Senate Bill No. 1415 -02

UNIVERSITY SENATE

UNIVERSITY AT ALBANY

STATE UNIVERSITY OF NEW YORK

Introduced by: Undergraduate Academic Council and
University Planning and Policy Council

Date: February 9, 2015

PROPOSAL TO ESTABLISH A BACHELOR OF SCIENCE IN COMPUTER ENGINEERING

IT IS HEREBY PROPOSED THAT THE FOLLOWING BE ADOPTED:

1. That the University Senate approves the attached Proposal as recommended by the Undergraduate Academic Council.

2. That the proposed program begin become effective with the Fall 2015 Semester.

3. That this proposal be forwarded to the President for approval.

New Program Proposal: Undergraduate Degree Program

Form 2A

Version 2014-11-17

This form should be used to seek SUNY's approval and New York State Education Department's (SED) registration of a proposed new academic program leading to an associate's and/or bachelor's degree. Approval and registration are both required before a proposed program can be promoted or advertised, or can enroll students. The campus Chief Executive or Chief Academic Officer should send a signed cover letter and this completed form (unless a different form applies[1]), which should include appended items that may be required for Sections 1 through 6, 9 and 10 and MPA-1 of this form, to the SUNY Provost at *program.review@suny.edu.* The completed form and appended items should be sent as a single, continuously paginated document.[2] If Sections 7 and 8 of this form apply, External Evaluation Reports and a single Institutional Response should also be sent, but in a separate electronic document. Guidance on academic program planning is available here.

Table of Contents

NOTE: Please update this Table of Contents automatically after the form has been completed. *To do this, put the cursor anywhere over the Table of Contents, right click, and, on the pop-up menus, select "Update Field" and then "Update Page Numbers Only." The last item in the Table of Contents is the List of Appended and/or Accompanying Items, but the actual appended items should continue the pagination.*

[1] Use a **different form** if the proposed new program will lead to a graduate degree or any credit-bearing certificate; be a combination of existing registered programs (i.e. for a multi-award or multi-institution program); be a breakout of a registered track or option in an existing registered program; or **lead to certification as a classroom teacher, school or district leader, or pupil personnel services professional** (e.g., school counselor).

[2] This email address limits attachments to 25 MB. If a file with the proposal and appended materials exceeds that limit, it should be emailed in parts.

Section 1. General Information		
a) Institutional Information	Date of Proposal:	
	Institution's 6-digit SED Code:	**210500**
	Institution's Name:	**University at Albany**
	Address:	**1400 Washington Avenue Albany NY 12222**
	Dept of Labor/Regent's Region:	**Capital Region**
b) Program Locations	List each campus where the entire program will be offered (with each institutional or branch campus 6-digit SED Code): **210500**	
	List the name and address of off-campus locations (i.e., extension sites or extension centers) where courses will offered, **or check here [X] if not applicable**:	
c) Proposed Program Information	Program Title:	**Computer Engineering**
	Award(s) (e.g., A.A., B.S.):	**BS**
	Number of Required Credits:	Minimum [**120**] If tracks or options, largest minimum [ ]
	Proposed HEGIS Code:	**0999**
	Proposed 6-digit CIP 2010 Code:	**14.0901**
	If the program will be accredited, list the accrediting agency and expected date of accreditation: **ABET (formerly the Accreditation Board for Engineering and Technology)** **Application will be submitted Summer 2017**	
	If applicable, list the SED professional licensure title(s)[3] to which the program leads:	
d) Campus Contact	Name and title: Celine Forsyth Assistant to the Dean Telephone: 518-442-3941 E-mail: cforsyth@albany.edu	
e) Chief Executive or Chief Academic Officer Approval	**Signature affirms that the proposal has met all applicable campus administrative and shared governance procedures for consultation, and the institution's commitment to support the proposed program. *E-signatures are acceptable.*** Name and title: **R. Timothy Mulcahy, Ph. D.** **Interim Senior Vice President for Academic Affairs and Provost** Signature and date:	
	If the program will be registered jointly[4] with one or more other institutions, provide the following information for each institution:	
	Partner institution's name and 6-digit SED Code:	
	Name, title, and signature of partner institution's CEO (or **append** a signed letter indicating approval of this proposal):	

3 If the proposed program leads to a professional license, a specialized form for the specific profession may need to accompany this proposal.

4 If the partner institution is non-degree-granting, see SED's CEO Memo 94-04.

Section 2. Program Information

2.1. Program Format

Check all SED-defined formats, mode and other program features that apply to the **entire program**.

a) Format(s): [ ]Day [ ]Evening [ ]Weekend [ ]Evening/Weekend [ ]Not Full-Time

b) Modes: **[X**]Standard [ ]Independent Study [ ]External [ ]Accelerated [ ]Distance Education
NOTE: *If the program is designed to enable students to complete 50% or more of the course requirements through distance education, check Distance Education, see Section 10, and* ***append*** *a Distance Education Format Proposal.*

c) Other: [ ] Bilingual [ ] Language Other Than English [ ] Upper Division [ ] Cooperative [ ] 4.5 year [ ] 5 year

2.2. Related Degree Program

NOTE: *This section is not applicable to a program leading to an associate's or a bachelor's degree.*

2.3. Program Description, Purposes and Planning

a) What is the description of the program as it will appear in the institution's catalog?

Computer Engineering

Computer engineering is a discipline that integrates computer hardware design with software design. Working with computing devices and systems, computer engineers draw from knowledge of electrical engineering, computer science, and basic mathematics and science to analyze and design solutions to computing problems.

The Bachelor of Science Degree in Computer Engineering is a student-centered industry-informed B.S. degree that leads to employment or research in the field of computer engineering. The computer engineering curriculum builds upon a base general engineering program that provides students with a broad foundation in engineering fundamentals, natural sciences, computer science, mathematics, communication skills, and laboratory experience. This base is then expanded to include a wide range of electrical and computer engineering topics via a series of required courses and technical electives. Currency in the industry is covered with electives that address emerging topics in computing such as multi-core processors, mobile communications, human/computer interface and VLSI and fabrication.

Students will develop proficiency in computing from a software and hardware perspective. They will solve, analyze, design, and build complex software and hardware components in diverse, collaborative teams to solve industry- informed relevant problems. With design opportunities embedded throughout the curriculum students will work directly with multiprocessors to build both software and hardware components, acquiring professional engineering skills that lead to an engineering undergraduate degree. Faculty and students work together to conduct research and create technologies to address present and future societal problems. By connecting with industry, students develop a commitment to professional and ethical engineering standards and a devotion to life-long learning.

Computer Engineers are hired in a wide variety of titles in the computer industry since they understand both the hardware and software elements of computing. Graduates will possess strong problem-solving, communication, and leadership skills. Industries involved in communication systems, high speed computing, computer design and software design hire computer engineers to work on teams of software and system engineers. Students can also serve a variety of public and private organizations.

b) What are the program's educational and, if appropriate, career objectives, and the program's primary student learning outcomes (SLOs)? ***NOTE: SLOs are defined by the Middle States Commission on Higher Education in the Characteristics of Excellence in Higher Education (2006) as "clearly articulated written statements, expressed in observable terms, of key learning outcomes: the knowledge, skills and competencies that students are expected to exhibit upon completion of the program."***

In support of ABET requirements, the Programmatic Educational Objectives for the Computer Engineering program are:

- Graduates will maintain professional and ethical standards.
- Graduates will design solutions to ambiguous, complex, and abstract real-world problems.
- Graduates will work effectively in diverse settings and communicate solutions to key stakeholders
- Graduates will participate in professional and community activities.

The Student Learning Outcomes of the Computer Engineering program are:

- The program must have documented student outcomes that prepare graduates to attain the program educational objectives.

  (a) an ability to apply knowledge of mathematics, science, and engineering

  (b) an ability to design and conduct experiments, as well as to analyze and interpret data

  (c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability

  (d) an ability to function on multidisciplinary teams

  (e) an ability to identify, formulate, and solve engineering problems

  (f) an understanding of professional and ethical responsibility

  (g) an ability to communicate effectively

  (h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context

  (i) a recognition of the need for, and an ability to engage in life-long learning

  (j) a knowledge of contemporary issues

  (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

c) How does the program relate to the institution's and SUNY's mission and strategic goals and priorities? What is the program's importance to the institution, and its relationship to existing and/or projected programs and its expected impact on them? As applicable, how does the program reflect diversity and/or international perspectives? For doctoral programs, what is this program's potential to achieve national and/or international prominence and distinction?

The Computer Engineering Degree Program at the University at Albany is aligned with President Jones' call to expand degrees and research in high growth, high needs areas. This multidisciplinary engineering program will attract a diverse pool of qualified, highly-motivated students engaged in computing at both a software and hardware level. The plan is for incoming freshman and upper division transfer classes to begin Fall 2015.

Computer Engineering will be the first of several engineering science degree programs in an evolving engineering profile for the University. This program, along with the creation of additional engineering science programs, will bring access to public high school students pursuing education engineering degrees in the Capital Region. It will enhance statewide

offerings in engineering and attract national and international engineering students interested in capitalizing on the reputation of the University.

The program will engage a diverse community of students. To ensure access by all students, admissions requirements are the same as the general requirements for admission to the University.

The Computer Engineering Program emphasizes each of the four key priorities outlined by President Jones. The degree expands degree-granting and research oriented programs offered by the University (Priority 1). Furthermore, this program will bring a high-growth and high-needs degree, with projected growth in demand, to the University and the Capital Region. The Computer Engineering educational program will increase out-of-state and international students recruitment options (Priority 2) by expanding the reputation and offerings of the University. The educational objectives, practical training, and skills included in the program were developed to engage a diverse community of students. Several of the program objectives deepen the University's engagement with the community (Priority 3). For example, one educational objective of the program is to have students participate in professional community activities. Finally, the Computer Engineering program helps the University to grow its financial resources (Priority 4) by adding a high-demand, high-growth program. The degree will expand the student body thereby increasing tuition revenue. Development of the engineering area should lead to increasing the amount of high quality research that is conducted at the University, thereby also increasing the number of grant applications and overall grant funding.

The Computer Engineering degree works towards several of the goals outlined in the University at Albany's Strategic Plan. The new program makes significant contributions to enhance the quality of undergraduate education (Undergraduate Education). The program description, program educational objectives, and student learning outcomes, all highlight several areas where this degree will make significant contributions to improving undergraduate education. The program develops high-demand skills of students, including skills specific to Computer Engineering (e.g., physics and electronics) and more general professional skills (e.g., oral and written communication, dealing with realistic industry economic or political constraints). The program has been developed to attract and serve a high quality and diverse group of students. The new Computer Engineering program also works to create an excellent student experience that integrates academic and co-curricular activities in the community and fosters life-long pride in the University (Student Experience). The program will include the renovation of teaching labs specifically for the Computer Engineering major along with space for faculty, teaching assistants and office personnel (Physical and IT Infrastructure). The program incorporates several elements to integrate co-curricular activities. Faculty and students will regularly work together outside of the classroom on research projects. Moreover, students will be required to work in collaborative teams to develop software and hardware solutions to relevant problems. These projects will develop the high-demand skills of students, while creating a positive and rewarding experience that is the start of a lifelong pride and relationship between students and the University. The goal of having students participate in professional community activities will increase the visibility and resources of the University (Community/Alumni Engagement).

d) How were faculty involved in the program's design? Describe input by external partners, if any (e.g., employers and institutions offering further education?

Faculty and staff have been meeting weekly since Fall, 2013 to create the curriculum necessary for proficiency in computer engineering and to match the outcomes of the program to its mission and goals. The interdisciplinary committee met with several consultants and Industry Partners to determine the essential intellectual and technical tools required for a 21st century computer engineer.

Using the December 2004 report on Curriculum Guidelines for Undergraduate Degree Programs in Computer Engineering from a Joint Task Force on Computer Engineering Curricula of the IEEE Computer Society and the Association for Computing Machines, the committee mapped 71% of the 185 topics embedded in the 16 Bodies of Knowledge with existing courses here at the University in physics, mathematics, and computer science. This work identified four content areas that required new course construction in computer systems engineering, digital signal processing, VLSI design and fabrication, and human computer interaction. Although the document was created in 2004 and the updated version is not due out until 2015, the committee was able to verify that the revised document will contain several emerging technologies all of which have been part of the committee's discussion on keeping the content current. Topics such as Systems on a Chip; Field Programmable Gate Array, Multicore processors, Security (especially for networked and embedded devices), mobile, power-aware systems, software and validation and verification of hardware, and hardware/software systems, are all emerging as topics necessary to understand the present state of industry needs. The curriculum of the Computer

Engineering major is flexible enough to allow these topics to be integrated into the curriculum through new computer engineering courses and student-selected electives.

e) How did input, if any, from external partners (e.g., educational institutions and employers) or standards influence the program's design? If the program is designed to meet specialized accreditation or other external standards, such as the educational requirements in Commissioner's Regulations for the Profession**, *append* a side-by-side chart to show how the program's components meet those external standards. If SED's Office of the Professions requires a** specialized form **for the profession to which the proposed program leads, *append* a completed form at the end of this document.**

Three external consultants were hired to direct the development of the program. Dr. William Sanders, Interim Department Head from the Department of Electrical and Computer Engineering at The University of Illinois, Urbana Champagne met with the Computer Engineering team at UAlbany to answer questions and describe successful computer engineering programs. He also met with key academic leaders to identify the next steps in creating an engineering profile on campus. Dr. Allen Downey, Professor of Computer Science from Olin College of Engineering, a new progressive engineering school, met with the team to introduce an engaged learning model. The focus on student learning, in addition to program objectives and student learning outcomes, provided a foundation to build the curriculum and discuss ways to integrate industry needs into the teaching environment. Professor David Soldan, from the Electrical & Computer Engineering Department in the College of Engineering at Kansas State University was instrumental in embedding ABET requirements into the development of the curriculum and providing expertise on lab construction and course offerings.

Meetings with industry representatives and partners took place during the spring 2014 semester. Information from those meetings was used in the development of the programmatic objectives, student learning outcomes, course content, instructional equipment, and design projects. Based on their recommendations the following changes were made to the curriculum and the design requirements:

- Increased design lab time in the curriculum providing a two semester 12 credit design lab
- Included the use of Open Source experience for students
- Embedded the use of small robotic devices for teaching and design labs
- Reduced the number of electives in computer science and reordered, removed and added course topics

Several educational partners were invited to campus to discuss the curriculum and they advised on inclusion of topics, order of delivery and student needs. They also were able to work directly with our faculty, answer questions on specific topics within certain courses and provide advice on emerging topics in the field in order to maintain currency in the program.

Conversations and meetings have taken place with community college partners. The program will enroll upper division students along with incoming freshman the first semester it is offered. These partners provided input on the first two years of the program to insure seamless transfer for their students. They also provided advice on teaching labs, virtual spaces, computer languages and computer and other equipment for the delivery of the first two years. Articulation agreements are under way.

Computer Engineers do not need a professional license, but are permitted to sit for the exams if they decide to do so. Graduates from this program will be prepared for Part 1 - NCEES Fundamentals of Engineering.

The program is built to meet ABET accreditation standards. This international professional organization insures that industry standards are met through a rigorous evaluation process based on established requirements for all engineering programs. Accreditation through ABET is the gold standard and will raise the profile of UAlbany's Computer Engineering program so it can compete for students from the Capital District and beyond.

Application for ABET accreditation will take place following the first graduating class in May 2017, per ABET requirements. At that time, the University will submit the necessary documentation for ABET review. Faculty will be trained on ABET requirements and will attend several ABET regional meetings so that the program is delivered in a manner that will ensure a successful accreditation application.

See Appendix 1 for side-by-side chart of accreditation requirements and program components.

f) Enter anticipated enrollments for Years 1 through 5 in the table below. How were they determined, and what assumptions were used? What contingencies exist if anticipated enrollments are not achieved?

Year	Anticipated Headcount Enrollment			Estimated FTE
	Full-time	Part-time	Total	
1	36		36	36
2	69		69	69
3	84		84	84
4	99		99	99
5	99		99	99

The classes included in the Computer Engineering program are designed to be small, interactive and intensive. The enrollment projections derive from the number of sections to be offered, and from anticipating both freshman and transfer admissions. Additionally, retention of students will be a priority for program administrators, and keeping sections smaller will aid in student retention. At a minimum we would expect a retention rate comparable to the University retention rate.

Both the program and student performance will be assessed regularly. This will allow the program to offer additional targeted academic assistance as necessary.

The University is committed to the development and growth of Computer Engineering. If the anticipated enrollments are lower than expected, a variety of university personnel will collaborate to identify if the enrollments reflect a programmatic issue or environmental issues. Any programmatic issues will be quickly addressed.

g) Outline all curricular requirements for the proposed program, including prerequisite, core, specialization (track, concentration), internship, capstone, and any other relevant component requirements, but do not list each General Education course.

Course Title	Credits
Computer Engineering	
ICEN 140 Intro to Engineering Design	3
ICEN 150 Intro to Engineering Analysis	3
ICEN 340 Digital Logic Design	3
ICEN 350 Signals and Systems	3
ICEN 353 Micro Processor Applications	3
ICEN 415 Electronics	3
ICEN 430 Systems Analysis and Design	3
ICEN 440 Design Lab I	3
ICEN 450 Design Lab II	6
ICEN 454 Micro Processor Applications Laboratory	3
Computer Science	
ICEN 201 Introduction to Computer Science	4
ICEN 213 Data Structures	3
ICEN 210 Discrete Structures	4
ICEN 333 Programming at the Hardware/Software Interface	4
ICEN 400 Operating Systems	3
ICEN 404 Computer Organization	3
ICEN 416 Computer Network Communications	3

Course Title	Credits
Math and Science	
AMAT 112 Calculus I	4
AMAT 113 Calculus II	4
AMAT 214 Calculus III	4
AMAT 220 Linear Algebra	3
AMAT 311 Ordinary Differential Equations	3
AMAT 37 Probability and Statistics for Engineering and the Sciences	3
APHY 140/145 Physics 1 with Lab	4
APHY 150/155 Physics 11 with Lab	4
ACHM 120/124 Chemistry 1 with Lab	4
Computer Engineering Electives	**12 cr from:**
ICEN 360 Emerging Technologies	(3)
ICEN 370 Digital Signal Processing	(3)
ICEN 460 Mobile Design Engineering	(3)
ICEN 470 Human Computer Interaction	(3)
ICEN 480 VLSI Design & Fabrication	(3)
ICSI 311 Principles of Programming Languages	(3)
ICSI 402 Systems Programming	(3)
ICSI 403 Algorithms and Data Structures	(3)
ICSI 405 Object Oriented Programming	(3)
ICSI 410 Introduction to Databases	(3)
ICSI 411 Database Performance Principles & Transaction Management	(3)
ICSI 418 Software Engineering	(3)

Total required credits: 102

h) Program Impact on SUNY and New York State

h)(1) *Need:* What is the need for the proposed program in terms of the clientele it will serve and the educational and/or economic needs of the area and New York State? How was need determined? Why are similar programs, if any, not meeting the need?

In the Capital District, engineering degrees are available only at private institutions, (RPI and Union) with tuition costs upwards of $40,000. Students who cannot afford the price tag of private tuition are forced to leave the area to access a public education in engineering above the 2-year level. Many of those students will never return to our region causing a regional drain of talent and expertise. This program will provide access to an affordable engineering degree in the Capital District. It will raise the number of trained engineers in the Capital District and will increase the pool of candidates in computing technology for local industries.

Computer Engineering is a term that has been used to identify those computer professionals whose skills fall within a continuum of expertise from software to electrical hardware. Programs will tend toward one end of the continuum or the other. The UAlbany Computer Engineering program covers content across the continuum with a strong association with the Computer Science offerings here at the college and the electrical engineering offerings from the Physics department. Because of the inclusion of the various disciplines our graduates bring a unique skill set to complex industry problems. Their skills fall within the intersection of engineering and computer software development and systems analysis/systems design making them the perfect member of a team employee for software development industries and hardware design companies who focus on providing customized computer solutions to their customer base.

It is the nature of the ever changing computer industry that titles morph along with the demand for skills. Many varied titles in computer development, analysis and design require the skills our graduates will acquire through this program making them employable across multiple titles and industries with strong employment growth. For example, software engineering and software developer are interchangeable for the software focus of our computer engineering degree. U.S. Bureau of Labor Statistics lists Software Engineer as the # 3 best job of 2013, with a 30% growth and a average salary of $90,530 - (http://www.careercast.com/slide/best-jobs-2013-3-software-engineer) In fact, the same site lists Software Engineer as the # 1 best job for 2012 - http://www.careercast.com/jobs-rated/10-best-jobs-2012. US News is stating that Software Developer is the number 1 job for 2012 and again in 2014 - http://money.usnews.com/careers/best-jobs/software-developer.

NYS DOL Employment Projections for the various titles:

SOC Code[1]	Title	Employment		Change		Annual Average Openings		
		2012	2022	Net	Percent	Total	Growth	Replacement
15-1121	Computer Systems Analysts	2,960	3,240	280	9.5%	90	30	60
15-1131	Computer Programmers	3,030	3,050	20	0.7%	70	0	70
15-1132	Software Developers, Applications	1,460	1,800	340	23.3%	60	40	20
15-1133	Software Developers, Systems Software	590	830	240	40.7%	40	30	10

The Bureau of Labor Statistics lists the fasted growing jobs in the state as:

SOC Code	Job Title	Percent Change	Employment	
			2008	2018
15-1031	Computer Software Engineers, Applications	14.8%	1,620	1,860
15-1032	Computer Software Engineers, Systems Software	19.6%	560	670
15-1031	Computer Software Engineers, Applications	14.8%	1,620	1,860
15-1051	Computer Systems Analysts	9.7%	1,760	1,930

Employment of computer hardware engineers is projected to grow 7% from 2012 to 2022, slower than the average for all occupations. A limited number of engineers will be needed to meet the demand for new computer hardware because more of the technology innovation takes place with software than with hardware. However, computer engineers and several comparable titles such as computer systems analysts, systems, and software and network engineers can meet industry needs for hardware and software positions. All are employable with a bachelor's degree and computer engineers are likely to enjoy excellent job prospects, because many companies report difficulties finding these highly skilled professionals

h)(2) ***Employment:*** **For programs designed to prepare graduates for immediate employment, use the table below to list potential employers of graduates that have requested establishment of the program and state their specific number of positions needed. If letters from employers support the program, they may be *appended* at the end of this form.**

Employer	*Need: Projected positions*	
	In initial year	In fifth year
Vicarious Visions	10	30
IBM	500	

See **Appendix 2** for letters of support from other employers and graduate program.

h)(3) ***Similar Programs:*** **Use the table below to list similar programs at other institutions, public and independent, in the service area, region and state, as appropriate. Expand the table as needed.** ***NOTE:*** *Detailed program-level information for SUNY institutions is available in the Academic Program Enterprise System (APES) or Academic Program Dashboards. Institutional research and information security officers at your campus should be able to help provide access to these password-protected sites. For non-SUNY programs, program titles and degree information – but no enrollment data – is available from SED's Inventory of Registered Programs.*

Institution	Program Title	Degree	Enrollment
Binghamton University	Computer Engineering	BS	114
Buffalo University	Computer Engineering	BS	192
Stony Brook University	Computer Engineering	BS	132
Rensselaer Polytechnic Institute	Computer and Systems Engineering	BS	229
Union College	Computer Engineering	BS	60

h)(4) **C*ollaboration:* Did this program's design benefit from consultation with other SUNY campuses? If so, what was that consultation and its result?**

The design and layout of the Computer Engineering programs at Binghamton, Buffalo, Stony Brook and New Paltz were reviewed and consulted at various points during our program design phase. With an eye toward ABET accreditation, we ensured that common elements between those programs were also part of ours. We learned about when they introduced different topics, and which classes they combined or separated. We were also able to identify and resolve curricular

problems along the way. Our SUNY partners offered model curricula with which we built our own. Consultations with our two-year community college partners concerned the SUNY Transfer Path courses, assisting us to ensure Seamless Transfer for their students.

h)(5) ***Concerns or Objections:*** **If concerns and/or objections were raised by other SUNY campuses, how were they resolved?**

No comments were received from other SUNY campuses during the 30 day comment period.

h)(6) ***Undergraduate Transfer:*** The State University views as one of its highest priorities the facilitation of transfer for undergraduate students. To demonstrate adequate planning for transfer under SUNY's student mobility policy, **Section 9** of this form on **SUNY Undergraduate Transfer** must be completed for programs leading to Associate in Arts (A.A.) and Associate in Science (A.S.) and for baccalaureate programs anticipating transfer enrollment.

2.4. Admissions

a) What are all admission requirements for students in this program? Please note those that differ from the institution's minimum admissions requirements and explain why they differ.

All students eligible for admission to the University at Albany may opt to major in Computer Engineering.

Computer Engineering is an unrestricted major. At the University at Albany, students may declare a major after completion of 24 credits. The program has been designed to comply with the SUNY Transfer Path for Computer Engineering, so that transfer students who satisfactorily complete a 2 year program that follows the Transfer Path will be able to seamlessly transfer into their junior year in this program.

b) What is the process for evaluating exceptions to those requirements?

N/A

c) How will the institution encourage enrollment in this program by persons from groups historically underrepresented in the institution, discipline or occupation?

Connections will be established with several engineering organizations. These include The Society of Women Engineers, The NYS Society of Professional Engineers, the University at Albany College of Computing Women In Technology program, and the Two Year Engineering Science Association. By participating in targeted events through these networks, such as high school engineering competitions, a recruitment pipeline will be created specifically for women and students of color typically underrepresented in computing professions.

Some incoming first time and transfer students will be supported through the Educational Opportunity Program (EOP), the Collegiate Science and Technology Entry Program (CSTEP) and engineering "boot camp" experiences prior to the start of the fall semester.

2.5. Academic and Other Support Services

Summarize the academic advising and support services available to help students succeed in the program.

To ensure student success bridge programs will be offered during the summer before the start of the Fall semester beginning in the summer of 2015. These bridge programs will prepare students in mathematics and science to transition to university level academic expectations. In addition, orientation for engineering science students will start the process of creating a community of like-minded students who can work together from the very first day to ensure each other's success.

In keeping with our belief that engaged students are successful students, engineering science students will be part of a professional community that connects through a living-learning community, association with industry representatives, common co-curricular activities, and connections to professional engineering organizations. Through the efforts of the Student Success division, EOP, CSTEP and the College of Computing and Information (CCI), students will have the

opportunity to participate in group activities, community engagement experiences, and student clubs and organizations focused on the role of engineering in society. Career Services will create career fairs where students can interact with industry representatives to learn about employment options and arrange optional internship and co-op opportunities. A student chapter of the Institute of Electrical and Electronics Engineers (IEEE) will be formed under the leadership of the newly hired computer-engineering faculty, and perhaps even a student chapter of Engineers without Borders will be created. This will provide UAlbany students access to regional and national professional opportunities and connect them to engineering students around the globe meeting the University motto of "The World Within Reach."

The Advisement Services Center at the University at Albany provides mandatory academic advising for all students until they have completed their first year and/or are admitted into their academic major of choice – whichever comes later. Each student is assigned an individual academic advisor and is encouraged to meet regularly with that advisor. The advisor will provide assistance in making a successful transition to college-level studies.

Once a student decides to major in Computer Engineering, and has completed at least a year of study, that student will be advised by the Computer Engineering academic advisor. This advisor will be a Staff Associate hired to support the program. The Staff Associate in conjunction with the department faculty will perform all the traditional functions of advisement: general mentoring, orientation to the major, substantive and procedural advisement in the major, supervision of many internships and orientation to the career world.

Advising PLUS is a university-wide service that offers "the help you need, when you need it." Students in academic difficulty receive personal consultation in which the source of the difficulty is identified, and a strategy for addressing it is created. Advising PLUS sponsors review sessions, individual tutoring, facilitates referrals and follow up to services such as departmental tutoring, university counseling, and the full range of student appeals and services available on campus.

2.6. Prior Learning Assessment

If this program will grant credit based on Prior Learning Assessment, describe the methods of evaluating the learning and the maximum number of credits allowed, **or check here [X] if not applicable**.

2.7. Program Assessment and Improvement

Describe how this program's achievement of its objectives will be assessed, in accordance with *SUNY policy*, including the date of the program's initial assessment and the length (in years) of the assessment cycle. Explain plans for assessing achievement of students learning outcomes during the program and success after completion of the program. *Append* at the end of this form, *a plan or curriculum map* showing the courses in which the program's educational and, if appropriate, career objectives – from Item 2.3(b) of this form – will be taught and assessed. *NOTE: The University Faculty Senate's Guide for the Evaluation of Undergraduate Programs is a helpful reference.*

To apply for ABET accreditation in Spring 17 following the first graduating class, the Computer Engineering program must complete an application including data on student learning outcomes and completed assessments. Examples of the assessment of student work are part of this application. To structure and support this level of assessment, the Staff Associate will be charged with collecting student work to demonstrate accomplishment of student performance on each student learning outcome.

Once accredited by ABET, the Computer Engineering program will participate in an accreditation review every 6 years by ABET.

Annually, a review of the outcomes data collected by the faculty will be reviewed at a departmental retreat to be held each spring. The retreat will provide faculty an opportunity to reassess performance measures, assessment tools and student performance in order to make changes for the next assessment round.

See Appendix 3 for curriculum map detailing educational objectives in specific coursework.

Section 3. Program Schedule and Curriculum

Complete the *SUNY Undergraduate Program Schedule* to show how a typical student may progress through the program. This is the registered curriculum, so please be precise. Enter required courses where applicable, and enter generic course types for electives or options. Either complete the blank Schedule that appears in this section, or complete an Excel equivalent that computes all sums for you, and can be found here. Rows for terms that are not required can be deleted.

