Proposal: CIS104 – Introduction to Informatics

I. Introduction

The Computer Science Department at Spelman College is proposing an introductory course in informatics. This course will provide an alternative route for satisfying Spelman College's Computer Literacy general requirement. In addition, this course can be used to satisfy perquisites for upper-level domain-specific informatics courses.

II. Rationale

Informatics is the science of information: storing, organizing, retrieving, analyzing, mining, and visualizing information for advancing scientific knowledge. Informatics is a growing field of study that is typically relied upon by scientists and non-scientists during research activities. At Spelman College, departments such as Biology and Chemistry are currently implementing curricular revisions that will require students to have knowledge of computing as an informatics tool. This course aims to meet that goal for first-year students.

III. Syllabus for Proposed Course

Course Title: Introduction to Informatics

Credits/Hours: 4.00 - class (3 hours per week) and lab (1.5 hours per week)

Prerequisite: none

Course Description:
This course introduces informatics as it is applied in biology, chemistry, and environmental science. This course provides students with the background on information theory, introductory informatics methods and algorithms, and exposure to standard informatics tools. This involves assignments and projects that are motivated by problems found in biology, chemistry, and environmental science that lend themselves to informatics-based solutions.

Goals and Objectives:
Goals:
The goals of this course are to
   • Provide students with an early introduction to information theory and informatics;
   • Expose students to the fundamental Mathematics and Computer Science concepts the support informatics;
   • Teach students how to use common informatics tools including MS Excel, Python, Matlab, BLAST, etc.; and

- Teach students how to communicate in the scientific community using MS Word, PowerPoint, and other technologies to write technical reports and presentations.

Objectives:

Upon completion of this course, the student will be able to:

- Define the characteristics of basic information theory and its relationship to informatics;
- Explain the history of computing and information science;
- Use elementary statistical analysis techniques to analyze data;
- Model scientific problems using fundamental Mathematical modeling techniques and Computer Science algorithms;
- Use word processors and presentation software to develop scientific articles and presentations;
- Interact with an SQL database using fundamental querying techniques; and
- Use basic informatics tools: MS Excel, Python, BLAST, Matlab, etc.

Textbooks and Supplies:

- **Main Text**: None at this Time
- **Lab Text**: None at this Time

Method of Instruction:

Instruction will consist of classroom lectures, discussions, exercises, laboratories, and independent research.

- Assigned Readings: The schedule at the end of this syllabus indicates assigned readings. These should be completed prior to class time to aid understanding of the material.
- Homework Problems: You are expected to complete problem sets as given. The problem sets are related to the material of the chapter being covered at the time. These problem sets will provide the students with experience with using the informatics methods and tools.
- Lab Assignments: You are expected to complete lab assignments during the allotted laboratory time. These assignments will revolve around the software tools that are used for informatics. Lab assignments will consist of technology instruction as well as investigative activities.
- Independent Research Project: Each student will be given an informatics problem that is associated with his or her major field of study. Each student will be expected to write a scientific paper and presentation on the problem, the methods for solving the problem, and their findings. The completion of this project will require the use of word processing software, informatics software tools, and electronic presentation software.

Topical Outline:

This is meant to serve as an approximate schedule. There are some topics, which may take less time, and other topics, which may take more time depending on the class itself. Significant modifications to the schedule will be made as early as possible.

Lecture Topics (assuming 14 weeks of instruction)

Topic	Assigned Reading	Time (weeks)
Introduction to Informatics • Characteristics of Information • Information to Informatics • Technology and Information Technology • History of Computing • Information Technology and Computing in Biology, Chemistry, and Environmental Science (Discipline-Specific problems and needed solutions)	TBD	2
Communicating Science • Report and Publication formatting and writing using Office Applications • Presentations using Office Applications	TBD	2
Modeling and Problem Solving - These methods will be explored using commonly used Informatics tools: MS Excel, Python, Blast, Matlab, etc. • Data and Knowledge representations • Modeling with Mathematics and Computer Science • Algorithms for Informatics • Real-World examples from Biology, Chemistry, Environmental Science that are applications of Mathematics and Computer Science.	TBD	4
Data Analysis - These methods will be explored using commonly used Informatics tools: MS Excel, Python, Blast, etc. • Measuring in the Sciences • Summarizing Data • Fitting Data with Regression • Real-World examples from Biology, Chemistry, Environmental Science that are applications of Mathematics and Computer Science.	TBD	4
Storing Data • Database technologies • Relational Databases and SQL	TBD	2

Evaluation Summary:

Exams (5-6) – Written and SW tools	40 %
Final Exam	20 %
Quizzes	10 %
Homework	10 %
Labs	10 %
Research Presentation	10 %

Numeric	Letter
93 - 100	A
90 – 92	A-
87 - 89	B+
83 - 86	B
80 – 82	B-
77 - 79	C+
73 - 76	C
70 – 72	C-
60 - 69	D
< 60	F

Academic Honesty:
At Spelman College, academic dishonesty includes but is not limited to submitting work that is not one's own, cheating on quizzes, tests, mid-term and final examinations, and plagiarism. Academic dishonesty will not be tolerated and will be dealt with in accordance with the policy on academic honesty in the Spelman College catalog.

Assignment Due Dates:
•   Homework assignments are due at the beginning of class on their due date
•   Labs are due at the end of each lab session (or 8AM of the next day the lab is held in special circumstances)
•   Research paper and presentation slides are due one week prior to the date of your presentation.

Late Policy:
No assignments are accepted late unless there was a PRIOR agreement with the professor, or if the absence on the due date is an excused absence. The professor has the option to drop the assignment if accepting the assignment late will affect the integrity of the assignment.

Attendance:
Students are required to be present and on time for each class and are responsible for all material covered in class whether they are present or absent. The instructor may withdraw students with excessive unexcused absences.

Class Cancellation Policy:
If for any reason a class is not held at the assigned time, all work scheduled for that day is automatically rescheduled for the next scheduled class period. Any projects, assignments, or homework due on a missed day become due at the next scheduled class period. Similarly, any tests scheduled for a class period which is not held at the assigned time will be given at the next scheduled class period.

Accommodation:

Any student who feels she may need an accommodation based on the impact of a disability should contact the Office of Disability Services privately to discuss her specific needs.

Please contact the Office of Disability Service at (404) 270-5289 in MacVicar Hall to coordinate reasonable accommodations.

IV. Sample Assignments and Labs

In this section, we present samples of the assignments that will be given in this course.

IV.1 Homework Assignments

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IV.2 Laboratory Assignment

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V.3 Independent Research Project

V. Curriculum Implications

This course is provided by the Computer Science department to fulfill the Spelman College Computer Science requirement for Biology, Chemistry, and Environmental Science majors or any other student that is interested in a career in informatics. This course is provided as a prerequisite for upper-level discipline specific informatics courses in any applicable department. Finally, this course will be the 4th course offered by the Computer Science Department to satisfy the Computer Science requirement for all non-Computer Science students.