Scientific/ Technical Report

1. DE-SC0002013

2. Cheyney University Curriculum and Infrastructure Enhancement in STEM (CUCIES II) Project
   Principal Investigator: Dr. Sakkar A. Eva
3. March 18, 2015
   Reporting period: September 29, 2009 to September 30, 2014

4. Grant Objectives and Accomplishments:

1) To increase curricula offerings in STEM disciplines that are consistent with the DOE critical skills need.

- Nanotechnology courses that are part of capstone semester course for Nanotechnology program were added to the Cheyney University course catalog.
- One new introductory course proposal on nanotechnology is submitted to the department.
- Computer Science program is redesigned and updated proposal for the new program went through the first two stages of approval process in the university. The new program has three tracks; cyber security, human computer interaction and general.
- One student participated summer research internship program in BNL

2) To increase the enrollment, retention, and graduation of students in DOE critical need STEM disciplines through strong evidence-based student engagement activities.

- PI and science faculty participated in recruitment activities that consisted of planetarium shows for K-12 students, tour of the Aquaculture Research and Education Laboratory (AREL), week long summer camp for middle school students on Cheyney university campus.
- PI and the university admission staff attended annual community college fair for STEM students in Philadelphia.
- Workshops and gathering of students and faculty were arranged to bring awareness of the importance of on-campus and off campus research internship and to kickoff summer internship application period.
- Seminar series sponsored by the department for students and faculty.
- Two students attended Pittcon conference in Philadelphia.
- To Improve / Enhance Community College Connectivity and Transfer Student Support Services is recognized as a critical need for the university and is included in the University College model for Cheyney University.
- To Increase student matriculation into graduate STEM programs faculty work closely with students to consider graduate school, provide guidance as to the opportunities for graduate school, to tests and steps necessary to apply for

graduate school. Natural and Applied Science (NAS) department hosts speaker series where scientific presentations as well as and graduate school recruiting presentations are made to the STEM students.

- To Increase the Number of Students Participating in Undergraduate Research ActivitiesNAS department hosts internship awareness event . Faculty work closely with students to encourage to participate in , to provide guidance, to coordinate opportunities for research internship and research training, on campus and off campus. Students gets hands on experience on campus in Aquaculture Research and Education Center (AREC) during academic year. NAS department host STEM poster session in early fall. Students attend various conferences and seminars, with travel supported by grants.
- NAS department set up a facebook account as depository of announcements of opportunities for summer internship, STEM scholarships, graduate school opportunities and other opportunities for STEM students.
- To Increase the number of students participating in Study Abroad Training / Research Activities NAS department is working on establishing relationship between other university's study abroad programs, and in-house study abroad program.

3) To enhance faculty teaching capacity at Cheyney University that are in line with DOE requirements.

- Full time faculty were hired in computer science and Physical science for two years.
- Faculty travel to professional conferences in STEM areas were supported by the grant. Travel to TMCF (Thurgood Marshall College Fund) meeeting, NSF JAM were funded by the grant.
- Two members of STEM faculty attended Pittcon conference in Philadelphia
- A planning grant proposal was submitted to NIH BUILD initiative
- PI attended training session via webinar on how to write NIH proposal
- PI attended teleconferences, and face to face meetings arranged by NNSA.

4) To increase the number of students conducting research in STEM disciplines and pursuing careers in DOE critical needs job areas.

- Students were placed in research internship positions on campus and off-campus for academic year and mostly for summer. Off campus, students were placed in Wistar institute, Children hospital of Philadelphia, Drexel University, PennState Hershey Medical College, Brook Haven National Laboratory, Foxchase Cancer Research Center, University of Pennsylvania, Scripps Oceanographic Institute, Thomas Jefferson University Hospital, US Navy Research Center, South Dakota State University. Several members of the faculty in the department of Natural and Applied Sciences worked with the students to place in the internship positions.
- Two students attended nanotechnology summer capstone semester in PennState nanotechnology education center.
- Cheyney students were admitted to graduate programs in Drexel University, Temple University, Delaware State University, Norfolk University, PennState

University, Louisiana University, Villanova University, Carnegie Melon University, University of Pittsburg, East Strausburg University, Georgetown University, Massachusetts College of Pharmacy, Thomas Jefferson University and West Chester University.

- Two Cheyney university STEM students went to Brazil and one in Madagascar for summer research experience.
- Cheyney students presented their work in research symposiums and received awards.
- 12 STEM students received tuition scholarship
- 10 STEM students received research scholarship as they worked as trainee under the guidance of Cheyney University STEM faculty
- Two students received travel award to attend professional conference.

5) To enhance the infrastructure for teaching and research at Cheyney University that are in line with DOE requirements