Please see **Appendix 4** for SUNY Undergraduate Sample Program Schedule

a) **If the program will be offered through a nontraditional schedule (i.e., not on a semester calendar), what is the schedule and how does it impact financial aid eligibility? *NOTE: Consult with your campus financial aid administrator for information about nontraditional schedules and financial aid eligibility.***

N/A

b) For *each existing course* that is part of the proposed undergraduate major (including cognates and restricted electives, but not including general education), *append a catalog description* at the end of this document,.

See **Appendix 5** for Existing Course Descriptions

c) For *each new course* in the undergraduate program, *append a syllabus* at the end of this document. *NOTE:* Syllabi for all courses should be available upon request. Each syllabus should show that all work for credit is college level and of the appropriate rigor. Syllabi generally include a course description, prerequisites and corequisites, the number of lecture and/or other contact hours per week, credits allocated (consistent with *SUNY policy on credit/contact hours*), general course requirements, and expected student learning outcomes.

See **Appendix 6** for new course syllabi

d) If the program requires external instruction, such as clinical or field experience, agency placement, an internship, fieldwork, or cooperative education, append a completed External Instruction form at the end of this document.

N/A

Section 4. Faculty

a) Complete the **SUNY Faculty Table** on the next page to describe current faculty and to-be-hired (TBH) faculty.

b) Append **at the end of this document position descriptions or announcements for each to-be-hired faculty member.**

See **Appendix 7** for vacancy announcements.

NOTE: *CVs for all faculty should be available upon request. Faculty CVs should include rank and employment status, educational and employment background, professional affiliations and activities, important awards and recognition, publications (noting refereed journal articles), and brief descriptions of research and other externally funded projects. New York State's requirements for faculty qualifications are in Part 52.2(b) of the Regulations of the Commissioner of Education.*

c) What is the institution's definition of "full-time" faculty? A full time faculty member is one who holds an appointment with a 100% time commitment.

SUNY Faculty Table

Provide information on current and prospective faculty members (identifying those at off-campus locations) who will be expected to teach any course in the major. Expand the table as needed. Use a separate Faculty Table for each institution if the program is a multi-institution program.

(a)	(b)	(c)	(d)	(e)	(f)
Faculty Member Name and Title/Rank **(Include and identify Program Director with an asterisk.)**	**% of Time Dedicated to This Program**	**Program Courses Which May Be Taught** **(Number and Title)**	**Highest and Other Applicable Earned Degrees (include College or University)**	**Discipline(s) of Highest and Other Applicable Earned Degrees**	**Additional Qualifications: List related certifications, licenses and professional experience in field.**
PART 1. Full-Time Faculty					
Seth Chaiken, Associate Professor, Computer Science	40%	I CEN 333 (*Hard/Software Interface*), I CEN 213 (*Data Structures*), I CEN 210 (*Discrete Structures*)	Ph.D., Massachusetts Institute of Technology; BS, The Cooper Union	Mathematics; Physics	
Saj Alam, Professor	40%	I CEN 353 *(Micro Process)*, I CEN 415 *(Electronics*), I CEN 454 (*Micro Process Apps)*	Ph.D. Indiana University Bloomington	Experimental Particle Physics	
Carolyn MacDonald, Professor	20%	I CEN 353 *(Micro Process)*, I CEN 415 *(Electronics*), I CEN 454 (*Micro Process Apps)*	Ph.D. Harvard University	Applied Physics (Materials Science)	Chair, Physics Department; Director, Ualbany Center for X-RAY Optics;
Neil Murray, Professor	20%	I CEN 404 (*Computer Organization*), I CEN 400 (*Operating System*), I CEN 416 *(Communications)*, I CEN 333 (*Hard/Software Interface)*, I CEN 213 (*Data Structures*), I CEN 210 *(Discrete Structures)*	Ph.D. Syracuse University; BS Cornell University	Computer and Information Science; Engineering Physics	Chair, Computer Science Department; Referree "IEEE Computer Journal."

Jeong-Hyon Hwang, Assistant Professor	20%	I CEN 404 (*Computer Organization*), I CEN 400 (*Operating System*), I CEN 416 *(Communications)*, I CEN 333 (*Hard/Software Interface)*, I CEN 213 (*Data Structures*), I CEN 210 *(Discrete Structures)*	Ph.D., Brown University; MS and BS, Korea University	Computer Science; Computer Science and Engineering; Math	
Siwei Lyu, Assistant Professor	20%	I CEN 404 (*Computer Organization*), I CEN 400 (*Operating System*), I CEN 416 *(Communications)*, I CEN 333 (*Hard/Software Interface)*, I CEN 213 (*Data Structures*), I CEN 210 *(Discrete Structures)*	Ph.D. Dartmouth University	Computer Science	
Guy Cortesi, Visiting Professor, Administrative Duties	100%	I CEN 140 (*Intro to Engr Design*), I CEN 150 *(Intro to Engr Analysis)*	Ph.D. University at Albany; MBA, East Tennessee State University; BS Clarkson University	Information Science; Business Administration; Electrical and Computer Engineering	Experienced computer engineer, college instructor, and technology business CEO.
Petko Bogdanov, Assistant Professor	20%	I CEN 470 (*Human Computer Interaction*), I CEN 480 (*VLSI Design & Fabrication)*	Ph.D University of California Santa Barbara; BEng, Technical University- Sofia	Computer Science and Engineering	Formerly Senior Software Engineer
Mariya Zhivkova Zheleva, Visiting Associate Professor	20%	I CEN 440 *(Design Lab I)*, I CEN 450 (*Design Lab II)*	Ph.D University of California Santa Barbara; MEng and BEng, Technical University- Sofia	Computer Science and Engineering	Reviewer for IEEE Transactions on Mobile Computing, Computer Communications and IEEE International Conference on Communications
Part 2. Part Time Faculty					
n/a					
Part 3. Faculty To-Be-Hired (List as TBH1, TBH2, etc., and provide title/rank and expected hiring date.)					

TBH1, Professor, Department Head Computer Engineering, Summer 2015	100%	I CEN 140 (*Intro to Engr Design*), I CEN 150 *(Intro to Engr Analysis)*	Ph.D.		
TBH2, Assistant Professor, Fall 2015	100%	I CEN 340 (*Digital Logic Design*), I CEN 350 (*Signals & Systems)*, I CEN 360 (*Emerging Technologies*), I CEN 370 (*Digital Signal Processing*)	Ph.D.		
TBH 3, Assistant Professor, Fall 2015	100%	I CEN 440 (*Design Lab I),* I CEN 450 (*Design Lab II)*	Ph.D.		
TBH4, Assistant Professor, Fall 2015	100%	I CEN 470 (*Human Computer Interaction),* I CEN 480 *(VLSI Design & Fabrication)*	Ph.D.		

Section 5. Financial Resources and Instructional Facilities

a) What is the resource plan for ensuring the success of the proposed program over time? Summarize the instructional facilities and equipment committed to ensure the success of the program. Please explain new and/or reallocated resources over the first five years for operations, including faculty and other personnel, the library, equipment, laboratories, and supplies. Also include resources for capital projects and other expenses.

The development of the program has been funded by the 2013 SUNY High Needs Grant for personnel and consultant fees to assist in developing the curriculum and identifying program needs. A budget was submitted for the 2014-2015 Academic Year which included one-time startup costs, first year implementation costs and cost for the delivery of instruction and personnel costs over the next four years. The budget was included in the 2014-2015 budget cycle to establish the department, hire a chair and three tenure track faculty and a visiting professor. Over time, increases in enrollment will support the cost of the program.

The budget for the program includes the cost of new faculty to deliver the computer engineering coursework which constitutes approximately 20% of the required coursework. The rest of the program, courses in physics, mathematics and general education will be offered by existing faculty in computer science and the College of Arts and Science. The budget allows for supplemental resources to absorb the impact of increased enrollment in these classes.

Lab needs for Computer Engineering are not as cost prohibitive as other engineering programs such as mechanical, electrical and civil. Instead, small electronic devices such as microprocessors can be purchased at reasonable rates by the students while the University can provide supplies such as components, wires and soldering needs within its budget. Equipment such as oscilloscopes and function generators will need to be purchased, and are accounted for in the start- up costs. Access to data and instructional technology is comparable to other University teaching spaces.

The program requires sufficient square footage for two design labs to accommodate the freshman and senior design labs. Campus Facilities has identified vacant space that can be used to meet the design needs of the program with minimal renovations at no cost to the program.

The Library has submitted an extensive review of existing and potential holdings to support the computer engineering program. The cost of the additional needs has been included in the budget for the first five years.

b) Complete the five-year SUNY Program Expenses Table, below, consistent with the resource plan summary. Enter the anticipated <u>academic years</u> in the top row of this table. List all resources that will be engaged specifically as a result of the proposed program (e.g., a new faculty position or additional library resources). If they represent a continuing cost, new resources for a given year should be included in the subsequent year(s), with adjustments for inflation or negotiated compensation. Include explanatory notes as needed.

SUNY Program Expenses Table

(OPTION: You can paste an Excel version of this schedule AFTER this sentence, and delete the table below.)

SUNY Program Expenses Table

SUNY Program Expenses Table

Program Expense Categories	Expenses (in dollars)					
	Before Start	**Academic Year 1:**	**Academic Year 2:**	**Academic Year 3:**	**Academic Year 4:**	**Academic Year 5:**
YEAR (example 2013)	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
(a) Personnel (including faculty and all others)	$75,000	$768,667	$698,030	$725,811	$738,847	$752,144
(b) Library	$0	$34,670	$36,404	$38,224	$40,135	$42,142
(c) Equipment	$95,000					
(d) Laboratories	$150,000					
(e) Supplies	$27,500	$55,575	$82,954	$74,506	$47,781	$50,170
(f) Capital Expenses	$140,000					
(g) Other (Specify): Search Expenses	$60,000					
Phones/Copier		$4,400	$4,400	$4,400	$4,400	$4,400
Research Start Up	$200,000	$600,000				
(h) Sum of Rows Above	**$747,500**	**$1,463,312**	**$821,788**	**$842,941**	**$831,163**	**$848,856**

Explanatory notes:

Section 6. Library Resources

a) Summarize the analysis of library collection resources and needs *for this program* by the collection librarian and program faculty. Include an assessment of existing library resources and accessibility to those resources for students enrolled in the program in all formats, including the institution's implementation of SUNY Connect, the SUNY-wide electronic library program.

The University Libraries collect, house, and provide access to all types of published materials in support of the research and teaching of the schools, colleges, and academic departments of the University. This evaluation considers those portions of the libraries' collections and services that would support a B.S. degree in Computer Engineering.

Library Collections

The University Libraries are among the top 115 research libraries in the country. The University Library, the Science Library, and the Dewey Graduate Library contain more than two million volumes and over 2.9 million microforms. The Libraries provide access to more 75,000 online journals and over 117,000 online books.

Whenever possible, current subscriptions are available online. Additionally, the Libraries serve as a selective depository for U.S. Government publications and house collections of software and media.

The Science Library, which opened in September 1999, occupies 61,124 square feet on four floors. The Science Library serves the entire University at Albany community, but contains collections supporting the departments of Atmospheric and Environmental Sciences, Biological Sciences, Chemistry, Computer Science, Mathematics and Statistics, Physics, Psychology, and the College of Nanoscale Science and Engineering. Approximately 600,000 volumes in the science and technology subject areas (Q-TP of the Library of Congress classification scheme) are housed in this library. Online resources (journals, databases, e-books, digital libraries) are available on and off campus, all hours of the day.

Books

Currently, it is estimated that there are over 20,000 books in those portions of the Library of Congress (LC) classification scheme which relate to computing and computer science; specifically in LC classes QA 76 (computer science), Q 327 (pattern recognition), Q 335-336 (artificial intelligence), QA 267-268 (machine theory), TA 1630-1650 (image processing), TK 5105 (computer networks), and TK 7880-7895 (computer electronics and hardware).

To assess to strength of the book collection in computer science, a study was conducted in 2008. The University Libraries book holdings were compared to the listing in the "Computing" chapter of *RCL: Resources for College Libraries* (volume 5: *Science and Technology*) on pages 335 to 349 (Chicago: American Library Association, 2007). The study showed that the University Libraries have 180 of 231 (77.9%) of the books listed, which indicates a strong collection.

The books in the current collection will support the computer science courses as well as some of the computer engineering courses in the curriculum. However, additional books will be needed. To create a basic undergraduate book collection for computer engineering, *RCL: Resources for College Libraries* (RCLweb.net) was consulted. The online version was updated in 2013. It provides a list of core titles that are essential for undergraduate study. The computer engineering section contains 29 books; the University Libraries have 10 of the books and one book is being requested in the Reference Resources section below. It is recommended that the remaining 18 books should be acquired at a cost of $2,447.

The University Libraries acquire books on approval using the services of Yankee Book Peddler (YBP). Most academic subjects have approval plans. The approval plan is used to obtain from selected major publishers and university presses newly published English language books written at the university level. Books are acquired according to a profile, which outlines subject areas to be included or excluded. YBP generated a list of computer engineering books that would fit the University Libraries' profile and were published during the 2013/2014 fiscal year. The list includes 17 books that cost $1,591. It is recommended that $1,600 be allotted annually for an approval plan.

Books not received on approval may be selected by the subject specialist and acquired through the direct order process. This includes books and other materials from publishers not covered by the approval plan. YBP also generated a list of books that would not be covered by the approval profile. The list contains 35 books that cost $4,770. Although all of the books in the YBP list may not be acquired, books from other publishers and other resources like conference proceedings and videos need to be considered. It is recommended that $6,000 be provided annually for direct ordering.

Reference Collection

The Science Library reference collection houses many reference resources for computing and computer science; some of these resources also cover computer engineering. These include guides to the literature, dictionaries, encyclopedias, biographical sources, handbooks, and style guides. Some of the resources are:

The Computer Science and Engineering Handbook, CRC Press, 1997.
A Dictionary of Computing, Oxford University Press, 2008. (also available online)
Encyclopedia of Computer Science and Technology, Facts on File, 2009.
Encyclopedia of Computers and Computer History, Fitzroy Dearborn, 2001.
International Biographical Dictionary of Computer Pioneers, Fitzroy Dearborn, 1995.
The International Dictionary of Data Communications, Global Professional Pub., 2011.
The Internet Encyclopedia (3 volumes), Wiley, 2004. (in the University Library)
Using the Engineering Literature, CRC Press, 2012.

There are also several online resources, such as:

The Computer Desktop Encyclopedia, The Computer Language Co. Inc., 1981-2014.
Computer Sciences, Macmillan, 2002.
Computer Vision: A Reference Guide, Springer, 2014.
A Dictionary of the Internet, Oxford University Press, 2009.
Encyclopedia of Computer Science, Wiley, 2003.
Handbook of Semantic Web Technologies, Springer, 2011.
Network Performance Engineering, Springer, 2011.

Despite the availability of these print and online resources, it is recommended that the following reference resources that focus on computer engineering and technology be acquired:

Computer Engineering Handbook, 2nd edition, CRC Press, 2008. ($180)
Computing Handbook: Information Systems and Information Technology, 3rd edition, CRC Press, 2014. ($225)
Newton's Telecom Dictionary, 27th edition, Flatiron Books, 2013. ($40)
Understanding Digital Signal Processing, 3rd edition, Prentice Hall, 2010. ($115)
Wiley Encyclopedia of Computer Science and Engineering (5 volumes), Wiley, 2009. ($2,025)

The total cost of these resources is $2,585. In addition, it is recommended that $750 be added to the existing Science Library reference budget to purchase new reference resources for computer engineering each year.

Journals and Magazines

The University Libraries' subscriptions to the *ACM (Association for Computing Machinery) Digital Library* and the *IEEE Computer Society Digital Library* provide access to nearly 60 scholarly journals. There are also subscriptions to scholarly journals from publishers like Elsevier *(ScienceDirect),* Springer, and Wiley. To assess the journals collection from publishers other than the ACM and IEEE Computer Society, the University Libraries collection was compared to a list of "major scholarly journals" in the "Computer Engineering" chapter of *Using the Engineering Literature*, edited by Bonnie A. Osif, CRC Press, 2012. This study found that the University Libraries provide access to 22 of 28 (78.6%) of the journals listed. Considering access is provided to the journals of the ACM and IEEE Computer Society along with the 22 journals from other publishers, it can be concluded that the scholarly journal collection is reasonably strong. It should be noted that 11 of the 22 journals are published by Elsevier, and are part of the *ScienceDirect* collection. The SUNY-wide *ScienceDirect* contract is currently under negotiation. The following 9 computer engineering-related journals are included in *ScienceDirect* (2 journals are among the computer science titles):

Computer Communications ($2,667)
Computer Systems Science and Engineering ($1,485)
Computers and Electrical Engineering ($2,183)
Displays ($1,156)
Integration, the VLSI Journal ($1,141)
Journal of Network and Computer Applications ($1,200)
Journal of Systems Architecture ($1,983)
Microprocessors and Microsystems ($1,154)
Performance Evaluation ($2,424)

At the time this report is being prepared, library management is hopeful that there will be an agreement between SUNY and Elsevier. The total 2014 subscription cost for the 9 Elsevier journals is $15,393.

In addition, new faculty should be given the opportunity to select journals in their areas of research that we do not subscribe to. If the 4 new faculty each select 3 journals, at an average cost of $1,774 for engineering journals, the total cost would be $21,288.

The *ACM Digital Library* and the *IEEE Computer Society Digital Library* also contain 24 magazines. Furthermore, the University Libraries provide access to many more computing magazines through its subscriptions to full text aggregator databases like *Applied Sciences and Technology Source*, *Computer Source*, *Academic Search Complete*, and *Academic OneFile*. The University Libraries also maintains subscriptions to 5 print magazines. No additional magazine resources are required.

Conference Proceedings

Conferences are an important means for communicating the latest developments in computer engineering. Major associations sponsor numerous conferences each year. Those associations include the Association for Computing Machinery (ACM), the IEEE Computer Society, the British Computer Society, and the IET (Institution of Engineering and Technology). Several databases, which are described below, index conference proceedings. The University Libraries subscribe to the *ACM Digital Library* and the *IEEE Computer Society Digital Library*. These collections include the conferences proceedings of the ACM, IEEE Computer Society, and related organizations. The University Libraries also subscribe to the *Springer Computer Science E-book Collection*. Many of the dozens of new e-books added to this collection each month are conference proceedings from around the world. The British Computer Society conference proceedings (and workshops) are open access and are available in a resource called *Electronic Workshops in Computing (eWiC)*. Conference proceedings published by the IET and other publishers can be selected for purchase by the computer engineering subject librarian. No new resources are required.

Databases and Digital Collections

The University Libraries currently subscribe to several databases and digital collections important to computer engineering. Those databases are listed and described below.

Comprehensive Databases
Published by the Institution of Engineering and Technology (IET), *Inspec* provides comprehensive indexing of the world's scientific literature for computers and computing, information technology, and communications. It covers journal articles, conference proceedings, reports, dissertations, and books.

The *(ACM) Guide to Computing Literature* is a comprehensive database that contains citations from the major English language publishers in computing. Coverage, which dates as far back as 1947, includes books, journal articles, conference proceedings, doctoral dissertations, master's theses, and technical reports.

Digital Collections/Full Text Databases

The *ACM (Association for Computing Machinery) Digital Library* is a full text database that provides access to all of the association's journals, magazines, special interest group newsletters, and conference proceedings.

The *IEEE Computer Society Digital Library* is a full text database that contains the scholarly journals, magazines, and conference proceedings and workshops published by the IEEE Computer Society.

Applied Science and Technology Source provides access to the full text from more than 1,400 journals and magazines, including scholarly journals, trade magazines, professional society journals, and conference proceedings. Three of the broad subjects covered are engineering, computing, and information technology.

Providing access to nearly 300 full text academic journals, magazines, and trade publications, *Computer Source* covers subjects like information systems and robotics. An additional 150 periodicals are also indexed and abstracted.

Related Databases

Web of Science indexes the core journals for all science and technology subjects, including computer engineering. Besides keyword and author searching, one of its key features is the ability to track an author's citation and determine who has cited that work.

MathSciNet is a comprehensive database for pure and applied mathematics, and indexes important resources in engineering mathematics.

At this time, no new databases are recommended. However, as engineering grows and research expands at the University, it may become necessary to subscribe to *Compendex*, a comprehensive database that covers engineering disciplines.

Patents

U.S. patents and patent applications are freely available from the United States Patent and Trademark Office (USPTO) Website as well as several other patent Websites. Patents from other countries and international organizations are also freely available on the Web. No resources are recommended.

Standards

Engineers depend on industrial standards for their work. Currently, the University Libraries rely on the New York State Library for standards, which has a large collection along with related publications. This includes standards from the American National Standards Institute (ANSI), the National Institute of Standards and Technology (NIST), and the International Organization for Standardization (ISO). The Websites of these organizations and others provide free standards searching capabilities. No resources are recommended. As the program grows, the University Libraries may need to revisit the acquisition of standards for computer engineering, if the need exists. A purchase on demand model may work best.

Technical Reports

Published by academic departments, companies, and government agencies, technical reports describe successful and unsuccessful research. They are intended for rapid dissemination before being presented at conferences or published in scholarly journals. Most organizations make their technical reports available on their Websites. However, the "technical report system" is changing. Many technical reports are being migrated to institutional repositories or subject repositories like the *Computing Research Repository (CoRR)*

(http://arxiv.org/corr/home). Therefore, search engines are needed to track down older as well as current reports. *Google* and *Google Scholar* are often very helpful. In addition, *TRAIL: The Technical Report Archive & Image* Library (http://technicalreports.org/), *National Technical Information Service (NTIS)* (http://ntis.gov/), *NCSTRL: Networked Computer Science Technical Reports Library* (http://csetechrep.ucsd.edu/Dienst/htdocs/Welcome.html), and the Google custom search engine (http://www.opendoar.org/search.php) at *OpenDOAR* (Directory of Open Access Repositories) are useful. No resources are recommended.

Interlibrary Loan and Delivery Services

The University Libraries' Interlibrary Loan (ILL) Department borrows books and microforms, and obtains digital copies of journal articles and other materials not owned by the Libraries from sources locally, state-wide, nationally, and internationally. ILL services are available at no cost to the user for faculty, staff, and students currently enrolled at the University at Albany. Users can manage their requests through the use of ILLiad, the University Libraries' automated interlibrary loan system, which is available through a Web interface at https://illiad.albany.edu/.

The University Libraries also provide delivery services for books and articles housed in any of the three libraries. Books can be delivered to one of the libraries or for faculty, to departmental addresses. Articles are scanned and delivered electronically via email. The Libraries also provide free delivery services to the home addresses of online learners and people with disabilities. Delivery services are managed through ILLiad as well.

Access to Research Collections

Library memberships provide access to many other libraries in the Capital District region, in New York State, and throughout the United States and Canada. In the Capital District, the Capital District Library Council (CDLC) sponsors the Direct Access Program (DAP). Upon presentation of a CDLC DAP card, students and faculty may borrow from or use 47 academic, public, law, medical, and technology libraries, including the Rensselaer Polytechnic Institute Libraries, which has excellent science and technology collections. Students and faculty may also use the collections of the New York State Library. Statewide, students and faculty may use and borrow materials from most of the SUNY-affiliated institutions.

Summary

The University Libraries have been committed to build and maintain collections in support of computer science. Many resources purchased for computer science and other science/technology subjects will also support computer engineering. However, additional resources will be needed. Those are:

Core undergraduate book collection (one time purchase) -- $2,447
Approval book plan (annual) -- $1,600
Direct order of books and other resources (annual) -- $6,000
Reference resources (one time purchase) -- $2,585
Direct order of reference resources (annual) -- $750
Journals for new faculty (annual) -- $21,288

b) Describe the institution's response to identified collection needs and its plan for library development.

All recommended library resources have been included in the program budget.

Section 7. External Evaluation

SUNY requires external evaluation of all proposed bachelor's degree programs, and may request an evaluation for a proposed associate degree or certificate program in a new or emerging field or for other reasons.

Is an external evaluation required? [ ] No [**X**] Yes

If yes, list below all SUNY-approved evaluators who conducted evaluations (adding rows as needed), and **append at the end of this document** each original, signed *External Evaluation Report.* ***NOTE:*** *To select external evaluators, a campus sends 3-5 proposed evaluators' names, titles and CVs to the assigned SUNY Program Reviewer, expresses its preferences and requests approval.*

Evaluator #1	**Evaluator #2**
Name: Joanne Dugan, Ph.D. Title: Professor and Director, Computer Engineering Program Institution: University of Virginia	Name: Mani Soma, Ph. D. Title: Professor, Electrical Engineering Institution: University of Washington

Section 8. Institutional Response to External Evaluator Reports

As applicable, **append** at the end of this document a single *Institutional Response* to all *External Evaluation Reports.*

Section 9. SUNY Undergraduate Transfer

The State University views as one of its highest priorities the facilitation of transfer.

a) For a proposed Associate in Arts (A.A.) or an Associate in Science (A.S.) degree, demonstrate that the program's graduates will be able to transfer into at least two parallel SUNY baccalaureate programs and complete them within two additional years of full-time study, per SUNY policy, by listing the transfer institutions below and appending at the end of this document:

b) For a proposed baccalaureate program, document articulation with at least two parallel SUNY

Baccalaureate Degree Institution	Baccalaureate Program SED Code and Title	Degree

associate degree programs for seamless transfer, by appending documentation of articulation, such as *SUNY Transfer Course Equivalency Tables* and/or letters of support from Chief Academic Officers at associate degree institutions or their designees. If transfer does not apply to this program, please explain why.

Associate Degree Institution	Associate Program SED Code and Title	Degree
Hudson Valley Community College	00919 - Engineering Science	AS
Broome Community College	00398 - Engineering Science	AS

NOTE: *Transfer course equivalency tables are needed, despite SUNY Transfer Paths, to ensure that all courses in an A.A. or A.S. program will be accepted for transfer. Official SED program titles and codes can be found on NYSED's Inventory of Registered Programs here.*

See **Appendix 8** for Articulation agreements/equivalency tables

Section 10. Application for Distance Education

a) Does the program's design enable students to complete 50% or more of the course requirements through distance education? [**X**] No [ ] Yes. If yes, **append** a completed *SUNY Distance Education Format Proposal* at the end of this proposal to apply for the program to be registered for the distance education format.

b) Does the program's design enable students to complete 100% of the course requirements through distance education? [**X**] No [ ] Yes

Section MPA-1. Need for Master Plan Amendment and/or Degree Authorization

a) Based on guidance on Master Plan Amendments, please indicate if this proposal requires a Master Plan Amendment.

[**X**] No [ ] Yes, a completed *Master Plan Amendment Form* is **appended** at the end of this proposal.

b) Based on *SUNY Guidance on Degree Authorizations* (below), please indicate if this proposal requires degree authorization.

[**X**] No [ ] Yes, once the program is approved by the SUNY Provost, the campus will work with its Campus Reviewer to draft a resolution that the SUNY Chancellor will recommend to the SUNY Board of Trustees.

SUNY Guidance on Degree Authorization. *Degree authorization is required when a proposed program will lead to a new degree (e.g., B.F.A., M.P.H.) at an existing level of study (i.e., associate, baccalaureate, first-professional, master's, and doctoral) in an existing disciplinary area at an institution. Disciplinary areas are defined by the New York State Taxonomy of Academic Programs. Degree authorization requires approval by the SUNY Provost, the SUNY Board of Trustees and the Board of Regents.*

List of Appended and/or Accompanying Items

a) Appended Items: If materials required in selected items in Sections 1 through 4 and Sections 9, 10 and MPA-1 of this form apply to this proposal, they should be appended as part of this document, after this page, with continued pagination. In the first column of the chart below, please number the appended items, and append them in number order.

Number	Appended Items	Reference Items
	For multi-institution programs, a letter of approval from partner institution(s)	Section 1, Item (e)
1	*For programs leading to professional licensure*, a side-by-side chart showing how the program's components meet the requirements of specialized accreditation, Commissioner's Regulations for the Profession, or other applicable external standards	Section 2.3, Item (e)
	For programs leading to licensure in selected professions for which the SED Office of Professions (OP) requires a specialized form, a completed version of that form	Section 2.3, Item (e)
2	*OPTIONAL: For programs leading directly to employment*, letters of support from employers, if available	Section 2, Item 2.3 (h)(2)
3	*For all programs*, a plan or curriculum map showing the courses in which the program's educational and (if appropriate) career objectives will be taught and assessed	Section 2, Item 7
4	Sample Program and Curriculum	Section 3
5	*For all programs*, a catalog description for each existing course that is part of the proposed undergraduate major (including cognates and restricted electives)	Section 3, Item (b)
6	*For all programs with new courses in the major*, syllabi for all new courses in a proposed undergraduate major	Section 3, Item (c)
	For programs requiring external instruction, a completed *External Instruction Form* and documentation required on that form	Section 3, Item (d)
7	*For programs that will depend on new faculty*, position descriptions or announcements for faculty to-be-hired	Section 4, Item (b)
8	*For all A.A. and A.S. programs*, Transfer Equivalency Tables and letters of support from at least two SUNY baccalaureate institutions; *for baccalaureate programs that anticipate transfer student enrollment*, documentation of seamless transfer with at least two SUNY two-year programs	Section 9
	For programs designed to enable students to complete at least 50% of the course requirements at a distance, a *Distance Education Format Proposal*	Section 10
	For programs requiring an MPA, a *Master Plan Amendment Form*	Section MPA-1

b) Accompanying Items - External Evaluations and Institutional Response: If Sections 7 and 8 of this form indicate that external evaluation is required as part of this proposal, please send a separate electronic document to *program.review@suny.edu* that contains the original, signed *External Evaluation Reports* and a single *Institutional Response* to all reports. The file name should indicate the campus, program title, award and content of the file (e.g., BuffaloU-English-PhD-ExEval).

