2008-2009 RRSCS Course information for minor program in Computational Science

Course Title and Number	Institution	Instructor	Quarter or Semester	Distance Learning	Credit Hours	Link
PHY 212 **Introduction to Modeling and Simulation** Class begin ~ end: Jan 5 ~ Mar 22 (including exam)	Sinclair Community College / Physics	Art Ross & Bob Chaney art.ross@sinclair.edu 937-512-2236	Winter quarter 2009	Video conferencing Yes	4	Academic calendar
	Prerequisites: None					
	Description: A variety of scientific problems will be analyzed by developing representative models, implementing the models, verifying and validating the model, reporting on the models in oral and written form, and by changing the models to reflect corrections, improvements and enhancements. Systems to be modeled include first and second order dynamic systems and random processes that utilize Monte Carlo simulations, random walk simulations and cellular automation simulations.					
PHY 220 **Introduction to Computational Physics** Class begin ~ end: Mar 30 ~ Jun 14 (including exam)	Sinclair Community College / Physics	Art Ross art.ross@sinclair.edu 937-512-2236	Spring quarter 2009	Video conferencing Course Info	5	Academic calendar
	Prerequisites: PHY 201 and MAT 201 or equivalent					
	Description: Mathematical models of physical systems will be developed and simulations will be constructed using Matlab and Vensim. Explorations of complex systems will be conducted and results will be presented in oral and written form. Activities include the study of projectile motion, harmonic motion of mass-spring systems, LRC circuits, Fourier analysis of signals, modeling empirical data, assessment of numerical techniques, and the survey of Monte Carlo techniques in physics.					
CSAC 245 **Introduction to Computational Science** Class begin ~ end: Aug 25 ~ Dec 5 Exam Period: Dec 8-11	Capital University / Mathematics, Computer Science, and Physics	Dr. Patrick Shields pshields@capital.edu 614- 236-7110	Fall semester 2008	No	3	Academic calendar
	Prerequisites:					
	Description: An introduction to the problems and solution methodologies in computational science. Computational tools such as a computer algebra system, a high performance computing engine, visualization software and Internet resources will used to explore and solve mathematical problems drawn from various fields of science.					
BSCI-50/70195 **BSCI 40195/ BTEC-40220** **ST: Bioinformatics** Class begin ~ end: Aug 25 ~ Dec 7 Exam Period: Dec 8-14	Kent State University / Biological Sciences	Dr. Helen Piontkivska opiontki@kent.edu 330-672-3620 http://shanghai.biology.kent.edu/	Fall semester 2008	WebCT Course Info	3	Academic calendar
	Prerequisites: Eighteen hours of biology and permission of instructor.					
	Description: Learn to use GenBank, Ensembl and other genomic databases, Construct multiple sequence alignments, Phylogenetic tree reconstruction, Comparative and evolutionary genomics, Microarray data analysis, Protein structure prediction and much more…					
20-CS-668 **Parallel Computing** Class begin ~ end: Sept 24 ~ Dec 7 Exam Period: Dec 8-13	University of Cincinnati / Computer Science	Dr. Fred Annexstein fred.annexstein@uc.edu http://www.cs.uc.edu/~annexste/ 513-556-1807	Fall Quarter 2008	Yes	3	Academic calendar
	Prerequisites: 20-CS-228 or Permission of Instructor					
	Description: This class is designed as an introduction to the concepts and practice of Parallel Computing. In this class students will be introduced to some of these tools, techniques, and methods of analysis in parallel computing. We will do a number of programming projects during the term. This course is designed as a dual level/senior undergraduate level course covering the					

	programming and algorithmic design issues arising in parallel computing. The course is designed to meet the competencies for Area 6 for the Minor Program in Computational Science of the Ralph Regula School of Computational Science. The following competencies are addressed in this course: Describe the fundamental concepts of parallel programming and related architectures. Demonstrate parallel programming concepts using MPI. Demonstrate knowledge of parallel scalability. Demonstrate knowledge of parallel programming libraries.					