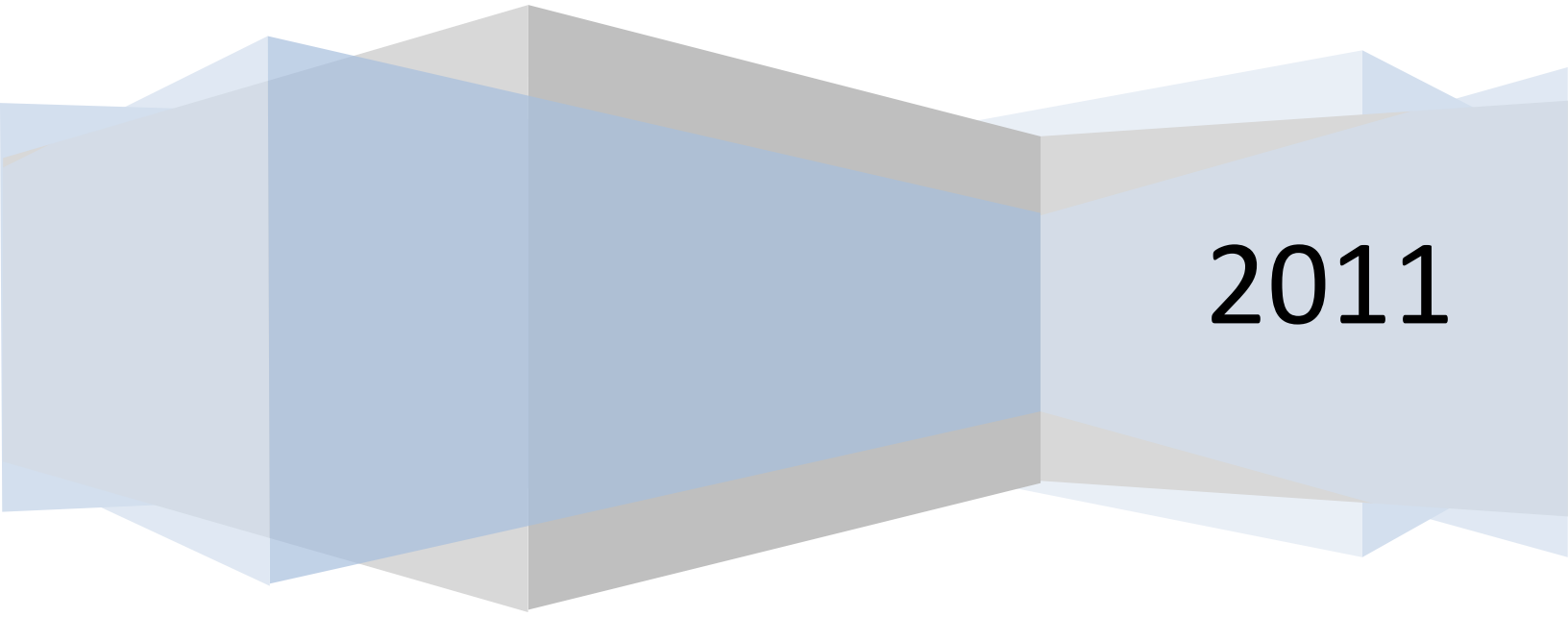
- The environmental science, ecology and radiochemistry courses are offered more frequently and the courses utilized AREL and the radiochemistry equipment.
- University provided training for the grant mangers to be able to utilize the software for financial management. The office of institutional research added well trained staff in the office.
- A new science building was funded by the state. The building was completed in 2014 and now houses all the STEM programs.

Cheyney University
School of Arts & Sciences
Department of Natural & Applied Sciences

Bachelor of Science in Computer Science

Proposal for a new curriculum for Cheyney University

by Dr. Henrry Rodriguez



2011

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Introduction

The University of Cheyney has decided to update its current Bachelor of Science degree in Computer Science program. The main reason is that this program does not satisfy the current needs for the market in this field. Evidence of that is that the number of students that have registered to this program has decreased dramatically in the past years. Currently, the program is not updated and offers many courses that are not actual in the market e.g. Basic Assembler, Switching Theory.

The new program has been developed based on professional recommendations. The two main sources has been taken from the Association of Computing Machinery (ACM) and the by Accreditation Board for Engineering and Technology (ABET). We have also revised similar bachelor programs in Computer Sciences offered by 12 different Universities in the country. Most of these universities were selected among the top best collage according USAnews. Others were selected because the university has special relation with Cheyney University e.g. West Chester University. We also have researched two major job board Web site to investigate the current needs of professionals in the area. This research was used to determine to professional profile that is needed in the Pennsylvanian market right now.

Purpose

The purpose is to create a program that will prepare professionals in the area of Computer Science with the knowledge, skills, and professionalism ethic needed for the current market. We have developed a new curriculum for a professional profile that would focus on the technologies and techniques currently used in the industry. We have also focused on developing a curriculum to attract new students to populate the career in the next years.

Scope

The ACM in its report (ACM, 2008) provides undergraduate curriculum guidelines for five defined sub-disciplines of computing:

- **Computer Science**,
- Information Systems,
- Software Engineering
- Information Technology, and
- Computer Engineering

The proposed curriculum will focused on the sub-discipline **Computer Science**.

ABET also gives recommendation for the curriculum of Computer Science (ABET, 2010). Their recommendations are divided into two groups. General Criteria and Program Criteria. We have focused mainly in their recommendations for the Curriculum of Computer Sciences programs.

Furthermore, we have decided to follow as close as possible these recommendations. The long term goal is to obtain the ABET accreditation for this curriculum program. The benefits[1] would be:

- *Accreditation provides you with a structured mechanism to assess, evaluate, and improve the quality of your program.*
- *Accreditation helps students and their parents choose quality college programs.*
- *Accreditation enables employers to recruit graduates they know are well-prepared.*
- *Accreditation is used by registration, licensure, and certification boards to screen applicants.*

The General Criteria about the curriculum reads as follow (ABET, 2010):

> **Criterion 5. Curriculum**
> The program's requirements must be consistent with its program educational objectives and designed in such a way that each of the student outcomes can be attained. The curriculum must combine technical and professional requirements with general education requirements and electives to prepare students for a professional career and further study in the computing discipline associated with the program, and for functioning in modern society. The technical and professional requirements must include at least one year of up-to-date coverage of fundamental and advanced topics in the computing discipline associated with the program. In addition, the program must include mathematics appropriate to the discipline beyond the pre-calculus level. For each course in the major required of all students, its content, expected performance criteria, and place in the overall program of study must be published.

The Program Criteria about the curriculum reads as follow (ABET, 2010):

> **Curriculum**
> Students must have the following amounts of course work or equivalent educational experience:
> a. Computer science: One and one-third years that must include:
> 1. Coverage of the fundamentals of algorithms, data structures, software design, concepts of programming languages and computer organization and architecture. [CS]
> 2. An exposure to a variety of programming languages and systems. [CS]
> 3. Proficiency in at least one higher-level language. [CS]
> 4. Advanced course work that builds on the fundamental course work to provide depth. [CS]
> b. One year of science and mathematics:
> 1. Mathematics: At least one half year that must include discrete mathematics. The additional mathematics might consist of courses in areas such as calculus, linear algebra, numerical methods, probability, statistics, number theory, geometry, or symbolic logic. [CS]
> 2. Science: A science component that develops an understanding of the scientific method and provides students with an opportunity to experience this mode of inquiry in courses for science or engineering majors that provide some exposure to laboratory work. [CS]

The program was developed following these recommendations.

Overall Description

To earn a Bachelor degree in Computer Science at Cheyney University, the student has to earn 45 unit credits from this program. The program consists of two modules. The first module is the **Core Courses**; 33 units. It includes eleven courses that are mandatory for all the students. The second module is formed by the **Computer Electives Courses**; 12 units. The Computer Elective

[1] This list is taken from the ABET Web site www.abert.org

Courses module is a pool of courses from where the students have to select at least four courses to graduate. Currently there are 12 courses developed in this pool. The syllabi for all the courses described in this proposal have been designed and developed as part of this work. In total, there are 23 courses developed.