	Appendix I		
	For programs leading to professional licensure, a side-by-side chart showing how the program's components meet the requirements of specialized accreditation, Commissioner's Regulations for the profession, or other applicable external standards		
	Standard		**How the standard is met by the new program**
Commissioner	Education/experience credits may also be proportionally earned for various levels and types of postsecondary education which, while not entirely the study of professional engineering, contain important elements/content of such study. Such postsecondary education should demonstrate the following: that it contains important elements/content of the study of professional engineering, such as mathematics, physics, chemistry, physical and applied sciences, design, and properties of materials;		AMAT 112/113/214 Calculus 1, II, III, AMAT 220 Linear Algebra, AMAT 311 Ordinary Differential Equations, AMAT 370 Probability and Statistics for Engineering and the Sciences ACHM 120/124 General Chemistry 1 plus lab, APHY 140/145/150/155 Physics I and II plus labs ICEN 140/150 Intro to Engineering Design and Analysis, ICEN 353 and 454 Microprocessors and Microprocessor Applications, ICEN 415 Electronics, ICEN 400 Operating Systems, ICSI 333 Programming at the Hardware/Software Interface, ICEN 340 Digital Logic Design, ICEN 350 Signals and Systems, ICEN 404 Computer Organization, ICEN 416 Computer Network Communications
Commissioner	that it is in an appropriate subject relevant to the field of professional engineering, such as mathematics, physics, chemistry, physical and applied sciences, design, and properties of materials;		ICEN 210 Discrete Structures, ICEN 213 Data Structures, ICEN 333 Programming at the Hardware/Software Interface, ICEN 340 Digital Logic Design, ICEN 350 Signals and Systems, ICEN 454 Microprocessor Applications Lab, ICEN 400 Operating Systems, ICEN 404 Computer Organization, ICEN 416 Computer Network Communications
Commissioner	that it is at an appropriate level of study that would, at a minimum, be the material equivalent of study at an undergraduate level		BS in Computer Engineering
Commissioner	that it is part of a program accredited by an acceptable accrediting agency or part of a program equivalent to such an accredited program.		Designed to meet ABET Accreditation Standards, below

ABET	one year of a combination of college level mathematics and basic sciences (some with experimental experience) appropriate to the discipline. Basic sciences are defined as biological, chemical, and physical sciences.		AMAT 112/113/214 Calculus 1, II, III, AMAT 220 Linear Algebra, APHY 140/145/150/155 Physics I and II plus labs ACHM 120/124 General Chemistry 1 plus lab
ABET	one and one-half years of engineering topics, consisting of engineering sciences and engineering design appropriate to the student's field of study. The engineering sciences have their roots in mathematics and basic sciences but carry knowledge further toward creative application. These studies provide a bridge between mathematics and basic sciences on the one hand and engineering practice on the other. Engineering design is the process of devising a system, component, or process to meet desired needs. It is a decision-making process (often iterative), in which the basic sciences, mathematics, and the engineering sciences are applied to convert resources optimally to meet these stated needs.		ICEN 140/150 Intro to Engineering Design and Analysis, ICEN 213 Data Structures, ICEN 415 Electronics, ICEN 353 and 454 Microprocessors and Microprocessor Applications Lab, ICEN 400 Operating Systems, ICSI 333 Programming at the Hardware/Software Interface, ICEN 340 Digital Logic Design, ICEN 350 Signals and Systems, ICEN 404 Computer Organization, ICEN 416 Computer Network Communications
ABET	a general education component that complements the technical content of the curriculum and is consistent with the program and institution objectives.		30 credit General Education program, to include coursework in Arts, Humanities, Social Science, US History, International Perspective, Foreign Language, Basic Communication. (Math, Natural Science and Challenges for the 21st Century are covered by major coursework.)
ABET	Students must be prepared for engineering practice through a curriculum culminating in a major design experience based on the knowledge and skills acquired in earlier course work and incorporating appropriate engineering standards and multiple realistic constraints.		ICEN 430 Systems Analysis and Design - 3 credits ICEN 440 Design Lab 1 - 3 credit hours ICEN 450 Design Lab II - 6 credit hours

University at Albany
New Program Proposal
BS in Computer Engineering

Appendix 2

Letters of support:

Potential employers

- General Electric
- Vicarious Visions
- Kitware
- IBM

Graduate program

- Rensselaer Polytechnic Institute (RPI)

August 27, 2014

Ann Marie Murray, Ph.D.
Assoc Provost for Program Development and Service Professor
Office of the Provost
University at Albany, State University of New York
University Hall 308
1400 Washington Avenue
Albany, New York 12222

Dear Dr. Murray,

I write in support of the new Computer Engineering Program at the University of Albany. As the Technology Leader for Analytics at GE Global Research, I recognize the need for graduates trained in both software and hardware elements of computing technology.

Our facility, located in Niskayuna, New York, includes labs composed largely of PhD experts in Applied Statistics, Applied Mathematics, Quantitative Finance, Operations Research, Industrial Engineering, Machine Learning, Signal Processing, Image Analysis, and Computer Vision. Our researchers work in teams to create new solutions for GE Businesses and other Fortune 500 companies as well as support the research goals of the U.S. Government.

We value the proposed curriculum outlined which not only includes computer programming and hardware development but also digital logic, signal processing and network communications. The senior design lab included in the curriculum may provide an opportunity for students to explore real-world problems such as with our talented research associates through internships and/or cooperative educational programs.

GE Global Research was created to maintain the company's market edge and to foster new discoveries and commercial applications. Graduates of the proposed University of Albany program will be positioned to apply for employment at this facility as well as other divisions of General Electric Company and similar employers. The computing industry is always

interested in finding employees who bring the requisite skills and desire to work on computing technology challenges.

Annually General Electric Company hires a number of employees to support the computing needs of the industry, and locally we typically have some openings.

We look forward to the implementation of this exciting new program and the access it will provide students interested in studying computer engineering at a public institution of higher learning.

Sincerely,

Mark Grabb
Technology Leader - Analytics
Software Sciences & Architectures

Vicarious Visions
an Activision company

150 BROADWAY, SUITE 205
ALBANY, NEW YORK 12204
TEL: (518) 701-2500
FAX: (516) 701-2501

October 15, 2014

Ann Marie Murray, Ph.D.
Associate Provost for Program Development and Service Professor
Office of the Provost
University at Albany, State **University** of New York
University Hall 308
1400 Washington Avenue
Albany, New York 12222

Re: University of Albany Computer Engineering Program

Dear Dr. Murray:

Reference is made to the Computer Engineering Program at the University of Albany. As the President of Vicarious Visions I recognize the need for graduates trained in both the software and the hardware end of computer in technology.

Vicarious Visions is a creator of hit video games with its studio based near Albany. We have shaped popular culture with hit video game titles including: Skylanders, Guitar Hero, Crash Bandicoot for various platforms. We focus on talented, energetic, and highly motivated individuals who work in teams to create games based on innovation and creativity.

We understand that the proposed computer engineering curriculum not only includes computer programming and hardware development but also digital logic, signal processing and network communications. The two required senior design labs may provide an opportunity for students to explore real-world problems through internships and/or cooperative educational programs.

We look forward to seeing how the curriculum and its use of design work and relevant industry based projects position graduates for companies in the entertainment software other industries that need capable people who can contribute to complex computer systems with both software and hardware expertise.

We are always on the lookout for applications to consider from computer engineering programs like UAlbany.

We wish you the best of luck on the implementation of this exciting new program for our region and the access it will provide students interested in studying computer engineering at a public institution of high learning.

Sincerely,

Guha Bala
President

Kitware
Leaders in Visualization Technology

28 Corporate Drive
Clifton Park, NY 12065 USA
Phone/Fax: (518) 371-3971
www.kitware.com

Dr. Anthony Hoogs
Senior Director of Computer Vision
Kitware, Inc.
28 Corporate Drive
Clifton Park, NY 12065
(518) 881-4910
anthony.hoogs@kitware.com
www.kitware.com/company/team/hoogs.html

October 23, 2014

Ann Marie Murray, Ph.D.
Associate Provost for Program Development and Service Professor
University at Albany, State University of New York
University Hall 308
1400 Washington Avenue
Albany, New York 12222

Re: Support of the UAlbany Computer Engineering Program

Dear Dr. Murray:

I'm writing in support of the Computer Engineering Program at the University of Albany. As the Senior Director of Computer Vision at Kitware, I recognize the need for graduates trained in both the software and the hardware end of computer technology. The planned curriculum offers students the qualifications and skills to serve the employment needs in companies such as Kitware.

Kitware is a leader in the creation and support of open-source software and state of the art technology in computer vision, visualization and medical imaging. By fostering extended, collaborative communities, Kitware is able to provide flexible, cost-effective visualization, computer vision, medical imaging, data publishing and quality software process solutions to a variety of academic and government institutions and private corporations worldwide. Our employees are trained computer professionals, and many are internationally-recognized in their fields.

The employment forecast for computer engineers is very positive. Computer engineers can serve industries like Kitware in many ways and are desirable employees. It is expected that within the next year we will hire more than ten employees, and we expect in five years that there will be at least thirty openings here at Kitware, some of which can be filled by applicants who possess the skills and training commensurate with those developed through the computer engineering program at the University.

Kitware
Leaders in Visualization Technology

28 Corporate Drive
Clifton Park, NY 12065 USA
Phone/Fax: (518) 371-3971
www.kitware.com

We see great value in the proposed computer engineering curriculum and appreciate being consulted on the curriculum during the developmental stage. We also look to continued collaboration on identifying industry-relevant problems that can be included in the multiple design courses throughout the curriculum. We also will entertain internships or coops for upper level students to work with our talented staff as our needs dictate. This will provide us the opportunity to stay connected to the University and benefit from the pool of trained students who may be available for a career with Kitware.

We wish you great success in this new offering at the University. The presence of public higher education degrees in computer engineering is important for many reasons. It will serve our industries and our communities in meeting the demands of the workforce while retaining skilled professionals in our region. We look forward to the implementation of the computer engineering program.

Sincerely,

Dr. Anthony Hoogs
Senior Director of Computer Vision
Kitware, Inc.

Susan M. Puglia

Route 100
Somers. !NY 10589

December 1, 2014

Ann Marie Murray, Ph.D.
Associate Provost for Program Development and Service Professor
University at Albany, State University of New York
1400 Washington Avenue, Albany, New York 12222

Dear Dr. Murray:

IBM enthusiastically supports the Computer Engineering Program at the University at Albany. As the Vice President of IBM Global University Programs and Vice Chair, Academy of Technology, I recognize the need for graduates who are trained for state of the art software and hardware solutions.

There are multiple ways that IBM can potentially enhance this new program at the University. The IBM Academic Initiative is a global program that offers no-charge access to resources to help faculty strengthen their educational programs better enabling their students to compete in the job market of any industry. We have already been working with UAlbany on incorporating these resources into the new computer engineering program. IBM also has a strong tradition of research collaboration with academia in universities around the world; opportunities to connect with faculty in IBM-aligned research areas can also be explored. The two required senior design labs may provide an opportunity for students to explore real-world problems with our creative employees through internships, cooperative educational programs, IBM Students for a Smarter Planet program, or a course that accesses Watson for cognitive computing. IBM is looking forward to partnering on these opportunities to create an industry presence within the curriculum.

This curriculum which you have defined, offers students the necessary competencies and skills that will meet our employment needs, particularly in the areas of software design and development across our portfolio as well as application and software engineering services. We encourage your students and graduates to apply for internships and full time jobs at www.ibm.com. As of today, there are more than 500 IBM jobs posted that require software or computer engineering, for which these students could be considered.

We look forward to our continued collaboration, the implementation of this exciting new program, and the access it will provide students interested in studying computer engineering at a public institution of high learning.

Sincerely,

IBM Vice President Global University Programs
and Vice Chair, Academy of Technology

Rensselaer
SCHOOL OF ENGINEERING
DEPARTMENT OF ELECTRICAL,
COMPUTER, AND SYSTEMS ENGINEERING

5 September 2014

Dr. Ann Marie Murray
Associate Provost for Program Development
SUNY - University at Albany
University Hall 308
1400 Washington Ave.
Albany, NY 12222

Re: Computer Engineering at UAlbany

Dear Dr. Murray:

It is my pleasure to provide this letter of support for the program in computer engineering under development at the University at Albany. The opinions expressed in this letter are strictly my own, developed over time from my perspective as both an administrator in a top-tier private institution, and as someone who earned all of his degrees and rose through the academic ranks at public universities.

In my view, there is plenty of space and, I would argue, a genuine need for a public option in engineering here in "Tech Valley." The recruitment of engineering students from the surrounding area need not be a "zero-sum game." A program at UAlbany will create additional opportunities for students drawn from non-traditional demographics, perhaps of more modest means, and/or those who seek a more comprehensive, larger-scale university environment than is currently available to engineering students in the Capital Region. Students in these circumstances may feel they have no option but to leave the area to pursue their studies. Many will find that to be infeasible; those who do leave may not return, with their skills and intellect thereby lost to the Region.

The program is also likely to attract more students who will be the first in their families to attend college. I have a particular affinity for such students, as I was one. The opportunity presented to these students through an affordable public education, especially in engineering, is invaluable not only for the students themselves, but to the Region and society as a whole. We cannot afford to have a significant fraction of our intellectual capacity sitting on the sidelines.

I have reviewed the proposed curriculum and I find it to be well conceived and logically structured. The early introduction of design, something we also do here at Rensselaer, can pique students' interest and keep them engaged — although it is sometimes a challenge to teach design when the analysis tools have not yet been presented. Finding the right balance (yes, it's possible) will certainly pay dividends. If I were to offer a suggestion, it would be to permit biology (including cellular biology) as an alternative to

chemistry in the basic sciences. Given the extensive impact of engineering on biology and medicine, particularly in instrumentation and modeling, now and into the foreseeable future, literacy in basic biology could prove extremely valuable to your graduates.

The expanding job market for engineers suggests that students in the program, assuming it is carefully crafted and executed, and assuming a high-quality faculty right from launch, will have little trouble landing positions upon graduation. Moreover, we at Rensselaer would welcome the local source of well-prepared domestic graduate students that such a program could potentially deliver. These are more likely to be students who remain in the Region, contribute to the local innovation ecosystem, engage in entrepreneurship, and act as magnets for new ventures. These activities can work synergistically to diversify and strengthen the area's economy, benefiting all of us who live and work here.

As the UAlbany program matures, I would not be surprised to see various sorts of collaborations emerge between our two faculties. I am thinking in particular of National Science Foundation programs in engineering and engineering education that require the involvement of multiple campuses serving diverse populations, as well as other State and Federal programs to which we can bring complementary expertise.

I wish you all the best with your new program. Please feel free to contact me with any questions as you proceed.

Sincerely,

Kim L. Boyer, Ph.D
Fellow IEEE, Fellow IAPR
Jefferson Science Fellow, US Department of State
Professor and Head

University at Albany
New Program Proposal
BS in Computer Engineering

Appendix 3

Curriculum map detailing educational objectives and how they will be assessed

STRATEGIES / MATH

ABET PROGRAM OUTCOMES	PERFORMANCE CRITERIA	A MAT 112 Calc I	A MAT 113 Calc II	A MAT 214 Calc III	AMAT 220 Linear Algebra	A MAT 311 Ordinary Differential Equations	A MAT 370 Probability and Statistics for Engineering and Sciences
(A) Apply knowledge of math, science and engineering		**X**	**X**	**X**	**X**	**X**	**X**
	a1. Solving text book problems	X	X	X	X	X	X
	a2. Constructing lab experiments						
	a3. Building models to demonstrate scientific and engineering concepts						
	a4. Analyzing laboratory data						
	a5. Using mathematical tools in problem solving	X	X	X	X	X	X
(B) Design and conduct experiments and analyze and interpret data							**X**
	b1. Writing lab report						
	b2. Using simulation tools in a project/lab						X
	b3. Participating in project development						
	b4. Creating prototypes and collect data to solve problems						
	b5. Evaluating outcomes of simulation activities						X
	b6. Analyze and report on a given set of data						X
(C) Design a system component or process							
	c1. Determine software, hardware and other needs to determine a solution						
	c2. Establish a plan to solve the problem						
	c3. Research possible alternatives and assess likelihood of						
	c4. Do a risk benefit analysis to determine an approach to a						
	c5. Establish a process for creating a prototype						
	c6. Succeed in creating a columinating project						
(D) Function on multidisciplinary teams							
	d1. Work collaboratively on assignments						
	d2. Present the outcomes of a team effort						
	d3. Demonstrate an active role on a team						
	d4. Demonstrate effective collaboration with diverse team members						
(E) Identify, formulate and solve engineering problems		**X**	**X**	**X**	**X**	**X**	
	e1. Capitalize on industry partnerships to identify engineering problems						
	e2. Design an experiment to solve the problem						
	e3. Actively participate in the solution to the problem						
	e4. Implementation of a design project						
	e5. Model the problem mathematically and apply standard mathematical tools	X	X	X	X	X	
(F) Understand ethical and professional responsibility							
	f1. Examine case studies in engineering ethics						
	f2. Meet with engineering professionals						
	f3. Complete course assignments in an ethics and professional manner						
	f4. Complete course assignments in an ethical and professional manner						

		STRATEGIES / MATH					
ABET PROGRAM OUTCOMES	**PERFORMANCE CRITERIA**	**A MAT 112 Calc I**	**A MAT 113 Calc II**	**A MAT 214 Calc III**	**AMAT 220 Linear Algebra**	**A MAT 311 Ordinary Differential Equations**	**A MAT 370 Probability and Statistics for Engineering and Sciences**
(g) Communicate effectively					**X**	**X**	**X**
	g1. Write reports and recommendations						
	g2. Present solutions to problem sets				X	X	X
	g3. Work collaboratively with team members to present outcomes						
	g4. Participate in demonstration opportunities						
(H) Understand engineering solutions in context						**X**	**X**
	h1. Perform successfully on assessment of engineering concepts						
	h2. Apply appropriate engineering skills to formulate a solution						
	h3. Evaluate solutions for correct methodology and procedures					X	X
	h4. Demonstrate alternative approaches to solving a problem					X	X
(I) Life-long learning							
	i1. Demonstrate knowledge of fundamentals						
	i2. Recognize the need to remain current in the field						
	i3. Be aware of professional engineering organizations						
	i4. Learn about career opportunities for engineers						
	i5. Participate in co-curricular activities						
	i6. Reading professional documentation and standards						
(J) Knowledge of contemporary issues							
	j1. Participate in discussion groups						
	j2. Write papers on contemporary issues						
	j3. Demonstrate knowledge through presentations or exams on contemporary issues						
(K) Use modern tools for engineering practice				**X**	**X**	**X**	**X**
	k1. Learn current industry standard engineering tools			X	X	X	X
	k2. Demonstrate proficiency in engineering modeling tools						
	k3. Utilize appropriate tools in solving engineering problems						

STRATEGIES / CHEMISTRY

ABET PROGRAM OUTCOMES	PERFORMANCE CRITERIA	A CHM 120 Chemistry I	A CHM 124 Chemistry I Lab	
(A) Apply knowledge of math, science and engineering		**X**	**X**	
	a1. Solving text book problems	X	X	
	a2. Constructing lab experiments		X	
	a3. Building models to demonstrate scientific and engineering concepts			
	a4. Analyzing laboratory data		X	
	a5. Using mathematical tools in problem solving		X	
(B) Design and conduct experiments and analyze and interpret data			**X**	
	b1. Writing lab report		X	
	b2. Using simulation tools in a project/lab			
	b3. Participating in project development			
	b4. Creating prototypes and collect data to solve problems			only apply data to solve problems
	b5. Evaluating outcomes of simulation activities			
	b6. Analyze and report on a given set of data		X	
(C) Design a system component or process				
	c1. Determine software, hardware and other needs to determine a solution			
	c2. Establish a plan to solve the problem			
	c3. Research possible alternatives and assess likelihood of			
	c4. Do a risk benefit analysis to determine an approach to a			
	c5. Establish a process for creating a prototype			
	c6. Succeed in creating a columinating project			
(D) Function on multidisciplinary teams			**X**	
	d1. Work collaboratively on assignments		X	
	d2. Present the outcomes of a team effort		X	individually
	d3. Demonstrate an active role on a team		X	required
	d4. Demonstrate effective collaboration with diverse team members		X	
(E) Identify, formulate and solve engineering problems		**X**	**X**	
	e1. Capitalize on industry partnerships to identify engineering problems			
	e2. Design an experiment to solve the problem	X	X	
	e3. Actively participate in the solution to the problem	X	X	
	e4. Implementation of a design project			
	e5. Model the problem mathematically and apply standard mathematical tools			

STRATEGIES / CHEMISTRY

ABET PROGRAM OUTCOMES	PERFORMANCE CRITERIA	A CHM 120 Chemistry I	A CHM 124 Chemistry I Lab	
(F) Understand ethical and professional responsibility		**X**	**X**	
	f1. Examine case studies in engineering ethics			
	f2. Meet with engineering professionals			
	f3. Complete course assignments in engineering ethics	X	X	Mandatory Ethics Course for TA's who are required to go over the ethics code of conduct with all students
	f4. Complete course assignments in an ethical and professional manner			
(g) Communicate effectively		**X**	**X**	
	g1. Write reports and recommendations		X	Write reports only
	g2. Present solutions to problem sets	X	X	
	g3. Work collaboratively with team members to present outcomes			
	g4. Participate in demonstration opportunities		X	
(H) Understand engineering solutions in context				
	h1. Perform successfully on assessment of engineering concepts			
	h2. Apply appropriate engineering skills to formulate a solution			
	h3. Evaluate solutions for correct methodology and procedures			
	h4. Demonstrate alternative approaches to solving a problem			
(I) Life-long learning				
	i1. Demonstrate knowledge of fundamentals			
	i2. Recognize the need to remain current in the field			
	i3. Be aware of professional engineering organizations			
	i4. Learn about career opportunities for engineers			
	i5. Participate in co-curricular activities			Chemistry Club
	i6. Reading professional documentation and standards			
(J) Knowledge of contemporary issues				
	j1. Participate in discussion groups			
	j2. Write papers on contemporary issues			
	j3. Demonstrate knowledge through presentations or exams on contemporary issues			
(K) Use modern tools for engineering practice				
	k1. Learn current industry standard engineering tools			
	k2. Demonstrate proficiency in engineering modeling tools			
	k3. Utilize appropriate tools in solving engineering problems			

STRATEGIES / PHYSICS

ABET PROGRAM OUTCOMES	PERFORMANCE CRITERIA	A PHY 140 Physics I	A PHY 145 Physics I Lab	A PHY 150 Physics II	A PHY 155 Physics II Lab	I CEN 353 / A PHY 353 Microprocessor Applications	I CEN 415 / A PHY 415 Electronics	I CEN 454 / A PHY 454 Microprocessor Applications Lab
(A) Apply knowledge of math, science and engineering		**X**	**X**	**X**	**X**	**X**	**X**	**X**
	a1. Solving text book problems	X	X	X	X	X	X	X
	a2. Constructing lab experiments		X		X	X	X	X
	a3. Building models to demonstrate scientific and engineering concepts		X		X	X	X	X
	a4. Analyzing laboratory data		X		X	X	X	X
	a5. Using mathematical tools in problem solving	X	X	X	X	X	X	X
(B) Design and conduct experiments and analyze and interpret data			**X**		**X**	**X**	**X**	**X**
	b1. Writing lab report		X		X	X	X	X
	b2. Using simulation tools in a project/lab					X		X
	b3. Participating in project development					X	X	X
	b4. Creating prototypes and collect data to solve problems						X	
	b5. Evaluating outcomes of simulation activities						X	
	b6. Analyze and report on a given set of data		X		X			
(C) Design a system component or process						**X**		**X**
	c1. Determine software, hardware and other needs to determine a solution					X		X
	c2. Establish a plan to solve the problem					X		X
	c3. Research possible alternatives and assess likelihood of					X		X
	c4. Do a risk benefit analysis to determine an approach to a							
	c5. Establish a process for creating a prototype							
	c6. Succeed in creating a columinating project					X		X
(D) Function on multidisciplinary teams						**X**	**X**	**X**
	d1. Work collaboratively on assignments					X	X	X
	d2. Present the outcomes of a team effort					X	X	X
	d3. Demonstrate an active role on a team					X	X	X
	d4. Demonstrate effective collaboration with diverse team					X	X	X
(E) Identify, formulate and solve engineering problems		**X**	**X**	**X**	**X**	**X**	**X**	**X**
	e1. Capitalize on industry partnerships to identify engineering problems							
	e2. Design an experiment to solve the problem	X	X	X	X		X	
	e3. Actively participate in the solution to the problem	X	X	X	X			
	e4. Implementation of a design project					X		X
	e5. Model the problem mathematically and apply standard mathematical tools	X		X			X	
(F) Understand ethical and professional responsibility						**X**		**X**
	f1. Examine case studies in engineering ethics							
	f2. Meet with engineering professionals							
	f3. Complete course assignments in engineering ethics					X		X
	f4. Complete course assignments in an ethical and professional manner					X		X
(g) Communicate effectively			**X**		**X**	**X**		**X**
	g1. Write reports and recommendations		X		X	X		X
	g2. Present solutions to problem sets					X		X
	g3. Work collaboratively with team members to present outcomes					X		X
	g4. Participate in demonstration opportunities					X		X

STRATEGIES / PHYSICS

ABET PROGRAM OUTCOMES	PERFORMANCE CRITERIA	A PHY 140 Physics I	A PHY 145 Physics I Lab	A PHY 150 Physics II	A PHY 155 Physics II Lab	I CEN 353 / A PHY 353 Microprocessor Applications	I CEN 415 / A PHY 415 Electronics	I CEN 454 / A PHY 454 Microprocessor Applications Lab
(H) Understand engineering solutions in context								
	h1. Perform successfully on assessment of engineering concepts							
	h2. Apply appropriate engineering skills to formulate a solution							
	h3. Evaluate solutions for correct methodology and procedures							
	h4. Demonstrate alternative approaches to solving a problem							
(I) Life-long learning						**X**		**X**
	i1. Demonstrate knowledge of fundamentals					X		X
	i2. Recognize the need to remain current in the field					X		X
	i3. Be aware of professional engineering organizations					X		X
	i4. Learn about career opportunities for engineers							
	i5. Participate in co-curricular activities							
	i6. Reading professional documentation and standards							
(J) Knowledge of contemporary issues								
	j1. Participate in discussion groups							
	j2. Write papers on contemporary issues							
	j3. Demonstrate knowledge through presentations or exams on contemporary issues							
(K) Use modern tools for engineering practice								
	k1. Learn current industry standard engineering tools							
	k2. Demonstrate proficiency in engineering modeling tools							
	k3. Utilize appropriate tools in solving engineering problems							

STRATEGIES ! COMPUTER SCIENCE

ABET PROGRAM OUTCOMES	PERFORMANCE CRITERIA	ICEN 201! ICSI 201 Intro to Computer Science	ICEN 210! ICSI 210 Discrete Structures	ICEN 213! ICSI 213 Data Structures	ICEN 333! ICSI 333 Programming at the HW!SW Interface	ICEN 400! ICSI 400 Operating Systems	ICEN 404! ICSI 404 Computer Organization	ICEN 416! ICSI 416 Computer Network Communications
(A) Apply knowledge of math, science and engineering		**X**	**X**	**X**	**X**	**X**	**X**	**X**
	a1. Solving text book problems	X	X	X	X	X	X	X
	a2. Constructing lab experiments	X		X	X	X		
	a3. Building models to demonstrate scientific and engineering concepts	X		X	X	X	X	X
	a4. Analyzing laboratory data					X		
	a5. Using mathematical tools in problem solving	X	X	X	X	X	X	X
(B) Design and conduct experiments and analyze and interpret data				**X**		**X**	**X**	**X**
	b1. Writing lab report					X		
	b2. Using simulation tools in a project/lab					X	X	X
	b3. Participating in project development							
	b4. Creating prototypes and collect data to solve problems					X		
	b5. Evaluating outcomes of simulation activities			X		X	X	
	b6. Analyze and report on a given set of data							
(C) Design a system component or process				**X**	**X**	**X**	**X**	**X**
	c1. Determine software, hardware and other needs to determine a solution						X	X
	c2. Establish a plan to solve the problem			X	X	X		
	c3. Research possible alternatives and assess likelihood of			X	X	X		
	c4. Do a risk benefit analysis to determine an approach to a				X	X		
	c5. Establish a process for creating a prototype			X		X		
	c6. Succeed in creating a columinating project							X
(D) Function on multidisciplinary teams								
	d1. Work collaboratively on assignments							
	d2. Present the outcomes of a team effort							
	d3. Demonstrate an active role on a team							
	d4. Demonstrate effective collaboration with diverse team members							
(E) Identify, formulate and solve engineering problems								
	e1. Capitalize on industry partnerships to identify engineering problems							
	e2. Design an experiment to solve the problem							
	e3. Actively participate in the solution to the problem							
	e4. Implementation of a design project							
	e5. Model the problem mathematically and apply standard mathematical tools							
(F) Understand ethical and professional responsibility		**X**						
	f1. Examine case studies in engineering ethics							
	f2. Meet with engineering professionals							
	f3. Complete course assignments in engineering ethics	X						
	f4. Complete course assignments in an ethical and professional manner							
(g) Communicate effectively								
	g1. Write reports and recommendations							
	g2. Present solutions to problem sets							
	g3. Work collaboratively with team members to present outcomes							
	g4. Participate in demonstration opportunities							

