommended by the National Council of Teachers of Mathematics' Standards and the American Statistical Association's Guidelines with regard to statistics and probability at the introductory level.
- For more information contact Prof. Kader at 262-2356 or gdk@math.appstate.edu. For a course permit contact 262-3050.

MAT 4010-102/STT 5530 (3 credit hour) • Bootstrap and Permutation Techniques • Alan Arnholt • TR 11:00-12:15 in 210 Walker

- **Prerequisites:** STT 2810 or by permission of the instructor
- **Purpose of the course:** The course will use the classic text *An Introduction to the Bootstrap* by Efron and Tibshirani. The following is an excerpt of a review of this text "It is a concise and accurate presentation of the bootstrap and its wide variety of applications and is very much up to the state-of-the-art in this rapidly growing area of statistics."
- For more information contact Prof. Arnholt at 262-2836 or arnholt@math.appstate.edu. For a course permit contact 262-3050.

MAT 4010-103/MAT 5530 (3 credit hour) • Differential Geometry • Sarah Greenwald • TR 12:30-1:45 in 310 Walker

- **Prerequisites:** MAT 2130
- **Purpose of the course:** Differential geometry has a rich history because it is found in many different places in our universe. It is intuitive and interdisciplinary, and it has found new relevance in fields such as physics, medical imaging, and computer graphics. This is an introductory course in the differential geometry of curves and surfaces in space, presenting both theoretical and computational components, and intrinsic and extrinsic viewpoints, along with numerous applications. The geometry of space-time will also be considered, as time allows.
- For more information contact Prof. Greenwald at 262-2363 or greenwaldsj@appstate.edu. For a course permit contact 262-3050.

MAT 4010-104/MAT 5330 (3 credit hour) • Mathematical Models• Rene Salinas • TR 9:30-10:45 in 303A Walker

- **Prerequisites:** CS 1440 (Programming) and background in at least two of the utilized tools (see description below), or by permission of the instructor
- **Purpose of the course:** A problem oriented course. The student uses mathematics to model a number of different situations. Among the tools used will be statistics, linear programing, differential equations, and computer simulations.
- For more information contact Prof. Salinas at 262-2866 or salinasra@appstate.edu. For a course permit contact 262-3050.

MAT 4720/MAT 5210 (3 credit hour) • Abstract Algebra • Jeff Hirst • MWF 9:00-10:50 in 314 Walker

- **Prerequisites:** MAT 3110 or by permission of the instructor
- **Purpose of the course:** This course will focus on group theory and also include an introduction to ring theory.
- For more information contact Prof. Hirst at 262-2861 or jlh@math.appstate.edu.

STT 4860/ STT 5860 (3 credit hour) • Probability Models and Statistical Inference I • Joel Sanqui • MWF 2:00-2:50 in 210 Walker

- **Prerequisites:** MAT 2130
- **Purpose of the course:** : This course is an introduction to the mathematical foundations of probability and statistical inference. Students who want to learn axiomatic probability and how it is used in the development of statistical inference methods such as confidence interval estimation and hypothesis testing would benefit from this course. This course (together with the sequel STT 4865/5865) also suits students intending to take actuarial Exam P administered by the Society of Actuaries. No previous statistics background is needed for this course.
- For more information contact Prof. Sanqui at 262-2868 or sanquijat@appstate.edu

MAT 5930 (3 credit hour) • Number Theory concepts • Tracie Salinas • this course meets off campus

- **Prerequisites:** Undergraduate major in mathematics AND MAT 3250 or by permission of the instructor
- **Special Notes:** This course meets at Caldwell Community College, Wednesdays at 5:00 p.m. and is designed for secondary teachers. (Ask about carpooling!)
- **Purpose of the course:** In this course, we will study topics in number theory, including historical developments in the subject and famous questions/problems, using a problem-solving approach. Our focus will be on how an understanding of these topics can illuminate teaching at the secondary level, particularly in algebra.
- For more information contact Prof. Salinas at 262-3676 or salinastm@appstate.edu .