ECPE/PHYS 4984: Nanotechnology

Randy Heflin	1-4504	108 Robeson	rheflin@vt.edu
Stephane Evoy	1-3204	460 Whittemore	evoy@vt.edu

I. Catalog Description

Overview of existing device and manufacturing paradigms in microelectronics, optoelectronics, magnetic storage, microsystems, and biotechnology. Overview of near- and long-term challenges facing those fields. Near- and long-term prospects of nanoscience and related technologies for the evolutionary support of current paradigms, and for the development of revolutionary designs and applications.

(3H, 3C).

Pre: ECPE 2204 or PHYS 3304 or PHYS 3455, or with permission of instructor

Course Number: ECPE 4984
PHYS 4984

Transcript Title: SS: Nanotechnology

II. Rationale of course

The evolution of microelectronic, optoelectronic, magnetic, integrative, and biotechnological devices increasingly calls for revolutionary approaches to device design and manufacturing. More than ever, a cross cutting background is required to address some of the fundamental issues involved in these areas. Specifically, nanostructure science and technology is a broad and interdisciplinary area of research and development activity that has been growing explosively worldwide in the past few years. It has the potential for revolutionizing the ways in which materials and products are created and the range and nature of functionalities that can be accessed. Students must therefore possess a solid grasp of the manufacturing challenges and revolutionary changes that the such fields will be facing within the next two decades, as well as prospective solutions bestowed by such novel approaches to device design and manufacturing.

III. Text

Required:

PHYS/ECPE 4984: Nanotechnology Course pack, edited by S. Rayyan , W. Barnhart, J. R. Heflin, and S. Evoy

The course web page will have a variety of useful information, including copies of the lecture transparencies. The course web address is:

www.phys.vt.edu/~rheflin/nanotech

IV. Syllabus

1. Micro/nanocharacterization	5 %
2. Micro/nanofabrication	20 %
3. Nanoscale and molecular electronics	15 %
4. Nanotechnology in magnetic storage	15 %
5. Nanotechnology in integrative systems	15 %
6. Nanotechnology in optoelectronics	15 %
7. Nanobiotechnology	15 %

V. Evaluation

Tri-weekly assignment:	40%
Reading evaluation quizzes:	30%
Term Research Paper:	30%

Term project will consist of a ~10 page research paper covering a specific aspect of nanotechnology. Time permitting, each student will present his/her paper to the class.