STRATEGIES ! COMPUTER SCIENCE

ABET PROGRAM OUTCOMES	PERFORMANCE CRITERIA	ICEN 201! ICSI 201 Intro to Computer Science	ICEN 210! ICSI 210 Discrete Structures	ICEN 213! ICSI 213 Data Structures	ICEN 333! ICSI 333 Programming at the HW!SW Interface	ICEN 400! ICSI 400 Operating Systems	ICEN 404! ICSI 404 Computer Organization	ICEN 416! ICSI 416 Computer Network Communications
(H) Understand engineering solutions in context								
	h1. Perform successfully on assessment of engineering concepts							
	h2. Apply appropriate engineering skills to formulate a solution							
	h3. Evaluate solutions for correct methodology and procedures							
	h4. Demonstrate alternative approaches to solving a problem							
(I) Life-long learning					**X**	**X**	**X**	**X**
	i1. Demonstrate knowledge of fundamentals				X	X	X	X
	i2. Recognize the need to remain current in the field				X			
	i3. Be aware of professional engineering organizations							
	i4. Learn about career opportunities for engineers							
	i5. Participate in co-curricular activities							
	i6. Reading professional documentation and standards					X		
(J) Knowledge of contemporary issues						**X**	**X**	**X**
	j1. Participate in discussion groups							
	j2. Write papers on contemporary issues							
	j3. Demonstrate knowledge through presentations or exams on contemporary issues					X	X	X
(K) Use modern tools for engineering practice								
	k1. Learn current industry standard engineering tools							
	k2. Demonstrate proficiency in engineering modeling tools							
	k3. Utilize appropriate tools in solving engineering problems							

STRATEGIES / COMPUTER ENGINEERING

ABET PROGRAM OUTCOMES	PERFORMANCE CRITERIA	I CEN 140 Intro to Engineering Design	I CEN 150 Intro to Engineering Analysis	I CEN 340 Digital Logic Design	I CEN 350 Signals and Systems	I CEN 430 Systems Analysis and Design	I CEN 440 Design Lab I	I CEN 450 Design Lab II
(A) Apply knowledge of math, science and engineering		**X**	**X**	**X**	**X**	**X**	**X**	**X**
	a1. Solving text book problems	X	X	X	X	X	X	X
	a2. Constructing lab experiments							
	a3. Building models to demonstrate scientific and engineering concepts							
	a4. Analyzing laboratory data							
	a5. Using mathematical tools in problem solving	X	X	X	X	X	X	X
(B) Design and conduct experiments and analyze and interpret data		**X**	**X**			**X**	**X**	**X**
	b1. Writing lab report	X	X				X	X
	b2. Using simulation tools in a project/lab	X	X				X	X
	b3. Participating in project development	X	X			X	X	X
	b4. Creating prototypes and collect data to solve problems	X	X				X	X
	b5. Evaluating outcomes of simulation activities	X	X			X	X	X
	b6. Analyze and report on a given set of data		X			X	X	X
(C) Design a system component or process		**X**	**X**			**X**	**X**	**X**
	c1. Determine software, hardware and other needs to determine a solution	X	X			X	X	X
	c2. Establish a plan to solve the problem	X	X			X	X	X
	c3. Research possible alternatives and assess likelihood of	X	X			X	X	X
	c4. Do a risk benefit analysis to determine an approach to a	X	X			X	X	X
	c5. Establish a process for creating a prototype	X	X			X	X	X
	c6. Succeed in creating a columinating project	X	X			X	X	X
(D) Function on multidisciplinary teams		**X**	**X**			**X**	**X**	**X**
	d1. Work collaboratively on assignments	X	X			X	X	X
	d2. Present the outcomes of a team effort	X	X			X	X	X
	d3. Demonstrate an active role on a team	X	X			X	X	X
	d4. Demonstrate effective collaboration with diverse team	X	X			X	X	X
(E) Identify, formulate and solve engineering problems		**X**	**X**	**X**	**X**	**X**	**X**	**X**
	e1. Capitalize on industry partnerships to identify engineering problems	X	X			X	X	X
	e2. Design an experiment to solve the problem	X	X			X		X
	e3. Actively participate in the solution to the problem	X	X	X	X	X	X	X
	e4. Implementation of a design project	X	X			X	X	X
	e5. Model the problem mathematically and apply standard mathematical tools	X	X					
(F) Understand ethical and professional responsibility		**X**	**X**			**X**	**X**	**X**
	f1. Examine case studies in engineering ethics	X	X				X	X
	f2. Meet with engineering professionals	X	X				X	X
	f3. Complete course assignments in engineering ethics	X	X			X	X	X
	f4. Complete course assignments in an ethical and professional manner	X	X			X	X	X
(g) Communicate effectively		**X**	**X**			**X**	**X**	**X**
	g1. Write reports and recommendations	X	X			X	X	X
	g2. Present solutions to problem sets	X	X				X	X
	g3. Work collaboratively with team members to present outcomes	X	X			X	X	X
	g4. Participate in demonstration opportunities	X	X				X	X

STRATEGIES / COMPUTER ENGINEERING

ABET PROGRAM OUTCOMES	PERFORMANCE CRITERIA	I CEN 140 Intro to Engineering Design	I CEN 150 Intro to Engineering Analysis	I CEN 340 Digital Logic Design	I CEN 350 Signals and Systems	I CEN 430 Systems Analysis and Design	I CEN 440 Design Lab I	I CEN 450 Design Lab II
(H) Understand engineering solutions in context		**X**	**X**			**X**	**X**	**X**
	h1. Perform successfully on assessment of engineering concepts	X	X			X	X	X
	h2. Apply appropriate engineering skills to formulate a solution	X	X			X	X	X
	h3. Evaluate solutions for correct methodology and procedures	X	X			X	X	X
	h4. Demonstrate alternative approaches to solving a problem	X	X			X	X	X
(I) Life-long learning		**X**	**X**				**X**	**X**
	i1. Demonstrate knowledge of fundamentals	X	X				X	X
	i2. Recognize the need to remain current in the field	X	X					
	i3. Be aware of professional engineering organizations	X	X					
	i4. Learn about career opportunities for engineers	X	X					
	i5. Participate in co-curricular activities							
	i6. Reading professional documentation and standards	X						
(J) Knowledge of contemporary issues		**X**	**X**				**X**	**X**
	j1. Participate in discussion groups	X	X				X	X
	j2. Write papers on contemporary issues	X	X				X	X
	j3. Demonstrate knowledge through presentations or exams on contemporary issues	X	X				X	X
(K) Use modern tools for engineering practice		**X**	**X**	**X**	**X**	**X**	**X**	**X**
	k1. Learn current industry standard engineering tools	X	X	X	X	X	X	X
	k2. Demonstrate proficiency in engineering modeling tools	X	X	X	X	X	X	X
	k3. Utilize appropriate tools in solving engineering problems	X	X	X	X	X	X	X

STRATEGIES / COMPUTER ENGINEERING ELECTIVES

ABET PROGRAM OUTCOMES	PERFORMANCE CRITERIA	I CEN 360 Emerging Technologies	I CEN 370 Digital Signal Processing	I CEN 460 Mobile Design Engineering	I CEN 470 Human Computer Interaction	I CEN 480 VLSI Design and Fabrication
(A) Apply knowledge of math, science and engineering		**X**	**X**	**X**	**X**	**X**
	a1. Solving text book problems	X	X	X	X	X
	a2. Constructing lab experiments					
	a3. Building models to demonstrate scientific and engineering concepts					
	a4. Analyzing laboratory data					
	a5. Using mathematical tools in problem solving	X	X	X	X	X
(B) Design and conduct experiments and analyze and interpret data						
	b1. Writing lab report					
	b2. Using simulation tools in a project/lab					
	b3. Participating in project development					
	b4. Creating prototypes and collect data to solve problems					
	b5. Evaluating outcomes of simulation activities					
	b6. Analyze and report on a given set of data					
(C) Design a system component or process		**X**				**X**
	c1. Determine software, hardware and other needs to determine a solution	X				X
	c2. Establish a plan to solve the problem	X				X
	c3. Research possible alternatives and assess likelihood of success	X				X
	c4. Do a risk benefit analysis to determine an approach to a solution	X				X
	c5. Establish a process for creating a prototype	X				X
	c6. Succeed in creating a columinating project	X				X
(D) Function on multidisciplinary teams				**X**		**X**
	d1. Work collaboratively on assignments			X		X
	d2. Present the outcomes of a team effort			X		X
	d3. Demonstrate an active role on a team			X		X
	d4. Demonstrate effective collaboration with diverse team members			X		X
(E) Identify, formulate and solve engineering problems		**X**		**X**		**X**
	e1. Capitalize on industry partnerships to identify engineering problems	X		X		X
	e2. Design an experiment to solve the problem	X		X		X
	e3. Actively participate in the solution to the problem	X	X	X	X	X
	e4. Implementation of a design project	X	X	X	X	X
	e5. Model the problem mathematically and apply standard mathematical tools	X	X	X	X	X
(F) Understand ethical and professional responsibility		**X**	**X**	**X**	**X**	**X**
	f1. Examine case studies in engineering ethics					
	f2. Meet with engineering professionals					
	f3. Complete course assignments in engineering ethics					
	f4. Complete course assignments in an ethical and professional manner	X	X	X	X	X
(g) Communicate effectively		**X**		**X**		**X**
	g1. Write reports and recommendations	X		X		X
	g2. Present solutions to problem sets	X		X		X
	g3. Work collaboratively with team members to present outcomes	X		X		X

		STRATEGIES / COMPUTER ENGINEERING ELECTIVES				
ABET PROGRAM OUTCOMES	**PERFORMANCE CRITERIA**	**I CEN 360 Emerging Technologies**	**I CEN 370 Digital Signal Processing**	**I CEN 460 Mobile Design Engineering**	**I CEN 470 Human Computer Interaction**	**I CEN 480 VLSI Design and Fabrication**
	g4. Participate in demonstration opportunities	X		X		X
(H) Understand engineering solutions in context		**X**	**X**	**X**	**X**	**X**
	h1. Perform successfully on assessment of engineering concepts		X	X	X	X
	h2. Apply appropriate engineering skills to formulate a solution	X	X	X	X	X
	h3. Evaluate solutions for correct methodology and procedures	X	X	X	X	X
	h4. Demonstrate alternative approaches to solving a problem	X	X	X	X	X
(I) Life-long learning						
	i1. Demonstrate knowledge of fundamentals					
	i2. Recognize the need to remain current in the field					
	i3. Be aware of professional engineering organizations					
	i4. Learn about career opportunities for engineers					
	i5. Participate in co-curricular activities					
	i6. Reading professional documentation and standards					
(J) Knowledge of contemporary issues		**X**	**X**	**X**	**X**	**X**
	j1. Participate in discussion groups	X				
	j2. Write papers on contemporary issues	X				
	j3. Demonstrate knowledge through presentations or exams on contemporary issues	X	X	X	X	X
(K) Use modern tools for engineering practice		**X**	**X**	**X**	**X**	**X**
	k1. Learn current industry standard engineering tools	X	X	X	X	X
	k2. Demonstrate proficiency in engineering modeling tools	X	X	X	X	X
	k3. Utilize appropriate tools in solving engineering problems	X	X	X	X	X

ABET PROGRAM OUTCOMES	PERFORMANCE CRITERIA	SOURCE OF ASSESSMENT*	COURSE ACTIVITIES	PERFORMANCE INDICATORS
(A) Apply knowledge of math, science and engineering		**ICEN 400/ ICSI 400 Operating Systems**		
	a1. Solving text book problems		Textbook or other readings, survey or longer questions or problems.	Students must sucessfully demonstrate completion of readings and satisfactory completion of problems and assignments, as outlined in syllabus.
	a2. Constructing lab experiments		All students attend a weekly 2 hour lab.	A satisfactory level of attendance is required for all labs. Attendance is mandatory and required to demonstrate s successful performance level in the course.
	a3. Building models to demonstrate scientific and engineering concepts		Written homework questions and problems and programming assignments are assigned to student to allow them to build models to demonstrate scientific and engineering concepts .	Successful accomplishment is measured as part of written homework questions and problems and programming assignments.
	a4. Analyzing laboratory data		Post-Lab analysis of results and write-ups are required.	Post-Lab analysis of results and write-ups are reviewed and graded for satisfactory performance as outlined in the individual labs and syllabus.
	a5. Using mathematical tools in problem solving		Assigned problems utilize numbers, graphs, formulas, and sequence diagrams, together with accurate logical reasoning.	Assigned problems, which utilize numbers, graphs, formulas, and sequence diagrams., together with accurate logical reasoning, are reviewed and graded for satisfactory performance as outlined in the individual assignments and syllabus.
(B) Design and conduct experiments and analyze and interpret data		**I CEN 440 Design Lab I**		
	b1. Writing lab report		Students analyse a problem and develop a solution and create and present a preliminary report.	Student prepared and presented preliminary reports are accessed for completeness and satisfactory progress, as outlined in the course syllabus and project assignments.
	b2. Using simulation tools in a project/lab		Simulation tools are heavily utilized as part of the modeling process and initial design phases.	Student designs and models, which rely heavily on the use of simulation tools, are reviewed and graded for completeness and accuracy as outlined in the course syllabus and project assignment grading rubrics or descriptions.
	b3. Participating in project development		Students complete a proposal, design, modeling/analysis and testing of their design and present their design and initial documentation and for approval during formal design reviews	Students developed proposals, designs, models//analysis, testing results, designs and presentations, and initial documentation are presented and accessed for satisfactory completion during formal design reviews.
	b4. Creating prototypes and collect data to solve problems		Students design/model and collect simulation data as part of the formal design process.	Students designs/modesl and collected simulation data is accessed for satisfactory completion and correctness as part of the formal design process.
	b5. Evaluating outcomes of simulation activities		Students analyze simulation results as part of the formal design process.	Student analyzed simulation results are accessed for satisfactory completion and correctness as part of the formal design process.
	b6. Analyze and report on a given set of data		Design reports and are presented for formal approval during formal design reviews.	Design reports are presented for formal approval and are accessed for satisfactory completion and correctness as part of the formal design process.
(C) Design a system component or process		**I CEN 430 Systems Analysis and Design**		
	c1. Determine software, hardware and other needs to determine a solution		The final project and course assignments require students to determine both h/w and s/w and other needs to satisfy the business requirements as part of the systems analysis and design.	Final project and course assignments, which require students to determine both h/w and s/w and other needs to satisfy the business requirements as part of the systems analysis and design, are accessed for satisfactory completion and correctness.
	c2. Establish a plan to solve the problem		A detailed project plan is produced by the students as part of the final project and course assignments.	Detailed project plans, produced by the students as part of the final project and course assignments, are accessed for satisfactory completion and correctness.
	c3. Research possible alternatives and assess likelihood of		Alternate design approaches are considered using a decision matrix and weighted decision analysis and other decision methods and part of the final project and assignments.	Student developed alternate design approaches, considered using a decision matrix and weighted decision analysis and other decision methods as part of the final project and assignments, are accessed for satisfactory completion and correctness.
	c4. Do a risk benefit analysis to determine an approach to a solution		Risk / benefit analysis is performed by students as part of course assignments and the final project.	Risk / benefit analysis, performed by students as part of course assignments and the final project, is accessed for satisfactory completion and correctness.
	c5. Establish a process for creating a prototype		A prototype system is developed and demoed / presented to the class as part of the final project. Prototypiing techniques are explored as part of the course materials.	A prototype system, developed and demoed / presented to the class by students as part of the final project, is accessed for satisfactory completion and correctness.
	c6. Succeed in creating a columinating project		The final project, which includes both written and verbal team presentations, incorporates all of the methods and techniques taught throughout the course.	The final project, which includes both written and verbal team presentations and incorporates all of the methods and techniques taught throughout the course, is reviewed and accessed for satisfactory completion as outlined in the project description.
(D) Function on multidisciplinary teams		**I CEN 415 / A PHY 415 Electronics**		
	d1. Work collaboratively on assignments		Students work collaboratively to design digital and analog circuits as they perform lab experiments and do design work.	Collaborative student work to design digital and analog circuits, as part of lab experiments, is reviewed and accessed for satisfactory completion as outlined in lab descriptions.
	d2. Present the outcomes of a team effort		Students present and demo their electronic designs as part of lab assignments and topics.	Students presentations and demos of their electronic designs, as part of lab assignments and topics, is accessed for satisfactory completion as outlined in lab descriptions and assignments.
	d3. Demonstrate an active role on a team		Under direct guidance from lab instructors, each lab team member actively participates in the development and design of electronic designs as part of lab assignments and topics.	Work by lab team members, who each actively participate in the development and design of electronic designs as part of lab assignments and topics, is accessed and monitored for satisfactory performance under direct guidance of lab instructors.
	d4. Demonstrate effective collaboration with diverse team members		Students from multiple majors and backgrounds particpate as team members to perform design work and lab experiments.	Student, who are from multiple majors and backgrounds, particpate as team members to perform design work and lab experiments. Their collaborative work is accessed and monitored for satisfactory performance under direct guidance from lab instructors.

(E) Identify, formulate and solve engineering problems		**I CEN 150 Intro to Engineering Analysis**		
	e1. Capitalize on industry partnerships to identify engineering problems		Industry partnerships are leveraged by incorporating guest speakers from industry and specific industry-related problems into projects and lectures.	Industry partners, whose presence and participation is leveraged by incorporating guest speakers from industry, work with the course instructor and students to discuss specific examples industry-related problems. Satisfactory understanding of these concepts by students is accessed and measured in projects and lecture discussions.
	e2. Design an experiment to solve the problem		Students experiment and solve engineering problems using a variety of industry-standard tools and techniques.	Student problem solutions to experiments and engineering problems, which utilize a variety of industry-standard tools and techniques, is accessed for satisfactory completion as outlined in assignment descriptions and classroom discussions.
	e3. Actively participate in the solution to the problem		Students are presented with realistic engineering problems and work together to formulate solutions.	Students, who are presented with realistic engineering problems and work together to formulate solutions, are accessed for satisfactory performance as part of individual and group assignments.
	e4. Implementation of a design project		Students conclude their coursework with a final project that incorporates and demonstrates that they have mastered skills taught throughout the class.	Students, who work on a final project that incorporates and demonstrates that they have mastered skills taught throughout the class, are accessed on this project for satisfactory performance, as outlined in the final design project guidelines.
	e5. Model the problem mathematically and apply standard mathematical tools		A wide range of mathematical tools are used to model and solve problems including MatLab, Mathematica, ProE, SolidWorks, SPICE, etc.	A demonstration of a satisfactory understanding of wide range of mathematical tools used to model and solve problems (including MatLab, Mathematica, ProE, SolidWorks, SPICE, etc) is performed as part of individual and group assignments and projects.
(F) Understand ethical and professional responsibility		**I CEN 450 Design Lab II**		
	f1. Examine case studies in engineering ethics		As part of the final project write-up and presentation, students must research engineering ethics issues and evaluate case studies and include this in their final presentations.	As part of the final project write-up and presentation, an accessment is performed to determine satisfactory completion of student research into engineering ethics issues and case studies.
	f2. Meet with engineering professionals		Students meet with engineering professionals on a regular basis throughout the design lab as they produce they final designs and reports and prepare for the final oral and writtent presentaitons.	Written communications between students and industry professionals is monitored and accessed via status reports to ensure that there is satisfactory progress towards goals and objectives outlined for the design lab.
	f3. Complete course assignments in engineering ethics		Students evaluate and incoportate discussions on engineering ethics and issues in their final project course documentation and presentations.	Students, who evaluate and incorportate discussions on engineering ethics and issues in their final project course documentation and presentations, are accessed for satisfactory understanding of these topics as part of the final project.
	f4. Complete course assignments in an ethical and professional manner		As students complete their final project, they are carefully evaluated to ensure all work is done both professional and in an ethical manner.	Student projects and assignments are accessed and evaluated to ensure that all work is completed in both a professional and an ethical manner.
(g) Communicate effectively		**I CEN 353 / A PHY 353 Microprocessor Applications**		
	g1. Write reports and recommendations		Students document their programming, design projects and assignments and produce reports and recommendations that includes solutions to complex technical problems.	Students, who document their programming, design projects and assignments and produce reports and recommendations, are accessed to ensure all work meets a satisfactory performance level, as outlined in project and assignment guidelines.
	g2. Present solutions to problem sets		Solutions to assignments, problems and lab work is presented both verbally and in written form.	Student solutions to assignments, problems, and lab work is presented both verbally and in written form. This work is accessed to ensure that it meets a satisfactory performance level, as outlined in project and assignment guidelines.
	g3. Work collaboratively with team members to present outcomes		Students work collaborately on assignments and lab projects to produce solutions to complex technical problems and circuit designs.	Students, who work collaborately on assignments and lab projects to produce solutions to complex technical problems and circuit designs, are accessed to ensure all work meets a satisfactory performance level, as outlined in project and assignment guidelines.
	g4. Participate in demonstration opportunities		Students must demonstrate their designs and solutions to other team members and the course instructor and TA.	Student demonstrations of designs and solutions are presented to other team members and the course instructor and TA. These demonstrations are accessed to ensure all work meets a satisfactory performance level, as outlined in project and assignment guidelines.
(H) Understand engineering solutions in context		**I CEN 430 Systems Analysis and Design**		
	h1. Perform successfully on assessment of engineering concepts		Students apply engineering skills and concepts to solve complex business and technical problems.	Student comprehension of engineering skills and concepts, used to solve complex business and technical problems, is accessed to ensure that their work and understanding meets a satisfactory performance level, as outlined in project and assignment guidelines.
	h2. Apply appropriate engineering skills to formulate a solution		Students soive engineering problems using a wide-range of skills and techniques and appropriately select the best approach to both analyze and design a system. This is demonstrated in both assignments and the final project.	Students soive engineering problems using a wide-range of skills and techniques and must appropriately select the best approach to both analyze and design a system. This is demonstrated in both assignments and the final project and accessed to ensure that their work meets a satisfactory performance level, as outlined in project and assignment guidelines.
	h3. Evaluate solutions for correct methodology and procedures		Students consider a wide-range of methods and procedures to both analyze and design a system to solve business problems. They then select the best approach to use to solve and complete each phase of the project.	Students consider a wide-range of methods and procedures to both analyze and design a system to solve business problems. Their methodology and selected approach used to solve and complete each phase of the project is accessed to ensure that their work and concept understanding meets a satisfactory performance level, as outlined in project and assignment guidelines.

	h4. Demonstrate alternative approaches to solving a problem		Multiple methods and techniques are taught and considered that may be used to analyze and design solutions to a systems design. Students must consider the best approach to also demonstrate their understanding of each approach as part of the final project written and verbal presentation.	Multiple methods and techniques are taught and considered that may be used to analyze and design solutions to a systems design. Students, who use this knowledge and demonstrate their understanding as part of the final project written and verbal presentation, are accessed to ensure that their work and concept understanding meets a satisfactory performance level, as outlined in project and assignment guidelines.
(I) Life-long learning		**I CEN 140 Intro to Engineering Design**		
	i1. Demonstrate knowledge of fundamentals		Students work on both individual and team design projects that demonstrate their knowledge of basic engineering concepts and fundamentals.	Students work on both individual and team design projects, which demonstrates their knowledge of basic engineering concepts and fundamentals, is accessed to ensure that their understanding meets a satisfactory performance level, as outlined in project and assignment guidelines.
	i2. Recognize the need to remain current in the field		Students engage in in-class discussions and research projects specifically designed to raise awareness about current engineering topics and the need to remain active and current in engineering as a life-long objective.	Students engagement in in-class discussions and research projects, specifically designed to raise awareness about current engineering topics and the need to remain active and current in engineering as a life-long objective, is accessed to ensure that their awareness and understanding meets a satisfactory performance level.
	i3. Be aware of professional engineering organizations		Students conduct research and work on projects that involve an exploration of engineering organizations and their purpose and charters.	Student conducted research and work on projects, which involves an exploration of engineering organizations and their purpose and charters, is accessed to ensure that their engagement and understanding meets a satisfactory performance level, as outlined in project and assignment guidelines.
	i4. Learn about career opportunities for engineers		Students learn the types of work engineers in various disciplines perform. They explore various career paths and issues facing engineers.	Students, who learn the types of work engineers in various disciplines perform and explore various career paths and issues facing engineers, are accessed in written assignments and class discussions to ensure that their understanding meets a satisfactory performance level, as outlined in project and assignment guidelines.
	i5. Participate in co-curricular activities			Not directly accessed. Students may join engineering organizations and on-campus clubs dedicated to broaden their exposure to their field.
	i6. Reading professional documentation and standards		Students are required to read and analyze professional engineering documentation and standards as part of course projects, assignments and in-class discussions.	Students, who are required to read and analyze professional engineering documentation and standards as part of course projects, assignments and in-class discussions, are assessed in those assignments to ensure that their understanding meets a satisfactory performance level.
(J) Knowledge of contemporary issues		**I CEN 440 Design Lab I**		
	j1. Participate in discussion groups		Students work together in groups and teams to solve a specific contemporary engineering problem	Student teamwork, as they solve specific contemporary engineering problems, is assessed in assignments and projects to ensure that their engagement and contribution meets a satisfactory performance level.
	j2. Write papers on contemporary issues		As part of course requirements, students prepare a detailed preliminary design and analysis report relating to a contemporary engineering problem.	Student work, which consists of detailed preliminary design and analysis reports relating to a contemporary engineering problem, is assessed in assignments and projects to ensure that their understanding and contribution meets a satisfactory performance level.
	j3. Demonstrate knowledge through presentations or exams on contemporary issues		As part of course requirements, students present their detailed preliminary design and analysis report relating to a contemporary engineering problem. This is presented to instructors and industry professionals.	Student preliminary design and analysis reports, relating to contemporary engineering problems, are presented to instructors and industry professionals and are assesed to ensure their understanding meets a satisfactory performance level.
(K) Use modern tools for engineering practice		**I CEN 340 Digital Logic Design**		
	k1. Learn current industry standard engineering tools		Students use industry standard engineering tools such as SPICE to design, model and analyze digital circuits.	Student use of industry standard engineering tools such as SPICE, to design, model and analyze digital circuits, is assessed to ensure their knowledge and understanding and usage meets a satisfactory performance level.
	k2. Demonstrate proficiency in engineering modeling tools		As part of course assignments, students translate real-world engineering problems in digital electronics into workable solutions using engineering modeling tools.	Student translation of real-world engineering problems in digital electronics into workable solutions using engineering modeling tools is assessed to ensure their knowledge and understanding meets a satisfactory performance level, as outlined in assignments and projects.
	k3. Utilize appropriate tools in solving engineering problems		Students must select and utilize the appropriate tools for solving digital circuit problems as part of course assignments.	Student selection and utilization of appropriate tools for solving digital circuit problems, is assessed to ensure their knowledge and understanding meets a satisfactory performance level, as outlined in assignments and projects.

University at Albany
New Program Proposal
BS in Computer Engineering

Appendix 4

SUNY Undergraduate Sample Program Schedule

SUNY Undergraduate Sample Program Schedule

Campus Name: University at Albany, State University of New York

Program/Track Title and Award: Computer Engineering, BS

Calendar Type	Semester	Quarter	Trimester	Other
	X			

SUNY Transfer Path Name (if one exists): Computer Engineering <----- Use Dropdown Arrow.

Use the table to show **how a typical student may progress through the program. Check all columns that apply to a course or enter credits where applicable.**

KEY **Course Type:** Required (R), Restricted Elective (RE), Free Elective (FE). **Course Credits:** Number of Credits for individual course (Enter number.) **GER Area:** SUNY General Education Requirement Area (Enter Area Abbreviation from the drop-down menu.) **GER Credits:** (Enter number of course credits.) **LAS:** Liberal Arts & Sciences Credits (Enter X if course is an LAS course.) **Major:** Major requirement (Enter X.) **TPath:** SUNY Transfer Path Major & Cognate Courses (Enter X.) **Elective/Other:** Electives or courses other than specified categories (Enter X.) Upper Div: Courses intended primarily for juniors and seniors outside of the major (Enter X.) **Upper Div Major:** Courses intended primarily for juniors and seniors within the major (Enter X.) **New:** new course (Enter X.) **Co/Prerequisite(s):** List co/prerequisite(s) for the noted courses. **SUNY GER Area Abbreviations** (the first five listed in order of their frequency of being required by SUNY campuses): Basic Communication (BC), Math (M), Natural Sciences (NS), Social Science (SS), Humanities (H), American History (AH), The Arts (AR), Other World Civilizations (OW), Western Civilization (WC), Foreign Language (FL).

The table will automatically update the number of credits, courses and categories in the program totals table at the bottom of the chart.

Label each term in sequence, consistent with the institution's academic calendar (e.g., Fall 1, Spring 1, Fall 2.