The syllabus for each course includes the following sections:

- Contact information
- Description of the Course
- Objectives of the course
- Reading Material
- Course outline
- Grading

Furthermore, the Computer Elective Courses pool contains courses that have been classified as *stand-alone courses*, and *specialization track courses*. Students are free to select their elective courses from this pool.

To earn recognition of ending a specialization, the student must take all the computer elective courses, namely four courses, from a single specialization track. The specialization tracks that have been developed are: ***Information Technology Security Track*** and ***Human-Computer Interaction track***. Both tracks consist of five courses each.

Both specialization tracks have been given priority in the ACM report (ACM, 2008). The IT security track would cover issues about security for networking, database, and operating system. The Human Computer Interaction track is close related to Software Engineering and would focus on creating software that common users would be able to use easily. It will also cover gathering requirements to feed that software development process, and to test the alternative design interfaces that users might have. This track will prepare professionals that would develop and implement programs that end users will be able to use effectively, efficiently and with a high level of satisfaction.

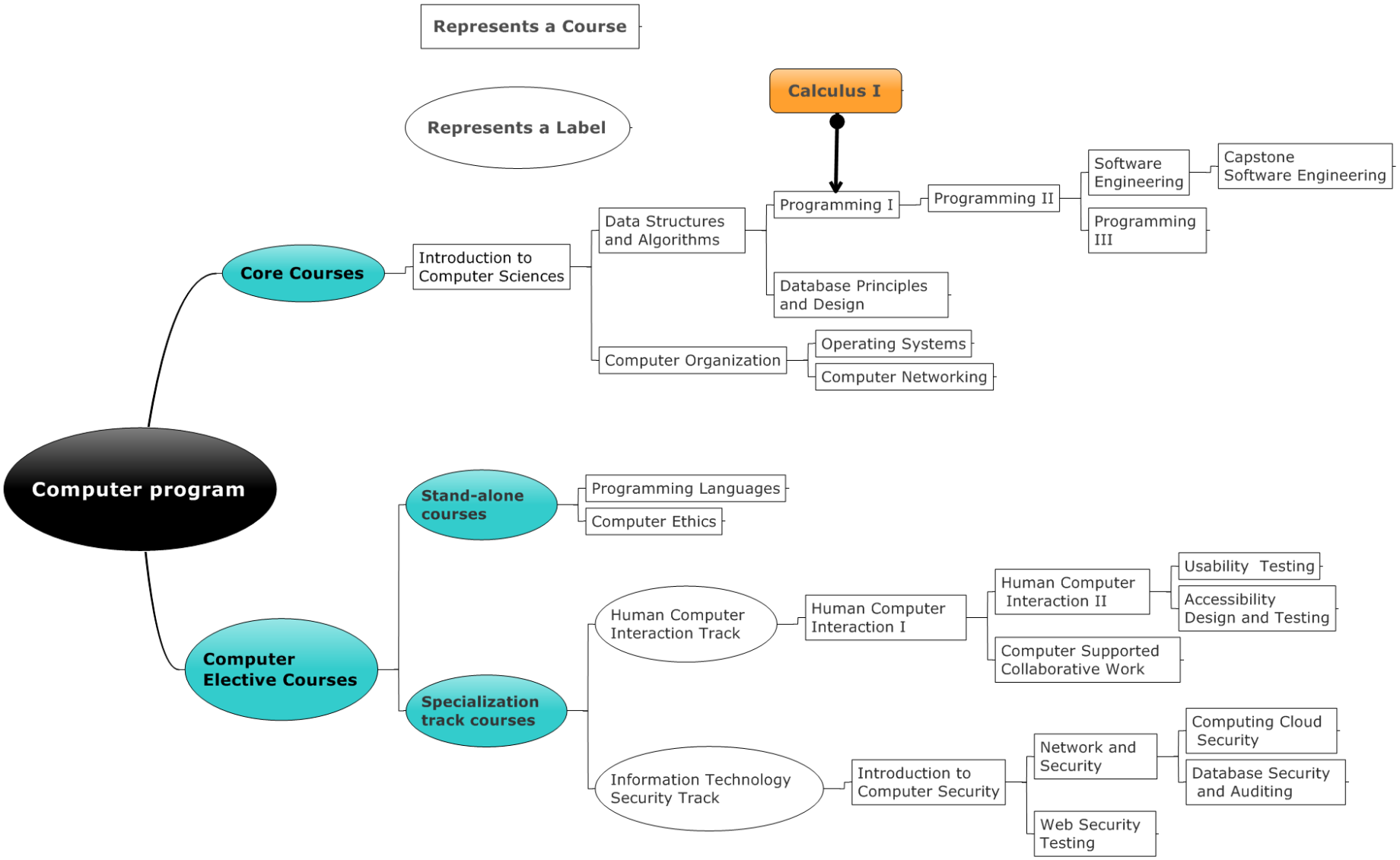

Figure 1 Computer Science program Chart

The Core Courses Module

There are ten courses in this module. The ten courses are mandatory for all the students in the program. The prerequisites are shown in the Figure 1 in the form of a linear chart. In order to be able to take a course, the student should have fulfilled all the courses in the given path or the course from the arrow. The introductory course *Introduction to Computer Science* is a pre-requisite for all the other courses in the Core Course Module. Furthermore, Calculus I is a pre-requisite for the course *Programming I.*

