I. Basic Course Information
A. Course Number and Title: SCIE-210H Independent Research in Science and Engineering I – Honors
B. New of Modified Course: Modified
C. Date of Proposal: Semester: Spring Year: 2012
D. Sponsoring Department: Science & Engineering
E. Semester Credit Hours: 3
F. Weekly Contact Hours: 3
G. Prerequisites: minimum GPA 3.5; permission of instructor in Science and Engineering department.
H. Laboratory Fees: Yes
I. Margaret Czerw: mczerw@raritanval.edu

II. Catalog Description

Prerequisite: Minimum GPA of 3.5; permission of instructor in Science and Engineering department.

Independent research provides students with an opportunity to engage in scientific research with the guidance of a faculty member. In consultation with and approval of the faculty member, students select a research topic, perform a literature search, design and complete appropriate research. Students will be required to complete a formal paper detailing the research; including the purpose, methods, results and conclusions. Additional culminating experiences, as directed by the instructor, may include an oral presentation, a poster display at a local or regional conference, or submission of a research paper to a journal.

III. Statement of Course Need
The course will be of particular interest to students considering transfer to four-year institutions majoring in science. This course will strengthen student’s applications to graduate programs in science by engaging the student in scientific research.

IV. Place of Course in College Curriculum
A. This course serves as a free elective.
B. To see course transferability for New Jersey schools, go to the NJ Transfer website, www.njtransfer.org; for all other colleges and universities, go to the individual websites.

V. Outline of Course Content
A. Introduction to research.
B. Literature research techniques.
C. Introduction to scientific writing.
D. Oral presentation of scientific research.

VI. EDUCATIONAL GOALS AND LEARNING OUTCOMES

A. EDUCATION GOALS
Students will:
1. Locate, review, interpret and analyze scientific information. (GE-NJ IL)
2. Apply fundamental concepts in engineering and science (GE-NJ 3)
3. Demonstrate the fundamentals of problem solving and critical thinking (GE-NJ 3)
4. Communicate scientific research findings (GE-NJ 1)

B. LEARNING OUTCOMES
Students will be able to:
1. Interpret data accurately (Goal 3).
2. Apply theoretical strategies to the analysis of data (Goal 2).
3. Formulate a scientific problem and appropriate hypotheses (Goal 2, Goal 3).
4. Conduct a literature search on a particular problem or question in the sciences (Goal 1).
5. Design and implement a scientific research project and write a formal research proposal (Goal 4).

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VII. MODES OF TEACHING AND LEARNING
Formats, modes, and methods for teaching and learning may be:
A. lecture/discussion
B. small group projects
C. service learning
D. student oral presentations
E. student collaboration
F. independent research

VIII. PAPERS, EXAMINATIONS, AND OTHER ASSESSMENT INSTRUMENTS
Assessment methods may be:
A. performance of laboratory techniques
B. presentation of research findings
C. analysis of reading assignments
D. other, as specified by instructor

IX. GRADE DETERMINANTS
In order to evaluate achievement of the goals and outcomes listed above, possible grade determinants may be:
A. Presentations
B. Discussion questions
C. Laboratory journal/writing assignments
D. Research projects

X. TEXTS AND MATERIALS
A. primary sources
B. web sources
C. databases

XI. RESOURCES
Students may need to use library databases and other library resources for critical research assignments and/or computers.