Fall 1

Course Number & Title (& Type)	Number of Credits	GER Area	GE Credits	LAS	Major	Elective/Other	Upper Div	Upper Div Major	TPath	New Course	Co/Prerequisite
AMAT 112 Calculus 1 - REQ	4	M	X	X	X				X		
ICEN 140 Intro to Engineering Design - REQ	3				X				X	X	
APHY 140 Physics 1 - REQ	3	NS	X	X	X				X		Co: AMAT 112
APHY 145 Physics 1 Lab - REQ	1			X	X				X		Co: APHY 140
ICEN 201/ICSI 201 - Introduction to Computer Science - REQ	4				X				X		
Term Totals	**15**	**2**	**7**	**8**	**15**				**5**	**1**	**(X)**

Spring 1

Course Number & Title (& Type)	Number of Credits	GER Area	GE Credits	LAS	Major	Elective/Other	Upper Div	Upper Div Major	TPath	New Course	Co/Prerequisite
AMAT 113 Calculus 2 - REQ	4		X	X	X				X		AMAT 112
ICEN 150 - Intro to Engineering Analysis - REQ	3				X				X	X	ICEN 140
APHY 150 Physics 2 - REQ	3		X	X	X				X		Pre: APHY 140, Co:AMAT 113
APHY 155 - Physics 2 Lab - REQ	1			X	X				X		Co: APHY 150
ICEN 213/ICSI 213 - Data Structures - REQ	3				X				X		ICEN/ICSI 201
UUNI 110 Writing and Critical Inquiry - REQ	3	BC	X	X							
Term Totals	**17**	**1**	**10**	**11**	**14**				**5**	**1**	**(X)**

Fall 2

Course Number & Title (& Type)	Number of Credits	GER Area	GE Credits	LAS	Major	Elective/Other	Upper Div	Upper Div Major	TPath	New Course	Co/Prerequisite
AMAT 214 Calculus 3 - REQ	4			X	X				X		AMAT 113
ACHM 120 - Chemistry 1 - REQ	3		X	X	X				X		
ACHM 124 - Chemistry 1 Lab - REQ	1			X	X				X		Co: ACHM 120
ICEN 333 Programming at the Hardware/Software Interface - REQ	4				X		X	X	X		Grade of C or better in ICEN/ICSI 213
AMAT 220 Linear Algebra - REQ	3			X	X						AMAT 113
Term Totals	**15**		**3**	**11**	**15**		**4**	**4**	**4**		**(X)**

Spring 2

Course Number & Title (& Type)	Number of Credits	GER Area	GE Credits	LAS	Major	Elective/Other	Upper Div	Upper Div Major	TPath	New Course	Co/Prerequisite
AMAT 311 Ordinary Differential Equations - REQ	3			X	X		X	X	X		AMAT 214
ICEN 415 Electronics - REQ	3			X	X		X	X	X		APHY 150
ICEN 210 Discrete Structures - REQ	4			X	X				X		ICEN/ICSI 201
Foreign Language Gen Ed - RE	4	FL	X	X							
US History/Social Science Gen Ed - RE	3	SS	X	X							
		AH									
Term Totals	**17**	**3**	**7**	**17**	**10**		**6**	**6**	**3**		**(X)**

Fall 3

Course Number & Title (& Type)	Number of Credits	GER Area	GE Credits	LAS	Major	Elective/Other	Upper Div	Upper Div Major	TPath	New Course	Co/Prerequisite
ICEN 353 MicroProcessor Applications - REQ	3			X	X		X	X			ICEN/ICSI 201
AMAT 370 Probability and Statistics for Engineering and the Sciences - REQ	3			X	X		X	X		X	AMAT 113 and ICEN /ICSI 210
ICEN 400 Operating Systems - REQ	3			X	X		X	X			ICEN/ICSI 333
ICEN 340 Digital Logic Design - REQ	3				X		X	X		X	ICEN/ICSI 210
Humanities Gen Ed - RE	3	H	X	X							
Term Totals	**15**	**1**	**3**	**12**	**12**		**12**	**12**		**2**	**(X)**

Spring 3

Course Number & Title (& Type)	Number of Credits	GER Area	GE Credits	LAS	Major	Elective/Other	Upper Div	Upper Div Major	TPath	New Course	Co/Prerequisite
ICEN 454 Microprocessor Applications Lab - REQ	3			X	X		X	X			ICEN/APHY 415
ICEN 404 Computer Organization - REQ	3				X		X	X			ICEN/ICSI 210 and ICEN/ICSI 333
ICEN 350 Signals and Systems - REQ	3				X		X	X		X	AMAT 220, AMAT 311, ICEN/APHY 415
Computer Engineering Elective (see list below) - RE	3				X		X	X		X	
Arts/International Perspectives Gen Ed - RE	3	AR	X	X							
		WC									
Term Totals	**15**	**2**	**3**	**6**	**12**		**12**	**12**		**2**	**(X)**

Fall 4

Course Number & Title (& Type)	Number of Credits	GER Area	GE Credits	LAS	Major	Elective/Other	Upper Div	Upper Div Major	TPath	New Course	Co/Prerequisite
ICEN 416 Communications 1 - REQ	3				X		X	X			ICEN/ICSI 400 and AMAT 370
Computer Engineering Elective - RE	3				X		X	X		X	
ICEN 440 Design Lab 1 - REQ	3				X		X	X		X	Pre: ICEN 350, ICEN /ICSI 400, ICEN/APHY 454. Co: ICEN 430
IICEN 430 Systems Analysis and Design - REQ	3				X		X	X		X	Co: ICEN 440
Elective - FE	2										
Term Totals	**14**				**12**		**12**	**12**		**3**	**(X)**

Spring 4

Course Number & Title (& Type)	Number of Credits	GER Area	GE Credits	LAS	Major	Elective/Other	Upper Div	Upper Div Major	TPath	New Course	Co/Prerequisite
Computer Engineering Elective - RE	3				X		X	X		X	
Computer Engineering Elective - RE	3				X		X	X		X	
ICEN 450 Design Lab 2 - REQ	6				X		X	X		X	ICEN 440
Term Totals	**12**				**12**		**12**	**12**		**3**	**(X)**

**Computer Engineering Electives
ICEN 360 Emerging Technologies
ICEN 370 Digital Signal Processing
ICEN 460 Mobile Design Engineering
ICEN 470 Human Computer Interaction
ICEN 480 VLSI Design & Fabrication
ICSI 311 Principles of Programming Languages
ICSI 402 Systems Programming
ICSI 403 Algorithms and Data Structures
ICSI 405 Object Oriented Programming
ICSI 410 Introduction to Databases
ICSI 411 Database Performance Principles & Transaction Management
ICSI 418 Software Engineering

Program Total Summary

Total Credits	SUNY GER Areas	SUNY GER Credits	Liberal Arts & Sciences Credits	Major Credits	Elective and Other Credits	Upper Division Credits	Upper Division Major Credits	Total TPath Courses	New Courses
120	9	33	65	102		58	58	17	12

GER Area Summary

Basic Communication (BC)	1	The Arts (AR)	1	
Mathematics (M)	1	American History (AH)	1	
Natural Sciences (NS)	1	Western Civilization (WC)	1	
Social Sciences (SS)	1	Other World Civilizations (OW)		
Humanities (H)	1	Foreign Language (FL)	1	

University at Albany
New Program Proposal
BS in Computer Engineering

Appendix 5

Catalog descriptions of existing courses that are part of the Computer Engineering proposal.

MATHEMATICS

A MAT 112 Calculus I (4)

Calculus of one variable. Limits, continuity, differentiation of algebraic functions, applications of differentiation, anti-derivatives, the definite integral, transcendental functions. A MAT 118 is the honors version of A MAT 112 and substitutes for A MAT 112 toward the prerequisite in any course. Only one of A MAT 111, 112, 118/118H and T MAT 118 may be taken for credit. Prerequisite(s): A MAT 100 or precalculus at the high school or college level. Students without precalculus should elect A MAT 101.

A MAT 113 Calculus II (4)

Techniques of integration, applications of the definite integral, conics, polar coordinates, improper integrals, infinite series. A MAT 119 is the honors version of A MAT 113 and substitutes for A MAT 113 toward the prerequisite in any course. Only one of A MAT 113, 119/119H and T MAT 119 may be taken for credit. Prerequisite(s): A MAT 111 or 112.

A MAT 214 Calculus of Several Variables (4)

Curves and vectors in the plane, geometry of three-dimensional space, vector functions in three-space, partial derivatives, multiple integrals, line and surface integrals. Prerequisite(s): A MAT 113 or 119.

A MAT 220 Linear Algebra (3)

Linear equations, matrices, determinants, finite dimensional vector spaces, linear transformations Euclidean spaces. Prerequisite(s): A MAT 113.

A MAT 311 Ordinary Differential Equations (3)

Linear differential equations, systems of differential equations, series solutions, boundary value problems, existence theorems, applications to the sciences. Prerequisite(s): A MAT 214.

PHYSICS

A PHY 140 Physics I: Mechanics (3)

An introduction to the fundamentals of physics: Classical Mechanics. Topics include the concepts of force, energy and work applied to the kinematics and dynamics of particles and rigid bodies and an introduction to special relativity. Only one of A PHY 140, A PHY 141 or T PHY 141 may be taken for credit. Prerequisite or corequisite: A MAT 111 or 112 or 118. Generally offered fall semester only.

A PHY 145 Physics Lab I (1)

Experiments in mechanics. One laboratory period each week. Prerequisite or corequisite: A PHY 140, A PHY 141 or T PHY 141. Offered fall semester only.

A PHY 150 Physics II: Electromagnetism (3)

An introduction to the fundamentals of physics: electrostatics and magnetism, including the concepts of the electric and magnetic fields, electric potential and basic circuits; the laws of Gauss, Ampere, and Faraday; Maxwell's equations; geometrical optics. Prerequisite or corequisite: A MAT 113 or 119; prerequisite: A PHY 140, A PHY 141, or T PHY 141. Generally offered spring semester only.

A PHY 155 Physics Lab II (1)

Experiments in electricity and magnetism, circuits, and optics. One laboratory period each week. Prerequisite or corequisite: A PHY 150, A PHY 151, or T PHY 151. Offered spring semester only.

CHEMISTRY

A CHM 120 General Chemistry I (3)

Atomic theory, quantitative relationships in chemical change, electronic structure of atoms and chemical periodicity, chemical bonding, and states of matter.

A CHM 124 (formerly A CHM 122A) General Chemistry Laboratory I (1)

Introduction to laboratory techniques, experiments demonstrating chemical principles in General Chemistry I, including stoichiometry, calorimetry, and properties of some elements and compounds. Prerequisite(s) or corequisite(s): A CHM 120 or 130. Effective Fall 2013 and beyond, course fee applies. Consult the Schedule of Classes.

COMPUTER SCIENCE

I CSI 311 Principles of Programming Languages (3)

Fundamental concepts and general principles underlying programming languages and their use as illustrated by Prolog and Lisp. Analysis and implementation of run-time environment including scope rules, binding, and parameter passing mechanism. Introduction to interpreters and compilers. Prerequisite(s): Grade of *C* or better required in I CSI 210 and 310. Normally offered spring semester only.

I CSI 402 Systems Programming (3)

Programming aspects of operating systems. Topics covered include implementation of storage management, resource allocation, multi-processing, scheduling, synchronization, inter-process communication, and terminal I/O.

Emphasis on projects to enhance subject understanding, problem solving, and programming skills. Prerequisite(s): Grade of *C* or better required in I CSI 333. Normally offered spring semester only.

I CSI 403 Algorithms and Data Structures (3)

Description of common data structures such as lists, push-down stores, queues, trees, and graphs. Definition of algorithm efficiency and efficient algorithms for integer and polynomial arithmetic, sorting, set manipulation, shortest paths, pattern matching, and Fourier transforms. Prerequisite(s): I CSI 210 and 310. Normally offered spring semester only.

I CSI 405 Object Oriented Programming Principles and Practice (3)

Object oriented software design principles (abstraction, polymorphism and inheritance; design patterns) with emphases on how they are embodied in a contemporary programming language, the principles of the structure, features and operation of such languages and systems, and increasingly complex API examples, design and implementation problems and projects to build proficient design, problem solving, programming and technology skills. Class presentation and discussion of some team developed project designs. A brief review of Java basics is given but proficiency in Java is highly desirable for the current course. This is not a course for programming beginners. Prerequisite(s): *C* or better in I CSI 310 or sufficient proficiency demonstrated to the instructor. Normally offered fall semester only.

I CSI 410 Introduction to Databases (3)

Introduction to using relational database software and database management systems. In-depth coverage of a practical Structured Query Language (SQL), physical and logical database design, rollback and recovery techniques, and access methods including interfaces to programming languages. Prerequisite(s): two semesters of course work in computer programming or equivalent experience. Familiarity with data structures and operating systems concepts is helpful but not required. Normally offered fall semester only.

I CSI 411 Database Performance Principles and Transaction Management (3)

Examination of database tuning principles and issues and how they apply to local and distributed transactional databases and data warehouses. Topics include locking and concurrency control, logging and recovery, query tuning, indexing schemes, file partitioning, hardware considerations, and how the database manager interacts with the transaction manager and the operating system. Prerequisite(s): I CSI 410 or a strong working knowledge of SQL. Normally offered spring semester only.

I CSI 418Y Software Engineering (3)

Software engineering principles, the role of abstraction in programming, abstract data types, modularization and

module interfaces, specifications, and teamwork. Project work in contemporary concurrent and object-oriented languages. Prerequisite(s): I CSI 333. Normally offered spring semester only.

Existing courses to be cross-listed with Computer Engineering (ICEN)

A PHY 353 Microprocessor Applications (3) Applications of microprocessors to data collection and process control; the capabilities of typical microprocessors and the techniques used to interface them to external devices; input/output programming, use of the data and address busses; interrupt handling, direct memory access, and data communications; characteristics of peripheral devices such as keyboards, printers, A/D and D/A converters, sensors, and actuators. Prerequisite(s): I CSI 201 or 204 or equivalent. An elementary knowledge of electricity is helpful.

A PHY 415 Electronics (3)

Transistors and their characteristics; electronic circuits, field effect transistors and applications, amplifiers, low and high frequency response; operational amplifiers; consideration of control-circuit design; fast-switching and counting devices; integrated circuits and their designs. Two class periods and one three-hour laboratory each week. Prerequisite: A PHY 150 or 151.

A PHY 454 Microprocessor Applications Laboratory (3)

Complements the theoretical development presented in A Phy 353. Centers around practical laboratory applications in both hardware and software of a particular microprocessor. Students prototype a minimum system and expanded system. Applications include keyboard, printer, display, A/D, D/A, and control functions. A knowledge of a microprocessor and digital logic functions is desirable. Prerequisite(s): A PHY 415 or permission of instructor or A PHY 353.

I CSI 201 Introduction to Computer Science (4)

Computer algorithms and their representation. The principle of information hiding and its relation to program block structure. File structure and access methods. The efficient use of computational resources. Program development and style. Normally offered fall, spring, summer.

I CSI 210 Discrete Structures (4)

Proofs by induction; mathematical reasoning, propositions, predicates and quantifiers; sets; relations, graphs, and trees; functions; counting, permutations and combinations. Prerequisite(s) or corequisite(s): I CSI 201. Normally offered in the fall and may be offered in the summer.

I CSI 213 Data Structures (3)

Commonly used abstract data structures and their implementation. The use of pointers and recursive programming. Stacks, queues, lists, and trees, and their application to such problems as sorting and searching. Analysis of

algorithms for using these structures. Prerequisite(s): I CSI 201. Normally offered fall and spring and may be offered in the summer.

I CSI 333 Programming at the Hardware Software Interface (4)

Instruction set architecture of contemporary computers; Boolean logic, memory, registers, instructions and interrupts. Assembly language programming; assembler passes, symbols, macros, function linkage and separate compilations. C language programming; syntax, control, types, abstractions, pointers and strings, dynamic memory, standard and user written libraries. ANSI and C++ standards. Instruction set simulation. Prerequisite(s): Grade of *C* or better required in I CSI 310. Normally offered fall semester only.

I CSI 400 Operating Systems (3)

Historical overview; operating system services; mass storage file organization; memory management in multiprogrammed systems; virtual memory; resource allocation; concurrent processes; deadlock detection and prevention; security; the design of contemporary operating systems such as UNIX. Prerequisite(s): I CSI 333. Normally offered fall semester only.

I CSI 404 Computer Organization (3)

An introduction to the logical organization of the hardware components of computing systems. Topics include logic design from a functional point of view, data representation and processing, description of major components such as the central processing unit and memory, and control and communication within the components and in the system. Prerequisite(s): I CSI 210 and 333. Normally offered spring semester only.

I CSI 416 Computer Communication Networks (3)

Introduction to computer communication networks. Equal emphasis on all layers of the ISO reference model and the TCP/IP protocol suite. Topics include physical networks, sliding window protocols, remote procedure call, routing, naming and addressing, security, authentication, performance, and applications. Prerequisite(s): I CSI 400 and A MAT 367.

University at Albany
New Program Proposal
BS in Computer Engineering

Appendix 6

Syllabi for new courses

ICEN 140	Intro to Engineering Design
ICEN 150	Intro to Engineering Analysis
ICEN 340	Digital Logic Design
ICEN 350	Signals and Systems
ICEN 360	Emerging Technologies
ICEN 370	Digital Signal Processing
ICEN 430	Systems Analysis and Design
ICEN 440	Design Lab I
ICEN 450	Design Lab II
ICEN 460	Mobile Design Engineering
ICEN 470	Human Computer Interaction
ICEN 480	VLSI Design & Fabrication
AMAT 370	Probability and Statistics for Engineering and the Sciences

University at Albany / Computer Engineering
Intro to Engineering Design
CEN 140 Section xxxx
Fall 2014

Meeting Time: TBD
Location: TBD

Instructor	TBD
Instructor Title	TBD
Office Location	TBD
Office hours	TBD
E-mail Address	TBD
TA's / Peer Educators	TBD

Textbooks (required):

Engineering Design: An Introduction
John R. Karsnitz, Stephen O'Brien, and John P. Hutchinson
ISBN-13: 978-1111645823 ISBN-10: 1111645825 2nd Edition: (2013)

Workbook for Karsnitz/O'Brien/Hutchinson's Engineering Design: An Introduction, 2nd
John R. Karsnitz, Stephen O'Brien, and John P. Hutchinson
ISBN-13: 978-1111645847 ISBN-10: 1111645841 2nd Edition: (2013)

COURSE DESCRIPTION / OVERVIEW
This course explores the topic of engineering design and teaches about and formalizes the design process and problem solving and other aspects of what engineers do. Using a combination of team and individual projects/labs, assignments, and classroom lectures and presentations, you will learn how to formulate, articulate, and solve problems, how to work on a team to design things, and how to present the results of engineering work in oral and written form. You will also learn about the different disciplines of engineering and the multidisciplinary nature of modern engineering design.

PREREQUISITES
None

COREQUISITES
MAT 112 – Calc 1, PHY 140 – Physics I, CSI 201 – Intro to CS (or equiv). or permission of Dept Chair

LEARNING OBJECTIVES / OUTCOMES:
At the completion of the course students will:

- Be able to articulate and understand what an engineer is and what an engineer does.
- Gain a general understanding of computer engineering and what do computer engineers do. They will also gain an understanding of how Computer Engineering compares to other engineering disciplines as Electrical, Software, Mechanical, Civil, etc.
- Work in multidisciplinary teams
- Explore professional ethic issues

- Understand the design process—the basic methodology of problem solving that includes:
    - Scoping the problem, problem solving, framing the problem
    - Examining alternatives
    - Develop a specification outlines that design requirements
        - Identifying a solution, cost and economic analysis and prototyping
    - Test/re-test the solution and Quality Assurance
    - Communicating - report writing and presentation skills
- Understand contemporary issues in engineering
- Be exposed to an introduction to the central topics of the Computer Engineering discipline and related interdisciplinary fields.
- Gain an explicit rather than tacit understanding of the procedures, practices, methodology and fundamental assumptions of the Computer Engineering discipline and its related interdisciplinary fields.
- Be exposed to multiple perspectives on the subject matter and field of Computer Engineering and its related interdisciplinary fields.
- Work in an active learning environment via labs and group and individual activities that enables them to be producers as well as consumers of knowledge.
- Be provided with opportunities for critical inquiry into the assumptions, goals, and methods of various related fields of academic study; with an aim to develop the interpretive, analytic, and evaluative competencies characteristic of critical thinking.

COURSE WEBSITE AND BLACKBOARD:
Blackboard will be used to provide essential course materials, the most current syllabus, and assignment documents and no separate course website will be maintained. However, this is not an online course and class and lab attendance is essential and required.

ASSESSMENT AND POLICIES:
The accomplishment of course objectives will be assessed by applying the concepts and tools for engineering design in a combination of team and individual assignments/labs/projects, tests, and a final project that includes research and design, a written component, and an oral presentation.

Exams: Two exams will be given. A portion of the class period preceding each exam will be utilized for a review session. There is no final exam during finals week.

Projects / Labs / Assignment: Projects / labs / assignments will be assigned and will be conducted both out of class and during lab period. They will be graded on a 5-point scale and will be totaled together to account for 40% of the final grade.

Final Project: A final project will be required. The requirements for this assignment will be fully described in a Blackboard later in the course.

Grading
A final grade will be determined as a weighted average of these scores using the following weights:
Exams (2) 30% (15 points each)
Labs/projects/assignments (8) 40% (5 points each)
Final Project 25% (15 for written portion / 10 points for oral portion)
Class Participation: 5%
Total possible points = 100

Grading Scale
A: 100-95 points A-: 94-90 points
B+: 89-87 points B: 84-86 points B-: 80-83 points
C+: 79-76 points C: 75-70 points
D:69-60 points
E: 59 points and below

Students must complete all requirements in order to pass the course. A grade of incomplete will be given only when circumstances beyond the student's control cause a substantial amount of course work to be unfinished by the end of the semester. Whenever possible, the student is expected to make extra efforts to prevent this situation from occurring. The instructor will be the sole judge of whether an incomplete is warranted. Final grades are computed based on the above formulas and are NOT negotiable. Per department policy, "...students may not submit additional work or be re-examined for the purpose of improving their grades once the course has been completed and final grades assigned."

Attendance/Lateness/Use of Computers in class
Students are expected to *attend every class and to arrive on time*. Please DO NOT disrupt the class or labs by entering late or leaving early without instructor approval. Attendance will be taken at every class meeting. Each unexcused absence (one approved by either instructor prior to class) will result in a 1-point deduction from your class participation grade. Computers may be used during class for note taking as long as the use is not disruptive or distracting. Also see
http://www.albany.edu/health_center/medicalexcuse.shtml.

Responsible Computing
Students are required to read the University at Albany Policy for the Responsible Use of Information Technology (http://www.albany.edu/its/policies_responsible_use_of_IT.htm). Students will be expected to apply the policies discussed in this document to all electronic communications in the course.

Students With Disabilities
Reasonable accommodations will be provided for students with documented physical, sensory, systemic, cognitive, learning and psychiatric disabilities. If you believe you have a disability requiring accommodation in this class, please notify the Director of the Disability Resource Center (Campus Center 137, 442-5490). That office will provide the course instructor with verification of your disability, and will recommend appropriate accommodations. For further information refer to the University's Disclosure Statement regarding Reasonable Accommodation found at the bottom of the document at the following website: http://www.albany.edu/disability/docs/RAP.doc. This website can be reached by following the link under "Reasonable Accommodation Policy" at the following webpage
http://www.albany.edu/disability/faculty-staff.shtml.

Academic Honesty and Overall Regulations
Every student has the responsibility to become familiar with the standards of academic integrity at the University. Faculty members must specify in their syllabi information about academic integrity, and may refer students to this policy for more information. Nonetheless, student claims of ignorance, unintentional error, or personal or academic pressures cannot be excuses for violation of academic integrity. Students are responsible for familiarizing themselves with the standards and behaving accordingly, and UAlbany faculty are responsible for teaching, modeling and upholding them. Anything less undermines the worth and value of our intellectual work, and the reputation and credibility of the University at Albany degree. Plagiarism and other acts of academic dishonesty will be punished. Read the Standards of Academic Integrity and policies in the Undergraduate Bulletin
(http://www.albany.edu/undergraduate_bulletin/regulations.html).

Rev 1.3 8/19/2014 updated for Gen Ed requirements

COURSE OUTLINE AND READINGS:

The following schedule of lecture topics and reading assignments is preliminary and may be changed as the semester progresses. The final schedule and specific h/w and lab assignments and materials will be provided in Blackboard. Students are expected to have read the listed material before it is covered in class.

Class	Topic	Readings	Notes
	PART 1 – The Engineering Design Process		
1	Intro to Course Intro to Engineering – what is an engineer?	Chapter 1	
2			Assignment 1 Due
3	Intro to the Design Process	Chapter 2	
4	Teaming	Chapter 3	Assignment 2 Due
5			
6	Idea Generation	Chapter 4, 5	
7			Assignment 3 Due
8	Reverse Engineering	Chapter 6	
9	Engineering Investigation and Research	Chapter 7	
10			Assignment 4 Due
11	Testing / QA	Chapter 9	
12	The Manufacturing Process	Chapter 10	
13	Review		Assignment 5 Due
14	Test 1		
	PART 2 – Resources for Engineering Design		
15	Designing Electrical and Computer Systems	Chapter 13	
16			
17	Human Factors in Engineering	Chapter 15	Assignment 6 Due
18			
19	Ethics		
20	Design Styles	Chapter 17	Assignment 7 Due
21			
22	Graphics and Presenting Your Ideas	Chapter 18	
23	Review		Assignment 8 Due
24	Test 2		
25	Final Project Presentations		
26	Final Project Presentations		
27	Final Project Presentations Last Class / Wrap-up		Final Projects Due

There will be additional readings related to networking and other course topics. These readings will be posted in Blackboard.

University at Albany / Computer Engineering
Intro to Engineering Analysis
CEN 150 Section xxxx

Fall 2014

Meeting Time: TBD
Location: TBD

Instructor	TBD
Instructor Title	TBD
Office Location	TBD
Office hours	TBD
E-mail Address	TBD
TA's / Peer Educators	TBD

Textbooks (required): Introduction to Engineering Analysis
Kirk D. Hagen (Author)
ISBN-13: 978-0133485080 ISBN-10: 0133485080 4th Edition (2013)

COURSE DESCRIPTION / OVERVIEW
This course introduces students to tools and techniques used in general engineering problem-solving. Introduction to Engineering Analysis focuses on using and learning the techniques, skills, and modern engineering tools necessary for engineering practice to solve engineering analytical problems in a logical and systematic way. The course will leverage course work in Physics, Computer Science and Mathematics.

PREREQUISITES
CEN 140 Introduction to Engineering Design

COREQUISITES
None

LEARNING OBJECTIVES / OUTCOMES:
At the completion of the course students will:

- Gain an understanding of the basic use of computer engineering tools (dependent on other software used in physics, mathematics, computer science and industry standards). This will include tools such as SPICE, MATLAB, Mathematica, ProE, and SolidWorks.
- Understand how to analyze and interpret data
- Understand the basics of simulation and modeling
- Model engineering problems using computer software
- Be exposed to an introduction to the central topics of the Computer Engineering design and related interdisciplinary areas.
- Gain an explicit rather than tacit understanding of the procedures, practices, methodology and fundamental assumptions of the Computer Engineering design and related interdisciplinary areas.
- Be exposed to multiple perspectives on the subject matter and field of Computer Engineering design and related interdisciplinary areas.
- Work in an active learning environment via labs and group and individual activities that enables them to be producers as well as consumers of knowledge.

- Be provided with opportunities for critical inquiry into the assumptions, goals, and methods of various related fields of academic study; with an aim to develop the interpretive, analytic, and evaluative competencies characteristic of critical thinking.

COURSE WEBSITE AND BLACKBOARD:
Blackboard will be used to provide essential course materials, the most current syllabus, and assignment documents and no separate course website will be maintained. However, this is not an online course and class and lab attendance is essential and required.

ASSESSMENT AND POLICIES:
The accomplishment of course objectives will be assessed by applying the concepts and tools for engineering design in a combination of team and individual assignments/labs/projects, tests, and a final project that includes research and design, a written component, and an oral presentation.

Exams: Two exams will be given. A portion of the class period preceding each exam will be utilized for a review session. There is no final exam during finals week.

Project / Labs / Assignment: Projects / labs / assignments will be assigned and will be conducted both out of class and during lab period. They will be graded on a 5-point scale and will be totaled together to account for 40% of the final grade.

Final Project: A final project will be required. The requirements for this assignment will be fully described in a Blackboard later in the course.

Grading
A final grade will be determined as a weighted average of these scores using the following weights:
Exams (2) 30% (15 points each)
Labs/projects/assignments (8) 40% (5 points each)
Final Project 25% (15 for written portion / 10 points for oral portion)
Class Participation: 5%
Total possible points = 100

Grading Scale
A: 100-95 points A-: 94-90 points
B+: 89-87 points B: 84-86 points B-: 80-83 points
C+: 79-76 points C: 75-70 points
D:69-60 points
E: 59 points and below

Students must complete all requirements in order to pass the course. A grade of incomplete will be given only when circumstances beyond the student's control cause a substantial amount of course work to be unfinished by the end of the semester. Whenever possible, the student is expected to make extra efforts to prevent this situation from occurring. The instructor will be the sole judge of whether an incomplete is warranted. Final grades are computed based on the above formulas and are NOT negotiable. Per department policy, "...students may not submit additional work or be re-examined for the purpose of improving their grades once the course has been completed and final grades assigned."

Attendance/Lateness/Use of Computers in class
Students are expected to *attend every class and to arrive on time*. Please DO NOT disrupt the class or labs by entering late or leaving early without instructor approval. Attendance will be taken at every class meeting. Each unexcused absence (one approved by either instructor prior to class) will result in a 1-point deduction from your class participation grade. Computers may be used during class for note taking as long as the use is not disruptive or distracting. Also see http://www.albany.edu/health_center/medicalexcuse.shtml.

Responsible Computing
Students are required to read the University at Albany Policy for the Responsible Use of Information Technology (http://www.albany.edu/its/policies_responsible_use_of_IT.htm). Students will be expected to apply the policies discussed in this document to all computing and electronic communications in the course.