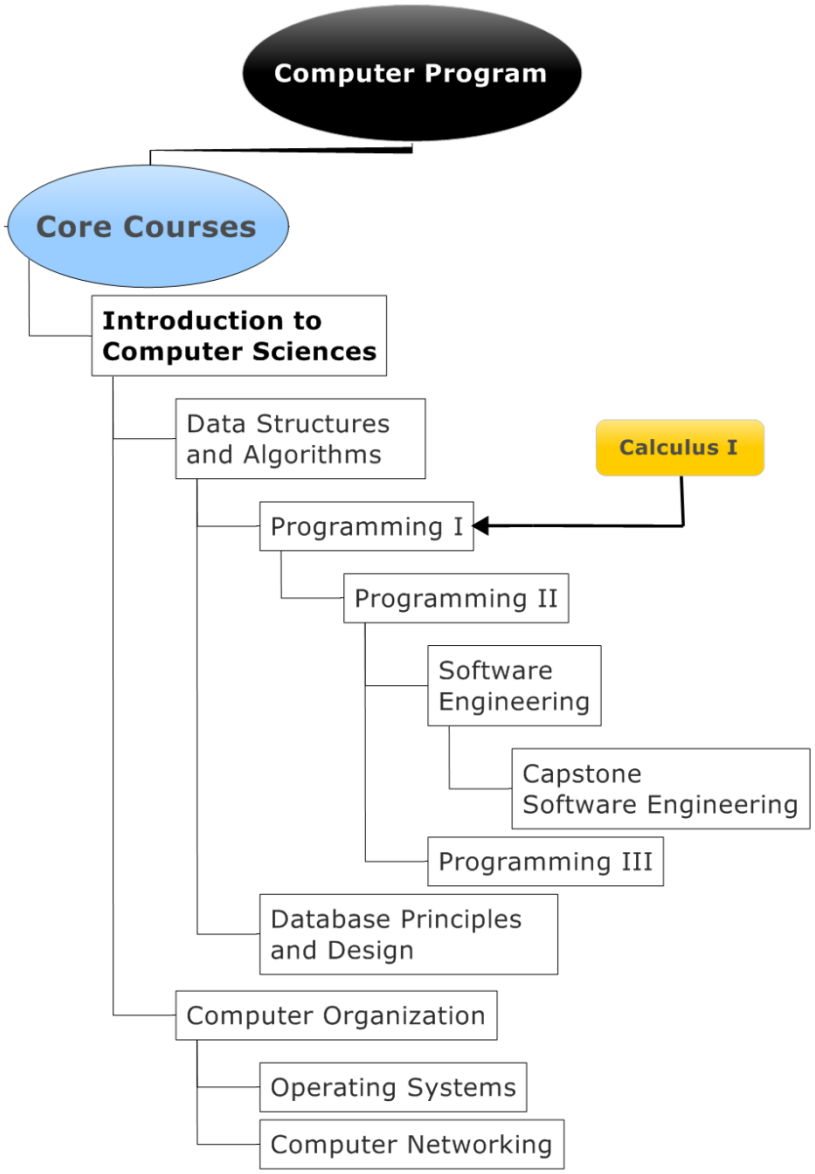

Figure 2 Computer Science Core program

For example, to take *Programming I*, the student should have passed the courses *Introduction to Computer Sciences* and *Data Structures and Algorithms.* Also, the course *Calculus I* should have been passed before taking the mentioned course. This module consists of the following courses.

Core Courses

- *Introduction to Computer Sciences*
  - *Data Structures and Algorithms*
    - *Programming I*
      - *Programming II*
        - *Programming III*
        - *Software Engineering*
          - *Capstone Software Engineering*
    - *Database Principles and Design*
  - *Computer Organization*
    - *Operating Systems*
    - *Computer Networking.*

Computer Elective Courses

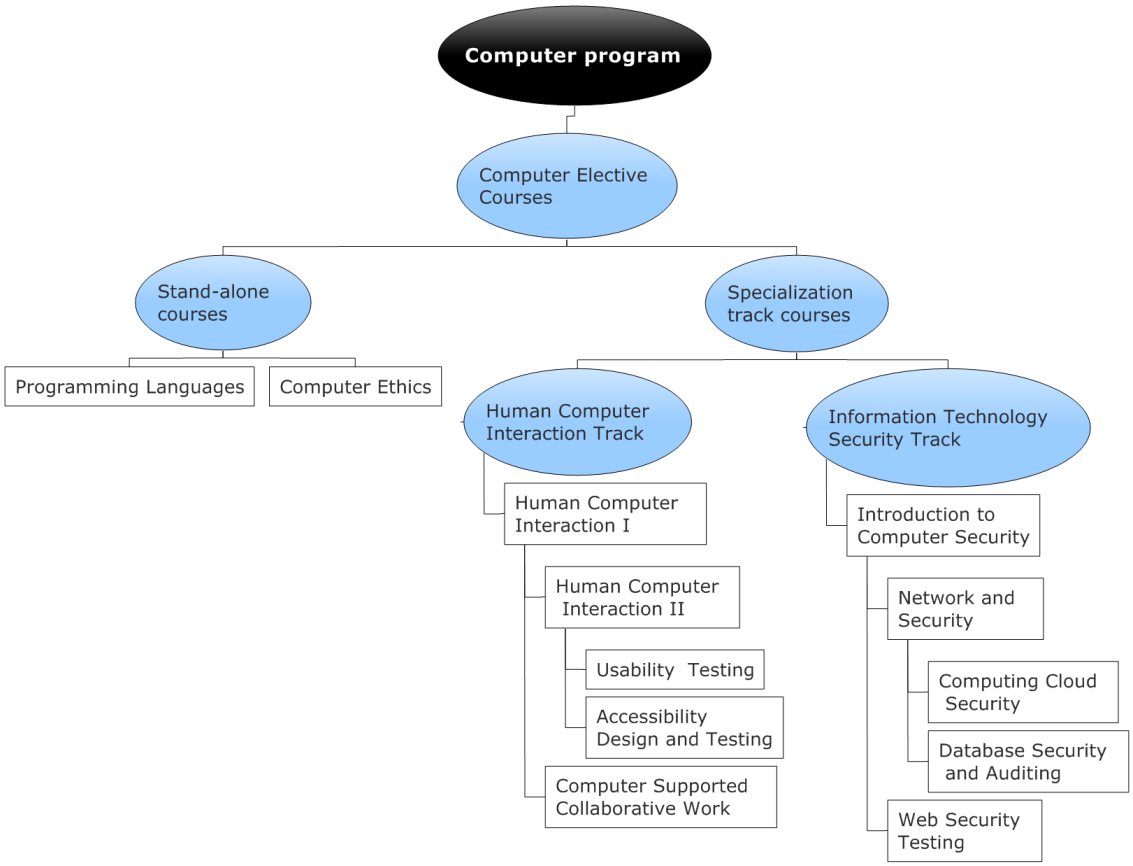

Figure 3 Computer Science Elective courses chart

The Computer Elective Track, as said before, consists of two tracks. Both tracks present an introductory course to the track. These introductory courses are pre-requisite to all the other courses in the track. Later, the courses are advanced courses for the specialization. Students should take four courses form the Computer Elective Course. In case the students take the four

elective from one single track, the students would be recognized as having a specialization in the track. The list below presents all the courses that have been developed for this module.