Chem 644 **Computational Chemistry** Class begin ~ end: Sept 24 ~ Dec 5 Exam Period: Dec 3-6	The Ohio State University / Chemistry	Dr. Richard Spinney rspinney@chemistry.ohio-state.edu 614-247-6847	Fall Quarter 2008	No	3	Academic calendar
	Prerequisites: Chem 252 (Organic Chemistry II)					
	Description: To provide a practical introduction to the theory and methods of molecular modeling and computational chemistry, focusing on its use for experimentalists. Hands-on experience will be obtained by all attendees in doing molecular mechanics, semi-empirical, *ab initio* quantum chemistry, density functional theory and modeling dynamic systems (molecular dynamics and kinetics).This is meant to be an introduction to molecular modeling for undergraduates, not a course on Quantum Mechanics.					
CSE 694L **Data and Information Visualization Description** Mar 30 ~ Jun 5 Exam Period: Jun 8-11	The Ohio State University / Computer Science and Engineering	Dr. Raghu Machiraju Machiraju.1@osu.edu 614-292-6730	Spring Quarter 2009	Yes Course Info	4	Academic calendar
	CSE294P, Or Equivalent Programming Experience. Math 153, CSE541, ME 260					
	Description: Describe role of perception in visualization, good design practices, tools for data and information visualization for various domains, and programming of interactive visualization systems. To expose students to visualization methods and techniques that increase the understanding of complex data. To familiarize the role of human visual system in processing and perception of image data. To familiarize the importance of good design practices for visualizing data. To master the construction of quantitative interactive tools for visualizing information and data. To be familiar with nuances of data and information visualization with biological experimental data and physical simulation data.					
COMP 345 **Optimization** Class begin ~ end: Aug 25 ~ Dec 12 Exam Period: Dec 15-19	Wittenberg University / Computer Science	Eric A. Stahlberg estahlberg@wittenberg.edu	Fall Semester 2008	No	3	Academic calendar
	Prerequisites: Calculus I and Introduction to programming. Familiarity with computational models and methods will be a benefit.					
	Description:					
MATH 299 **Special Topics: Differential Equations and Discrete Dynamical Systems** Class begin ~ end: Jan 5 ~ Mar 21	Columbus State Community College / Mathematics	John Nedel 614- 287-3857	Winter quarter 2009	No	5	Academic calendar
	Prerequisites: Math 152 Calculus II					
	Description:					
MATH 299 **Special Topics: Differential Equations and Discrete Dynamical Systems** Class begin ~ end: Mar 30 ~ Jun 13	Columbus State Community College / Mathematics	John Nedel 614- 287-3857	Spring quarter 2009	No	6	Academic calendar
	Prerequisites: Math 153 Calculus III and an introductory modeling course					
	Description:					
CS/PBIO 416/516 **Problem Solving with Bioinformatics Tools** Class begin ~ end:	Ohio University / Computer Science and Plant Biology	Dr. Lonnie Welch and Sarah Wyatt 740-593-1575, 1133 welch@ohio.edu	Spring Quarter 2009	Yes	4	Academic calendar

Mar 30 ~ Jun 6 Exam Period: Jun 8-12	Prerequisites: CS 361 (Data Structures) or PBIO 330/BIOS 325 (Genetics)					
	Description: Computation has become integral and critical to research in the life sciences. Biotechnology researchers produce vast quantities of data that require detailed analysis. In addition, numerous biological data repositories offer an overwhelming amount of information. This course will provide an opportunity to learn about bioinformatics software tools that enable the efficient analysis of biological data. Students will acquire important skills that (1) are required by employers in the growing field of biotechnology, and (2) are necessary for successful research in the life sciences. The course will provide a unique learning environment. It will bring together students from the life sciences, computer science, engineering, mathematics, and other related fields. It will offer perspectives from faculty in the fields of biology and computer science. Classroom activities will focus on employing state-of-the-art bioinformatics tools to collaboratively solve a set of biological research problems. Students will become familiar with the capabilities of popular bioinformatics tools, and with the kind of information contained in popular biological databases. Participants will also gain insight into how bioinformatics tools and biological databases are used in multidisciplinary biological research and experimentation processes.					