Students With Disabilities
Reasonable accommodations will be provided for students with documented physical, sensory, systemic, cognitive, learning and psychiatric disabilities. If you believe you have a disability requiring accommodation in this class, please notify the Director of the Disability Resource Center (Campus Center 137, 442-5490). That office will provide the course instructor with verification of your disability, and will recommend appropriate accommodations. For further information refer to the University's Disclosure Statement regarding Reasonable Accommodation found at the bottom of the document at the following website: http://www.albany.edu/disability/docs/RAP.doc. This website can be reached by following the link under "Reasonable Accommodation Policy" at the following webpage http://www.albany.edu/disability/faculty-staff.shtml.

Academic Honesty and Overall Regulations
Every student has the responsibility to become familiar with the standards of academic integrity at the University. Faculty members must specify in their syllabi information about academic integrity, and may refer students to this policy for more information. Nonetheless, student claims of ignorance, unintentional error, or personal or academic pressures cannot be excuses for violation of academic integrity. Students are responsible for familiarizing themselves with the standards and behaving accordingly, and UAlbany faculty are responsible for teaching, modeling and upholding them. Anything less undermines the worth and value of our intellectual work, and the reputation and credibility of the University at Albany degree. Plagiarism and other acts of academic dishonesty will be punished. Read the Standards of Academic Integrity and policies in the Undergraduate Bulletin (http://www.albany.edu/undergraduate_bulletin/regulations.html).

COURSE OUTLINE AND READINGS:

The following schedule of lecture topics and reading assignments is preliminary and may be changed as the semester progresses. The final schedule and specific h/w and lab assignments and materials will be provided in Blackboard. Students are expected to have read the listed material before it is covered in class.

Class	Topic	Readings	Notes
1	Intro to Course Intro to Engineering Analysis – The Role of Analysis / Engineering Failure	Chapter 1	
2			Assignment 1 Due
3	Dimensions and Units	Chapter 2	
4			Assignment 2 Due
5	Analysis Methodology	Chapter 3	
6	The Computer as an Analysis Tool / Modeling		
7	Using Excel for Engineering Analysis		Assignment 3 Due
8			
9	Intro to MatLab		
10			Assignment 4 Due
11	Intro to Mathematica		
12			
13	Review		Assignment 5 Due
14	Test 1		
15	Other Engineering Tools – ProE, SolidWorks	Chapter 4	
16	Analysis of Electrical and Computer Circuits	Chapter 5	
17	SPICE		Assignment 6 Due
18			
19	Data Analysis: Graphing	Chapter 9	
20			Assignment 7 Due
21	Data Analysis: Statistics	Chapter 10	
22			
23	Review		Assignment 8 Due
24	Test 2		
25	Final Project Presentations		
26	Final Project Presentations		
27	Final Project Presentations Last Class / Wrap-up		Final Projects Due

University at Albany / Computer Engineering

Digital Logic Design

CEN 340 Section xxxx

Fall 2014

Meeting Time: TBD
Location: TBD

Instructor	TBD
Instructor Title	TBD
Office Location	TBD
Office hours	TBD
E-mail Address	TBD
TA's / Peer Educators	TBD

Textbooks (required): Digital Design
Frank Vahid (Author)
ISBN-13: 978-0470531082 2th Edition (2011)

COURSE DESCRIPTION / OVERVIEW

This course introduces students to Digital Logic Design. The course begins with binary (yes/no) phenomena and builds successively more complex components and systems, ending with a simple processor. Using a combination of team and individual projects/labs, students will discover how simple gates are built from switches, how components are built from gates, and how systems are built from components. Initial designs assume that there is no concept of time and that everything is immediately available. Time is then introduced, from which the concept of memory emerges, which greatly expands the devices that can be designed and used to create more complex systems. The final goal is to assemble a simple processor from the constituent components and to understand how software computations are performed on hardware.

PREREQUISITES

CEN 210 Discrete Structures

COREQUISITES

None

LEARNING OBJECTIVES / OUTCOMES:

At the completion of the course students will:

- Experience how electrical and computer engineers build digital systems
- Improve their problem-solving skills, including design and debugging skills
- Design in multiple levels of abstraction, that is, be able to move from detailed component-level design to system design (where components are treated as building blocks) and vice-versa
- Appreciate the need for precision in technical communications, particularly with respect to interface design
- Be able to translate a real-world problem into precise specifications for a digital system, design a system to meet those specifications, and demonstrate that your solution solves the problem.

- Be able to take a digital system already designed and implemented and deconstruct and analyze it to determine what it does, how it works, and how to use it in a system.

COURSE WEBSITE AND BLACKBOARD:
Blackboard will be used to provide essential course materials, the most current syllabus, and assignment documents and no separate course website will be maintained. However, this is not an online course and class attendance and participation is essential and required.

ASSESSMENT AND POLICIES:
The accomplishment of course objectives will be assessed by applying the concepts and tools for signals and systems in a combination of team and individual assignments and tests.

Exams: Two exams plus a final will be given. A portion of the class period preceding each exam will be utilized for a review session.

Projects / Labs / Assignment: Projects / labs / assignments will be assigned and will be conducted both out of class and during lab period. They will be graded on a 5-point scale and will be totaled together to account for 40% of the final grade.

Final Project: A final project will be required. The requirements for this assignment will be fully described in a Blackboard later in the course.

Grading
A final grade will be determined as a weighted average of these scores using the following weights:
Exams (2) 30% (15 points each)
Labs/projects/assignments (8) 40% (5 points each)
Final Project 25% (15 for written portion / 10 points for oral portion)
Class Participation: 5%
Total possible points = 100

Grading Scale
A: 100-95 points A-: 94-90 points
B+: 89-87 points B: 84-86 points B-: 80-83 points
C+: 79-76 points C: 75-70 points
D:69-60 points
E: 59 points and below

Students must complete all requirements in order to pass the course. A grade of incomplete will be given only when circumstances beyond the student's control cause a substantial amount of course work to be unfinished by the end of the semester. Whenever possible, the student is expected to make extra efforts to prevent this situation from occurring. The instructor will be the sole judge of whether an incomplete is warranted. Final grades are computed based on the above formulas and are NOT negotiable. Per department policy, "...students may not submit additional work or be re-examined for the purpose of improving their grades once the course has been completed and final grades assigned."

Attendance/Lateness/Use of Computers in class
Students are expected to *attend every class and to arrive on time*. Please DO NOT disrupt the class or labs by entering late or leaving early without instructor approval. Attendance will be taken at every class

meeting. Each unexcused absence (one approved by either instructor prior to class) will result in a 1-point deduction from your class participation grade. Computers may be used during class for note taking as long as the use is not disruptive or distracting. Also see http://www.albany.edu/health_center/medicalexcuse.shtml.

Responsible Computing
Students are required to read the University at Albany Policy for the Responsible Use of Information Technology (http://www.albany.edu/its/policies_responsible_use_of_IT.htm). Students will be expected to apply the policies discussed in this document to all computing and electronic communications in the course.

Students With Disabilities
Reasonable accommodations will be provided for students with documented physical, sensory, systemic, cognitive, learning and psychiatric disabilities. If you believe you have a disability requiring accommodation in this class, please notify the Director of the Disability Resource Center (Campus Center 137, 442-5490). That office will provide the course instructor with verification of your disability, and will recommend appropriate accommodations. For further information refer to the University's Disclosure Statement regarding Reasonable Accommodation found at the bottom of the document at the following website: http://www.albany.edu/disability/docs/RAP.doc. This website can be reached by following the link under "Reasonable Accommodation Policy" at the following webpage http://www.albany.edu/disability/faculty-staff.shtml.

Academic Honesty and Overall Regulations
Every student has the responsibility to become familiar with the standards of academic integrity at the University. Faculty members must specify in their syllabi information about academic integrity, and may refer students to this policy for more information. Nonetheless, student claims of ignorance, unintentional error, or personal or academic pressures cannot be excuses for violation of academic integrity. Students are responsible for familiarizing themselves with the standards and behaving accordingly, and UAlbany faculty are responsible for teaching, modeling and upholding them. Anything less undermines the worth and value of our intellectual work, and the reputation and credibility of the University at Albany degree. Plagiarism and other acts of academic dishonesty will be punished. Read the Standards of Academic Integrity and policies in the Undergraduate Bulletin (http://www.albany.edu/undergraduate_bulletin/regulations.html).

COURSE OUTLINE AND READINGS:

The following schedule of lecture topics and reading assignments is preliminary and may be changed as the semester progresses. The final schedule and specific assignments will be provided in Blackboard. Students are expected to have read the listed material before it is covered in class.

Class	Topic	Readings	Notes
	Welcome to the Digital World	Chapter 1	
1	Intro to Digital Systems		
2	Switches, logic functions and circuits		Assignment 1 Due
3	Digital representation of data		
4	Logic, Boolean algebra and equivalence		Assignment 2 Due
	Combinational logic design: You have everything that you need to know at the present	Chapter 2	
5	Inputs, outputs, functions and their representation		
6	The relationships between logic equations and circuits		Assignment 3 Due
7	Explorations of useful circuits (decoders, encoders, multiplexers, adders, comparators, shifters, ALU)		
8	Test 1		
	Sequential logic design: Adding the concept of time	Chapter 3	
9	Remembering a single bit of information		Assignment 4 Due
10	Sequential systems, finite state machines		
11	Exploration of useful circuits (flip-flops, registers, counters)		
12	Controllers		Assignment 5 Due
13	Sequential design process		
14	Combinational and Sequential design process	Chapter 4	
15			
	Digital Design		
16	RTL Design	Chapter 5	Assignment 6 Due
17			
18	Optimizations and Trade-offs / Assembling digital components	Chapter 6	
19			Assignment 7 Due
20	Physical Implementation / Establishing the connections	Chapter 7	
21			
22	Processor Design/ Making the system programmable	Chapter 8	Assignment 8 Due
23			
24	Test 2		
25	Final Project Presentations		
26	Final Project Presentations		
27	Final Project Presentations Last Class / Wrap-up		Final Projects Due

University at Albany / Computer Engineering

Signals and Systems

CEN 350 Section xxxx

Fall 2014

Meeting Time: TBD
Location: TBD

Instructor	TBD
Instructor Title	TBD
Office Location	TBD
Office hours	TBD
E-mail Address	TBD
TA's / Peer Educators	TBD

Textbooks (required): Signals and Systems Using Matlab
Luis Chaparro (Author)
ISBN-13: 978-0-12-394812-0 2th Edition (2015)

COURSE DESCRIPTION / OVERVIEW
This course introduces students to Signals and Systems. The course is divided into three parts: introduction, theory, and applications of continuous-time signals and systems, and theory and applications of discrete-time signals and systems. The course is organized so that students not only get a solid understanding of the theory—enhanced by analytic examples and software examples using MATLAB, learn about applications, but also develop confidence and proficiency in the material by working on analytic and computational problems.

PREREQUISITES
AMAT 220 Linear Algebra, CEN 415 Electronics, AMAT 311 Differential Equations

COREQUISITES
None

LEARNING OBJECTIVES / OUTCOMES:
At the completion of the course students will:

- Gain an understanding of Signals and Systems basics, theory and applications of continuous-time signals and systems, and theory and applications of discrete-time signals and systems
- Understand the connection between continuous- and discrete-time signals and systems, infinitesimal and finite calculus, and why complex numbers and functions are used in the study of signals and systems.
- Understand conceptual issues using MATLAB problems designed to deepen the conceptual understanding as they are applied.

COURSE WEBSITE AND BLACKBOARD:
Blackboard will be used to provide essential course materials, the most current syllabus, and assignment documents and no separate course website will be maintained. However, this is not an online course and class attendance and participation is essential and required.

ASSESSMENT AND POLICIES:
The accomplishment of course objectives will be assessed by applying the concepts and tools for signals and systems in a combination of team and individual assignments and tests.

Exams: Two exams plus a final will be given. A portion of the class period preceding each exam will be utilized for a review session.

Projects / Assignments: Projects / assignments will be assigned and will be completed out of class. They will be graded on a 10-point scale and will be totaled together to account for 40% of the final grade.

Grading
A final grade will be determined as a weighted average of these scores using the following weights:
Exams (2) 30% (15 points each)
Final Exam 25% (25 points)
Projects/assignments (4) 40% (10 points each)
Class Participation: 5%
Total possible points = 100

Grading Scale
A: 100-95 points A-: 94-90 points
B+: 89-87 points B: 84-86 points B-: 80-83 points
C+: 79-76 points C: 75-70 points
D:69-60 points
E:59 points and below

Students must complete all requirements in order to pass the course. A grade of incomplete will be given only when circumstances beyond the student's control cause a substantial amount of course work to be unfinished by the end of the semester. Whenever possible, the student is expected to make extra efforts to prevent this situation from occurring. The instructor will be the sole judge of whether an incomplete is warranted. Final grades are computed based on the above formulas and are NOT negotiable. Per department policy, "...students may not submit additional work or be re-examined for the purpose of improving their grades once the course has been completed and final grades assigned."

Attendance/Lateness/Use of Computers in class
Students are expected to *attend every class and to arrive on time*. Please DO NOT disrupt the class by entering late or leaving early without instructor approval. Attendance will be taken at every class meeting. Each unexcused absence (one approved by either instructor prior to class) will result in a 1-point deduction from your class participation grade. Computers may be used during class for note taking as long as the use is not disruptive or distracting. Also see
http://www.albany.edu/health_center/medicalexcuse.shtml.

Responsible Computing
Students are required to read the University at Albany Policy for the Responsible Use of Information Technology (http://www.albany.edu/its/policies_responsible_use_of_IT.htm). Students will be expected to apply the policies discussed in this document to all computing and electronic communications in the course.

Students With Disabilities
Reasonable accommodations will be provided for students with documented physical, sensory, systemic, cognitive, learning and psychiatric disabilities. If you believe you have a disability requiring accommodation in this class, please notify the Director of the Disability Resource Center (Campus Center 137, 442-5490). That office will provide the course instructor with verification of your disability, and will recommend appropriate accommodations. For further information refer to the University's Disclosure Statement regarding Reasonable Accommodation found at the bottom of the document at the following website: http://www.albany.edu/disability/docs/RAP.doc. This website can be reached by following the link under "Reasonable Accommodation Policy" at the following webpage http://www.albany.edu/disability/faculty-staff.shtml.

Academic Honesty and Overall Regulations
Every student has the responsibility to become familiar with the standards of academic integrity at the University. Faculty members must specify in their syllabi information about academic integrity, and may refer students to this policy for more information. Nonetheless, student claims of ignorance, unintentional error, or personal or academic pressures cannot be excuses for violation of academic integrity. Students are responsible for familiarizing themselves with the standards and behaving accordingly, and UAlbany faculty are responsible for teaching, modeling and upholding them. Anything less undermines the worth and value of our intellectual work, and the reputation and credibility of the University at Albany degree. Plagiarism and other acts of academic dishonesty will be punished. Read the Standards of Academic Integrity and policies in the Undergraduate Bulletin (http://www.albany.edu/undergraduate_bulletin/regulations.html).

COURSE OUTLINE AND READINGS:

The following schedule of lecture topics and reading assignments is preliminary and may be changed as the semester progresses. The final schedule and specific assignments will be provided in Blackboard. Students are expected to have read the listed material before it is covered in class.

Class	Topic	Readings	Notes
	Introduction to Signals and Systems		
1	Intro to Course Intro to signals and Systems	Chapter 0	
2			
	Theory and Application of Continuous-time Signals and Systems		
3	Continuous-time Signals	Chapter 1	
4			
5	Continuous-time Systems	Chapter 2	Proj./Assignment 1 Due
6			
7	The Laplace Transform	Chapter 3	
8			
9	Frequency Analysis: The Fourier Series	Chapter 4	
10			Proj./Assignment 2 Due
11	Frequency Analysis: The Fourier Transform	Chapter 5	
12			
13	Test 1		
14	Application of Laplace Analysis to Control	Chapter 6	
15			
16	Fourier Analysis in Communications and Filtering	Chapter 7	Proj./Assignment 3 Due
17			
	Theory and Application of Discrete-time Signals and Systems		
18	Sampling Theory	Chapter 8	
19			
20	Discrete-time Signals and Systems	Chapter 9	
21			Proj./Assignment 4 Due
22	The Z-Transform	Chapter 10	
23	Review		
24	Test 2		
25	Fourier Analysis of Discrete-time Signals and Systems	Chapter 11	
26			
27	Intro to Design of Discrete Filters / Summary	Chapter 12	
	Final Exam		

University at Albany / Computer Engineering

Emerging Technologies

CEN 360 Section xxxx

Fall 2015

Meeting Time: TBD
Location: TBD

Instructor	TBD
Instructor Title	TBD
Office Location	TBD
Office hours	TBD
E-mail Address	TBD
TA's / Peer Educators	TBD

Textbooks (required): Wharton on Managing Technologies
Authors: George S. Day, Paul J. H. Schoemaker and Robert E. Gunther
Published by: John Wiley and Sons, Inc. ISBN-471-36216-0 2000

COURSE DESCRIPTION / OVERVIEW
This course will explore current emerging technologies and related technical management practices on a global basis. Working individually, students will explore the current body of literature/knowledge and conduct research on emerging technologies found in contemporary technology-intensive enterprises. Extensive and advanced readings, research, and writing assignments will be required.

PREREQUISITES
I CEN 415, A MAT 214

COREQUISITES
None

LEARNING OBJECTIVES / OUTCOMES:
Emerging Technologies consists of converging technologies that create new efficiencies; arise from new knowledge or the innovative application of existing knowledge; lead to the rapid development of new capabilities; are projected to have significant systemic and long-lasting economic, social and political impacts; create new opportunities for and challenges to addressing global issues and have the potential to disrupt or create entire industries.

In today's business environment, companies find themselves working with reduced resources while they are expected to do more with those limited funds and at the same time they are also expected to increase company profits. With limited funds to invest in new and innovative technologies that would have an impact on the company's bottom line, the process of determining technologies that would add value to the company and the management of those technologies is critical.

At the completion of the course the student will, based on their readings, research and study of the current body of literature:

- Be able to organize, compose and develop a scholarly analytical research paper and accompanying oral presentation centered on an emerging technology topic, as assigned by the instructor of this course.
- Be able to create in their own comprehensive definition of emerging technology management and be able to discuss with a high level of understanding key terminology common to management trends, principles and practices common to technology-intensive organizations and present their finding in an analytical research paper.
- Be able to demonstrate a thorough and high level of understanding regarding the future models of emerging technology management in their original written analytical research paper.

COURSE WEBSITE AND BLACKBOARD:
Blackboard will be used to provide essential course materials, the most current syllabus, and assignment documents and no separate course website will be maintained. However, this is not an online course and class attendance and participation is essential and required.

ASSESSMENT AND POLICIES:
The accomplishment of course objectives will be assessed by applying the concepts and tools for signals and systems in a combination of team and individual assignments and tests.

Exams: There are no exams in this course

Projects / Assignments: There are three assignments to be completed outside of class. Each will be graded on a 100-point scale and will be averaged together to account for 100% of the final grade.

Assignment 1 – Research Paper - Aspects of Emerging Technologies Management. This paper includes material found in Chapters 3, 4, 9, 10 and 11 of the course textbook and additional student research on these topics that includes The Technology Assessment Process, Evaluation of Technologies, Establishing Strategies, Disruptive Innovation/Technology, Technology Planning, and Intellectual Property.

Assignment 2 – Research Paper - Future Models for Workplace Structure in Technology-Intensive Organizations. This paper includes material found in Chapters 15, 16, 17 and 18 of the course textbook and additional student research.

Assignment 3 – Research Paper and Oral Presentation - Emerging Technology Topic. This analytical research paper and accompanying oral presentation, based on student research, is centered on a emerging technology topic assigned by the instructor of this course.

Assignment 1 25% (25 points) Assignment 2 25% (25 points) Assignment 3: Written portion 25% (25 points) / Oral presentation 25% (25 points) – 50% (50 points)

Total possible points = 100

Grading Scale
A: 100-95 points A-: 94-90 points
B+: 89-87 points B: 84-86 points B-: 80-83 points
C+: 79-76 points C: 75-70 points
D:69-60 points
E: 59 points and below

Students must complete all requirements in order to pass the course. A grade of incomplete will be given only when circumstances beyond the student's control cause a substantial amount of course work to be unfinished by the end of the semester. Whenever possible, the student is expected to make extra efforts to prevent this situation from occurring. The instructor will be the sole judge of whether an incomplete is warranted. Final grades are computed based on the above formulas and are NOT negotiable. Per department policy, "...students may not submit additional work or be re-examined for the purpose of improving their grades once the course has been completed and final grades assigned."

Attendance/Lateness/Use of Computers in class
Students are expected to *attend every class and to arrive on time*. Please DO NOT disrupt the class by entering late or leaving early without instructor approval. Attendance will be taken at every class meeting. Each unexcused absence (one approved by either instructor prior to class) will result in a 1-point deduction from your class participation grade. Computers may be used during class for note taking as long as the use is not disruptive or distracting. Also see http://www.albany.edu/health_center/medicalexcuse.shtml.

Responsible Computing
Students are required to read the University at Albany Policy for the Responsible Use of Information Technology (http://www.albany.edu/its/policies_responsible_use_of_IT.htm). Students will be expected to apply the policies discussed in this document to all computing and electronic communications in the course.

Students With Disabilities
Reasonable accommodations will be provided for students with documented physical, sensory, systemic, cognitive, learning and psychiatric disabilities. If you believe you have a disability requiring accommodation in this class, please notify the Director of the Disability Resource Center (Campus Center 137, 442-5490). That office will provide the course instructor with verification of your disability, and will recommend appropriate accommodations. For further information refer to the University's Disclosure Statement regarding Reasonable Accommodation found at the bottom of the document at the following website: http://www.albany.edu/disability/docs/RAP.doc. This website can be reached by following the link under "Reasonable Accommodation Policy" at the following webpage http://www.albany.edu/disability/faculty-staff.shtml.

Academic Honesty and Overall Regulations
Every student has the responsibility to become familiar with the standards of academic integrity at the University. Faculty members must specify in their syllabi information about academic integrity, and may refer students to this policy for more information. Nonetheless, student claims of ignorance, unintentional error, or personal or academic pressures cannot be excuses for violation of academic integrity. Students are responsible for familiarizing themselves with the standards and behaving accordingly, and UAlbany faculty are responsible for teaching, modeling and upholding them. Anything less undermines the worth and value of our intellectual work, and the reputation and credibility of the University at Albany degree.

Plagiarism and other acts of academic dishonesty will be punished. Read the Standards of Academic Integrity and policies in the Undergraduate Bulletin (http://www.albany.edu/undergraduate_bulletin/regulations.html).

COURSE OUTLINE AND READINGS:

The following schedule of lecture topics and reading assignments is preliminary and may be changed as the semester progresses. The final schedule and specific assignments will be provided in Blackboard. Students are expected to have read the listed material before it is covered in class.

Class	Topic	Deliverables
	PART 1 – Aspects of Emerging Technologies	
1	Intro to Course / Overview of Requirements	
2	Chapter 3	
3	Chapter 4	
4	Chapter 9	
5	Chapter 10	
6	Chapter 11	
7		
8	Status Meeting	
9		Assignment 1 Due
	PART 2 – Future Models for Workplace Structure in Technology-Intensive Organizations	
10	Chapter 15	
11	Chapter 16	
12	Chapter 17	
13	Chapter 18	
14		
15	Status Meeting	
16		
17	Status Meeting	
18		Assignment 2 Due
	PART 3 – Emerging Technology Topic	
19		
20	Status Meeting	
21		
22	Status Meeting	
23		
24	Status Meeting	
25	Assignment 3 Oral Presentations	
26	Assignment 3 Oral Presentations	
27		Written Portion - Assignment 3 Due

University at Albany / Computer Engineering

Digital Signal Processing

CEN 370 Section xxxx

Fall 2015

Meeting Time: TBD
Location: TBD

Instructor	TBD
Instructor Title	TBD
Office Location	TBD
Office hours	TBD
E-mail Address	TBD
TA's / Peer Educators	TBD

Textbooks (required): Discrete-Time Signal Processing
Author(s): Alan V. Oppenheim; Ronald W. Schafer
ISBN-13 9780132148153
Publisher: Prentice Hall
Copyright year: © 2010

COURSE DESCRIPTION / OVERVIEW
This course covers the techniques of modern digital signal processing that are fundamental to a wide variety of application areas. The course covers the mathematical basis of discrete-time signal analysis, discuses the theory and implementation of fast Fourier transform algorithms, and discusses the design and implementation of digital filters. The coverage of the fundamentals is complemented with introductory treatments of several advanced techniques including linear prediction, adaptive filtering, and two-dimensional signal processing. The course concludes with a discussion of the application of digital signal processing techniques toward the solution of various types of practical problems. This course makes extensive use of MATLAB as an analysis, design, and visualization tool.

PREREQUISITES
AMAT 220 Linear Algebra, CEN 415 Electronics, AMAT 311 Differential Equations

COREQUISITES
None

LEARNING OBJECTIVES / OUTCOMES:
At the completion of the course students will:

- Learn DSP algorithms, DSP processor structure, and real-time DSP design methodologies.
- Gain experience in utilizing the development tools for implementing real time DSP algorithms.
- Learn how to use programmable DSP processor to implement DSP algorithms.
- Learn the cycle of real time DSP algorithm design using tools such as MATLAB.
- To become ware of the broad application of real-time DSP.

COURSE WEBSITE AND BLACKBOARD:
Blackboard will be used to provide essential course materials, the most current syllabus, and assignment documents and no separate course website will be maintained. However, this is not an online course and class attendance and participation is essential and required.

ASSESSMENT AND POLICIES:
The accomplishment of course objectives will be assessed by applying the concepts and tools for signals and systems in a combination of team and individual assignments and tests.

Exams: Two exams plus a final will be given. A portion of the class period preceding each exam will be utilized for a review session.

Projects / Assignments: Projects / assignments will be assigned and will be completed out of class. They will be graded on a 10-point scale and will be totaled together to account for 40% of the final grade.

Grading
A final grade will be determined as a weighted average of these scores using the following weights:
Exams (2) 30% (15 points each)
Final Exam 25% (25 points)
Projects/assignments (4) 40% (10 points each)
Class Participation: 5%
Total possible points = 100

Grading Scale
A: 100-95 points A-: 94-90 points
B+: 89-87 points B: 84-86 points B-: 80-83 points
C+: 79-76 points C: 75-70 points
D:69-60 points
E:59 points and below

Students must complete all requirements in order to pass the course. A grade of incomplete will be given only when circumstances beyond the student's control cause a substantial amount of course work to be unfinished by the end of the semester. Whenever possible, the student is expected to make extra efforts to prevent this situation from occurring. The instructor will be the sole judge of whether an incomplete is warranted. Final grades are computed based on the above formulas and are NOT negotiable. Per department policy, "...students may not submit additional work or be re-examined for the purpose of improving their grades once the course has been completed and final grades assigned."

Attendance/Lateness/Use of Computers in class
Students are expected to *attend every class and to arrive on time*. Please DO NOT disrupt the class by entering late or leaving early without instructor approval. Attendance will be taken at every class meeting. Each unexcused absence (one approved by either instructor prior to class) will result in a 1-point deduction from your class participation grade. Computers may be used during class for note taking as long as the use is not disruptive or distracting. Also see
http://www.albany.edu/health_center/medicalexcuse.shtml.

Responsible Computing
Students are required to read the University at Albany Policy for the Responsible Use of Information Technology (http://www.albany.edu/its/policies_responsible_use_of_IT.htm). Students will be expected to apply the policies discussed in this document to all computing and electronic communications in the course.

Students With Disabilities
Reasonable accommodations will be provided for students with documented physical, sensory, systemic, cognitive, learning and psychiatric disabilities. If you believe you have a disability requiring accommodation in this class, please notify the Director of the Disability Resource Center (Campus Center 137, 442-5490). That office will provide the course instructor with verification of your disability, and will recommend appropriate accommodations. For further information refer to the University's Disclosure Statement regarding Reasonable Accommodation found at the bottom of the document at the following website: http://www.albany.edu/disability/docs/RAP.doc. This website can be reached by following the link under "Reasonable Accommodation Policy" at the following webpage http://www.albany.edu/disability/faculty-staff.shtml.

Academic Honesty and Overall Regulations
Every student has the responsibility to become familiar with the standards of academic integrity at the University. Faculty members must specify in their syllabi information about academic integrity, and may refer students to this policy for more information. Nonetheless, student claims of ignorance, unintentional error, or personal or academic pressures cannot be excuses for violation of academic integrity. Students are responsible for familiarizing themselves with the standards and behaving accordingly, and UAlbany faculty are responsible for teaching, modeling and upholding them. Anything less undermines the worth and value of our intellectual work, and the reputation and credibility of the University at Albany degree. Plagiarism and other acts of academic dishonesty will be punished. Read the Standards of Academic Integrity and policies in the Undergraduate Bulletin (http://www.albany.edu/undergraduate_bulletin/regulations.html).

COURSE OUTLINE AND READINGS:

The following schedule of lecture topics and reading assignments is preliminary and may be changed as the semester progresses. The final schedule and specific assignments will be provided in Blackboard. Students are expected to have read the listed material before it is covered in class.