Computer Elective Courses

1. Stand-alone courses
   - Programming Languages
   - Computer Ethics
2. Specialization track courses
   - Human Computer Interaction Track
     - Human Computer Interaction I
       - Human Computer Interaction II
         - Usability Testing
         - Accessibility Design and Testing
       - Computer Supported Collaborative Work
3. Information Technology Security Track
   - Introduction to Computer Security
     - Network and Security
       - Computing Cloud Security
       - Database Security and Auditing
     - Web Security Testing

Recommended Plan of Study

Freshman Fall	Freshman Spring
Introduction to Computer Science	**Data structures and Algorithms**
Math	Math
Humanities and Arts	Humanities and Arts
Science	Science
Total: 15	**Total: 15**
Sophomore Fall	**Sophomore Spring**
Computer Organization	**Programming II (Functional programming language)**
Programming I (Functional programming language)	**Operating System**
Math	Math
Humanities and Arts	Humanities and Arts
Science	Science
Total: 15	**Total 15**
Junior Fall	**Junior Spring**
Database Principles and Design	**Software Engineering Computer Networking**
Programming III (Visual Programming Language)	**Computer Networking**
Science	*Computer Elective*
Math	Math
Humanities and Arts	Humanities and Arts
Total: 15	**Total: 15**
Senior Fall	**Senior Spring**
Capstone Software Project	*Computer Elective*
Computer Elective	*Computer Elective*
Math.	Math
Humanities and Arts	Humanities and Arts
Total: 15	**Total: 15**

Bibliography

ABET, C. C. (2010, 11 15). *Criteria for accrediting computing programs.* Retrieved 05 11, 2011, from ABET: http://www.abet.org/Linked%20Documents-UPDATE/Program%20Docs/abet-cac-criteria-2011-2012.pdf

ACM, T. T. (2008). *Computer Science Curriculum 2008.* Retrieved 05 11, 2011, from ACM: http://www.acm.org//education/curricula/ComputerScience2008.pdf

UCC #216 - P1

CHEYNEY UNIVERSITY OF PENNSYLVANIA
UNIVERSITY CURRICULUM COMMITTEE
CURRICULUM REVISION PROPOSAL FORM

Proposal writer(s): 1. Henry Rodriguez,
2. Sakkar Eva
3. Fu Zhang

School/Department: Department: Natural and Applied Science

Submission date: April 10, 2012 (Original), October 28, 2013 (resubmission)

PART ONE

Please address the following questions regarding your proposed curriculum revision.

1a) If a Bachelors of Science degree, how many required credits are needed, other than general education requirements, for matriculation? Please note that *required credits* refers to the total number of mandatory credits, whether offered in the degree hosting department or an ancillary department. If a Bachelors of Science degree, does the number of major requirements exceed the 60 credit maximum stated in the Board of Governors Policy (1990-06-A)? If so, provide an empirical justification for exceeding the maximum requirements.

There are 59 credits required for the program. The curriculum is revised to meet current workforce need in the computer science. One of the goals of the revision is to align the program with the curricular recommendation of Accreditation Board for Engineering and Technology, Inc. (ABET), a computing accreditation commission. A copy of ABET curriculum recommendation for computer science is attached.

The major core consists of eleven courses (33 credits). The program presents ten elective courses. These courses are Advanced Computer Science courses for two tracks (five courses for each track) in the CSC program. Students have the option to complete the program without specializing in any of the two tracks mentioned above. The revised computer science program offers:

a) B. S. (General): The student shall take the major core courses + four courses (12 credits) from any track or general computer Elective courses
b) B. S. *Human Computer Interaction* track The student shall take the major core courses + at least 12 Credit from the corresponding track
c) B. S. *Information Technology Security* track The student shall take the major core courses + at least 12 Credit from the corresponding track

There are three math (10 credit) required courses and one science course (4 credit) that is required related electives for the program. One of the general education science requirements will have to be a lab course.

2) Does the proposed major curriculum permit elective course selections within the *required credits*? If so, provide a global name or category for each of the elective clusters and a list or description of the courses permitted to satisfy the elective cluster.

ALL PROPOSALS

RELATED SCIENCE ELECTIVES (4 CREDITS)		
GAC 000	**Official Course Name From Powercampus**	**0-4**
	Science free elective	4

GENERAL

B. S. (General): The student shall take the major Core courses + four courses (12 credits) from any of the two computer science track (HCI and ITS) and the two other Advanced Computer Science Elective course (CSC 321 and CIS323).

ADVANCE COMPUTER SCIENCE ELECTIVES (12 CREDITS)		
GAC 000	**Official Course Name From Powercampus**	**0-4**
CSC 321	Computer Ethics ◊	3
CSC323	Programming Languages ◊	3
CSC 341	Human Computer Interaction I ◊	3
CSC 342	Human Computer Interaction II ◊	3
CSC 347	Computer Supported Collab. Work ◊	3
CSC 445	Accessibilty Desing and Testing ◊	3
CSC 443	Usability Testing ◊	3
CSC 331	Introduction to Computer Security ◊	3
CSC 332	Network Security ◊	3
CSC 433	Computing Cloud Security ◊	3
CSC 435	Database Security and Auditing ◊	3
CSC 337	Web Security Testing ◊	3

HUMAN COMPUTER INTERACTION

B. S. *Human Computer Interaction* track: The student shall take the major Core course + at least 12 Credit from the Human Computer Interaction advanced courses.

ADVANCE COMPUTER SCIENCE ELECTIVES (6 CREDITS)		
GAC 000	**Official Course Name From Powercampus**	**0-4**
CSC 343	Computer Supported Collab. Work ◊	3
CSC 445	Accessibilty Desing and Testing ◊	3
CSC 443	Usability Testing ◊	3

INFORMATION TECHNOLOGY SECURITY

B.S. *Information Technology Security* track: The student shall take the major Core courses + at least 12 Credit from the Information Technology Security track

ADVANCE COMPUTER SCIENCE ELECTIVES (6 CREDITS)		
GAC 000	**Official Course Name From Powercampus**	**0-4**
CSC 433	Computing Cloud Security ◊	3
CSC 435	Database Security and Auditing ◊	3
CSC 337	Web Security Testing ◊	3

UCC #216 - P3

3) Does the proposed major curriculum ensure that 40% of the 120 (i.e., 42 credits) of students credits are junior or senior level courses? List the department code, course numbers, course name, and earned credits (in that order) for each of the upper-level courses that total or surpass the 42 credit minimum.

