Department of Scientific Computing Classes **FALL 2014**

ISC 3222 3 Credit Hours	***Symbolic and Numerical Computations***	SACHIN SHANBHAG	Introduces state-of-the-art software environments for solving scientific and engineering problems. Topics include solving simple problems in algebra and calculus; 2-D and 3-D graphics; non-linear function fitting and root finding; basic procedural programming; methods for finding numerical solutions to DE's with applications to chemistry, biology, physics, and engineering. Prerequisites: MAC 2311, MAC 2312.	T R 11:00-12:15 152 DSL
ISC 3313 3 Credit Hours	***Introduction to Scientific Computing***	ALAN LEMMON	This course introduces the student to the science of computations. Topics cover algorithms for standard problems in computational science, as well as the basics of an object-oriented programming language, to facilitate the student's implementation of algorithms. The computer language will be Java. Prerequisites: MAC 2311, MAC 2312.	M W F 10:10-11:00 152 DSL
DIG 3725/ISC 5935 3 Credit Hours	***Introduction to Game and Simulator Design***	GORDON ERLEBACHER	Techniques used to design and implement computer games and/or simulation environments. Topics include a historic overview of computer games and simulators, game documents, description/use of a game engine, practical modeling of objects and terrain, use of audio. Physics and artificial intelligence in games covered briefly. Programming is based on a scripting language. Topics are assimilated through the design of a 3D game. Prerequisite: MAC 2311.	M W F 11:15-12:05 499 DSL
ISC 4221 4 Credit Hours	***Algorithms for Science Applications II***	PETER BEERLI	This course offers stochastic algorithms, linear programming, optimization techniques, clustering and feature extraction presented in the context of science problems. The laboratory component includes algorithm implementation for simple problems in the sciences and applying visualization software for interpretation of results. Prerequisites: MAC 2312, ISC 3222. Co-requisite: ISC 4304C.	T R 12:30-1:45 217 HCB R 3:30-6:00 (Lab) 152 DSL
ISC 4223 4 Credit Hours	***Computational Methods for Discrete Problems***	ANKE MEYER-BAESE	This course describes several discrete problems arising in science applications, a survey of methods and tools for solving the problems on computers, and detailed studies of methods and their use in science and engineering. The laboratory component illustrates the concepts learned in the context of science problems. Prerequisites: MAS 3105, ISC 4304.	M W F 12:20-1:10 152 DSL F 3:30-6:00 (Lab) 152 DSL
ISC 4232 4 Credit Hours	***Computational Methods for Continuous Problems***	JANET PETERSON	This course provides numerical discretization of differential equations and implementation for case studies drawn from several science areas. Finite difference, finite element, and spectral methods are introduced and standard software packages used. The lab component illustrates the concepts learned on a variety of application problems. Prerequisites: MAS 3105, ISC 4304.	T R 9:30-10:45 152 DSL T 3:30-6:00 (Lab) 152 DSL
ISC 4244 4 Credit Hours	***Computer Applications in Psychology***	DENNIS SLICE	This course gives the students practical knowledge of a powerful and flexible programming language with application to computational and research elements important to the field of psychology. Topics include complex searches, image and audio manipulation, data analysis, all in the context of using a variety of software tools and packages.	M W F 2:30-3:20 499 DSL M 12:20-2:15 (Lab) A105 PDB
ISC 4933/ISC 5935 3 Credit Hours	***Data Mining***	ANKE MEYER-BAESE	This course enables students to study concepts and techniques of data mining, including characterization and comparison, association rules mining, classification and prediction, cluster analysis, and mining complex types of data. Students also examine applications and trends in data mining.	M W F 9:05-9:55 499 DSL
ISC 4933/ISC 5224 3 Credit Hours	***Introduction to Bioinformatics***	ANKE MEYER-BAESE	Bioinformatics provides a quantitative framework for understanding how the genomic sequence and its variations affect the phenotype. Designed for biologists and biochemists seeking to improve quantitative data interpretation skills, and for mathematicians, computer scientists and other quantitative scientists seeking to learn more about computational biology. Lab exercises reinforce the classroom learning.	M W F 9:05-9:55 499 DSL
ISC 5305 3 Credit Hours	***Scientific Programming***	XIAOQIANG WANG	This course uses the C++ language to present object-oriented coding, data structures, and parallel computing for scientific programming. Discussion of class hierarchies, pointers, function and operator overloading, and portability. Examples include computational grids and multidimensional arrays.	T R 11:00-12:15 219 HCB
ISC 5316 4 Credit Hours	***Applied Computational Science II***	TOMASZ PLEWA	Provides students with high performance computational tools to investigate problems in science and engineering with an emphasis on combining them to accomplish more complex tasks. Topics include numerical methods for partial differential equations, optimization, statistics, and Markov chain Monte Carlo methods.. Prerequisite: ISC 5315.	T R 2:00-3:15 217 HCB M 3:30-6:00 (Lab) 152 DSL
ISC 5935 4 Credit Hours	***Numerical Methods for Differential Equations***	JANET PETERSON	This course provides numerical discretization of differential equations and implementation for case studies drawn from several science areas. Finite difference, finite element, and spectral methods are introduced and standard software packages used. The lab component illustrates the concepts learned on a variety of application problems. Prerequisites: MAS 3105, ISC 4304.	T R 9:30-10:45 152 DSL T 3:30-6:00 (Lab) 152 DSL