Class	Topic	Readings	Notes
	Characterization of DT signals and systems		
1	Intro to Course Intro to course, review of continuous-time signal and system concepts	Chapter 1	
2	Review of discrete-time signals and systems; convolution	Chapter 2	
3	Difference equations and discrete-time Fourier transforms		
4	DTFTs & CTFTs of periodic and sampled signals	Chapter 4	
5	Introduction to multi-rate DSP: decimation & interpolation		
6	Implementation of decimation & interpolation; Intro to Z-	Chapter 3	Proj./Assignment 1 Due
7	Z-transform properties and inverses		
8	Z-transforms and frequency response of LSI systems	Chapter 5	
9	Intro to discrete Fourier series and the discrete Fourier transform	Chapter 8	
10	The DFT and circular convolution		
11	Frequency Analysis: The Fourier Transform		
12	Test 1		
13	Intro to fast Fourier transform algorithms	Chapter 9	Proj./Assignment 2 Due
14	FFT structures, algorithms, and computational considerations		
	Digital filter design and implementation		
15	Intro to digital filter implementation	Chapter 6	
16	IIR filter structures and implementation		
17	FIR structures and implementation		
18	IIR filter design; use of analog prototypes	Chapter 7	
19	FIR design using windows		Proj./Assignment 3 Due
20	Computer-aided FIR design: The Parks-McClellan algorithm		
21	Intro to linear prediction	Other	
22	Linear prediction and lattice filters		
23	Intro to adaptive filters		
24	Test 2		
25	Intro to two-dimensional signal processing		
26	Two-dimensional filter design		Proj./Assignment 4 Due
27	Short-time Fourier analysis and spectrograms	Chapter 10	
	Final Exam		

University at Albany / Computer Engineering

Systems Analysis and Design

CEN 430 Section xxxx

Fall 2015

Meeting Time: TBD
Location: TBD

Instructor	TBD
Instructor Title	TBD
Office Location	TBD
Office hours	TBD
E-mail Address	TBD
TA's / Peer Educators	TBD

Text (required): Systems Analysis & Design Methods (7th Edition), Jeffrey Whitten, Lonnie Bentley, McGraw-Hill, 2007 (www.mhhe.com/whitten).

COURSE DESCRIPTION
The application of information technology has extended to all quarters of the business world. While the nature and the scope of information systems vary widely depending on the business context, the fundamental knowledge underlying their development remains the same. This course aims to provide technology students with a solid understanding of the important methodologies and tools & techniques related to the development of information systems in a variety of contexts. It is designed to complement and enhance the content of I CEN 440 (Design Lab I) by providing a framework for the analysis and design of the Design Lab project.

PREREQUISITES

COREQUISITES
I CEN 440

LEARNING OBJECTIVES:
At the completion of the course students will:

- Develop an in-depth understanding of the fundamental concepts of information systems analysis and design and acquire related practical skills.
- Better understand and be able to select the best tools for systems analysis and design.
- Understand the design methodology for analyzing business information systems.
- Prepare a complete systems design using the methods and tools learned in this course and present this information to the class both in written and oral form.

COURSE WEBSITE AND BLACKBOARD:
Blackboard will be used to provide essential course materials, the most current syllabus, and assignment documents and no separate course website will be maintained. However, this is not an online course and class attendance and participation is essential and required.

ASSESSMENT AND POLICIES:
The accomplishment of course objectives will be assessed by applying the concepts and tools for performing systems analysis / design-related problems in a combination of assignments, tests, student presentations, and a final project that includes a written component and an oral presentation.

Grading
Final Project: 25 points (10 for written portion / 10 points for oral portion)
Student Presentation - special topic (10 points)
Tests: 15 points each (30 points)
Two assignments: 15 points each (30 points)
Participation / Attendance: 5 points
Total possible points = 100

Grading Scale
A: 100-95 points A-: 94-90 points
B+: 89-87 points B: 84-86 points B-: 80-83 points
C+: 79-76 points C: 75-70 points
D:69-60 points
E: 59 points and below

FINAL PROJECT:
You (and your team members) are part of a (fictitious) startup company that you have created to provide IT Project Management and System Analysis and Design services. As part of this project you will be using the various tools and techniques learned and discussed in this course. All work for this company (project) will be documented in an online collaborative Wiki. Your group will present a summary of your efforts in a final presentation to the class.

Students must complete all requirements in order to pass the course. A grade of incomplete will be given only when circumstances beyond the student's control cause a substantial amount of course work to be unfinished by the end of the semester. Whenever possible, the student is expected to make extra efforts to prevent this situation from occurring. The instructor will be the sole judge of whether an incomplete is warranted. Final grades are computed based on the above formulas and are NOT negotiable. Per department policy, "...students may not submit additional work or be re-examined for the purpose of improving their grades once the course has been completed and final grades assigned."

Attendance/Lateness/Use of Computers in class
Students are expected to *attend every class and to arrive on time*. Please DO NOT disrupt the class by entering late or leaving early without instructor approval. Attendance will be taken at every class meeting. Each unexcused absence (one approved by either instructor prior to class) will result in a 1-point deduction from your class participation grade. Computers may be used during class for note taking as long as the use is not disruptive or distracting. Also see
http://www.albany.edu/health_center/medicalexcuse.shtml.

Responsible Computing
Students are required to read the University at Albany Policy for the Responsible Use of Information Technology (http://www.albany.edu/its/policies_responsible_use_of_IT.htm). Students will be expected to apply the policies discussed in this document to all computing and electronic communications in the course.

Students With Disabilities
Reasonable accommodations will be provided for students with documented physical, sensory, systemic, cognitive, learning and psychiatric disabilities. If you believe you have a disability requiring accommodation in this class, please notify the Director of the Disability Resource Center (Campus Center 137, 442-5490). That office will provide the course instructor with verification of your disability, and will recommend appropriate accommodations. For further information refer to the University's Disclosure Statement regarding Reasonable Accommodation found at the bottom of the document at the following website: http://www.albany.edu/disability/docs/RAP.doc. This website can be reached by following the link under "Reasonable Accommodation Policy" at the following webpage http://www.albany.edu/disability/faculty-staff.shtml.

Academic Honesty and Overall Regulations
Every student has the responsibility to become familiar with the standards of academic integrity at the University. Faculty members must specify in their syllabi information about academic integrity, and may refer students to this policy for more information. Nonetheless, student claims of ignorance, unintentional error, or personal or academic pressures cannot be excuses for violation of academic integrity. Students are responsible for familiarizing themselves with the standards and behaving accordingly, and UAlbany faculty are responsible for teaching, modeling and upholding them. Anything less undermines the worth and value of our intellectual work, and the reputation and credibility of the University at Albany degree. Plagiarism and other acts of academic dishonesty will be punished. Read the Standards of Academic Integrity and policies in the Undergraduate Bulletin (http://www.albany.edu/undergraduate_bulletin/regulations.html).

COURSE OUTLINE AND READINGS:

The following schedule of lecture topics and reading assignments is preliminary and may be changed as the semester progresses. The final schedule and specific assignments will be provided in Blackboard. Students are expected to have read the listed material before it is covered in class.

Class	Topic	Readings	Notes
1	Intro to Course	Chapter 1	
2	Information Systems Building Blocks	Chapter 2	
3	Systems Development	Chapter 3	
4	Project Management	Chapter 4	
	Systems Analysis		
5	Systems Analysis	Chapter 5	
6	Requirements Discovery	Chapter 6	
7	Use-Case Modeling	Chapter 7	
8	Data Modeling	Chapter 8	Assignment 1 Due
9	Process Modeling	Chapter 9	
10	Feasibility Analysis	Chapter 11	
11	Test 1		
	Systems Design		
12	Systems Design	Chapter 12	
13	Application Architecture	Chapter 13	Assignment 2 Due
14	Database Design	Chapter 14	
15	Output Design	Chapter 15	
16	Input Design	Chapter 16	
17	Interface Design	Chapter 17	
18	Test 2		
	Projects and Presentations		
19	Student Presentations - Special Topics		Student Presentations
20	Student Presentations - Special Topics		
21	Student Presentations - Special Topics		
22	Student Presentations - Special Topics		
23	Special Topic		
24	Final Project Presentations		
25	Final Project Presentations		
26	Final Project Presentations		
27	Final Project Presentations, Wrap-up		Final Projects Due

University at Albany / Computer Engineering
Design Lab I
CEN 440 Section xxxx
Fall 2014

Meeting Time: TBD
Location: TBD

Instructor	TBD
Instructor Title	TBD
Office Location	TBD
Office hours	TBD
E-mail Address	TBD
TA's / Peer Educators	TBD

Textbook (required):

Tools and Tactics of Design by Peter G. Dominick, John T. Demel, William M. Lawbaugh, Richard J. Freuler, G. L. Kinzel, Eli Fromm, Published October 1st 2012 by Wiley-Blackwell

COURSE DESCRIPTION / OVERVIEW

This course is part one of a two-semester-long capstone design lab that serves as a significant educational experience for the student to enhance their professional skills and the application of their growing engineering and technical expertise. The two-semester-long capstone design lab provides the opportunity for teams of computer engineering students to propose, prototype/design, build, test, demonstrate, present and fully document a working prototype of a sophisticated electronic system. The two-semester-long capstone design lab represents a complex project that demonstrates the engineering design process and project engineering as practiced in industry. Student teams apply the design process by developing a project under the guidance of industry sponsors and / or faculty through design, fabrication, test and evaluation. In addition to technical feasibility studies, students also explore the concept of the engineer as an entrepreneur by considering their design for technology transfer for commercial use. This includes the development of a business case / preliminary business plan and the marketing viability for their design proposal. The project topic can be related to one or more computer engineering areas, including Digital Systems and Information Technology, Communications and Signal Processing, Control Systems, Optoelectronics, Electromagnetics, and Solid State Materials and Devices. If possible, students interested in taking the lab should form teams before the course starts and discuss their project topic ideas with the lab instructors and other faculty and industry partners in various computer-engineering areas. In part one of the capstone design lab students complete the proposal, design, modeling/analysis and testing of their design and present their design and initial documentation and for approval during formal design reviews. The approved final design is then built, tested, and demonstrated as a reliably operating electronics system along with publication quality technical documentation during part two (CEN450) of this two-semester-long capstone design lab.

A typical project will consist of digital hardware interfacing with "peripherals" (such as sensors, digital circuits, RF and microwave electronics, optoelectronics, motors and other actuators), and software. Part one of the two-semester-long capstone design lab focuses on the specification and design/modeling of the electronic system. Part two completes the two-semester-long capstone design lab with the development of a working prototype along with publication quality technical documentation and a final presentation. Throughout the semester(s) teams provide weekly status reports and regular updates on project progress.

PREREQUISITES
CEN 350 Signals and Systems, CEN 400 Operating Systems, and CEN 454 Micro Processor Apps.

COREQUISITES
CEN 416 Communications

LEARNING OBJECTIVES / OUTCOMES:
At the completion of the course students will:

- Become fully familiar with the initial phases of the design process as practiced in industry as they propose, specify, design/model, prepare initial documentation, and present their design, which is composed of both hardware and software, as part of formal design reviews.
- Better understand realistic design constraints for a complex computer engineering project that include the economical, environmental, social, political, ethical, health, safety, manufacturability, sustainability and social impacts.
- Receive approval for their design and be ready proceed to CEN450 where they will build, test, and demonstrate and present heir final design as a reliably operating electronics system with final publication quality technical documentation.
- Form and work extensively in a team environment.
- Develop written and oral communication skills as they develop a project plan, business and marketing plan, conduct design research, develop concepts and designs, perform design analysis, and participate in design reviews.
- Become fully proficient with engineering design and modeling tools and professionalism associated with industry-standard work environments.

COURSE WEBSITE AND BLACKBOARD:
Blackboard will be used to provide essential course materials including the most current syllabus, and no separate course website will be maintained. However, this is not an online course and classroom and lab attendance is essential and required.

ASSESSMENT AND POLICIES:
The accomplishment of course objectives will be assessed by reviewing progress made towards established project goals as outlined by the instructor. No other separate exams and or assignments are included in this course.

Grading
Project Plan 10% (10 points)
Design Specification 15% (15 points)
Design Concept 15% (15 points)
Initial Design Report 20% (20 points)
Preliminary Design Review 20% (10 for written portion / 10 points for oral portion)
Final Design Review 20% (10 for written portion / 10 points for oral portion)
Total possible points = 100

Grading Scale
A: 100-95 points A-: 94-90 points
B+: 89-87 points B: 84-86 points B-: 80-83 points
C+: 79-76 points C: 75-70 points
D:69-60 points
E: 59 points and below

Rev 1.2 9/2/2014 Added wording for business exploration and technology transfer of design.

Students must complete all requirements in order to pass the course. A grade of incomplete will be given only when circumstances beyond the student's control cause a substantial amount of course work to be unfinished by the end of the semester. Whenever possible, the student is expected to make extra efforts to prevent this situation from occurring. The instructor will be the sole judge of whether an incomplete is warranted. Final grades are computed based on the above formulas and are NOT negotiable. Per department policy, "...students may not submit additional work or be re-examined for the purpose of improving their grades once the course has been completed and final grades assigned."

Attendance/Lateness/Use of Computers in class
Students are expected to fully and actively participate in this course and all teamwork. Students who do not actively and equally participate will not receive credit for the course. Also see http://www.albany.edu/health_center/medicalexcuse.shtml.

Responsible Computing
Students are required to read the University at Albany Policy for the Responsible Use of Information Technology (http://www.albany.edu/its/policies_responsible_use_of_IT.htm). Students will be expected to apply the policies discussed in this document to all electronic communications in the course.

Students With Disabilities
Reasonable accommodations will be provided for students with documented physical, sensory, systemic, cognitive, learning and psychiatric disabilities. If you believe you have a disability requiring accommodation in this class, please notify the Director of the Disability Resource Center (Campus Center 137, 442-5490). That office will provide the course instructor with verification of your disability, and will recommend appropriate accommodations. For further information refer to the University's Disclosure Statement regarding Reasonable Accommodation found at the bottom of the document at the following website: http://www.albany.edu/disability/docs/RAP.doc. This website can be reached by following the link under "Reasonable Accommodation Policy" at the following webpage http://www.albany.edu/disability/faculty-staff.shtml.

Academic Honesty and Overall Regulations
Every student has the responsibility to become familiar with the standards of academic integrity at the University. Faculty members must specify in their syllabi information about academic integrity, and may refer students to this policy for more information. Nonetheless, student claims of ignorance, unintentional error, or personal or academic pressures cannot be excuses for violation of academic integrity. Students are responsible for familiarizing themselves with the standards and behaving accordingly, and UAlbany faculty are responsible for teaching, modeling and upholding them. Anything less undermines the worth and value of our intellectual work, and the reputation and credibility of the University at Albany degree. Plagiarism and other acts of academic dishonesty will be punished. Read the Standards of Academic Integrity and policies in the Undergraduate Bulletin (http://www.albany.edu/undergraduate_bulletin/regulations.html).

COURSE OUTLINE AND DELIVERABLES:

The following is an outline of course topics and requirements.

Class	Topic	Deliverables
	PART 1 – Tools and Tactics of Design	
1	Intro to Course / Design Lab Overview	
2	Defining the Problem: Steps and Decision-Making Skills Defining the Problem: Project and People Skills	
3	Formulating Solutions: Steps and Decision-Making Formulating Solutions: Project and People Skills	Project selection, Formation of Teams
4	Developing Models and Prototypes: Steps and Decision-Making Developing Models and Prototypes: Project and People Skills	
5	Overview of Design Phase Four- Presenting and Implementing	Project Plans Due
	PART 2 – Design	
6	Status Meeting	
7		
8	Design Specification Review meeting	Design Spec Due including business and marketability analysis and technical feasibility
9		
10	Status Meeting	
11		
12	Initial Design Concept Review meeting	Initial Design Concept Due
13		
14	Status Meeting	
15		
16	Initial Design Report Review meeting	Initial Design Report Due (Contains results of modeling/analysis and test results)
17		
18	Status Meeting	
19		
20	Preliminary Design Review Meeting	Preliminary Design Review
21		
22	Follow-up meeting to Preliminary Design	
23		
24	Final Design Review Meeting	Final Design Review
25		
26	Follow-up meeting to Final Design Review	
27		Final Approval of Design

University at Albany / Computer Engineering
Design Lab II
CEN 450 Section xxxx
Fall 2014

Meeting Time: TBD
Location: TBD

Instructor	TBD
Instructor Title	TBD
Office Location	TBD
Office hours	TBD
E-mail Address	TBD
TA's / Peer Educators	TBD

Textbooks:

None required

COURSE DESCRIPTION / OVERVIEW

This course is part two of a two-semester-long final capstone design lab, where teams of computer engineering students build, test, demonstrate, and document the electronic system they proposed, specified, modeled, and designed during part one of capstone design lab (CEN440). In this course student teams integrate and demonstrate what they have learned in prior courses and labs by building and testing a working and reliable physical prototype of their design along with publication quality technical documentation, which includes a project website. Students conduct a product demonstration that shows how their physical design meets all engineering specifications, standards, and constraints. Students also further explore the concept of the engineer as an entrepreneur by continuing the validation of their design for technology transfer. This includes finalized go-forward business and marketing plans of their design for commercial use. This course fully familiarizes students with a realistic design and project constraints that include economical, environmental, social, political, ethical, health, safety, manufacturability, sustainability and social impacts as practiced in industry. Throughout the semester student teams provide weekly status reports and regular updates on project progress.

PREREQUISITES

CEN440

COREQUISITES

None

LEARNING OBJECTIVES / OUTCOMES:

At the completion of the course students will:

- Be able to build, test, and demonstrate a sophisticated working prototype of an electronic system.
- Fully understand the final phases engineering design process consistent with industry standards.
- Work extensively in a team environment.
- Continue to develop and refine written and oral communication skills as they present and document their finalized technical design work and business feasibility analysis and plan, with publication quality documentation. This includes a professional-class project website, a working physical prototype, and a formal final project presentation.

COURSE WEBSITE AND BLACKBOARD:
Blackboard will be used to provide essential course materials including the most current syllabus, and no separate course website will be maintained. However, this is not an online course and classroom and lab attendance is essential and required.

ASSESSMENT AND POLICIES:
The accomplishment of course objectives will be assessed by reviewing progress made towards established project goals as outlined by the instructor. No other separate exams and or assignments are included in this course.

Grading
Project Plan 10% (10 points)
Project Website 15% (15 points)
Physical Prototype / Design 20% (25 points)
Final Design Documentation 20% (25 points)
Final Design Presentation 20% (25 points)
Total possible points = 100

Grading Scale
A: 100-95 points A-: 94-90 points
B+: 89-87 points B: 84-86 points B-: 80-83 points
C+: 79-76 points C: 75-70 points
D:69-60 points
E: 59 points and below

Students must complete all requirements in order to pass the course. A grade of incomplete will be given only when circumstances beyond the student's control cause a substantial amount of course work to be unfinished by the end of the semester. Whenever possible, the student is expected to make extra efforts to prevent this situation from occurring. The instructor will be the sole judge of whether an incomplete is warranted. Final grades are computed based on the above formulas and are NOT negotiable. Per department policy, "...students may not submit additional work or be re-examined for the purpose of improving their grades once the course has been completed and final grades assigned."

Attendance/Lateness/Use of Computers in class
Students are expected to fully and actively participate in this course and all teamwork. Students who do not actively and equally participate will not receive credit for the course. Also see http://www.albany.edu/health_center/medicalexcuse.shtml.

Responsible Computing
Students are required to read the University at Albany Policy for the Responsible Use of Information Technology (http://www.albany.edu/its/policies_responsible_use_of_IT.htm). Students will be expected to apply the policies discussed in this document to all electronic communications in the course.

Students With Disabilities
Reasonable accommodations will be provided for students with documented physical, sensory, systemic, cognitive, learning and psychiatric disabilities. If you believe you have a disability requiring accommodation in this class, please notify the Director of the Disability Resource Center (Campus Center 137, 442-5490). That office will provide the course instructor with verification of your disability, and will recommend appropriate accommodations. For further information refer to the University's Disclosure Statement regarding Reasonable Accommodation found at the bottom of the document at the following website: http://www.albany.edu/disability/docs/RAP.doc. This website can be reached by following the link under "Reasonable Accommodation Policy" at the following webpage http://www.albany.edu/disability/faculty-staff.shtml.

Academic Honesty and Overall Regulations
Every student has the responsibility to become familiar with the standards of academic integrity at the University. Faculty members must specify in their syllabi information about academic integrity, and may refer students to this policy for more information. Nonetheless, student claims of ignorance, unintentional error, or personal or academic pressures cannot be excuses for violation of academic integrity. Students are responsible for familiarizing themselves with the standards and behaving accordingly, and UAlbany faculty are responsible for teaching, modeling and upholding them. Anything less undermines the worth and value of our intellectual work, and the reputation and credibility of the University at Albany degree. Plagiarism and other acts of academic dishonesty will be punished. Read the Standards of Academic Integrity and policies in the Undergraduate Bulletin (http://www.albany.edu/undergraduate_bulletin/regulations.html).

COURSE OUTLINE AND READINGS:

The following is an outline of course topics and requirements.

Class	Topic	Deliverables
1	Intro to Course	
2		
3	Project Plan Meeting	Project Plans Due
4		
5	Status Meeting / Present project website	Initial Project Website Due
6		
7	Status Meeting	
8		
9	Status Meeting	
10		
11	Status Meeting	
12		
13	Design Prototype Presentation Meeting	Initial Physical Working Prototype Due
14		
15	Status Meeting	
16		Initial draft of all Project Documentation Due (Includes all technical and business planning project documents and publication quality final design documentation)
17	Status Meeting	
18		
19	Status Meeting	
20		
21	Status Meeting	
22		
23	Status Meeting / Present final project website	Final Project Website Due
24		
25	Status Meeting / Present Final Project Documentation	Final Project Documentation Due (Includes all finalized technical and business planning project documents and publication quality final design documentation)
26	Final Prototype Demo Meeting	Final Physical Working Prototype Due
27	Final oral presentation and final project demonstration	Final oral presentation and final project demonstration due

University at Albany / Computer Engineering

Mobile Design Engineering

CEN 460 Section xxxx

Fall 2015

Meeting Time: TBD
Location: TBD

Instructor	TBD
Instructor Title	TBD
Office Location	TBD
Office hours	TBD
E-mail Address	TBD
TA's / Peer Educators	TBD

Textbooks (required):

1. Mobile Communications; Authors: Jochen H. Schiller; Published by: Addison-Wesley; ISBN-13: 978-0321123817; ISBN-10: 0321123816
2. (additional, not required) Computer Networking: A top-down approach featuring the Internet; Authors: James F. Kurose and Keith W. Ross; Published by: Addison-Wesley; ISBN-13 978-0136079675; ISBN-10 0136079679

COURSE DESCRIPTION / OVERVIEW

Building on students' basic knowledge of wired computer networks, this course will explore mobile wireless networks. Students will learn about current protocols and technologies in mobile networks. Through hands-on exercises students will gain experience in wireless networks operation and configuration. Successful completion of the course will require detailed prior understanding of network-based communications, Internet protocol operations, strong systems programming skills and familiarity with UNIX.

PREREQUISITES
I CEN 400 and I CEN 416

COREQUISITES
None

LEARNING OBJECTIVES / OUTCOMES:

Recent projections on Internet traffic demand predict that the Internet traffic generated in 2018 alone will be larger than that of the period from 1984 to 2013 combined. A majority of this traffic will originate from mobile devices. A plethora of technologies provide wireless connectivity for mobile devices. This course will provide and in-depth understanding of modern mobile technologies.

The specific characteristics of mobile networks make traditional wired networks protocol infeasible for wireless networks. This course will start by introducing wireless network specifics that require custom protocol design. It will then cover different approaches toward mobile wireless networking as well as applications that make use of mobile networks.

At the completion of the course the student will:

- Be able to demonstrate a thorough understanding of the mobile networking protocol stack, technologies and applications.
- Be able to utilize mobile network monitoring and analysis tools for wireless network performance and evaluation
- Be able to complete network programming tasks that include performance evaluation in real-world wireless network deployments
- Be able to compose and develop a research article and give an oral presentation on a topic related to mobile network technologies.

COURSE WEBSITE AND BLACKBOARD:
Blackboard will be used to provide essential course materials, the most current syllabus, and assignment documents and no separate course website will be maintained. However, this is not an online course and class attendance and participation is essential and required.

ASSESSMENT AND POLICIES:

The accomplishment of course objectives will be assessed by applying the concepts and tools for engineering design in a combination of team and individual assignments/projects and tests.

Exams: Two exams will be given – a midterm and final. A portion of the class period preceding each exam will be utilized for a review session.

Project/Assignment: Projects/assignments will be assigned and will be conducted out of class. They will be graded on a 100-point scale and will be totaled together to account for 50% of the final grade.

Final Project: A final project will not be required.

Grading
A final grade will be determined as a weighted average of these scores using the following weights:
Exams (2) 45% (20 points midterm and 25 points final)
Labs/ assignments (5) 50% (10 points each)
Class Participation: 5% (5v points)
Total possible points = 100

Grading Scale
A: 100-95 points A-: 94-90 points
B+: 89-87 points B: 84-86 points B-: 80-83 points
C+: 79-76 points C: 75-70 points
D:69-60 points
E: 59 points and below

Students must complete all requirements in order to pass the course. A grade of incomplete will be given only when circumstances beyond the student's control cause a substantial amount of course work to be unfinished by the end of the semester. Whenever possible, the student is expected to make extra efforts to prevent this situation from occurring. The instructor will be the sole judge of whether an incomplete is warranted. Final grades are computed based on the above formulas and are NOT negotiable. Per

department policy, "...students may not submit additional work or be re-examined for the purpose of improving their grades once the course has been completed and final grades assigned."
purpose of improving their grades once the course has been completed and final grades assigned."

Attendance/Lateness/Use of Computers in class
Students are expected to *attend every class and to arrive on time*. Please DO NOT disrupt the class by entering late or leaving early without instructor approval. Attendance will be taken at every class meeting. Each unexcused absence (one approved by either instructor prior to class) will result in a 1-point deduction from your class participation grade. Computers may be used during class for note taking as long as the use is not disruptive or distracting. Also see http://www.albany.edu/health_center/medicalexcuse.shtml.

Responsible Computing

Students are required to read the University at Albany Policy for the Responsible Use of Information Technology (http://www.albany.edu/its/policies_responsible_use_of_IT.htm). Students will be expected to apply the policies discussed in this document to all computing and electronic communications in the course.

Students With Disabilities
Reasonable accommodations will be provided for students with documented physical, sensory, systemic, cognitive, learning and psychiatric disabilities. If you believe you have a disability requiring accommodation in this class, please notify the Director of the Disability Resource Center (Campus Center 137, 442-5490). That office will provide the course instructor with verification of your disability, and will recommend appropriate accommodations. For further information refer to the University's Disclosure Statement regarding Reasonable Accommodation found at the bottom of the document at the following website: http://www.albany.edu/disability/docs/RAP.doc. This website can be reached by following the link under "Reasonable Accommodation Policy" at the following webpage http://www.albany.edu/disability/faculty-staff.shtml.

Academic Honesty and Overall Regulations
Every student has the responsibility to become familiar with the standards of academic integrity at the University. Faculty members must specify in their syllabi information about academic integrity, and may refer students to this policy for more information. Nonetheless, student claims of ignorance, unintentional error, or personal or academic pressures cannot be excuses for violation of academic integrity. Students are responsible for familiarizing themselves with the standards and behaving accordingly, and UAlbany faculty are responsible for teaching, modeling and upholding them. Anything less undermines the worth and value of our intelletual work, and the reputation and credibility of the University at Albany degree. Plagiarism and other acts of academic dishonesty will be punished. Read the Standards of Academic Integrity and policies in the Undergraduate Bulletin (http://www.albany.edu/undergraduate_bulletin/regulations.html).

COURSE OUTLINE AND READINGS:

The following schedule of lecture topics and reading assignments is preliminary and may be changed as the semester progresses. The final schedule and specific assignments will be provided in Blackboard. Students are expected to have read the listed material before it is covered in class.

Class	Topic	Notes
	Class overview; Introduction to mobile networking	
1	Schiller, Chapter 1	
2	Schiller, Chapter 1	
	Wireless transmission	
3	Schiller, Chapter 2	
4	Schiller, Chapter 2	Assignment 1 Due
5	Schiller, Chapter 2	
	Wireless Medium Access Control	
6	Schiller, Chapter 3	
7	Schiller, Chapter 3	
8	Kurose and Ross, Chapter 6.3; Schiller, Chapter 7	
9	Schiller, Chapter 7	
	Telecommunication systems	
10	Schiller, Chapter 4	Assignment 2 Due
11	Schiller, Chapter 4	
12	**Satellite Systems:** Schiller, Chapter 5	
13	Review	
14	Midterm	
15	**Broadcast systems:** Schiller, Chapter 6	
	Mobile Network Layer	
16	Schiller, Chapter 8	
17	Schiller, Chapter 8	Assignment 3 Due
18	Schiller, Chapter 8	
	Mobile Transport Layer	
19	Schiller, Chapter 9	
20	Schiller, Chapter 9	
21	Schiller, Chapter 9	
	Support for Mobility	
22	Schiller, Chapter 10	Assignment 4 Due
23	Schiller, Chapter 10	
24	Students research paper presentation	
25	Students research paper presentation	
26	Final Review	Assignment 5 Due
27	Final exam	

University at Albany / Computer Engineering

Human Computer Interaction

CEN 470 Section xxxx

Fall 2015

Meeting Time: TBD
Location: TBD

Instructor	TBD
Instructor Title	TBD
Office Location	TBD
Office hours	TBD
E-mail Address	TBD
TA's / Peer Educators	TBD

Textbooks (required): Interaction Design: Beyond Human - Computer Interaction
Authors: Yvonne Rogers, Helen Sharp, and Jenny Preece
Published by: John Wiley and Sons, Inc. ISBN: 978-0470665763 2011

COURSE DESCRIPTION / OVERVIEW
In this online course, students will learn how to design technologies that bring people joy, rather than frustration. Students will learn several techniques for rapidly prototyping and evaluating multiple interface alternatives -- and why rapid prototyping and comparative evaluation are essential to excellent interaction design. A unique aspect of this course is that it imbeds the 9-Week "Human-Computer Interaction" course in it. Students sign up for this UC San Diego class, which includes a series of video lectures, assignments, quizzes and other elements, which are designed to enhance the overall student learning experience.