GENERAL

With the two upper level free electives OR UPPER-LEVEL COURSES EARNED IN THE DISTRIBUTION REQUIREMENTS THE total upper level courses will be 42.

CODE/CRN	COURSE TITLE	CR	CumCR
GAC 000	**Official Course Name From Powercampus**	**3**	**3**
CSC 301	Operating Systems ◊	3	**3**
CSC 310	Computer Programming III ◊	3	**6**
CSC 312	Database Principles and Design ◊	3	**9**
CSC 314	Computer Networking ◊	3	**12**
CSC 316	Software Engineering ◊	3	**15**
CSC 419	Capstone Software Engineering ◊	3	**18**
	ADVANCE COMPUTER SCIENCE ELECTIVES	12	**30**
MAT 325	Probability and Statistics	3	**33**
MAT 303	Linear Algebra	3	**36**
	Upper Level Free Elective 1	3	**39**
	Upper Level Free Elective 2	3	**42**

HUMAN COMPUTER INTERACTION

With the two upper level free electives OR UPPER-LEVEL COURSES EARNED IN THE DISTRIBUTION REQUIREMENTS THE total upper level courses will be 42.

CODE/CRN	COURSE TITLE	CR	CumCR
GAC 000	**Official Course Name From Powercampus**	**3**	**3**
CSC 301	Operating Systems ◊	3	**3**
CSC 310	Computer Programming III ◊	3	**6**
CSC 312	Database Principles and Design ◊	3	**9**
CSC 314	Computer Networking ◊	3	**12**
CSC 316	Software Engineering ◊	3	**15**
CSC 419	Capstone Software Engineering ◊	3	**18**
CSC 341	*Human Computer Interaction I ◊*	*3*	**21**
CSC 342	*Human Computer Interaction II ◊*	*3*	**24**
	ADVANCE COMPUTER SCIENCE ELECTIVES	6	**30**
MAT 325	Probability and Statistics	3	**33**
MAT 303	Linear Algebra	3	**36**
	Upper Level Free Elective 1	3	**39**
	Upper Level Free Elective 2	3	**42**

INFORMATION TECHNOLOGY SECURITY

With the two upper level free electives OR UPPER-LEVEL COURSES EARNED IN THE DISTRIBUTION REQUIREMENTS THE total upper level courses will be 42.

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CSC 312	Database Principles and Design ◊	3	**9**
CSC 314	Computer Networking ◊	3	**12**
CSC 316	Software Engineering ◊	3	**15**
CSC 419	Capstone Software Engineering ◊	3	**18**
CSC 331	*Introduction to Computer Security ◊*	*3*	**21**
CSC 332	*Network Security ◊*	*3*	**24**
	ADVANCE COMPUTER SCIENCE ELECTIVES	6	**30**
MAT 325	Probability and Statistics	3	**33**
MAT 303	Linear Algebra	3	**36**
	Upper Level Free Elective 1	3	**39**
	Upper Level Free Elective 2	3	**42**

4) The general education requirements state that distribution courses are not to be within the major. Does the current curriculum worksheet require that students take major courses to fulfill their distribution requirements? If so, list them in the table below.

ALL PROPOSALS

The curriculum revision for Computer Science is made to meet current workforce need in the computer science. One of the goals of the revision is to align the program with the curricular recommendation of Accreditation Board for Engineering and Technology, Inc. (ABET), a computing accreditation commission. The recommendation for Science courses for computer science program is two science courses with lab. A copy of ABET curriculum recommendation for computer science is attached.

CODE/CRN	COURSE TITLE	CR	CumCR
S___ ____	Natural Science Elective II (with lab)	4	4
MAT ____	Mathematics (DiscreteMath)	3	**7**

5) Are there any additional graduation requirements or notes that should be included on the curriculum worksheet to aid in the advising process. For example, requiring a higher cumulative grade point average for graduation or a limit on the number of D grades permitted in the major or specific courses. Please include them as concise bulleted statements below.

Students must receive 'C' or better grades in all 100 and 200 level CSC courses, the Capstone course (CSC419) and Discrete math (currently MAT203, proposed to change the number to MAT303). Additionally only two 'D's will be accepted in rest of the CSC major required and advanced elective courses.

6) Please indicate in the table below any approved intensive designation courses in your program or related discipline that are required or strongly suggested that majors complete. If any of these courses are listed in the curriculum worksheet above, do they include the corresponding designation after the course title in parentheses?

CODE	CRN	Course Title	Designation	Required and on Sheet	Strongly Suggested
AAS	210	A-A Exp. in a Global Context	G	☐x	☐
HEN	319	Advance Composition	W, I	☐	☐x
HAR	313	African Am. Art History	A, I	☐	☐x
RHI	201	History of Africa	W, G	☐	☐x
RHI	311	Recent History of US	W	☐	☐x
RPS	319	Personality	W	☐	☐x
RSO	230	Social Problems	W	☐	☐x
RHI	216	African American History I	A	☐	☐x
CSC	419	CapstoneSoftwareEngineerin	W	☐X	☐

7) Please list all coursework that defines the proposed major that will be used to create the curriculum worksheet. If applicable, please include any courses that are superimposed over core or distribution general education requirements last.
Not required.

7b) Curriculum worksheets will clearly indicate the courses that are used to calculate their major grade point average (gpa)? This should be done by including a diamond (◊) after the names of all courses that will be used to calculate the students major gpa below.
Please refer to each of the included curriculum worksheets; they are all clearly indicated with a diamond, as desired.

PART TWO

Please attach a draft of the curriculum worksheet. The curriculum worksheet template can be obtained from any curriculum committee member.

