Development of the Imaging Science High School Elective
RIT’s commitment to community and education

Center for Image Processing in Education (CIPE)

Application and approval for a new high school course

RIT summer curriculum development
Course Goals

- to experience the science and application of imaging
- to gain an awareness of local and global imaging communities
- to help bridge the gap between HS and college level coursework
to include more critical thinking skills
- “thinking deep thoughts, deeply”

to improve technical reading skills

to gain an awareness of careers in the digital imaging world
Digital Imaging

- Introduction & History (1 day)
- Observables (7 days)
- Visual Perception (6 days)
- Capturing Observables (6 days)
- Digital Image Processing (13 days)
- Image Display and Microstructure (4 days)
- Final Project (4 days)
Visual Perception

- Impossible Illusions
- After Images
- Distortion Illusions
- Color Illusions
- Facial Illusions
- Camouflage Illusions
- Ambiguous Illusions
Presentations
In our classroom...

Seeing is believing
Seeing the Light
Our Textbook
“Seeing the Light”

by David Falk
Dieter Brill
David Stork
Labs ... we've included

- color television lab
- geometrical optics lab
shadowgram lab - otherwise known as the Mike and Matt show
vision lab
Dark Room
It works!
Guest Lecturers

Mr. David Wyble
Dr. Jeff Pelz
Mr. Joe Pow
Computer Investigations

using NIH Image

• ACME Detective Agency
• Travel USA
• The Plot Thickens
• You Can Count on it
• Inside the knee
Victor Central School
Brendan shares his interest of Imaging Science in the Movies
The New York State Math, Science and Technology Standards can be easily correlated to an elective in Imaging Science.
Standard 1 (Analysis, Inquiry, and Design)

- Use algebraic and geometric representations to describe and compare data from images.
- Use inductive reasoning to construct, evaluate, and validate conjectures and arguments with images.
- Apply algebraic and geometric concepts and skills to the solution of problems within the images.
- Elaborate on basic scientific and personal explanations of natural phenomena within images.
- Use various means of representing, organizing, and recording observations from images and insightfully interpret the organized data.
Standard 2 (Information Systems)

Understand and use the more advanced features of database software for further analysis of images.
Standard 3 (Mathematics)

- Use graphing utilities to create and explore geometric and algebraic models from images.
- Choose the appropriate tools for measurement for collecting, analyzing, and interpreting images.
- Relate absolute value, distance between two points, and the slope of a line to the coordinate plane within images.
- Model real-world situations depicted in images with the appropriate function.
- Use computers and graphing calculators to analyze mathematical phenomena within images.
Standard 4 (Science)

- Explain complex phenomena, such as tides, variations in day length, solar insolation, apparent motion of the planets, and annual traverse of constellations using images.

- Use the concepts of density and heat energy to explain observations of weather patterns, seasonal changes, and the movements of the Earth’s plates using images.

- Explain the properties of materials in terms of the arrangement and properties of the atoms that compose them using images.

- Explain variations in wavelength and frequency in terms of the source of the vibrations that produce them using images.

- Explain and predict different patterns of motion of objects using images.
Standard 6 (Interconnectedness)

Search for multiple trends when analyzing data for patterns, and identify data that do not fit the trends within images.
Standard 7 (Interdisciplinary Problem Solving)

- Explain and evaluate images mathematically and scientifically by formulating a testable hypothesis.
- Using images to demonstrate the logical connections between scientific concepts guiding the hypothesis and the design of an experiment.
- Applying and inquiring into the mathematical ideas relating to the investigation of images.
- Using technological tools and procedures to assist in the investigation of images as well as the communication of results.
Lessons Learned.. a teacher’s perspective

careful selection of the course title

individual research and textbook-based summaries resulted in solid learning

use more of the textbook “Try It” inquiry activities – the more hands on the better
Future Challenges

- competition for enrollment
- fall vs. spring course
- college credit
- identifying qualified students
Next Steps...
(communicating with colleagues)

- share classroom experiences
- share feedback from students
- reflect on and adjust curriculum
- provide curriculum materials for interested schools
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RIT Center for Imaging Science and staff
Mr. Joe Pow