CS 412 **Parallel Computing** Class begin ~ end: Mar 30 ~ Jun 6 Exam Period: Jun 8-12	Ohio University / Electrical Engineering and Computer Science	Dr. Frank Drews 740-593-1248 drews@ohio.edu	Spring Quarter 2009	Yes (Video conferencing)	5	Academic calendar
	Prerequisites: Introductory "Algorithms and Data Structures" course					
	Description: This course is a practical-oriented introduction to Parallel Computing. It aims to teach students an understanding of the complex interactions between software and hardware in parallel and distributed system. Upon completion of this course, the student should be familiar with fundamental aspects of parallel and distributed systems, taxonomies, performance measures, and theoretical limitations of parallel systems. Students will understand parallel programming languages and middleware, and will be able to design and implement efficient parallel applications on a variety of parallel architectures. The course will be accompanied by a number of programming projects and exercises including, but not limited to, bioinformatics applications and case studies.					
CST120 **Computational Science Methods** Aug 25 ~ Dec 7 Exam Period: Dec 8-14	Stark State Community College	Robert Berens rberens@starkstate.edu 330-494-6170	Fall Semester 2008	No	3	Academic calendar
	Prerequisites:					
	Description: Develop the necessary computational skills to model and simulate a broad set of deterministic and stochastic systems including the modeling of empirical data. Integrated problem solving methods found in modern research facilities and high technology workplaces will be utilized.					
CST121 **Introduction to Modeling and Simulation** Class begin ~ end: Jan 12 ~ May 3 Exam Period: May 4-10	Stark State Community College	Karen Hardesty khardesty@starkstate.edu 330-494-6170	Spring Semester 2009	No	3	Academic calendar
	Prerequisites:					
	Description: A variety of scientific problems will be analyzed by developing representative models, implementing the models, verifying and validating the model, reporting on the models in oral and written form, and by changing the models to reflect corrections, improvements and enhancements. Systems to be modeled include first and second order dynamic systems and random processes that utilize Monte Carlo simulations, random walk simulations and cellular automation simulations.					
CSA 443 **High Performance Computing and Parallel Programming** Class begin ~ end: Jun 29 ~ Aug 7 Exam Period: TBD	Miami University / Computer Science & Systems Analysis	Dr. Dhananjai M. Rao raodm@muohio.edu 513-529-0335	Summer Semester 2009	Yes	3	Academic calendar
	Prerequisites: 1) CSA-278 (Computer Architecture) or equivalent 2) Knowledge of Java/C/C++ programming					
	Description: An introduction to practical use of multi-processor workstations and supercomputing clusters, using parallel algorithms and concurrent data structures, for solving computational problems in a variety of science and engineering domains. The course builds on basic concepts of programming and problem solving.					
15PHYS410 **Computational Physics** Class begin ~ end:	University of Cincinnati / Physics	Richard Gass richard.gass@uc.edu 513-661-0491	Spring Quarter 2009	Yes (Video conferencing)	3	Academic calendar

Mar 30 ~ Jun 5 Exam Period: Jun 6-11	Prerequisites: 15MATH273 (Differential Equations)
	Description: A major portion of the course will be devoted to the numerical solution of partial differential equations with an emphasis on topics (such as the quantum mechanics of nano-structures) that are of current interest in physics and engineering. We will use Mathematica as our primary programming language although we will have to write a little FORTRAN or C if we run a problem on a cluster. Topics to be covered include: Numerical integration, Equation solving, Solving ordinary differential equations, Solution of boundary value and eigen value problems, Numerical solution of partial differential equations, Monte Carlo methods, An introduction to high performance computing (time permitting), Topics of interest to the class.