CHEYNEY UNIVERSITY OF PENNSYLVANIA
DEPARTMENT OF NATURAL AND APPLIED SCIENCES

NFT 210: INTRODUCTION TO NANOSCIENCE AND NANOTECHNOLOGY

SYLLABUS SPRING 2012

Department: Natural and Applied Sciences

Course number: NFT 210 Section 01
Course Title: Introduction to Nanoscience and Nanotechnology
Phone: (610) 399-2019
Fax: (610) 399-2706

Instructor:Dr. Laxmidhar Senapati/ Dr. Sakkar Eva
Office: Carver Hall, Room 128
Office Hours: To be decided

E-mail: lsenapati@cheyney.edu
seva@cheyney.edu

CATALOG DESCRIPTION: This is an introductory course and designed to introduce various aspects of nanotechnology and its application. Topics to be covered includes but not limited to the principles of sub atomic theory, nanostructures, fabrication processes, new properties (electrical, optical, chemical and biological) that are fundamentally different from bulk properties. The course will also cover the application of those properties in new generation computers, sensors, medicine and optical devices. Course includes tours of the nanofabrication facilities at Pennsylvania State University. The advancement of nanotechnology has revealed it to be a unique and distinct discipline rather than a specialization within a larger field. It is a synergy of chemistry, physics, biology and engineering focused on nanoscience. It is an integrated, multidisciplinary, and specifically designed to attract students in the field of nanoscience and nanotechnology.

Prerequisites: Physical Science (SPH 100) or Physics II (SPH 212 or SPY 212) or General Chemistry (SCH 112)

TECHNOLOGY COMPETENCIES:
Demonstrate basic skills in computer operation, word processing, spreadsheet/graphing and web browsing.

COURSE OBJECTIVES:
Students who successfully complete the course will have basic knowledge of nanotechnology. They will have sufficient knowledge about the basic principle of Nano-devices and its fabrication and characterization methods. This course will bring nanotechnology awareness among students and help them in pursuing a Nanoscience degree that we have in place with the department of Natural and Applied Sciences

COURSE TOPICS

PART I: NANOSCIENCE

- ✓ Perspectives Introduction to Nanoscience
- ✓ Societal Implication of Nano

Nanotools

- ✓ Characterization methods
- ✓ Fabrication methods

Physics: Properties and Phenomena

- ✓ Materials, Structure, and the Nanosurface
- ✓ Energy at the Nanoscale
- ✓ The Material Continuum
- ✓ Nanothermodynamics

Chemistry: Synthesis and Modification

- ✓ Carbon-Based Nanomaterials
- ✓ Chemical Interactions at the Nanoscale
- ✓ Supramolecular Chemistry
- ✓ Chemical Synthesis and Modification of Nanomaterials

Natural and Bionanoscience

- ✓ Natural Nanomaterials
- ✓ Biomolecular Nanoscience

PART II: NANOTECHNOLOGY

- ✓ **Perspectives** Introduction: Nanotechnology
- ✓ Nanometrology: Standards and Nanomanufacturing

Electromagnetic Nanoengineering

- ✓ Nanoelectronics
- ✓ Nano-Optics
- ✓ Nanomagnetism

Mechanical Nanoengineering

- ✓ Nanomechanics
- ✓ Nanostructure and Nanocomposite Thin Films

- ✓ Applications of Thin Films

Chemical Nanoengineering

- ✓ Nanocatalysis
- ✓ Nanocomposites and Fibers

Biological and Environmental Nanoengineering

- ✓ Nanobiotechnology
- ✓ Biomimetrics
- ✓ Medical Nanotechnology
- ✓ Environmental Nanotechnology

COURSE REQUIREMENTS AND EVALUATION

I. **Performance Goals:** Performance goals are specified for each chapter. These goals represent minimum learning requirements for each chapter.

II. **Homework*:** Homework will be assigned per chapter and online through D2L.

III. **Quizzes*:** Quizzes will be administered every week unless an hour exam is scheduled in the same week. There are no make-up quizzes and the lowest quiz will be dropped. Please note that, a quiz may be given at anytime on any lecture day. These quizzes will be graded, returned, and used in your final grade evaluation. Quizzes will in general cover the lecture materials and assigned readings.

IV. **Examinations*:** There will be three (3) One-Hour Examinations given during the semester. Tentative dates for these exams are given below.

A two- (2) hour final examination will be given during the final examination period. The final exam will be COMPREHENSIVE; therefore, you will be responsible for the mastery of all material covered during the semester.

V. **Make-up Policy for One-hour Examinations:** Make-up Exams will be COMPREHENSIVE and your instructor may use one-half of your score on the final exam as your one-hour make-up exam score. To be eligible for make-up, an OFFICIAL EXCUSE for a missed exam must be presented to the instructor no later than one week after the missed exam.

VI. Calculators: CALCULATORS ARE REQUIRED FOR EXAMS AND QUIZZES. You must bring your own. NO SHARING! *Please note that programmable and cell phone calculators are not acceptable!*

VII. Point System: The point system used for a final grade evaluation is listed below:

Three Hour Exams (100 Points Each)	300 Points
Quizzes and Homework	200 Points
Final Examination	200 Points
Class Participation	100 Points
TOTAL	**800 Points.**

VIII. Letter Grades: Letter grades will be computed rigorously from the final total points as follow:

704 to 800 Points .....A (88.0- 100 %)
624 to 703 Points .....B (78.0-87.9 %)
520 to 623 Points .....C (65.0-77.9 %)
400 to 519 Points .....D (50.0-64.9 %)
Below 400 Points .....F (Below 50.0 %)

IX. Tentative Examination Schedule:

Date[&]	**Time**
Exam 1 - Week of February 13, 2012	Class period
Exam 2 - Week of March 12, 2012	Class period
Exam 3 – Week of April 16, 2012	Class period
Final Exam- As scheduled by the university	To be decided

[&] Your instructor will announce the exact date of each exam in class.

***Point discrepancies must be presented to the instructor within one week after corrected homework assignment, quiz, or hour exam has been returned to the class.**

X. Learning Assistance: You may request further help with the course through the instructor or the chemistry/physics tutors. You are encouraged to use the instructor's office hours for most of the help you may need with the course.

XI. Student Support Services: If you have a documented disability and which to discuss academic accommodations, please contact the Office of Disability Support Services.

XII. Cellular Phones: You may not use cell phones during class. All cell phone must be turned off immediately you set foot into the class. First violation of this rule will yield a serious warning.

