

ROCHESTER INSTITUTE OF TECHNOLOGY
Rochester, New York

COLLEGE of SCIENCE
Department of IMAGING SCIENCE

NEW COURSE: 1051-XXX

1.0 TITLE: APPLIED COMPUTING FOR IMAGING SCIENCE
DATE: 13 June 2003
CREDIT HOURS: 3
PREREQUISITE(S): 1051-211 or equivalent and permission of instructor
COREQUISITE(S): none
COURSE PROPOSED BY: Carl Salvaggio

2.0 COURSE INFORMATION:

	Contact Hours	Maximum Students / Section
Classroom	3	12
Lab	n/a	n/a
Studio	n/a	n/a
Other	n/a	n/a

QUARTER(S) OFFERED:

Fall Winter Spring Summer

STUDENTS REQUIRED TO TAKE THIS COURSE:

Imaging Science, 2nd or 3rd year

STUDENTS WHO MIGHT ELECT TO TAKE THE COURSE:

Not recommended for non-majors

3.0 GOALS OF THE COURSE:

The goal of this course is to provide the student the skills to critically analyze published research in the field of imaging science. The student will gain an understanding of how to read a scientific article, research a topic beyond what the author has written, and the ethics surrounding the publishing of scientific research. These goals will be accomplished while honing their programming, writing and presentation skills.

4.0 COURSE DESCRIPTION:

This course is intended to develop the students skills in applied computing and research techniques. A prerequisite to scientific advancement is a thorough understanding of historical and recent literature relevant to the field of study. This often involves repeating experiments that predecessors and current colleagues have performed. Often, insights are gained when experiments are

repeated that cannot be realized simply by reading an article in a professional journal or conference proceeding. In this course, the student will choose an article from the historical or recent literature that describes a computational technique used in the field of imaging science. The student will implement the described algorithm in the computer language of their choice, and attempt to repeat the results obtained by the author. Along the way, the student will make three oral presentations during class, the first describing the referenced research, the second, a report on their progress in re-implementing the referenced work, and the third, describing the success, failure or questions that arose during execution of the project. The intent is to develop a critical approach to reading published research, questioning both implementation and results in order to gain a thorough understanding of the work. (1051-211 or other programming course and permission of the instructor) Class 2, Credit 3 (S)

5.0 POSSIBLE RESOURCES:

- 5.1 Research Systems, Incorporated, Image Processing in IDL, October 2002 Edition, Research Systems, Incorporated, Boulder, Colorado, 2002.
- 5.2 Student version of IDL 5.6 for Windows

6.0 TOPICS:

- 6.1 Determining the scope of an article
- 6.2 Scientific presentation
- 6.3 Scientific writing
- 6.4 Ethics of scientific research
- 6.5 Miscellaneous numerical methods (as dictated by choice of student projects)

7.0 INTENDED LEARNING OUTCOMES AND ASSOCIATED ASSESSMENT METHODS OF THOSE OUTCOMES:

- 7.1 Ability to critically evaluate a scientific article (PRESENTATION)
- 7.2 Ability to reproduce results presented in the literature (PROGRAM)
- 7.3 Ability to research a topic beyond what is available in the chosen article (PRESENTATION)
- 7.2 Ability to use the IDL environment as an interactive problem solving tool and visualization system

8.0 PROGRAM OR GENERAL EDUCATION GOALS SUPPORTED BY THIS COURSE:

- 8.1 The student will further develop their scientific writing and presentation skills
- 8.2 The student will gain the understanding that published research needs to be critically read in order to understand, evaluate and reproduce results and will begin to be able to accomplish each of these tasks
- 8.3 The student will be prepared with the necessary skills for their senior or future graduate research project

9.0 OTHER RELEVANT INFORMATION:

- 9.1 Course needs to be conducted in a classroom equipped with a high-resolution projector (1280x1024) for classroom instruction

10.0 SUPPLEMENTAL INFORMATION:

none