PREREQUISITES

A CEN 333

COREQUISITES
None

LEARNING OBJECTIVES / OUTCOMES:
The main objective of this course is to help students build human-centered design skills, so that they have the principles and methods to create excellent interfaces with any technology.

At the completion of the course the student will be able to

- Explain the difference between good and poor interaction design.
- Understand user needs and how to design for them.
- Choose between the numerous forms of interaction available (talking, touching, wearing, etc).
- Demonstrate an understanding of ethics in monitoring peoples behavior
- Be able to demonstrate a thorough and high level of understanding regarding the future forms of HCI as part of a research project.

COURSE WEBSITE AND BLACKBOARD:
Blackboard will be used to provide essential course materials, the most current syllabus, and assignment documents and no separate course website will be maintained. However, this is not an online course and class attendance and participation is essential and required.

ASSESSMENT AND POLICIES:
The accomplishment of course objectives will be assessed by applying the concepts and tools for HCI in a combination of team and individual assignments and tests.

Exams: Two exams plus a final will be given.

Projects / Assignments: Projects / assignments will be assigned and will be graded on a 10-point scale and will be totaled together to account for 40% of the final grade.

Grading
A final grade will be determined as a weighted average of these scores using the following weights:
Exams (2) 30% (15 points each)
Final Exam 25% (25 points)
Projects/assignments (4) 40% (10 points each)
Class Participation: 5%
Total possible points = 100

Grading Scale
A: 100-95 points A-: 94-90 points
B+: 89-87 points B: 84-86 points B-: 80-83 points
C+: 79-76 points C: 75-70 points
D: 69-60 points
E: 59 points and below

Students must complete all requirements in order to pass the course. A grade of incomplete will be given only when circumstances beyond the student's control cause a substantial amount of course work to be unfinished by the end of the semester. Whenever possible, the student is expected to make extra efforts to prevent this situation from occurring. The instructor will be the sole judge of whether an incomplete is warranted. Final grades are computed based on the above formulas and are NOT negotiable. Per department policy, "...students may not submit additional work or be re-examined for the purpose of improving their grades once the course has been completed and final grades assigned."

Attendance
Since this is an online class, attendance and participation will be measured by student involvement and engagement as outlined in assignments and course activities.

Responsible Computing
Students are required to read the University at Albany Policy for the Responsible Use of Information Technology (http://www.albany.edu/its/policies_responsible_use_of_IT.htm). Students will be expected to apply the policies discussed in this document to all computing and electronic communications in the course.

Students With Disabilities
Reasonable accommodations will be provided for students with documented physical, sensory, systemic, cognitive, learning and psychiatric disabilities. If you believe you have a disability requiring accommodation in this class, please notify the Director of the Disability Resource Center (Campus Center 137, 442-5490). That office will provide the course instructor with verification of your disability, and will recommend appropriate accommodations. For further information refer to the University's Disclosure Statement regarding Reasonable Accommodation found at the bottom of the document at the following website: http://www.albany.edu/disability/docs/RAP.doc. This website can be reached by following the link under "Reasonable Accommodation Policy" at the following webpage http://www.albany.edu/disability/faculty-staff.shtml.

Academic Honesty and Overall Regulations
Every student has the responsibility to become familiar with the standards of academic integrity at the University. Faculty members must specify in their syllabi information about academic integrity, and may refer students to this policy for more information. Nonetheless, student claims of ignorance, unintentional error, or personal or academic pressures cannot be excuses for violation of academic integrity. Students are responsible for familiarizing themselves with the standards and behaving accordingly, and UAlbany faculty are responsible for teaching, modeling and upholding them. Anything less undermines the worth and value of our intellectual work, and the reputation and credibility of the University at Albany degree. Plagiarism and other acts of academic dishonesty will be punished. Read the Standards of Academic Integrity and policies in the Undergraduate Bulletin (http://www.albany.edu/undergraduate_bulletin/regulations.html).

COURSE OUTLINE AND READINGS:

The following schedule of lecture topics and reading assignments is preliminary and may be changed as the semester progresses. The final schedule and specific assignments will be provided in Blackboard. Students are expected to have read the listed material before it is covered in class.

Class	Topic	Readings	Notes
1	Intro to Course What is interaction design?	Chapter 1	
2	Understanding and Conceptualizing Interaction	Chapter 2	
3			
4	Cognitive Aspects	Chapter 3	
5			
6	Social Interaction	Chapter 4	Proj./Assignment 1 Due
7			
8	Emotional Interaction	Chapter 5	
9			
10	Interfaces	Chapter 6	
11			
12	Test 1		
13	Data Gathering	Chapter 7	Proj./Assignment 2 Due
14			
15	Data Analysis	Chapter 8	
16			
17	The Process of Interaction Design	Chapter 9	
18			
19	Establishing Requirements	Chapter 10	Proj./Assignment 3 Due
20			
21	Design, Prototyping and Construction	Chapter 11	
22			
23	Evaluation	Chapter 12	
24	Test 2		
25	Evaluation Framework	Chapter 13	
26			Proj./Assignment 4 Due
27	Evaluations Studies / Wrap-up and Summary	Chapter 14	
	Final Exam		

University at Albany / Computer Engineering

VLSI Design & Fabrication

CEN 480 Section xxxx

Fall 2015

Meeting Time: TBD
Location: TBD

Instructor	TBD
Instructor Title	TBD
Office Location	TBD
Office hours	TBD
E-mail Address	TBD
TA's / Peer Educators	TBD

Textbooks (required): "CMOS circuit design, layout and simulation"
Authors: R. Jacob Baker
Published by: Wiley-Interscience ISBN: 978-0-470-22941-5

Software Used:
MATLAB: Finding the minority carrier distribution in the channel, weak inversion and strong inversion.
Synopsys: CMOS layout design

COURSE DESCRIPTION / OVERVIEW
This course provides a survey of VLSI technology and very large-scale integrated systems. It considers problems that occur when ordinary circuits are replicated to involve millions of devices. It covers CMOS technology, and design styles up to the point of submission for fabrication. Computerized methods with high-density circuits with optimized speed and power consumption are utilized. Students perform simple layouts and simulations suitable for extension to a very large scale.

PREREQUISITES

I CEN 454

COREQUISITES
None

LEARNING OBJECTIVES / OUTCOMES:

At the completion of the course the student will understand and be able to demonstrate knowledge of

- The concept of well in CMOS and metal layers.
- Active and poly layers.
- The concept of CMOS fabrication
- VLSI layout
- The concept of modeling of CMOS for analog and digital applications
- The inverter, static and dynamic logic, memory circuits

COURSE WEBSITE AND BLACKBOARD:
Blackboard will be used to provide essential course materials, the most current syllabus, and assignment documents and no separate course website will be maintained. However, this is not an online course and class attendance and participation is essential and required.

ASSESSMENT AND POLICIES:
The accomplishment of course objectives will be assessed by applying the concepts and tools for HCI in a combination of team and individual assignments and tests.

Exams: Two exams plus a final will be given.

Projects / Assignments: Projects / assignments will be assigned and will be graded on a 10-point scale and will be totaled together to account for 40% of the final grade.

Grading
A final grade will be determined as a weighted average of these scores using the following weights:
Exams (2) 30% (15 points each)
Final Exam 25% (25 points)
Projects/assignments (4) 40% (10 points each)
Class Participation: 5%
Total possible points = 100

Grading Scale
A: 100-95 points A-: 94-90 points
B+: 89-87 points B: 84-86 points B-: 80-83 points
C+: 79-76 points C: 75-70 points
D: 69-60 points
E: 59 points and below

Students must complete all requirements in order to pass the course. A grade of incomplete will be given only when circumstances beyond the student's control cause a substantial amount of course work to be unfinished by the end of the semester. Whenever possible, the student is expected to make extra efforts to prevent this situation from occurring. The instructor will be the sole judge of whether an incomplete is warranted. Final grades are computed based on the above formulas and are NOT negotiable. Per department policy, "...students may not submit additional work or be re-examined for the purpose of improving their grades once the course has been completed and final grades assigned."

Attendance
Since this is an online class, attendance and participation will be measured by student involvement and engagement as outlined in assignments and course activities.

Responsible Computing
Students are required to read the University at Albany Policy for the Responsible Use of Information Technology (http://www.albany.edu/its/policies_responsible_use_of_IT.htm). Students will be expected to apply the policies discussed in this document to all computing and electronic communications in the course.

Students With Disabilities
Reasonable accommodations will be provided for students with documented physical, sensory, systemic, cognitive, learning and psychiatric disabilities. If you believe you have a disability requiring accommodation in this class, please notify the Director of the Disability Resource Center (Campus Center 137, 442-5490). That office will provide the course instructor with verification of your disability, and will recommend appropriate accommodations. For further information refer to the University's Disclosure Statement regarding Reasonable Accommodation found at the bottom of the document at the following website: http://www.albany.edu/disability/docs/RAP.doc. This website can be reached by following the link under "Reasonable Accommodation Policy" at the following webpage http://www.albany.edu/disability/faculty-staff.shtml.

Academic Honesty and Overall Regulations
Every student has the responsibility to become familiar with the standards of academic integrity at the University. Faculty members must specify in their syllabi information about academic integrity, and may refer students to this policy for more information. Nonetheless, student claims of ignorance, unintentional error, or personal or academic pressures cannot be excuses for violation of academic integrity. Students are responsible for familiarizing themselves with the standards and behaving accordingly, and UAlbany faculty are responsible for teaching, modeling and upholding them. Anything less undermines the worth and value of our intellectual work, and the reputation and credibility of the University at Albany degree. Plagiarism and other acts of academic dishonesty will be punished. Read the Standards of Academic Integrity and policies in the Undergraduate Bulletin (http://www.albany.edu/undergraduate_bulletin/regulations.html).

COURSE OUTLINE AND READINGS:

The following schedule of lecture topics and reading assignments is preliminary and may be changed as the semester progresses. The final schedule and specific assignments will be provided in Blackboard. Students are expected to have read the listed material before it is covered in class.

Class	Topic	Readings	Notes
1	Intro to Course Intro to CMOS Design	Chapter 1	
2	The Well	Chapter 2	
3	The Metal Layers	Chapter 3	
4	The Active and Poly Layers	Chapter 4	
5	Resistors, Capacitors and MOSFETs	Chapter 5	
6	MOSFET Operation	Chapter 6	Proj./Assignment 1 Due
7	CMOS Fabrication	Chapter 7	
8	Emotional Interaction	Chapter 8	
9	Electrical Noise	Chapter 9	
10	Models for Analog Design	Chapter 10	
11	Models for Digital Design		
12	Test 1		
13	The inverter	Chapter 11	Proj./Assignment 2 Due
14	Static Logic Gates	Chapter 12	
15	Clocked Circuits	Chapter 13	
16	Dynamic Logic Gates	Chapter 14	
17	VLSI Layout Examples	Chapter 15	
18	Memory Circuits	Chapter 16	
19	Sensing	Chapter 17	Proj./Assignment 3 Due
20	Special Purpose CMOS Circuits	Chapter 18	
21	Digital PLLs	Chapter 19	
22	Current Mirros	Chapter 20	
23	Amplifiers / Diff Amps	Chapter 21/22	
24	Test 2		
25	Voltage References / Op Amps	Chapter 23/24	
26	Dynamic Analog Circuits	Chapter 25	Proj./Assignment 4 Due
27	Wrap-up and Summary		
	Final Exam		

AMAT370 – Probability and Statistics for Engineering and the Sciences

Syllabus

AMAT370 is a one semester introduction to statistics with minimal probability prerequisites designed to meet the needs and time constraints of computer engineering students, but also of interest to math and science majors who seek a more applied course than Math 363. The initial text will be Probability and Statistics for Engineering and the Sciences, 7th ed, Thomson 2008, by Jay L. Devore. The prerequisites insure that students will have had some prior exposure to basic probability. The course will begin with a brief review of counting techniques (permutations and combinations) and discrete random variables (binomial and Poisson). Continuous random variables and jointly distributed variables (chapters 4 and 5) will then be covered, but not in full detail. Chapters 6, 7, 8 and 9 (point estimation, and hypothesis testing for one and two samples) will be fully covered. Students will learn how to use the normal, t and chi-square distributions and applications of the central limit theorem. Chapter 12 on simple linear regression will be next, with perhaps some account of using computer statistical packages to do multiple regression. Moment generating functions and Bayesian networks are not covered in Devore and these topics will be presented by the instructor, with appropriate references.

Prerequisites: two semesters of calculus and either Math 367 or CSI 210.

Students cannot apply both 362 and 370 or both 363 and 370 toward the requirements for a math major. AMAT370 fulfills the probability/statistics requirement for the math BA. AMAT367 and 370 can be one of four sequences required for the BS in mathematics. Students who expect to do graduate work in mathematics or statistics should take both AMAT362 and 363, not AMAT370.

University at Albany
New Program Proposal
BS in Computer Engineering

Appendix 7

Position announcements for faculty to-be-hired

Chair of Computer Engineering Department

About University at Albany:

Established in 1844 and designated a University Center of the State University of New York in 1962, the University at Albany's broad mission of excellence in undergraduate and graduate education, research and public service engages a diverse student body of more than 17,300 students in nine schools and colleges across three campuses.

Located in Albany, New York, New York State's capital, the University is convenient to Boston, New York City and the Adirondacks.

Category:	Faculty
Department:	Computer Engineering Dept/College of Computing & Information
Locations:	Albany, NY
Posted:	Oct 02, '14
Type:	Full-time
Ref. No.:	P14-36256

E-mail to a friend

Job Description:

The College of Computing and Information, University at Albany seeks applicants for an associate or full professor faculty position beginning spring 2015 for Chair of the proposed Computer Engineering Department.

We seek to create a new department in computer engineering which will be housed in the College of Computing and Information (CCI). The program is being built on the University's strengths in teaching, research, and workforce development particularly in CCI and the department of Physics. Computer Engineering is one of several multidisciplinary engineering programs that will be created across the campus.

The successful candidate will have an established record of scholarship with demonstrated potential to influence the growth and development of a computer engineering faculty and the computer engineering program at the University at Albany.

The Computer Engineering Department will reside in the College of Computing and Informatics which presently houses three Departments: Computer Science, Informatics, and Information Studies. Degrees include undergraduate degree programs, combined BS/MS programs, Master's of Science programs, and doctoral programs. For additional information on the College and its departments, please see http://www.albany.edu/cci/

The University at Albany has a diverse population of approximately 17,000 undergraduate and graduate students. Albany, the state capital, is located on the Hudson River in beautiful upstate New York, in close proximity to the Berkshires, the Catskills, and the Adirondacks,

Human Resources
UAB 300
1400 Washington Avenue
Albany, NY 12222
PHONE (518) 437-4700
FAX (518) 437-4731

Human Resources is located in Suite 300 of the University Administration Building on 1215 Western Ave.

and is convenient to Boston, Montreal, and New York City.

Requirements:

Applicants must have a Ph.D. in Computer Engineering or Electrical Engineering or a closely-related discipline from a college or university accredited by the U.S. Department of Education or an internationally recognized accrediting organization. Additionally, applicants must address in their applications their ability to work with a culturally diverse population. Applicants must demonstrate expertise in one or more of the following areas: computer engineering, electrical engineering, embedded systems, mobile applications, networking, operating systems, and software engineering. Applicants must have a strong record of funded research and demonstrated expertise in academic administrative and leadership skills. Applicants must be willing to teach at the undergraduate and graduate levels. Applicants should demonstrate active participation in professional engineering organizations. Applicants should be committed to teaching, research, and service in an interdisciplinary environment.

Questions regarding the position may be addressed to: CompEchairsearch@albany.edu

Additional Information:

Professional Rank and Salary Range: Associate or Full Professor Faculty Member, competitive and commensurate with qualifications and experience

Start date: Spring 2015

The Jeanne Clery Disclosure of Campus Security Policy and Campus Crime Statistics Act, or Clery Act, mandates that all Title IV institutions, without exception, prepare, publish and distribute an Annual Security Report. This report consists of two basic parts: disclosure of the University's crime statistics for the past three years; and disclosures regarding the University's current campus security policies. The University at Albany's Annual Security Report is available in portable document format [PDF] by clicking this link http://police.albany.edu/ASR.shtml

THE UNIVERSITY AT ALBANY IS AN EO/AA/IRCA/ADA EMPLOYER

Please apply online via http://albany.interviewexchange.com/candapply.jsp?JOBID=53337

Application Instructions:

Applicants MUST submit the following documents:

- Cover letter
- Curriculum Vitae (with publications and list of at least 3 references with contact information)
- Research statement
- Teaching statement

Note: After submitting your CV, the subsequent pages give you instructions for uploading additional documents (i.e. cover letter etc.).

See the FAQ for using our online system. Please **contact us** if you need assistance applying through this website.

Returning Applicants - Login to your U-Albany Careers Account to check your completed application.

The search will remain open until the position is filled.

Frequently Asked Questions (FAQ's)

<<Prev 5 of 38 Next >>

COLLEGE OF COMPUTING AND INFORMATION
UNIVERSITY AT ALBANY State University of New York

3 Assistant Professor Faculty Positions
Computer Engineering Department

The College of Computing and Information, University at Albany seeks applicants for three (3) assistant professor tenure-track faculty positions beginning fall 2015 for the proposed Computer Engineering Department. This position is posted on our faculty vacancy website: http://albany.interviewexchange.com/jobofferdetails.jsp? Applicants are encouraged to apply online.

We would welcome applications from a cluster of faculty involved in collaborative research in computer engineering.

The College of Computing and Information is currently in the process of establishing a Department of Computer Engineering. The program is being built on the University's strengths in teaching, research, and workforce development particularly in CCI and the department of Physics. Computer Engineering is one of several multidisciplinary engineering programs that will be created across the campus.

Applicants must have a Ph.D. in Computer Engineering or Electrical Engineering or a closely-related discipline from a college or university accredited by the U.S. Department of Education or an internationally recognized accrediting organization or anticipate completion by August 2015. Applicants must demonstrate expertise in one or more of the following areas: computer engineering, electrical engineering, embedded systems, mobile applications, networking, operating systems, and software engineering. Applicants will also have a record of research accomplishments and grant participation. Applicants must be willing to teach at the undergraduate and graduate levels. Applicants should demonstrate active participation in professional engineering organizations. Applicants should be committed to teaching, research, and service in an interdisciplinary environment. Applicants must submit a complete CV, including a list of publications, a research statement, and a teaching statement, along with the names and contact information for at least 3 references.

The Computer Engineering Department will reside in the College of Computing and Information which presently includes three Departments: Computer Science, Informatics, and Information Studies. Degrees include undergraduate degree programs, combined BS/MS programs, Master's of Science programs, and doctoral programs. For additional information on the College and its departments, please see http://www.albany.edu/cci/.

The University at Albany has a diverse population of approximately 17,000 undergraduate and graduate students. Albany, the state capital, is located on the Hudson River in beautiful upstate New York, in close proximity to the Berkshires, the Catskills, and the Adirondacks, and is convenient to Boston, Montreal, and New York City.

Questions regarding the position may be addressed to CompEfacultysearch@albany.edu.

University at Albany
New Program Proposal
BS in Computer Engineering

Appendix 8

Articulation tables

Hudson Valley Community College

Broome Community College

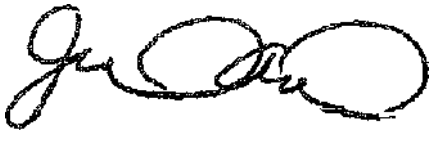
UN IVE RS ITYATALBANY
State University of New York

TRANSFER ARTICULATION AGREEMENT
COMPUTER ENGINEERING DEGREE PROGRAM
BROOME COMMUNITY COLLEGE
AND
THE UNIVERSITY AT ALBANY

This transfer articulation agreement is the result of thoughtful cooperation between the faculty and staff of the University at Albany and Broome Community College.

Academic programs at Broome Community College provide strong preparation for and ready access to baccalaureate programs at the University at Albany. Therefore, we have developed an agreement with Broome Community College that will provide the maximum number of transfer credits applied to the Computer Engineering degree program at the University at Albany. We strongly believe that many students in a two-year program of study at Broome Community College will benefit from the information, guidance and transfer course equivalencies this agreement provides.

The University at Albany is delighted to continue our longstanding, close relationship with Broome Community College and we are proud to offer each student the opportunity to earn both an Associate's degree and Baccalaureate degree within the State University of New York System.



Jeanette Altarriba, Ph.D.
Vice Provost and Dean for Undergraduate Education
Universtiy at Albany
State University of New York

UN IVE RS ITYATALBANY State University of New York The attached

fa University at Albany and Broome Community College transfer equivalency table

represents the required and suggested elective courses that are similar and parallel to those completed by degree-seeking students at the University at Albany. Broome Community College students who complete the program as outlined in these arrays will be awarded full transfer credit and afforded the opportunity to complete the Bachelor's degree in Computer Engineering in four additional semesters of study at the University at Albany.

Broome Community College students pursuing programs that do not conform to those specified herein will be considered for admission on an individual basis. The transfer course equivalency table in this agreement will be amended or expanded with mutual consent through an annual review by both institutions.

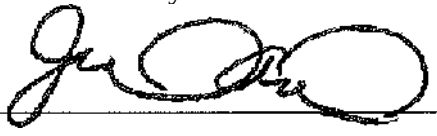
Approved for
Broome Community College
State University of New York

Francis L. Battisti, Ph.D.

Vice President and Chief Academic Officer
Title

Date: _____

Approved for
University at Albany
State University of New York



Jeanette Altarriba, Ph.D.

Vice Provost and Dean for Undergraduate Education
Title

Date: /-RA 9

SUNY TRANSFER COURSE EQUIVALENCY TABLE — As of 12/4/14

SUNY Broome 00398 - AS in Engineering Scl Course #	Course					liversity at Albany .;omputer Enpinee				
OHM 145/145L	General Chemistry I & Lab I						e . a b l			
CST 127	Intro to C+-1-for Engineers					ICS1 010	Computer Science Elective			
CST 150	Obiect Oriented Programming (Eng-Elective #5)					ICS1010	Elective in Lieu of intro to Comp-Sci. - 201			
CST 202	Data Structures (Eng-Elective					ICSI 213	Data Structures			
EGR 100 +101	Engineering Orientation 1 and II					ICEN	Engineering Orientation I and II			
EGR 150	Engineering DesIgn I with Graphics					I C E N	Engineering Design I with Graphics			
EGR 151	Engineering Design II					ICEN 140	Intro Engineering Design			
EGR 200 EGR 201 EGR 287 EGR 288	Engineering Orientation 111 Orientation IV Engineering Design ill Engineering Design IV					10EN 150	Introduction to Engineering Analysis Combined Credit for EGR 200+287+201+288)			
EGR 285	Electrical Circuits (Engineering Elective 2)					APHY 010	Physics Elective in lieu of Electronics			
EGR 289	Microprocessors					ICSI 010	CSI Elective in lieu of Microprocessors			-
ENG110/111	College Writing I or II	BC/SS				AENG 010Z	English Elective	BC/SS		
ENG 220	Communicating about Ideas and Values	HU				AENG 010	Humanities Gen Ed			
HIS 130 or 131	United States History I or II	AH				AHIS 1001101	American Political and Social History 1 or II	A H		
MAT 181	Calculus I					AMAT 112	Calculus I			
MAT 182	Calculus II					AMAT 113	Calculus II			
MAT 250	Discrete Mathematics (Engineering Elective 3)					AMAT 221	Discrete Math in lieu of Discrete Structures **			3
MAT 264	Linear Algebra (Engineering Elective 4)					AMAT 220	Linear Algebra			3
MAT 281	Calculus III					AMAT 214	Calculus III		X	4
MAT 282	Differential Equations w/Linear Algebra					AMAT 311	Differential Equations		X	4
PI-1`7Si81	Physics for Engineers and Scientists: Mechanics and Thermodynamics					APHY 140/145	Physics I and Lab		X X	4 4
PHY 182	Physics for Engineers and Scientists:					APHY 150/155	Physics II and Lab		XX	4
PED XXX	PED Elective					AMAT 370	taken At:ONOany aftettranstety Probability & Slats for Engineering and Sciences			
						APHY 454	Micro Processor Applications			
						ICEN 333	Programming - Hardware/Software Interface			
						ICEN 340	Digital Logic Design			
						ICEN 350	Signals and Systems			
						ICEN 400	Operating Systems			
						ICEN 404	Computer Organization			
						ICEN 416	Communications I			
						ICEN 430	Systems Analysis and Design			
						ICEN 440	Desigli Lab I			
						ICEN 450	Design Lab II			-
						ICEN XXX	CEN Electives (four)			12
							ArtsIInternational Perspective Gen Ed	AH/OW		
							Foreign Language Gen Ed	FL		
			Total Credits:	70			Total Credits Transferred:			70
							Total Credits Needed for Graduation after Transfer:			56
							Total Credits for BS in Computer Engineering			126

UN IVE RS ITYATALBANY

'& State University of New York

TRANSFER ARTICULATION AGREEMENT

COMPUTER ENGINEERING DEGREE PROGRAM

HUDSON VALLEY COMMUNITY COLLEGE

AND

THE UNIVERSITY AT ALBANY

This transfer articulation agreement is the result of thoughtful cooperation between the faculty and staff of the University at Albany and Hudson Valley Community College.

Academic programs at Hudson Valley Community College provide strong preparation for and ready access to baccalaureate programs at the University at Albany. Therefore, we have developed an agreement with Hudson Valley Community College that will provide the maximum number of transfer credits applied to the Computer Engineering degree program at the University at Albany. We strongly believe that many students in a two-year program of study at Hudson Valley Community College will benefit from the information, guidance and transfer course equivalencies this agreement provides.

The University at Albany is delighted to continue our longstanding, close relationship with Hudson Valley Community College and we are proud to offer each student the opportunity to earn both an Associate's degree and Baccalaureate degree within the State University of New York System.

Jeanette Altarriba, Ph.D.
Vice Provost and Dean for Undergraduate Education
Universtiy at Albany
State University of New York

n State University of New York UNIVERSITY AT ALBANY

The attached University at Albany and Hudson Valley Community College Transfer Equivalency Table represents the required and suggested elective courses that are similar and parallel to those completed by degree-seeking students at the University at Albany. Hudson Valley Community College students who complete the program as outlined in these arrays will be awarded full transfer credit and afforded the opportunity to complete the Bachelor's degree in Computer Engineering in four additional semesters of study at the University at Albany.

Hudson Valley Community College students pursuing programs that do not conform to those specified herein will be considered for admission on an individual basis. The Transfer Equivalency Table in this agreement will be amended or expanded with mutual consent through an annual review by both institutions.

Approved for Hudson Valley Community College State University of New York	Approved for University at Albany State University of New York
Carolyn G. Curtis, Ph.D.	Jeanette Altarriba, Ph.D.
Vice President for Academic Affairs Title	Vice Provost and Dean for Undergraduate Education Title
Date:	Date:

Course # CHM 110/120						Equivalent Course Title Chemistry I, plus Lab			
ass	Programming & Logic II, Data Structures (Engineering Elective 3)				ICSI 105	Computing and Information, in lieu of Data Structures**		×	
CISS 290	CA-F Programming (Restricted Elective)				ICSI 010	SCSI Elective, in lieu of Intro to Comp-Science		×	
ENGL 101	English Composition	BC			AENG 010	English Elective	BC		
ENGL 102	English Composition II				AENG 010	English Elective			
ENGR 110	Engineering Tools					Elective			
ENGR 120	Introduction to Engineering Design		XXX		ICEN 140	Intro to Engineering Design		×	
ENGR 210	Engineering Statics and Strength of Materials				ICEN 150	Intro to Engineering Analysis		×	
ENGR 225	Electrical Circuits (Engineering Elective 1)				APHY 000	Physics Elective, in lieu of Electronics		×	
HIST 110/111	Interpretation of American History I or II	AH/H			AHIS 100/101	American Political and Social History I or II	AHIH		
MATH 180	Calculus I		×		AMAT 112	Calculus I		×	
MATH 183	Discrete Mathematics (Engineering Elective 2)				ICEN 210	Discrete Structures		XXX	
MATH 190	Calculus II				AMAT 113	Calculus II		XXX	
MATH 210	Calculus III				AMAT 214	Calculus III			
MATH 220	Calculus IV: Differential Equations		▒		AMAT 311	Differential Equations			
PHYS 150	Physics I	NS			APHY 140+145	Physics I, Plus Lab	NS	XX	
PHYS 151	Physics II				APHY 150+155	Physics II, Plus Lab		XX	
PHYS 250 MEM	Physics III				APHY 250	Physics IV (CEN Elective for this program)**		X	4
					::Courses to be total:	*OA:040h after transfer			
					APHY 353	Microprocessors		X	3
					APHY 454	Micro Processor Apps			
					AMAT 220	Linear Algebra - WAIVED		XX	
					AMAT 370	Probability and Statistics for Engineering & Sciences			
					ICSI 333	Hardware/Software Interface			
					ICSI 400	Operating Systems			
					ICSI 404	Computer Organization			
					ICSI 416	Computer Networking Communications			
					ICEN 340	Digital Logic Design			
					ICEN 350	Signals and Systems		▒×	
					ICEN 440	Design Lab			
					ICEN 450	Design_lab.(1.			
					ICENXXX	Elective			
					ICEN XXX	Elective			
					ICEN XXX	"Elective			
						Foreign Language, Gen Ed	FL		
						Arts/International Perspectives Gen Ed	AR/OW		
						Social Science, Gen Ed	SS		
			Total Credits:	67			Total Credits Transferred:		67
							Total Credits Needed for Graduation after Transfer:		59
							Total credits for degree		126