A second violation is an automatic withdrawal from the course. **PLEASE, TURN YOUR PHONES OFF AS SOON AS YOU ENTER THE CLASSROOM!**

CLASS ATTENDANCE

The instructor strongly believes that regular and punctual class attendance is essential to the student's optimum scholastic achievement. The class attendance will be taken during every class. Regular class attendance is a student obligation, and a student is responsible for all the work, including tests and written work, of all class meetings.

ACADEMIC DISHONESTY

Cheyney University's Academic Integrity Policy:

The following statement appears in the Cheyney University Undergraduate Catalog and it states:

Integrity in taking examinations and writing papers and in all other academic work is expected of all students. Failure to live up to this expectation is a matter of serious concern not only for the students involved, but for the entire university. Violations will be reported to the Provost and Vice President for Academic and Student Affairs for referral to the Academic Advisory Council (33).

This policy covers plagiarism and other forms of academic dishonesty. Note: The instructor will use his discretion on what constitutes an academic dishonesty in addition to the stated university policy.

REQUIRED TEXTBOOK:

Gabor L. Hornay, H. F. Tibbals, Joydeep Dutta and John Moore; Introduction to Nanoscience and NanoTechnology; ISBN: 9781420047790 & ISBN 10:1420047795.

REFERENCES :

1.M. Di Ventra, S. Evoy and James R. Heflin, Introduction to Nanoscale Science and Technology; ISBN: 978-1-4020-7720-3.

2. S. M. Lindsay; Introduction to Nanoscience; ISBN13: 978-0-19-954421-9 & ISBN10: 0-19-954421-2.

3. Gabor L. Hornyak, John J. Moore, H.F. Tibbals, Joydeep Dutta; Fundamentals of Nanotechnology; ISBN: 9781420048032 & ISBN 10: 1420048031.

CHEYNEY UNIVERSITY OF PENNSYLVANIA
UNIVERSITY CURRICULUM COMMITTEE
NEW COURSE PROPOSAL FORM

Proposal writer: Dr. Laxmidhar Senapati, Dr. Sakkar Eva

Department: Natural and Applied Sciences

Proposed course name: Introduction to NanoScience and NanoTechnology

Proposed course number: NFT210

Proposed lecture hours: Time to be decided

Proposed studio/lab hours: N/A

Brief description of proposed course:
This is an introductory course and designed to introduce various aspects of nanotechnology and its application. Topics to be covered includes but not limited to the principles of sub atomic theory, nanostructures, fabrication processes, new properties (electrical, optical, chemical and biological) that are fundamentally different from bulk properties. The course will also cover the application of those properties in new generation computers, sensors, medicine and optical devices. Course includes tours of the nanofabrication facilities at Pennsylvania State University. The advancement of nanotechnology has revealed it to be a unique and distinct discipline rather than a specialization within a larger field. It is a synergy of chemistry, physics, biology and engineering focused on nanoscience. It is an integrated, multidisciplinary, and specifically designed to attract students in the field of nanoscience and nanotechnology.

PART ONE

Please address the following questions regarding your proposed course.

1) Is the course required for a degree program? No

2) Does it replace an existing course? If so, which one? Why is that course being deleted?
If not, what is the justification for adding an additional course to the course offerings in your program?

No, this course does not replace an existing course. It provides our students with an option to get introduction to a new and rapidly expanding science field that is applied and has the potential of application in various disciplines. It will be recommended for students who will be taking nano capstone courses in Pennsylvania State University. The course can serve to meet free elective or science elective requirement for all majors. It can also serve as related major elective for biology, chemistry and general sciences.

3) If the answer to #1 is yes and #2 is no, explain how the credit requirements for the degree program will be affected. Will the credit requirements increase? How will that be accomplished within the 120 credits required for graduation?

4) How often will the course be offered?

We plan to offer this course once every year.

5) Who will take the course, i.e., is the course intended for majors, non-majors currently taking courses in your department, or non-majors currently taking courses outside your department?

This course would be open to any major.

6) Will any new faculty be needed to teach the course?

No additional faculty is needed to teach this course.

7) Do similar courses exist in other departments? If so, which course(s)? Explain how this course does not simply duplicate the course in the other department. Provide justification that this course is needed and does not conflict with offerings in other departments. What resource impact will this have on other departments?

There is no similar course in existence in our catalog.

8) What additional costs or resource needs (supplies, equipment, facilities, support personnel, computer software or equipment, library resources) are anticipated over the next calendar year by instituting this course?

No additional resources are needed. A trip to Nano Fabrication Center at Pennsylvania State University is planned which can be covered by travel awards within the STEM grants.

9) What courses will be taught as a result of shifting resources to this new course? What will be the expected impact of this course on other courses, sections, or students?

The course will not have any impact on other courses currently been offered.

10) Will there be a prerequisite?

Physical Science (SPH 100) or Physics II (SPH 212 or SPY 212) or General Chemistry (SCH 112)

11) What methods of instruction and learning will be used?

In class lecture, demonstration, inquiry based learning and field trip.

PART TWO

Below supply a one-paragraph justification explaining why this course is needed in addition to or in place of the current course offerings in your program or area. This justification will be included in the action sheet that is forwarded to the Provost and the Academic Affairs Council should the course be approved by the committee, and will serve to explain why your proposal should be implemented.

There is currently no course offered in this area. This course provides students a survey of the basic concepts and applications of a new and emerging field of Nanoscience and Nanotechnology. This course will help in motivating students to get into Nanoscience and Nanotechnology track which will increase their employability. This will also help to attract students to the Nanotechnolgy Associate of Science program offered by the department of Natural and Applied Sciences.

PART THREE

Please attach a draft syllabi and proposed catalog entry for your course, in addition to any other materials you think would be helpful in considering your proposal.

See attached syllabus.


The Conception of GCC- Specific Chimeric Antigen Receptors
Scott Waldman, Steven Hughes
Kimmel Cancer Center, Philadelphia, PA
Thomas Jefferson University
Abstract
Introduction
Methods
MACS T-Cell Purification
Results
T Cell Transduction Efficiency
T-Cell Activation and Expansion
Study Objective
Conclusion
Acknowledgements
Pacon
Tri-Fold Presentation Board
Tríptico para presentaciones
Panneau d'affichage à trois battants
48 in x 36 in • 12 ft²
1.2 m x 91.4 cm • 1.1 m²


Chandra Gadsden
Cheyney University of Pennsylvania
EXHIBITOR